North Eastern Regional Power Committee

Agenda for 47th PCC Sub-Committee Meeting

Time of Meeting : 10:30 Hrs.

Date of Meeting : 24th July, 2017 (Monday)

Venue : "Hotel Nandan", Guwahati.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 46th MEETING OF PROTECTION SUB- COMMITTEE OF NERPC.

The minutes of 46th meeting of Protection Sub-committee held on 7th April, 2017 at Guwahati were circulated vide letter No. NERPC/SE/PCC/2017/1554-578 dated 21st April 2017.

No comments/observations were received from the constituents, the Sub- committee may kindly confirm the minutes of 46th PCCM of NERPC.

B. ITEMS FOR DISCUSSION

1. Third Party Protection audit of NER Sub-Stations

It was discussed in the **subgroup meeting held on 23rd Jan'17** that the last 3rd party Protection audit was done 4 years back. As per recommendations of Enquiry Committee, thorough third party protection audit need to be carried out in time bound manner. This exercise should be repeated periodically and monitored by RPCs. Subgroup agreed that it was necessary to carry out 3rd party protection audit at the earliest and referred the matter to PCC forum.

In 46th PCCM, Sr. Executive, OTPC informed the forum that OTPC has already implemented the recommendations of audit committee and submitted the report to NERPC. Forum requested subgroup to review the relay settings submitted by OTPC. Sr. Manager, TSECL informed the forum that they have implemented the recommendations for distance protection and will be implementing for other relays at the earliest. Forum requested TSECL to submit report by 30th April, 2017 to NERPC.

After detailed deliberation, it was decided to carry out third party protection audit of 1/3rd of NER substation. Forum decided to form 8 teams with 2 members from NERPC, NERLDC, POWERGRID, NEEPCO, AEGCL, MePTCL & TSECL each and one member each from DoP, Nagaland, P&ED, Mizoram, MSPCL & all ISGS in NER. In POWERGRID substation audit, members from 2 states & NERLDC/NERPC shall be present. And in state substation audit, members from POWERGRID, NERPC/NERLDC and other state shall be present. All constituents are requested to send their nominee(s) to SE(P), NERPC before 30th April, 2017. Formation of teams, identification of stations and utility wise coordinators & preparation of audit schedule are to be completed within 30th April'17 by

subgroup. Forum requested hosting station to arrange logistics, food & accommodation facilities to the audit team. Audit will be starting from May 2017.

During Subgroup Meeting held on 17th July, 2017, NERPC requested DGM, NERLDC to brief the Subgroup about the strategy for conducting 3rd Party Protection Audit. NERLDC informed the subgroup that 3rd Party Protection Audit of one-third of the total substations and generating stations may be carried out in the 1st phase. In view of this, NERLDC highlighted the following **substations and generating stations of respective constituents to be carried out in 1st phase considering the most critical Substation and Generating Station and based on protection related issues**.

1. **POWERGRID**: Substations at +/- 800 kV HVDC Biswanath Chariali, 400/132 kV Silchar, 220/132 kV Mariani, 220/132 kV Mokokchung, 220/132 kV Dimapur, 132/33 kV Imphal (Total 6 Substations)
   Switching Stations at 132 kV Aizawl and 132 kV Khleihriat (Total 2 Switching Stations).
2. **NEEPCO**: Generating Stations at 220 kV AGBPP, 132 kV AGTCCPP, 132 kV Doyang HEP and 132 kV TGBPP, Monarchak (Total 4 Generating Stations).
3. **NHPC**: 132 kV Loktak HEP.
4. **NTPC**: 400 kV BgTPP.
5. **OTPC**: 400 kV Palatana GBPP.
6. **DoP, Arunachal Pradesh**: Substation at 132/33 kV Khupi, 132/33 kV Pasighat, 132/33 kV Chimpu and 132/33 kV Daporijo(Total 4 Substations).
7. **AEGCL**: Substations at 400/ 220 kV Azara, 220/132/33 kV BTPS, 220/132/33 kV Agia, 220/132/33 kV Samaguri, 220/132/66/33 kV Mariani, 220/132/66/33 kV Tinsukia, 220/132/33 kV Sonabil, 220/33 kV Jawaharnagar, 220/132/33 kV Boko, 132 kV/33 Gohpur, 132/33 kV Kahilipara, 132/33 kV Rangia, 132/33 kV Dhaligaon, 132/33 kV Panchgram, 132/33 kV Srikona, 132/33 kV Umrangsho, 132/33 kV Dibrugarh, 132/33 kV Depota, 132/33 kV Pailapool and 132/33 kV Bokajan Substation(Total 20 Substations)
   Generating Stations at 132 kV NTPS, 132 kV LTPS and 132 kV Karbi Langpi HEP (Total 3 Generating Stations).
8. **MSPCL**: Substations at 132/33 kV Imphal, 132/33 kV Ningthoukhong, 132/33 kV Karong and 132/33 kV Kakching(Total 4 Substations).
9. **MePTCL**: Substations at 132/33 kV Khliehriat, 132/33 kV Mawlai, 132/33 kV NEHU, 132/33 kV Nangalbibra and 132/33 kV EPIP-II (Total 5 Substations)
   Generating Stations at 132 kV Leska HEP and 132 kV Umiam Stage-III HEP (Total 2 Generating Stations).
10. **P & ED, Mizoram**: Substations at 132/33 kV Zuangtui, 132/33 kV Luangmual and 132/33 kV Kolasib(Total 3 Substations).
11. **DoP, Nagaland**: Substations at 132/66/33 kV Dimapur, 132/33 kV Kohima and 132/33 Mokokchung(Total 3 Substations).

12. **TSECL**: Substations at 132/66/33 kV Agartala, 132/66/33 kV Udaipur, 132/33 kV Surajmaninagar, 132/33 kV PK Bari, 132/33 kV Budhjangnagar and 132/33 kV Dharmanagar(Total 6 Substations) Generating Stations at 132 Rokhia, 132 kV Baramura and 66 kV Gumti (Total 3 Generating Station).

It was discussed in the meeting that a group comprising of one member each of NERPC/NERLDC, NTPC/NHPC/NEEPCO/OTPC/POWERGRID and state constituent shall be nominated for carrying out the 3rd Party Protection Audit.

Data as per Ramakrishna Task Force format and NERPC format should be available prior to protection audit.

Subgroup concluded the discussion by stating that the above Substations and Generating Stations may be audited w.e.f. 1st week of August, 2017 and referred the matter to PCC forum.

Members may please discuss.

2. Identification of short lines to install line differential protection

During Sub Group Committee Meeting of PCC held on 24th Oct'16, NERLDC informed the forum that for purpose of installation of line differential protection on Short lines, it is necessary to identify the list of lines for this purpose.

The identification exercise for installation of Differential Protection relays has to be completed for all Transmission Lines of NER Grid level on a priority basis.

As informed by BgTPP-NTPC & POWERGRID, the installation of Differential Protection on 400 kV BgTPP – Bongaigaon D/C has been completed. As the 1st stage, differential protection is to be installed on important short lines like 132 kV Silchar – Srikona D/C, 132 kV Imphal(PG) – Imphal(MSPCL) D/C etc.

In 45th PCC meeting, forum decided that in the absence of uniformity of specific length criteria for installation of differential protection installation on short lines (valid for both existing and new transmission lines), the criteria adopted by SRPC could be referred for North-Eastern Region. After detailed deliberation, the following criterion was decided for adoption for identification of short line for differential protection:-

a) All 132 kV transmission lines of length <5 Kms.
b) All 220 kV transmission lines of length <10 Kms
c) All 400 kV transmission lines of length <50 Kms
d) All 132 kV & above dedicated transmission lines of Generators with installed capacity > 50 MW

The short lines as identified would be considered on basis of importance for installation of Differential Protection relays. The process of installation may be started wherever no additional investments in terms of Communication links between two ends of the line are required. Constituents of NER are requested to identify the lines in which line differential protections are to be installed under above criteria.

In 46th PCCM, it was decided that all constituents should identify short lines (integrated) only and submit the list of such lines to NERPC & NERLDC by 30th April, 2017. Subgroup will compile and come out with complete list of all such short line where differential protection is required by 30th April 2017. MePTCL informed that they have already identified the short lines.

After detailed deliberation, it was decided to exclude short lines that are radially connected to NER Grid from installing differential protection.

AEGCL informed that they have placed order to ABB for differential protection in line between LV side of ICT-2 at BgTPP and 220 kV BTPS bus. NTPC informed that this link shall not be treated as line, as there is no 220 kV Bus at BgTPP end. Due to difference in opinion amongst AEGCL, NTPC, PGCIL and NERLDC it was decided that NERPC & NERLDC will arrange a separate meeting with AEGCL and NTPC to sort out this matter.

MePTCL & AEGCL have replied to NERLDC/NERPC with the list of lines for installation of line differential relay but the list submitted by AEGCL is not complete.

Forum may please review the criteria for installation of differential protection relay. Members may compile and finalize the list of all the lines of NER where differential protection relay is to be installed.

3. **Finalization of Draft model maintenance procedures that are to be followed by utilities.**

During 46th PCC Meeting, it was decided that all constituent has to give suggestions and feedback on Draft model maintenance procedure for transmission system prepared by group comprising of NERLDC, PGCIL and AEGCL on or before 30th April, 2017. **After 30th April, 2017, the sub-committee will finalize the maintenance procedure**.

Also, Forum requested all members to furnish list of plant wise available diagnostic tools to NERPC & NERLDC by 30th April 2017. MePTCL informed that they submitted the list of diagnostic tools to NERPC.

Forum also requested power utilities of NER to assess the number of new kits for measurement of tower footing resistance without the need to disconnect earth shielding wire. Possibilities of funding from PSDF for this purpose may be explored.

However, no feedback has been received from constituents regarding draft model maintenance procedure for transmission utilities.

The draft model maintenance procedure for transmission utilities is considered as final and transmission utilities may please follow the maintenance procedure.

4. Calculation of Relay Setting as per recommendation of V. Ramakrishna Task Force

The relay settings details as formulated by NERTS in line with recommendations of V. Ramakrishna Task Force on Power system contingencies, had been circulated by NERLDC to all constituents of NER for comments. During Sub Group Committee Meeting of PCC held on 24th Oct'16, it was agreed that the same can be implemented at the earliest for uniformity in protection systems.

In 45th PCC meeting, it was informed to the forum that MePTCL has started the exercise while AEGCL has started implementing but having problem in the Resistive Reach setting and will come up with detailed analysis of the issue in the next meeting. TSECL has assured that it will start the work at the earliest. NTPC told that they can start implementing as per NERTS formulation only after receiving comments from their Corporate Office and will communicate the same to NERPC at the earliest.

Status as per 46th PCCM is given in the table below:

Sl. No.	Constituent	Current Status of implementation	Completion Date
1.	Assam	Started	By September, 2017
2.	Arunachal Pradesh	No representative present	By September, 2017
3.	Manipur	No representative present	By September, 2017
4.	Meghalaya	Started	By September, 2017
Sl. No.	**Constituent**	**Current Status of implementation**	**Completion Date**
5.	Mizoram	No representative present	By September, 2017
6.	Nagaland	Not started	By September, 2017
7.	Tripura	Completed	Completed
8.	NERLDC	Completed	Completed
9.	NEEPCO	Started	By September, 2017
10.	NHPC	Completed	Completed
11.	NTPC	Started	By April, 2017
12.	OTPC	Completed	Completed

The committee requested all constituent to implement recommendation of V. Ramakrishna Task Force by September, 2017 and furnish report of the same to NERPC and NERLDC.

Members may please intimate the status of implementation of Relay Settings as per Ramakrishna task force.

5. **Review of Zone-II relay settings:**

During Sub Group Committee Meeting of PCC held on 24th Oct'16, the forum discussed the relay settings document finalized by NERTS, POWERGRID for adoption in NER, for fulfilment with recommendations of V. Ramakrishna Committee Task Force. The forum had agreed for implementation of Zone-II / Zone-III settings accordingly.

NERLDC has circulated the impedances of shortest and longest lines for review of the reach of Zone-II Relay Settings by the constituents. Till now NERLDC has received comments from Assam, Meghalaya, OTPC and Kopili (NEEPCO). Forum asked AEGCL to furnish the guidelines of Zone-2 timing followed by them at the earliest to NERPC & NERLDC.

In 46th PCCM, after detailed deliberation it was decided that Zone –II setting to be completed for all important lines by 30th April, 2017. Forum requested subgroup to circulate list of important lines where settings have to be implemented at the earliest. The list of important lines were circulated to all the utilities by subgroup. The same was discussed in subgroup meeting on 18th April'17.

Members may please discuss the status of implementation of zone-II settings in important lines.

6. **Review of relay settings- Substation wise (including downstream state substation):**

During Sub Group Committee Meeting of PCC held on 24th Oct'16, it was informed that due to ill-coordination in relay settings between State systems and ISTS, frequent tripping of elements are occurring. Most of the Grid disturbances in NER Grid are due to this. **P&E Dept., Mizoram and DoP, Nagaland** were requested to co-ordinate their relay settings with ISTS systems and implement the same as suggested by NERTS.

NERPC may take up with P&E Dept., Mizoram and DoP, Nagaland in this regard for quick implementation.

Decision taken in sub group meeting held at Shillong on 24.10.16 are to be implemented at the earliest and status to be reported to NERPC&NERLDC.

In 46th PCCM, EE, DoP Nagaland informed the forum that they will discuss with POWERGRID and implement the required relay settings in downstream elements of DoP, Nagaland within 1 month to avoid unnecessary tripping of ISTS lines due to downstream fault.

DoP, Nagaland & P&ED, Mizoram may intimate the status.

7. **Details of PSS installed and activated in all Hydro stations:**

During Sub Group Committee Meeting of PCC held on 24th Oct'16, NERLDC requested all power stations to provide details where PSS is installed. It was also requested to activate existing PSS after tuning and inform the same through mail.

NEEPCO vide mail dtd. 27th Oct'16 informed that all hydro stations of NEEPCO have PSS installed and activated. NERLDC vide email dtd. 27th Oct'16 had requested NEEPCO for further details of PSS.

NERLDC requested NEEPCO and NHPC to furnish details and settings of existing PSS (Time constant, PSS gain, PSS output limiter Max, Min etc.).

Only Palatana CCGT has provided the details of PSS installed and activated for damping oscillations to NERLDC, whereas the details provided by NEEPCO is not sufficient and to be submitted to NERPC/NERLDC. NEEPCO has given parameters of block diagram of some of their generators (Khandong, etc.), which do not convey any practical meaning in sense of damping of Low Frequency Oscillations. NERLDC requested NEEPCO to furnish the following details of PSS – Make, Date installed, Last date of tuning by OEM, Tuned frequency range.

In the 45th PCCM, NERLDC expressed concern in the matter of several cases of Poorly Damped/Negatively Damped Oscillations in Southern part of NER Grid, and requested NHPC to tune their PSS if it is already installed, and furnish details of PSS to NERPC&NERLDC.

In 46th PCCM, the committee requested NEEPCO to provide the necessary details to NERLDC at the earliest. NERLDC requested NHPC to install PSS for the better system operation. Manager, NHPC informed that PSS is not installed in Loktak generating station.

Members may please discuss.

8. Standardization of Disturbance Recorder Channels:

Disturbance Recorders on Transmission elements are necessary for post disturbance analysis, and identification & rectification of any protection operation. As per CBIP's manual on Protection of Generators, GT, Transformers and Networks, it is recommended to have minimum 8(eight) analog signals and 16(sixteen) binary signals per bay or circuit. Also, it should have a minimum of 5 sec of total recording time, minimum pre-fault recording time of 100 msec and minimum post-fault recording time of 1000 msec.

POWERGRID had standardized Disturbance Recorder Channels for lines, transformers & reactors. The Sub-committee requested NERPC/NERLDC to circulate the above standardization to all constituents of NER for giving comments and suggestion by 24.07.15. NERLDC had sent this document to all constituents of NER for giving comments and suggestion by 24.07.15.

During 42nd PCC meeting, the forum requested NTPC to provide their standardized DR Channels for generator so that it may be standardized for all generating units of NER. NTPC representative readily agreed. S.E. (O) once again requested all the constituents to kindly furnish their comments so that the process may be completed.

During the 43rd PCCM, DGM (SO-II), NERLDC stated since no comments/observations were received from the constituents it may be assumed that the DR channels for line, transformer and reactor are finalized. After detailed deliberation, forum decided DR channels as finalized have to be implemented in

all ISTS lines and intra-state lines with numerical relays, within 31.07.2016 and gradually for all 220kV and 132kV lines.

The forum agreed that since Assam power system is the largest state system of NER Grid, standardization of DR channels in lines of Assam is felt necessary. It was decided that AEGCL may complete implementation of standardized DR channels by 31st August 2016, and take help from NERTS, if necessary.

NTPC agreed to submit standardized DR channels for generator by 20.07.2016, which can then be discussed for adoption by all generators of NER Grid.

In 44th PCCM, AEGCL representative informed the forum that the work of DR standardization will be completed by 30th November 2016.

In 46th PCCM, AGM, AEGCL informed that they have already standardized DR channels for all 200KV and above lines. NERLDC informed forum that after repeated request to OTPC, their DR digital channels are not standardized, so proper analysis of events related to Palatana could not be done. OPTC informed that they will look in to this matter at the earliest. TSECL informed that they have not done the DR standardization. The forum requested NERLDC to provide list of all lines where standardization of DR Channel is required. All members are requested to provide update of Standardization of channel to NERLDC at the earliest.

Members may please discuss.

9. Implementation of SPAR

During Sub Group Committee Meeting of PCC held on 24th Oct'16, NERLDC indicated that SPAR (Single Phase Auto Reclosure) is not available in 132 kV AGTPP – Agartala D/C lines, which was resulting in multiple tripping of these lines on transient fault. NERTS was requested for changing of Auto-reclosure scheme to SPAR.

It was also decided that utilities should identify those transmission lines which have no SPAR scheme for implementation of the same. Implementation of SPAR is considered necessary in view of reliability of the power system.

In 45th PCCM, Forum requested all constituents to furnish status report of SPAR implementation to NERPC.

In 46th PCCM, Forum requested subgroup to circulate list of important lines to get the latest information regarding implementation of 1-phase/3-phase Auto-Reclosure scheme. All members to furnish the required information to NERLDC & NERPC by 30th April'17.

10. Installation of Polymer Insulator and Transmission Line Surge Arrestor in Lightning Prone Areas

It was noted that most of tripping of transmission lines in NER Grid occur either on account of lightning strikes or due to vegetation infringement problem. It was decided that all utilities will identify the lightning prone areas and conduct checking of high tower footing resistance in transmission lines in these areas.

Since tripping of line on lightning occurs due to arcing, to prevent that it is required to either maintain low value of tower footing resistance or install of lightning arrester for the particular towers having consistent high tower footing resistance due to prevailing ground conditions.

In 45th PCCM, The forum requested all the constituents to complete the process of identification of lightning prone line sections, and initiate action in this regard.

Forum requested members to identify lightning prone areas and measure tower footing resistance in these locations. AEGCL & MePTCL informed that they don't have proper earth resistance measuring tool at present and they are planning to procure the same at the earliest.

POWERGRID informed that additional shield wire earthing and counterpoise earthing are not helping much to arrest lightning. Better way is to install TLSA as chemical earthing cost (around RS. 80,000) is double the cost of installation of TLSA (around RS. 40,0000).

In 46th PCC Meeting, forum requested members to identify lightning prone areas and measure tower footing resistance in these locations. AEGCL & MePTCL informed that they don't have proper earth resistance measuring tool at present and they are planning to procure the same at the earliest. POWERGRID had informed that additional shield wire earthing and counterpoise earthing are not helping much to arrest lightning. Better way is to install TLSA as chemical earthing cost (around RS. 80,000) is double the cost of installation of TLSA (around RS. 40,0000).

During Subgroup Meeting held on 17th July, 2017, DGM(NERLDC) suggested MePTCL and NETC to identify the lightning prone areas of all the lines of MePTCL and NETC respectively and install polymer insulators and line arrestors to those lightning prone areas.

Members may please discuss.

10. Mock Testing of SPS related to Palatana

During Sub Group Committee Meeting of PCC held on 17th July'17, members addressed the importance of mock testing of SPS related to Palatana at the earliest to avoid the disturbance in Southern part of NER Grid.

POWERGRID informed that there is time stamping issue of DT signal at Palatana. POWERGRID informed that the matter will be resolved in few days. **POWERGRID and Palatana agreed to do mock test of all SPS related to Palatana on 24th July, 2017 subject to good weather condition.** DGM,

NERLDC further stated that time of both ends is to be synchronized with GPS before doing mock testing of SPS related to Palatana.

Members may please discuss

11. Desynchronisation of AGTCCPP Machines due to Under Voltage issue

During Sub Group Committee Meeting of PCC held on 17th July'17, NEEPCO informed the Subgroup that it is difficult to run their machines under under-voltage condition.

Subgroup decided that system study has to be done by TSECL to identify the nodes where under-voltage issue exists and plan for the installation of Capacitor Banks for improvement of voltage profile.

Members may discuss

12. Low Frequency Oscillations (LFOs) at 132 kV Agartala

In subgroup meeting held on 9th March 2017, NERLDC showed the PMU plots of several instances of oscillations observed at 132 kV Agartala PMU and raised concern on proper tuning of Automatic Voltage Regulator (AVR) of AGTPP units considering the oscillation in voltage and many of the cases involved switching of AGTPP units. He also requested NEEPCO to take this matter seriously as these localized oscillations can spread to other generating stations connected to grid.

Sr. Manager, NEEPCO informed that there was a change in control systems of AGTTP Units 3 & 4. OEM has informed them that oscillation may be due to change in control system as oscillations were observed only in these units. He also informed that control systems of AGTPP Units 1 & 2 will be replaced soon with new ones. If those machines also experience oscillation problem, OEM will install additional equipment to damp the oscillation.

DGM (SO-II), NERLDC asked NEEPCO to check and inform forum whether PSS is enabled and functioning properly. He also requested NEEPCO to carry out AVR tuning and take necessary actions to damp out oscillations at the earliest as these oscillations can lead to wide spread oscillations in grid.

In 46th PCCM, it was discussed that Sr. Manager, NEEPCO informed that the oscillation started after changing the control panel of units 1 and 2. NEEPCO also informed that matter is already reported to OEM and OEM is yet to provide any solution. The forum requested NEEPCO to pursue the matter very seriously with the OEM as low frequency oscillation endangers the stability of grid and come up with solution at the earliest.

NEEPCO may please intimate the status.

13. Analysis & Discussion on Events, Grid Incidences, Grid Disturbances which occurred in NER Grid w.e.f 1st January - 30th June 2017.

The following numbers of Grid Disturbances (GD) & Grid Incidents (GI) occurred during the period **w.e.f 1st March to 30th June 2017 and 1st January to 30th June 2017** :-

Sl. No.	Control Area	Grid Incidents in nos.	Grid Disturbance in nos.	Grid Incidents in nos.	Grid Disturbance in nos.
		Mar'17 to June'17	Mar'17 to June'17	Jan'17 to June'17	Jan'17 to June'17
1	Palatana	8	4	19	4
2	AGBPP	3	0	6	0
3	AGTPP	13	10	18	10
4	Ranganadi	0	0	0	0
5	Kopili	0	0	2	0
6	Khandong	7	0	7	0
7	Doyang	0	4	0	4
8	Loktak	1	5	1	5
9	BgTPP	2	0	7	0
10	Arunachal Pradesh	0	12	0	17
11	Assam	0	19	0	20
12	Manipur	0	20	0	22
13	Meghalaya	0	27	0	27
14	Mizoram	0	14	0	14
15	Nagaland	0	22	0	22
16	Tripura	0	22	0	22

Sl. No.	Category of GD/GI	Grid Disturbance in nos	
		March'17 to June '17	Jan'17 to June'17
1	GI-I	21	26
2	GI-II	13	34
3	GD 1	131	152
4	GD 2	4	4
5	GD 3	1	1
6	GD 4	1	1
7	GD 5	0	0
8	Total GI	34	60
9	Total GD	137	158

This is for information to the members.

The root cause analysis and remedial measures to prevent the Grid Events were discussed during meetings of Sub-group of PCC held on 18th April'17 & 17th July, 2017. Tripping of few elements could not be concluded due to non-submission of DR output (For example: tripping related to 220/132 kV BTPS Substation, 220/132 kV Samaguri Substation , etc.)

Tripping for the period March, 2017 to June 2017 are categorized as listed below. **Utilities may please take suggested remedial measures accordingly within stipulated time.**

i. Tripping due to Vegetation
ii. Tripping due to Lightning
iii. Tripping due to improper relay coordination
iv. Tripping due to mis-operation.
v. Tripping due to Equipment Failure**.**

The report of the GD, GI and Element Tripping along with root cause, remedial measures and action to be taken is attached at **Annexure-I.**

The following key points were noted during the Subgroup meeting held on 18th Apr17, 5th May07 and 17th Jul17 and may be discussed among the Members:

Key points discussed in subgroup meeting held on 18th April 2017

a) While analysing the tripping of **400 kV Palatana I & II lines on 20.03.17 at 13:54 Hrs**, it has been observed that a transient B-Ph to earth fault occurred in 400 kV Palatana – Silchar II line during stringing of OPGW. DPR opened the B-Ph at both ends and auto reclosed at Silchar after dead time, but auto-reclose at Palatana did not operate. Current in B-Phase at Silchar remained low (only charging current and reactor current at both ends).

   This resulted in flowing of load current only in R & Y phase of 400 kV Palatana – Silchar II from Palatana, while the current in B-Phase of 400 kV Palatana – Silchar I much higher causing a neutral current in 400 kV Palatana – Silchar I at Palatana. B phase of 400 kV Palatana – Silchar I tripped on earth fault at Palatana after 1.6 Sec sending Direct Trip signal to Silchar. Later on, the 400 kV Palatana – Silchar II tripped at both ends on PD.

b) Palatana, OTPC informed that as per scheme enable at Palatana for Auto-reclose function is single phase fault with one high speed reclosing shot. OTPC informed that Auto-reclose function blocking due to Line 2 main breaker auxiliary contact BG1-C malfunctioning resulted in activation of Pole discrepancy Protection. Accordingly during Line 2 shutdown OTPC has carried out dummy functional test of Line 2 Auto reclose, but found that A/R response was fine. OTPC also informed that they have replaced the BG1-C contacts.

c) TSECL informed that the status of improvement of protection systems at Agartala, Rokhia & Udaipur substations of Tripura will be informed to the forum within 1 week.

d) Palatana, OTPC informed that the PD settings for the 400 kV Palatana- Silchar I & II lines are as follows:

Name of element	Breaker	Trip circuit 1	Trip circuit 2
400 kV Palatana-Silchar I	Main Breaker	1.5 sec	1.5 sec
	Tie Breaker	2.5 sec	2.5 sec
400 kV Palatana-Silchar II	Main Breaker	1 sec	1.5 sec
	Tie Breaker	2.5 sec	2.5 sec

OTPC suggested that PD Timing of Line-2 Tripping circuit-1 to be increased from 1second to 1.5 seconds. Similarly PD settings of both tripping circuits of both Tie breaker to be decreased from 2.5 seconds to 1.5 seconds.

Relay settings for 400 kV Palatana- Silchar I & II lines to be reviewed jointly by Palatana and NERTS.

e) The forum requested OTPC to implement the SPS-2 at the earliest. OTPC informed the forum that the same can be implemented once NERTS, POWERGRID provide a DT signal from Silchar end. The forum requested NERTS, POWERGRID to look into the matter at the earliest and provide necessary support to implement SPS-2 as per designed.

f) Palatana has informed that they have checked relay configuration in line with DR standardization documents provided by NERLDC vide e-mail dated 17.07.2015 and found that none of the digital channels description is available as digital inputs for `Disturbance Recorder' menu in their line protection relays of Micom P442/437 model. OTPC is only able to change the Analog channel. Description of Analog channels is different as they have phase nomenclature A, B, C instead of R, Y, B in this channel. Forum requested OTPC to look into the matter. The forum requested OTPC that DR should have a minimum of 5 sec of total recording time, minimum prefault recording time of 100 msec and minimum post-fault recording time of 1000 msec and this information is to be recorded in single file.

g) AGTPP, NEEPCO informed that cable for DR downloading will be supplied by ALSTOM by May'17.

h) NERLDC requested all the utilities to inform root cause of the events along with suggested remedial measures while furnishing FIR of any events in the grid.

i) The forum suggested all the utilities to do patrolling of lines in case of repeated tripping. Patrolling report to be submitted to NERPC with a copy to NERLDC.

j) NERLDC informed the forum that outage report of +/- 800 kV HVDC, Biswanath Chariali- Agra is not being received by NERLDC since November'17. The matter has also been discussed with NRLDC and NLDC. NERLDC requested NERTS to look into the matter. NERTS assured that the same will be supplied by CRTAMC of NER henceforth.

k) During analysis of events, it has been observed that there is no Numerical Relay at Doyang HEP, NEEPCO. NEEPCO informed the forum that due to remote location no vendor are ready to deliver the same. The forum suggested NEEPCO to take help from NERTS and install numerical relays at Doyang HEP at the earliest.

l) Palatana, OTPC raised the issue System Study Meeting is not being held for so many months and requested to arrange System Study Meeting at the earliest for discussion of implementation of SPS related to reliable power supply to Tripura & Bangladesh & operation of Palatana machines.

Key Points discussed in subgroup meeting on 5th May, 2017

1. **Grid Disturbance of Tripura System on 25.04.17 at 13:05 hrs.**

   At 13:05 hrs on 25.04.17, 400 kV Silchar-Palatana II line got tripped (Silchar :Distance Protection, Y-E,Z1, 187.5 km; and Palatana-Distance Protection, Y-E, Z1, 57.55 km). 400 kV Silchar-Palatana line I was under Shutdown as per 131st OCC Meeting.

   Units of Palatana, AGTPP, Rokhia and Monarchak tripped subsequently along with following lines:

   1. 132 kV AGTPP-Agartala I & II
   2. 132 kV AGTPP-Kumarghat
   3. 132 kV Palatana-Udaipur
   4. 132 kV Palatana-SM Nagar:
   5. 132 kV Agartala-Dhalabil line
   6. 132 kV Ambassa-Teliamura(Gamaitilla)

   Due to operation of SPS-I at Palatana,132 kV Silchar-Srikona D/C.132 kV Silchar-Panchgram lines and 132 kV Badarpur-Panchgram line got tripped. Due to blackout at 132 kV Surajmaninagar Substation, 132 kV Comilla-SM Nagar Line I & II was hand tripped.

   Due to the tripping of above lines, total load loss was 283 MW(Tripura- 103 MW, South Assam-61MWand Bangladesh 119 MW) and Generation Loss was 680 MW(Palatana-556 MW, AGTPP- 62 MW, Monarchak-60 MW & Rokhia -26MW) respectively.

   P.K Bari, Gournagar(Kailashar), Kamalpur and Ambassa Substations survived during the grid disturbance.

   Deliberation in the meeting

   Southern Part of NER Grid was connected to rest of NER Grid through 400 kV Silchar – Palatana Line I, 132 kV AGTPP - Kumarghat line & 132 kV Agartala - Dhalabil lines (400 kV Silchar – Palatana Line I was under planned shutdown for GIS Construction work of 09 nos. of pile foundation in the Switchyard at Srikona S/S from 08:33 Hrs dated 25.04.17 and 132 kV Jirania - Baramura line was under shutdown on 25.04.17 due to conductor snap (low capacity) & 132 kV Agartala - Dhalabil line (low capacity) overloaded & tripped subsequently on over current. As a result, Southern Part of NER Grid separated from rest of NER Grid. Palatana, AGTCCPP, Rokhia and Monarchak

Generating units also tripped. Due to tripping of these elements, Southern part of NER grid subsequently collapsed due to load- generation mismatch.

NERLDC informed the forum that from the Disturbance recorder outputs from Main- 1 and Main – 2 of DPR of Silchar of 400 kV Silchar – Palatana II line indicate that this line tripped on DPR, Zone-1, Y-E from Silchar end, **auto-reclose was attempted but the line tripped due to persistent fault in Y-B-E phase**. Main – 1 of DPR of Palatana end indicates that the line tripped on DPR, Zone-1, Y-E , auto-reclose was attempted but the line tripped due to persistent fault in Y-B-E phase. DR of Main II from Palatana end has not been received.

DGM, NERTS informed the forum that the tripping of 400 kV Silchar – Palatana Line II is attributed to falling of a tree at location 172 and 173 (i.e. Teliamura forest area). Forum requested POWERGRID to **share the photographs of the affected part** as found in patrolling with NERLDC & NERPC. The ROW clearance is less in the forest area. Patrolling has been done by NERTS and some more probable areas that may encroach the ROW have been identified. **NERTS has decided to discuss this matter with Forest Department.**

Forum requested all constituents take prior permission from NERLDC for doing live line works as this involves auto-recloser function of DPR in non-auto mode.

Tripping of 400 kV Silchar - Palatana 2 line with 400 kV Silchar - Palatana 1 line under shutdown satisfied the conditions required for operation of SPS-2, which is designed to reduce the generation of Palatana to 20 MW i.e house load of Palatana. But SPS-2 associated with Palatana Generation failed to operate resulted in collapse of islanded systems i.e Tripura system with Bangladesh (South Comilla) along with Palatana & AGCCTPP systems. NERLDC presented PMU plots of the frequency rise in islanded system. **It was decided by the forum to conduct mock testing of SPS periodically for checking healthiness of the SPSs owing to non-operation of SPS-II.**

It was also decided that **relay settings of Palatana, AGTCCPP, Silchar, and critical substations in Tripura system** will be reviewed.

Also, forum requested TSECL to submit the details regarding UFR operation related to this event to NERLDC & NERPC at the earliest.

POWERGRID, NETC, TSECL & OTPC may please intimate the status

2. **Grid Disturbance of Tripura System on 26.04.17 at 12:51 hrs.**

At 12:51 hrs on 26.04.17, 400 kV Silchar-Palatana II line got tripped(Silchar: DT Received, and Palatana-details awaited). 400 kV Silchar-Palatana line I was under Shutdown as per 131st OCC Meeting. Units of AGTPP, Rokhia and Monarchak tripped subsequently along with following lines.

1. 132 kV AGTPP-Agartala I & II
2. 132kV AGTPP-Kumarghat

3. 132 kV Palatana-Udaipur
4. 132 kV Palatana-SM Nagar
5. 132 kV Dhalabil-Agartala

132 kV Baramura-Jirania was under S/D.
Due to blackout at Surajmaninagar, 132 kV Comilla-SM Nagar I & II was hand tripped.

Due to the tripping of above lines, total load loss was 151 MW(Tripura- 45 MW and Bangladesh- 106 MW)
Generation Loss was 172 MW(AGTPP- 48 MW, Monarchak-69 MW & Rokhia -55MW) respectively.

P.K Bari, Gournagar(Kailashar), Kamalpur, Dhalabil, Ambass, Teliamura and Baramura Substations survived during the grid disturbance.

Issues to be discussed

i) Root cause & remedial measure for repeated tripping of 400 kV Palatana-Silchar Line-2 on 20.03.2017, 19.04.2017 , 25.04.2017 & 26.04.2017
ii) Time line required for facilitate DT command extended upto Palatana for modification of SPS-2.
iii) Coordination of Relay Settings of 400 kV Palatana-Silchar Line-1 & 2.
iv) Pole Discrepancy time settings required at both Silchar and Palatana including Tie Breaker.

Deliberation in the meeting:

Southern Part of NER Grid was connected to rest of NER Grid through 400 kV Silchar – Palatana Line I, 132 kV AGTPP - Kumarghat line & 132 kV Agartala - Dhalabil lines. 400 kV Silchar – Palatana Line I was under planned shutdown for GIS Construction work of 09 nos. of pile foundation in the Swichyard at Srikona S/S from 08:33 Hrs dated 25.04.17 and 132 kV Jirania - Baramura line was under shutdown on 26.04.17 due to conductor snap.

The incident started with tripping of 400 kV Silchar – Palatana Line II at 12:51 Hrs dated 26.04.17.

132 kV AGTCCPP - Kumarghat line (low capacity) & 132 kV Agartala - Dhalabil line (low capacity) overloaded & tripped subsequently on over current.

<u>As a result, Southern Part of NER Grid separated from rest of NER Grid.</u>

Palatana, AGTCCPP, Rokhia and Monarchak Generating units also tripped.

Due to tripping of these elements, Southern Part of NER Grid subsequently collapsed due to load-generation mismatch.

DGM, NERLDC informed the forum that from DR, it appears to be a high impedance fault. He informed that the exact nature of fault could not be determined from the DR. He requested **NERTS to carry out intensive patrolling for tracing of evidence of faults.**

Engineer, NERTS informed the forum that Silchar end of the line received DT from Palatana end. To identify the nature of tripping at Palatana end, it was requested to **Palatana to submit the list of settings for which DT is sent to Silchar end.** As per PMU plots it was found that fault was cleared by tripping of 132 kV lines from Agartala on O/C.

Chief Manager, NLDC requested both NERTS and OTPC representative to provide relay setting in excel sheet. It was also decided that **relay settings of Palatana, Azara, AGTCCPP, Silchar, Byrnihat and critical substations in Tripura system will be reviewed**.

Forum requested all constituents take prior permission from NERLDC for doing live line works as this involves auto-recloser function of DPR in non-auto mode.

The forum also stressed the need for periodical testing of SPS so that it operates as per design during emergency condition. Manager OTPC informed that they have the pole discrepancy time as Main= 1.5s and Tie =1.5s and also informed that Auto-Reclose feature is not activated in Tie Bay of Generator.

NERTS suggested OTPC to check whether priority scheme is activated for Auto-recloser at Palatana end. If priority scheme is activated, then Pole Discrepancy time shall be as Main=1.5s & Tie=2.5s else Main=1.5s & Tie=1.5s

Also, forum requested TSECL to submit the details regarding UFR operation related to this event to NERLDC & NERPC at the earliest.

POWERGRID, NETC, TSECL & OTPC may please intimate the stat

3. **Frequent tripping of 132 kV Agartala AGTPP line:**

132 kV Agartala AGTCCPP line has tripped frequently during April'17 due to earth fault at AGTPP end. Earth fault settings of both end is to be checked.

Deliberation in the meeting

NERLDC informed the forum that 132 kV Agartala - AGTCCPP line is a very short line which is frequently tripping due to Earth fault. It is a double circuit line and both lines are tripping simultaneously. Sr. Engineer, NLDC informed the forum that due to short nature of the line, it is tripping due to zone overreaching. To resolve the issue, it is either to go for differential protection or implement permissive scheme suitable for short lines with proper zone coordination. As discussed in 45th PCC Meeting, it was decided to use differential protection in 132 kV line under 05 km of line length. 132 kV Agartala- AGTPP is 8.4 km; hence it was not recommended to use differential protection in the circuit. But because of frequent tripping of the circuit, the forum decided that the matter might be discussed in the next PCC Meeting and the feasibility of installing differential protection in the circuit may be looked into.

Engineer, NERTS informed the forum that no tripping took place at Agartala end and tripping was always at AGTCCPP end due to earth fault. He suggested that the fault was in the downstream in Tripura system. The forum requested TSECL to check thoroughly for any tripping in downstream distribution network at the time of tripping of 132 kV AGTCCP-Agartala D/C lines.

It was also decided by the forum that relay settings of Agartala, AGTCCPP and downstream substations of Agartala will be reviewed.

TSECL, NEEPCO & POWERGRID may please intimate the status

4. **Under-Voltage issue at Tripura system to be discussed.**

Deliberation in the meeting

DGM NERLDC informed the forum that the Tripura system is facing under voltage during peak hours due to over drawal by Tripura. To reduce the under-voltage issue, Sr. Engineer, NLDC suggested the generating stations to change the Tap setting of the transformer and also to switch off line reactor at such time.

TSECL, NEEPCO & OTPC may please intimate the status

5. **Grid Disturbance on 28th April'17.**

Southern Part of NER comprising of Tripura, Mizoram, Manipur, South Assam, Palatana, AGTPP, Loktak & Bangladesh (South Comilla load) systems was connected with rest of NER Grid through 400 kV Silchar - Byrnihat line, 132 kV Haflong - Jiribam line, 132 kV Badarpur - Khliehriat line & 132 kV Dimapur - Imphal line (400 kV Silchar - Azara line tripped at 18:42 Hrs on 28.04.17. NERLDC requested RTAMC to restore this line vide Code 817).

At 19:10 Hrs on 28th April'17, 400 kV Silchar - Byrnihat line tripped. This led to overloading of 132 kV Haflong - Jiribam line, 132 kV Badarpur - Khleihriat line & 132 kV Dimapur - Imphal line and subsequently tripped on over current. Due to tripping of these lines, Southern Part of NER was separated from rest of NER grid and subsequently collapsed due to load generation mismatch.

Antecedent NER Demand Met: 1922 MW
Antecedent NER Generation: 1722 MW
Total Load Loss: 843 MW (Tripura-211, Bangladesh-154, Manipur-136, Mizoram-45, South Assam-81,Meghalaya-216)
Generation Loss: 990 MW (Palatana-515, AGTPP-78, Loktak-105, Monarchak-72, Rokhia-55, Baramura-20, LHEP-126, Umiam Stg II-7, Umiam Stg I-12)

CEA Category: GD-IV

Restoration was started with closing 400 kV Silchar – Azara Line at 19:17 Hrs. Power was extended to Manipur power system through 132 kV Imphal (PG) – Imphal at 19:34 Hrs. Power was extended to Mizoram power system through 132 kV Kumarghat (PG) – Aizwal at 19:49 Hrs. Power extended

to South Assam power system through 132 kV Silchar - Srikona 1 line at 19:42 Hrs. Power extended to Tripura power system at 19:46 Hrs through 132 kV AGTPP - Agartala line. Power extended to Bangladesh (South Comilla) area at 20:03 Hrs through 132 kV Surajmaninagar - South Comilla 1 line.

Observations/Items to be discussed:

Reason for Misa substation blackout

Whether 220 kV lines at Misa were uniformly segregated

Reason for tripping of +/- 800 kV Biswanath Charali - Agra HVDC

Details regarding operation of related SPS

Operation of UFR

Root Cause

Deliberation in the meeting

Southern Part of NER Grid comprising of power systems of Tripura, South Assam, Manipur, Mizoram, Bangladesh (South Comilla) & Myanmar (Tamu) was connected with rest of NER Grid through 400 kV Silchar - Azara line, 400 kV Bongaigaon - Byrnihat line, 132 kV Badarpur – Khliehriat line, 132 kV Haflong – Jiribam line & 132 kV Dimapur – Imphal line (132 kV Karong-Kohima line & 132 kV Lumshnong-Panchgram line kept open for system requirement)

Part of Meghalaya power system (downstream of Byrnihat) was connected with rest of NER Grid through 400 kV Bongaigaon – Byrnihat line, 400 kV Silchar – Byrnihat line 220 kV Misa – Byrnihat I & II lines and 132 kV Khliehriat –NEIGRIHMS line, 132 kV Mustem - NEHU line (132 kV Nangalbibra-Nongstoin line and 132 kV Lumshnong-Panchgram line kept open for system requirement)

400 kV Silchar - Azara line (112 MW) tripped at 18:42 Hrs on 28.04.17. NERLDC requested RTAMC to restore this line vide Code 817 at 19:03 Hrs of 28.04.17 but the line was not restored due to delay in resetting the relay at Azara end as reported by SLDC, Assam to RTAMC, Shillong.

400 kV Bongaigaon - Byrnihat line (-100 MW) tripped at 18:58 Hrs on 28.04.17.

At 19:11 Hrs, 400 kV Silchar – Byrnihat (High Capacity) tripped and subsequently, 132 kV Badarpur – Khlierihat (low capacity), 132 kV Dimapur –Imphal (low capacity), & 132 kV Jiribam- Halflong (low capacity) tripped on O/C due to cascading effect.

As a result, Southern Part of NER Grid separated from rest of NER Grid and subsequently collapsed due to load generation mismatch.

220 kV Misa - Byrnihat I (- 28 MW) & II (- 28 MW) tripped at 19:11 Hrs on 28.04.17. As informed by SLDC, MePTCL, at the same time, 132 kV Khliehriat –NEIGRIHMS line & 132 kV Mustem - NEHU line tripped. Due to tripping of these elements, Part of Meghalaya power system (downstream

of Byrnihat) was separated from NER Grid and subsequently collapsed due to load generation mismatch.

NERLDC informed the forum that DR of Azara is showing SOTF (Switch on to Fault)/TOR (Trip on Reclose) and Silchar received DT from Azara.Zone-3 initiated at both ends and this needs to be analyzed by both POWERGRID & AEGCL. Similarly for tripping of 400 kV Silchar–Bynihat line, Bynihat showed Z1 fault and DT received at Silchar end after 289 milliseconds. **The Forum suggested that settings of relays at Byrnihat needs to be checked and receipt of DT at Silchar end needs to be analyzed by POWERGRID & MePTCL**.

Also the relay setting of Byrnihat needs to be thoroughly checked for the reason for DEF operation as it should not have operated. It was also decided that relay settings of Palatana, Azara, Byrnihat, Silchar and critical substations in Tripura power system will be reviewed.

It was informed by Manager, NERTS that REL670 relay at Misa did not reset the LBB timer after fault clearing in 400 kV Misa-Byrnihat Line I and resulted in opening of all the feeders connected to the Bus II due to LBB operation. **Reason for LBB operation at Misa substation was not clear and forum requested POWERGRID to analyze the event and detailed report is to be submitted to NERPC & NERLDC.** Also, the forum suggested that relay REL670 has to be checked thoroughly to avoid such mal-operation.

Chief Manager, NLDC requested NERTS and OTPC to provide snap shot of SCADA to analyze whether DT was received for SPS 3 operation. He also suggested for dummy checking of SPS. It was also decided to conduct mock testing of SPS periodically for healthiness of the SPSs.

Also, forum requested all the constituents to submit the details regarding UFR operation related to this event to NERLDC & NERPC at the earliest.

It is been observed that separate electromechanical relays are still been used for over current protection even though Numerical relays are installed for the protection of that line. Due to this, disturbance recorder outputs have not been generated for tripping of these lines in over current. Also, as per discussions in 43rd PCCM, DR channels are to be standardized in all ISTS lines and intra-state lines with numerical relays. It is been observed that, DR channels are not properly configured yet for some of the lines.

Forum requested all constituents to enable Over Current feature in Numerical relays installed for lines and configure DR channels as per standard already circulated.

Key points discussed in subgroup meeting held on 17th July 2017

a) SF6 Low alarm (2nd stage) of 400 kV Silchar – Byrnihat line at Byrnihat end sends DT signal during single pole tripping mainly in R and B phases. As informed by POWERGRID, the gas pressure of all the breakers are within limits but the situation arises only during the case of tripping. Subgroup requested MePTCL to resolve the matter at the earliest as two major disturbances on 28th April17 and

8th June17 occurred due to tripping of 400 kV Silchar -Byrnihat S/C and 400 kV Silchar -Azara S/C on account of lightning.

b) 400 kV Silchar – Palatana line II tripped on **16th May, 2017 at 08:27 Hrs** due to physical contact of foreign object with the conductor during OPGW work. Fault was in the line reactor differential protection zone and differential protection of line reactor operated at Silchar and cleared the fault instantaneously. However, Palatana end Distance relay over-reached and had seen the fault in Zone-1 tripping the B-phase line instantaneously at Palatana end due improper ground compensation factor at Palatana end. As informed by Palatana, the settings has been changed and the problem is resolved. Subgroup requested Palatana to inform the revised settings at the earliest.

c) DGM, NERLDC requested the constituents that prior to changing of protection settings, approval from NERPC is to be taken.

d) As informed by AEGCL representative, BCU at Azara Substation restarts after every tripping. Due to this, Auto – reclose fails and the line trips. The matter is to be taken up with ABB and resolved at the earliest.

e) DGM, NERLDC requested to the Subgroup that root cause analysis of the events should be done based on the weekly events report sent by NERLDC on weekly basis for identifying the root cause and take the remedial measures immediately and the report is to be sent to NERPC and NERLDC on weekly basis.

f) Subgroup members requested NERLDC to arrange Protection Subgroup Meeting on monthly basis.

g) DGM, NERLDC suggested MePTCL to identify the lightning prone areas of all the lines of MePTCL and install polymer insulators and line arrestors to those lightning prone areas.

h) DGM, NERLDC suggested NETC to identify the lightning prone areas of all the lines of NETC and install polymer insulators and line arrestors to those lightning prone areas.

i) DGM, NERLDC requested to all constituents to submit DR and EL output within 24 hours of tripping for root cause analysis and for taking remedial measures immediately and to submit the list of Event Logger installed.

j) POWERGRID informed the Subgroup that there is simultaneous tripping of 132 kV Dimapur – Doyang I and II line and 132 kV Doyang – Mokokchung line at many occasions. Subgroup requested POWERGRID and Doyang to check the settings and analyse the root cause.

k) POWERGRID informed the Subgroup that TLSA is installed in selected location of 132 kV Khandong – Khleihriat I feeder. POWERGRID informed that lightning related tripping has reduced due to installation of TLSA in this line. POWERGRID is planning to install TLSA in entire line.

l) Subgroup requested that installation of DR, EL output Software by Substation Owner is to be done at the earliest. The procedure for downloading the file is also to be shown to the operator of the station.

DR/ EL output after each tripping has to be furnished by the owner of the station even if he is not the owner of the protection system.

m) It has been recorded that 132 kV AGTCCPP – Agartala I and II lines and 132 kV AGTCCPP – Kumarghat line has tripped frequently. It has been analysed that these lines tripped for fault beyond its jurisdiction. Subgroup requested AGTCCPP to submit the relay settings of all the elements connected to AGTCCPP and TSECL to submit the relay settings of all the elements of 132 kV Substations owned by TSECL to NERPC and NERLDC.

n) AEGCL informed the Subgroup that 220 kV Balipara – Sonabil line tripped on 01.04.2017 at 08:25 Hrs due to fault in 220 kV Samaguri – Sonabil line which was idle charged from Sonabil end. Subgroup requested POWERGRID to check the relay settings at Balipara end of this line.