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

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No. NERPC/SE (O)/OCC/2014/***1696-1730*** Dated: August 22, 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. Managing Director, MSPDCL, Electricity Complex, Keishampat, Imphal – 795 001
8. Managing Director, MSPCL, Electricity Complex, Keishampat, Imphal – 795 001
9. CGM, (LDC), SLDC Complex, AEGCL, Kahilipara, Guwahati-781 019
10. Chief Engineer (WE Zone),Department of Power ,Govt. of Arunachal Pradesh, Itanagar- 791111
11. Chief Engineer (EE Zone),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
12. Chief Engineer (TP&MZ),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
13. Engineer-in-Chief (P&E), Department of Power, Govt. of Mizoram, Aizawl – 796 001
14. Chief Engineer (P), Department of Power, Govt. of Nagaland, Kohima – 797 001
15. General Manager, TSECL, Agartala – 799 001
16. Regional ED (East –II), NTPC, 3rd Floor, OLIC Bldg., Pl No- N.17/2, Nayapalli, Bhubaneswar-12
17. ED, NERTS, PGCIL, Dongtieh-Lower Nongrah, Lapalang, Shillong -793 006
18. ED (O&M), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
19. ED (Commercial), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
20. ED (O&M), NHPC, NHPC Office Complex, Sector-33, Faridabad,Haryana-121003
21. GM (Plant), OTPC, Badarghat Complex, Agartala, Tripura - 799014
22. GM, NERLDC, Dongtieh, Lower Nongrah, Lapalang, Shillong -793 006
23. Member Secretary, ERPC, 14 Golf Club Road, Tollygunge, Kolkata-700033
24. Chief Engineer, GM Division, Central Electricity Authority, New Delhi – 110066

Sub: Minutes of the 24th PCC Meeting - Reg.

Sir,

The Minutes of the 240th PCC Meeting of NERPC held on 12.08.2014 at "Hotel Grand Starline", 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,

बी. लिंगखोइ

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

Copy to:

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

वी. लिंगारेड्डु

निदेशक / **Director/ SE**

North Eastern Regional Power Committee

MINUTES OF THE 24th PROTECTION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 12/08/2014 (Tuesday)
Time : 14:30 hrs
Venue : "Hotel Grand Starline", Guwahati.

The List of Participants in the 24th PCC Meeting is attached at **Annexure – I**

Shri B. Lyngkhoi, SE (Operation), NERPC welcomed all the participants to the 24th PCC meeting. He stated that in view of the importance of protection system in the region especially after two major Grid Disturbances which occurred in the region on 19.03.2014 & 27.07.2014, the constituents have requested to have the full fledged PCC meeting separately from OCC meeting so that the issues can be discussed in thread bear so that such incidences can be avoided. He requested all the constituents to furnish the data viz. DR, ER etc., immediately to NERLDC/NERPC whenever such incidences occurred so that thorough analysis can be studied for fruitful outcome of the meeting. Further, he expressed concerned about the two major incidences occurred in a span of less than six months and hence thorough deliberation has to discussed in the meeting.

Thereafter, he requested Sri S.M. Jha, EE (O), NERPC to take up the agenda items for discussion.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 23rd MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

The minute of 23rd meeting of Protection Sub-committee held on 16th July, 2014 at Cherrapunjee was circulated vide letter No. NERPC/SE (O)/OCC/2014/0143-0176 dated 24th July, 2014.

The Sub-committee confirmed the minutes of 23rd PCCM of NERPC as no comments/observations were received from the constituents.

ITEMS FOR DISCUSSION

A.1 Sustained Oscillations in NER System on 5th July 2014 at 00:24 Hrs:

NERLDC informed that on 5th July, 2014 at 00:24:40.600 Hrs Palatana GTG-I and STG-1 tripped triggering operation of SPS-1 due to which 132 kV Silchar- Srikona I & II, 132 kV Silchar- Panchgram and 132 kV Badarpur- Panchgram tripped. There was around 65 MW load relief due to SPS-1 operation. Palatana was generating around 350 MW before tripping.

However, immediately after tripping sustained Low Frequency Oscillations was observed in NER System for around 2 minutes which ultimately damped and stabilized at around 00:26:50.720 Hrs.

It is a matter of serious concern and needs detailed analysis. It is requested to provide any major observations including DR/EL/FL etc. on this incident.

In the 99th OCC meeting, constituents are requested to provide data of DR/EL/FL and other major observation to NERLDC for analysis.

However, on 05.08.2014 at 11:14 Hrs, oscillations were observed again in NER System, which is very dangerous for grid security.

Deliberation in the meeting

The sub-committee is of the view that since PMUs are already installed in NER, the question of providing data to NERLDC is not required since the same can be obtained from these PMUs, hence NERLDC should explore from the facilities availed in the PMUs.

SE (O) stated that NERLDC may explore the same as suggested by the forum but requested all the constituents to furnish the data as required by NERLDC at the earliest. Constituents agreed.

The Committee noted as above.

A.2 Implementation of 3-phase Auto Reclosure Scheme in all lines connected to Khandong and Kopili HEP:

There are several instances of 3-Phase Successful Auto Reclosure of 132kV Badarpur-Khlieriat line of Powegrid. Now, in NER, the various 132kV lines connected to Kopili and Khandong HEP are passing through the areas having high isokeraunic level for which Single & Multi Phase Tripping on account of lightening occurs. Hence, for reliable operation of Power system it is required to implement 3-Phase Auto Reclosure Scheme in all the 132kV lines connected to Kopili and Khandong HEP of NEEPCO. The list of such lines are:

a) 132kV Khliehriat – Khandong # 1
b) 132kV Khliehriat – Khandong # 2
c) 132kV Haflong – Khandong
d) 132kV Kopili – Khandong # 1
e) 132kV Kopili – Khandong # 2

Deliberation in the meeting

NEEPCO initially expressed objection considering stress on their machine during 3-Phase reclosing on persisting fault in line. DGM, NERTS explained the function of 3-Phase Auto Reclosure Scheme and clarified NEEPCO that Khandong end will be selected as Check Synchronizing Mode in such case the question of 3-Phase reclosing of CB on persisting at Khandong end does not arise. The representatives of NEEPCO understood the scheme and appreciated the explanation on the matter.

After deliberation, SE(O), NERPC instructed to implement the scheme for above lines for better performance of NER Grid.

The Committee noted as above.

A.3 Implementation of 3-Phase Dead Line Charging of Radially fed 132kV Lines connected to Ranganadi HEP:

At present, the power flows to Nirjuli, Gohpur and Ziro radially from Ranganadi HEP and any transient fault in line causes undesirable outages. Hence, to avoid outages during transient fault it is essential to implement 3- Phase Dead Line charging of following 132kV Lines.

a) 132kV Ranganadi – Nirjuli Line (Dead Line Charging at RHEP)
b) 132kV Nirjuli – Gohpur Line (Dead Line Charging at Nirjuli)
c) 132kV Ranganadi – Ziro Line (Dead Line Charging at RHEP)

In the 99th OCC meeting, members agreed to the proposal of NERTS (for A.2 & A.3 above). NEEPCO representative informed that they will make a study on the issue and revert back in the next OCC.

Deliberation in the meeting

Representative from NEEPCO and AEGCL agreed to the proposal. The status may be reviewed in next PCC/ OCC meeting.

The Committee noted as above.

A.4 Implementation of islanding scheme in NER:

During the 94thOCC meeting, the committee had decided the following islanding scheme and associated frequency levels for creation of islands in NER:

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 Mokokchung – 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	At AGBPP [UFRs of line bays & Generator to be used]	**NEEPCO**

		of about 80-90 MW [i.e each module will contribute to reduction of about 40-45 MW (GT:30MW+ST:15MW)].		
		(h) Lines required to be opened for load shedding of 30MW (off-peak) and 50MW (peak) [if load > generation in the islanded pocket]		
		(i) 132kV Tinsukia – Ledo S/C line (at 48.7Hz instantaneous).	UFR [At Tinsukia]	**AEGCL**
		(j) 66kV Tinsukia – Rupai S/C line (at 48.6Hz instantaneous)		**AEGCL**
		(k) 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

The following officers were nominated for the meeting of the subgroup:

Assam: Sh. Gunajit Bhuyan, AGM (MRT) & Sh. Ashutosh Bhattacharji, Mgr
Meghalaya: Sh. F.E. Kharshiing, SE, SLDC & Sh. H. Shangpliang, EE (MRT)
PGCIL: Sh. P. Kanungo, DGM, Sh. M. Madhavan, Mgr & Sh. Supriya Paul, Er
NEEPCO: Sh. Tanya Taji, Sr. Mgr & Sh. Jaypal Roy, Mgr.
NERLDC: Sh. P.P. Bandapodhyay, DGM & Sh. A. Mullick, CM
NERPC: Sh. B. Lyngkhoi, SE(O) and Sh. S.M. Jha, EE(O)
OTPC: Sh. S. R. Das, Mgr (E)

In the meeting of Operation and Protection sub-group, it was brought to the notice that most of UFRs associated with two islanding schemes operated as expected and it was decided to reduce the time delay setting of UFR to 2 secs (in place of 5 sec). Assam had informed that there is some change in load connected with NTPS and subgroup had requested Assam to provide details of connected load. Assam & NEEPCO was also requested to intimate about the low frequency setting for tripping of Gas based Generators at NTPS (of Assam), at AGBPP & AGTPP (of NEEPCO) and to intimate frequency at which machines at NTPS, AGBPP & AGTPP tripped on 19-03-2014 so that the matter can be discussed further.

During the meeting the DGM, POWERGRID suggested to reduce the time delay setting of UFR to 500ms instead of 2 secs as proposed in last subgroup meeting. The subcommittee felt that following information should be collected before deciding about the final setting of UFRs.

During 98th OCC meeting, DGM, NERTS suggested to reduce time delay for the UFRs from 5secs to 500ms. DGM, NERLDC supported the same & also expressed urgent need for the review of the schemes by convening meeting of the committee at the earliest.

It was agreed in the 99th OCC meeting to modify the time delay setting of UFR to 500msec instead of 2 sec. The subcommittee agreed to implement the same for the time being.

Deliberation in the meeting

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. POWERGRID, NERTS has to implement the revised time setting of UFR from existing 5 Secs to 500 ms for the following lines:

a) 220 kV New Mariani (PG) – AGBPP, at New Mariani (PG)

DGM, NERTS informed that the UFR will be installed by mid-week of September 2014. Relay setting of the same will be delayed by 500 ms.

B. AEGCL has to implement the revised time setting of UFR from existing 5 Sec to 500 ms for the following lines:

b) 220 kV Mariani – Misa, at Mariani

c) 220 kV Mariani – Samaguri, at Samaguri

d) 132 kV Mokokchung – Mariani, at Mariani

On request of AEGCL, DGM, NERTS agreed to help for implementation of revised time setting of UFR from existing 5 Sec to 500 ms at Mariani by September 2014.

(e) 132 kV Dimapur (PG) – Bokajan, at Dimapur (PG)

DGM, NERTS informed that the UFR will be installed by mid-week of September 2014. Relay setting of the same will be delayed by 500 ms.

C. NEEPCO has to implement the revised time setting of UFR from existing 5 Sec to 500 ms for the following generation:

(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 will contribute to reduction of about 40-45 MW (GT:30MW+ST:15MW)]

The scheme is proposed to be implemented at AGBPP utilizing UFRs of line bays & Generator.

Sr. Mgr., NEEPCO stated that matter will be looked into and the status would be intimated in the next PCC meeting.

(h) Lines required to be opened for load shedding of 30MW (off-peak) and 50MW (peak) [if load > generation in the islanded pocket]

(i) 132kV Tinsukia – Ledo S/C line (at 48.7Hz instantaneous) at Tinsukia

(j) 66kV Tinsukia – Rupai S/C line (at 48.6Hz instantaneous) at Tinsukia

(k) 132kV Jorhat – Bokakhat line (at 48.5Hz instantaneous) at Jorhat/Bokakhat

The above settings are existing setting based on frequency discrimination. Representatives of AEGCL opined some delay in tripping based on time discrimination and proposed to include 200ms and 100ms delay for 132kV Tinsukia – Ledo S/C line and 66kV Tinsukia – Ledo S/C line respectively. DGM, NERTS stated that once the island is formed immediate load generation balancing is essential for survival of the island and so the additional delay will be detrimental as delay by frequency discrimination already exists. He further informed that NERLDC as system operator may study and suggest the setting for above three lines.

It was agreed that the time delay setting of islanding scheme at 48.80 Hz will be reduced to 500ms instead of 5 Sec. AEGCL was requested to furnish the relay setting and CB response time for NTPS. NEEPCO was also requested to furnish the same for AGBPP.

NERLDC may inform the forum about the settings to be adopted for above three lines in next PCC Meeting.

The Committee noted as above.

2. <u>ISLAND AT 48.50 Hz with 5 Sec delay</u> :

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)]

A. POWERGRID, NERTS has to implement the revised time setting of UFR from existing 5 Sec to 500 ms for the following lines:

(a) 132 kV Silchar – Dullavcherra, at Silchar
(b) 132 kV P.K. Bari – Kumarghat, at Kumarghat
(c) 132 kV AGTPP – Kumarghat, at Kumarghat

DGM, NERTS informed that the revised timing will be implemented by mid-week of September 2014.

B. OTPC has to implement the revised time setting of UFR from existing 5 Sec to 500 ms for the following lines:

(d) 132 kV Palatana – Udaipur, at Pallatana
(e) 132 kV Palatana – Surjamani Nagar, at Pallatana

OTPC agreed to revise the timing by mid-week of September 2014.

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.

Deliberation in the meeting

It was agreed that the time delay setting of islanding schemes at 48.50 Hz and 47.90 Hz will be reduced to 500ms instead of 5 Sec. It was agreed to form a study group after getting detail of relay setting from Pallatana.

Further, any subsequent study by the study group after getting detail of relay setting from Pallatana will be taken up in parallel. A suitable date of meeting will be fixed after obtaining the relevant issue / data pertaining to the above islanding schemes.

The Committee noted as above.

A.5 Testing of protective relays of downstream system of 132kV Khliehriat (Me.ECL) Sub Station:

All downstream faults of 132kV Khliehriat (Me.ECL) Sub Station gets reflected to 132kV Khliehriat (PG) Sub Station causing greater isolation of system. Hence, it is essential that Me.ECL should carry out testing of downstream Relays at 132kV Khliehriat (Me.ECL) Sub Station and based on the condition of relays further course of action may be decided. In case the relays are found defective POWERGRID will

revise the existing relay setting at 132kV Khliehriat (PG) Sub Station in such a way that expedite tripping of both 132kV Khliehriat – Khliehriat Line # 1 & 2 occurs during downstream fault to avoid undesirable isolation of Lines at upstream.

It was decided in the 99th OCC meeting that POWERGRID and Me.ECL will conduct a joint inspection and checking of relays on 25/07/2014 to identify the problems and suggest remedial action.

Deliberation in the meeting

Representatives from Me. PTCL informed the members that relays in some of the feeders have been tested and the settings are also checked. Detail reports may be submitted within one month after necessary correction/ rectification of setting. Me. PTCL agreed to pursue with concerned officer so that relay setting of 132kV Khliehriat - Khliehriat (PG) Line can be modified.

DGM, POWERGRID intimated the forum that refection of fault in downstream lines connected to 132kV Khliehriat (Me.ECL) Sub Station still persists to NER Grid through 132kV Khliehriat (Me.ECL) – Khliehriat (PG) Line 1 & 2 which causes multiple tripping of other healthy lines of NER Grid. DGM, POWERGRID further informed that the relay setting of 132kV Khliehriat (Me.ECL) – Khliehriat (PG) Line 1 & 2 will be minimized and inter-tripping of Line 1 & 2 will be made so that during any disturbance in Meghalaya downstream system immediate isolation of Meghalaya System from NER Grid at Khliehriat (PG) can be done to avoid undesirable tripping of upstream healthy lines in Grid. Such contingent arrangement will remain in place till the protection and switchgear of MeECL System is not made healthy.

Further, DGM, POWERGRID informed that the existing earthing system of 132kV Khliehriat (Me.ECL) Sub Station requires lots of improvement to meet the present practice / requirement of Earthing. He further informed that the power supply module of Distance Relay of POWERGRID installed at Me.ECL Station in 132kV Khliehriat – Khliehriat Line # 1 already burnt twice during lightening due to poor earthing. Thus, unless improvement of earthing is done the replacement / rectification of relay will not help. Meanwhile, a joint review of earthing of 132kV Khliehriat (Me.ECL) Sub Station has already been done by POWERGRID and Me.ECL and the report will be submitted to NERPC shortly.

The Committee noted as above.

A.6 Intermittent Tripping of the 132kV Haflong – Jiribam Line due to construction activity by APDCL:

The 132kV Haflong – Jiribam line has tripped in the following occasions due to poor electrical clearance with a 33kV Line being constructed by AEGCL.

Sl No.	Date of Tripping	Time of Tripping	Fault in the span	Village
1.	14.06.14	11:04	Loc.82- Loc.83	Reco Village
2.	15.06.14	09:22	Loc.82- Loc.83	--do--
3.	01.07.14	13:05	Loc.79- Loc.80	--do--

It is learnt that the 33 kV Haflong – Harangajao line is being diverted to facilitate construction of 4-Lane Highway. The diverted line crosses our 132 kV Haflong – Jiribam Line at more than one place. But APDCL has not informed POWERGRID about the proposed diversion of their line crossing the 132kV Line. Following the fault distance shown by relay, our patrolling party found conductors being strung beneath our 132 Line in a dangerous way causing faults.

APDCL may consult POWERGRID before hand to carry out such construction activities in the vicinity of POWERGRID's EHV Lines.

In the 99th OCC meeting, Assam representative assured that they will take up corrective measures and report to NERPC.

Deliberation in the meeting

It was agreed to refer the agenda item to OCC meeting in the presence of concerned officers.

The Committee noted as above.

B.1 Major Events in North-Eastern Regional Grid during the period July, 2014:

NERLDC informed that one major Grid Disturbances had occurred in NER on 25.07.2014. On 25.07.14 at 05:14:18.820 Hr, 400 kV Balipara – Ranganadi II line tripped (Balipara: Directional E/F with 1922 msec delay, DT receive & Ranganadi: Carrier receive, Overvoltage protection), at 05:14:15.920 Hr, 400 kV Balipara – Ranganadi I line tripped from Ranganadi end only (Balipara : Tie CB tripped, Main CB did not trip & Ranganadi: DP, Z1, R-E). The 400 kV Balipara – Ranganadi I line was Hand Tripped from Balipara later.

Due to tripping of above lines, power supply to Ziro & Itanagar areas of Arunachal Pradesh & Gohpur area of Assam disrupted.

At 05:14:24.800 Hr, 220 kV Samaguri – Balipara line tripped (Samaguri – DP, Z1, B-E & Balipara – No tripping), at 05:14:25.107 Hr, 400 kV Misa – Balipara II line tripped (Misa – Directional E/F with 1800 msec delay & Balipara – No tripping) & at 05:14:25.186 Hr 400 kV Misa – Balipara I line tripped (Misa – DT received & Balipara – Overvoltage protection).

Due to tripping of 400 kV Misa – Balipara D/C lines & 220 kV Samaguri – Balipara S/C line, Southern part of NER Grid (NER Grid except Ziro, Itanagar & Khupi areas of Arunachal Pradesh & Gohpur, Depota & Dhaligaon area of Assam) was connected with rest of NER Grid through narrow corridor 220 kV BTPS – Agia line.

After tripping of above elements, at 05:14:27.585 Hr, 220/132 kV, 2x50 MVA ICT at Balipara tripped, which led to disruption of power supply in Depota area of Assam & Khupi area of Arunachal Pradesh.

At around 05:21 Hr, 220 kV Azara – Sarusajai D/C lines & 220 kV Azara – Boko and 220 kV Boko – Sarusajai S/C tripped. Due to tripping of these elements, Southern part of NER Grid separated from rest of NER Grid. Frequency of the Southern part of NER Grid shot upto 51.15 Hz (as per PMU).

At 05:34:10.880 Hr, Southern part of NER Grid collapsed due to load generation mismatch.

The following issues related to above grid disturbance are to be discussed:

Whether any UFR operated? – If operated, Quantum of load relief etc.
Why Island No 1 & Island No 2 were not formed?.
Root cause of disturbance.
Submission of Disturbance Recorder & Event Logger output
Submission of Relay Flag
Response of RGMO
Load Loss: 1384 MW & Generation Loss: 1564 MW

Deliberation in the meeting

1) Whether any UFR operated? – If operated, Quantum of load relief etc.

Representative from Mizoram reported that UFR operated on 25.07.2014 and 2.83 MW load was relieved. No record of UFR operation is available with other SLDCs. All concerned constituents were requested to confirm UFR operation from the sub-stations and check the relay setting of UFRs installed.

2) Why Island No 1 & Island No 2 was not formed?

Time delay for the above 2 islanding schemes is 5secs which is agreed to be reduced to 500ms. Duration of frequency below the minimum frequency of the islanding schemes was not available. NERLDC was requested to retrieve the required information from PMUs installed in NER and the same may be reviewed by the system study group.

3) Root cause of disturbance.

The root cause of the disturbance was that the Circuit Breaker at Balipara S/s failed to clear the fault in 400kV Balipara-Ranganadi Line - II.

4) Submission of Disturbance Recorder & Event Logger output
5) Submission of Relay Flag

All members were requested to submit Disturbance Recorder output, Event Logger output and relay flag for further studies by the system study group.

6) Response of RGMO

NEEPCO and NHPC were requested to ensure the proper functioning of RGMO. The same may be reviewed in next PCC/ OCC meeting.

It was agreed that necessary steps may be taken at all level to prevent such incidence in future. The incidence may be studied thoroughly by the system study group before putting up to higher authorities.

The Committee noted as above.

B.2 Root cause analysis of tripping of ISTS elements due to problem in downstream system:

It has been observed that in many instances the tripping of ISTS elements are attributed due to problems in downstream system of state . Due to tripping of these ISTS elements, reliability of the system is reduced. Root cause of tripping of the elements within the state are required to be analyzed and the concerned state also may confirm the same as tripping is now related to availability of the ISTS elements. The tripping beyond 1 hop should also be critically analyzed for the same reason.

Some of the grid incidences occurred during the month of July, 2014 is given below. The Sub-committee may kindly discuss and give suggestions to avoid repetition again.

B.2.A. Palatana Module I Tripping (3 Nos.):

At 0024 Hrs on 05.07.14, Palatana GTG- I tripped. Due to tripping of GTG-I, STG-I also tripped. There was a generation loss of 338 MW.

Representative from Palatana informed that the tripping was due to failure of Lightning Arrestor which has been rectified.

At 1323 Hrs on 05.07.14, Palatana GTG- I tripped. Due to tripping of GTG-I, STG-I also tripped. There was a generation loss of 202 MW.

Representative from Palatana informed that the tripping was due to problem in fuel control valve which has been rectified.

At 1726 Hrs on 05.07.14, Palatana GTG- I tripped. Due to tripping of GTG-I, STG-I also tripped. There was a generation loss of 196 MW.

Representative from Palatana informed that the tripping was due to problem in fuel control valve which has been rectified.

B.2.B. Disturbance in Manipur System (7 Nos.):

At 0821 Hrs on 05.07.14, 132 kV Imphal(PG) – Imphal I and II lines tripped. Due to tripping of these elements, power supply to Imphal area of Manipur was interrupted. Load Loss: 63 MW

At 1725 Hrs on 06.07.14, 132 kV Imphal(PG) – Ningthoukong S/C and 132 kV Loktak – Ningthoukong S/C lines tripped. Due to tripping of these elements, power supply to Ningthoukong area of Manipur was interrupted. Load Loss: 20 MW

At 0128 Hrs on 17.07.14, 132 kV Imphal(PG) – Ningthoukong S/C and 132 kV Loktak – Ningthoukong S/C lines tripped. Due to tripping of these elements, power supply to Ningthoukong area of Manipur was interrupted. Also, there was generation loss at Loktak due to backing down in order to control line loadings. Load Loss: 10 MW Generation Loss: 45 MW (Loktak)

At 1232 Hrs on 18.07.14, 132 kV Imphal(PG) – Imphal I and II lines tripped. Due to tripping of these elements, power supply to Imphal area of Manipur was interrupted. Load Loss: 63 MW

At 0445 Hrs on 22.07.14, 132 kV Imphal(PG) – Imphal I and II lines tripped. Due to tripping of these elements, power supply to Imphal area of Manipur was interrupted. Load Loss: 35 MW

At 1731 Hrs on 26.07.14, 132 kV Loktak – Imphal S/C and 132 kV Loktak – Ningthoukong S/C lines tripped. Due to tripping of these elements, power supply to part of Manipur was interrupted. Load Loss: 71 MW

At 1420 Hrs on 02.08.14, 132 kV Imphal(PG) – Imphal I & II lines tripped and 132 kV Loktak – Ningthoukong. Due to tripping of these elements, power supply to major part of Manipur system was affected. Further, there was generation loss due to backing down of Loktak HEP to maintain safe line loadings. Load Loss: 70 MW Generation Loss: 35 MW (Loktak)

Deliberation in the meeting

Representative from Manipur informed that the above tripping were due to problem in faults nearby Rengpang sub-station which is very remote and without proper communication or security. Maintenance of the lines is very difficult. Manipur was requested to look into the issue and take necessary steps possible to prevent such frequent tripping.

The Committee noted as above.

B.2.C. Disturbance in Meghalaya System (2 Nos.):

At 2302 Hrs on 24.07.14, 132 kV Leshka – Khleihriat I and II tripped, resulting in tripping of all 3 running units of Leshka HEP. Generation Loss: 126 MW (Leshka)

Representatives from Me. PTCL informed that the above tripping is due to heavy lightning.

At 0359 Hrs on 29.07.14, there was multiple tripping of lines from 132 kV Khliehriat substation of Me. PTCL, in which 132 kV Khliehriat(PG) – Khliehriat I & II tripped along with 132 kV Leshka – Khliehriat I and II, resulting in tripping of all 3 running units of Leshka HEP and load loss in Khliehriat area of Meghalaya. Load Loss: 55 MW Generation Loss: 105 MW (Leshka)

Representatives from Me. PTCL agreed to look into the reason of tripping for necessary action to be taken.

B.2.D. Disturbance in Assam System (4 Nos.):

At 10:00 Hrs on 04.07.14, 220 kV Sarusajai – Samaguri II, 220 kV Samaguri – Jawaharnagar, 220 kV Jawaharnagar – Sarusajai, 220 kV Agia – Azara S/C and 220 kV Azara – Sarusajai I & II resulted in load loss in capital area of Assam.
Load Loss: 210 MW

At 11:44 Hrs on 04.07.14, 220 kV Sarusajai – Samaguri II tripped, while other connecting lines were out of service, leading to load loss in Capital area of Assam. Load Loss: 245 MW

At 12:10 Hrs on 04.07.14, 220 kV Sarusajai – Samaguri II tripped, while other connecting lines were out of service, leading to load loss in Capital area of Assam. Load Loss: 200 MW

At 20:15 Hrs on 08.07.14, 132 kV Sarusajai – Kahelipara II, III & IV tripped while 132 kV Sarusajai – Kahelipara I was out of service, leading to loss of load in capital area of Assam. Load Loss: 62 MW

Representatives from AEGCL informed that the above tripping are due to snapping of bus conductor at Kahilipara. Strengthening work is in progress and the tripping is expected to be reduced.

B.2.E. Disturbance in Tripura System (2 Nos.):

At 2057 Hrs on 20.07.14, 132 kV AGTPP – Agartala I & II lines tripped. Due to tripping of these lines, there was generation loss at AGTPP due to backing down. Generation Loss: 36 MW

At 0117 Hrs on 27.07.14, 132 kV AGTPP – Agartala II line and 132 kV Agartala – Kumarghat S/C lines tripped. At the same time, there were trippings in Tripura system of 132 kV Agartala – Rokhia I & II and 132 kV Agartala – Dhalabil lines. Due to these trippings, AGTPP U # 1 and 4 also tripped. These resulted in load loss in part of Tripura system and generation loss at AGTPP. Load Loss: 25 MW Generation Loss: 36 MW

Representatives from TSECL agreed to look into the reason of tripping for necessary action to be taken.

B.2.F. Reliability Issues in NER (7 Nos.):

a) **At 1245 Hrs on 07.07.14**, 220 kV Balipara – Samaguri S/C tripped.
b) **At 1450 Hrs on 10.07.14**, 220 kV Agia – Azara S/C tripped.
c) **At 1450 Hrs on 10.07.14**, 400 kV Silchar – Azara S/C tripped.
d) **At 1955 Hrs on 10.07.14**, 400 kV Binaguri – Bongaigaon I tripped.
e) **At 0942 Hrs on 17.07.14**, 400 kV Balipara – Misa I tripped.
f) **At 1240 Hrs on 17.07.14**, 220 kV Samaguri – Jawaharnagar S/C tripped.
g) **At 1304 Hrs on 31.07.14**, 220 kV Azara – Sarusajai I tripped.

Due to tripping of the above mentioned lines, reliability of NER Grid reduced and NER Grid was operated in vulnerable condition.

It was agreed that the above tripping may be studied in detail after getting required information like duration of tripping, relay flag, etc..

G. 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. 01st July, 2014 to 3rd August, 2014 enclosed at **Annexure – G**. Event information on weekly basis are being sent to the power utilities of NER by e-mail. Constituents are requested to furnish details of tripping reported in the letters.

Deliberation of the Committee

The Sub-committee requested all the utilities to ensure avoidance of mal-operation protection systems in the interest of grid security.

Date and Venue of next PCC

It is proposed to hold the 25th PCC meeting of NERPC on second week of September, 2014. The exact venue will be intimated in due course.

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Annexure-I

List of Participants in the 24th PCC Meetings held on 12/08/2014

SN	Name & Designation	Organization	Contact No.
1.	Sh. Nangkong Perme, EE (E)	Ar. Pradesh	9436288643
2.	Sh. G.K.Bhuyan, AGM	AEGCL	9854015601
3.	Sh. A. Bhattacharjee, Dy. Mgr	AEGCL	9435332928
	Not represented	**Manipur**	
4.	Sh. B. Narry, AEE	Me. PTCL	9089000911
5.	Sh. P.S. Nonglong, AE	Me. PTCL	9774247457
6.	Sh. David Ramnunsanga, Sr. EE	Mizoram	9436155836
	Not represented	**Nagaland**	
7.	Sh. Uddhayan Debbarma, DGM	TSECL	9436462842
8.	Sh. Debabrata Pal, Sr. Mgr	TSECL	9436500244
9.	Sh. Amaresh Mallick, DGM	NERLDC	9436302720
10.	Sh. C.P.Saikia, Sr. Mgr (E/M)	NEEPCO	9435577598
11.	Sh. D.Goswami, Sr. Mgr (E/M)	NEEPCO	9435577655
	Not represented	**NTPC**	
12.	Sh. Niraj Kr. Choudhary, Dy. Mgr (E)	NHPC	9436894890
13.	Sh. Pranav Kumar, Engineer (E)	NHPC	9436894887
14.	Sh. P.Kanungo, DGM (OS)	NERTS	9436302823
15.	Sh. T.Karmakar, AM (Electrical)	OTPC	9435239314
16.	Sh. B. Lyngkhoi, S.E (O)	NERPC	9436163419
17.	Sh. Lalrinsanga, A.S	NERPC	9436161886
18.	Sh. S. M. Jha, E.E (O)	NERPC	8731845175

Annexure - G

Events in NER Grid from 01.07.14 to 03.08.14

Sl. No.	Name of Transmission Element/Generator Tripped	Owner / Utility	Date of Event	Time of Event	Effect (Loss of Generation/ Load in MW)	Category as per Standards
A. Multiple / Repeated tripping						
1	220 kV Sarusajai- Samaguri II	AEGCL	04.07.14	1000	Load Loss: 210 MW	GD-II
	220 kV Sarusajai- Jawaharnagar					
	220 kV Jawaharnagar- Samaguri					
	220 kV Agia - Azara S/C					
	220 kV Azara - Sarusajai I					
	220 kV Azara - Sarusajai II					
2	220 kV Sarusajai- Samaguri II	AEGCL	04.07.14	1144	Load Loss: 245 MW	GD-II
	(Lines as per Sl.No.1 above except this			1210	Load Loss: 200 MW	GD-II
3	132 kV Imphal(PG) - Imphal(S) -I	POWERGRID	05.07.14	0821	Load Loss: 63 (Manipur)	GD-I
	132 kV Imphal(PG) - Imphal(S) -II	POWERGRID/ MSPCL				
4	132 kV Dimpaur(PG)- Bokajan	AEGCL	05.07.14	1030	Load Loss : 8 (Nagaland)	GD-I
	132 kV Dimapur(PG)- Kohima	Nagaland				
5	132 kV Imphal(PG)- Ningthoukong	MSPCL (Manipur)	06.07.14	1725	Load Loss: 20	GD-I
	132 kV Loktak- Ningthoukong					
6	132 kV Sarusajai- Kahelipara II	AEGCL	08.07.14	2015	Load Loss: 62	GD-I
	132 kV Sarusajai- Kahelipara III					
	132 kV Sarusajia- Kahelipara IV					
7	132 kV Aizawl- Jiribam	POWERGRID	12.07.14	1619	Load Loss: 59 (Mizoram)	GD-I
	132 kV Aizawl- Kumarghat					
	132 kV Aizawl- Kolasib					
	132 kV Aizawl- Luangmol	Mizoram				

Sl. No.	Name of Transmission Element/Generator Tripped	Owner / Utility	Date of Event	Time of Event	Effect (Loss of Generation/ Load in MW)	Category as per Standards
	132 kV Aizawl-Zemabawk	POWERGRID				
8	132 kV Loktak- Ningthoukong	MSPCl	17.07.14	0128	Generation Loss: 45 (Loktak backdown)	GI-I
	132 kV Imphal- Ningthoukong	MSPCL/ POWERGRID				
9	132 kV Imphal (PG)- Imphal I	POWERGRID	18.07.14	1232	Load Loss: 63	GD-I
	132 kV Imphal (PG)- Imphal II	POWERGRID/ MSPCL				
10	132 kV PK Bari- Dharmanagar	TSECL	20.07.14	1230	-	-
	132 kV PK Bari- Kumarghat	TSECL				
11	132 Kv AGTPP- Agartala I	POWERGRID	20.07.14	2057	Generation Loss: 36	GI-I
	132 Kv AGTPP- Agartala II					
12	132 Imphal (PG) - Imphal I	POWERGRID	22.07.14	0445	Load Loss: 35	GD-I
	132 kV Imphal (PG) - Imphal II	POWERGRID/ MSPCL				
	132 kV Imphal (PG) - Imphal II	POWERGRID/ MSPCL	22.07.14	0514	-	
13	132 kV Imphal (PG)- Imphal I	POWERGRID	22.07.14	1413	Load Loss: 95	GD-I
	132 kV Imphal (PG)- Imphal II	POWERGRID/ MSPCL				
14	132 kV Leshka - Khleihriat I	MePTCL	24.07.14	2302	Generation Loss : 126 (Leshka HPP)	GD-I
	132 kV Leshka - Khleihriat II	MePTCL				
	Leshka U # 1	MePGCL				
	Leshka U # 1I	MePGCL				
	Leshka U # III	MePGCL				
15	132 kV Loktak - Imphal S/C	POWERGRID	26.07.14	1731	Load Loss : 71 (Manipur)	GD-I
	132 kV Loktak - Ningthoukong S/C	MSPCL				
16	132 kV AGTPP - Agartala II	POWERGRID	27.07.14	0117	Load Loss : 25, Generation Loss : 38 (AGTPP)	GD-I
	132 kV AGTPP - Kumarghat S/C					
	132 kV Agartala - Rokhia I	TSECL				
	132 kV Agartala - Rokhia II	TSECL				

Sl. No.	Name of Transmission Element/Generator Tripped	Owner / Utility	Date of Event	Time of Event	Effect (Loss of Generation/ Load in MW)	Category as per Standards
	132 kV Agartala - Dhalabil	TSECL			(AGTPP)	
	AGTPP U - 1	NEEPCO				
	AGTPP U - 4	NEEPCO				
17	132 kV Badarpur - Panchgram S/C	AEGCL	27.07.14	0200	Load Loss : 30 (Assam)	GD-I
	132 kV Silchar - Panchgram S/C	AEGCL				
	132 kV Srikona - Panchgram S/C	AEGCL				
18	132kV AGTPP - Kumarghat S/C	POWERGRID	28.07.14	0151	-	-
	132kV AGTPP - Kumarghat S/C			0837	-	-
	AGTPP U # 4	NEEPCO		0837	Generation Loss : 17	
19	132 kV Khleihriat (PG) - Khlehriat I	POWERGRID	29.07.14	0359	Load Loss : 55; Generation Loss : 155 (Leshka - 105, Khandong - 25 and Kopili II - 25)	GD-I
	132 kV Khleihriat (PG) - Khlehriat II	MePTCL				
	132 kV Khandong - Khliehriat(PG) I	POWERGRID				
	132 kV Khandong - Khliehriat(PG) II	POWERGRID				
	132 kV Leshka - Khleihriat I	MePTCL				
	132 kV Leshka - Khleihriat II	MePTCL				
	Khandong U # 1	NEEPCO				
	Kopili St-II	NEEPCO				
	Leshka U # 1	MePGCL				
	Leshka U # 1I	MePGCL				
	Leshka U # III	MePGCL				
20	220 kV Misa - Samaguri I	POWERGRID	30.07.14	0314	-	-
	220 kV Misa - Samaguri II	POWERGRID				
21	132 kV Aizawl - Kumarghat S/C	POWERGRID	01.08.14	1451	-	-
				1550		
22	132 kV Dimapur(PG) - Kohima S/C	Nagaland	02.08.14	1054	Load Loss : 7 (Kohima area)	GD-I

Sl. No.	Name of Transmission Element/Generator Tripped	Owner / Utility	Date of Event	Time of Event	Effect (Loss of Generation/ Load in MW)	Category as per Standards
22	132 kV Dimapur(PG) - Imphal(PG) S/C	POWERGRID	02.08.14	1654	-	-
23	132 kV Imphal(PG) - Imphal I	POWERGRID	02.08.14	1420	Load Loss : 70, Generation Loss : 35 (Loktak generation backed down to control line loadings)	GD-I
	132 kV Imphal(PG) - Imphal II	POWERGRID/MSPCL				
	132 kV Loktak - Ningthoukong S/C	MSPCL				
24	132 kV Khandong - Kopili I	POWERGRID	03.08.14	1541	-	-
	132 kV Khandong - Haflong S/C	POWERGRID				
H. Tripping of critical element						
1	132 kV Dimapur(PG) - Dimapur II	Nagaland	03.06.14	0933	Load Loss - 28	GD-I
2	132 kV Ranganadi- Ziro	POWERGRID	04.07.14	0953	Load Loss- 12	GD-I
3	132 kV Nirjuli - Gohpur	POWERGRID	05.07.14	1537	Load Loss- 22	GD-I
4	400 kV RHEP- Balipara II	POWERGRID	07.07.14	1153	-	-
5	220 kV Balipara- Samaguri	POWERGRID	07.07.14	1245	-	-
6	220 kV Agia- Azara	AEGCL	10.07.14	1450	-	-
7	400 kV Silchar- Azara	NETC	10.07.14	1450	-	-
8	400 kV Balipara- Misa I	POWERGRID	17.07.14	0942	-	-
9	132 kV Dimapur- Kohima	Nagaland	17.07.14	1214	Load Loss: 8 (Kohima Area)	GD-I
10	220 Kv Samaguri- Jawaharnagar	AEGCL	17.07.14	1240	-	-
11	132 kV Dimapur- Kohima	Nagaland	18.07.14	0858	Load Loss: 8 (Kohima Area)	GD-I
12	132 kV Badarpur- Khliehriat	POWERGRID	20.07.14	1308	-	-
13	132 kV Dimapur- Kohima	Nagaland	24.07.14	1430	Load Loss : 10 (Kohima area)	GD-I
14	220 kV Azara - Sarusajai I	AEGCL	31.07.14	1304	-	-
15	132 kV Dimapur(PG)- Kohima	Nagaland	31.07.14	1634	Load Loss : 10 (Kohima area)	GD-I
I. Unit tripping						
1	Kopili Stg-II	NEEPCO	03.07.14	0848	Generation loss: 25	GI-I
2	Khadong U-1		04.07.14	1352	Generation loss: 25	GI-I
3	Palatana GTG-I	OTPC	05.07.14	0024	Generation loss: 338	GI-II
4	Palatana STG-I					
5	Palatana GTG-I		05.07.14	1323	Generation loss: 202	GI-II
6	Palatana STG-I					
7	Palatana GTG-I		05.07.14	1726	Generation loss: 196	GI-II

Sl. No.	Name of Transmission Element/Generator Tripped	Owner / Utility	Date of Event	Time of Event	Effect (Loss of Generation/ Load in MW)	Category as per Standards
8	Palatana STG-I		05.07.14	1726	Generation loss: 196	GI-II
9	Palatana STG-I	OTPC	10.07.14	0020	Generation loss: 123	GI-II
10	AGBPP U-4	NEEPCO	10.07.14	1340	Generation loss: 28	GI-II
11	Leshka U-1	MeECL	10.07.14	1723	Generation loss: 126	GI-I
12	Leshka U-2					
13	Leshka U-3					
14	Leshka U-1	MeECL	10.07.14	1757	Generation loss: 126	GI-I
15	Leshka U-2					
16	Leshka U-3					
17	Kopili Stg-II	NEEPCO	11.07.14	1802	Generation loss: 25	GI-I
18	Khadong U-1		11.07.14	1825	Generation loss: 25	GI-I
19	Kopili Stg-II		12.07.14	1558	Generation loss: 25	GI-I
20	AGBPP U-2	NEEPCO	16.07.14	0640	Generation loss: 110	GI-II
21	AGBPP U-3					
22	AGBPP U-4					
23	AGBPP U-5					
24	AGBPP U-8					
25	AGBPP U-9					
26	Loktak U-2	NHPC	15.07.14	1154	Generation loss: 69	GI-I
27	Loktak U-3					
28	Khandong U-1	NEEPCO	20.07.14	1316	Generation loss: 50	GI-I
29	Kopilli Stg-II					
30	AGBPP U # 1	NEEPCO	22.07.14	1103	Generation Loss : 27	GI-II
31	Kopilli Stg-II	NEEPCO	24.07.14	2028	Generation Loss : 24	GI-I
32	Khandong U-1	NEEPCO	24.07.14	2028	Generation Loss : 24	GI-I
33	Kopili U-4	NEEPCO	26.07.14	0845	Generation Loss : 24	GI-I
34	AGBPP U-8	NEEPCO	27.07.14	2235	Generation Loss : 10	GI-II
35	AGBPP U # 9	NEEPCO	29.07.14	0801	Generation Loss : 7	GI-II
36	AGBPP U # 4	NEEPCO	29.07.14	0949	Generation Loss : 29	GI-II
37	Kopili U # 2	NEEPCO	30.07.14	0023	Generation Loss : 51	GI-I
38	AGTPP U # 4	NEEPCO	30.07.14	1126	Generation Loss : 18	GI-I
39	AGBPP U # 4	NEEPCO	31.07.14	1658	Generation Loss : 28	GI-II
40	Khandong U # 1	NEEPCO	01.08.14	1304	Generation Loss : 21	GI-I
41	Loktak U # 2	NHPC	02.08.14	0505	Generation Loss : 34	GI-I
42	Kopili St-II	NEEPCO	03.08.14	0428	Generation Loss : 25	GI-I
43	Doyang U # 1	NEEPCO	03.08.14	2228	Generation Loss : 19	GI-I
44	Doyang U # 2	NEEPCO	03.08.14	2228	Generation Loss : 19	GI-I

J. System Isolation / Grid Disturbance

Sl. No.	Name of Transmission Element/Generator Tripped	Owner / Utility	Date of Event	Time of Event	Effect (Loss of Generation/ Load in MW)	Category as per Standards
1	**400 kV Balipara - Ranganadi II**	**POWERGRID**	**25.07.14**	**0514**	**Load Loss : 1564 ; Generation Loss: 1384**	**GD-V**
	220 kV Balipara - Samaguri S/C	**POWERGRID / AEGCL**		**0514**		
	400 kV Balipara - Misa II	**POWERGRID**		**0514**		
	400 kV Balipara - Misa I			**0514**		
	400/220 kV, 315 MVA ICT at Bongaigaon			**0516**		
	400 kV Balipara - Ranganadi I			**0514**		
	Ranganadi U # II	**NEEPCO**		**0514**		
	Ranganadi U # III			**0514**		
	220 kV Misa - Samaguri I	**POWERGRID**		**0521**		
	220 kV Misa - Samaguri II			**0534**		
	220 kV Azara - Agia S/C	**AEGCL**		**0521**		
	220 kV Azara - Boko S/C			**0521**		
	400 kV Silchar - Byrnihat S/C	**NETC**		**0534**		
	Palatana GTG - I	**OTPC**		**0534**		
	Palatana STG - I			**0534**		
	220 kV BTPS - Agia S/C	**AEGCL**		**0534**		
K. Tripping of Inter-Regional Lines						
1	400 kV Binaguri- Bongaigaon I	POWERGRID	10.07.14	1955	-	-