

North Eastern Regional Power Committee

**MINUTES OF THE 52<sup>nd</sup> PROTECTION COORDINATION**

**SUB-COMMITTEE MEETING OF NERPC**

**Date** : 13/12/2018 (Thursday)  
**Time** : 10:00 hrs  
**Venue** : "Hotel Nandan", Guwahati.

The List of Participants in the 52<sup>nd</sup> PCC Meeting is attached at **Annexure - I**

Shri P.K. Mishra, Member Secretary, NERPC welcomed all the participants to the 52<sup>nd</sup> PCC meeting. He noted the presence of participants from all the utilities except Mizoram and NTPC. He informed the forum that M/s PRDC has commenced work on PDMS project with Assam as pilot state.

Thereafter he requested Shri B. Lyngkhoi, Director(O&P) to take up the agenda items for discussion.

Shri B. Lyngkhoi, Director(O&P), NERPC informed that recently a training programme was conducted by M/s PRDC on Protection Setting under the aegis of AEGCL for protection engineers of NER from 03.12.18 to 07.12.18. He thanked M/s PRDC and AEGCL for successful completion of the programme.

**A. CONFIRMATION OF MINUTES**

**CONFIRMATION OF MINUTES OF 51<sup>st</sup> MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.**

The minutes of 51<sup>st</sup> meeting of Protection Sub-committee held on 9<sup>th</sup> August, 2018 at Guwahati were circulated vide letter No. NERPC/SE/PCC/2018/2565-589 dated 30<sup>th</sup> August, 2018.

Director, NERPC informed that the following amendment has been made to item B.4 of 51<sup>st</sup> PCC minutes vide mail dated.

**Refer Item No. B.4 of 51<sup>st</sup> PCC Meeting - "Approval of protection settings to be adopted by NERPC secretariat for 1st time charging of any new elements to the grid"**

The minutes of 51<sup>st</sup> PCC Meeting of NERPC is hereby amended as below:

***“Before 1st time charging of any new elements to the grid no approval of protection setting from NERPC is required. An undertaking by concerned utility for healthiness of protection system is to be submitted to NERLDC. Concerned Engineering Department of the respective utilities will have the prime responsibility to carry out their own protection calculations / setting.***

However, for any system connectivity between two or more utilities, the relay co-ordination is to be done mutually. In case any support is required they may approach NERPC for necessary assistance.

This is to be followed and adhered by all utilities.

GM, NERLDC opined that prior to first time charging of new transmission element, protection settings calculated by the utility will be checked by Protection Sub-group for protection co-ordination.

GM(AM), NERTS informed that for all PGCIL elements Engineering Department of Corporate Centre approves the settings. He was of the opinion that for elements having the CTU-STU interaction, settings may be checked the Sub-group.

After detailed deliberation the forum decided the following:-

- Sub-group will check the settings for ISTS elements having CTU-STU or STU-STU interaction before first charging. For this PDMS/PSCT shall be used as and when it is available.
- For all other ISTS elements respective utilities shall finalize the settings. No approval or submission is required before first time charging.
- The recommendations of the Sub-group shall be followed if not in contradiction with any prevalent protection philosophies being followed.

***The Sub-committee confirmed the minutes of 51<sup>st</sup> PCCM of NERPC with the above modifications as no other comments/observations were received from the constituents.***

## **ITEMS FOR DISCUSSION**

### **1. FOLLOW UP OF REMEDIAL ACTIONS:**

The suggested measures as per 52<sup>nd</sup> PCC:

SN	Name of element	Actions to be taken	Concerned Utilities	Status as per 51st PCC Meeting	Status as per 52nd PCC Meeting
1	133 kV Lekhi - Nirjuli Line	Checking of healthiness of Protection System (Relays, Circuit breaker, DC system etc.) of downstream substations	DoP, AP/NERTS/AEG CL	Status could not be updated due to absence by DoP, AP	DoP AP informed that Protection system healthy. Coordination is required for 132kV Lekhi-Nirjuli-Gohpur-BNC. To be completed by Jan'19
2	132 kV Agia - Medipathar I line and 132 kV Mawngap - Nongstoin I line	Healthiness of Protection System at Nongstoin for 132 kV Mawngap - Nongstoin Line to be done by MePTCL.	MePTCL	Under PSDF works By Nov'18	Completed
3	133 kV Agia - Medipathar I line and 132 kV Mawngap - Nongstoin I line	Checking of healthiness of Protection System (Relays, Circuit breaker, DC system etc) of downstream substations	MePTCL	Under PSDF works By Nov'18	Downstream co-ordination by Jan'19
4	132 kV Kolasib-Badarpur line & 132 kV Kolasib-Aizwal line	Relay Coordination to be done at Kolasib & downstream substations of Kolasib by P&ED Mizoram.	P & ED Mizoram, NERTS	By 17.08.18	By 20.12.18
7	132 kV AGTCCPP-Agartala	Over-reach of DPR at AGTCCPP. Setting to be revised after HTLS upgradation.	NEEPCO	NEEPCO to revise settings upon discussion with NERTS by Aug'18.	#By Jan'19
8	132 kV Rangia - Motonga	Checking of relay settings at Rangia	NERTS	Standardisation of DR channels to be co-ordinated by NLDC	**
9	400kV Balipara-BNC I&II	POR settings to be disabled. Z-I to be kept at 80%	NERTS	Oct'18	POR settings enabled because FSC is in service. To be dropped.

10	132kV Bus Bar at Palatana	Healthiness/operation of bus bar protection need to be reviewed	OTPC	By 1 <sup>st</sup> week of Sep'18.	Completed
11	Blackout of 220 kV Mariani(PG) on 06.03.18	POWERGRID to review over voltage setting at Mariani and Mokokchung SS and time grading may be provided.** Issue of non-tripping at AGBPP end of Mariani(PG)-AGBPP line & at Misa end of Mariani(PG)-Misa line are to be attended.	NERTS/NEEPCO	Setting revised. Carrier to be checked by 15.09.18.	Carrier problem to be jointly checked by NERTS&NEEPCO. By Jan'19
12	Disturbance in Tripura on 22nd, 26th & 31st Mar'18 and 30th Apr'18 Fault in 132 kV Rokhia - Agartala D/C. Delayed fault clearance due to absence of DPR.	Status of Installation of DPR in 132 kV Rokhia - Agartala D/C	TSECL	By 15.10.18	Done
		O/C & E/F co-ordination after installation of DPR		By 15.10.18	Done
		Review of Z-II (to be 150% of line length) settings at SM Nagar for Agartala D/C		By 31.08.18	Done
		R & B phase analog DR input to be reversed at SM Nagar.		By 31.08.18	Done
		Review of Z-II (to be 120% of line length) settings at Budhaj Nagar for Agartala line		By 31.08.18	Done
		Review of Z-II & Z-III settings at Palatana for SM Nagar line. Adopted CT ratio & CT ratio in relay settings at Palatana for SMNagar line to be checked.		OTPC	By 10.09.18

13	132 kV AGTCCPP - Agartala D/C on 31.03.18	Installation of Line Differential in 132 kV AGTCCPP - 79 Tilla D/C & Review of impedance setting of both ends as a temporary measure.	NERTS/NEEPCO	LDP - Jun'19(LOA date) Settings by 31.08.18.	LDP installation by Jun'19
14	220kV Misa blackout and loss of generation of Khandong and Kopili on 21.05.18	ICT-2 at Misa delayed fault clearance is to be analysed.	NERTS	ICT to be replaced under NERSS-V. Settings will be done afresh.	NERTS informed that Settings found OK. Delayed fault clearance by this ICT was due to week infeed during the event and this issue of delayed clearance will not recur. ICT will be replaced. To be dropped.
		Z-2 overlapping of 220 kV Misa - Samaguri and 220 kV Samaguri - Sarusajai to be checked.	AEGCL/NERTS	By Aug'18	AEGCL informed that settings were Checked and rectified. Forum requested NERTS to check the settings at Samaguri for confirmation
15	Faults in 132kV 79Tilla-Rokhia D/C	Rokhia E/F relay to be made directional. OR Directional Earth Fault function of DPR is to be enabled and then disable backup earth fault relay (EM).	TSECL	After DPR installation. By Oct'18	Completed.
16	Repeated trippings of 132kV Doyang-Mokokchung and 132kV Mokokchung - Mokokchung D/C	Timings at 132 kV Mokokchung(PG) and 132kV Doyang to be increased.	NERTS/NEEPCO	By Aug'18	NERTS informed that settings at 132 kV Mokokchung (PG) has been increased. NEEPCO intimated that settings at Doyang will be revised by Dec'18.

		Relay and protection system healthiness of all elements to be checked at Mokokchung(NAG)	DoP Nagaland	-	Protection system healthy.
17	Jiribam blackout on 06.06.18	Downstream settings at Pailapol to be coordinated if not done	AEGCL	By 28.08.2018	SAS upgradation completed. New settings implemented.
		Protection settings and relay healthiness for 132kV Pailapol-Srikona at Pailapol to be ensured	AEGCL	By 28.08.2018	Checked and found OK.
18	Tripping of 400kV Palatana-Silchar D/C on 11.05.18	Non attempt of Auto recloser at Palatana of 400 kV Silchar – Palatana 2 line to be investigated	OTPC	By Aug'18	Completed
19	Tripping of 220kV Misa-Byrnihat-I on 09.05.18	Maloperation of Earth Fault relay at Misa to be attended	NERTS	By Aug'18	Relay setting checked and found OK.
20	Repeated tripping of 400kV Palatana-Silchar-2	Maloperation of B/U impedance relay. DT sent due to relay restart/self-restart to be investigated.	NERTS	OEM visited. Detailed report to be given by 15 <sup>th</sup> Sep'18.	Completed. Detailed report submitted.
21	Tripping of 400kV Balipara-Bongaigaon -3 on 26.07.18	Maloperation of O/C relay at Bongaigaon	NERTS	By Aug'18	Rectified B/U impedance relay and B/U relay replaced.
22	Tripping of 220kV Misa-Samaguri-2 on 02.07.18	SOTF operation while transferring from one bus to another (non-operation of changeover switch) at Samaguri.	AEGCL	Fault in relay rectified by NERTS. AEGCL- By Aug'18	Fault in voltage selection relay rectified by AEGCL.
23	Tripping of 132kV Bus-B at RHEP due to bus differential on 07.07.18	Bus bar protection to be configured in DR of all elements at RHEP.	NEEPCO	By Sep'18	WIP by 14.12.18

24	Repeated Tripping of 132kV Palatana-SMNagar and 132kV SMNagar-Comilla	DPR at Palatana over-reached. Settings to be reviewed and DPR tested.	OTPC	By 10.09.2018	Completed
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**Deliberation of the sub-Committee:**

\*\*NERTS informed that relay co-ordination at Motonga and Deothang would be taken up by NLDC in the next Operational Coordination Committee meeting with Bhutan. NERLDC informed that this issue was taken up in the 3rd operational co-ordination committee held on 31<sup>st</sup> May'18. After detailed deliberation it was confirmed that NERTS being the owner of the Indian section of the line has to do the DR standardization at Rangia. NERTS assured that the same would be completed by Jan'19.

GM(AM), NERTS opined that more clarity ought to be given in the action taken with separate attachments for setting(s) if required. The forum concurred and requested the Sub-group to take necessary action.

#NERTS informed that huge variation observed in impedance calculated using the parameters provided by vendor. Field testing will be done for measurement of impedance and actual measurement values will be shared by POWERGRID with NEEPCO by Jan19.

***The Sub-Committee noted as above.***

***Action: All utilities.***

**A.1 Third Party Protection audit of NER Sub-Stations**

In 51<sup>st</sup> PCCM, Director(O&P), NERPC updated the status of the third party protection audit. He informed that a comparative summary (detailing 2012-13 audit status & 2017-18 audit) has been circulated to all the utilities, for updation of latest status and timeline. The forum requested all the utilities to submit the status and timeline for completion of suggested remedial actions by 31.08.2018.

The comparison report for all utilities has been attached at **Annexure-A.1.**

Latest status has been submitted by AEGCL, MSPCL and MePTCL. Other utilities may please give the latest status.

**Deliberation of the sub-Committee:**

The timeline given by various utilities for submission of compliance status (Third Party Audit + Tractabel Audit) is as below:

TSECL	By 15.01.19
DoP Nagaland	By 15.01.19
NERTS-POWERGRID*	By 15.01.19
DoP Ar.Pradesh	By 15.01.19
NHPC	By 31.12.18
NEEPCO	By 15.01.19
P&ED Mizoram	Not updated
NTPC	Not updated
OTPC*	By 15.01.19

\*NERTS (Tractabel Audit compliance status by 15.01.18) and OTPC have already submitted the latest status.

***The Sub-Committee noted as above.***

***Action: All concerned utilities.***

**A.2 Standardization of Disturbance Recorder Channels:**

AEGCL informed the forum that they have implemented the standardization of DR channel in all lines connected to other utilities . AEGCL will intimate the updated status through mail.

AEGCL informed the forum that they have implemented the standardization of DR channel in all lines connected to other utilities. AEGCL will intimate the updated status through mail.

MePTCL informed the forum that they have standardized DR channels for Micom relay. They are facing problem for ABB relay and referred to NERTS, POWERGRID for help. The Forum requested POWERGRID to assist on this matter.

NERLDC requested all power utilities to provide DR output (DAT and CFG file) of all the transmission elements for verification.

In 49<sup>th</sup> PCCM, AEGCL representative informed that for remaining 6 sub-stations standardization would be completed by May'18. E E (System Protection), MePTCL informed that after obtaining the ABB software from AEGCL, the standardisation for remaining stations of Mendipathar SS, Killing SS, Stage III PS and Stage IV PS will be

completed by 30.04.2018. The forum requested NERLDC to circulate the DR template to all concerned utilities.

SE(O&P),NERPC suggested that during erection works under R&U scheme the commissioning engineers should do the work of DR channel standardization.

In 50th PCCM, NERLDC informed the forum that list of elements for which DR standardization has been completed will be circulated to all constituents. Forum requested all constituents to update the status.

SE(O&P),NERPC requested other utilities to submit a schedule in alignment with R&U works.

Format for DR standardization (formulated by POWERGRID) is for One and Breaker scheme and DMT scheme. Few modifications are required for other bus schemes.

**Deliberation of the sub-Committee:**

After detailed deliberation the following were decided:

- For utilities who have completed R&U works manual trigger is to be given to each NR and DR generated is to be forwarded to NERLDC accordingly for verification. This exercise is to be done for all grid connected substations. *AEGCL, MePTCL and TSECL to expedite.*

*Target Date: By Mar'19*

- For other utilities in the course of R&U works the above procedure may be followed for DR standardization if any. This exercise is to be done for all grid connected substations. *For compliance by DoP Ar. Pradesh, MSPCL, P&ED Mizoram, DoP Nagaland.*

DGM, TSECL informed the following:

- DPR has been submitted to NLDC under PSDF viz. "*Real time condition monitoring to enhance reliability of sub-station assets and capacity building in the state of Tripura*". The estimated project cost is • 112.94 Cr.
- Proposal has been submitted to DoP, Govt. of Tripura for "*Modernization of workshop with the state of the art technology including meter testing facilities*" with an estimated cost of • 16.38 Cr. for consideration in the 15th Finance Commission.
- DPR is under preparation to be submitted to NLDC-
  - a. Protection upgradation of 132kV EHV sub-stations
  - b. Re-conductoring with HTLS conductor of 132kV transmission line

- c. Centralized relay tripping data acquisition from different sub-stations of TSECL.

***The Sub-committee noted as above.***

***Action: All utilities as above.***

### **A.3 Implementation of SPAR**

In 50<sup>th</sup> PCCM DM(E/M), NEEPCO once again re-iterated that for 132kV Khandong-Kopili D/C a detailed study is required regarding which end should be dead sync and which end check sync as both end involve generator. He informed that it would be a retrograde step to implement 3-ph A/R for 132kV Khandong-Kopili D/C.

OTPC representative also expressed similar concerns regarding 132kV Palatana - SMNagar because of poor fault clearing times at 132kV SM.Nagar and beyond.

DGM(SO-II), NERLDC informed that as per CEA (Technical Standards for Construction of Electric Plants and Lines) Regulations, 2010 it is mandatory to implement A/R for all 132kV and above lines. Members noted the concern of OTPC & NEEPCO and decided that the matter would be referred to CEA/NPC with 3-ph fault levels of the respective buses.

A list detailing the status of implementation of A/R for different lines is attached at **Annexure-A.3**. Director(O&P),NERPC requested all the utilities to update the status in the attached list before the next meeting.

In 51<sup>st</sup> OCCM, Director(O&P), NERPC informed the forum of the decision conveyed by NPC for implementation of A/R for lines connecting two generating stations. Considering stress on generators it is recommended not to implement A/R for lines connecting two generating stations. So A/R is not to be implemented for 132kV Khandong-Kopili D/C. DGM(AM), NERTS opined that SPAR should not be allowed for lines connecting two generating stations as that may allow flow of negative sequence current to generators. Forum requested OTPC to keep auto recloser in auto mode for 132 kV S M Nagar – Palatana line at Palatana. Palatana confirmed that Auto-reclose will be enabled by 10.09.18. Meanwhile, OTPC was requested to revert back with the study for implementation of 3-ph- A/R for 132kV Palatana-SMNagar. The forum once again requested all the utilities to update the status of A/R wherever information is not yet available as per format attached as **Annexure A3**.

**Deliberation of the sub-Committee:**

After detailed deliberation the forum decided that A/R may be implemented for all ISTS lines/lines connected to ISTS stations immediately. The forum updated the status of A/R for various lines. The updated list is attached at **Annexure-A.3**.

OTPC informed that A/R for 132kV Palatana-SMNagar has been implemented, but it has been kept in non-Auto mode for reasons which have been communicated beforehand. Member Secretary, NERPC requested OTPC to submit a fresh letter detailing the reasons for not keeping A/R in service.

NERLDC has informed that the forum decided to keep auto reclose of 132 kV Palatana – S M Nagar line in auto mode and OTPC have to keep auto reclose of 132 kV Palatana – S M Nagar line in auto mode immediately.

Regarding A/R for 132kV Dimapur-Kohima NERTS informed that 3 pole A/R facility is available at Dimapur. EE, DoP Nagaland informed that the matter has been taken up with higher authorities for implementation of A/R facilities at Kohima at the earliest.

AEGCL intimated that auto-recloser of 132 kV Khandong – Umrangshu line at Umrangshu will be completed by Jan'19. Forum requested subgroup to collect status of auto-recloser for only Grid Connected lines of state system. Status pertaining to AEGCL & MePTCL will be discussed in the next subgroup meeting.

***The Sub-committee noted as above.***

***Action: All state transmission utilities/OTPC.***

**A.4 Disturbance in Tripura System**

As discussed in previous PCC meeting there have been a number of disturbances in Tripura system. However no fruitful resolution was achieved due to non-participation by TSECL. Brief recommendations of 48<sup>th</sup> PCC are as follows:

- Non-directional E/M relays for O/C, E/F at P.K. Bari to be made directional
- Installation of Numerical relay at 132kV P.K. Bari
- Installation of Line differential relay for 132kV P.K. Bari - Kumarghat

These are to be addressed immediately.

Further Kumarghat blackout happened on 04.02.18. This could not be analyzed in the Sub-group meeting on 06.03.18 due to absence of DR/EL outputs from Tripura.

In 49<sup>th</sup> PCCM DGM(AM),NERTS informed that line differential relay for 132kV P.K.Bari-Kumarghat would be installed at both ends by NERTS. The Sub-Committee

decided that TSECL would hand over spare NR at 132kV PKBari to NEEPCO for installation at AGTCCPP for 132 kV AGTCCPP – Kumarghat line.

DGM(SO-II),NERLDC informed that a team from NERLDC would visit Rokhia, 79Tilla, Udaipur, Monarchak to co-ordinate downstream relay settings.

In 51<sup>st</sup> PCCM Sr. Manager, TSECL informed that R&U works have been taken up in earnest. He informed that works at 79Tilla, Rokhia, Udaipur and PKBari would be carried out with utmost priority. The approximate timeline agreed by TSECL is as follows:

<b><i>Name of sub-station</i></b>	<b><i>Time of completion</i></b>
79Tilla	by 15.10.2018
Rokhia	by 15.10.2018
Udaipur	by 15.10.2018
PKBari	by 15.10.2018

Members requested that in view of the large number of grid incidences concerning Tripura, the R&U works be expedited ASAP. Forum requested TSECL to ensure installation of DPR at both ends of the lines emanating from these substations.

CM, NERTS informed that Line Differential Relay for 132kV PK.Bari-Kumarghat and 132kV AGTCCPP-Agartala D/C would be commissioned by Dec'18.

**Deliberation of the sub-Committee:**

Sr. Manager, TSECL informed that R&U works for 79Tilla, Rokhia, Udaipur, PKBari, Kailashor, Dhalabil and Ambassa has been completed. NERTS informed that line differential relay for 132kV PKBari-Kumarghat and 132kV AGTCCPP-Agartala D/C would be procured by Jan'19 and installation by Feb'19. NERLDC requested other utilities to intimate status of R & U works related to protection system of grid connected substations on monthly basis for monitoring.

***The Sub-committee noted as above.***

***Action: TSECL, NERTS.***

**A.5. Identification of short lines to install Line Differential Protection (LDP)**

Decision as per deliberations in the previous meeting(s):

- A draft list prepared by NERLDC for important short lines was circulated previously. The same has been attached at **Annex. A.5.** for reference.

- NERTS has considered 220kV transmission lines with length less than 10km for installation of LDP.
- For 132kV lines impedance is to be matched with 220kV lines and accordingly lines have to be identified.
- All state utilities are to conduct the exercise and revise the list accordingly with modification of DPR if necessary.

**Deliberation of the sub-Committee:**

Director, NERPC informed that as agreed in 19<sup>th</sup> TCC/RPC meeting the OPGW and accessories would be included under NERPSIP scope for all state lines. He stated that this entails preparation of two separate DPRs: (i) for OPGW and accessories, (ii) for Line differential relay (to be submitted for funding from PSDF). For the former he requested NERTS to assist the state utilities in preparation of the DPR.

The following status was informed by various utilities:

Name of state/Utility	Status
DoP Ar. Pradesh	No lines require LDP
AEGCL	Lines identified. Under DPR preparation stage.
MSPCL	Lines not yet identified. To be taken up in Sub-group.
MePTCL	Lines identified. Revised DPRs to be prepared.
P&ED Mizoram	Lines not yet identified. To be taken up in Sub-group.
DoP Nagaland	Lines identified. Under DPR preparation stage.
TSECL	Lines not yet identified. To be taken up in Sub-group.

After detailed discussion, it was decided that for 132 kV Ranganadi \_ Pare 2 line which is owned by DoP, AP, installation of LDP to be done by NEEPCO and OPGW by DoP, Ar. Pradesh and where ever 2 parties are involved, procurement of same make and type LDP relay to be ensured.

***The Sub-committee noted as above.***

***Action: All state transmission utilities/NERTS.***

**A.6 Technical presentation in PCCM:**

In 50<sup>th</sup> PCCM Director(O&P), NERPC stated that as decided in earlier PCC meeting; technical presentation would be given on important topics once PCC deliberations are completed. It was decided that on the 51<sup>st</sup> PCC meeting, presentations on (1)Ramakrishna Task Force Recommended settings by NERTS (2) D/R inference and analysis will be given by NERTS.

In 51<sup>st</sup> PCCM DGM(AM), NERTS gave a presentation on the various 'Bus Bar Schemes' and their functionality. The forum unanimously appreciated the lucid, detailed and insightful presentation given by DGM(AM). Member Secretary requested NERTS again to give a presentation on the Ramakrishna Task Force Recommended Settings in the next PCCM.

**Deliberation of the sub-Committee:**

It was decided that NERTS would give presentation on Ramakrishna Task Force Settings in the next PCCM.

***The Sub-committee noted as above.***

***Action: NERTS.***

**B.1 Actions recommended by Sub-group:**

The Sub-group in its meeting held on 30.08.2018, 09.10.18, 22.11.18 & 10.12.18 recommended the following actions:

Sl. No	Brief details of the disturbance/incidence	Actions to be taken	Concerned Utilities	Status as per 52 <sup>nd</sup> PCCM
1	Frequent tripping of 220kV Misa-Killing D/C	Location to be identified for any flashover in each of the cases viz. 220kV Killing - Misa #II on 05.08.18, 18.08.2018 and 23.08.18 & 220kV Killing - Misa #I on 23.08.18,05.09.18	MePTCL	##
2		Tower footing resistance measurement to be done for the identified locations. Necessary corrective measures for improving of soil resistivity in line with soil reactivating chemical compound treatment as per IS or installation of	MePTCL	##

		TLA may be considered for vulnerable lines		
3		Fault location to be identified and Vegetation clearance to be done for 220kV Misa - Byrnihat #I tripping on 26.09.18, 07.10.18 & 03.11.18 and for 220kV Misa - Byrnihat #II on 08.09.18 & 26.09.18	MePTCL	##
4		Multiple tripping of 220kV Misa- Byrnihat D/C on 06.09.18 & 07.09.18. Suspected DC mixing during breaker testing of 220 kV Misa – Dimapur -1 line at Misa end to be checked by NERTS.	NERTS	##
5		P444 Main-II relay settings to be checked for 220kV Misa - Byrnihat -II (relay not operated for fault on 08.09.18)	MePTCL	##
6		Relay to be fed from Line CVT instead of Bus CVT at Byrnihat for 220kV Misa-Byrnihat-I	MePTCL	##
7		A/R operation at Byrnihat to be checked for 220kV Misa-Byrnihat-I	MePTCL	##
8	Tripping of 400kV Balipara - Bongaigaon-IV on 13.09.18 & 15.09.18	FSC protection issued trip command to line breaker instead of operation of Bypass breaker of FSC. Issue taken with OEM.	NERTS	##
9	Frequent tripping of 400kV Silchar-Azara 24.09, 15.10, 17.10 & 31.10	Tripping on 24.09.18 - Main-I relay non-operation at Silchar to be checked.	NERTS	##
10		Tripping on 24.09.18 - Delayed clearance on DEF at Azara to be checked.	AEGCL	##
11		DEF to be configured in DR	NERTS/AEGCL	##
12		Vegetation clearance to be done	NETC/NERTS	Completed for identified fault locations
13	Frequent tripping of 132kV Lumshnong-Panchgram	Tripping due to vegetation fault -06.08.18, 07.08.18, 24.10.18,16.11.18. Fault	MePTCL/AEGCL	##

		location to be identified and Vegetation clearance to be done.		
14		Location to be identified for any flashover for tripping on 09.08.18, 15.08.18	MePTCL/AEGCL	##
15	Tripping of 220/132kV 160MVA ICT-1&2 at Killing on 23.08.18	i) OSR operation to be checked ii) Flashover spot to be identified, iii) OLTC oil parameters to be checked.	MePTCL	##
16	Aizawl blackout in Aug'18	Settings alongwith directionality of earth fault relay may be reviewed for 132kV P.K.Bari-Kumarghat at P.K.Bari.		##
17		DPR zone timings to be checked at Doyang end for Ckt#II	NEEPCO	##
18	Tripping of 132kV Doyang-Dimapur D/C on 01.08.18, 16.08.18, 19.08.18	Tower top patrolling is to be carried out for identification of lightning prone areas.	NERTS	##
19		Tower footing resistance measurement to be done for the identified locations.	NERTS	##
20		Exact location to be identified and vegetation clearance to be done.		##
21		All faults on vegetation. Vegetation clearance to be done and patrolling report to be submitted.	NERTS	##
22	Frequent tripping of 400kV Palatana-Silchar #II on 14.08.18, 19.08.18, 18.09.18, 06.10.18	Z-III reach to be checked at Palatana end	OTPC	##
23		Carrier status to be delinked from A/R operation in PSL at Palatana for 400kV Silchar.	OTPC	##
24		Z-II instantaneous tripping (no carrier received observed in DR) at Palatana to be checked	OTPC	##
25		Carrier health to be checked and monitored at Silchar/Palatana	NERTS/OTPC	##

26		Delayed fault clearance and non-operation of M-I at Silchar to be attended	NERTS	##
27	Tripping of 400kV Palatana-Silchar D/C on 17.10.18	Main-2 relay at Silchar for 400kV Palatana Ckt#1 maltripping due to overreach (CT ratio increase). To be checked and rectified with OEM	NERTS	##
28		Vegetation clearance to be done and patrolling report to be submitted.	NERTS	##
29	Blackout of Ranganadi, Pare and Ar. Pradesh on 29.09.18	Overvoltage settings for 132 kV RHEP – Pare 2 line & 132 kV Itanagar – Pare line at 132 kV Pare to be reviewed	NEEPCO	##
30		Delay in outage of filter bank after tripping of Pole to be investigated	NERTS	##
31	Tripping of 400kV Byrnihat-Bongaigaon on 25.09.18, 09.10.18, 16.11.18	Main-I & Main-II relay at Byrnihat channel standardization to be done.	MePTCL	##
32		Main-I relay (at Byrnihat) neutral feed to be checked.	MePTCL	##
33		Healthiness of carrier to be checked at Bongaigaon and Byrnihat end.	MePTCL/NERTS	##
34		A/R non-operation to be checked at Byrnihat end.	MePTCL	##
35		Carrier status to be checked at Byrnihat	MePTCL	##
36		Tower top patrolling to be done and lightning location to be identified	NERTS	##
37		Tower footing resistance measurement to be done for the identified locations. Necessary corrective measures for improving of soil resistivity in line with soil reactivating chemical compound treatment	NERTS	##
38		Numerical Relay at Bongaigaon/Byrnihat to be time synced	NERTS/MePTCL	##
39		Vegetation clearance to be done and patrolling report to be furnished	NETC	##

40	Disturbance in Tripura System on 27.09.18	Tower top patrolling to be done, lightning location to be identified and tower footing resistance to be measured for 132kV AGTCCPP-Agartala D/C if required.	NERTS	##
41		Relay settings and CT connection to be reviewed for 132kV Agartala - SMNagar D/C at Agartala.	TSECL	##
42		Carrier inter-trip to be implemented for 132kV Agartala-Budhjunagar immediately.	TSECL	##
43		DPR Settings to be reviewed for 132kV Palatana - SMNagar line at Palatana.	OTPC	##
44		Patrolling report to be submitted for 132kV Agartala-Budhjunagar line.	TSECL	##
45	Tripping of 400kV Bongaigaon-Alipurduar-2 on 25.09.18	Z-I over reaching of M-2 relay at Bongaigaon end of 400 kV Bongaigaon - Alipurduar 2 line to be investigated	NERTS	##
46	Disturbance in Nagaland System on 19.09.18	LBB mal-operation checked and rectified at Dimapur.	NERTS	Completed
47		The relay 7SA 522 at Misa has temporarily been put out of service for further investigation. Another Distance Relay (GE-Make) and B/U O/C & E/F protection is put in service.	NERTS	Completed
48		Tower top patrolling to be done for 220kV Mariani-Mokokchung D/C.	NERTS	##
49	Frequent tripping of 220kV Mariani-Mokochung-I on overvoltage	Y-ph CVT error to be rectified	NERTS	##
50	Tripping of 132kV Pare-Lekhi and Pare Units on 30.09.18	Vegetation clearance of 132 kV Pare - Lekhi line to be done	DoP Ar. Pradesh/NERTS	##

51		GT neutral over current protection settings of Pare units to be reviewed	NEEPCO	##
52	Repeated tripping of 132kV Ranganadi-Pare	Carrier healthiness to be checked at Pare	NEEPCO	##
53		Vegetation fault clearance to be done	DoP Ar. Pradesh	##
54	Tripping of 400kV Bongaigaon-APD-I on 09.10.18	Main-I Z-2 non-detection to be checked at Bongaigaon	NERTS	##
55		Main -2 relay at Bongaigaon non-operation to be checked	NERTS	##
56	Tripping of 132kV Badarpur-Panchgram on 18.10.18, 27.10.18	Z-III timing to be checked at Badarpur end	NERTS	##
57	Grid Incidence on 05.12.18	Combine the existing TEED and Reactor Differential Protection Zone as well as replace the existing old differential relays by new Numerical Differential Relay.	NERTS	Dec'18
58		Multiple E/F in buried cables to be addressed with GIS upgradation	NERTS	Mar'19
59		Commissioning of Aux.BCU	NERTS	Jan'19
60		Review of HVDC pole protection philosophy	NERTS	Dec'18
		List out the TEED protections in NER and testing of these relays/include the TEED protection zone in differential protection Zone of Reactor or Transformer	NERTS	Jan'19

**Deliberation of the sub-Committee:**

## After detailed deliberations the forum decided that recommended actions should be detailed and not generic in nature. Eg. for lightning/vegetation related incidents the location number should be finalized in the Sub-group itself, with only implementation related actions viz. chemical earthing, TLSA installation etc. being monitored in PCCM/OCCM.

***The Sub-committee noted as above.***

***Action: All utilities as above/NERPC/NERLDC.***

## **B.2 Frequent trippings in Manipur System:**

Tripping of 132kV Aizawl - Tipaimukh and 132kV Jiribam - Tipaimukh on 20.08.18

Findings of the Sub-group:

- Suspected downstream fault at Tipaimukh

Remedial actions to be taken:

- Reasons for non-tripping at Tipaimukh end to be furnished by MSPCL.
- Status of PLCC for protection at Tipaimukh to be intimated by MSPCL

Frequent Tripping of 132 kV Loktak – Ningthoukhong line

132 kV Loktak – Ningthoukhong line tripped 2 times in the month of Sep'18 and 3 times in Nov'18.

Findings of the Sub-group:

- Fault in the line for incidents in Sep'18
- Downstream fault for incidents in Nov'18.

Remedial actions to be taken:

- MSPCL is requested to submit the patrolling report and action taken report
- E/F to be made directional at Ningthoukhong
- DR to be furnished

Frequent tripping of 132kV Loktak-Rengpang

132kV Loktak-Rengpang tripped 6 times in Sep'18 and 5 times in Oct'18

Findings of the Sub-group:

- As per DR submitted from Loktak end vegetation fault on all occasions

Remedial actions to be taken:

- Vegetation clearance to be done and patrolling report to be furnished by MSPCL.
- DR for Rengpang end to be furnished by MSPCL at the earliest.

### **Deliberation of the sub-Committee:**

After detailed deliberation it was decided that the above trippings may once again be discussed in detail in the Sub-group with attendance of officers from MSPCL.

***The Sub-committee noted as above.***

***Action: MSPCL, NERLDC, NERPC.***

## **B.3 Relay setting co-ordination in Nagaland system:**

In discussions of Sub-group it was highlighted that co-ordination in settings is required for the following lines:

- 132kV Doyang-Mokokchung(PG)-Mokokchung(NAG)
- 132kV Doyang-Sanis-Wokha-Kohima-Dimapur

Suggested settings are attached at **Annex. B.3**

**Deliberation of the sub-Committee:**

After detailed deliberation it was decided that the setting coordination would be completed by 31.12.2018.

***The Sub-committee noted as above.***

***Action: NERTS, NEEPCO, DoP Nagaland.***

**B.4 Grid Disturbance of NER on 05.12.18 at 10:19 Hrs:**

At 10:19 Hrs on 05.12.18, Bus fault occurred at 400 kV Bongaigaon Sub-Station resulting in bus dead of 400 kV Bongaigaon, 400 kV Balipara, 400 kV Biswanath Chariali, 400 kV Ranganadi and 400 kV Misa Sub-Stations. As a result of these dead buses, power supply to Khupi area & Capital area of Arunachal Pradesh and Sonabil area of Assam interrupted , As a result, there was about 140 MW load loss in these areas..

The tripping of 400 kV lines from ER (Alipurduar & Binaguri) which were exporting approx. 800 MW to NER led to the overloading of 220 kV lines (220 kV APD-Salakati-D/C) for the short period when loading on each circuit is approx. 220 MW plus for 3 SCADA samples. Through these 220 kV lines ER-NER remain synchronized with the grid and islanding of NER was saved, tripping of even one line would have caused severe high loading of other and ultimately separation of NER. The low value of net NER-IR exchange (HVDC export nearly equal to import by 400 kV and 220 kV AC lines) and survival of 220 kV lines during the fault saved the separation of NER.

The following lines tripped:

1. 400 kV Bongaigaon – New Siliguri I & II
2. 400 kV Bongaigaon – Alipurduar I & II
3. 400 kV Bongaigaon – Balipara I, II & III
4. 400 kV Bongaigaon – Azara
5. 400 kV Bongaigaon – Byrnihat
6. 400 kV Bongaigaon – BgTPP I and II
7. 400 kV Balipara – Misa I & II
8. 400 kV Balipara – Biswanath Chariali I, II, III & IV
9. 400 kV Biswanath Chariali- Ranganadi I

10. 220 kV Mariani – Mokochung I,&II
11. 400/220 kV 315 MVA ICT I and II at Azara
12. 400/220 kV 315 MVA ICT I and II at Misa
13. 400/220 kV 315 MVA ICT I and II at Balipara
14. 400/132 kV 200 MVA ICT I and II at Biswanath Chariali
15. 132 kV Biswanath Chariali – Pavoi D/C, 132 kV Pavoi – Gohpur, 132 kV Sonabil – Pavoi, 132 kV Sonabil – Gohpur, 132 kV Balipara – Sonabil,
16. 800 kV HVDC Pole I & 2

Preliminary information from NERTS reveals that R-phase isolators of Bus Reactor-II at Bongaigaon Substation opened automatically on load signaling that the Isolator/Breaker/ Earth Switch interlock did not function. Also, apparently the Bus Bar Protection Schemes and LBB Schemes did not operate.

NERTS may intimate and explain the reason of automatic signal generation for opening of the Isolators of Bus Reactor II, and the reason for non-functioning of Bus Bar Protection Schemes and LBB Schemes at Bongaigaon Substation.

For ensuring the safe and secure operation of the grid, the Isolator/Breaker/Earth Switch interlock schemes, Bus Bar Protection Schemes and LBB schemes of all the major substations at NER is to be done by all the concerned constituents.

**Deliberation of the sub-Committee:**

NERLDC requested that comments of POSOCO against the minutes of Special Meeting held on 05.12.2018 may be considered.

Following points were discussed meeting:

- a. Frequency Controller is in service at BNC as confirmed by NERTS.
- b. Synchronization can be done at 220 kV at Alipurduar and Salakati as confirmed by ERTS and NERTS respectively.
- c. NERLDC informed that mainly Palatana and AGTCCPP Units participated in the oscillation. PSS tuning may be done for Palatana units and NEEPCO to expedite the installation of new DVR in AGTCCPP units.

Director(O&P), NERPC requested NERLDC to provide the settings for PSS. NERLDC informed the forum that range of low frequency oscillations observed in the grid can be provided using PMU data for proper tuning. It was also informed that CTU/RPC can engage 3rd party for checking of PSS.

- d. NERLDC highlighted the importance of time synchronization of SCADA, SoE, DR output and EL output. NERTS informed that time synchronization issue will be addressed. It is decided to resolve the issue at the earliest and will be monitored in the PCC meeting.
- e. NERTS intimated that Over Current and Earth Fault protections are enabled after the incident in Backup Impedance protection with following settings:
- Over Current:  
Current Setting: 4 times load current  
Time Setting: 100 msec, definite time
- Earth Fault:  
Over Current:  
Current Setting: 2 times load current  
Time Setting: 100 msec, definite time
- f. NERTS informed that DC fault occurred during panel shifting work at 220 kV substations and was momentary in nature. So, it cannot be certain that fault was in +/- DC. He also informed that behavior of the DC system during DC fault cannot be predicted.

***The Sub-committee noted as above.***

***Action: All utilities.***

### **B.5 Reconstitution of Protection Subgroup**

At present, members of Protection Sub Group of NERPC are from NERPC, NERLDC, POWERGRID, MePTCL and NEEPCO. Some of Events, GDs and GIs could not be discussed/ analyzed during last few Protection Sub Group Meetings as these events were pertaining to other utilities who are not members of this group.

It is requested that Protection Sub Group may be reconstituted.

### **Deliberation of the sub-Committee:**

Director, NERPC reiterated that NERLDC, MePTCL, NEEPCO and NERTS are permanent members because the respective utilities are based in Shillong and Sub-group has to be convened immediately following any major disturbances. After detailed discussion, it was decided to include AEGCL as permanent member of Sub-group. However in case any tripping(s) pertaining to other utilities they must attend the Sub-group meeting(s). The forum nominated the following officer(s):

Name of Utility	Name of officer(s)
DoP Ar. Pradesh	Sh. Domo Kamduk
AEGCL	Sh. N. Sharma
MSPCL	Sh. Themchan Woleng
P&ED Mizoram	Sh. Zoramdina
DoP Nagaland	Sh. R. Iralu
TSECL	Sh. Anabik Som
NHPC	Sh. Yugandhar
NTPC	Sh. Rajendran
OTPC	Sh. S.R. Das

*The Sub-committee noted as above.*

*Action: All utilities.*

**B.6 Analysis & Discussion on Events, Grid Incidences, Grid Disturbances which occurred in NER Grid w.e.f 1<sup>st</sup> August 2018 – 30<sup>th</sup> November 2018.**

The following numbers of Grid Disturbances (GD) & Grid Incidents (GI) occurred during the period w.e.f 1<sup>st</sup> August 2018 – 30<sup>th</sup> November 2018:

Sl. No.	Control Area	Grid Incidents in nos. (Aug'18 to Nov'18)	Grid Disturbance in nos. (Aug'18 to Nov'18)	Grid Incidents in nos. (Jan'18 to Nov'18)	Grid Disturbance in nos. (Jan'18 to Nov'18)
1	Palatana	1	0	13	1
2	AGBPP	9	0	30	0
3	AGTPP	6	0	34	2
4	Ranganadi	1	0	1	0
5	Kopili	5	0	15	1
6	Khandong	6	0	13	2
7	Doyang	0	1	2	2
8	Loktak	2	1	2	2
9	BgTPP	3	0	21	0
10	Pare	2	0	6	0
11	Ar. Pradesh	0	16	3	45
12	Assam	0	5	0	30

13	Manipur	0	12	0	27
14	Meghalaya	0	0	0	9
15	Mizoram	0	7	0	20
16	Nagaland	0	25	0	56
17	Tripura	0	11	0	36

Sl. No.	Category of GD / GI	Grid Disturbance in nos.	
		Aug'18 to Nov'18	Jan'18 to Nov'18
1	GI-I	16	69
2	GI-II	19	68
3	GD 1	76	203
4	GD 2	0	1
5	GD 3	0	1
6	GD 4	0	0
7	GD 5	0	0
8	<b>Total GI</b>	35	137
9	<b>Total GD</b>	76	205

*The Sub-committee noted as above.*

#### **B.7 Status of implementation of protection audit recommendations by M/s Tractabel**

Protection audit of 6 substations of NER was conducted by Tetrabel (Consultancy firm to review the status of implementation of recommendation of Enquiry Committee on Grid Disturbance and Protection Audit) in Jun-Sep'2016. Following substations were audited by Tractabel:

1. 400/220 kV Bongaigaon-Salakati (PG)
2. 400/220 kV Balipara (PG)
3. 400/220 kV Byrnihat (MePTCL)
4. 400/220 kV Misa (PG)
5. 400/132 kV Ranganadi HEP (NEEPCO)
6. 220 kV Sarusajai (AEGCL)

Relevant pages of Audit report submitted by Tetrabel is attached as **Annexure-B.7**.

POWERGRID, MePTCL, AEGCL & NEEPCO are requested to intimate the status of implementation of protection audit recommendations by Tetrabel.

**Deliberation of the sub-Committee:**

Pls refer to discussion item **A.1**.

***The Sub-committee noted as above.***

**B.8 Standard for Station Event Logger/Events in SCADA system**

Since the installation of Event Loggers, SAS/SCADA, etc. under R & M works funded from PSDF is going on/completed in NER states, it is proposed that utilities may adopt the standard followed by POWERGRID for EL/Events in SCADA system. This will help in post analysis after any grid disturbance. List of minimum required inputs which are to be configured in Station Event Logger/SACADA is attached as **Annexure-B.8**.

**Deliberation of the sub-Committee:**

GM, NERLDC requested that other utilities may please follow the standard being followed by POWERGRID for SoE submission to NERLDC.

***The Sub-committee noted as above.***

***Action: All utilities.***

**B.9 Replacement of C&R panel against 132KV Silchar-I & II feeder at 132/33KV Srikona S/S, AEGCL by M/s Siemens**

During recent replacement of C&R panel at 132KV Silchar Feeder-II following problems has been observed after replacement of old C&R panel with new C&R panel supplied by AEGCL:

- a. Distance relay has been installed instead of differential relay as per original scheme.
- b. A/R of CB is not possible as the scheme is suitable for 3-pole gang operation.
- c. Features like CB Spring charge status of individual pole, trip circuit supervision of all poles are not available.
- d. Binary inputs of CB such as PD signal are not available in the relay.
- e. Relay SAS signal could not be verified due to shortage of time during shut down.

However in 132KV Silchar Feeder - I replacement of C&R has not yet been done. As such keeping in view the above problems incurred after replacement in Silchar feeder-II, arrangement may be made to try to interface the BCU etc. as applicable in up gradation by AEGCL in our existing C&R panel and its proper functionality to be confirmed.

Thus if the above process is successful, then AEGCL may reinstall the old POWERGRID C&R panel (which has been replaced) of Silchar Feeder-II and reinstall the interfacing unit as required by AEGCL in that panel and confirm its functionality.

Alternatively other option which may be adopted is that after solving the issues as mentioned in SI No. a, b, c, d,e in Silchar Feeder-II then only work against Silchar Feeder - I may be started.

**Deliberation of the sub-Committee:**

GM(AM), NERTS apprised the forum of the ground reality at Srikona station. He stated that GO CB has been procured under PSDF and the panel for the same does not have features required for SPAR operation. This has impeded the SPAR operation for Silchar(PG) feeders at Srikona which have SP CB but panels have been changed. DGM, AEGCL informed that all possibilities are being explored alongwith the one of integration of POWERGRID C&R panel with the SAS.

***The Sub-committee noted as above.***

***Action: AEGCL.***

**Date & Venue of next PCC meeting**

It is proposed to hold the 53<sup>rd</sup> PCC meeting of NERPC on second week of March, 2019. However, the exact date and 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 52<sup>nd</sup> PCC Meetings held on 13.12.2019**

SN	Name & Designation	Organization	Contact No.
1.	Sh. Nangkong Perme, SE (SO & PSC)	Ar. Pradesh	09436288643
	Sh. Narayan Sarma, DGM (MRT)	Assam	09435040035
	Sh. Ashutosh Bhattarcharjee, AGM (P&E)	Assam	
	Sh. Abhishek Kalita, AM	Assam	08486213068
	Sh. Nishanta Baruah, AM	Assam	08473036988
	Sh. Nakambam Pritam Singh, DM	Manipur	09862296029
	Sh. Themchon Woleng, Manager	Manipur	08311000143
	Sh. Y. Kharpuri, AE, C&C	Meghalaya	09774507325
	<b>No Representatives</b>	<b>Mizoram</b>	
	Sh. Mhonlumo Kikon, EE (TR), Mokokchung	Nagaland	09436005616
	Sh. L.Singson	Nagaland	09436831129
	Sh. Jyotirmoy Dutta, DGM	Tripura	09436540963
	Sh. S. Chaudhuri, Sr. Mgr	Tripura	09436503239
	Sh. Amaresh Mallick, GM(SO-II)	NERLDC	09436302220
	Sh. Jerin Jacob, AM (So-II)	NERLDC	09402120113
	Sh. Pallash Jyoti Borah, AM. (SO-II)	NERLDC	09366435631
	Sh. Joypal Roy, Sr. Manager	NEEPCO	09435577726
	Sh. Tanya Tazi, Sr. Manager	NEEPCO	09436042053
	Sh. Ashim Kr. Sarmah, DM(E/M)	NEEPCO	09435078860
	Sh. P. Kanungo, GM- AM	PGCIL	09436302823
	Sh. Devaprasad Paul, Manager	PGCIL	
	Sh. S.R. Das, Sr. Manager	OTPC	09612400784
	<b>No Representatives</b>	<b>NTPC</b>	
	Sh. P.K. Mishra, MS	NERPC	-
	Sh. B. Lyngkhai, Director/S.E (O&P)	NERPC	09436163419
	Sh. S. Mukherjee, AD-I/AEE	NERPC	08794277306