

# North Eastern Regional Power Committee

## Agenda For

### 24<sup>th</sup> PCC Sub-Committee Meeting

Time of meeting : 14:00 Hrs.

Date of meeting : 12<sup>th</sup> August, 2014 (Tuesday)

Venue : "Hotel Grand Starline", Guwahati.

#### A. CONFIRMATION OF MINUTES

##### CONFIRMATION OF MINUTES OF 23<sup>rd</sup> MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

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

*No observations or comments were received from the constituents. The Sub-committee may confirm minutes of 23<sup>rd</sup> PCCM of NERPC.*

#### ITEMS FOR DISCUSSION

##### **A.1 Sustained Oscillations in NER System on 5<sup>th</sup> July, 2014 at 0024 Hrs:**

NERLDC informed that on 5<sup>th</sup> 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.

***NERLDC may intimate the latest status and committee may like to discuss.***

**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

**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.

***NEEPCO may intimate the latest status and committee may like to discuss.***

**A.4 Implementation of islanding scheme in NER**

During the 94<sup>th</sup>OCC meeting, the committee had decided the following islanding scheme and associated frequencies levels for creation of islands in NER:

SN	Islanding Scheme	Lines required to be opened	UFR Location	Implementing Agency
1	<p><b>ISLAND AT 48.80 Hz with 5 Sec delay:</b> Island comprising of generating units of AGBPP (Gas), NTPS (Gas) &amp; LTPS (Gas) and loads of Upper Assam system &amp; Deomali area (Ar. Pradesh) <b>[Total Generation: 380-400MW and load: 200MW (off peak)-300MW (peak)]</b></p>	(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) <b>Generators to be desynchronized for reduction of generation [if Generation &gt; Load in the islanded pocket]</b>		
		(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)].	At AGBPP [UFRs of line bays & Generator to be used]	NEEPCO
		(h) <b>Lines required to be opened for load shedding of 30MW (off-peak) and 50MW (peak) [if load &gt; generation in the islanded pocket]</b>		
		(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 Jorhat / Bokakhat]	AEGCL		

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2	<b>ISLAND AT 48.50 Hz with 5 Sec delay</b>	132 kV Palatana – Udaipur	UFR-1 [At Palatana]	OTPC
	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) <b>[Total Generation: 150-160MW and load: 110MW (off-peak) &amp; 170-180MW (peak)]</b>	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	<b>ISLAND AT 47.90 Hz:</b> 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. Lyngkhai, 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 98<sup>th</sup> 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 99<sup>th</sup> 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.

***NEEPCO and Assam are requested to provide the required information and sub-committee may like to discuss further on the islanding scheme.***

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

All downstream faults of 132kV Khliehriat (MeECL) Sub Station gets reflected to 132kV Khliehriat (PG) Sub Station causing greater isolation of system. Hence, it is essential that MeECL should carry out testing of downstream Relays at 132kV Khliehriat (MeECL) 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 99<sup>th</sup> OCC meeting that POWERGRID and MeECL will conduct a joint inspection and checking of relays on 25/07/2014 to identify the problems and suggest remedial action.

***POWERGRID and Me.ECL may intimate the latest status.***

**A.7 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 apdcl.

<u>Sl No.</u>	<u>Date of Tripping</u>	<u>Time of Tripping</u>	<u>Fault in the span</u>	<u>Village</u>
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 99<sup>th</sup> OCC meeting, Assam representative assured that they will take up corrective measures and report to NERPC.

***APDCL/ AEGCL may intimate the latest status.***

### **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**

**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.

***Committee may like to discuss.***

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.

**A. Pallatana 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**.

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**.

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**.

**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)**

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

**At 2302 Hrs on 24.07.14**, 132 kV Leshka – Khliehriat I and II tripped, resulting in tripping of all 3 running units of Leshka HEP.

**Generation Loss: 126 MW (Leshka)**

**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)**

**D. Disturbance in Assam System (4 Nos.):**

**At 1000 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 1144 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 1210 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 2015 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**

**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**

**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.

**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. 01<sup>st</sup> July, 2014 to 3<sup>rd</sup> August, 2014** enclosed at **Annexure - G** (Letters for **Furnishing 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.

**Any other item:**

**Date and Venue of next OCC**

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

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Events in NER Grid from 01.07.14 to 03.08.14						Annexure - G
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
<b>A. Multiple / Repeated tripping</b>						
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 Agja - Azara S/C					
	220 kV Azara - Sarusajai I					
	220 kV Azara - Sarusajai II					
2	220 kV Sarusajai- Samaguri II <i>(Lines as per SL.No.1 above except this)</i>	AEGCL	04.07.14	1144	Load Loss: 245 MW	GD-II
				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 Sarusajai- 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	Mizoram				
	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				

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
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 # II	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				
	132 kV Agartala - Dhalabil	TSECL				
	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	
	132 kV Khleihriat (PG) - Khleihriat I	POWERGRID				
	132 kV Khleihriat (PG) - Khleihriat II	MePTCL				

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
19	132 kV Khandong - Khliehriat(PG) I	POWERGRID	29.07.14	0359	Load Loss : 55; Generation Loss : 155 (Leshka - 105, Khandong - 25 and Kopili II - 25)	GD-I
	132 kV Khandong - Khliehriat(PG) II	POWERGRID				
	132 kV Leshka - Khliehriat I	MePTCL				
	132 kV Leshka - Khliehriat II	MePTCL				
	Khandong U # 1	NEEPCO				
	Kopili St-II	NEEPCO				
	Leshka U # 1	MePGCL				
	Leshka U # II	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
	132 kV Dimapur(PG) - Imphal(PG) S/C	POWERGRID			-	-
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/MS PCL				
	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

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	
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	
<b>I. Unit tripping</b>							
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			1323	Generation loss: 202	GI-II	
5	Palatana GTG-I		05.07.14	1726	Generation loss: 196	GI-II	
6	Palatana STG-I			10.07.14	0020	Generation loss: 123	GI-II
7	Palatana GTG-I			10.07.14	1340	Generation loss: 28	GI-II
8	Palatana STG-I	OTPC					
9	Palatana STG-I	NEEPCO					
10	AGBPP U-4	NEEPCO					
11	Leshka U-1	MeECL	10.07.14	1723	Generation loss: 126	GI-I	
12	Leshka U-2						
13	Leshka U-3	MeECL	10.07.14	1757	Generation loss: 126	GI-I	
14	Leshka U-1						
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	NHPC	15.07.14	1154	Generation loss: 69	GI-I	
26	Loktak U-2						
27	Loktak U-3	NEEPCO	20.07.14	1316	Generation loss: 50	GI-I	
28	Khandong U-1						
29	Kopilli Stg-II	NEEPCO	22.07.14	1103	Generation Loss : 27	GI-II	
30	AGBPP U # 1						
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	AGTTP 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	

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
44	Doyang U # 2	NEEPCO	03.08.14	2228	Generation Loss : 19	GI-I
<b>J. System Isolation / Grid Disturbance</b>						
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				
<b>K. Tripping of Inter-Regional Lines</b>						
1	400 kV Binaguri- Bongaigaon I	POWERGRID	10.07.14	1955	-	-