भारत सरकार Government of India
विद्युत मंत्रालय Ministry of Power
उत्तर पूर्वी क्षेत्रीय विद्युत समिति
North Eastern Regional Power Committee
एन ई आर पी सी कॉम्प्लेक्स, डोंग पारमाओ, लापालाङ, शिल्लोंग-७९३००६, मेघालय
NERPC Complex, Dong Parmaw, Lapalang, Shillong - 793006, Meghalaya

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Website: www.nerpc.nic.in

No. NERPC/SE (O)/PCC/2019/***2475-2512*** Dated: July 22, 2019

To,

1. Managing Director, AEGCL, Bijuli Bhawan, Guwahati – 781 001
2. Managing Director, APDCL, Bijuli Bhawan, Guwahati – 781 001
3. Managing Director, APGCL, Bijuli Bhawan, Guwahati – 781 001
4. Director (Generation), Me. PGCL, Lumjingshai, Short Round Road, Shillong – 793 001
5. Director (Distribution), Me. ECL, Lumjingshai, Short Round Road, Shillong – 793 001
6. Director(Transmission), Me. PTCL, Lumjingshai, Short Round Road, Shillong – 793 001
7. Managing Director, MSPDCL, Secure Office Bldg. Complex, South Block, Imphal – 795 001
8. Managing Director, MSPCL, Electricity Complex, Keishampat, Imphal – 795 001
9. Director (Tech.), TSECL, Banamalipur, Agartala -799 001.
10. Director (Generation), TPGCL, Banamalipur, Agartala -799 001.
11. Chief Engineer (WE Zone),Department of Power ,Govt. of Arunachal Pradesh, Itanagar- 791111
12. Chief Engineer (EE Zone),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
13. Chief Engineer (TP&MZ),Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
14. Engineer-in-Chief (P&E), Department of Power, Govt. of Mizoram, Aizawl – 796 001
15. Chief Engineer (P), Department of Power, Govt. of Nagaland, Kohima – 797 001
16. CGM, (LDC), SLDC Complex, AEGCL, Kahilipara, Guwahati-781 019
17. Group General Manager, NTPC, Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
18. ED, NERTS, PGCIL, Dongtieh-Lower Nongrah, Lapalang, Shillong -793 006
19. ED (O&M), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
20. ED (Commercial), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
21. ED (O&M), NHPC, NHPC Office Complex, Sector-33, Faridabad,Haryana-121003
22. Vice President (Plant), OTPC, Badarghat Complex, Agartala, Tripura - 799014
23. GM, NERLDC, Dongtieh, Lower Nongrah, Lapalang, Shillong -793 006
24. Member Secretary, ERPC, 14 Golf Club Road, Tollygunge, Kolkata-700033
25. Chief Engineer, GM Division, Central Electricity Authority, New Delhi – 110066
26. Chief Engineer (NPC), NRPC Complex, Katwaria Sarai, SJSS Marg., New Delhi - 110016

Sub: Minutes of 53rd PCC Meeting.

Sir/Madam,

Please find enclosed herewith the minutes of 53rd PCC Meeting held at Guwahati on the **11th July, 2019** for your kind information and necessary action. The minute is also available on the website of NERPC, **www.nerpc.nic.in**.

Any comments/observations may kindly be communicated to NERPC Secretariat at the earliest.

Encl: As above

भवदीय/Yours faithfully,

B. Lyngkhoi
Member Secretary I/C

Copy to:

1. CGM, AEGCL, Bijuli Bhavan, Guwahati - 781001
2. CGM, APGCL, Bijuli Bhavan, Guwahati - 781001
3. CGM, DISCOM, Bijuli Bhavan, Guwahati - 781001
4. Head of SLDC, Me.ECL, Lumjingshai, Short Round Road, Umjarain, Shillong – 793 022
5. Head of SLDC, Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791 111
6. Head of SLDC, Department of Power, Dimapur, Nagaland
7. Head of SLDC, Electricity Department, Govt. of Manipur, Keishampat, Imphal – 795 001
8. Head of SLDC, Department of Power, Govt. of Mizoram, Aizawl – 796 001
9. Head of SLDC, TSECL, Agartala – 799 001
10. Chief Engineer(Elect), Loktak HEP,Vidyut Vihar, Kom Keirap, Manipur- 795124
11. Addl. GM (EED), NTPC Ltd., Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
12. DGM (C&M), OTPC, 6th Floor, A-Wing, IFCI Tower -61, Nehru Place, New Delhi – 110019.

Member Secretary I/C

North Eastern Regional Power Committee

MINUTES OF THE 53rd PROTECTION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 11/07/2019 (Thursday)

Time : 10:00 hrs

Venue : "Hotel Nandan", Guwahati.

The List of Participants in the 53rd PCC Meeting is attached at **Annexure – I**

Shri B.Lyngkhoi, Member Secretary (I/C), NERPC welcomed all the participants to the 53rd PCC meeting. He noted the presence of participants from all the utilities except Ar.Pradesh, Nagaland and NTPC. He noted that of late many utilities are participating irregularly in the PCC forum in absence of agenda pertaining to them. This is lowering the morale of the forum. The presence of the members from all utilities strengthen the forum with various technical inputs. On behalf of the forum he requested all the utilities to ensure maximum participation in the PCC forum. Further he added that a dedicated Sub-group has been formed to analyse disturbances. The recommendations of the Sub-group and PCC are to be followed in letter and spirit.

Thereafter he requested AEE, NERPC to take up the agenda items for discussion.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 52nd MEETING OF PROTECTION SUB-COMMITTEE OF NERPC.

The minutes of 52nd meeting of Protection Sub-committee held on 13th December, 2018 at Guwahati were circulated vide letter No. NERPC/SE/PCC/2018/2565-589 dated 3rd January, 2019.

The Sub-committee confirmed the minutes of 52nd PCCM of NERPC with the above modifications as no other comments/observations were received from the constituents.

A. ITEMS FOR INFORMATION

A.1 REMEDIAL ACTIONS ALREADY COMPLETED BY UTILITIES:

Name of the utility	Total nos of recommended remedial actions 52nd PCCM onwards	Nos of recommended actions Completed	Remedial actions remaining to be completed
MePTCL	20	13	7
NERTS	64	21	43
OTPC	6	4	2

TSECL	16	6	10
DoP Nagaland	3	1	2
AEGCL	17	7	10
MSPCL	6	1	5
NEEPCO	17	2	15
P&ED Mizoram	3	1	3
DoP Ar.Pradesh	5	0	5
NTPC	1	0	1
NHPC	1	0	1
Total	155	46	110

This is for information please.

B. I T E M S FOR DISCUSSION

B.1 Standardization of Disturbance Recorder Channels:

Decision as per previous meeting:

- 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.

Deliberation of the sub-Committee:

AEGCL	Sample DR outputs of completed R&U stations will be submitted after Aug'19. Sample DR outputs of ongoing R&U stations to be given upon completion of works as per schedule.
MePTCL	DR output of Main-2 relay is not standardized at Killing station. Main-1 DR output from Killing by 26.09.2019. Other stations by July'19
TSECL	Sample DR output of all stations by July'19
DoP Ar.Pradesh	Could not be updated as no representative
MSPCL	Sample DR output of completed R&U stations will be submitted by July'19. Ongoing stations to be given upon

	completion of works as per schedule.
P&ED Mizoram	Sample DR output of completed R&U stations by July'19. Ongoing stations to be given upon completion of works as per schedule.
DoP Nagaland	Could not be updated as no representative

The Sub-Committee noted as above.

Action: All utilities as above.

B.2 Implementation of SPAR

Decision(s) as per deliberation in previous meeting(s):

- AEGCL has submitted the A/R status as follows:

SPAR implemented at both ends		**Status updated in the Sub-group**	**Status as updated in the 53rd PCC Meeting**
220kV Agia - BTPS D/C	SPAR implemented but turned off because of the requirement of few changes in the scheme	Agia end By July'19	Agia end By July'19
220kV BTPS-Salakati D/C	SPAR implemented but turned off because of the requirement of few changes in the scheme	No carrier communication. By June'19	August '19
SPAR implemented at one end		**Latest status**	
220kV Agia-Azara D/C	SPAR available at Azara, Agia end under R&U works	Agia end by July'19	Agia end by July'19
220kV Azara-Boko D/C	SPAR available at Azara, other end will be done in R&M works	Boko end by Aug'19	Boko end by Aug'19
220kV Jawaharnagar-Samaguri D/C	SPAR available at JawaharNagar, other end will be done in R&U works	Presently available at both end, functional.	Presently available at both end, functional.
220kV KarbiLangpi-Sarusajai D/C	SPAR in service in sarusajai, other end will be done under PSDF	Presently available at both end, functional.	Presently available at both end, functional.
220kV Samaguri-Sarusajai D/C	SPAR in service in sarusajai, other end will be done under PSDF	Presently configuration is 220kV Samaguri-Sonapur-Sarusajai. SPAR present both at Samaguri and Sarusajai. Sonapur by July'19	Presently configuration is 220kV Samaguri-Sonapur-Sarusajai. SPAR present both at Samaguri and Sarusajai. Sonapur

			by July'19
220kV Samaguri-Sonabil D/C	SPAR in service in sonabil, at samaguri end it will be implemented under psdf	Presently available at both end, functional.	Presently available at both end, functional.
132kV Balipara-Sonabil	3ph AR available at Sonabil end, Balipara end to be impkemented by AEGCL	Balipara end by July'19	Balipara end by July'19
132kV Pavoi-Sonabil	3ph AR available at Sonabil end, Pavoi end under R&U	Pavoi end by Aug'19	Pavoi end by Aug'19
		Latest status	
All other 220kV & 132kV Lines	To be implemented under PSDF	To be monitored after Aug'19	To be monitored after Aug'19

All other utilities to submit the A/R status for the 132kV lines.

Action: MSPCL, MePTCL, TSECL, P&ED Mizoram, DoP Ar.Pradesh, DoP Nagaland.

- Auto-reclosure for 132kV Palatana-Surjamaninagar

  OTPC vide their letter no. OTPC/UDP/PLT/2018-19/Electrical/42 dated 23rd Aug'18, wherein OTPC requested to allow them to keep auto reclose function of 132 kV Transmission lines at Palatana in "Non-auto mode". Director, NERPC vide mail dated. 07.09.18 had requested OTPC to abide by the decision of the 51st PCC meeting to keep AR in "Auto" mode for 132kV Palatana-Surjmaninagar. OTPC may please inform the status.

Deliberation of the sub-Committee:

Manager, OTPC informed that letter to Member Secretary was given detailing all the backgrounds for not keeping SPAR turned on. Member Secretary, NERPC informed that as per discussion in Sub-group dead line charging from Surjamaninagar and check sync AR at Palatana with time delay as per requirement of OTPC. Manager, OTPC agreed to this arrangement and stated that acceptable time delay is 2s. The forum requested OTPC and NERTS to implement at the earliest.

Action: OTPC, NERTS.

- Previous PCC forums as well as Sub-group in its meetings had recommended that AR for 132kV Dimapur-Kohima has to be activated at the earliest. DoP Nagaland may please intimate the latest status.

  In 52nd PCCM NERTS informed that 3 pole A/R facility is available at Dimapur(PG). 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.

Deliberation of the sub-Committee:

After detailed deliberation the forum decided that 3-ph A/R is to be implemented for 132kV Dimapur-Kohima, with dead line charging at Kohima and check sync at Dimapur.

Action: DoP Nagaland.

- Auto-reclosure for important lines:

Name of line	**Latest status**	**Status as in 53rd PCC meeting**
132kV Khandong-Umrangsho	To be implemented By Jan'19	Khandong end –ready Umrangsho - Relay ready by Jul'19
400kV Bongaigaon-BGTPP D/C	Rectified By Aug'19	To be done by Jul'19
400kV Silchar-Azara	Non-operation for events on 04.05.19 to be investigated	DT send to both end for event on 04.05.19. Reason for DT signal from both ends to be checked by Jul'19.

B.3 Disturbance in Tripura System

In 52nd PCC meeting it was informed that:

- R&U works for 79Tilla, Rokhia, Udaipur, PKBari, Kailashor, Dhalabil and Ambassa has been completed.
- Line differential relay for 132kV PKBari-Kumarghat and 132kV AGTCCPP-Agartala D/C would be procured by Jan'19 and installation by Feb'19.

After 52nd PCC meeting frequent disturbances have occurred in Tripura System. Frequent instances of Grid Disturbance occurred in the month of Jun'19 in Tripura Power System on 18th June'19, 22nd June'19 & 27th June'19 resulting in tripping of generating units and interruption of power supply to South Comilla of Bangladesh, State capital as well as other parts of the state.Apart from the disturbances, repeated tripping of multiple elements was observed due to fault in 132 kV Agartala – Rokhia 1 line. NERLDC vide its letter to TSECL dated 21.06.19 requested to look into the matter on urgent basis and ensure strict compliance of mandated O&M practices, protection relay setting / co-ordination. TSECL is requested to intimate the root cause & action taken to avoid the recurrence.

Deliberation of the sub-Committee:

Member Secretary, NERPC informed that vide letter dated 28.06.19, CMD, TSECL was informed of the deficiencies in Tripura grid system and rectification thereof. However no reply has been obtained in this regard. Sr.Manager, TSECL stated that works as per the recommendations are going on and a formal letter detailing the status would be sent soon. NERLDC presentation is attached at **Annexure-B.3**. *Forum suggested following additional recommendations to be done by TSECL*:

a. CB operation at Dhalabil for Kamalpur feeder to be checked [DP issued trip and CB did not open for 1 second for event on 18.06.19]

b. Distance Protection at Kamalpur for 132 kV PK Bari feeder to be checked as it did not operate for fault in the line on 18.06.19.
c. Z-1 operation of 132 kV SMNagar – Budhjungnagar -2 line at Budhjungnagar to be checked (over reached for event on 18.06.19).
d. Settings of Distance Protection at Dhalabil for 132 kV Agartala feeder to be checked and CB operation to be checked. [DP, Z-1 detected at Dhalabil for 132 kV Agartala line (over reached) for event on 22.06.19. CB did not open for 2 seconds.]
e. Review of Z-2 & Z-3 timing of lines going out from SMNagar & 132 kV Agartala – Budhjunnagar line at Budhjungnagar (over lapping with Palatana, 500 msec delay for Z-2 & 800 msec delay for Z-3 for these lines at present)
f. Distance Protection at Dhalabil for 132 kV Agartala feeder to be checked as Z-2 was not detected by this relay for the event on 27.06.19.`
g. RCA of tripping of 132 kV Ambassa – Gamaitilla line on 27.06.19.

Forum suggested following additional recommendations to be done by NEEPCO:

h. Under voltage time delay settings for GTGs at AGTCCPP to be reviewed
i. AGTCCPP to install TSE and attend time sync issues
j. O/C E/F settings to be reviewed for 132kV AGTCCPP-Agartala D/C at AGTCCPP
k. Review of relay settings for auxiliary systems at Monarchak. This is to be coordinated with little higher than the Z-3 timing i.e 2 seconds at least.

Forum requested that corrective actions which are not requiring fund to be attended within 3 months and which are requiring funding to be attended within 6 months. NERLDC informed that they would approach Hon' CERC in case of non-compliance of agreed time line for implementation of suggested corrective actions.

TSECL/NEEPCO were requested to submit the following pending DR outputs:**Sl No**	**Name of the Element**	**Date of the event**
1	132 kV Rokhia – Agartala 1 line (both sides)	17.06.19 18:30 Hrs
2	Rokhia Units	17.06.19 18:30 Hrs
3	AGTCCPP Unit 1 & 5	17.06.19 18:30 Hrs
4	132 kV Rokhia – Agartala 1 line (both sides)	17.06.19 22:42 Hrs
5	Rokhia Units	17.06.19 22:42 Hrs
6	132 kV Rokhia – Agartala 1 line (both sides)	18.06.19

7	Rokhia Units	18.06.19
8	132 kV Baramura – Gamaitilla line (both sides)	18.06.19
9	132 kV Rokhia – Agartala 1 line (both sides)	22.06.19
10	Rokhia Units	22.06.19
11	132 kV Baramura – Gamaitilla line (both sides)	22.06.19
12	132 kV Rokhia – Agartala 1 line (both sides)	26.06.19
13	Rokhia Units	26.06.19
14	132 kV Link feeder at Rokhia	26.06.21
15	132 kV Ambassa – Gamaitilla line (both lines)	27.06.19
16	132 kV Rokhia – Agartala 1 line (both sides)	27.06.19
17	132 kV Monarchak – Udaipur line (Udaipur End)	30.06.19

The Sub-Committee noted as above.

Action: TSECL/NEEPCO.

B.4. Identification of short lines to install line differential protection

In 52nd PCC meeting, Director, NERPC informed that as agreed in 19th 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. HQ to take action
MSPCL	Lines not yet identified.
MePTCL	Tendering in progress.
P&ED Mizoram	Lines not yet identified.
DoP Nagaland	Lines identified. Under DPR preparation stage.
TSECL	Lines not yet identified.

Line Differential Protection for important lines:

Name of line	Scope and name of utility	Latest status
132kV RHEP-Pare HEP -2	Installation of line differential relay at both ends-NEEPCO OPGW – DoP Ar.Pradesh	NEEPCO- relay procurement under process Status of OPGW could not be updated
132kV Doyang-Sanis	Installation of line differential relay – NEEPCO/DoP Nagaland OPGW – DoP Nagaland	OPGW delivered at DHEP DoP Nagaland to submit the status for installation of OPGW NEEPCO- relay procurement under process.

The Sub-Committee noted as above.

Action: all STUs, NEEPCO.

B.5 Non-analysis of important grid incidences and disturbances:

Some grid incidences/ disturbances could not be analysed due to non-submission of DR/EL/RCA as follows:

Details of the incidence/disturbance	Reasons for non-analysis	Name of utility	Latest status
Grid Disturbance in Dharmanagar area of Tripura and Durlavcherra area of Assam due to tripping of 132 kV P K Bari - Dharmanagar & 132 kV Hailakandi - Dullavcherra on 17.01.2019	DR Dharmanagar to be submitted	TSECL	R&U completed. Will be submitted henceforth
	Detailed RCA to be submitted	AEGCL/TSECL	Durlavcherra DRPC out of order B-ph conductor current cannot be driven. After isolation from Dharmanagar then system stabilised. Hailakandi - after R&U DR will be submitted
Grid Disturbance in P K Bari, Ambassa and Dharmanagar areas of Tripura Power System and Dullavchera area of Assam due to tripping of 132 kV P K Bari - Silchar 1 & 2 lines, 132 kV P K Bari - Kumarghat line, 132 kV Ambasa - Gamaitila line, 132 kV P K Bari - Kamalpur line and 132 kV Hailakandi - Dullavcherr line on 21.01.19	Fault in 132 kV Ambassa - Gamaitilla line which was not cleared at Ambassa & PK Bari due to breaker problem. DR/EL to be submitted. Detailed RCA to be submitted	TSECL	R&U completed. Will be submitted henceforth

Grid Disturbance in capital area of Kohima due to tripping of 132kV Dimapur - Kohima on 17.02.2019	DR,EL& RCA to be submitted.	NERTS/DoP Nagaland	Dimapur-submitted Kohima end DR-could not updated as no representative
Grid Disturbance in Kamalpur/Rangia area of Assam and Motonga area of Bhutan due to tripping of 132kV Kamalpur-Kahilipara line on 23.01.19	Kahilipara R&U recently completed. No NR at Kamalpur. DR will be submitted henceforth. Reason for tripping to be intimated.	AEGCL	DR will be submitted henceforth
Grid Disturbance in Itanagar area of Arunachal Pradesh due to tripping of 132kV Ranganadi-Chimpu and 132kV Pare-Chimpu on 29.01.19	DR/RCA to be submitted	NEEPCO/DoP Ar.Pradesh	NEEPCO-DR submitted Chimpu end DR-could not updated as no representative
Grid Disturbance in Dhalabil area due to tripping of 132kV Agartala-Dhalabil and 132kV Dhalabil-Kamalpur on 05.02.19	DR/RCA to be submitted	TSECL	R&U completed. Will be submitted henceforth
Grid Disturbance in Kohima(capital) area of Nagaland due to tripping of 132kV Doyang-Sanis on 27.02.2019	DR/RCA to be submitted	NEEPCO/DoP Nagaland	NEEPCO- DR will be available after installation of NR Sanis end DR-could not updated as no representative

Deliberation of the sub-Committee:

CGM, NERLDC expressed his deep concern on the non-submission of DR/EL to NERLDC. Member Secretary, NERPC stated that due to non-submission of DR/EL the analysis of the disturbances could not be completed by the Sub-group. After detailed deliberation it was decided that shutdown requisition would not be entertained from utilities not submitting the DR regularly as decided in the OCCM.

The Sub-Committee noted as above.

Action: All transmission utilities, NERLDC, NERPC.

B.6 Technical presentation in PCCM:

It was decided that on the 53rd PCC meeting, presentations on Ramakrishna Task Force Recommended settings would be given by NERTS

Deliberation of the sub-Committee:

Member Secretary, NERPC suggested that Case Studies based on recommendations of Sub-group/changes in relay settings/remedial measures which have reduced trippings may be presented in Sub-group meetings and PCC forum. The forum welcomed the proposal and advised that STUs take in a leading role in this regard.

The Sub-Committee noted as above.

Action: All transmission utilities, NERLDC, NERPC.

B.7 Status of submission of FIR and DR &EL outputs for the Grid Events w.e.f 01.12.18 to 30.06.19:

In line with regulation 12 (1) of CEA Grid Standards Regulations and IEGC provision under clause 5.2 (r), FIR and DR & EL Outputs for each grid events are required to be submitted by concerned utilities to NERLDC for detailed investigation and analysis.

The list of trippings along with status of furnishing FIR and DR & EL outputs from Dec'18 to Jun'19.

The Sub-Committee noted as above.

B.8 Status of R & M works of Protection System funded from PSDF:

Utilities are requested to intimate the substation wise present status and target date of completionof R & M works of protection system especially the installation of distance protection and differential protection in transmission lines, implementation of auto recloser scheme, installation of station event logger,procurement of diagnostic tools etc.

Deliberation of the sub-Committee:

Member Secretary, NERPC informed that the R&U status station-wise is being monitored in OCC and MePTCL has Submitted the R&U status station wise. He once again requested all the utilities to submit the station-wise status to NERPC.

The Sub-Committee noted as above.

Action: All concerned utilities.

B.9 Availability of carrier inter-trip scheme for lines of 132 kV and above voltage level

Utilities are requested to intimate the lines for which carrier inter-trip scheme is available and action plan for lines where tele-protection is not available.

Deliberation of the sub-Committee:

Member Secretary, NERPC suggested that initially carrier-intertrip be implemented immediately for all lines connected to ISTS stations. NERLDC proposed carrier inter-trip to be implemented for all Important grid elements. The forum approved Carrier-intertrip to be immediately implemented for all Important grid elements in NER.

The Sub-Committee noted as above.

Action: All concerned utilities.

B.10 Major Grid Disturbances and Grid Events in NER Power System since last Subgroup Meeting held on 13.06.19:

Details of the Grid Disturbances in NER Power System apart from repeated Grid Disturbances in Tripura Power System since last Subgroup Meeting held on 13.06.19 are given the below table:

Affected Area(s)	Outage date & time	Remarks
Zuangtui area of Mizoram Power System	13-Jun-19 05:53Hrs& 13-Jun-19 15:20 Hrs	Load Loss= 32 MW & 44 MW respectively
Arunachal Pradesh Power System (except Khupi and Deomali areas)	15-Jun-19 00:53 Hrs& 02-Jul-19 00:07 Hrs	GD on 15.06.19 was due to tripping of 400 kV BiswanathChariali - Ranganadi 1 & 2 lines and GD on 02.07.19 was due to tripping of 132 kV RHEP – Itanagar line & 132 kV Pare – Itanagar line. (Load Loss = 70 MW & 47 MW respectively and Generation Loss: 0 MW & 65 MW respectively)
Mokokchung area of Nagaland Power System	20-Jun-19 11:52Hrs& 21-Jun-19 08:43	Load Loss = 28 MW & 32 MW respectively

Capital area of Nagaland Power System and Karong substation of Manipur Power System	23-Jun-19 14:42Hrs, 23-Jun-19 19:22Hrs, 23-Jun-19 20:22Hrs & 24-Jun-19 10:48Hrs	Load Loss =25 MW, 38 MW, 28MW & 22 MW respectively
Imphal area of Manipur Power System	15-Jun-19 19:09 Hrs	Load Loss = 52 MW
Ningthoukhong&Rengpangareas of Manipur Power System	26-Jun-19 17:13	Load Loss = 45 MW
Kolasib area of Mizoram Power System	30-Jun-19 07:06	Load Loss = 39 MW

Details of the **critical Grid Events since last Subgroup Meeting held on 13.06.19** are given the below table:

a. 400 kV Balipara – Misa 1 line on 03.07.19
b. 220 kV Misa – Kopili 3 line on 03.07.19 (2 times)
c. 125 MVA, 400/132 kV ICT-1 at Palatana on 29.06.19
d. 400 kV Silchar – Palatana 2 line on 21.06.19
e. 400 kV BNC – RHEP 2 line on 20.06.19 & 03.07.19
f. 400 kV Silchar – Azara line on 19.06.19
g. 400 kV Silchar – Imphal 2 line on 17.06.19
h. 400 kV Silchar – Byrnihat line on 16.06.19

Deliberation of the sub-Committee:

After detailed deliberation the forum referred the matter to the next Sub-group meeting.

The Sub-Committee noted as above.

Action: NERPC.

B.11 Analysis & Discussion on Events, Grid Incidences, Grid Disturbances which occurred in NER Grid w.e.f 1st December 2018 – 30th June 2019.

The following numbers of Grid Disturbances (GD) & Grid Incidents (GI) occurred during the period **w.e.f 1st December 2018 – 30thJune 2019.** List of grid disturbance & grid incidents for the period 01.12.18 to 30.06.19 is attached as ***Annexure B.11*** for discussion:

Sl. No.	Control Area	Grid Incidents in nos. (Jan'18 to Dec'18)	Grid Disturbance in nos. (Jan'18 to Dec'18)	Grid Incidents in nos. (Jan'19 to Jun'19)	Grid Disturbance in nos. (Jan'19 to Jun'19)
1	Palatana	14	1	3	2
2	AGBPP	31	0	22	0
3	AGTPP	34	2	31	2
4	Ranganadi	1	0	1	0
5	Kopili	15	1	3	0
6	Khandong	13	2	4	0
7	Doyang	2	2	0	0
8	Loktak	2	2	1	2
9	BgTPP	22	0	8	0
10	Pare	6	0	1	0
11	Arunachal Pradesh	-	47	-	30
12	Assam	-	31	-	9
13	Manipur	-	28	-	17
14	Meghalaya	-	9	-	4
15	Mizoram	-	21	-	17
16	Nagaland	-	59	-	22
17	Tripura	-	36	-	12

Sl. No.	Category of GD / GI	Grid Disturbance in nos.	
		Jan'18 to Dec'18	Jan'19 to Jun'19
1	GI-I	69	38
2	GI-II	71	36
3	GD 1	209	101
4	GD 2	1	2
5	GD 3	1	0
6	GD 4	0	0
7	GD 5	0	2
8	**Total GI**	140	74
9	**Total GD**	211	105

Deliberation of the sub-Committee:

NERLDC gave a presentation (**attached at Annexure - B.11**). Following are the salient points of the presentation:

1. There were about not less than 1000 nos. of tripping of grid elements for a period of Jan'19 to Jun'19 which is matter of concern and questions the maintenance practices followed by the utilities of NER.
2. Grid Disturbance for the period Apr-Jun'19 is more than nos. in Apr-Jun'18 even though weather condition was much favorable in this year compared to last year.
3. Protection co-ordination issues and downstream fault reflecting in ISTS elements contributed to rise in no. of GDs.
4. Repeated disturbances in Tripura, Nagaland, AP & Mizoram is a matter of concern as Capital is getting affected multiple times and international power supply is getting affected in case of Tripura. Concern utilities were requested to attend the issues pertaining to the protection systems in a time bound manner.
   Forum requested that corrective actions which are not requiring fund to be attended within 3 months and which require fund to be attended within 6 months. NERLDC informed that they would approach Hon' CERC in case of non-compliance of agreed time line for implementation of suggested corrective actions.
5. It was decided that this presentation will be given in next TCC meeting.
6. Comparison of element wise tripping of NERTS presented**.**
7. No. of tripping of 400 kV lines is on the higher side from the starting of the year. NERTS, POWERGRID informed that rise in tripping of 400 kV lines is mostly due to the Silchar – Imphal 1 & 2 lines. Few constructional defects are identified in this corridor as well as Silchar – Byrnihat & Silchar – Azara lines. Some of the defects are already attended and remaining will be attended as per the planned shutdown schedule. PID of the 400 kV Balipara – BNC – RHEP corridor will be scheduled for this year. This will help to identify the defects in this corridor and those will be attended immediately.
8. Rising trend of 220 kV line tripping was observed in the last week of Jun'19 which was due to repeated tripping of Misa – Kopili lines. NERLDC highlighted that auto reclosing would have avoided some of the trippings. NERTS informed that issue with the carrier system of Misa – Kopili will be attended by Jul'19.
9. It was noted that tripping of 132 kV lines was increased drastically this year. CGM, NERLDC highlighted that this situation is alarming and lack of analysis & quick implemention of corrective actions by constituents is contributing to the repeated tripping which is putting the grid in a vulnerable condition.
10. Tripping of lines owned by NERTS, DoP AP, MSPCL, P & ED Mizoram, DoP Nagaland, TSECL and NTEC lines from Bongaigaon – Silchar has increased.
    It was decided that NERTS will look in to the repeated tripping of 132 kV Pare – Lekhi line.
    MSPCL was requested to furnish DR outputs from 132 kV stations for analysis. Forum noted that the remedial measures implemented as informed by MSPCL is not adequate as unwanted trippings were observed in Jun'19 also.
    Regarding tripping in Nagaland Power System, NERTS informed that relay issued trip command at Mokokchung for 132 kV Doyang line and CB did not trip. NERLDC informed that DR outputs are not submitted by DoP Nagaland. NERPC

informed that separate meeting will be arranged with DoP Nagaland for discussing their issues.

P&ED Mizoram informed that DR outputs from Kolasib will be submitted for necessary studies by NERTS within a week. He also informed that Zuangtui Z-2 timing will be reduced to 350 msec by Jul'19. NERPC to write to NERTS for arranging appropriate equipments for downloading DR outputs from Kolasib & Rangia substations.

11. Regarding ICT trippings, NERTS informed that Imphal ICT trippings were due to cable fault. This issue is under discussion and decision of the management will be intimated to forum. Also, NERTS informed that most of the other ICT trippings were due to moisture ingress. This is a common problem in all over India and canopy was provided to ICTs to prevent this. Some more guidelines would be expected.

NEEPCO informed that Ranganadi ICT-2 NVD trip is now modified to alarm.

12. NHPC informed that tripping of Loktak units on 17.06.19 was due to high thrust bearing temperature and some operational error was involved which will be avoided in future.

The Sub-Committee noted as above.

B.12 Protection related information for updating list of important grid elements of NER

a. Details of Controlled Switching Devices in NER
b. Lines where Tele-protection is available
c. Details of LDP
d. Details of offline fault locators

Deliberation of the sub-Committee:

NERLDC requested all the utilities to submit the information by Jul'19.

The Sub-Committee noted as above.

Action: All concerned utilities.

C. I T E M S F O R STATUS REVIEW

C. 1. REMEDIAL ACTIONS RECOMMENDED IN 52nd PCCM:

The suggested measures with status as updated in the last Sub-group:

SN	Name of element	Actions to be taken	Concerned Utilities	Last updated status	Status as per 53rd 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/AEGCL	DoP AP informed that Protection system healthy. Coordination is required for 132kV Lekhi-Nirjuli-Gohpur-BNC. To be	Completed

				completed by Jan'19	
2	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	Downstream co-ordination by Jan'19	completed
3	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 20.12.18	Completed
4	132 kV AGTCCPP -Agartala	Over-reach of DPR at AGTCCPP. Setting to be revised after HTLS upgradation.	NEEPCO	#By Jan'19	Line parameters to be measured. S/D to be taken for both the lines together. To be matched with the M/C s/d
5	132 kV Rangia - Motonga	Checking of relay settings at Rangia	NERTS	**	Done on 30.06.19
6	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	Carrier problem to be jointly checked by NERTS&NEEPCO. By Jan'19	Rectification done in carrier inter-trip circuit at Misa done. Joint checking to be done.

7		Z-2 overlapping of 220 kV Misa - Samaguri and 220 kV Samaguri - Sarusajai to be checked.	AEGCL/NERTS	AEGCL informed that settings were Checked and rectified. Forum requested NERTS to check the settings at Samaguri for confirmation	220kV Misa-Samaguri - settings as per philosophy. 220kV Samaguri-Sarusajai-Rectified Jun'19
8	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	NERTS informed that settings at 132 kV Mokokchung (PG) has been increased. NEEPCO intimated that settings at Doyang will be revised by Dec'18.	Setting OK. On 20.06.19 CB did not open at Mokokchung(NAG). Breaker to be tested.
9	Tripping of 400kV Balipara-Bongaigaon-3 on 26.07.18	Maloperation of O/C relay at Bongaigaon	NERTS	Rectified B/U impedance relay and B/U relay replaced.	To be dropped
10	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 voltage selection relay rectified by AEGCL.	Replaced in Jun'19
11	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	WIP by 14.12.18	Completed.
12	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,	MePTCL	Patrolling completed. No flashover locations found. Subgroup suggested MePTCL to conduct tower top patrollin	MePTCL restored the AR at Killing end on the 10.07.2019.Power Grid to confirm the AR operation

		18.08.2018 and 23.08.18 & 220kV Killing - Misa #I on 23.08.18,05.09.18			at Misa end
13		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 TLA may be considered for vulnerable lines	MePTCL	Tower footing resistance submitted and found that the values are well within range.	Tower footing found within limits. MePTCL restored the AR at Killing end on the 10.07.2019.Power Grid to confirm the AR operation at Misa end
14		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	Action taken report is to be submitted by NERTS.	DC mixing and DC Earth Fault rectified in last week of May'19.
15		A/R operation at Byrnihat to be checked for 220kV Misa-Byrnihat-I	MePTCL	Settings checked and found OK. 3-phase trip occurs for 1-ph fault due to which Reclose command not initiated. NERTS and MePTCL to jointly check at Byrnihat both A/R and carrier healthiness on 24.06.2019.	Team from System Protection,BPL visited killing on the 10.07.19 and both analog protection coupler of BPL 1& 2 for Misa 1&2 resply revived and all 4 codes were

					tested from Killing end and found ok. The Protection coupler was put in service and AR operated perfectly at killing. Same to be checked at Misa. By 22.07.19
16	Frequent tripping of 400kV Silchar-Azara 24.09, 15.10, 17.10 &31.10	Tripping on 24.09.18 - Main-I(SIEMENS) relay non-operation at Silchar to be checked.	NERTS	Already rectified. To intimate the changes done at Silchar.	Fault Locator was enabled and the impedance settings were reviewed- last week of April'19
17	Frequent tripping of 132kV Lumshnong-Panchgram**	Tripping due to vegetation fault - 06.08.18,07.08.18, 24.10.18,16.11.18. Fault location to be identified and Vegetation clearance to be done.	MePTCL/AEGCL	Patrolling done for the Assam section for 93 towers upto 55km from the Panchgram end. All clearances are perfect	To be reviewed after installation of NR at Panchgram.
18		Location to be identified for any flashover for tripping on 09.08.18, 15.08.18	MePTCL/AEGCL	No flashover locations found in Assam section.	To be reviewed after installation of NR at Panchgram.
19	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.	TSECL	To be updated	By July'19

20	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	TLA installed in identified locations.	To be dropped
21		Tower footing resistance measurement to be done for the identified locations.	NERTS	TLA installed in identified locations.	To be dropped
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	Submitted. To be checked.	Found in order. To be dropped.
23		Delayed fault clearance and non-operation of M-I at Silchar to be attended	NERTS	Completed. To intimate the exact findings and settings change done.	Settings reviewed-last week April'19
24	Blackout of Ranganadi, Pare and Ar. Pradesh on 29.09.18	Delay in outage of filter bank after tripping of Pole to be investigated	NERTS	Referred to OEM	Referred to OEM
25	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	NERLDC has assured to give sample format of DR to be implemented at Killing. Request to provide the same	Main-II Submitted Main 1 will be submitted after incorporation change of settings etc in the relay.
26		A/R non-operation to be checked at Byrnihat end.	MePTCL	Due to contact latching problem of main-I relay (Siemens). Joint visit by NERTS on 24.06.19.	NERTS taken up with SIEMENS. OEM reverted back with suggestions pole open

					threshold to be increased to 100mA.
27		Tower top patrolling to be done and lightning location to be identified	NETC	identified	
28		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	NETC	Completed. NETC to submit report in this regard to NERPC/NERLDC	
29		Vegetation clearance to be done and patrolling report to be furnished	NETC	Vegetation clearance done. Report to be submitted.	
30	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	Locations identified and Chemical Treatment to be done by Jul'19	Completed
31		Relay settings and CT connection to be reviewed for 132kV Agartala - SMNagar D/C at Agartala.	TSECL	To be updated	132kV 79Tilla-SMNagar CktI: s/d on 19.07 & 20.07 then it will be done. DR will be sent subsequently

32		Carrier inter-trip to be implemented for 132kV Agartala-Budhjunnagar immediately.	TSECL	To be updated	Feasibility to be checked
33		DPR Settings to be reviewed for 132kV Palatana - SMNagar line at Palatana.	OTPC	Submitted. To be reviewed by Sub-group.	Found in order
34		Patrolling report to be submitted for 132kV Agartala-Budhjunnagar line.	TSECL	To be updated	Will be submitted in Jul'19
35	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	NERTS to intimate settings change / modifications done.	Settings reviewed - last week Mar'19
36	Disturbance in Nagaland System on 19.09.18	Tower top patrolling to be done for 220kV Mariani-Mokokchung D/C.	NERTS	Exact RCA-jumper loosening 30km from Mariani. Will be rectified by June'19	Rectification to be carried out in next AMP.
37	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	To be updated	To be updated
38	Repeated tripping of 132kV Ranganadi-Pare	Vegetation fault clearance to be done	DoP Ar.Pradesh	To be updated	To be updated
39	Tripping of 132kV Badarpur - Panchgra	Z-III timing to be checked at Badarpur end	NERTS	To be monitored for repeat incident	Zone-3 timing at Badarpur for Panchgram feeder kept as 800 mS as per

	m on 18.10.18, 27.10.18				philosophy

The Sub-Committee noted as above.
Action: All concerned utilities.

C.2 REMEDIAL ACTIONS SUGGESTED IN SUB-GROUP:

The suggested measures with status as updated in the last Sub-group:

Sl. No	Brief details of the disturbance/incidence	Actions to be taken	Concerned Utilities	Last updated status	Status as per 53rd PCC Meeting
1	Grid Disturbance in Kolasib Area of Mizoram due to tripping of 132kV Badarpur-Kolasib and 132kV Aizawl-Kolasib on 30.12.18	Exact fault location at downstream of Kolasib to be identified and Root Cause to be provided	P&ED Mizoram	Fault in 33kV line. relay coordination done.	To be dropped.
2		Protection co-ordination works i.r.o. Turial, Kolasib, Badarpur and Aizawl by Feb'19.	NERTS/NEEPCO/P&ED Mizoram	Kolasib Switchgear operation to be checked and the report to be submitted.	By July'19
3	Tripping of 400kV BNC-RHEP-2 on 11.12.18	DT sent/received to be configured in DR at both BNC&RHEP	NEEPCO/NERTS	RHEP- completed BNC - NERTS to intimate	Completed on 10.07.19
4	Tripping of 400kV Bongaigaon-Byrnihat on 08.12.18	Gas leakage in bus duct to be rectified	MePTCL	Offer yet to be received. By June'19	EE Killing has requested for offer from OEM but till date there is no response.
5		DT send to be configured in DR at Byrnihat	MePTCL	Main-II completed Main-I: By June'19	Main-II completed Main-I: By July'19

6	Tripping of 132kV RHEP-Ziro & 132kV Ziro-Daporizo on 04.01.19	O/C, E/F relay co-ordination for 132kV RHEP-Ziro at Ziro(PG) to be done with 132kV Ziro-Daporizo - By Feb'19	NERTS/DoP Ar.Pradesh	To be intimated	Non directional instantaneous element of Earth Fault relay at Ziro for Ranganadi feeder kept in service with a setting of 4 kA to prevent any tripping at Ranganadi
7	Grid disturbance in Imphal area due to tripping of 132kV Imphal-Imphal-D/C on 26.01.2019, 29.01.2019, 08.02.2019, 19.02.2019, 23.02.2019	Downstream fault. DR & detailed RCA with SLD to be submitted	MSPCL	>Instantaneous high set O/C at 132 kV Imphal(MSPCL) for 132 kV Imphal(PG) 1 & 2 lines to be disabled	Completed. Subsequent tripping on same protection to be checked by MSPCL
8	Grid Disturbance in capital area of Assam due to tripping of 220/132 kV, 100 MVA ICT I, II & III at Sarusajai and 132 kV Sarusajai-Sishugram 1 Line on 17.02.2019**	Carrier intertrip to be implemented for 132kV Sarusajai - Kamakhya	AEGCL	By June'19	By July'19
9	Grid Disturbance in Hailakandi area due to tripping of 132kV Silchar-Hailakandi D/C, 132kV Hailakandi-Panchgram and 132kV Durlavcherra-Hailakandi on 26.01.2019	DR/RCA to be submitted	AEGCL	->LBB triggered wrongfully from CB of 132kV Hailakandi-Panchgram at Hailakandi. Rectified.	To be dropped
10	Grid Disturbance in Arunachal Pradesh due to tripping of 132kV	Fault in 132kV Ziro-Daporizo. RCA to be	DoP Ar.Pradesh	Fault in 132kV Ziro-Daporizo. RCA to be submitted	RCA to be submitted.

	RHEP-Ziro and 132kV Ziro-Daporizo line on 11.03.2019(two times)	submitted			
12	Grid Disturbance in Southern Part of NER grid due to tripping of 400kV Palatana-Silchar D/C on 03.04.2019##	Review of settings of negative sequence protection of GBC Motor at Monarchak	NEEPCO	Referred to OEM	TMS setting changed to 2s.
13		Conductor failure to be referred to OEM with sample	NETC	Report by June'19	
14		Thermo vision scanning of 132kV PKBari-Kamalpur-Dhalabil-Agartala & strengthening of jumpers	TSECL	To be informed	s/d going on for jumper strengthening & vegetation clearance. Thermo-vision scanning will be explored.
15	**Multiple tripping of 132 kV Jiribam – Loktak line** (18-01-2019 09:07:00, 19-01-2019 09:10:00 & 25-03-2019 14:31:00)	Disable SoTF/TOR function of 132 kV Loktak – Jiribam Line at Loktak till correction of SOTF/TOR logic.	NHPC	To be updated	Auxiliary contact replaced. Subsequently no mal-tripping observed.
16	**Disturbance in Meghalaya Power System at 21:03 Hrs on 16.01.19**	Availability of Distance Protection in 132 kV Byrnihat to be intimated	MePTCL	Both the protection scheme for the 132 KV EPIP Line 1 & 2 at EPIP I & II will be installed & commissioned on the 24.06.2019. C&R panels,	Both 132 KV EPIP 1&2 line are equipped with Protection Scheme as on July 2019.

				Switchgears etc will be commissioned.	
17		O/C E/F Relays at Khlieriat (MePTCL) to be made directional	MePTCL	MePTCL For Line 2 MePTCL has completed. For Line 1 Power Grid to be confirmed	Directionality of O/C and E/F relay at Khliehriat (PG) for Khliehriat-Khliehriat-1 checked and found in order.
18		Details of separate O/V protection to intimated.	NERTS	None	To be dropped
19	Simultaneous tripping of 400 kV Azara - Bongaigaon Line & 400 kV Bongaigaon - Killing (Byrnihat) Line on 29-01-2019 10:40:00 Hrs	No conclusive finding from DR. Detailed RCA to be submitted	NETC	To be updated	
20	400 kV Balipara - Biswanath Chariali 1 Line on 23-02-2019 00:07:00 Hrs	Y Ph CVT Secondary voltage for all three cores needs to be checked physically at site by NERTS at BNC and submission of testing report (CVT secondary voltage)	NERTS	Completed. NERTS to submit test report of CVT secondary voltage	Y-ph CVT Sec voltages for Balipara – I feeder at BNC : For each of the 3 cores Line CVT voltage:64.2kV Bus CVT voltage:62.7kV
21		Report regarding switching of filter bank before set power order	NERTS	Referred to OEM	Referred to OEM

		of 750MW to be investigated.			
22	400 kV Bongaigaon - Killing (Byrnihat) Line on 11-03-2019 13:37:00 Hrs	Vegetation fault as per DR and AR successful. But tripped in reclaim time. Report to be submitted	NETC	To be updated	
23	400 kV Bongaigaon - Killing (Byrnihat) Line on 26-03-2019 13:31:00	Root cause could not concluded from DR output. Report to be submitted	NETC	To be updated	
24	800 kV Biswanath Chariali - Agra 1 HVDC on 14-03-2019 09:05:00 Hrs	RCA to be submitted	NERTS	To be updated	HVDC Pole-I tripped on 14.03.19 on Reverse Power Direction Trip initiated from Agra end for a transient fault in B-Ph of Balipara – Bongaigaon -2 line . Matter referred to OEM ABB for analysis.
25	400/ 220 kV, 315 MVA ICT 2 at BGTPP tripped on 15-03-2019 00:11:00 Hrs	Settings of Line differential relay to be reviewed at both ends and testing of the relays to be done	AEGCL/NTPC	Shutdown date to be fixed. AEGCL and NTPC to jointly test	OCC date to be fixed in s/d list and communicated.

26	220 kV Kopili - Misa 1& 2 Lines tripped on 17-03-2019 12:49:00 Hrs	Carrier healthiness to be checked by Apr'19	NERTS	Carrier healthy	To be dropped
27		Carrier sent and Receive channel is to be configured in DR at Kopili	NEEPCO	To be updated	Order placed for deputation of service personnel of relay.
28	Tripping of 132kV Aizawl-Tipaimukh and 132kV Jiribam-Tipaimukh on 20.08.18	Relay coordination amongst lines, ICT and downstream to be done	MSPCL	To be updated	To be reviewed before putting ICT into service.
29		ICT winding to be repaired	MSPCL	Delayed due to bad road conditions	Delayed due to bad road conditions
30	Tripping of 132kV Aizawl-Tipaimukh on 31.03.19 &132kV Jiribam-Tipaimukh on 27.02.19	PLCC and carrier intertrip to be checked jointly by NERTS & MSPCL for Aizawl,Tipaimukh and Jiribam	MSPCL/NERTS	By June'19	Rectification complete on 10.07.19
31	132kV Jiribam-Tipaimukh tripped on 24.02.2019	Gapless LA at Jiribam to be installed	NERTS	To be updated	Work order placed for procurement of Gap Less LA at Jiribam . Completion : Dec'19.
32	Frequent tripping of 132kV Loktak-Ningthoukong	E/F to be configured in DR at Ningthoukong	MSPCL	To be updated	Completed
33	Frequent tripping of 132kV Jiribam-Jiribam in Apr'19&May'19	B/U protection time setting to be	NERTS	To be updated	Back up protection relays tested and

		increased at Jiribam(PG)			necessary rectification done on 17.06.19.
34	132kV Aizawl-Tipaimukh & 132kV Jiribam-Tipaimukh tripped on 01.04.19	Loc No. for lightning fault and status of tower top patrolling to be informed	NERTS	To be updated	Tower top patrolling done and flashover marks found at various locations. Accordingly TLAs installed at 337, 329, 327, 315, 299, 285, 278, 449, 411, 388, 356 & 350.
35		Review of the E/F settings for 132kV Aizawl-Tipaimukh at Aizawl	NERTS	To be updated	Completed on 10.07.19
36	132kV Aizawl-Tipaimukh tripped on 31.03.19	Z-I settings to be reviewed at Aizawl	NERTS	To be updated	Done on 10.07.19

The Sub-Committee noted as above.

Action: All concerned utilities

C.3 Third Party Protection audit of NER Sub-Stations

In 51st 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 timeline given by various utilities for submission of compliance status (Third Party Audit + Tractabel Audit) is as below:

TSECL	To be submitted by 30.06.19
DoP Nagaland	By 15.01.19
NERTS-POWERGRID(Tractabel Audit)	To be submitted by 30.06.19
DoP Ar.Pradesh	By 15.01.19
NHPC	By 31.12.18
P&ED Mizoram	Not updated

NTPC	Not updated

Deliberation of the sub-Committee:

Member Secretary, NERPC requested all the utilities(as above) to submit the status for implementation of recommendations immediately. CGM, NERLDC requested that a meeting be convened to review the implementation of recommendations of 2013-14 audit and 2017-18 audit. The forum decided that meeting would be held on same day as the next Sub-group meeting.

The Sub-Committee noted as above.

Action: TSECL, DoP Nagaland, NERTS, DoP Ar.Pradesh, P&ED Mizoram, NTPC, NERPC.

C.4 Status review against recommendations for GD-IV & V in NER:

Brief details of the disturbance	Recommendations	Name of utility	Last updated status	Latest status
Grid Incidence on 05.12.18 affecting 800kV BNC HVDC and 4 other stations in NER	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	Reactor-2 differential protection reach increased. Reactor-3 teed protection tested and found ok
	completion of ongoing construction of GIS bay for 400/220 kV ICT (220 kV side) at Bongaigaon as this will eliminate the requirement of Control Cables between the two stations	NERTS	Mar'19	Completed
	Incidents of station auxiliary DC earth faults shall be logged in the SCADA once the Auxiliary BCU is commissioned under ongoing	NERTS	Jan'19	Completed

	NTAMC project.			
	Review of BNC-APD-Agra Multi-terminal HVDC Pole protection philosophy	NERTS	Dec'18	In progress
GD-V on 03.04.19 affecting southern part of NER & GD-V on 20.04.19 affecting southern part of NER and part of Assam, Meghalaya system	Review of negative phase sequence relay settings for GBC motor at Monarchak	NEEPCO	Settings send to BHEL. No reply yet. Expected by June'19	TMS changed. BHEL response on idea settings awaited.
	Identification of weak joints for 400kV Palatana-Silchar D/C	NETC	Sample of failed conductor to be sent to the manufacturer by NETC for RCA as the conductor suffered mechanical breakage. There was no issue with joints.	Sent to NTH.
	Study for reactive compensation in Tripura System	TSECL	NERLDC informed that node wise MVAR data of 33 kV system is required to carry out the studies. TSECL informed that MVAR data at 33 kV level is not available at SLDC. Forum requested TSECL to monitor & record MVAR data at 33 kV nodes for 1 month and submit the data for study.	MVAR data to be submitted by SLDC Tripura by 15.07.19
	Identification of feeders for	TSECL	List attached at **Annexure-C.4**	Refer to OCC

	additional UFR based load shedding under Islanding Scheme-II			
	Standalone EL for integration of relay at AGTCPP by Oct'19	NEEPCO	AGTCCPP - Oct'19. Standalone EL at RHEP completed in June'19	AGTCCPP - Oct'19. Standalone EL at RHEP completed in June'19
	NHPC to procure standalone EL for Loktak HEP	NHPC	Dec'2020 because no budget provisions	Next year supply will be done linked with R&M
	NERTS would explore options in consultation with OEM regarding time synchronization issues at Silchar	NERTS	Undergoing. Referred the case to OEM	The problem is suspected to be specific to a make of GPS time synchronizer. The GPS Time Synchroniser at Sichar is replaced with a different make on 03.07.19 and is under observation.
	Upon SPS-2 activation 132kV Bus Coupler Breaker to be opened at Palatana. Old scheme of opening of HV side CBs of ICTs to be disabled/removed	OTPC	Not implemented. OTPC informed that By Opening of Bus Coupler would will lead to blackout of Palatana. To be discussed during visit of UFR Inspection team to Palatana.	Original scheme to remain.
	Revised SPS-3 scheme offer sought from GE by NERTS	NERTS	Technical offer Received from GE. Once technical clearance is	Refer to 158th OCC discussion

			given to GE, they will submit the commercial offer.	
	Line defects in 400kV Silchar - Azara & 400kV Silchar-Byrnihat T/L to be attended	NETC	To be executed in the next shutdown	
	Impedance measurement for 400kV Paltana-Silchar D/C, 400kV Silchar-Azara, 400kV Silchar - Byrnihat	NERTS	On opportunity	On opportunity
	Line parameters to be matched at Silchar, Azara and Byrnihat.	NERTS/ AEGCL/ MePTCL	To be informed	Shall be done by 15.07.19
	Spare relay REL 670 to be installed at Byrnihat for 400kV Silchar-Byrnihat	MePTCL	S/d postponed. By June'19	By July'19
	NERTS and AEGCL to jointly visit Azara and check exact cause for delay in appearance of voltage input to relay when charged via Tie Breaker	NERTS/ AEGCL	To be informed	By July'19

The Sub-Committee noted as above.

Action: All utilities as above.

C.5 Non-submission of DR outputs for the elements where two utilities are involved

It was decided in the earlier subgroup & PCC meetings that DR & EL outputs to be submitted by the substation owner where ever two utilities are involved. Status as discussed in Sub-group meeting on 13.06.19:

Sl. No.	Name of Substation	Name of Main Bay	Name of Bay Owner	Substation Owner	Status	Status as per 53rd PCCM
1	220/132 kV Kopili	132 kV Khandong 1 Bay	POWERGRID	NEEPCO	Agreed by NEEPCO. NERTS to provide software	DR facility at Kopili
		132 kV Khandong 2	POWERGRID			

		Bay			and give demonstration.	Control Room Khandong end to be done by NEEPCO Kopili – SCADA&D RPC at control room After replacement of relay at kop-1, before charging confirmation to station
2	132/33 kV Khandong	132 kV Kopili 2 Bay	POWERGRID			
		132 kV Khliehriat 2 Bay	POWERGRID			
3	220/132/66/33 kV Mariani	220 kV Misa Bay	POWERGRID	AEGCL	Software not available. NERTS to provide software	
		220 kV AGBPP Bay	POWERGRID		Software not available. NERTS to provide software	
4	220/132/33 kV Samaguri	220 kV Misa 1 Bay	POWERGRID		Subject to replacement of old bays	
		220 kV Misa 2 Bay	POWERGRID		Subject to replacement of old bays	
5	132/33 kV Gohpur	132 kV Nirjuli Bay	POWERGRID		Software not available. NERTS to provide software	
6	132/33 kV Panchgram	132 kV Badapur Bay	POWERGRID		Software not available. NERTS to	

					provide software	
7	132/33 kV Srikona	132 kV Silchar 1 Bay	POWERGRID		Software not available. NERTS to provide software	
		132 kV Silchar 2 Bay	POWERGRID		Software not available. NERTS to provide software	
8	132/33 kV Rangia	132 kV Motonga Bay	POWERGRID		AEGCL to submit	
9	132/66/33 kV Kolasib	132 kV Aizawl (PG) Bay	POWERGRID	P&ED, Mizoram	Agreed to submit NERTS to visit Kolasib on 20.06.19	Software, cable, DRPC suitable downloading facilities at Kolasib & Rangia to provided by NERTS
		132 kV Badarpur(PG) Bay	POWERGRID			
10	132/33/11 kV PK Bari	132 kV Silchar 1 Bay	POWERGRID	TSECL	Agreed to submit	Nerts to submit
		132 kV Silchar 2 Bay	POWERGRID		Agreed to submit	
11	132/66/33 kV Mokokchung (DoP Nagaland)	132 kV Mokokchung (PG) 1 Bay	POWERGRID	DoP, Nagaland	Agreed to submit	
		132 kV Mokokchung (PG) 2 Bay	POWERGRID		Agreed to submit	
12	400/220/33kV Balipara	132 kV Bhalukpung/ Khupi Bay	NEEPCO	POWERGRID	Agreed to submit	
13	132kV AGBPP-Tinsukia		NEEPCO	AEGCL	NEEPCO asked AEGCL to give software and demonstration to download DR	

Deliberation of the sub-Committee:

After detailed deliberation it was decided that bay owners would explain the DR downloading facilities in detail to the personnel(of the station owner) stationed at the respective stations.

The Sub-Committee noted as above.
Action: All utilities as above.

C.6 Frequent tripping & non-submission of DR output from 132 kV Rangia for 132 kV Motonga (now 132 kV Deothang) line

132 kV Rangia – Motonga line tripped 5 times in the month of Apr'19 and 1 time in the month of May'19.

Line configuration was changed to 132 kV Rangia – Deothang since 2nd Jun'19 and this line tripped 3 times after this.

Letters from NERLDC ref no: NERLDC/SO-II/446 dated 28.05.19 & ref no: NERLDC/SO-II/446 dated 28.05.19 are attached as Annexure-2.

No Disturbance Recorder, Event Logger & First Information Report received from either ends due to which proper analysis could not be done. In few of the events, over voltage & under voltage protection operation was reported from site.

As per email from AEGCL dated 10-Jun-19, DR channels are not standardized at Rangia and relay indication was reported observing the leds.

NERTS, POWERGRID is requested to please intimate root cause of these events and the action plan for attending issues at Rangia.

In Sub-group meeting on 13.06.19, Sr.DGM, NERTS informed that relay settings have been changed at Rangia. The DR output would be collected by AEGCL once the channel standardization is done by NERTS at Rangia. DR channel standardization would be done by Jul'19.

Deliberation of the sub-Committee:

Sr.DGM, NERTS informed that checking of relay setting at Rangia done on 30.06.19 and found in order. Settings at Deothang end checked on 05.06.19 . Timimg settings for all zones at Deothang for rangia feeder are set at zero. Member Secretary, NERPC informed that Bhutan has given communication that works have been completed. So observations of NERTS & the status would be sent to NLDC for follow up from their end with BPC.

The Sub-Committee noted as above.
Action: NERPC/NERLDC.

D. I T E M S F O R APPROVAL

D.1 Overvoltage settings for 400kV System:

Overvoltage settings for 400kV System has been prepared by NERLDC. The Sub-Group suggested that the overvoltage settings for Stage-II to be kept at 140% instantaneous. No grading is required for Over Voltage Stage-II settings. Accordingly, the final proposed over-voltage settings is attached at **Annexure-D.1**.

Deliberation of the sub-Committee:

Sr.DGM, NERTS informed that OV settings would be implemented by first week of Aug'19. NERLDC requested that drop off to pickup ratio of the relay to be tested after implementation of settings and to be submitted to NERLDC/NERPC. After detailed deliberation it was decided that schedule would be drawn up by NERTS and testing of the relays would be done during AMP(preferably completion by 14.08.19).

The Sub-Committee noted as above.
Action: NERTS/MePTCL/AEGCL/NEEPCO/OTPC.

Date & Venue of next PCC meeting

It is proposed to hold the 54th PCC meeting of NERPC on second week of September, 2019. However, the exact date and venue will be intimated in due course.

The meeting ended with thanks to the Chair.

*****

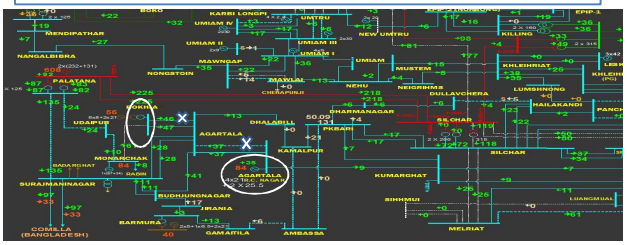
Annexure-I

List of Participants in the 53rd PCC Meeting held on 11th July, 2019

SN	Name & Designation	Organization	Contact No.
	No Representatives	**Ar. Pradesh**	
1.	Sh. Nishanta Baruah, Asst. Manager	Assam	08473036988
2.	Sh. Jayela Wahengbam, Asst.Manager (Syst.Opt.), SLDC	Manipur	-
3.	Sh. B.Nikhla, EE	Meghalaya	09436314163
4.	Sh. A.G.Tham, AEE	Meghalaya	09774664034
5.	Sh. Malsawmdawngliana.EE (Com)	Mizoram	09436153594
	No Representative	**Nagaland**	**-**
6.	Sh. Anil Debbarma, DGM, SLDC	Tripura	09612589250
7.	Sh. Mrinal Paul, Sr.Manager, SLDC	Tripura	09436137022
8.	Sh. Joypal Roy, DGM	NEEPCO	09435577726
9.	Sh. J.L.Das, DGM	NEEPCO	09436250668
10.	Sh. Ashim Kr. Sarmah, Manager	NEEPCO	09435078860
11.	Sh. Krishna Kant Rai, Manager	NEEPCO	09436581230
12.	Sh. V. Suresh, CGM	NERLDC	09449599156
13.	Sh. Amaresh Mallick, Sr. GM (SO-II)	NERLDC	09436302720
14.	Sh. Jerin Jacob, Dy. Manager (SO-II)	NERLDC	09402120113
15.	Sh. H.Talukdar, Sr.DGM	PGCIL	-
16.	Sh. N.Yugandhar, Sr. Manager, Loktak	NHPC	09800003819
17.	Sh. Smruti Ranjan Das, Manager	OTPC	09612400784
18.	Sh. B. Lyngkhoi, MS I/C	NERPC	09436163419
19.	Sh. S. Mukherjee, AD	NERPC	08794277306

Grid Disturbances & Grid Events in Tripura Power System in the month of Jun'19

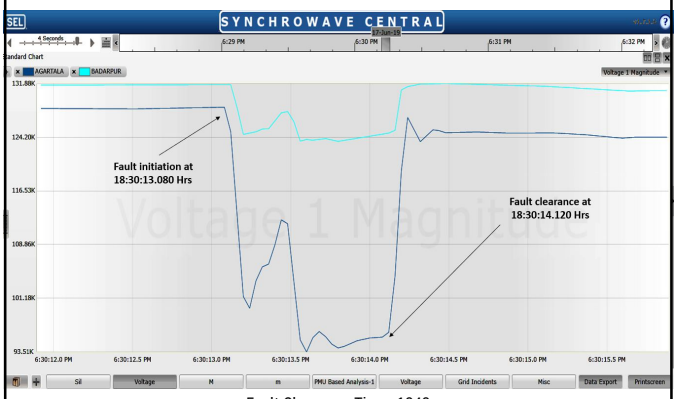
1. Grid Incidence at 18:30 Hrs on 17-06-2019



- Triggering Incident: Failure of Jumper in 132 kV Rokhia – Agartala 1 line
- AGTCCPP Unit 1, 3 & 5 and 132 kV AGTCCPP – Agartala 1 line tripped due to delay in fault clearance (1040 msec) by the protection system of 132 kV Rokhia – Agartala 1 line.
- It was learned that 132 kV Rokhia Units also tripped. Detailed report yet to be submitted by SLDC Tripura.

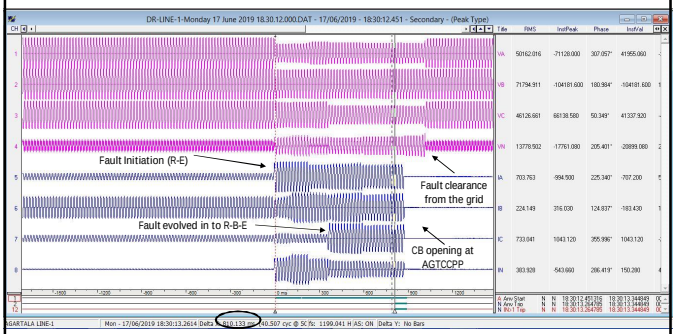
- **Generation loss at AGTCCPP**: 60 MW

132 kV Agartala & Badarpur PMU Voltage Plot



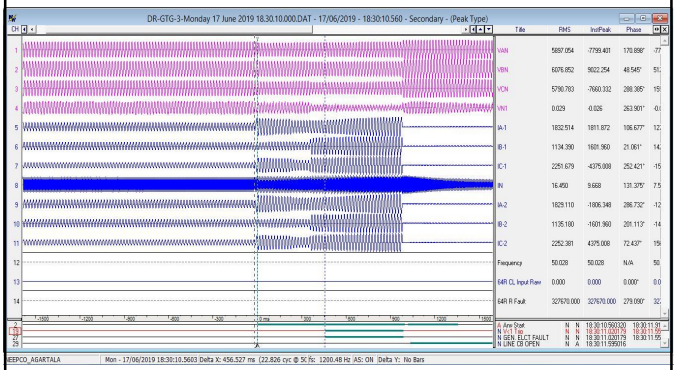
Fault Clearance Time: 1040 msec

DR output from AGTCCPP of 132 kV AGTCCPP – Agartala-1 line



R-E fault with In: 0.642 kA, In>1 trip within 810 msec of fault initiation. R-E fault evolved to R-B-E fault. Fault cleared from system within 1.020 seconds.{Note: DR not time sync, 2 sec drift with GTG-3 DR)

DR output of AGTCCPP Unit-3



GTG-3 tripped on ***under voltage stage-1*** protection within 450 msec from fault initiation.
Voltage at U/V initiation: Vre-5.1 kV Vye-5.9 kV & Vbe - 5.05 kV
(**settings**: 84 volt in secondary, Ph-Ph sensing, 400 msec delay Definite Time). DR Link

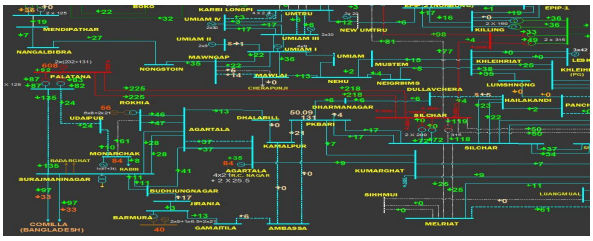
Topics for discussion

- **Root cause of the event** (Failure of Jumper in 132 kV Rokhia – Agartala 1 line): TSECL is requested to intimate the Loc. No, Phase(s) involved etc.
- Reason for delayed clearance of fault by Protection System of 132 kV Rokhia – Agartala 1 line?
- Reason for tripping of 132 kV AGTCCPP – Agartala 1 line at AGTCCPP where 132 kV AGTCCPP – Agartala 2 line survived?
  As per settings submitted by AGTCCPP, both lines have the same settings for Earth Fault protection in DP [*CT ratio: 600/1, PMS: 200 mA, TMS: 100 msec, Definite Time*]
- Reason for tripping of Rokhia Units?
- Reason for tripping of AGTCCPP Units (time settings appears to be in the lower side).
  GTG U/V Stage-1 Settings: 84 volt in secondary (80%), Ph-Ph sensing, **400 msec** delay definite time (Note: Stage-II is disabled)
  STG U/V Stage-1 Settings: 99 volt in secondary (90%), **5 sec** delay; Stage-II: 93.5 volt in secondary (85%), 2.**5 sec** delay
- **DR outputs not submitted for following elements**:
  a. 132 kV Rokhia – Agartala 1 line (both sides)
  b. Rokhia Units
  c. AGTCCPP Unit 1 & 5
- DR output submitted by AGTCCPP is not time synchronized. 2 sec drift observed between DR output of Unit-3 & Line-1 DR outputs at AGTCCPP.

Suggested Remedial Measures

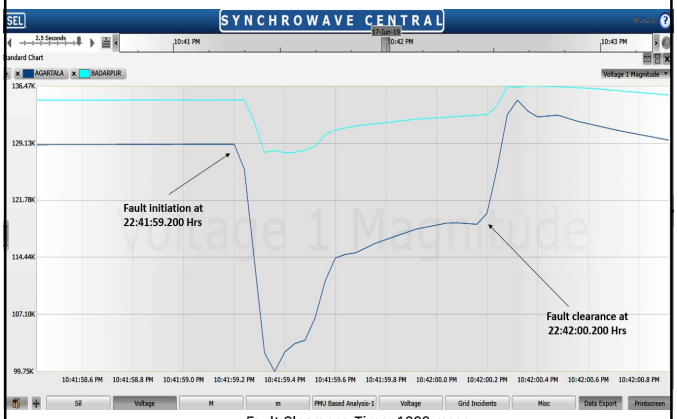
- Immediately put into service distance relay for 132kV Agartala - Rokhia Ckt # I at Rokhia
- CT/PT proper connection to be ensured at Agartala for 132kV Agartala-Rokhia D/C
- Under voltage settings for GTG at AGTCCPP to be reviewed
- Distance Protection & BU O/C E/F settings to be reviewed for 132kV AGTCCPP-Agartala D/C at AGTCCPP
- Proper line patrolling with jumper tightening and strengthening of weak sections to be done for 132kV Rokhia -Agartala D/C.
- Submission of DR outputs of 132 kV 79 Tilla - Rokhia 1 line & Rokhia units for this event.
- AGTCCPP to install TSE and attend time sync issues

2. Grid Event at 22:42 Hrs on 17-06-2019



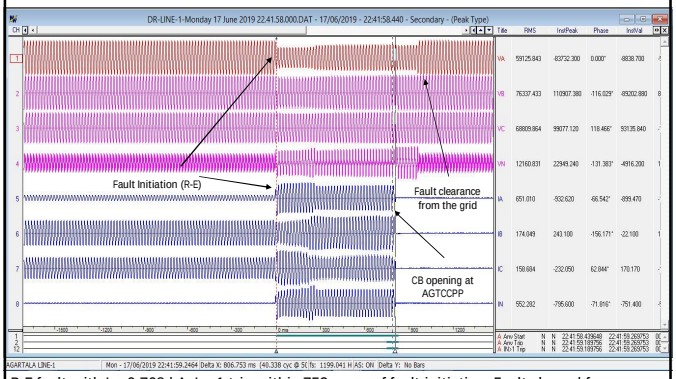
- Triggering Incident: Failure of Jumper in 132 kV Rokhia – Agartala 1 line
- Monarchak STG tripped along with 132 kV Rokhia – Agartala 1 line tripped due to delay in fault clearance (1000 msec) by the protection system of 132 kV Rokhia – Agartala 1 line.
- It was learned that 132 kV Rokhia Units also tripped. Detailed report yet to be submitted by SLDC Tripura.
- Monarchak reported that CW PUMP AND HP BFP tripped due to ***negative phase sequence*** due to delayed fault clearance.
- **Generation loss at Monarchak**: 29 MW

132 kV Agartala & Badarpur PMU Voltage Plot



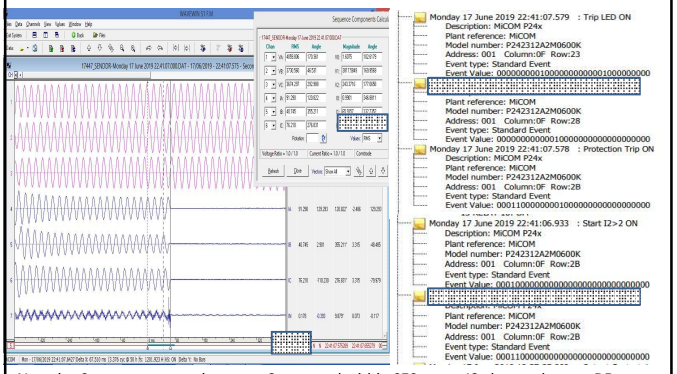
Fault Clearance Time: 1000 msec

DR output from AGTCCPP of 132 kV AGTCCPP – Agartala-1 line



R-E fault with In: 0.768 kA, In>1 trip within 753 msec of fault initiation. Fault cleared from system within 0.970 seconds.{Note: DR not time sync, 1 sec drift with PMU)

DR & EL outputs submitted by Monarchak



Negative Sequence protection stage-2 operated within 650 msec. I2 observed as per DR Output: 30 Amps.

Topics for discussion

- **Root cause of the event** (Failure of Jumper in 132 kV Rokhia – Agartala 1 line): TSECL is requested to intimate the Loc. No, Phase(s) involved etc.
- Reason for delayed clearance of fault by Protection System of 132 kV Rokhia – Agartala 1 line?
- Reason for tripping of 132 kV AGTCCPP – Agartala 1 line at AGTCCPP where 132 kV AGTCCPP – Agartala 2 line survived?
  As per settings submitted by AGTCCPP, both lines have the same settings for Earth Fault O/C protection [*CT ratio: 600/1, PMS: 200 mA, TMS: 100 msec, Definite Time*]
- Reason for tripping of Rokhia Units?
- Reason for tripping of Monarchak STG (As per event file, Negative Sequence Protection operated within 650 msec)?

Note:

a. Here, fault cleared in 1 sec

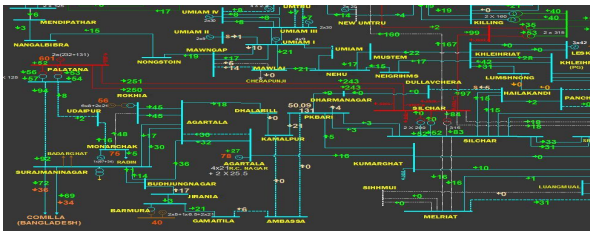
b. In 400 kV & 220 kV system, Z-3 timing is 1sec to 1.5 sec.

- **DR outputs not submitted for following elements**:
  a. 132 kV Rokhia – Agartala 1 line (both sides)
  b. Rokhia Units
- DR output submitted by AGTCCPP is not time synchronized. 1 sec drift observed from PMU.

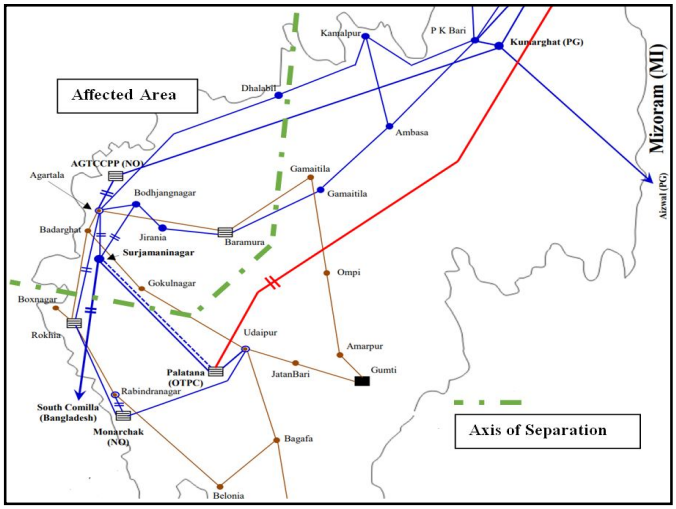
Suggested Remedial Measures

- Immediately put into service distance relay for 132kV Agartala - Rokhia Ckt # I at Rokhia
- CT/PT proper connection to be ensured at Agartala for 132kV Agartala-Rokhia D/C
- Negative Sequence Protection settings for auxiliary systems at Monarchak to be reviewed
- Distance Protection & BU O/C E/F settings to be reviewed for 132kV AGTCCPP-Agartala D/C at AGTCCPP
- Proper line patrolling with jumper tightening and strengthening of weak sections to be done for 132kV Rokhia -Agartala D/C.
- Submission of DR outputs of 132 kV 79 Tilla - Rokhia 1 line & Rokhia units for this event.
- AGTCCPP to install TSE and attend time sync issues

3. Disturbance in Tripura Power System at 11:42 Hrs on 18-06-2019



- Triggering Incident: Fault in 132 kV Rokhia – Agartala 1 line (it was informed that bamboo fell on line near Agartala)
- **Generation loss**: 497 MW
- **Load Loss: 106 MW (Tripura)**



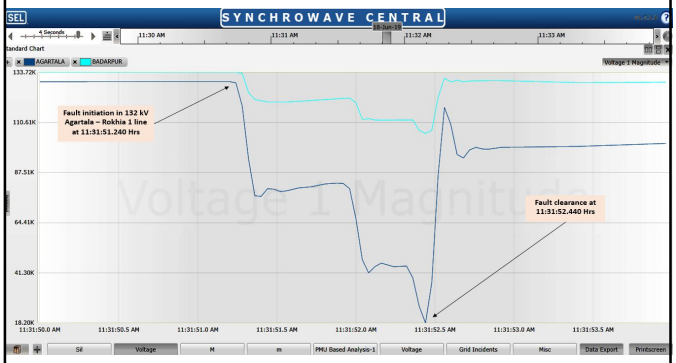
Disturbance in Tripura Power System at 11:43 Hrs on 18-06-2019

- **At 11:32 Hrs on 18.06.19**, fault initiated in 132 kV Agartala – Rokhia 1 line due to touching of bamboo.
- AGTCCPP Unit-1, 2 & 3 tripped on under voltage stage-1 protection & AGTCCPP Stage 2 tripped subsequently due to tripping of GTGs.
- 132 kV Palatana - Surajmaninagar line tripped at Palatana in Distance Protection (DP), Zone-III.
- 132 kV Rokhia - Agartala I & 2 lines tripped and fault was cleared from the system. As per 132 kV Agartala PMU, **fault was cleared in 1.2 seconds**.
- Tripping of GBCs at Palatana & subsequent tripping of Module-1 of Palatana, OTPC were also reported.
- It appears that **delay in fault clearance in the 132 kV Agartala – Rokhia 1 line** resulted in wide spread tripping of elements connected to the grid.

Disturbance in Tripura Power System at 11:43 Hrs on 18-06-2019

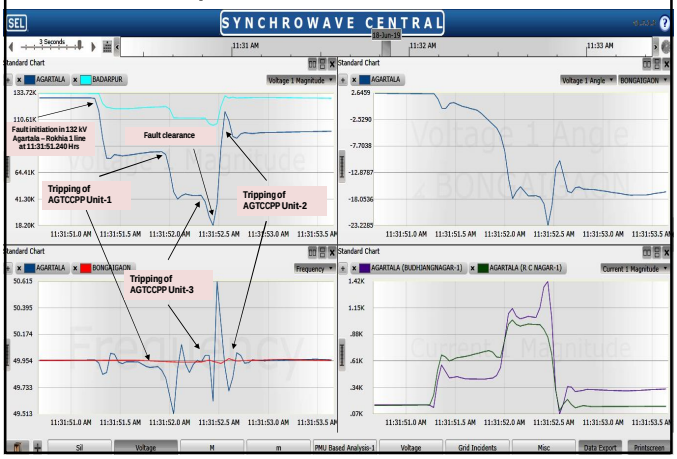
- After the above incident, Tripura Power System except Udaipur, Rokhia, Kailashahar, Dharmanagar, P.K Bari, Ambasa & Gamaitila substations was connected with rest of NER Grid through 132 kV AGTCPP -Kumarghat line, 132 kV Kamalpur - P.K Bari line and 132 kV Gamaitila - Baramura line.
- At **11:43 Hrs**, 132 kV Kamalpur – P.K Bari line tripped due to fault in this line (root cause analysis not submitted by TSECL).
- Subsequently, 132 kV Gamaitila - Baramura line tripped (root cause analysis not submitted by TSECL) and
- 132 kV AGTCCPP - Kumarghat line tripped at Kumarghat due to operation of Backup over current protection.
- Due to tripping of these elements, Tripura Power System except part of Tripura Power System [Udaipur, Rokhia, Kailashahar, Dharmanagar, P.K Bari, Ambasa, Gamaitila] was separated from rest of NER Grid and subsequently collapsed due to no source in this area.

PMU plot of delayed fault clearance in 132 kV Agartala – AGTCCPP 1 line

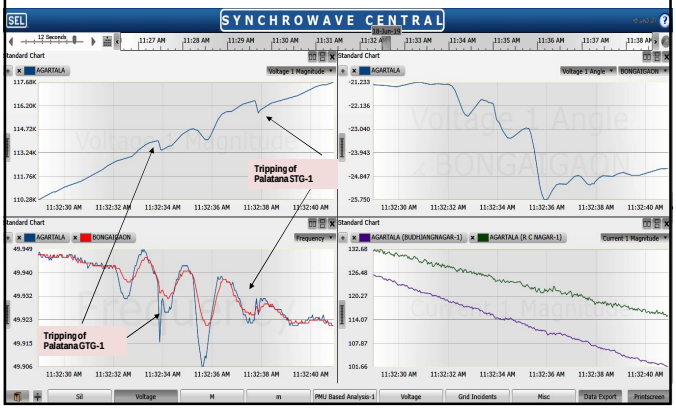


Fault Clearance Time: 1.2 sec

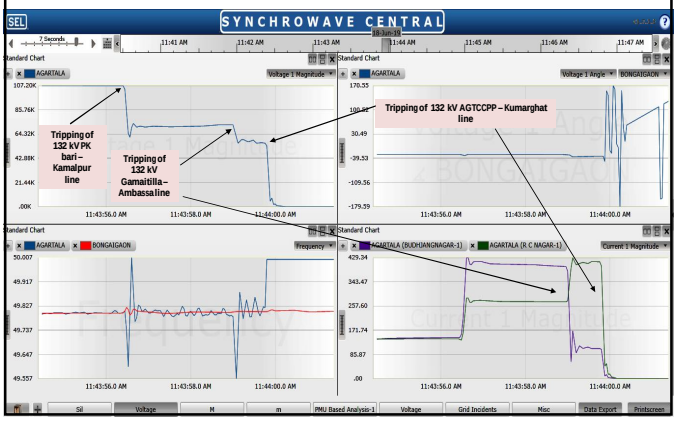
PMU plot of fault at 11:31 Hrs



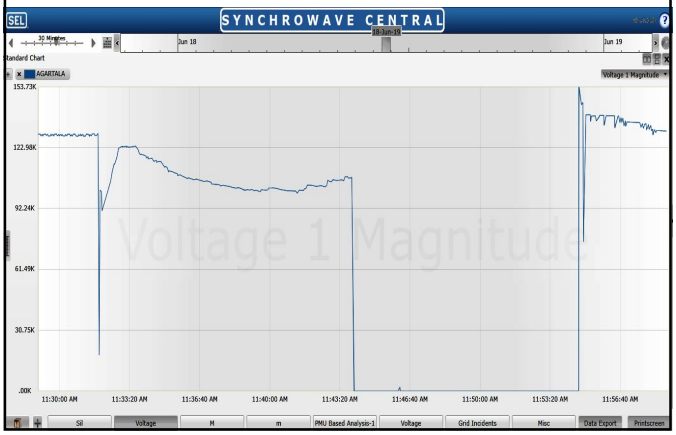
Palatana Units Tripping



PMU plot of event at 11:43 Hrs



PMU plot of the entire event



Topics for discussion

- **Root cause of the event** (Touching of bamboo in 132 kV Rokhia – Agartala 1 line): TSECL is requested to intimate the Loc. No, Phase(s) involved etc.
- Reason for delayed clearance of fault by Protection System of 132 kV Rokhia – Agartala 1 line (DP detected the fault with a huge time delay)?
- Reason for tripping of 132 kV Rokhia – Agartala 2 line at Agartala on DP, Z-1 (here also DP detected fault with a time delay)?
- Reason for tripping of Rokhia Units?
- Reason for tripping of Module-1 at Palatana where other module survived? [GBC-2 & 3 tripped due to low voltage at 6.9 kV bus for 1 sec]
- Reason for tripping of Monarchak Units? [GBC tripping was reported]
- Reason for tripping of AGTCCPP Units (time settings appears to be in the lower side).
  GTG U/V Stage-1 Settings: 84 volt in secondary (80%), Ph-Ph sensing, **400 msec** delay definite time (Note: Stage-II is disabled)
  STG U/V Stage-1 Settings: 99 volt in secondary (90%), **5 sec** delay; Stage-II: 93.5 volt in secondary (85%), 2.**5 sec** delay

Topics for discussion

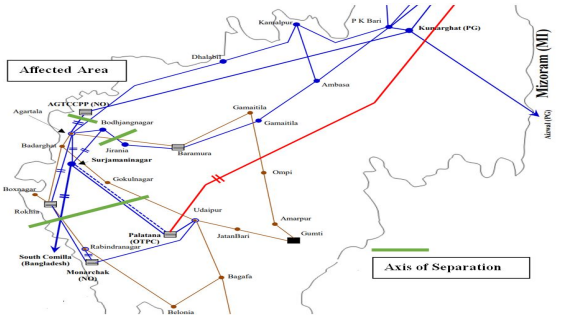
- As per DR outputs submitted by TSECL, following lines also tripped and fault in CT of 132 kV SMNagar Bus coupler bay was also reported:
  - 132 kV SMNagar – Agartala -1 line tripped at SMNagar on Z-4 at 11:37 Hrs (note-Z-4 was detected at Agartala end also)
  - 132 kV SMNagar – Agartala -2 line tripped at SMNagar on Z-4 at 11:19 Hrs (Z-3 initially changed to Z-4)
  - 132 kV SMNagar – Budhjungnagar -1 line tripped at Budhjungnagar on Z-2 at 12:27 Hrs.
  - 132 kV SMNagar – Budhjungnagar -2 line tripped at Budhjungnagar on Z-1 at 12:27 Hrs.

  Note: Timing is taken from DR output which seems to be not in sync with GPS
- DR outputs not submitted for following elements:
  a. 132 kV Rokhia – Agartala 1 line (Rokhia end)
  b. Rokhia Units
  c. 132 kV Baramura – Gamaitilla line (both sides)
- DR outputs submitted from AGTCCPP, Rokhia, Agartala, SMNagar & PK Bari are *not time synchronized*.

Suggested Remedial Measures

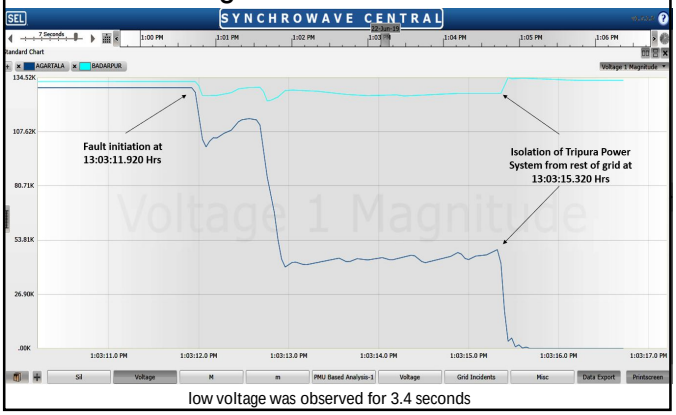
- Immediately put into service distance relay for 132kV Agartala - Rokhia Ckt # I at Rokhia,
- CT/PT proper connection to be ensured at Agartala for 132kV Agartala-Rokhia D/C & 132 kV Agartala – SMNagar -1 line,
- Bus-Coupler CT to be immediately replaced and both the buses at SMNagar to be put into service,
- CB operation at Dhalabil for Kamalpur feeder to be checked [DP issued trip and CB did not open for 1 second]
- DP at Kamalpur for PK Bari feeder to be checked as it did not operate.
- RCA for tripping of 132kV Baramura - Gamaitilla and 132kV PK Bari –Kamalpur & Rokhia Units to be submitted - TSECL,
- Bus bar protection to be put into service at SMNagar - TSECL.
- Distance Protection at SMNagar for 132 kV Budhjungnagar D/C to be checked & settings to be reviewed
- Z-1 operation of 132 kV SMNagar – Budhjungnagar -2 line at Budhjungnagar to be checked (over reached).
- Time synchronization of DR at 79 Tilla, P.K Bari, SMNagar, Rokhia - TSECL

4. Disturbance in Tripura Power System at 13:03 Hrs on 22-06-2019



- Triggering Incident: Fault in 132 kV Rokhia – Agartala 1 line (It was learnt that fault was in 132 kV Agartala – Rokhia 1 line due to jumper failure)
- **Generation loss**: 175 MW
- **Load Loss: 75 MW (Tripura)**

PMU plot of delayed fault clearance in 132 kV Agartala – AGTCCPP 1 line



low voltage was observed for 3.4 seconds

Disturbance in Tripura Power System at 13:03 Hrs on 22-06-2019

- At 13:03 Hrs on 22.06.2019, *132 kV Palatana - Surajmaninagar line, 132 kV Jirania - Budhjungnagar line, 132 kV Monarchak - Rokhia line, 132 kV Agartala-Dhalabil line, 132 kV Agartala - Rokhia I & II lines, 132 kV Agartala - AGTCCPP I & II lines* tripped.
- Due to tripping of these elements, Tripura Power System except Udaipur, Kailashahar, Dharmanagar, P K Bari, Kamalpur, Ambasa, Jirania, Baramura, Gamaitila, Monarchak, Rabindranagar substations was separated from rest of NER Grid and subsequently collapsed due to no source in this area.

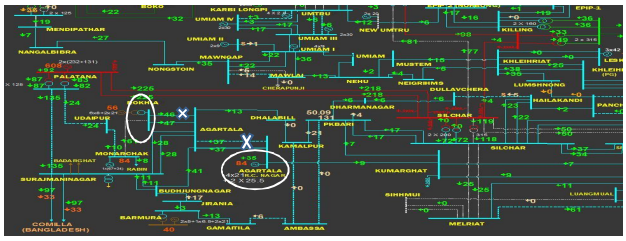
Disturbance in Tripura Power System at 13:03 Hrs on 22-06-2019

- It was learnt that fault was in 132 kV Agartala – Rokhia 1 line due to jumper failure.
- Due to delay in fault clearance, wide spread tripping of elements reported including AGTCCPP Unit-1, 5 & 6.
- 132 kV Monarchak – Rokhia line tripped at Monarchak on Distance Protection, Z-II operation.
- 132 kV Palatana – Surajmaninagar line tripped at Palatana on Distance Protection, Z-III operation.
- As per 132 kV Agartala & 132 kV Badarpur PMU data, low voltage was observed for 3.4 seconds

Suggested Remedial Measures

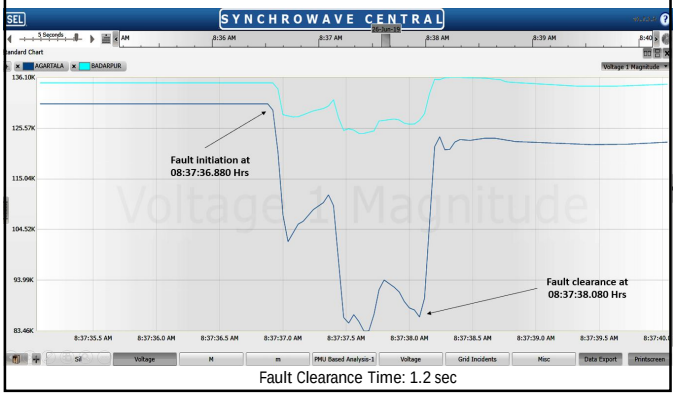
- Immediately put into service distance relay for 132kV Agartala - Rokhia Ckt#I at Rokhia - TSECL
- CT/PT proper connection to be ensured at Agartala for 132kV Agartala-Rokhia D/C - TSECL
- Settings of Distance Protection at Dhalabil for Agartala feeder to be checked and CB operation to be checked.
  [*DP, Z-1 detected at Dhalabil for Agartala line (over reached). CB did not open for 2 seconds.*]
- At Rokhia protection to be ensured in the link section between the old switchyard and new switchyard for 132kV Agartala-Rokhia D/C – TSECL
- RCA of tripping of 132 kV Budhjungnagar – Jirania line & Rokhia Units to be submitted - TSECL
- Timely submission of FIR, DR & EL outputs: TSECL
- Submission of DR output for the following elements for this event:
  a. 132 kV Budhjungnagar – Jirania line (both sides)
  b. Rokhia Units
  c. 132 kV Agartala – Rokhia 1 line (both ends) & Link feeder at Rokhia

5. Grid Incidence at 08:37 Hrs on 26-06-2019



- Triggering Incident: Suspected fault in 132 kV Rokhia – Agartala 1 line
- 132 kV Agartala – AGTCCPP D/C and AGTCCPP Units - 4, 5 & 6 tripped due to delay in fault clearance (1200 msec) by the protection system of 132 kV Rokhia – Agartala 1 line.
- It was learned that 132 kV Rokhia Units also tripped. Detailed report yet to be submitted by SLDC Tripura.
- **Generation loss at AGTCCPP**: 60 MW

PMU plot of 132 kV Agartala showing delayed fault clearance

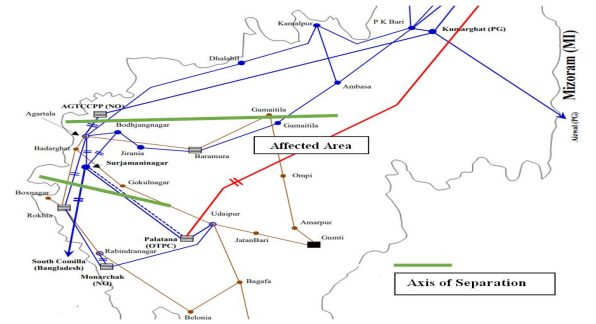


Fault Clearance Time: 1.2 sec

Suggested Remedial Measures

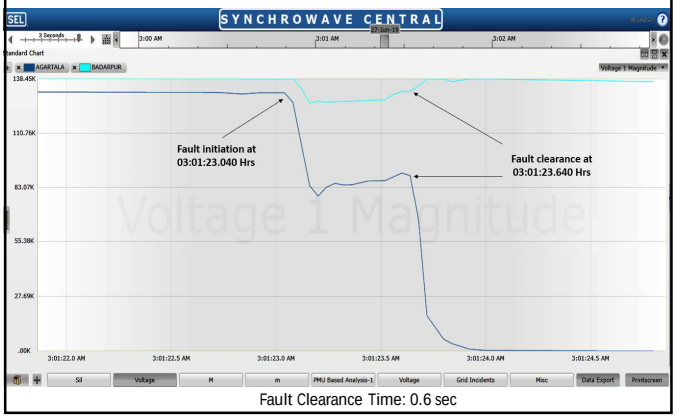
- Immediately put into service distance relay for 132kV Agartala - Rokhia Ckt#I at Rokhia - TSECL
- CT/PT proper connection to be ensured at Agartala for 132kV Agartala-Rokhia D/C - TSECL
- Review of O/C E/F settings at AGTCCPP for 132 kV Agartala D/C & Under Voltage Settings of GTs at AGTCCPP – NEEPCO
- RCA of tripping of 132 kV Rokhia – Agartala 1 line & Rokhia Units to be submitted - TSECL
- Timely submission of FIR, DR & EL outputs: TSECL
- Submission of DR outputs for the following elements:
  - Link feeder at Rokhia
  - 132 kV Rokhia – Agartala 1 line (both ends)

6. Disturbance in Tripura Power System at 03:01 Hrs on 27-06-2019



- Triggering Incident: It was learnt that fault was in 132 kV Agartala Bus Sectionalizer due to hardware failure
- **Generation loss**: 182 MW
- **Load Loss: 110 MW (Tripura)**

PMU Voltage 1 Magnitude Plot of 132 kV Agartala



Fault Clearance Time: 0.6 sec

Disturbance in Tripura Power System at 03:01 Hrs on 27-06-2019

- At 03:01 Hrs on 27.06.19, all 132 kV lines (*132 kV Agartala – Rokhia D/C, 132 kV Agartala – AGTCCPP D/C, 132 kV Agartala – Budhjungnagar line, 132 kV Agartala – Surajmaninagar 2 line*) connected to 132 kV Agartala substation were tripped **either on Distance Protection, Zone-2 from remote end or Zone-1V at Agartala except for 132 kV Agartala – Surajmaninagar - I line which tripped on Distance Protection, Zone-I**.
- Along with these lines, 132 kV Palatana- Surajmaninagar line tripped at Palatana on Distance Protection, Zone-2
- and 132 kV Ambassa – Gamaitilla line tripped on over current earth fault protection.(132 kV Palatana – Udaipur line was under shutdown).
- Due to tripping of these elements, Tripura Power System except Dhalabil, Kamalpur, P.K Bari, Budhjungnagar, Jirania, Baramura, Gamaitilla, Ambassa, Kailashahar & Dharmanagar substations was separated from rest of NER Grid and subsequently collapsed due to no source in this area.

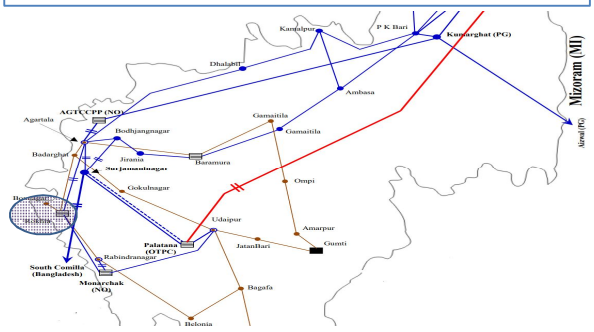
Disturbance in Tripura Power System at 03:01 Hrs on 27-06-2019

- It was learnt that there was a bus fault at 132 kV Agartala due to hardware failure in bus sectionalizer which resulted in tripping of all 132 kV lines emanating from 132 kV Agartala substation.
- It is also to be mentioned that bus sectionalizer is not having circuit breaker instead isolator is used. As per protection audit in 2017, it was reported that bus sectionalizer isolator is bypassed due to restriction in current carrying capacity of isolator contacts.
- As per 132 kV Agartala PMU, fault was cleared in 600 milli seconds

Suggested Remedial Measures

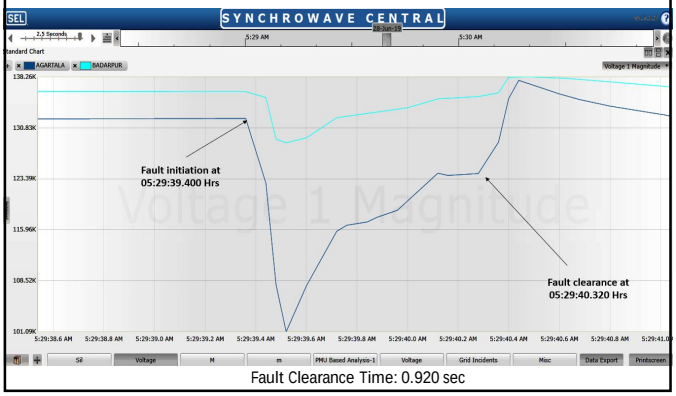
- Bus-bar protection to be implemented for 132kV 79Tilla Substation.
- Relay directionality at Agartala for 132kV Agartala-SMNagar-I to be corrected.
- Review of Z-2 & Z-3 timing of lines going out from SMNagar & 132 kV Agartala – Budhjunnagar line at Budhjungnagar (*over lapping with Palatana, 500 msec delay for Z-2*)
- Distance Protection at Dhalabil for Agartala feeder to be checked as Z-2 was not detected by this relay.
- CB to be installed/upgradation of isolator of bus sectionalizer at Agartala(79 Tilla)
- RCA of tripping of 132 kV Ambassa – Gamaitilla line.
- DR output to be submitted for tripping of the following elements:
  a. 132 kV Ambassa – Gamaitilla line (both lines)
  b. 132 kV Rokhia – Agartala -1 line (both ends)

7. Grid Event in Tripura Power System at 05:29 Hrs on 28-06-2019



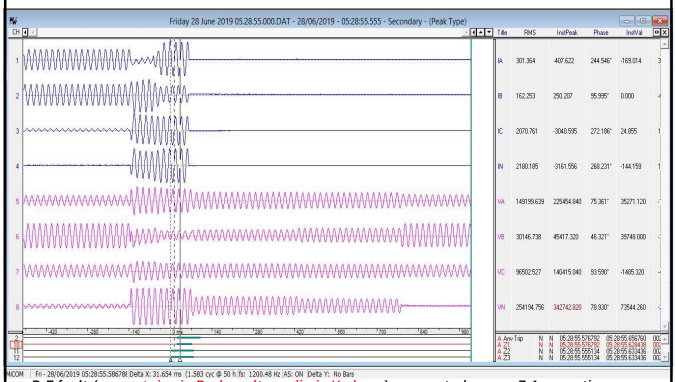
- Triggering Incident: Suspected fault in 132 kV link line connecting old & new switchyard at Rokhia
- **Generation loss**: 56 MW
- **Load Loss: 32 MW (Tripura)**

PMU Voltage 1 Magnitude Plot of 132 kV Agartala



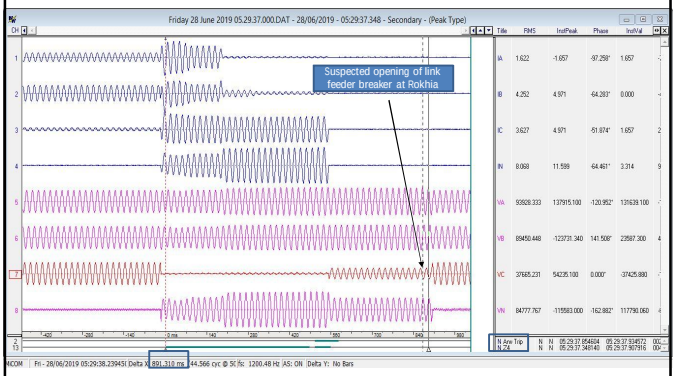
Fault Clearance Time: 0.920 sec

DR output of 132 kV Rokhia – Monarchak line (Rokhia End)



B-E fault (current rise in B-ph, voltage dip in Y phase), suspected wrong Z-1 operation

DR output of 132 kV Rokhia – Agartala 2 line (Rokhia End)

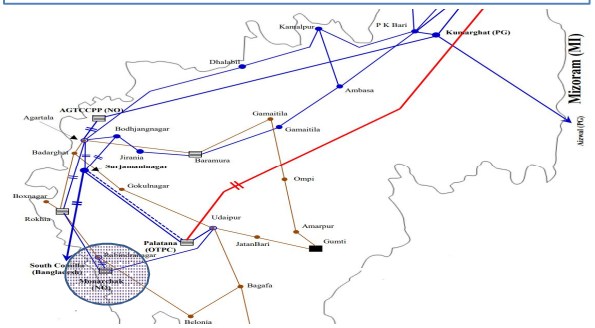


B-E fault in reverse direction (Z-4 operated and breaker opened at Rokhia)

Suggested Remedial Measures/Action to be taken

- At Rokhia directionality of the relay to be ensured with proper CT connections at the earliest
- At Rokhia protection to be ensured in the link section between the old switchyard and new switchyard for link line.
- Submission of root cause analysis by TSECL
- Submission of DR output of Link Feeder at Rokhia by TSECL

8. Grid Disturbance in Tripura Power System at 10:58 Hrs on 30-06-2019

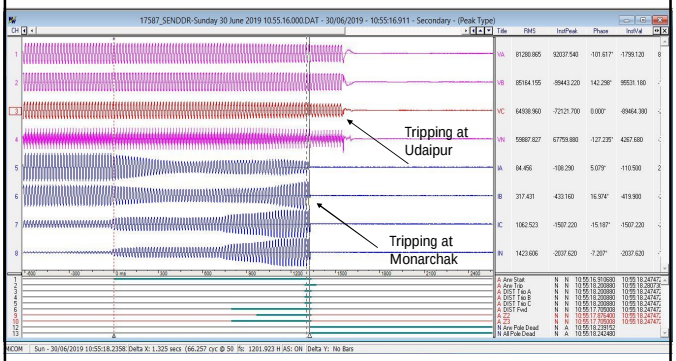


- Triggering Incident: Suspected vegetation fault in 132 kV Monarchak – Udaipur line
- **Generation loss**: 68 MW
- **Load Loss: 6 MW (Tripura)**

Grid Disturbance in Tripura Power System at 10:58 Hrs on 30-06-2019

- 132 kV Rokhia-Monarchak line was under outage since 10:00 Hrs on 30.06.2019.
- At 10:58 Hrs on 30.06.19, 132 kV Monarchak - Udaipur line tripped.
- Due to tripping of this element, Rabindranagar area of Tripura Power System was separated from rest of NER Grid and subsequently collapsed due to load generation mismatch in this area.

DR Output of 132 kV Monarchak – Udaipur line (Monarchak end)



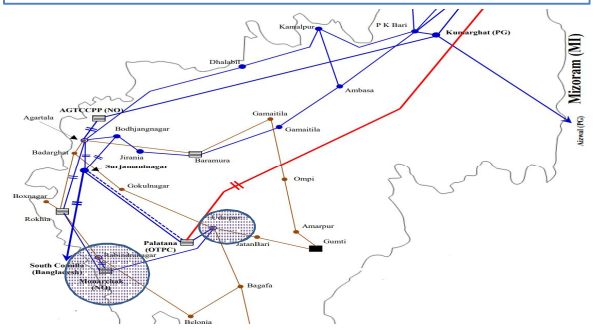
B-E fault with In: 1.4 kA, Angle between V & I in faulty phase: -15 degrees, Z-2 trip, delayed Z-2 detection. Fault cleared from Monarchak in 1.3 sec & from system within 1.5 seconds

Suggested Remedial Measures

- Proper line patrolling of 132 kV lines with vegetation clearance, jumper tightening and strengthening of weak sections to be done – TSECL
- RCA of tripping of 132 kV Monarchak - Udaipur line
- Implementation of Carrier aided protection in 132 kV lines
- Submission of DR output for the tripping of following element:

  132 kV Monarchak – Udaipur line (Udaipur End)

9. Grid Disturbance in Tripura Power System at 02:45 Hrs on 01-07-2019

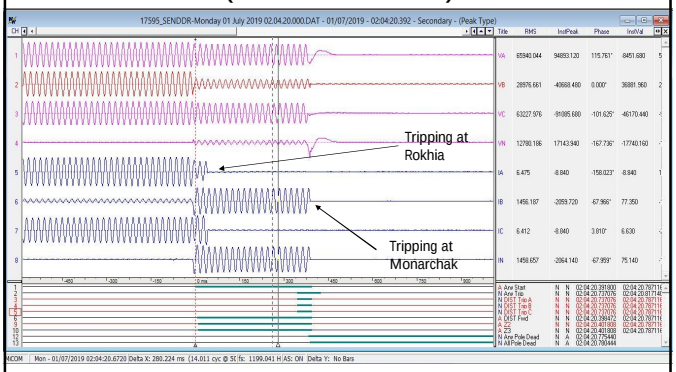


- Triggering Incident: Suspected fault in 132 kV Monarchak – Rokhia line
- **Generation loss**: 39 MW
- **Load Loss: 37 MW (Tripura)**

Grid Disturbance in Tripura Power System at 02:45 Hrs on 01-07-2019

- Udaipur area of Tripura Power System and Monarchak Power Station were connected with rest of NER Grid through 132 kV Monarchak - Udaipur line.
- 132 kV Udaipur- Palatana Line was idle charged to restrict loading of 125 MVA ICT II at Palatana.
- At 02:45 Hrs on 01.07.19, 132 kV Monarchak - Rokhia line tripped.
- Due to tripping of this element, Udaipur area of Tripura Power System and Monarchak Power Station were separated from rest of NER Grid and subsequently collapsed due to load generation mismatch.

DR output of 132 kV Monarchak – Rokhia line (Monarchak end)



Y-E fault with In: 1.4 kA, Angle between V & I in faulty phase: -68 degrees, Z-2 trip. Fault cleared from Rokhia in 55 msec & from Monarchak within 401 msec

Suggested Remedial Measures

- Proper line patrolling of 132 kV lines with vegetation clearance, jumper tightening and strengthening of weak sections to be done – TSECL
- RCA of tripping of 132 kV Monarchak - Rokhia line
- Implementation of Carrier aided protection in 132 kV lines

General Observations:

- Most of the events mentioned were due to suspected fault in 132 kV Agartala – Rokhia 1 line.
- Proper analysis of the grid events and timely addressing the issues by the utility would have prevented the recurrence of same kind of events.
- Delayed clearance of fault by the protection system of 132 kV Rokhia – Agartala 1 line was contributed to the multiple undesirable trippings in Tripura Power System.
- Wrong CT/PT wiring to the distance protection is also contributed to the undesired trippings/delayed fault clearance.
- Apart from issues pertaining to protection system, maintenance of line and substation is also a serious issue and such frequent tripping highlights the need for proper line patrolling with jumper tightening, strengthening of weak sections, appropriate vegetation management and periodic maintenance of substation equipment.

General Observations:

- It is to be mentioned here that root cause of many of the events mentioned is not concluded due to non-submission of DR & EL outputs and analysis report by TSECL.
- In some of the instances, DR & EL outputs and First time information report were submitted to NERLDC after 24 Hrs of the incident which is a violation of Regulation 5.2(r) of IEGC & regulation 12 of Central Electricity Authority (Grid Standards) Regulations, 2010
- As per DR outputs, it is observed that none of the relays were time synchronized at 132 kV Rokhia, 132 kV Agartala, 132 kV SMNagar, 132 kV Budhjungnagar & 132 kV PK Bari.

General Recommendations:

- Proper line patrolling with jumper tightening, strengthening of weak sections, appropriate vegetation management and periodic maintenance of substation equipment – TSECL
- Installation of Busbar protection at SMNagar and 79Tilla - TSECL
- Implementation of carrier aided protection & auto recloser scheme in 132 kV lines of TSECL
- Submission of FIR and DR & EL outputs for any Grid Events within 24 Hrs of the event: TSECL
- CT/PT connections to the Distance Relay and backup directional relays to be checked and DR output to be triggered manually for all the distance protection in Tripura Power System after necessary corrections if required and to be submitted to NERPC/NERLDC – TSECL

General Recommendations:

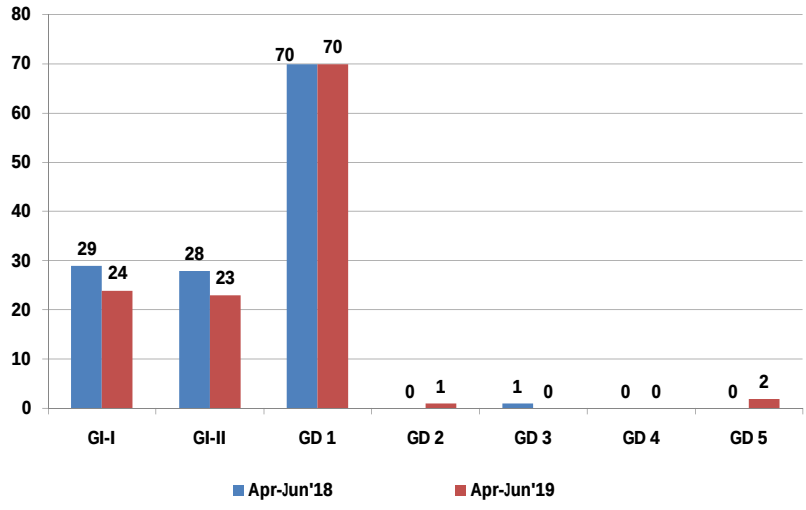
- Circuit Breaker operation to be checked at 132 kV Agartala, 132 kV Rokhia & 132 kV SMNagar and 132 kV stations for state owned elements-TSECL
- Breaker Operation to be configured in DR:TSECL
- Time synchronization of DR & EL - TSECL
- Scheme drawings in all 132 kV substations have to be kept in substations for reference-TSECL
- AC Systems in Control Rooms & Battery Rooms are to be kept in “on condition” all the time.
- DC system schematics should be kept readily available and also periodic maintenance has to kept in proper record.
- The UFR relief as seen in the Inspection Report does not provide any relief and the purpose of installing the scheme is meaningless. The same has to be addressed.

Thanks....

53rd PCC Meeting on 11.07.19

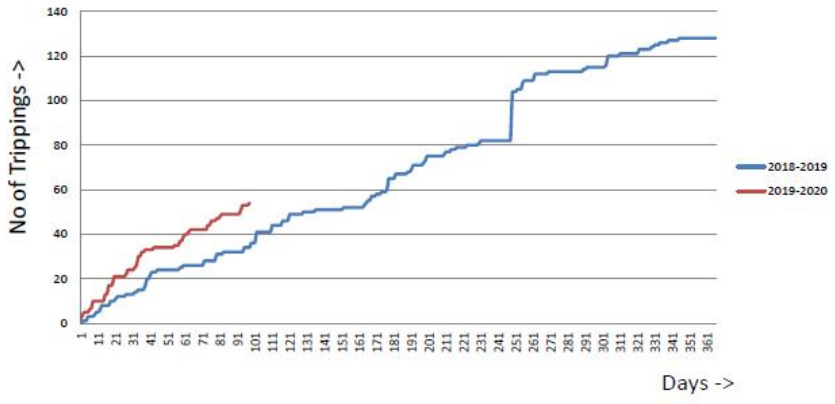
Presentation by NERLDC

Statistics of Grid Incidences & Grid Disturbances in NER Grid for the period w.e.f April to June



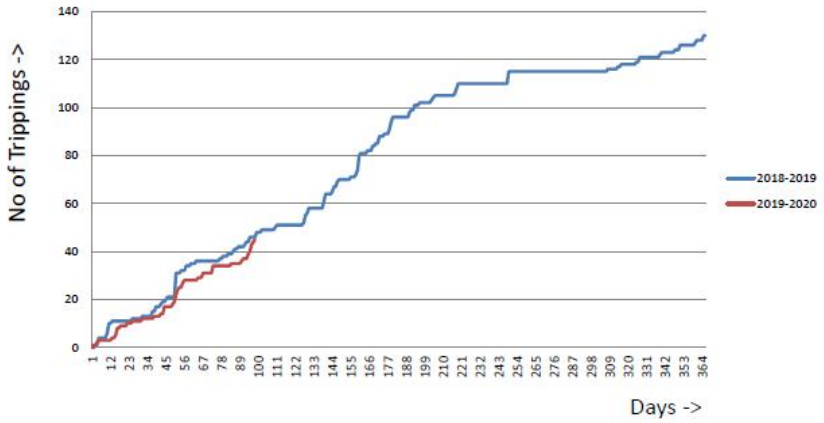
Statistics of Transmission Element Tripping in NER Grid

No. of Tripping of 400 kV lines till 07-07-2019



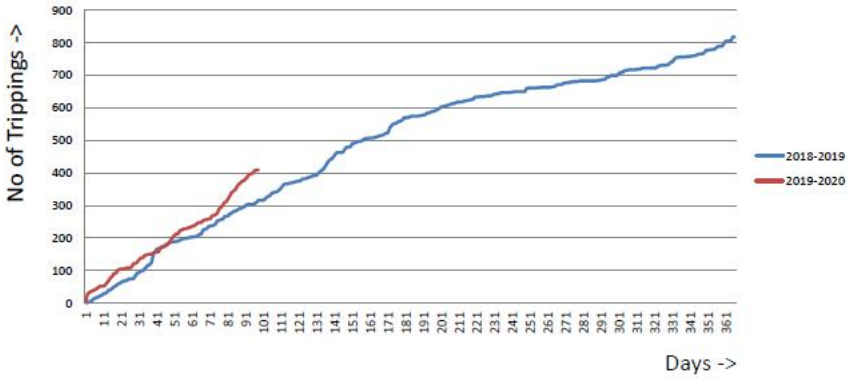
No.of tripping in 2018-2019 as on date: 34
No.of tripping in 2019-2020 as on date: 54
(Total No Lines= 26)

No. of Tripping of 220 kV lines till 07-07-2019



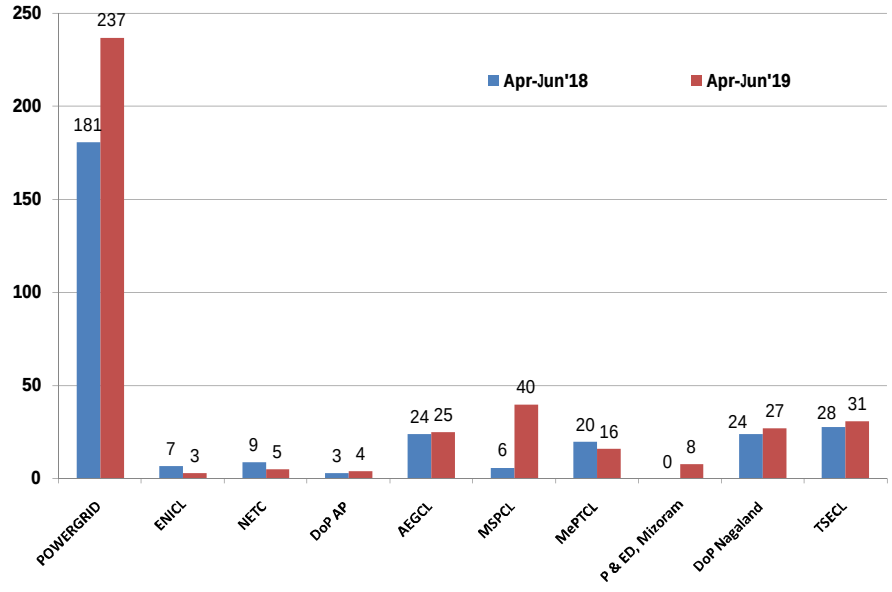
No.of tripping in 2018-2019 as on date: 46
No.of tripping in 2019-2020 as on date: 45
(Total No Lines= 43)

No. of Tripping of 132 kV lines till 07-07-2019

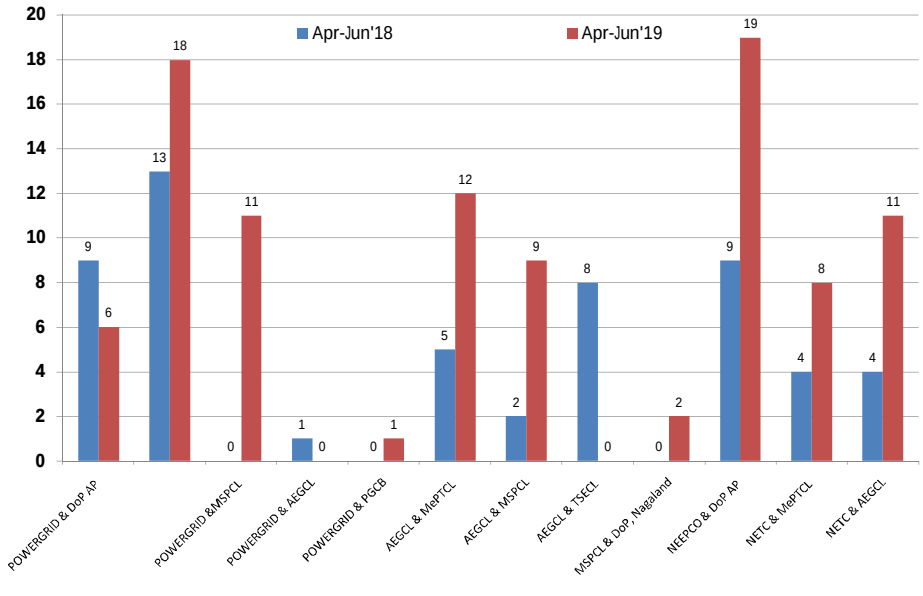


No.of tripping in 2018-2019 as on date: 316
No.of tripping in 2019-2020 as on date: 409
(Total No Lines= 161)

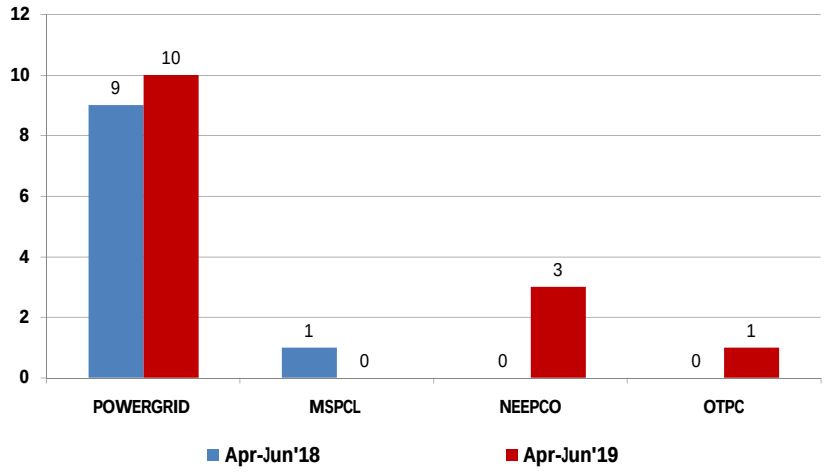
Utility wise comparison of transmission line tripping



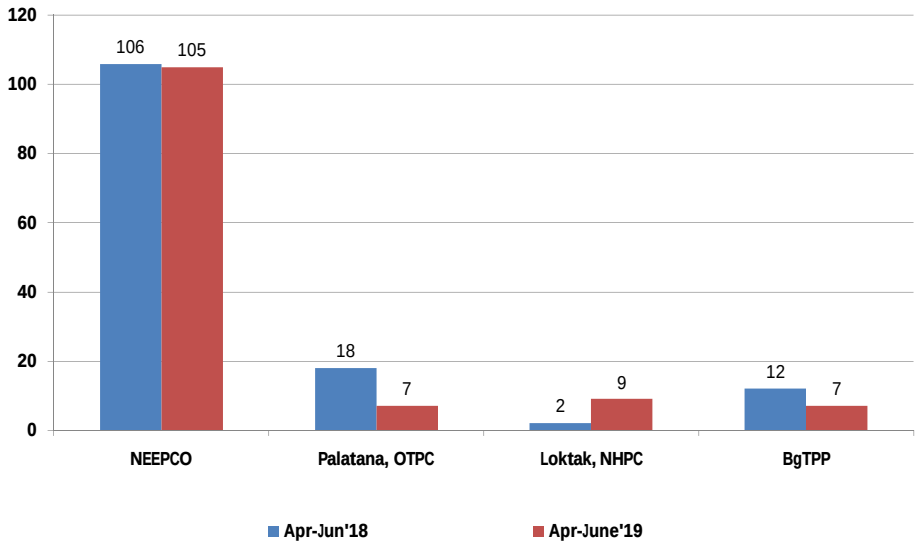
Comparison of transmission line tripping where multiple utilities involved



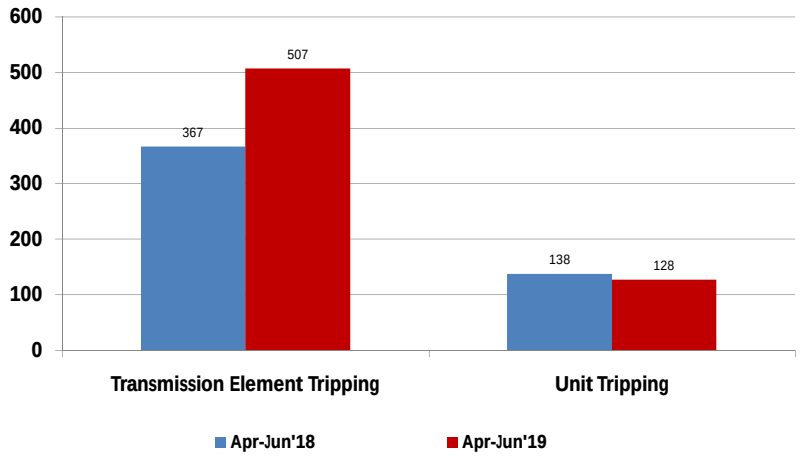
Comparison of Transformer Tripping



Utility Wise Comparison of Unit Tripping

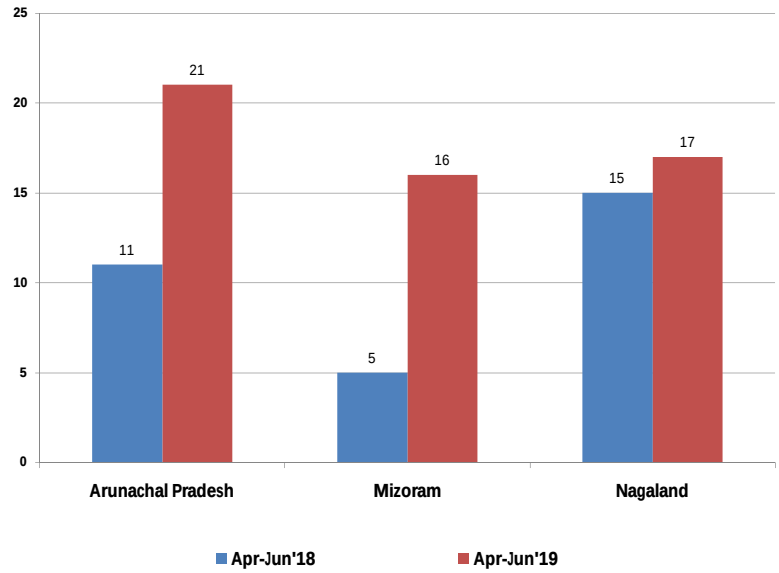


Comparison of Transmission Element and Unit Tripping



Thank You

NER STATES WITH INCREASING TREND IN TERMS OF GRID DISTURBANCES



Identification of short lines to install Line Differential Protection (LDP)

- Review of Latest Status in view of identification of short lines to install LDP
- As per 52nd PCC Meeting, MSPCL, P&ED, Mizoram and TSECL have not identified the lines for installation of differential relay.
- As per DoP, AP no lines required LDP.
- DPR in preparation stage in AEGCL and DoP, Nagaland. Revised DPR to be prepared in MePTCL.
- Installation of LDP in 132 kV RHEP – Pare 2 line and 132 kV Doyang Sanis Line.
- In subgroup meeting dated 13.06.19, DoP Nagaland & DoP Ar.Pradesh not present via VC, so status could not be updated. MSPCL, P&ED Mizoram and TSECL were requested to update the status at the earliest.

Review of Over-Voltage Settings for 400 kV System

- Subgroup finalized the over voltage settings of 400 kV lines & few 220 kV lines in the subgroup meeting held on 05.04.19 and referred to PCC forum. It was decided in the subgroup meeting held on 05.04.19 that the overvoltage settings for Stage-II to be kept at 140% instantaneous. No grading is required for Over Voltage Stage-II settings.

Installation of Polymer Insulator and Transmission Line Surge Arrestor in Lightning Prone Areas & Polluted Areas

- Status review & details of elements where Polymer Insulator/Transmission Line Surge Arrestor already installed and its performance report

Status of Auto-Reclosure of Grid connected Lines

- AEGCL has submitted the A/R status. All other utilities to submit the A/R status for the 132kV lines.
- Utilities are requested to furnish the target date for Implementation of Auto Reclosure Scheme and furnish the details as decided- Status review
- Status of Auto-reclose of 132 kV Palatana – Surajmaninagar line and 132 kV Dimapur – Kohima line.

Availability of carrier inter-trip scheme for lines of 132 kV and above voltage level

- Status review & details of elements where Polymer Insulator/Transmission Line Utilities are requested to intimate the lines for which carrier inter-trip scheme is available and action plan for lines where tele-protection is not available.

Standardization of Disturbance Recorder Channels

- As decided in last PCC meeting, 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.*
- *The details are yet to be received.*

Details of Controlled Switching Devices installed in NER

- Utilities were requested to submit information related to CSD installed.

Details of Off Line Fault Locators available in sub-station

- Utilities were requested to submit information related to Off Line Fault Locators available in sub-station.

Status of submission of FIR and DR & EL outputs for the Grid Events w.e.f 01.12.18 to 30.06.19

- In line with regulation 12 (1) of CEA Grid Standards Regulations and IEGC provision under clause 5.2 (r), FIR and DR & EL Outputs for each grid events are required to be submitted by concerned utilities to NERLDC for detailed investigation and analysis.
- The list of trippings along with status of furnishing FIR and DR & EL outputs from Dec'18 to Jun'19 is attached as ***Annexure 1***.

Status of R & M works of Protection System funded from PSDF:

Utilities are requested to intimate the **substation wise present status and target date of completion of R & M works of protection system** especially the installation of distance protection and differential protection in transmission lines, implementation of auto recloser scheme, installation of station event logger, procurement of diagnostic tools etc.

Major Grid Disturbances and Grid Events in NER Power System apart from repeated Grid Disturbances in Tripura Power System since last Subgroup Meeting held on 13.06.19:

Affected Area(s)	Outage date & time	Remarks
Zuangtui area of Mizoram Power System	13-Jun-19 05:53 Hrs & 13-Jun-19 15:20 Hrs	Load Loss= 32 MW & 44 MW respectively
Arunachal Pradesh Power System (except Khupi and Deomali areas)	15-Jun-19 00:53 Hrs & 02-Jul-19 00:07 Hrs	GD on 15.06.19 was due to tripping of 400 kV Biswanath Chariali - Ranganadi 1 & 2 lines and GD on 02.07.19 was due to tripping of 132 kV RHEP – Itanagar line & 132 kV Pare – Itanagar line. (Load Loss = 70 MW & 47 MW respectively and Generation Loss: 0 MW & 65 MW respectively)
Mokokchung area of Nagaland Power System	20-Jun-19 11:52 Hrs & 21-Jun-19 08:43	Load Loss = 28 MW & 32 MW respectively

Contd..

Affected Area(s)	Outage date & time	Remarks
Capital area of Nagaland Power System and Karong substation of Manipur Power System	23-Jun-19 14:42 Hrs, 23-Jun-19 19:22 Hrs, 23-Jun-19 20:22 Hrs & 24-Jun-19 10:48 Hrs	Load Loss =25 MW, 38 MW, 28MW & 22 MW respectively
Imphal area of Manipur Power System	15-Jun-19 19:09 Hrs	Load Loss = 52 MW
Ningthoukhong & Rengpang areas of Manipur Power System	26-Jun-19 17:13	Load Loss = 45 MW
Kolasib area of Mizoram Power System	30-Jun-19 07:06	Load Loss = 39 MW

- Details of the **critical Grid Events since last Subgroup Meeting held on 13.06.19** are given the below table:

  - 400 kV Balipara – Misa 1 line on 03.07.19
  - 220 kV Misa – Kopili 3 line on 03.07.19 (2 times)
  - 125 MVA, 400/132 kV ICT-1 at Palatana on 29.06.19
  - 400 kV Silchar – Palatana 2 line on 21.06.19
  - 400 kV BNC – RHEP 2 line on 20.06.19 & 03.07.19
  - 400 kV Silchar – Azara line on 19.06.19
  - 400 kV Silchar – Imphal 2 line on 17.06.19
  - 400 kV Silchar – Byrnihat line on 16.06.19

Proposed Over Voltage Settings of NER

Annexure-D.1

Sl No	Substation	Element Details	Suggested Over Voltage Settings Stage I		Suggested Over Voltage Settings Stage II	
			Voltage (in percentage)	Time delay (in seconds)	Voltage (in percentage)	Time delay (in seconds)
1	400 kV Bongaigaon	Balipara III	110	4	140	0.1
		BgTPP I	110	5	140	0.1
		Balipara I	110	6	140	0.1
		New Siliguri I	110	7	140	0.1
		Alipurduar I	111	4	140	0.1
		Byrnihat	111	5	140	0.1
		Alipurduar II	111	6	140	0.1
		BgTPP II	111	7	140	0.1
		Azara	112	4	140	0.1
		Balipara II	112	5	140	0.1
		New Siliguri II	112	6	140	0.1
		Balipara IV	112	7	140	0.1
2	400 kV Balipara	Bongaigaon III	110	4	140	0.1
		Kameng-I	110	5	140	0.1
		Bongaigaon I	110	6	140	0.1
		Misa I	110	7	140	0.1
		Biswanath Charali I	111	4	140	0.1
		Biswanath Charali III	111	5	140	0.1
		Biswanath Charali II	111	6	140	0.1
		Kameng-II	111	7	140	0.1
		Biswanath Charali IV	112	4	140	0.1
		Bongaigaon II	112	5	140	0.1
		Bongaigaon IV	112	7	140	0.1
		Misa II	112	6	140	0.1
3	400 kV Biswanath Charali	RHEP I	110	5	140	0.1
		Balipara I	111	4	140	0.1
		Balipara III	111	5	140	0.1
		Balipara II	111	6	140	0.1
		RHEP II	111	7	140	0.1
		Balipara IV	112	4	140	0.1
4	400 kV Silchar	Palatana I	110	4	140	0.1
		Azara	110	5	140	0.1
		Palatana II	111	6	140	0.1
		Byrnihat	111	7	140	0.1

Proposed Over Voltage Settings of NER

Annexure-D.1

Sl No	Substation	Element Details	Suggested Over Voltage Settings Stage I		Suggested Over Voltage Settings Stage II	
			Voltage (in percentage)	Time delay (in seconds)	Voltage (in percentage)	Time delay (in seconds)
5	400 kV Palatana	Silchar I	110	4	140	0.1
		Silchar II	111	6	140	0.1
6	400 kV Ranganadi	Biswanath Charali I	110	5	140	0.1
		Biswanath Charali II	111	7	140	0.1
7	400 kV Byrnihat	Bongaigaon	111	5	140	0.1
		Silchar	110	7	140	0.1
8	400 kV Azara	Bongaigaon	112	4	140	0.1
		Silchar	110	5	140	0.1
9	400 kV BgTPP	Bongaigaon I	110	5	140	0.1
		Bongaigaon II	111	7	140	0.1
10	400 kV Misa	Balipara I	110	7	140	0.1
		Balipara II	112	6	140	0.1
11	220 kV Mariani(PG)	Mokokchung-I	110	6	140	0.1
		Mokokchung-II	110	7	140	0.1
		AGBPP	111	7	140	0.1
		Misa	111	6	140	0.1
12	220 kV Mokokchung	Mariani(PG) I	110	6	140	0.1
		Mariani(PG) II	110	7	140	0.1
13	220 kV Mariani(AS)	NTPS	110	6	140	0.1
		Samaguri	110	7	140	0.1
		AGBPP	111	7	140	0.1
		Misa	111	6	140	0.1

Notes: Series compensated D/C lines, may be kept more than 113%

Some are p-p and some are p-e voltage

* Revised