¼ãäÀ¡ã ÔãÀ±ãšãÀ Government of India
ãÌã²ã¦ã ½ã¨äãÊã¾ã Ministry of Power
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North Eastern Regional Power Committee
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Meghalaya State Housing Finance Co-Operative Society Ltd. Building
¶ãäãØã¼ã ãÖÊÔã, ã Ìã£Êãäì – 793003
Nongrim Hills, Shillong – 793003.

ISO 9001:2008

Ph. No: 0364 - 2520034
Fax No: 0364 - 2520030

No. NERPC/SE(O)/PCC/2013/ 4050-79 Date: 16th July, 2013

To,

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

Sub: Minutes of the 11th PCC Meeting held on 10th July, 2013 at Guwahati.

The Minutes of the 11th PCC Meeting of NERPC held on 10.07.2013 at "Hotel Grand Starline", Guwahati is enclosed for favour of kind information and necessary action please**.**

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

Encl: As above

¼ãÌãªã¾ã / Yours faithfully,

(ºãã. ãÊãŒãäƒ /B. Lyngkhoi)
,ã£ãäàà¥ã ,ãã¾ã¾ã¦ãã / Superintending Engineer (O)

Copy to:

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

North Eastern Regional Power Committee

MINUTES OF THE 11th PROTECTION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date: 10.07.2013 (Wednesday)

Time: 10:00 hrs

Venue: "Hotel Grand Starline," Guwahati.

The List of Participants in the 11th PCC Meeting is attached at **Annexure – I**

Shri S. K. Ray Mohapatra, Member Secretary I/C, NERPC welcomed all the participants to the 11th PCC meeting. He informed the house that the next TCC/RPC meeting will be held in the month of August, 2013 after the gap of about one year. Further, he expressed concern about the frequent trippings in Meghalaya & Manipur system including generating station at Loktak of NHPC. More than 50 undesirable trippings have occurred during the month of May & June 2013. Reduction in trippings is essential for safe and secure operation of the grid and he requested the concern constituents to look into the matter seriously for improvement in the situation. Further, he also briefed that the Detail Project Reports (DPRs) have been received from all the constituents, except POWERGRID and the total estimated cost is about Rs. 889 Crores for taking up renovation work / rectification of various deficiencies in substations and generating stations of 132kV and above voltage class in NER. He mentioned that funding for entire amount projected in the DPR may not be available and hence requested the constituents to plan accordingly to rectify the deficiencies in their system. The issue may be discussed in the coming NPC meeting and the outcome will be intimated to all the constituents. Other issues viz. protection philosophy for NER including Zone – 3 setting, cause of various trippings, non-operation of switchgear in Manipur, Meghalaya, NHPC system etc. need to be discussed.

He requested all members for active participation during discussion in the meeting as protection system plays a vital role in security and safety of the grid.

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

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 10th MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

SE (O), informed that the minutes of the 10th meeting of the PCC held on 8th June, 2013 at Guwahati were circulated vide letter No. NERPC/OP/PCC/2013/3561-90 dated 17th June, 2013.

No comments or observations were received from any of the constituents, the minutes of 10th PCC meeting was confirmed.

ITEMS FOR DISCUSSION

B. FOLLOW UP ACTION

B.1. Independent third party audit of protection system

During the 86th OCC meeting, SE (O) informed that Arunachal Pradesh, Tripura and Mizoram have already finalized their DPR and soft copy has been submitted to NERPC. Assam, Manipur and Nagaland informed that their DPR will be submitted very soon.

All the constituents, except NHPC & POWERGRID, have completed the DPR and submitted to CEA. The copy of DPR has been received in NERPC Secretariat from all state constituents and NEEPCO, except Assam, Mizoram and NHPC.

Deliberation of the Committee

SE (O) highlighted the discussion in the 87th OCC meeting. He informed the house that the DPRs have been received from all the constituents, except POWERGRID and funding for entire amount projected for the scheme may not be available and hence constituents should gear up or plan accordingly to rectify the deficiencies in their system. The rectification / renovations of substations / generating stations are required for safety, security and reliable operation of the system. He requested

the constituents to prioritize the work and identify the critical sub-stations and plan accordingly based on the availability of the fund.

On enquiry about the status of DPR, DGM, POWERGRID informed that DPR has already been prepared and has been sent to corporate office for approval before submission to CEA and NERPC and the estimated cost is about Rs. 23.7 crores.

The estimated cost projected in the DPR for rectification / renovations of substations / generating stations in NER is given below:

Name of Utility	Estimated Cost (Rs. In Crores)
Ar. Pradesh	33.454
Assam	381.584
Manipur	40.815
Meghalaya	183.659
Mizoram	65.247
Nagaland	37.525
Tripura	73.618
NEEPCO	43.74
NHPC	5.137
POWERGRID	23.700 (subject to approval from Corporate office)
Total	Rs. 889.479 Crores (Approx.)

The Sub-committee noted as above.

B.2 <u>Z-3 Protection settings in respect of transmission lines</u>:

In the aftermath of twin major grid disturbances in NEW grid on 30th & 31st July, 2012, the Zone-3 protection settings of different transmission lines (132 kV & above) assumed high importance and loadability of transmission lines based on Zone-3 settings need to be reviewed on urgent basis. In view of above, all constituents were requested to furnish the existing Zone-3 protection settings (at both ends) of 132kV and above voltage class lines.

During the 10th PCC meeting, POWERGRID gave a presentation on zone settings in respect of distance protection including Zone-3 setting with typical examples. POWERGRID was requested to discuss in detail about load encroachment and

Zone-3 setting with typical examples in next PCC meeting. Further, the committee stressed to adopt general settings for different zones of distance relay for whole NER for proper relay co-ordination and integrated operation of grid. After detail discussion the committee suggested the following settings:

Sl.N.	Zones	Zone Setting	Time delay
1	Z1	The setting shall be 80 % - 85% of the protected line length.	Instantaneous
2	Z2	For single circuit line, the setting shall be 120% of the protected line length (length of principal line section). For double circuit line, the setting shall be 150% of the protected line length (length of principal line section) to take care of the effect of mutual compensation. However, it must be ensured that Zone-II setting does not enter into lower voltage level through transformer. It may be restricted to 50% of total transformer impedance to have discrimination with Zone-III.	0.3 to 0.5 Seconds
3	Z3	The setting shall be 120% of (protected section + longest line section at remote end). It must be ensured that Zone-III setting does not enter into lower voltage level through transformer. It should be restricted to (protected section + 90% of total transformer impedance)	0.9 to 1.5 Seconds
4	Reverse Zone	Reverse reach shall be 20% of the protected section	0.9 to 1.5 seconds

However, the zone settings of distance relays for unusual cases may be treated separately.

The committee requested all the utilities to give their comment/suggestion in the next PCC meeting so that the general settings for different zones of distance relay may be finalized and adopted for whole NER.

Assam, NEEPCO and Ar. Pradesh are requested to provide details of their Zone -3 setting for 220kV system.

Deliberation of the Committee

After detailed deliberation, the Committee decided to adopt following protection philosophy in NER.

Protection philosophy in NER

SN	Protection	Setting	Time delay
A	**Line Protection**		
1	Distance Protection: Zone - 1	The setting shall be 80 % of the protected line length.	Instantaneous
2	Distance Protection: Zone – 2	For single circuit line, the setting shall be [100% of the protected line length (length of principal line section) + 50% of the shortest line emanating from far end bus bar] **or** [120% of the protected line] whichever is higher. For double circuit line, the setting shall be 150% of the protected line length (length of principal line section) to take care of the effect of mutual compensation. However, it must be ensured that Zone-II setting does not enter into lower voltage level through transformer. It may be restricted to 50% of total transformer impedance to have discrimination with Zone-III.	300ms for short lines (<= 100kms) and 500ms for long lines (> 100kms)
3	Distance Protection: Zone – 3	The setting shall be [120% of protected section + 100% of the longest line emanating from the far end bus bar] **or** [100% of the protected line + 100% of the longest line emanating from the far end bus bar + 25% of the longest line emanating from the far end of the second line considered], whichever is lower. It must be ensured that Zone-III setting does not enter into lower voltage level through transformer. It should be restricted to (protected section + 90% of total transformer impedance)	1.0 secs.
4	Distance Protection: Reverse	Reverse reach shall be 20% of the shortest line & 10% of longest line emanating from that bus	1.0 secs. to 1.2 secs.

	Zone		
5	Lines with Series and other compensations in the vicinity of Sub-station	80% of the protected line. 100 milli seconds time delay for allowing correct distance measurement after the series capacitor is bypassed.	100 ms
6	Power swing blocking	Block tripping in all zones (except Zone 1) for all lines. Out of step tripping to be applied on all inter regional tie lines.	Deblock time delay = 2 secs.
7	Protection for broken conductor	Negative sequence current to positive sequence current ratio more then 0.2 ($I2/I1 \geq 0.2$). Only for alarm.	3.5 secs. to 5.0 secs.
8	Carrier Communication & Protection	Protection using carrier communication (PLCC / OPGW) is to be provided for all 400 kV, 220 kV and 132 kV lines (where auto-reclosure is in operation). Each 400 kV and 220 kV line shall be provided with two (2) protection channels in addition to one speech + data channel for each direction. In case of 220kV and 132kV lines, the speech and data channel can also be used for protection, wherever possible.	
9	Back up protection	For 220 kV, 132kV and 66kV lines with only one distance Protections (i.e Main-I), back up protection by IDMT O/C and E/F is also to be provided.	
10	Directional Earth fault protection	400 kV & 220 kV lines with two (2) distance Protections (i.e. Main-I & Main –II), shall be supplemented with directional Earth Fault (IDMT type) protections (not as a back up) to detect very high resistance fault, which cannot be detected by distance relay.	
11	Auto Re-closing with dead time	Single pole trip and re-closing. Dead time = 1.0 sec, Reclaim time = 25 sec.	
12	Over Voltage Protection	Two stage Over voltage protection to be provided for 400kV lines	Stage I: 5secs. Stage II:100ms

		Stage I (Low set stage) : 110% Stage II (Low set stage): 150% O/V relay for 400kV lines shall be connected to trip concerned line breaker(s), start LBB, block auto reclosure and send direct trip command. A time grading of 1 sec may be provided between relays of different lines at a station.	
13	Disturbance Recorder (DR), Event Logger (EL) and Fault locator (FL)	To be provided as a standard for all 400kV & 220kV lines on both ends. DR, EL & FL, being inbuilt feature in Numerical Relays, such features should also be used even at 132kV and 66kV level.	
14	Time Synchronising Equipment (TSE)	To be provided as a standard for all 400kV, 220kV and 132kV/ 66kV substations.	
B	**Bus bar and LBB Protection**		
1	LBB protection and bus bar protection	Bus bar & LBB protection to be provide at 400kV & 220kV level for substations and Generating stations having multiple feeds. Bus bar & LBB protection may also be provided at 132kV level for important substations having multiple feeds. LBB current sensor I > 20%	For LBB, Time delay = 200ms.
C		**Protection for Inter Connecting Transformer (ICT)**	
1	ICT protection	The ICT of 400kV/220kV/132kV/66kV class shall be provide with following protection: (a) Differential protection (b) Back up Directional O/C + E/F protection on HV and LV side (c) Restricted Earth Fault (REF) protection (d) Over Fluxing (OF) protection (e) Protection for Tertiary (if applicable) (f) Over load Alarm (110% of rated current) (g) Buchholz protection (Two Stages: Alarm and Tripping) (h) High Winding Temperature using Winding Temperature Indicator (WTI) and high Oil Temperature using Oil Temperature	Time delay for Over load relay: 5 secs. (for alarm only, but not for tripping)

		Indicator (OTI) (Stage-I: Alarm and Stage-II: tripping) (i) Pressure Relief Device (PRD) for tripping (j) Low oil level tripping using Magnetic Oil Gauge (MOG) (k) Oil Surge Relay (OSR) of OLTC for tripping (l) Gapless Surge Arresters on both primary & secondary sides of transformers located outdoors and connected to over head lines. The Protection of 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 main breaker. The Group-A should include Differential protection, back up protection (on HV side), over fluxing protection (on HV side), high oil temperature tripping, PRD tripping and Delta winding protection (wherever applicable).	
		The Group-B should include REF protection, back up protection (on LV/MV side), over fluxing protection (on LV/MV side), high Winding temperature tripping, OSR tripping, low oil level tripping and Buchholz tripping.	
D	**Protection for Reactor**		
1	Protection of Reactor	The Reactors of 400kV/220kV/132kV/66kV class shall be provide with following protection: (a) Differential protection (b) Back up protection [Impedance type or Definite Time O/C & E/F protection] (c) Restricted Earth Fault (REF) protection (d) Buchholz protection (Two Stages: Alarm and Tripping) (e) High Winding Temperature using Winding Temperature Indicator (WTI) and high Oil Temperature using Oil Temperature Indicator (OTI) (Stage-I: Alarm and Stage-II: tripping) (f) Low oil level tripping using Magnetic Oil Gauge (MOG)	

		(g) PRD for tripping (h) Gapless Surge Arrester The Protection of reactor 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 main breaker. The Group-A should include Differential protection, back up protection, high oil temperature tripping, and PRD tripping. The Group-B should include REF protection, high Winding temperature tripping, low oil level tripping and Buchholz tripping.	
E	**Protection for Bus Coupler / Bus Transfer bay**		
1	Bus coupler or Bus transfer bay protection	Non Directional over current and Earth fault protection.	

Assam requested for some more time to remove over current protection, which have been provide for 220kV lines with two distance protection considering the present transmission constraint in the system and the existing CT ratios. All constituents were requested to review the O/C settings at 220kV & 132kV level. The practice of tripping under over load condition (much below the thermal limit of conductor) should be avoided. Such practice may lead to cascade tripping. Necessary action needs to be taken at the earliest to do away with such practice.

The Sub-committee noted as above. Constituents are requested to go through above protection philosophy and suggest correction /modification, if required, so that matter can be discussed further and finalized before putting the proposal for approval of TCC/RPC.

B.3 SPS scheme for Pallatana

During 84th OCC meeting, the committee reviewed the nomination for System Study Group; the nominations were as given below:

Ar. Pradesh – Shri Tarik Mize, Executive Engineer.

Assam – Navjit Patir, AEGCL.

Manipur – Shri N. Jasobanta Singh, AE & Shri Th. Bimol Singh, AE

Mizoram- Sh. C.C.Lalrimwala, SDO & Sh. Zoramdina, AE
Meghalaya – Sh. D.J. Lyngdoh, AEE, SLDC & Sh. L. Nongkhlaw, AEE, SLDC
Nagaland- Sh. S. Longkumer, SDO, Sh. H. Assumi, SDO & Sh. C. Walling, SDO
Tripura – Sh. Mrinal Paul, Manager & Sh. Anwesh Choudhury, Manager.
NEEPCO – Sh. Bhaskar Goswami, Sr. Manager.
NERLDC – Sh. A. Mallick, CM & Sh. Anupam Kumar, Engineer
NERTS – Sh. P. Kanungo, DGM & Sh. Supriya Paul, Dy Manager
OTPC – Sh. Tapas Karmakar, Asstt. Manager
NERPC – Sh. Lalrinsanga, EE & Sh. S.M. Jha, EE
IIT, Guwahati - nomination will be taken up by NERPC Secretariat.

During 84th OCC meeting, NERLDC gave the presentation on system studies associated with System Protection Scheme (SPS) under following conditions:

Case 1: Tripping of generating unit of OTPC at Palatana

Case 2: Tripping of 400 kV D/C Palatana-Silchar line

Case 3: Tripping of 400 kV Silchar-Byrnihat line,

NERLDC informed that the study was carried out by taking the base case of NER peak and off-peak conditions in July, 2013.

During off-peak hours, the above trippings may not create serious problem. But during peak hours, above trippings may lead to grid disturbance.

As pre-condition, for successful operation of the proposed System Protection Scheme (SPS), the following lines should be kept in open condition for all the three cases mentioned above

- 132 kV D/C Khliehriat(PG) – Khliehriat(MeECL) lines at Khliehriat(MeECL)
- 132 kV Khliehriat(MeECL) – NEHU line
- 132 kV Khliehriat(MeECL) – NEIGRIHMS line
- 132 kV Pailapool – Jiribam line at Jiribam end

The scheme for all the three 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: <u>400 kV Silchar – Byrnihat line</u>

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 Generating Unit at Palatana. But unit may run in Full Speed No Load (FSNL) condition.

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

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

The committee deliberated in details about trippings under above three conditions and requested POWERGRID to check the feasibility for implementation of the above schemes. Further, the committee requested all constituents to go through the schemes and give their suggestions/comments before finalization of the schemes.

During the 86th OCC meeting, the representative of OTPC informed that necessary action has already been taken at their end for successful implementation of the proposed SPS pertaining to tripping of generating Unit#1 (Case-I). The auxiliary contact of CB has been wired upto PLCC panel in consultation with POWERGRID.

EE(O), NERPC informed that the SPS scheme for Case 2 may be reviewed as it may require backing down of generation /tripping of GT/STG of Unit #1 of OTPC.

OTPC requested the forum that the SPS pertaining to other two cases [Case-II & Case-III], requiring automatic tripping of STG/GT of generating Unit#1, needs further discussion. The tripping of STG may lead to reduction of generation to a very low level. Hence detail discussion is required with BHEL, POWERGRID, NERLDC and NERPC before implementation of the SPS for Case II &III.

Meghalaya stated that Leshka HEP has started full generation and since so many Meghalaya lines are kept in open condition for implementation of SPS, NERLDC need to ensure the evacuation of full generation of power of Leshka HEP.

After detailed deliberation, the committee suggested that the system study group need to study the proposal in detail, particularly SPS pertaining to Case-II & III and prepare action plan for implementation of SPS.

Deliberation of the Committee

SE (O) highlighted that the matter was also discussed during the 87th OCC meeting. OTPC had informed that the proposed SPS pertaining to tripping of generating Unit#1 (Case-I) has already been implemented successfully in consultation with POWERGRID. However, discussion is required with BHEL, POWERGRID, NERLDC and NERPC before implementation of the SPS for Case II & III. OTPC suggested for reduction in generation instead of tripping of STG. NERLDC also agreed for reduction in generation.

The representative of OTPC requested for a meeting of representatives of above organizations either at Palatana or at NERTS, Shillong to resolve the matter at the earliest.

The OOC & PCC Sub-committee decided that the issue shall be discussed and finalized on 23rd July, 2013 at NERTS, Shillong and requested OTPC to attend the above meeting along with representative of BHEL.

The Sub-committee noted as above.

B.4 Automatic demand management, Implementation of islanding schemes

During the 85th OCC meeting, MS I/C, NERPC informed that during the NPC meeting, held at CEA, New Delhi on 15th April, 2013, he had expressed the difficulty in preparation of islanding schemes in NE Region because of very low level of frequency (i.e. 47.9 Hz) proposed for islanding. POSOCO was requested by NPC to extend necessary guidance / assistance to NERPC / NERLDC in formulation of the suitable islanding scheme(s) in that region.

The committee discussed about the frequency setting for tripping of the Gas based generating Units covered under the proposed islanding schemes.

Assam representatives informed that the frequency setting for tripping of the Gas based generating Units of NTPS is 48.72 Hz.

NEEPCO informed that the frequency setting for tripping of the Gas based generating Units is generally much higher than proposed islanding frequency i.e. 47.9Hz. The frequencies at which generating Units of AGBPP are likely to trip are 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. OTPC informed that frequency setting for tripping of the Gas based generating Units of OTPC is 47.8 Hz (for M/s BHEL make Unit).
After detailed discussion in 86th OCC & 10th PCC meetings, both committees have decided the following islanding scheme and associated frequencies levels for creation of islands in NER:

Sl. No.	Islanding Scheme	Frequency
1.	Island comprising of generating units of AGBPP, NTPS & LTPS and loads of Upper Assam system & Deomali area [Total Generation: 380-400MW and load: 200-300MW]	48.80 Hz
2.	Island comprising of generating units of AGTPP, generating units at Baramura, Rokhia & Gumati (Hydro) and loads of Tripura system & Dullavcherra area [Total Generation: 150-160MW and load: 110-150MW]	48.20 Hz
3.	Isolation of NER from NEW grid at ER-NER boundary with	47.90 Hz

	rest of the generation and load of NER	

Further, the committee suggested for discussion with ER regarding isolation of NER from NEW grid at ER-NER boundary. All constituents were requested to study the proposal so that the matter can be discussed further for finalization.

Deliberation of the Committee

SE (O) again highlighted that the islanding scheme was also discussed during 87th OCC meeting. However, for 3rd islanding scheme, committee requested NERLDC to go for system study before finalization. When the NER grid is in import mode, isolation of NER from ER grid may deteriorate the situation further in NER. But when the NER grid is in export mode, isolation of NER from ER grid may be helpful. After isolation, NER may be in a position to support ER for early restoration of their system. DGM, NERLDC informed that depending on the power flow in NER-ER corridor, the islanding scheme can be made functional accordingly.

The committee requested NERLDC to take initiative to involve the system study Group to study the proposed islanding Scheme and SPS in detail. NERLDC agreed.

The Sub-committee noted as above.

B.5 Frequent Tripping Of 33kV System of DOP, AP at Nirjuli and Ziro:

During 9th TCC and NERPC Meeting the issue was discussed in details and Arunachal Pradesh informed that they have already initiated various measures to reduce no. of faults on 33 KV lines owned by Dept. of Power, Govt. of Arunachal Pradesh.

During 10th TCC and NERPC Meeting POWERGRID again expressed concern for non-reduction of no. of faults in 33kV Feeders. Arunachal Pradesh again assured to take necessary action urgently to reduce no. of faults in their 33kV lines.

During 11th TCC and NERPC Meeting POWERGRID again raised the issue. But, the issue could not be discussed due to non-availability of representatives from Arunachal Pradesh during the meeting and agenda point was deferred for the next meeting.

During 12th TCC and NERPC Meeting POWERGRID again expressed the concern and informed that the tripping of 33kV Feeders at Nirjuli and Ziro is in increasing

trend. Accordingly TCC advised NERPC to write a letter to Ar. Pradesh in this regard.

The present status of tripping of 33kV Feeders at Nirjuli and Ziro Sub Station as discussed in the 87th OCC meeting is as below:

(a) Tripping 33kV Feeders at Ziro

SN	Feeder	Tripping (Jan'10–Sep'11)		Tripping (Oct'11 – Jun'13)	
		Nos.	Nos. / Month	Nos.	Nos. / Month
1	Kurung- Kamey	470	24.73	296	14.8
2	Old Ziro Feeder	304	16.00	136	6.8
3	Kimin Feeder	783	38.84	425	21.25

(b) Tripping 33kV Feeders at Nirjuli

SN	Feeder	Tripping (Jan'10–Sep'11)		Tripping (Oct'11 – Jun'13)	
		Nos.	Nos. / Month	Nos.	Nos. / Month
1	AP - 1	109	5.73	153	7.28
2	AP – 2	258	13.57	332	15.80
3	AP - 4	48	2.52	34	1.62

Arunachal Pradesh to take necessary action on priority to reduce no. of faults in 33kV feeders owned by DoP, Govt. of Arunachal Pradesh to avoid further failure of transformers at Nirjuli and Ziro Sub Stations.

Deliberation of the Committee

Representative from DoP, Ar. Pradesh informed that matter has been intimated to the higher authority and trippings have come down in some feeders. However, he informed that he will pursue the matter for further improvement.

DGM, POWERGRID stated that this issue has been discussed many times in OCC/PCC meetings but there was no appreciable improvement in the situation. He requested NERPC to take up the matter in the next TCC/RPC meetings.

The sub-Committee noted as above.

B.6 T- Connection of Lekhi & Bhalukpong sub-Station

During the 10th PCC meeting, the representative of Ar. Pradesh informed the forum that the LILO arrangement at Lekhi is expected to be complete in all respect by June 2013. He informed that the work of LILO at Bhalukpong has been stopped by the Department of Environment and forest due to forest clearances. However, Ar. Pradesh is taking up the issue with them and the status will be intimated in next PCC meeting

Deliberation of the Committee

Representative from DoP, Ar. Pradesh informed that the clearance from Department of Environment & Forest is still pending for which work of LILO at Bhalukpong will be delayed. The LILO arrangement at Lekhi is likely to be completed soon. The issue of forest clearance has been intimated to the higher authority and the pile foundation work is likely to be completed by September, 2013.

The Sub-committee suggested that these issues have been discussed many times in OCC/PCC forum without any positive outcome and hence requested NERPC to take up the matter in the next TCC/RPC meetings.

The sub-Committee noted as above.

B.7 Installation of Harmonic Filters:

During the 9th NERPC meeting, POWERGRID informed that CPRI has already carried out measurement of harmonics in the portion of NER Grid involving RHEP, Nirjuli S/S and Balipara S/S under different conditions including isolation of ER-NER Grid.

During the 10th NERPC meeting POWERGRID informed that CRPI has submitted offer to them for designing of filters amounting to Rs. 1.75 lacs.

During 12th NERPC Meeting, POWERGRID informed that as per the study of CPRI, the harmonics are generated at Satyam Steel Plant at Banderdewa in Ar. Pradesh. So, the cost of harmonic filters has to be borne by Satyam Steel Plant, Banderdewa and accordingly, Ar. Pradesh has to take up the matter with the consumer.

During 13th NERPC Meeting, Ar. Pradesh informed that they have received the specification and other details of harmonic filters from POWERGRID and they will

implement the same within 2-3 months' time i.e., within September / October 2012.

Till now, Satyam Steel Plant, Banderdewa has not installed the Filter which is essential to avoid further stressing of equipments at 132/33 kV Nirjuli (PG) Sub Station.

Deliberation of the Committee

The representative from DoP, Ar. Pradesh informed that the material for the above work has already been procured as per the specification of POWERGRID and the material has reached the site. He requested POWERGRID to send their representative to check and verify so that Ar. Pradesh can pursue with Satyam Steel Plant to install the filters at the earliest. POWERGRID agreed. The status will be reviewed in the next OCC meeting.

The sub-Committee noted as above.

B.8 Commissioning of Line CVTs of 132kv Khliehriat (PG) - Khliehriat (Me.ECL) Line # II

During 10th PCC meeting, the representative of Me.ECL informed that installation work will be completed by June, 2013.

Deliberation of the Committee

Representative from Me. ECL informed that the commissioning of line CVT of 132kV Khliehriat (PG) – Khliehriat (Me.ECL) line # II at Khliehriat end of Me. ECL was completed on 12th June, 2013.

The sub-Committee noted as above.

B.9 Installation of BMK at Khliehriat (Me.ECL) Bay # II at Khliehriat (PG) Station

During 10th PCC meeting, the representative of Me.ECL informed that installation work will be completed by June, 2013.

Deliberation of the Committee

Representative from Me. ECL informed that installation of BMK at Khliehriat end of Me. ECL was completed on 12th June, 2013.

The sub-Committee noted as above.

B.10 Un-authorized dismantling of POWERGRID owned 2 Nos PLCC panels at 132

kV Khliehriat (Me. ECL) substation.

Me. ECL has dismantled 2 Nos BPL make PLCC panels of 132 kV Khliehriat (PG)-Khliehriat (MeECL) # I at Khliehriat (MeECL) station without informing/ discussing POWERGRID. Thus at present the PLCC link between these two stations through the PLCC link is out of service.

During the 10th PCC meeting, the Sub-committee requested all the constituents that before carrying out dismantling works or any other works which involves more than one agency, the affected party should be informed in advance. The representative of Meghalaya informed that 2 Nos. of PLCC panels will be re-installed soon.

Deliberation of the Committee

Representative from Me. ECL informed that order for procurement of PLCC materials has already been placed and PLCC panels of POWERGRID will be re-installed in July, 2013.

The sub-Committee noted as above.

B.11 Non Operation of Protective Switchgear of Khliehriat (MeECL) SS

The fault in downstream of Meghalaya system beyond 132kV Khliehriat (MeECL) Sub Station is not getting cleared by the existing protection system for which greater part of 132kV Pocket involving Khliehriat SS (PG), Badarpur SS (PG) and Khandong HEP (NEEPCO) get undesirably isolated.

REVISION OF RELAY SETTING:

SN	Name of the Feeder	Relay Settings		Status
		Original	Revised	
1	132 kV Loktak – Imphal –II	**Imphal SS** T_{Z2} = 500ms, T_{Z3} = 1000ms	**Imphal SS** T_{Z2} = 300ms, T_{Z3} = 700ms	Done
2	132 kV Khliehriat (PG) – Khliehriat (Me.ECL) – I	**Khliehriat (PG)** T_{Z2} = 500ms, T_{Z3} = 10000ms 67N=TMS-0.45	**Khliehriat (PG)** T_{Z2} = 200ms, T_{Z3} = 6000ms 67N=TMS-0.25	Done
3	132 kV Khliehriat (PG) – Khliehriat (Me.ECL) – II	**Khliehriat (PG)** T_{Z2} = 500ms, T_{Z3} = 10000ms	**Khliehriat (PG)** T_{Z2} = 200ms, T_{Z3} = 6000ms	Done

4	132 kV Loktak-Ningthoukhong	Zone-2, Zone-3 and B/U Protection to be reviewed.
5	132 kV Loktak-Rangpeng	
6	132 kV Khliehriat (Me.ECL) – NEHU	Protective switchgear to be checked for operation and Zone-2 & Zone-3 delay to be reduced.
7	132 kV Khliehriat (Me.ECL) – Leshka	
8	132 kV Khliehriat (Me.ECL) – Lumshnong	

During the 10th PCC meeting, Me.ECL representative informed that necessary action has already been taken to reduce the fault in downstream area of Meghalaya system (beyond 132kV Khliehriat) and committee requested POWERGRID to monitor the status and bring to the notice of the committee, if there is no improvement. Regarding relay setting, Me.ECL will co-ordinate with POWERGRID for correct Zone setting of distance relays.

The matter relating to the problem in Manipur & NHPC, the Sub-committee suggested that representative from Dept. of Power, Manipur, NHPC & POWERGRID should visit the site and discuss the problem and resolve the matter.

Deliberation of the Committee

Representative from Me. ECL informed that issue pertaining to Sl. No 6 to 8 have already been attended. The settings of O/C + earth fault relays have been modified. Zone –II setting has been reduced from 0.5 sec. to 0.3 sec. and Zone-III setting has been reduced from 1.0 sec. to 0.6 sec. Further, he informed that relay at Lumshnong has already been replaced and order has been placed for replacement of other faulty relays. The committee requested POWERGRID to check the relay settings.

The sub-Committee noted as above.

B.12 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 by NEEPCO in 11th PCC is as follows:

SN	Station	Line	Utility	Status
1	Kopili HEP	220 KV Misa #1	NEEPCO	By July' 2013
2	Kopili HEP	220 KV Misa #II	NEEPCO	By July' 2013
3	Kopili HEP	220 KV Misa #III	NEEPCO	By July' 2013
4	Kathalguri PH	220 KV Misa	NEEPCO	Completed
5	Kathalguri PH	220 KV Mariani	NEEPCO	Completed
6	Samaguri SS	220 KV Balipara	AEGCL	Oct, 2013
7	BTPS SS	220 KV Salakati # I	AEGCL	Oct, 2013
8	BTPS SS	220 KV Salakati # II	AEGCL	Oct, 2013

Deliberation of the Committee

The Sub-committee decided to review the above status in the next PCC meeting. The committee advised Assam to install Main –II (Distance protection) at Tinsukia end of Kathalguri-Tinsukia 220kV D/c line.

The sub-Committee noted as above.

B.13 Non Operation of Protective Switchgear of DOP, Manipur & NHPC

In several cases Loktak connected transmission lines are getting tripped due to non-operation of protective switchgear in 132 kV Loktak - Ninthoukhong and 132 kV Loktak - Rangpeng lines. This is resulting greater isolation of 132 kV System undesirably affecting 132kV portion of NER Grid. Please refer SN: 25, 26, 27 & 39 of **Annexure – C.1**. Protective Switchgear of DOP, Manipur is required to be made functional immediately.

During the 10th PCC meeting, the representative of Manipur informed that renovation work in various substations is in progress and after completion of works the situation would improve.

Manipur was requested to carrying out regular patrolling of the lines, passing through jungle areas requiring regular trimming of trees to reduce transient fault. POWERGRID also informed that some the relays in existing substations are not healthy and need immediate replacement for smooth operation of the grid. POWERGRID expressed their willingness to provide some relays for replacement in existing substation at Yurembam. The representative of Manipur assured that the matter will be discussed with higher authority for taking immediate necessary action.

Deliberation of the Committee

POWERGRID informed that their representative had visited Manipur and had discussion with the concerned officers of DoP Manipur and NHPC. The deficiency in their system has been highlighted during the discussion.

The representative of NHPC was requested to take early action for reduction in undesirable trippings in their system. Since no representative from DoP Manipur was present in the meeting, the Sub-committee requested NERPC to take up the matter with DoP Manipur as well as NHPC.

The sub-Committee noted as above.

B.14 Parallel Operation of 3x20 MVA Transformer with 160 MVA Auto-transformer at Kopili

During 10th PCC meeting, the status could not be updated since no representative from NEEPCO was present.

The representative of POWERGRID was requested to fix a suitable date for the meeting in consultation with NEEPCO and to take necessary action to complete the paralleling operation of transformers at the earliest so that 3x20MVA, 220/132kV transformers can be utilized effectively.

Deliberation of the Committee

The committee discussed about the importance of bringing the 3x20MVA transformer back into service. Sr. Mgr. (E/M), NEEPCO informed that the matter has been taken up with POWERGRID. It has been observed that the 3x20MVA, transformer can only operate at Principal tap and there is no back up O/C+E/F protection on 220kV side of transformer. However, all efforts are to be taken to complete the work by July, 2013. The sub-committee suggested that all required protection should be in place before operation of the transformer. The status will be reviewed in the next PCC meeting.

The sub-Committee noted as above.

C. NEW ITEMS

C.1 Major Grid Disturbances during April, 2013 to June, 2013:

There was no major grid disturbance during the month of June, 2013.

Committee may like to note.

However, the following major events occurred in NER w.e.f. 27th May13 to 26th June'13 and Committee may like to discuss and find out a remedial solution.

Repeated tripping of elements in and around Imphal & Ningthoukhong area

1. At 1404 Hrs on 29.05.13, 132 kV Loktak-Jiribam II and 132 kV Loktak-Ningthoukhong tripped, followed by tripping of 132 kV Loktak-Imphal, 132 kV Loktak-Rengpang lines and all units of Loktak, at 1407 Hr.

2. At 1243 Hrs on 31.05.13, 132 kV Loktak–Jiribam II, 132 kV Loktak–Imphal, 132 kV Loktak-Ningthoukhong lines and all units of Loktak tripped. At 1037 Hr on 01.06.13 132 kV Loktak-Jiribam II, 132 kV Loktak-Imphal and 132 kV Loktak-Ningthoukhong lines and all units of Loktak tripped again.

3. At 0505 Hrs on 05.06.13, 132 kV Loktak – Ningthoukhong, 132 kV Loktak – Imphal line & Loktak Unit II tripped.

4. At 1152 Hrs on 16.06.13, all three units of Loktak, 132 kV Imphal(PG) – Imphal, 132 kV Loktak – Ningthoukhong, 132 kV Loktak – Imphal & 132 kV Loktak – Jiribam II tripped.

5. At 1210 Hrs on 17.06.13, 132 kV Loktak – Jiribam II, 132 kV Dimapur – Imphal, 132 kV Loktak – Ningthoukhong, 132 Loktak - Imphal & all three units of Loktak tripped.

6. At 0630 Hrs on 19.06.13, all three units of Loktak , 132 kV Loktak – Jiribam II & 132 kV Dimapur – Imphal line tripped.

7. At 1250 Hrs on 17.06.13, 132 kV Loktak – Jiribam II & 132 kV Dimapur – Imphal & all three units of Loktak tripped.

Deliberation of the Committee

Since no representative from DoP Manipur was present in the meeting, the Sub-committee requested NERPC to take up the matter with DoP Manipur.

The sub-Committee noted as above.

Bus fault at Ranganadi

At 2001 Hrs on 12.06.13, Bus Coupler of 132 kV Ranganadi tripped, leading to tripping of 132 kV Ranganadi – Nirjuli, 132 kV Ranganadi–Ziro lines, 400/132 kV, 360 MVA ICT I at Rangandi and Unit II & III at Ranganadi.

Deliberation of the Committee

Sr. Mgr. (E/M), NEEPCO informed that the problem has been identified and corrective action will be taken at the earliest to rectify the problem.

The sub-Committee noted as above.

D/C tripping of 220 kV Birpara-Salakati

1. At 0727 Hrs on 03.06.13, 220 kV Birpara – Salakati I & II line tripped
2. At 0055 Hrs on 13.06.13, Bus Coupler at 220 kV Salakati tripped, leading to tripping of 220 kV Birpara – Salakati D/C, 220/132 kV, 50 MVA ICT at Salakati and BTPS – Salakati D/C line.
3. At 1531 Hrs on 23.06.13, 220 kV Birpara – Salakati I & II line tripped.
4. At 0659 Hrs on 24.06.13, 220 kV Birpara – Salakati I & II line tripped.
5. At 1152 Hrs on 24.06.13, 220 kV Birpara – Salakati I & II line tripped.
6. At 2237 Hrs on 08.06.13, 220/132 kV ICT I at Salakati, of 220 kV Birpara – Salakati D/C and 220 kV BTPS – Salakati II lines tripped.

Deliberation of the Committee

The Sub-committee requested NERPC to take up the matter with ERPC to resolve the above problem.

The sub-Committee noted as above.

Repeated tripping of elements in and around Khliehriat area

1. At 1434 Hrs on 29.05.13, 132 kV Khliehriat(PG) - Khliehriat D/C tripped. 132 kV Khliehriat(PG)-Khliehriat I tripped also at 1514 Hrs and at 1607 Hr.
2. At 1603 Hr on 31.05.13, 132 kV Khliehriat(PG) - Khliehriat D/C tripped again.
3. At 1100 Hrs on 14.06.13, 132 kV Khliehriat(PG) – Khliehriat D/C tripped.
4. At 1155 Hrs on 14.06.13 132 kV Khliehriat(PG) – Khliehriat I line tripped.
5. At 1620 Hrs on 18.06.13, 132 kV Khliehriat(PG) – Khliehriat I & 132 kV Khliehriat(PG) – Khliehriat II line tripped.

6. At 1920 Hrs on 18.06.13, 132 kV Khliehriat(PG) – Khliehriat II line tripped.
7. At 2315 Hrs on 22.06.13, 132 kV Khliehriat(PG) – Khliehriat I line tripped
8. At 1627 Hrs on 18.06.13, 132 kV Khandong – Khliehriat II line tripped.
9. At 1324 Hrs on 22.06.13, 132 kV Khandong – Khliehriat I line tripped.

Deliberation of the Committee

Representative from Me. ECL informed that there is some problem with earthing system in Khliehriat sub-station and so far they have not been able to detect the exact problem.

The Sub-committee suggested NERPC to have a joint inspection of POWERGRID, NERPC and Me. ECL at Khliehriat sub-station so that the problem could be resolved at the earliest.

The sub-Committee noted as above.

Repeated tripping of elements in and around Sarusajai area

1. At 1759 Hrs on 11.06.13, 220 kV Bus at Sarusajai S/S tripped, leading to tripping of 220 kV Sarusajai – Langpi D/C, 220 kV Sarusajai – Samaguri D/C, 220 kV Sarusajai – Agia S/C, 220 kV Sarusajai – Boko S/C & 220/132 kV ICT I, II & III.
2. At 1251 Hrs on 23.06.13, 220 kV Sarusajai – Boko, 220 kV Sarusajai – Agia , Samaguri – Sarusajai I & II, 220 kV Sarusajai – Langpi I & II, 220/132 kV ICT, 3 x 100 MVA tripped.

Deliberation of the Committee

Representative from Assam informed that the CT blasted again and even after replacement of the CT blasted again. There is no bus bar protection at 220kV level of the substation at Sarusajai and the CB also did not operate at Sarusjai end. It is difficult to pin point the problem as DRs are yet to be received form Agia & Boko. After receiving the datas, analysis will be done and corrective action will be taken accordingly.

The sub-committee advised Assam to provide the bus bar protection at 220kV level in all existing substations as per requirement of CEA's regulations. The action plan will be discussed in next PCC meeting.

Representative of Assam informed the house that due to shortage of trained technical manpower, non-availability of laptops & associated software etc., the down loading & mailing of recording from DRs is not received in time from the site for analysis. POWERGRID was requested to explore the possibility of using the laptops [likely to be provided (in place of DCDs) with SEM] for down loading the DRs.

The sub-Committee noted as above.

Other major trippings.

1. At 1432 Hr of 30.05.13, GTG I & STG I of Palatana CCGT tripped.
2. At 1758 Hrs on 04.06.13 Palatana GTG I & STG I tripped.
3. At 1217 Hrs on 05.06.13, Palatana GTG I tripped & followed by STG I tripping at 1227 Hrs.
4. At 0504 Hrs on 12.06.13, both Palatana GTG I & STG I tripped.
5. At 1424 Hrs on 21.06.13, Palatana GT I & ST I tripped.
6. At 2059 Hrs on 21.06.13, Palatana GT I & ST I tripped.
7. At 1316 Hrs on 06.06.13, 400 kV Silchar – Byrnihat S/C line tripped.
8. At 1131 Hrs on 14.06.13, 400 kV Silchar – Byrnihat S/C line tripped.
9. At 1026 Hrs on 12.06.13, 400 kV Palatana – Silchar D/C & 400 kV Silchar – Byrnihat S/C tripped.
10. At 0611 Hrs on 18.06.13, 132 kV Aizawl – Jiribam line tripped.
11. At 2052 Hrs on 21.06.13, 132 kV Aizawl – Jiribam line tripped.
12. At 1256 Hrs on 19.06.13, Khandong Unit II, Kopili Stg II & 132 kV Khandong – Khliehriat I & II line tripped.
13. At 0910 Hr on 01.06.13, 132 kV Aizwal-Kolasib line tripped. At 1041 Hr on 01.06.13, 132 kV Aizwal-Kolasib & 132 kV Badarpur-Kolasib line tripped.
14. At 1715 Hr on 02.06.13, 132 kV Silchar-Panchgram, 132 kV Badarpur-Panchgram, 132 kV Panchgram-Lumnsnong and 132 kV Khliehriat-Khliehriat lines tripped.
15. At 0952 Hrs on 10.06.13, 132 kV Silchar – Dullavcherra S/C line tripped &

16. 132 kV Silchar – Dullavcherra S/C line tripped at 1545 Hrs, 1557 Hrs and 1759 Hrs on 11.06.13.
17. At 2257 Hrs on 13.06.13, 132 kV Haflong – Jiribam S/C & 132 kV Loktak - Jiribam II tripped.
18. At 1945 Hrs on 14.06.13, 220 kV BTPS – Agia S/C line tripped.
19. At 1823 Hrs on 17.06.13, Loktak Unit II tripped.

Tripping of these elements are serious in nature involving multiple tripping of elements in a part of grid, repeated tripping of a particular element, power station blackouts, failure of power supply to states and needs detailed investigation. Letter nos. NERLDC/SO-II/10552-62 dtd.03.06.13, NERLDC/SO-II/10780-91 dtd. 18.06.13, NERLDC/SO-II/10792-10802 dtd.18.06.13, NERLDC/SO-II/10922-39 dtd.25.06.13, was issued to all power utilities of NER for furnishing details as per IEGC and CEA Grid Standard Regulations. Detail information of above events is still awaited.

Regional entities are requested to furnish details at the earliest in line with IEGC and CEA Grid Standard Regulations. Necessary actions are required to avoid such undesirable trippings in future.

As specified in Sec. 5.2(r) of IEGC, all the Users, STU / SLDC and CTU shall send information including disturbance recorder/sequential event recorder output to RLDC within 24 hours for purpose of analysis of any grid disturbance / event.

Deliberation of the Committee

CM, NERLDC requested all the constituents to intimate whenever there were major trippings in their states which affect the NER grid.

The sub-Committee noted as above.

Tripping related to Pallatana:

In several incidents of transient fault in 400 kV Pallatana – Silchar # 1/2 the DPR of Pallatana end operates along with TOR Logic which extends Direct Trip command to Silchar end resulting blocking of SPAR. Please refer SN: 16, 17, 29, 36 and 38 of **Annexure - C.1.**

Further, during the visit of representatives of POWERGRID and M/S Alstom at Pallatana on 22.05.2013, it was observed that the status of Line CB to DPR is missing for which the TOR was operating undesirably. OTPC confirmed that the connection would be made within 2 days.

Deliberation of the Committee

Please refer **Annexure – C.1**

The sub-Committee noted as above.

Tripping related to AEGCL, Samaguri:

On 14.05.2013 220 kV Balipara – Samaguri line tripped at Samaguri end on Earth fault but, the line remained in charged condition from Balipara end. Further, no. disturbance / tripping were recorded in any other system recorded during the said relay operation.

The constituent are requested to provide following details

(a) Cause of tripping
(b) Details of relay operation, DR, Even logger
(c) Whether relay operation was normal or undesirable
(d) Corrective measures / action taken
(e) Future plan of action to avoid repetition of such incidences

Deliberation of the Committee

Representative from Assam informed that the protection system will be reviewed, analysis will be done and the same will be intimated in the next PCC meeting.

The sub-Committee noted as above.

Frequent tripping of AGBPP gas compressors and units:

1. At 0145 Hrs on 03.06.13, AGBPP Gas Compressor I stalled, leading to tripping of Unit II & IV.
2. At 0413 Hrs on 03.06.13, AGBPP Gas Compressor I stalled, leading to tripping of Unit II & IV.
3. At 2145 Hrs on 04.06.13, AGBPP Gas Compressor I stalled, leading to tripping of Unit II & IV.

4. At 0906 Hrs on 07.06.13, AGBPP Gas Compressor III stalled, leading to tripping of Unit II & IV.

5. At 0716 Hrs on 10.06.13, AGBPP Gas Compressor IV stalled, leading to tripping of AGBPP Unit II & IV.

6. At 1629 Hrs on 10.06.13, AGBPP Gas Compressor III stalled, leading to tripping of AGBPP Unit III & IV.

Due to tripping of compressors, there was loss of AGBPP generation resulting in sudden increase of power flow from Eastern Region as well as 400 kV Farakka – Malda D/C lines.

Deliberation of the Committee

Sr. Mgr. (E/M), NEEPCO informed that AGBPP has already initiated the action and order has already been placed for procurement of three (3) gas engines with compressor of higher capacity and the work is likely to be completed by March, 2014. After commissioning of gas engines of higher capacity, the problem is likely to be resolved.

The sub-Committee noted as above.

Tripping related to NEEPCO.

In certain cases the High Set Element of 132kV Rangandi-Nirjuli Line at RHEP operates undesirably during fault in 132kV Nirjuli-Gohpur Line. On one occasion 132 kV Dimapur-Doyang-2 line got tripped from Doyang end only with the indication of 3-Ph trip relay. Please refer tripping SN: 8, 30 and 37. NEEPCO may disable the High set element in Nirjuli line and ensure functioning of protective system at Doyang substation.

NEEPCO is requested to provide following details

(a) Cause of tripping
(b) Details of relay operation, DR, Even logger
(c) Whether relay operation was normal or undesirable
(d) Corrective measures / action taken
(e) Future plan of action to avoid repetition of such incidences

Deliberation of the Committee

Sr. Mgr. (E/M), NEEPCO informed that the tripping on 132 KV Ranganadi – Nirjuli line is due to problem with DoP, Ar. Pradesh. Most of the time it has been observed that due to some problem in 33 KV feeders connected with Nirjuli S/S, the fault reflected in Ranganadi end and got cleared in RHEP. He requested Ar. Pradesh to look into the matter for safety of the grid.

Regarding tripping of 132 KV Doyang – Dimapur line, POWERGRID was requested to look into the matter so that same is not repeated. NEEPCO was also requested to check the high set element at Nirjuli end to avoid undesirable tripping at Ranganadi end due to fault in 132kV Nirjuli – Gohpur line. The status will be reviewed in next PCC meeting.

The sub-Committee noted as above.

Date and Venue of next PCC

It is proposed to hold the 12th PCC meeting of NERPC on 8th August, 2013 (Thursday) after the 88th OCC meeting. As per roaster, Ar. Pradesh will be the host for 12th PCC meeting. The exact venue will be intimated in due course.

The meeting ended with thanks to the Chair.

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Annexure-I

List of Participants in the 11th PCC meeting held on 10/07/2013

SN	Name & Designation	Organization	Contact No.
1.	Sh. Tarik Mize, EE, SLDC	Ar. Pradesh	09436059758
2.	Sh. G.K. Bhuyan, AGM, Prot. cell	Assam	09854015601
3.	Sh. A. Bhatcharjee DM, Prot. cell	Assam	09435332928
4.	**No Representatives**	**Manipur**	
5.	Sh. J. Hynniewta, EE (T&T)	Meghalaya	09436110417
6.	Sh. A. G. Tham, AE (MRT)	Meghalaya	09774664034
7.	Sh. Zoramdina, AE, P&ED	Mizoram	08415901755
8.	Sh. Peter Malsawma, AE, P&ED	Mizoram	08974287650
9.	**No Representatives**	**Nagaland**	
10.	**No Representatives**	**NTPC**	
11.	Sh. B. Debbarma, DGM, SO	Tripura	09436450501
12.	Sh. Sankar Chandhini, Sr. Mgr	Tripura	09436503239
13.	Sh. A. Mallick, CM	NERLDC	09436302720
14.	Sh. P. Kanungo, DGM	NERTS	09436302823
15.	Sh. M Madhavanand, DM	NERTS	09436335250
16.	Sh. D.Goswami, Sr.Mgr. (E/M)	NEEPCO	09435577655
17.	Sh. R.Saikia, Manager (E/M)	NEEPCO	09435339834
18.	Sh. Y.Surjamani Singh, Manager	NHPC	09436894857
19.	Sh. R.C. Singh, Manager	NHPC	09436894889
20.	Sh. Parshram Saha, Adviser (O&M)	OTPC	08794728670
21.	Sh. S.K. Ray Mohapatra, MS I/C	NERPC	09818527857
22.	Sh.B. Lyngkhoi, SE (O)	NERPC	09436163419
23.	Sh. Lalrinsanga, EE (C)	NERPC	09436161886
24.	Sh. S.M. Jha, EE (O)	NERPC	08731845175
25.	Sh. D.K. Bauri, EE	ERPC	09863317236

LIST OF NER TRIPPINGS FOR THE MONTH JUNE 2013

SN	Name of Line/ICT (Line Length kM /	Tripping		Restoration		Relay Indication	Cause of Tripping	Corrective Measures / Action Taken	Deliberation of PCC
		Date	Time	Date	Time				
1	132 KV Aizawl- Kolasib (66 kM)	01.06.13	09:10	01.06.13	09:49	AZL: 21YNZ2 KOL : N/T	At KOL secondary side cable of 132/33 KV Tranformer of 33 KV Salwaive feeder punctured.	132 kV Side of ICT setting to be co-ordinated with remote end (Aizawl & Badarpur). Mizoram may furnish settings of ICT.	The Committee requested Mizoram to look into the matter and to take corrective measures at the earliest in consultation with POWERGRID. Mizoram agrred and the status will be reviewed in the next PCC meeting.
2	132 KV Aizawl- Kolasib (66 kM)	01.06.13	10:41	01.06.13	11:33	AZL: 21YNZ2, 67.2 KM KOL : N/T BDP: 21YNZ2,115.7 KM	Tripped during charging of faulty 33 KV Salwaive feeder through 132/33 KV transformer at KOL end. Y-Ph LA of Transformer Bay has blasted.		
	132 KV Badarpur-Kolasib (107.22 KM)	01.06.13	10:41	01.06.13	11:33				
3	132 KV Loktak -Imphal (35.04 KM)	01.06.13	10:59	01.06.13	13:42	IMP: 67NX LOK: N/T.	Y-Ph Jumper of 132 kV Imphal-Loktak - 2 at Loc.No.115 has burnt.	1) Jumper replaced and line thermovision scanning carried out. 2) Protection system at Loktak has failed to clear the fault hence, NHPC has to ensure healthiness of protection system.	For information only Status could not be updated as representative of Manipur was absent NHPC was requested to look into the matter.
4	132 KV Badarpur - Badarpur (Panchgram) (1 KM)	02.06.13	17:15	02.06.13	18:57	BDP (PG): 21YNZ2, Pgram: N/T (Bus dead at Pancgram)	1) Y- ph CT of Pancgram - Lumshnong line blasted at Panchgram end.	MeECL should ensure functioning of their protective relays down the line.	The Committee requested Me.ECL to look into the matter and to take corrective measures at the earliest and ensure healthiness of CBs & relays. The status will be reviewed in the next PCC meeting.
5	132 KV Salakati-Gelephu (49.27 KM)	03.06.13	08:04	03.06.13	08:45	SLKT: 21RBZ1, 21.0 KM GLP: N/T.	B-Ph LA counter increment at SLKT End. Subsequent Line patrolling revealed breakage of 2 nos of Insulator discs at Loc: 122 (37.793 kM) R-Ph.	S/D prposed in July'13 for attending the Insulator problem.	For information only

6	132 KV Salakati-Gelephu (49.27 KM)	03.06.13	23:52	04.06.13	00:24	SLKT: 21RYBZ1, 27.4KM. Gelephu- N/A.	R,Y & B-Ph LA counter increment at SLKT End. Subsequent Line patrolling revealed breakage of 2 nos of Insulator discs at Loc: 122 (37.793 kM) R-Ph.	Same as Tripping SN: 5.	For information only
7	132 KV Khandong - Haflong (64 KM)	04.06.13	11:18	05.06.13	10:50	HFG- 21RYZ1, 42.5KM KHD:Z-I, B-ph	Insulator punctured at Loc 59 (Y-ph)	Insulator string replaced.	For information only
8	132KV Ranganadi-Nirjuli	08.06.13	13:17	08.06.13	14:29	RNG: 67NX NIR: N/T	High set element operated at Ranagandi end.	Matter already referred to NEEPCO in earlier occassions. But, till now High set element not removed.	NEEPCO informed that they will look into the matter and rectification will be done soon
9	132 KV K.Ghat - R.C.Nagar (104.02 kM)	08.06.13	13:47	08.06.13	13:55	KGT: 21YBZ1, 69.40KM RCN: 21YBZ1,	Transient Fault.	Line patrolling carried out and no abnormality observed.	POWERGRID informed that they have referred the case to Corporate R&D to suggest corrective action.
10	132 KV Salakati-Gelephu (49.27 KM)	08.06.13	18:57	08.06.13	19:28	SLKT: 21RNZ1, 28KM. Gelephu-21RNZ1.	Transient Fault.	Line patrolling carried out and no abnormality observed.	
11	220KV Salakati-BTPS-II	08.06.13	22:37	08.06.13	23:25	SLKT: 21RNZ1 BTPS(AEGL): N/T.	Transient fault is in 220 kV Salakati-BTPS-2 circuit.	AeGCL may ensure operation of protective scheme at BTPC end.	Assam informed that Differential Protection has to be installed since it is a short line
12	132 KV Jiribam - Loktak - II (82.4 kM)	11.06.13	10:53	11.06.13	11:04	LOK: 21RYZ1, JBM: 21RYZI, 65.5 km	Transient fault.	Line patrolling carried out and no abnormality observed.	POWERGRID informed that patrolling of this line to clear infringnment is very difficult due to security problem
13	400 KV Bongaigaon - New Binaguri-II (216 KM)	11.06.13	14:09	11.06.13	14:23	BONG: 21BNZ1, 66.9 KM, A/R OPTD	Transient Fault.	Code transmission checked on 27.06.13 found to be OK.	For information only
14	132 /33kV ICT - II at Nirjuli(10 MVA)	11.06.13	15:40	12.06.13	02:41	NIR: 67NX of LV side. 33kV B-Ph CT blasted	33 kV CT blasted in ICT-1.	The failed CT has been replaced with available spare.	POWERGRID informed that CT has been replaced.
	132 /33kV ICT - I at Nirjuli (10 MVA)	11.06.13	15:40	11.06.13	16:05	NIR: 67NX			
15	400 KV Bongaigaon - New Binaguri-I (216 KM)	11.06.13	18:27	11.06.13	18:42	BIN: 21BNZ2, BNG: N/T	Transient Fault.	Code transmission checked on 27.06.13 found to be OK.	For information only

16	400 KV Silchar - Palatana-I (247 KM)	12.06.13	10:26	12.06.13	11:30	Sil: Direct Trip Rcvd.	1) Due to Tripping of SIL-BYR line voltage at Pallatana increased to 441 kV, which has lead to tripping of SIL-PAL-1 & 2 circuits. 2) SPS has not been commissioned otherwise both circuits would not be tripped.	1) SPS scheme shall be made operational at Pallatana. 2) Over Voltage settings of the lines at Pallatana end kept at 4.5 & 5 Secs on 13.06.13.	POWERGRID informed that problem of TOR have been found and corrective measures have been carried out.
	400 KV Silchar - Palatana-II (247 KM)	12.06.13	10:26	12.06.13	12:50	Sil: Direct Trip Rcvd. Pallatana: O/V.			
	400 KV Silchar-Byrnihat	12.06.13	10:26	12.06.13	11:40	Sil: Direct Trip Rcvd. BYR: 21BNZ1, 93.6 KM.			
17	400 KV Silchar - Palatana-II (247 KM)	12.06.13	12:56	18.06.13	09:59	Sil: 21RNZ1, 164.7 kM & 85LO Pallatana: 21RN	Transient fault & TOR operation at Pallatana.	1) Line patrolling has been carried out and no abnormality observed. 2) OTPC to ensure extension of CB status to relay to avoid undesirable operation of TOR.	POWERGRID informed that they have referred the case to Corporate R&D to suggest corrective action.
18	220KV Salakati- BTPS-I	13.06.13	00:55	13.06.13	03:33	SLKT: 21RNZ2, 4.67 KM	1) 220 kV BTPS-Salakti-1 line CVT failed at BTPS end, the line was tripped from Salakati end and from BTPS end cleared in Z2, Before operation of Z2 220 kV BTPS-Salakati-2 line tripped on 67 NX. 2) 220 kV Salakati-BTPS-2 circuit Trip relay contacts were burnt and hence Cb did not trip, which has lead to LBB operation.	Trip relay contacts found burnt, the same were replaced on 16.06.13.	POWERGRID informed that corrective measures have been taken.
	220KV Salakati- BTPS-II	13.06.13	00:55	13.06.13	02:50	SLKT: 67NX BTPS ; N/T			
	400/220 KV ICT-I at Bor	13.06.13	00:55	13.06.13	02:15	SLK: Bus Bar Protection optd. (LV side)			
	132 KV Salakati-Gelephu (49.27 KM)	13.06.13	00:59	13.06.13	02:46	H/T at Salakati end subsequent to LBB optd. at Salakati S/S			
	220/132 KV ICT-I at Sala	13.06.13	01:05	13.06.13	02:15	H/T at Salakati end subsequent to LBB optd. at Salakati S/S			
19	132 KV Khliehriat - Khlieriat-I (7.8 KM)	13.06.13	15:09	13.06.13	15:13	KHELT (P/G): 67NX KHELT (Mecl): N/T	Line tripped due to fault in 132 KV KHELT - NEHU MECL Line.	Same as Tripping No: 4.	The Committee requested Me.ECL to look into the matter and to take corrective measures at the earliest and the status will be reviewed in the next PCC meeting.
20	132 KV Khliehriat - Khlieriat-I (7.8 KM)	14.06.13	11:00	14.06.13	11:52	KHELT (P/G): 21RNZ3, 11.4KM KHELT (Mecl): N/T	Line tripped due to fault in 132 KV KHELT - NEHU MECL Line.	Same as Tripping No: 4.	

21	400 KV Silchar - Byrnihat	14.06.13	11:31	14.06.13	12:06	Sil: 21RNZ1, 133.7 KM. BYR: 21RNZ1, 115 KM. A/R OPTD.	Transient Fault.	Line patrolling is under progress.	POWERGRID informed that patrolling was carried out and tripping might be due to lightning
22	132KV Dimapur-Imphal	14.06.13	15:27	14.06.13		DMP: 21YNZ1, 26.789 IMP: 21YNZ1, 116.4 KM Sucessful A/R OPTD	Transient Fault.	Line patrolling reveled no abnormality.	POWERGRID informed that since no abnormality was found, the same will be monitored by them.
23	132KV Dimapur-Imphal	14.06.13	15:47	14.06.13	15:59	DMP: 21RYBZ1, 30.8 KM, IMP: 21RYBZ1, 117 KM			
24	132Salakati-Gelephu	16.06.13	09:29	16.06.13	09:55	SKT: 21RYBZ2, 59.1KM Gele phu- N/T	Line tripped due to lightning and flashover marks observed during tower top patrolling.	S/D Proposed during July'13 for attending the insulators problem.	The Sub-committee requested NERPC to take up the matter with ERPC
25	132 KV Loktak -Imphal	16.06.13	11:55	16.06.13	12:05	Imp (PG): 67NX, LOK: 21BN	Same time 132 KV Loktak-Ningthoukhong tripped at Ningthoukhong end only and JBM-LOK tripped at LOK.	NHPC & DoP, Manipur to ensure proper functioning of protective relays & Switchgear.	The Sub-committee requested NERPC to take up the matter with DoP, Manipur & NHPC to look into the matter on priority for safety of the grid.
26	132 KV Jiribam - Loktak - II (82.4 kM)	17.06.13	12:10	17.06.13	12:26	JBM: 21RYZ2, 172.9 KM	Lok Gen. 70 MW also tripped At the same time 132 KV LOK-NINGTHOUKHONG line tripped at Loktak end showing Relay : D/P, Z-I, Ph-R-Y	NHPC & DoP, Manipur to ensure proper functioning of protective relays & Switchgear.	
	132 KV Loktak -Imphal	17.06.13	12:10	17.06.13	12:20	IMP: 67 NX LOK: N/T			
	132 KV Dimapur - Imphal	17.06.13	12:10	17.06.13	12:18	DIM: 21RYZ2, 189.6 KM IMP : N/T			
27	132 KV Dimapur - Imphal	19.06.13	06:30	19.06.13	06:45	DIM: 21RYZ2, 180.2 KM IMP : N/T	Lok Gen. 70 MW also tripped At the same time 132 KV LOK-NINGTHOKHONG line tripped at Loktak end .	NHPC & DoP, Manipur & POWERGRID, Imphal to ensure proper functioning of protective relays & Switchgear.	
	132 KV Jiribam - Loktak - II (82.4 kM)	19.06.13	06:30	19.06.13	06:40	JBM: 21RYZ2, 174.6KM LOK : N/T			

28	132 KV Khandong - Khleihriat-I	19.06.13	12:55	19.06.13	13:17	KHD: 21RYBZ1, 23.8 KM KHLT: 21RBZ1, 26.9 KM	Heavy lightning was prevailing at the time of tripping	Matter referred to R&D cell for further analysis towards installationo of LA on Transmission line.	For information only
	132 KV Khandong - Khleihriat-II	19.06.13	12:55	19.06.13	13:17	KHD: 21RYBZ1, 23.2 KM KHLT: 21			
29	400 KV Silchar - Palatana-II (247 KM)	21.06.13	09:21	21.06.13	10:27	Sil: 21RNZ1, 150.4KM Pallatana: DT.	Transient Fault.	Infringement is under clearance.	For information only
30	132kV Nirjuli-Ranaganadi	22.06.13	08:22	22.06.13	08:39	RNG: O/C High set. NRJ: N/T	1) Line Patrolling carried out and no abnormality observed. 2) Highset element operation is undesirable.	Same as Tripping No: 8.	The Sub-committee requested DoP, Ar. Pradesh to look into the matter seriously for the safety of the grid.
	132kV Nirjuli - Gohpur	22.06.13	08:22	22.06.13	08:45	NRJ: 21RYZ1, 9.9KM GHP: N/T			
31	220 KV Salakati Birpara-I (160.0 KM)	23.06.13	15:31	23.06.13	15:59	SLKT: 21RNZ2, 136.1 KM BIR: 21RNZ1, 9.52 KM	Tripped due to Lightning.	ER2 has already taken up rectification works.	The Sub-committee requested NERPC to take up the matter with ERPC/ERLDC.
	220 KV Salakati Birpara-II (160.0 KM)	23.06.13	15:31	23.06.13	15:51	SLKT: 21RNZ2, 145.1 KM BIR: 21RNZ1, 10.49 KM A/R OPTD.			
32	220 KV Salakati Birpara-I (160.0 KM)	24.06.13	06:59	24.06.13	07:58	SLKT: 21RBZ1, 27.21 Km BIR: 21RBZ2, 146.3 KM	Line tripped due to Lightning.	ER2 has already taken up rectification works.	
	220 KV Salakati Birpara-II (160.0 KM)	24.06.13	06:59	24.06.13	07:30	SLKT: 21RZ1, 28.8 Km BIR: 21RZ2, 117.6 KM AR OPTD			

33	220 KV Salakati Birpara-I (160.0 KM)	24.06.13	11:52	24.06.13		SLKT: 21RNZ1, 37.7 KM, Ir= 1.695 KA (M-I) & Z-I, Ph-R, 21.5 KM, Ir=1.53 KA (M-II). BIR: 21RNZ2, 140.4 KM Ir=942.8 A	1) Line charged from BIR end at 12:19 Hrs. but tripped instanteniously showing relay : SOTF, Ph-R-Y-B, 130.9 KM, Ir-Iy-Ib = 1.9 KA. 2) Line tripped on SOTF due to decapping of Insulators.	Decapped insulator strings replaced and line taken in to service.	The Sub-committee requested NERPC to take up the matter with ERPC/ERLDC.
	220 KV Salakati Birpara-II (160.0 KM)	24.06.13	11:52			SLKT: 21RNZ1, 38.46 KM Ir= 1.814 KA (M-I) & Z-I, Ph-R, 22.2 KM ,Ir= 1.64 KA (M-II). BIR: 21RNZ2,143.9 KM, Ir= 942.6 A	1) Line charged from BIR end at 12:10 Hrs. but tripped instanteniously showing relay : Z-2, Ph-R-Y, 135.2 KM, Ir = 1.117 KA, Iy= 366.7 A, Ib = 60.41 A. 2) Line tripped on SOTF due to decapping of Insulators.		
34	132 KV Aizawl- Kolasib	24.06.13	16:20	25.06.13	01:23	AZL: 21BNZ1, 25.8 KM Kolasib: N/T.	CB problem at Kolasib	S/D Prposed from 18-20th JYLY'13 for attending the problem.	Refer Sl. No 1 above
35	400KV Balipara-Bongaigaon-I	24.06.13	22:07	24.06.13	22:15	BNG: 21RNZ1, 133.3 KM, Ir=1.3KA BLP: M1-21RNZ1, 95.58, M2- 21RNZ1, AR OPTD	Transient Fault.	Line patrolling revealed NO evidance of tripping. Further tower top patrolling recommended.	Tower top patrolling is under progress.
36	400 KV Silchar - Palatana II (247 KM)	26.06.13	04:25			SIL : N/T. PALT : CB Auto Trip. Carrier received.	Undesirable operation of CB.	OTPC to ensure proper functioning of CB.	OTPC informed that Earth Fault was detected and problem was rectified.
37	132 KV Dimapur - Doyang II	26.06.13	13:08	26.06.13	18:08	DMP : N/T. DOY : 3 Ph trip relay optd.	Charging delayed due to CB Problem at DOY end.	Line is in chaged condition form DMP end and hence NEEPCO to ensure functioning of relays.	NEEPCO informed that there was some problem in the CB and the same has now been rectified.
38	400 KV Silchar - Palatana II (247 KM)	26.06.13	23:11			SIL : Z-2, Ph-Y, 194 KM PALT : open position.	Transient Fault.	Infringement is under clerance.	For information only

39	132 KV Loktak - Jiribam II	29.06.13	13:36	29.06.13	13:54	JBM : Z-II, Ph-R-Y, 192.5 KM LOK : N/T	Tripped due fault in 132 KV LOK- Ningthoukong state line.	NHPC & DoP, Manipur to ensure proper functioning of protective relays & Switchgear.	Refer Sl. No 3 & 12 above
	132 KV Loktak -Imphal	29.06.13	13:36	29.06.13	13:56	Imphal: Z-II, Ph- R-, 44.6 KM LOK : 186A			
40	132 KV Khandong - Khleihriat-I	29.06.13	19:04			Khelerihat: D/P, Z-II, 44KM KHD: Z-I R,Y,B Ph.	(B-Ph CVT blasted at Khandong(NEEPCO).	Correct Operation.	For information only.
	132 KV Khandong - Kopili II	29.06.13	19:04	29.06.13	19:43	KHD: Z-I R,Y,B Ph. KOPILI- B-Ph.			