North Eastern Regional Power Committee

Agenda for

63rd Protection Coordination Sub-Committee Meeting

Date: 18/01/2024 (Thursday)

Time: 11:30 hrs

Venue: Hotel Royale De'Casa, Guwahati

A. CONFIRMATION OF MINUTES

1. CONFIRMATION OF MINUTES OF THE 62nd PROTECTION SUB-COMMITTEE MEETING OF NERPC.

Minutes of the 62nd PCC Meeting held on 20th December, 2023 (Wednesday) at NERPC conference hall, Shillong was circulated vide No.: NERPC/SE (O)/PCC/2023/ 3356-3397 dated 9th January, 2024.

No comment(s)/observation(s) were received from the constituents.

The Sub-committee may confirm the minutes of 62nd PCCM of NERPC

B. ITEMS FOR DISCUSSION

B.1 Protection Audit of NER:

As per the protection code of IEGC 2023 following roles and responsibilities, related to the subject mentioned, of constituents have been defined–

Description		Constituent	Responsibility	Timeline
Audit	Internal Audit	All users (132kV and above)	Shall conduct internal audit of protection system	Annually
			Audit report to be shared with RPC	Within 30 days of Audit
			Action plan for rectification of deficiencies to be shared with RPC	Within 30 days of Audit
	Third party Audit	All users (132kV and above)	Shall conduct audit for each SS	Once in five years
			Shall conduct audit on advice of RPC	Within three months of advice of RPC
			Audit report* to be submitted to RPC and NERLDC/SLDC	Within a month of submission of third-party audit report
			Action plan for rectification of deficiencies	Same as above
		RPC	Compliance to audit reports to be followed up regularly	Not specified
		RPC	After analysis of any event, shall identify substations where audit is required to be carried out	Conditional responsibility
	Annual audit plan	All users	Annual audit plan to be submitted to RPC by ***31st October***	Annual

In 60th PCCM the following points were discussed-

Member Secretary NERPC informed that third party protection audit has to be generally conducted by the utilities on their own. However, the 3rd party audit will be carried out by team constituted by NERPC at selected substations based on the criticality, analysis and requirement. In this regard, NERPC has already circulated an audit calendar and audit formats for reference of the constituents.

The nodal officers of respective State/power utilities have to fill the audit formats and submit to the NERPC secretariat within 1 week.

The forum decided that compliance to audit reports will be followed up regularly in PCC meeting of NERPC. NERLDC to submit a list of all 132 kV and above substations of the States to NERPC.

Information regarding substations that have already been audited will be provided by states to NERPC & NERLDC.
Forum agreed that all users (132 kV and above) have to conduct Internal Audit annually and submit audit report to RPC with action plan for rectification of deficiencies within 30 days of Audit.

AEGCL requested for a uniform guideline for maintenance of bay elements. Member Secretary requested POWERGRID to share their maintenance guideline with the states so that Assam and other utilities may adopt it after customizing to suit local requirement.

In 62nd PCCM following points were discussed -

1. Audit of substations of Assam (Sarusajai, Kahilpara, BTPS) will be carried out tentatively from 29th to 31st January 2024.
2. Three different groups each of four members will conduct the above audit. The members would be as follows:

Group Members: NERPC, NERLDC, PGCIL & Nagaland/MeECL.

Forum requested all above utilities to nominate suitable officers for the audit and mail to NERPC by 12th January'24.

Status of compliance of IEGC 2023 –

List of utilities that have submitted the audit plan for FY 2024-25 –

1. DoP Arunachal Pradesh
2. Indigrid
3. NEEPCO
4. Sterlite

NERLDC stated that a google sheet format for declaration of Internal/3rd party audit plan for FY24-25 has been prepared for submission of details of Audit plan. Forum requested NERLDC to circulate the format once again to all utilities. Forum

requested all remaining utilities to submit Audit plan for FY 2024-25 in the format as prepared by NERLDC.

Sub-committee may deliberate

B.2 Submission of Protection performance indices by utilities

As per the protection code of IEGC 2023 following roles and responsibilities, related to the subject mentioned, of constituents have been defined–

Description		**Constituent**	**Responsibility**	**Timeline**
Performance indices **	1.Dependibility index (D) 2.Security index (S) 3.Reliability index (R	All users (132kV and above)	Shall submit the indices for previous month to RPC and RLDC	Monthly (by 10th of Next month)
		All users	Shall submit he reason for indices less than unity (element wise) and action plan for corrective measures	Not specified
		RPC	Action plan to be regularly followed up in RPC	

**definition of indices

(a) The Dependability Index defined as $D = \frac{Nc}{Nc+Nf}$

where,

N_c is the number of correct operations at internal power system faults and

N_f is the number of failures to operate at internal power system faults.

(b) The Security Index defined as $S = \frac{Nc}{Nc+Nu}$

Where,

N_c is the number of correct operations at internal power system faults

N_u is the number of unwanted operations.

(c) The Reliability Index defined as $R = \frac{Nc}{Nc+Ni}$

Where,

N_c is the number of correct operations at internal power system faults

N_i is the number of incorrect operations and is the sum of N_f and N_u

In 60th PCCM it was decided that all users have to submit Performance indices (Dependability-D, Security-S, Reliability-R) to NERPC & NERLDC by 10th of every month for previous month indices. Users also have to submit reason for indices

being less than unity and corrective action plan. Action plan will be regularly followed up in PCCM.

In 61st PCCM, regarding submission of the report on performance indices, ISTS, ISGS and state utilities assured that they will start sending the report December'23 onwards. Member secretary NERPC stated that if clarification is required on any index, utilities may communicate with NERLDC and NERPC

In 62nd PCCM, forum noted that POWERGRID, Assam & NETC have submitted the Performance Indices. Forum requested all other constituents to submit the indices on timely basis i.e. by 10th of every month.

Sub-committee may deliberate

B.3 Analysis and Discussion on Grid Disturbances which occurred in NER grid in December'23 in compliance with IEGC 2023:

TABLE 8 : REPORT SUBMISSION TIMELINE

Sr. No.	Grid Event^ (Classification)	Flash report submission deadline (users/ SLDC)	Disturbance record and station event log submission deadline (users/ SLDC)	Detailed report and data submission deadline (users/ SLDC)	Draft report submission deadline (RLDC/ NLDC)	Discussion in protection committee meeting and final report submission deadline (RPC)
1	GI-1/GI-2	8 hours	24 hours	+7 days	+7 days	+60 days
2	Near miss **event**	8 hours	24 hours	+7 days	+7 days	+60 days
3	GD-1	8 hours	24 hours	+7 days	+7 days	+60 days
4	GD-2/GD-3	8 hours	24 hours	+7 days	+21 days	+60 days
5	GD-4/GD-5	8 hours	24 hours	+7 days	+30 days	+60 days

^*The classification of Grid Disturbance (GD)/Grid Incident (GI) shall be as per the* CEA Grid Standards.

The forum may deliberate upon the GD/GI/Near miss events that occurred in December 2023 based on the draft reports prepared by NERLDC (**annexure B.3**)

Agenda items from NERLDC

B.4 Status of submission of FIR and DR & EL outputs for the Grid Events for the month of December'2023

In line with regulation 12 (1) of CEA Grid Standards Regulations and IEGC-23 provision under clause 37.2 (c), FIR and DR & EL Outputs for each grid events are required to be submitted by concerned utilities to NERLDC for detailed investigation and analysis.

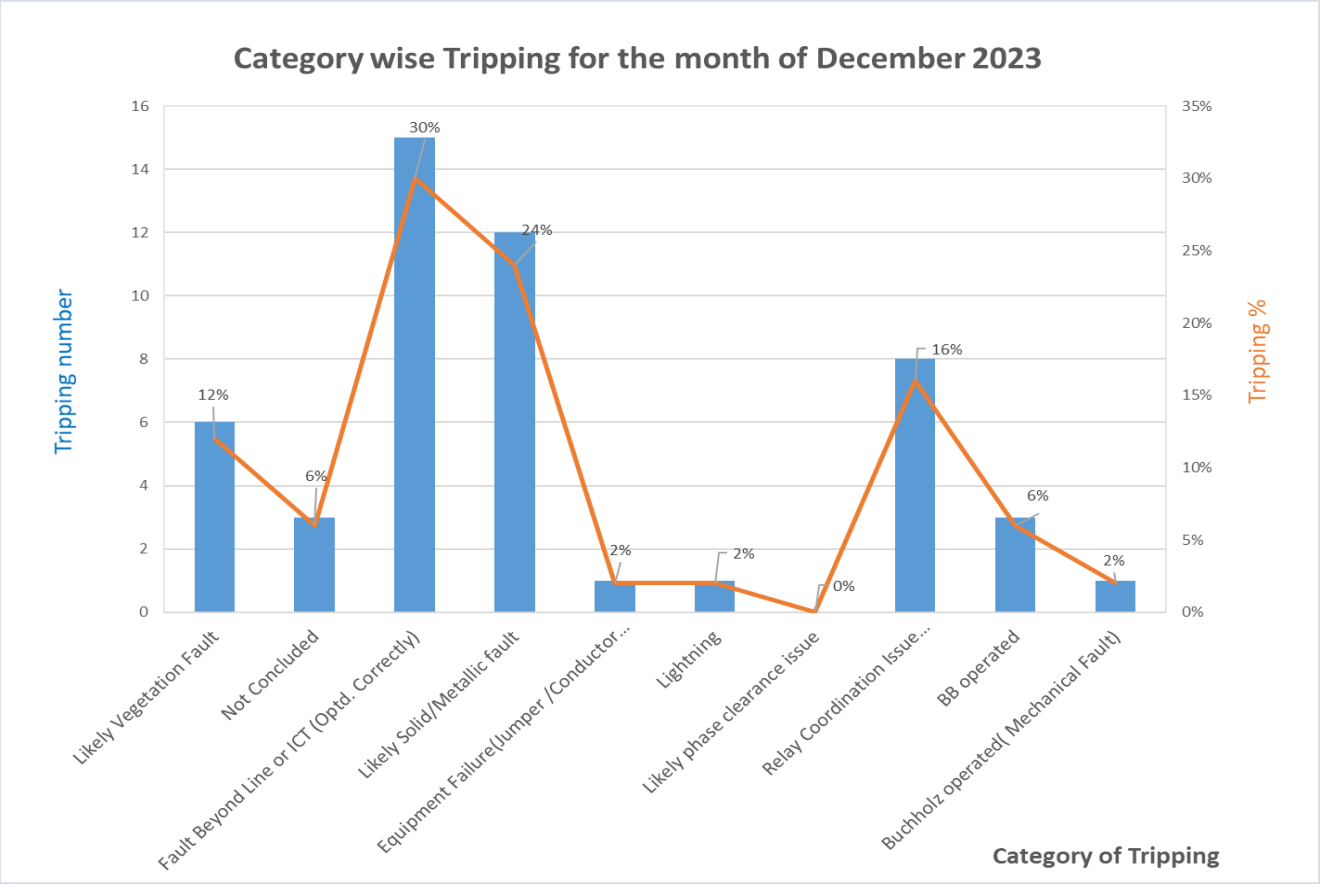
Status of uploading of FIR, DR & EL outputs in Tripping Monitoring Portal for events from 01-12-2023 to 31-12-2023 is given below:

Name of Utility	Total FIR/ DR/EL to be submitted	Total FIR, DR & EL submitted			Total FIR, DR & EL not submitted			% Submission of		
		FIR	DR	EL	FIR	DR	EL	FIR	DR	EL
DoP, Arunachal Pradesh	13	13	13	11	0	0	1	100	100	92
AEGCL	16	0	2	1	15	7	6	0	22	33
APGCL	2	0	0	0	2	2	2	0	0	0
MSPCL	1	1	1	1	0	0	0	100	100	100
MePTCL	1	0	1	1	1	0	0	0	100	100
MePGCL	12	2	6	5	10	0	2	17	100	71
P&ED, Mizoram	1	0	0	0	1	1	1	0	0	0
DoP, Nagaland	4	3	3	3	1	0	0	75	100	100
TSECL	4	2	4	4	2	0	0	50	100	100
POWERGRID	22	22	21	19	0	0	2	100	100	91
NEEPCO	12	9	9	8	3	2	3	75	82	73
NHPC	1	0	1	1	1	0	0	0	100	100
IndiGrid	1	1	1	1	0	0	0	100	100	100
KMTL	2	2	2	2	0	0	0	100	100	100

Concerned Utilities are requested to upload Disturbance Recorder (DR), Event Logger (EL) outputs for grid events along with a First Information Report (FIR) in Tripping Monitoring Portal (https://tripping.nerldc.in/Default.aspx) for analysis purpose. In light of the cybersecurity measures implemented by Grid India to safeguard sensitive information, NERLDC has created the email address nerldcso3@gmail.com . This new account has been specifically set up to facilitate the secure exchange of DR and EL files that have previously faced blockage when sent to nerldcprotection@grid-india.in.

B.5 Category wise Tripping for the month of December 2023:

There were a total of 50 numbers of Line & ICT tripping during the month of December'23. A plot showing number of tripping and tripping percentage in each category such as Likely Vegetation, Solid/metallic fault and fault beyond the line etc. is shown below. It is observed that for around 6% of tripping, root cause could not be concluded due to non-submission or submission of improper DR/EL.



List of tripping due to Vegetation fault during December, 2023

Sl. No.	Element Name	Owner	Tripping Date & Time	Patrolling Report
1	400 kV Misa-Silchar I	NTL	06-12-2023 15:28	Not submitted
2	132 kV Along-Pasighat	DoP, Arunachal Pradesh	13-12-2023 22:29	Not submitted
3	400 kV New Kohima-New Mariani I	KMTL	18-12-2023 23:09	Not submitted
4	400 kV New Kohima-New Mariani I	KMTL	19-12-2023 11:56	Not submitted
5	132 kV Dharmanagar - P K Bari Line	TSECL	28-12-2023 03:46	Not submitted
6	132 kV Along-Pasighat	DoP, Arunachal Pradesh	31-12-2023 06:14	Not submitted

The patrolling report of POWERGRID for the month of November, 2023 is attached in **Annexure 1**.

B.6 Submission of Flash Report and Detailed Report by User/SLDC as per IEGC-2023:

As per IEGC-2023, all User/SLDCs are requested to prepare and share **Flash Report** and **Detailed Report** with NERLDC and NERPC following any Grid Events.

Status of submission of the same for the month of December'23 is shown below:

Sl. No.	GD/GI/Near Miss	Affected Areas	Date & Time	Flash/Detailed report to be submitted by User/SLDC	Flash Report By User { IEGC section 37.2 (b)}	Detailed report by User within 7 Days { IEGC section 37.2 (e)}	Detailed Report submitted By NERLDC	Root Cause	Non Compliance observed
1	GD-I	Grid Disturbance at Lakwa	14:19 Hrs on 06-12-2023	Assam	Yes	No	29-12-2023	Bursting and catching of fire at compressor transformer of LTPS	**IEGC section 37.2 (e)- Detailed Report By User** **IEGC section 37.2 (c) & CEA grid Standard 15.3- DR/EL provided within 24 Hours?**
2	GD-I	Grid Disturbance at Umiam Stg-II	12:12 Hrs on 09-12-2023	Meghalaya	No	No (submitted on 28-12-2023)	29-12-2023	Suspected fault in the 132 kV Umiam 3-Umiam 4 Line-2. Multiple tripping occurred due to relay coordination issue	**IEGC section 37.2 (b)- Flash Report By User** **IEGC section 37.2 (e)- Detailed Report By User** **IEGC section 37.2 (c) and CEA grid Standard 15.3-DR/EL provided within 24 Hours?** **Umiam Stg-1, 3, 4- IEGC Section 17.3 - Time Synchronization issue**
3	GD-I	Grid Disturbance at Kohima	09:52 Hrs of 11-12-2023	Nagaland	Yes	Yes	26-12-2023	B-phase conductor of 132kV Dimapur (PG)-Kohima snapped at Lalmati area (Tower no. 88)	**MSPCL:** CEA grid Standard 15.3-DR/EL provided within 24 Hours?
4	NM	Near Miss at Kopili	16:58 Hrs of 13-12-2023	NEEPCO	No	No	29-12-2023	CB pole of Kopili Unit-III got stuck due to which bus bar protection got initiated leading to near miss incident at Kopili S/S	**IEGC section 37.2 (b)- Flash Report By User** **IEGC section 37.2 (e)- Detailed Report By User** **NEEPCO: IEGC section 37.2 (c) and CEA grid Standard 15.3-DR/EL provided within 24 Hours?**
5	GD-I	Grid Disturbance at Kopili	16:31 Hrs of 14-12-2023	NEEPCO	No	No (submited on 23-12-2023)	28-12-2023	CB pole of Kopili Unit-III got stuck due to which LBB got initiated leading to blackout of Kopili S/S	**IEGC section 37.2 (b)- Flash Report By User** **IEGC section 37.2 (e)- Detailed Report By User** **NEEPCO: IEGC section 37.2 (c) and CEA grid Standard 15.3-DR/EL provided within 24 Hours?**

Member may discuss

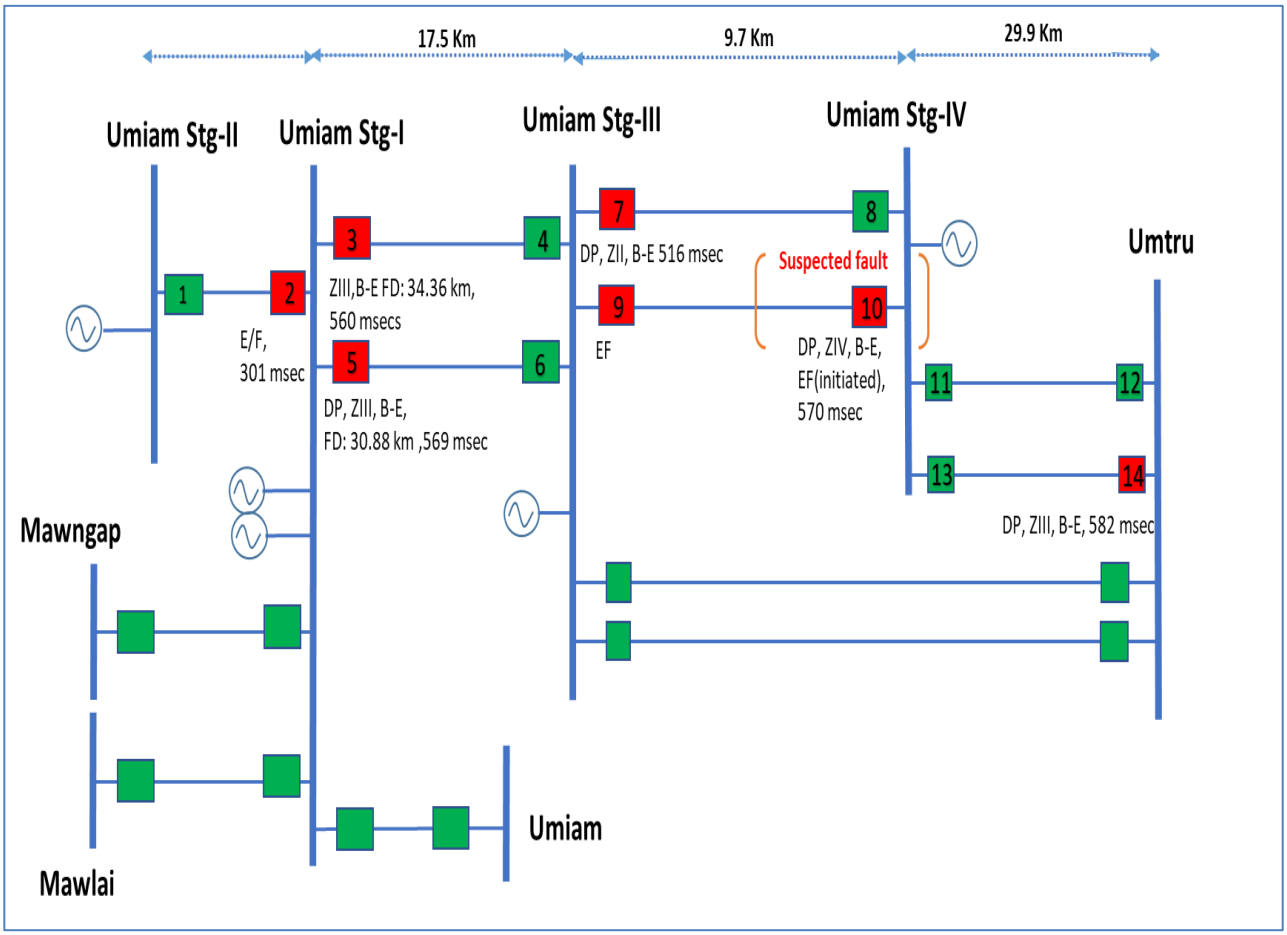
B.7 Non-operation of auto recloser in Important Grid Elements for transient faults in December 2023:

Sl No	Element Name	Time	Relay End1	Relay End2	A/R not Operated	Remarks from Utility
1	220 kV Dimapur(PG)-Misa-2 Line	12-12-2023 11:08	DP,ZI,B-E,FD:28.5 KM	DP,ZI,B-E,FD:83.40 KM	Both ends	

2	220 kV AGBPP-Mariani(PG) Line	12-12-2023 12:29	DP,ZI,B-E,FD: 44.9 Km, NO DR submitted	DP,ZI,B-E,FD: 110.9 KM, A/R successful	AGBPP	
3	400 kV Byrnihat-Silchar Line	13-12-2023 17:14	DP,ZI,Y-E,FD:36.4 KM, A/R Unsuccessful	DP,ZII,Y-E,FD:165 KM, Carrier aided	Silchar	
4	400 kV New Kohima - New Mariani 1 Line	18-12-2023 23:09	DP,ZI,B-E, FD: 1.18 KM, A/R successful	DP,ZII,B-E, FD: 86 kms, Carrier aided tripping	New Mariani	
5	132 kV Along-Pasighat Line	24-12-2023 03:07	DP, ZI, R-E	DP, ZI, R-E	Both ends	
6	132 kV Along-Pasighat Line	31-12-2023 06:14	DP,ZI,R-E,FD:48.01 KM	DP,ZI,R-E,FD:20.43 KM	Both ends	

B.8 Blackout of 132 kV Umiam Stg-II on 09th Dec 2023:

At 12:12 Hrs of 09-Dec-2023, the following element tripped as shown below resulting in blackout of 132 kV Umiam Stg-II:-



As per DR analysis, 132 kV Umiam Stage 1- Umiam Stage 3 Line 1 & 2 tripped from Umiam Stage 1 end in 560 msecs & 570 msecs respectively on operation of DP, ZIII indicates that fault is beyond the line.

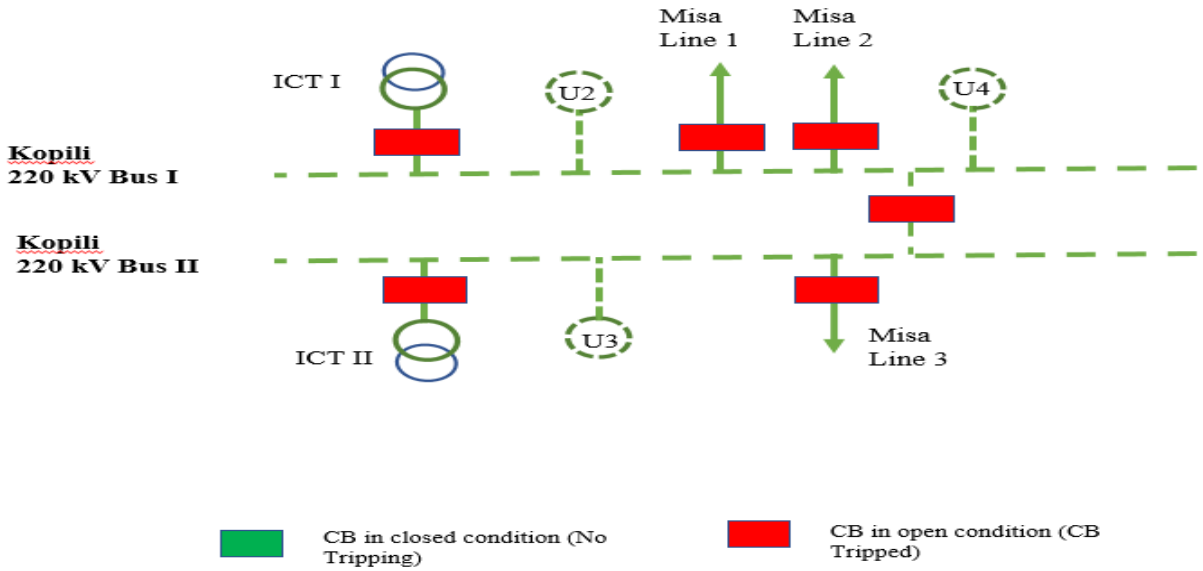
Tripping of 132 kV Umiam Stage 3- Umiam Stage 4 Line 1 on DP, ZII from Stage 3 end and no tripping from Stage 4 end indicates the fault is not in the line. Suspected fault in 132 kV Umiam Stage 3- Umiam Stage 4 Line 2 and tripping of multiple elements occurred due to relay coordination Issues.

Following protection issues were observed:

- Tripping on DP, ZIII in 560-580 msecs indicates less time delay setting incorporated at Umiam Stage 3.
- Tripping 132 kV Umiam Stage 1 – Umiam Stage 2 on Earth Fault from Stage 2 end indicates directionality issue in the backup relay.
- Tripping of Umiam I Unit-3 & 4 and Umtru Unit-1 seems unwanted.

Meghalaya is requested to share the root cause of these trippings and remedial measures taken.

B.9 Frequent Operation of Bus Bar Protection at Kopili Hydro Power Station:



Several instances of Bus Bar protection operation at Kopili was observed during the period of December'23 to January'24.

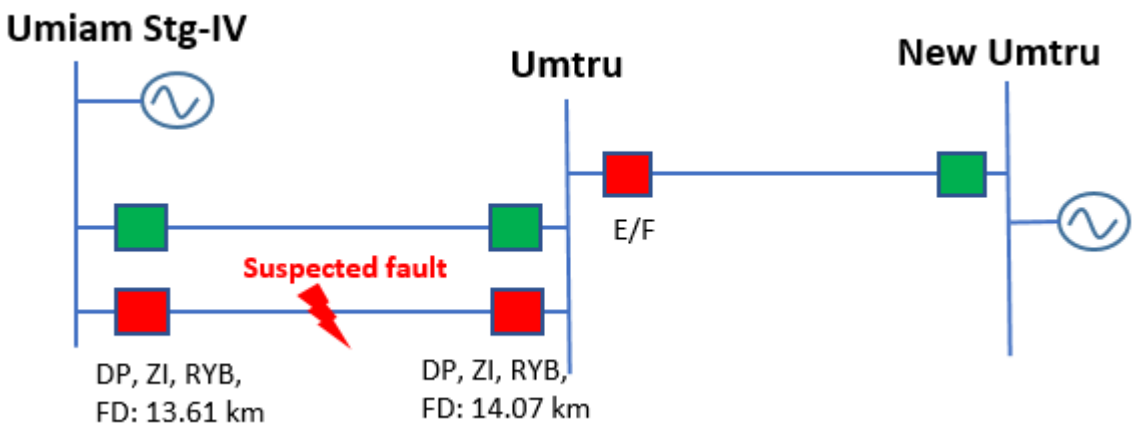
Sl. No	Event Date & Time	Element Tripped	Gen Loss (MW)	Remarks
1	13-12-2023 16:58	220 kV Misa-Kopili 1 & 2, ICT-2, Unit-4 and Bus Coupler	50	Blackout of 220 kV Bus-2
2	14-12-2023 16:31	220 kV Misa-Kopili 1,2 & 3, ICT-1 & 2, Unit-2 and Bus Coupler	50	Blackout of 220 kV Bus-1 & 2
3	02-01-2024 16:59	220 kV Misa-Kopili 2, ICT-1, Unit-2,3,4 and Bus Coupler	115	Blackout of 220 kV Bus-1
4	02-01-2024 17:50	220 kV Misa-Kopili 2, ICT-1, Unit-2,3,4 and Bus Coupler	110	Blackout of 220 kV Bus-1
5	05-01-2024 17:05	220 kV Misa-Kopili 2, ICT-1, Unit-2,3 and Bus Coupler	95	Blackout of 220 kV Bus-1
6	08-01-2024 18:03	220 kV Misa-Kopili 2, ICT-1, Unit-2,3 and Bus Coupler	100	Blackout of 220 kV Bus-1

Operation of Bus Bar protection seems to be mal-operation as there is no fault in the system. NEEPCO informed that there was problem in Y-phase CB pole of Kopili Unit-3 which was replaced on 20.12.2023. However, similar event occurred repeatedly for four times between 02.01.2024 to 08.01.2024, indicating that the root cause behind the Bus Bar operation problem at Kopili Power Station remains unresolved.

NEEPCO is requested to share the root cause behind Bus Bar operation at Kopili and rectify the issue at the earliest, as long outage of B/B protection is not advisable, ensuring secured and integrated grid operation of the NER Grid.

B.10 <u>Tripping of 132 kV Umtru-New Umtru & 132 kV Umtru-Umiam Stg-4 Line 2 on 10th Jan, 2024:</u>

At 05:12 Hrs of 10-Jan-2024, the following element tripped as shown below:-



Suspected fault in 132 kV Umtru-Umiam Stg-IV Line-2 at a distance of 14 Km from Umtru end. Tripping of 132 kV Umtru-New Umtru line from Umtru end on Earth Fault seems unwanted and directionality of relay needs to be checked.

No DR & EL file received for the mentioned tripping which is violation of IEGC section 37.2 (c)

Meghalaya is requested to share the root cause of these tripping and remedial measures taken.

B.11 <u>Submission of Protection Performance Indices by Transmission Utilities:</u>

As per Regulation No. 15(6), Protection Code - Users shall submit the following protection performance indices of previous month to their respective RPC and RLDC

on monthly basis for 220 kV and above (132 kV and above in NER) system by 10th of every month for previous month indices, which shall be reviewed by the RPC:

- The Dependability Index defined as $D = Nc/\ Nc+Nf$
- The Security Index defined as $S = Nc\ /Nc+Nu$
- The Reliability Index defined as $R = Nc\ Nc+Ni$

Where,

Nc: number of correct operations at internal power system faults

Nf: Number of failures to operate at internal power system faults.

Nu: Number of unwanted operations.

Ni: Number of incorrect operations and is the sum of Nf and Nu

NETC & NTL submitted the Protection Performance Indices for the month of December, 2023 as follows:

Sl. No.	Name of Transmission Licencee	D= (Nc/Nc+Nf)	S= (Nc/Nc+Nu)	R= (Nc/Nc+Ni)
1	NETC	1	1	1
2	NER-II Transmission Limited (NTL)	1	1	1

It has been observed that Protection Performance Indices are not being submitted by all the users. Therefore, all Users are requested to furnish performance indices (Dependability-D, Security-S, Reliability-R) with regards to the tripping of elements to NERPC & NERLDC positively by 10th of every month for previous month indices.

B.12 System Protection Scheme (SPS) Document of North Eastern Region:

A document on System Protection Schemes of North Eastern Region is prepared by NERLDC which comprises of details of all the SPS available in NER.

Regulatory Requirements

As per clause 29(14) under System Security of the IEGC-2023,

NLDC, RLDCs, SLDCs, CTU, STUs or users may identify the requirement of System Protection Schemes (SPS) (including inter-tripping and run-back) in the power system to operate the transmission system within operating limits and to protect against situations such as voltage collapse, cascade tripping and tripping of important corridors/flow-gates. Any such SPS at the intra-regional level shall be finalized by the concerned RPC.

SPS at the inter-regional and cross-border levels shall be finalized by the NLDC in coordination with the concerned RPCs. SPS shall be installed and commissioned by the concerned users. SPS shall always be kept in service. If any SPS at the intra-regional level is to be taken out of service, the permission of the concerned RLDC shall be required. If any SPS at the inter-regional and cross-border levels is to be taken out of service, permission of NLDC shall be required.

As per clause 16 (System Protection Scheme) of IEGC-2023,

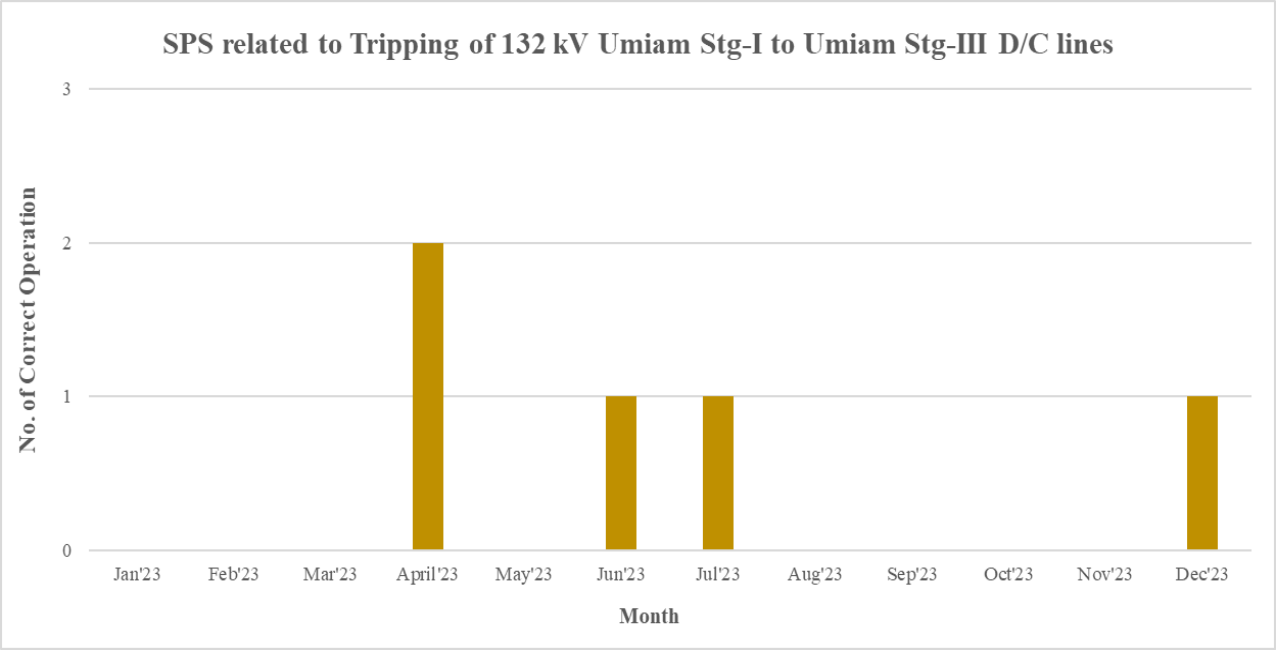
a. SPS for identified system shall have redundancies in measurement of input signals and communication paths involved up to the last mile to ensure security and dependability.
b. For the operational SPS, RLDC or NLDC, as the case may be, in consultation with the concerned RPC(s) shall perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year. RLDC or NLDC shall share the report of such studies and mock testing including any short comings to respective RPC(s). The data for such studies shall be provided by CTU to the concerned RPC, RLDC and NLDC.
c. The users and SLDCs shall report about the operation of SPS immediately and detailed report shall be submitted within three days of operation to the concerned RPC and RLDC in the format specified by the respective RPCs.
d. The performance of SPS shall be assessed as per the protection performance indices specified in these Regulations. In case, the SPS fails to operate, the concerned User shall take corrective actions and submit a detailed report on the corrective actions taken to the concerned RPC within a fortnight.

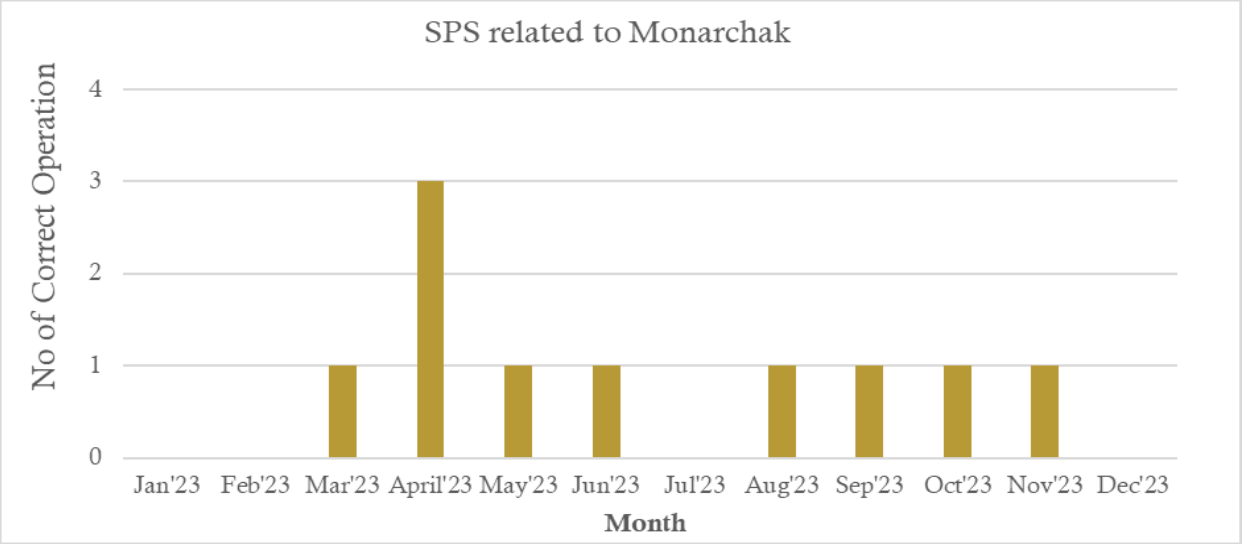
The Summary of System Protection Schemes (SPS) both inter/Intra regional including cross border SPS which are in service, and no of schemes Approved and no of schemes under discussion stage are detailed below: -

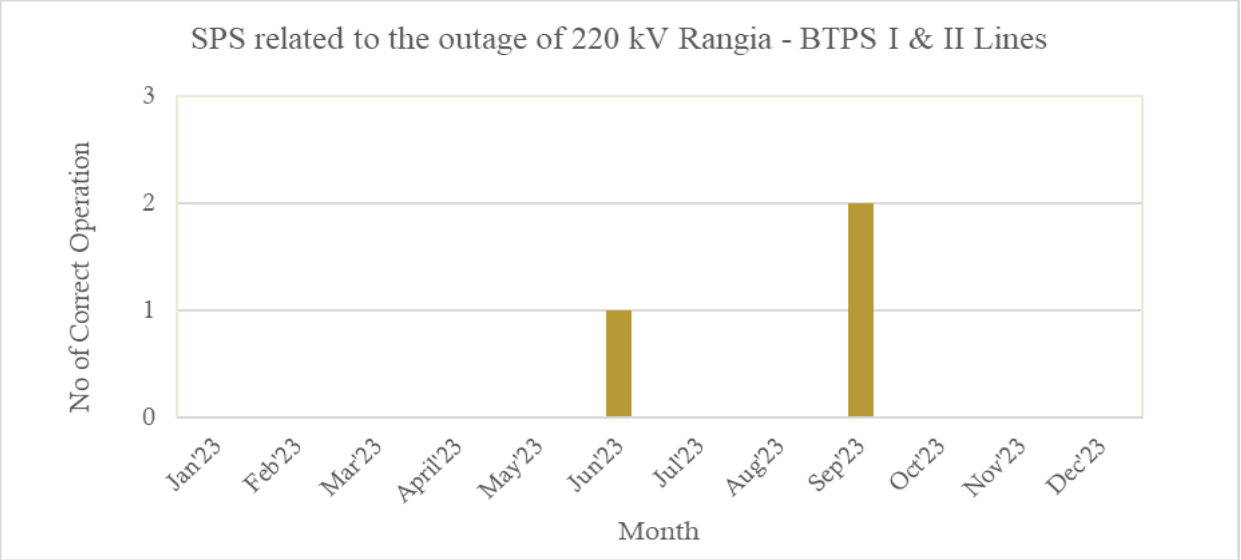
Sl. No	**Region**	**No. of Schemes in service**	**No. of Schemes approved (yet to be operationalized)**	**No of schemes under discussion**
1	SPS in NER under operation	13	4	0

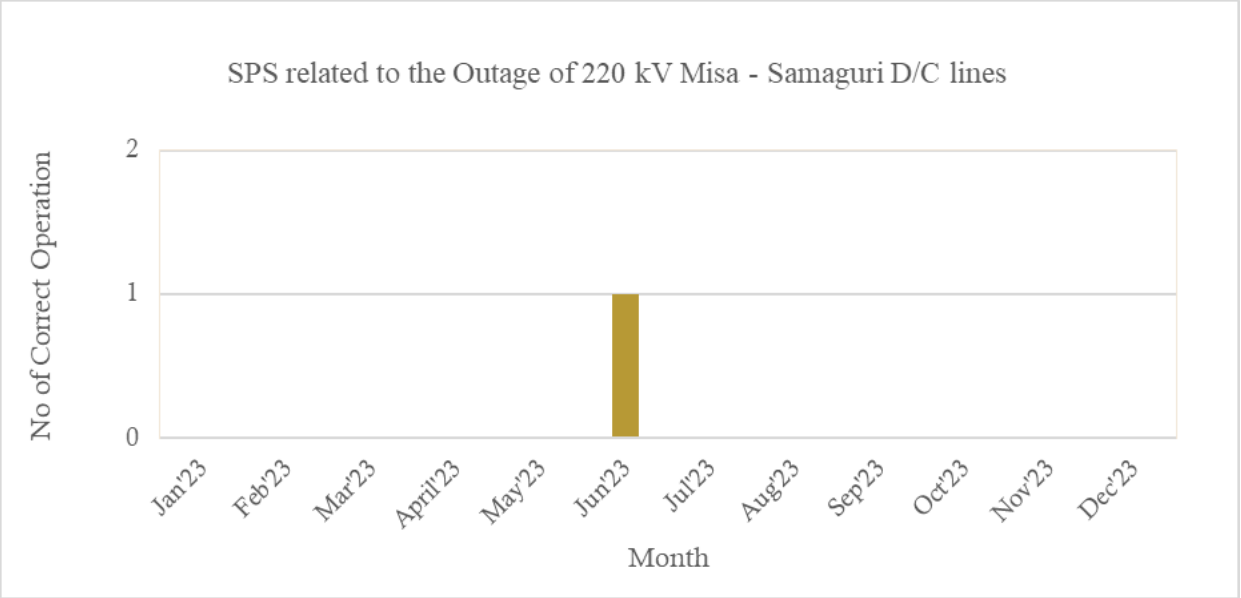
2	SPS related to reliable power supply to Bangladesh	2	1	-
	TOTAL	15	5	0

Performance of the SPS Schemes during Jan'23 to Dec'23:




SPS related to Monarchak
No of Correct Operation
4
3
2
1
0
Jan'23
Feb'23
Mar'23
April'23
May'23
Jun'23
Jul'23
Aug'23
Sep'23
Oct'23
Nov'23
Dec'23
Month


SPS related to the outage of 220 kV Rangia - BTPS I & II Lines
No of Correct Operation
3
2
1
0
Jan'23
Feb'23
Mar'23
April'23
May'23
Jun'23
Jul'23
Aug'23
Sep'23
Oct'23
Nov'23
Dec'23
Month


SPS related to the Outage of 220 kV Misa - Samaguri D/C lines
No of Correct Operation
2
1
0
Jan'23
Feb'23
Mar'23
April'23
May'23
Jun'23
Jul'23
Aug'23
Sep'23
Oct'23
Nov'23
Dec'23
Month

All the utilities are requested to review the document and furnish comments if any to NERLDC by ***25th of January, 2024.***

B.13 Disabling of existing SPS:

i. SPS related to tripping of 132 kV Umiam Stg-I to Umiam Stg-III D/C lines:

This SPS is related to tripping of 132 kV Umiam Stg-I to Umiam Stg-III D/C lines which causes 30 MW instantaneous load shedding near Mawphlang area.
After commissioning of 220 kV Killing-Mawngap D/C lines and re-conductoring of 132kV Lumshnong-Panchgram line, there is no need for this SPS to be in operation.

ii. SPS related to 220 kV BTPS-Salakati D/C lines:

After upgradation of 220 kV BTPS-Salakati D/C lines, the ampacity of HTLS Zebra is 1100 A and the adopted CT ratio is 1600/1.
Therefore, the existing SPS related to 220 kV BTPS-Salakati D/C lines is deemed unnecessary.

The respective utilities are requested to make necessary arrangement to disable the SPS.

Members may discuss

B.14 Submission of monthly progress report by respondents of NERLDC's Petition:

As per the Direction of Hon'ble commission related to the Petition No 198/MP/2020, 259/MP/2020, 535/MP/2020, 539/MP/2020 and 540/MP/2020, respective respondents has to submit the **monthly progress report** of the action plan prepared by the respective respondents in consultation with the Petitioner (i.e. NERLDC).

Order dated	**Petition No**	**Respondant**
08-Nov-2023	198/MP/2020	DoP, Arunachal Pradesh
	259/MP/2020	DoP, Nagaland
	539/MP/2020	MSPCL
27-Oct-2023	535/MP/2020	TPTL/TSECL
	540/MP/2020	P&ED, Mizoram

All the respondents are requested to share the monthly progress report for the month of Dec'23.

Agenda from NERTS

B.15 Diversion of PLCC panels allotted for Salakati-Gelephu feeder to 220kV Salakati-BTPS-II feeder:

POWERGRID has procured PLCC panels to install in Salakati-Gelephu feeder at both ends. But, Bhutan Power Dept had cancelled the shutdown planned in Jan 2023 to install PLCC panels by POWERGRID as they are planning for DTPC installation at both ends. Further, even after reminders from POWERGRID & NLDC no action plan has been shared by Bhutan for DTPC installation till date. POWERGRID has planned to install the above allocated PLCC panels in 220kV Salakati-BTPS #II feeder. and there shall be no further plan to install PLCC panels in Salakati-Gelephu feeder by POWERGRID. This is for information and record.

Sub-committee may deliberate

B.16 Pending Line Diff Relay issues in 132kV feeder:

a. As discussed in 62nd PCCM, CT & PT wiring check is pending at Luangmol end for 132kV Aizwal - Luangmol feeder due to which Diff function cannot be activated at both ends.

b. For 132kV Haflong - Haflong feeder, at Haflong AEGCL end CT wiring needs to be checked & rectified as Diff function cannot be activated until the wiring mismatch is rectified.

Sub-committee may deliberate

B.17 PLCC issues follow up:

a. PLCC/DTPC needs to be implemented in below stated lines –

1. 132kV Dimapur Kohima
2. 132kV Nirjuli Lekhi
3. 132kV Melriat - Zemabwk

b. 400kV Mariani Kohima Ckt #2 - For 400kV Mariani-Kohima Ckt-2, ABB make PLCC Model no-ETL41 is installed at both ends. PLCC panels at both ends are owned by KMTL. At Mariani end, for PLCC Ch#1, alarm is persisting in P4LA card. KMTL had previously deputed service engineer for rectification of the issue in Oct 2022.The

issue was resolved in Oct 2022. However, the same issue had resurfaced again from 24th August 2023. Repeated communication has been sent to KMTL to resolve the issue. However, rectification action is still pending.

c. 132 kV Roing - Pasighat – PLCC panels for 132kV Roing -Pasighat feeder are installed at both ends. Panels are in healthy condition at both ends. However, due to non-availability of healthy 48V dc supply at Pasighat end, PLCC panels at Pasighat are in OFF state. DoP AP is requested to arrange healthy 48V dc supply at Pasighat end.

Sub-committee may deliberate

B.18 AR issues follow up:

a. Enabling of AR & Carrier Aided Trip at Gohpur end for 132kV NirjuliGohpur feeder by AEGCL

b. 132kV Dimapur-Doyang 1&2 – At Doyang end, AR is not functional. NEEPCO may kindly look into it to enable it.

c. 132kV Dimapur-Bokajan - Auto reclose for this line is not functional at Bokajan end. AEGCL is requested to enable it at the earliest.

Sub-committee may deliberate

C. FOLLOW–UP AGENDA ITEMS

C.1 Non-Operation of A/R at Doyang HEP for 132 kV Dimapur- Doyang 1&2 line:

Sl. No.	Element Name	Time	Relay End1	Relay End2	Remarks
1	132 kV Dimapur - Doyang 1	19-09-2023 14:53	DP, ZI, R-Y-E, FD: 86.192 Kms, AR Successful	DP, ZI, R-Y-E, AR Not Operated	Lightning
2	132 kV Dimapur - Doyang 2	07-08-2023 19:35	DP, ZI, B-E, FD:23.84 kms, AR Successful	DP, ZI, B-E, AR Not Operated	Lightning
3	132 kV Dimapur - Doyang 2	19-08-2023 02:19	DP, ZII, Y-E, FD: 91.14 Kms; carrier aided, AR Successful	DP, ZI, Y-E, AR Not Operated	Lightning

Numerous instances of tripping have been noted, primarily attributed to the transient nature of the fault. The Autorecloser at the Dimapur (PG) end has consistently performed successfully. Nevertheless, it is apparent that no Autorecloser operation was recorded in the submitted Disturbance Recorder (DR) from the Doyang end, indicating that there is need of checking of Autorecloser function at Doyang HEP.

In 60th PCCM NERLDC updated the forum that CBs at Doyang are spring closed and air operated (pneumatic type). As soon as breaker gets open, air pressure goes down below 15Kg/cm2 and the breakers goes to non-operative mode. After running the compressor when air pressure is achieved to 15Kg/cm2, that condition goes off, by that time AR time becomes over. They have called CGL, OEM of the breakers, to attend the problem. The OEM has assured that they will report within this month. In case, OEM is not able to resolve this matter, all the CBs of Doyang SY needs to be replaced (CBs were procured during commissioning of the Plant i.e., 2000).

In 61st PCCM NEEPCO intimated that the OEM will visit on 08th December, 2023 and suggest the resolution. If resolution not possible then NEEPCO will replace CB. The forum requested NEEPCO to resolve the issue at the earliest.

In 62nd PCCM, NEEPCO updated that the OEM visit could not take place so far due to some unavoidable reasons. Further NEEPCO informed that the visit is planned in Jan'24.

NEEPCO may update

C.2 <u>Requirement of SPS for 132 KV Khliehriat (PG)-Khliehriat D/C line</u>

With expected availability of at least two machines of Kopili and one machine of Khandong during peak hours of the coming winter months of 2023-24 and considering the anticipated increase in demand, it is expected that total power flow along 132 KV Khliehriat (PG)-Khliehriat D/C line would be between 90-110 MW under different conditions. Load flow studies had been carried out by SLDC and shared with NERLDC. The matter had also been discussed with DGM, NERTS since 132 KV Khliehriat (PG)-Khliehriat line 1 is under POWERGRID. The scheme envisages shedding of 20-25 MW load at 132 KV Mustem substation in the event of tripping of any circuit of 132 KV Khliehriat (PG)-Khliehriat D/C line.

The above requirement was agreed in principle during the 205th OCC meeting and NERLDC and MePTCL were requested to develop the tripping logic and to present it in the next PCC meeting. The schematics of the SPS is attached for reference.

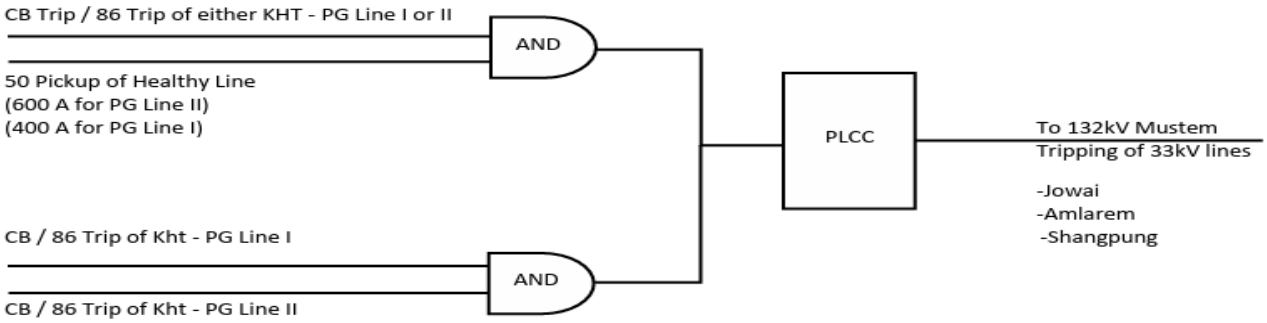
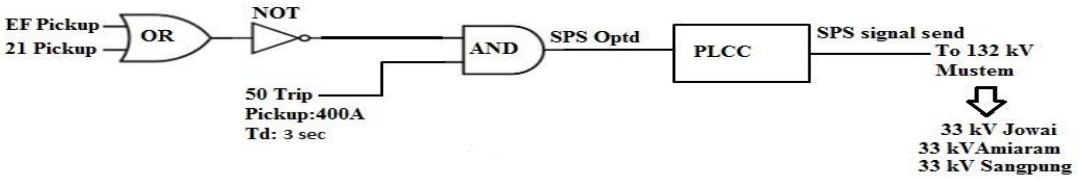


Fig: SPS Schematics at 132kV Khliehriat S/S for 132kV PG Line I & II

In 60th PCCM, NERLDC provided the modified logic (as below) and same need to be implemented by MePTCL. MePTCL agreed the same.

SPS Logic Diagram



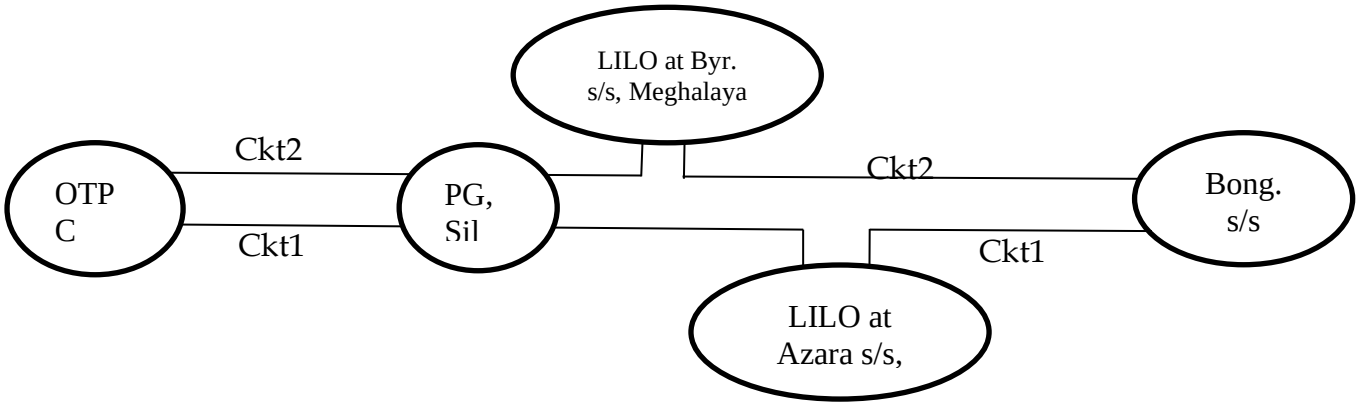
In 61st PCCM SLDC, Meghalaya informed that the scheme has been put up for approval of higher authorities and the logic will tentatively be implemented by December'23 end.

In 62nd PCCM, MePTCL updated that the SPS is implemented at Mustem, while it will be implemented at Khliehriat S/S in Jan'24.

C.3 Correction of the settings of the relays associated with NETC transmission line elements and installation of TWFL in connected S/S.

North East Transmission Company Limited (NETC) is currently operating the 400 kV D/C Palatana-Silchar and Silchar-Bongaigaon T/L with connectivity through LILO line at Byrnihat (Meghalaya) and at Azara (Assam) for evacuation of power from OTPC power plant located at Palatana, Tripura to NER States.

A Single line diagram showing the connectivity of the 400 kV Palatana-Bongaigaon Transmission system is as follows:



During the last financial year (FY 2022-23), there were instances of tripping in the 400 kV D/C Palatana-Bongaigaon Transmission System. Due to inaccurate fault calculations of the relays, difficulties were faced in detection of fault location. In normal scenarios, we expect to locate the faults within a range of +/- 5 km from the relay distance measurement. However, during post-fault patrolling, we discovered

fault locations approximately 10-15 km away from the relay's calculated distance. The same issue persisted for the tripping instances during the current Financial Year (2023-24) as well. Here is a brief overview of such tripping instances:

SL. No.	Name of line element	No. of tripping occurred during		Remarks
		FY 2022-23.	FY 2023-24 till Sept 2023	
1	Palatana-Silchar line 1	12	2	During the all these tripping(s), the distance indications of the relay were wrong.
2	Palatana-Silchar line 2	4	4	
3	Silchar-Azara	7	2	
4	Silchar-Byrnihat	10	8	
5	Byrnihat-Bongaigaon	2	1	
6	Azara-Bongaigaon	0	0	

In view of above, we propose the following for detail deliberation by the forum:

i) A comprehensive review of the relay setting arrangements and implementation of the modified setting in conformity with the actual line parameters at all the connecting substations.

ii) Installation of the travelling Wave-Based Fault Locators (TWFL) at all the aforementioned connecting substations to ensure smooth and effective operation of the lines by precisely locating faults in cases of the line tripping.

In 60th PCCM, following decisions were taken

AEGCL representative stated that there is no issue with relay settings and line parameters. Further he stated that some error in fault distance is inevitable in case the fault involves the ground. He suggested to adopt some kind of methodology by which such error may be minimized.

Forum decided that RPC, NERLDC, NERTS, AEGCL and NETC will jointly discuss to address the issue as suggested by AEGCL. A comprehensive review of the line parameters and relays settings will also be undertaken jointly by NERPC, NERLDC NETC and concerned bay owners.

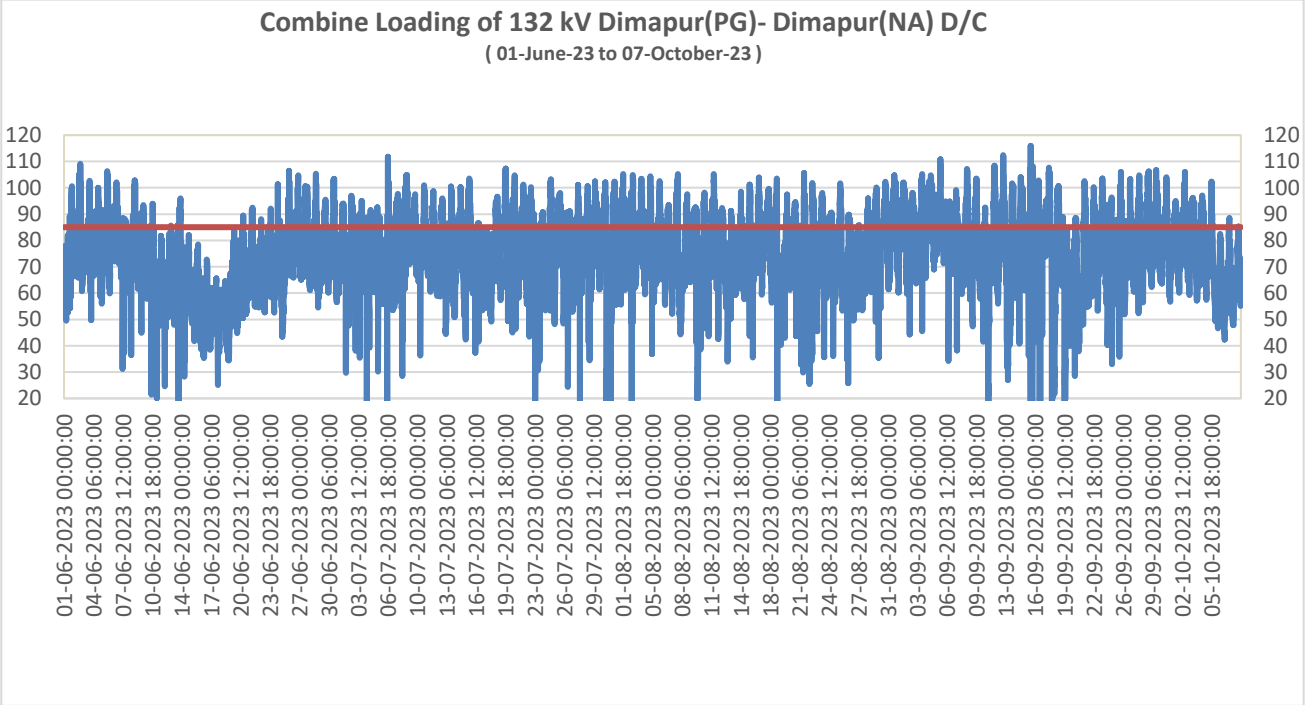
To research the fault location, DR data from Azara/Byrnihat needs to be reviewed by AEGCL/NERLDC during tripping of any one line of 400 kV Azara-Silchar and Byrnihat-Silchar line as there is no mutual compensation wiring at LILO Azara & Byrnihat SS.

Regarding TWFL, the forum decided that proposal may be considered only after the

measures, as suggested above are not fruitful.

In 62nd PCCM, NERPC stated that a special meeting with NERTS, NERLDC, Assam and NETC will be organized shortly to discuss the issue.

C.4 Requirement of SPS implementation at Dimapur to for ensuring reliable power in Dimapur area of Nagaland:



Loading profile of Dimapur shows N-1 contingency of any one circuit not satisfied most of the time as the combine loading was above 85 MW for 22% of times and above 80 MW for 35% of times.

Hence, to satisfy the N-1 contingency at Dimapur (NL) and to avoid load loss in the Dimapur area, DoP, Nagaland is requested to implement suitable System Protection Scheme (SPS) with following criteria-

If the loading of any one circuit current exceeds more than 415A, the SPS will trigger and it will shed 25-30 MW load at Nagarjan area, which will increase the reliability of Nagarjan area of Nagaland system.

In 60th PCCM, DoP Nagaland updated that reconductoring of the line is under process, DPR is in final stage.

Regarding the SPS, forum requested DoP Nagaland to identify 25-30 MW load at Nagarjan area for the implementation of the SPS scheme at the earliest.

In 61st PCCM, Nagaland stated that feeders have been identified to cut around 40MW in 66kV Power House and 33kV Metha Further he stated that internal approval for the same has also been taken.

In 62nd PCCM, NERLDC informed that DoP Nagaland has identified the load and NERLDC has prepared the draft SPS. NERLDC further informed that the draft SPS has been sent to NERPC for review.

NERPC stated that the scheme will be reviewed shortly.

C.5 <u>Providing PLCC in State owned lines /bays:</u>

a. 132kV Dimapur Kohima line (Length – 58 km): DoP informed that currently PLCC ABB, ETL-41 is working at Kohima which supports Speech & data only. OPGW has already been laid. Nagaland will implement carrier scheme through DTPC (Digital tele-protection coupler).

b. 132 kV Melriat-Zemabawk line (Length – 10.12 km): Mizoram not present. However, the forum requested DoP Mizoram to arrange the 48V dc supply at Zemabawk to commission the PLCC link.

c. 132 kV Nirjuli-Lekhi line (Length – 11 km): Forum requested DoP Ar. Pradesh to implement the PLCC link on the said line and the option of PSDF funding under reliable communication may be explored. Ar. Pradesh informed that it will be installed in the next FY 2024-25.

<u>In 61st and 62nd PCCM -</u>

a. DoP Nagaland stated that DPR is being prepared for implementation of DTPC for tele-protection. Also, DoP Nagaland will explore the possibility of MPLS for carrier communication.
b. Mizoram stated that 48V DC supply is present at the substation. NERTS to commission the link soon. NERTS stated that WT, CVT not available at Zemabawk, same to be provided by Mizoram
c. DoP Ar. Pradesh stated that OPGW is available on the line. Forum requested DoP Ar. Pradesh to implement DTPC on the line

Utilities may update

C.6 Non-operation of auto recloser in Important Grid Elements for transient faults in October and November 2023:

As updated in 62nd PCCM

Sl No	Element Name	Time	Relay End1	Relay End2	A/R not Operated	Remarks from Utility
1	220 kV NTPS - Tinsukia 1 Line	26-10-2023 16:37	DP,Z1,Earth fault,39km	B-Eph, Z-1, LA burst	No details provided	Configuration to be completed in next planned shutdown
3	220 kV Jawaharnagar - Samaguri Line	25-10-2023 11:11	DP, ZI, B-E, FD: 35.9 km	DP, ZI, R-E, FD: 71.8km, AR successful	Jawahar nagar	GIS work underway. AR will be implemented in next occ shutdown
4	132 kV Jiribam - Pailapool Line	30-10-2023 12:47	DP, ZI, R-Y, FD: 6.49 km, AR successful	DP, ZI, R-Y	Pailapool	Relay OEM has arrived, work underway, Will be completed by Dec'23

Sl No	Element Name	Time	Relay End1	Relay End2	A/R not Operated	Remarks from Utility
2	132 kV Agartala - Surajmaninagar 2 Line	17-11-2023 15:10	DP,ZI,Y-B,FD:5.81 km, AR successful	DP,ZI,R-Y,FD:11.98 KM	Surajmani nagar	Will be implemented within 6 months
4	220 kV Mariani (AEGCL) - Samaguri Line	29-11-2023 15:10	DP, ZI, B-E	DP, ZI, B-E, FD: 16 km	Samaguri	AR will be implemented by January-24 at Mariani (currently PSDF work is going on at Mariani so AR kept off at Samaguri)

C.7 <u>132kV KUMARGHAT P.K. BARI ISSUE</u>

POWERGRID has commissioned Line Diff Relay for 132kV Kumarghat PK Bari feeder.

During commissioning, following issues have been noted at PK Bari end: -

1. AR kept OFF at PK Bari end by Tripura, however, the same is in ON Position at Kumarghat end.
2. Due to previous experience of multiple tripping at Kumarghat because of fault in P.K. Bari-Dharmanagar feeder & non isolation of the fault by P.K. Bari end CB, previously it was decided that Zone Timer for 132kV Kumarghat-P.K. Bari feeder (at Kumarghat end) shall be kept as under: -

a. Z1 = 0 msec
b. Z2 = 200 msec
c. Z3 = 300 msec

Tripura may please confirm the healthiness of the CBs (PK Bari end CB for Kumarghat PK Bari & P.K. Bari end CB for P.K. Bari-Dharmanagar feeder) otherwise forum may allow continuing the above Time delay setting for respective Zones of Distance Protection in 132kV Kumarghat-P K Bari Line at Kumarghat end.

In 62nd PCCM, Forum approved above stated time delay setting till TSECL checks and confirms the healthiness of the CBs (PK Bari end CB for Kumarghat PK Bari & P.K. Bari end CB for P.K. Bari-Dharmanagar feeder).

TSECL assured the forum to check the healthiness at the earliest.

TSECL may update

C.8 <u>132kV AIZWAL – LUNAGMOL LINE DIFF RELAY ISSUE</u>

POWERGRID has commissioned Line Diff Relay for 132kV Aizwal Luamgmol feeder. After commissioning, following observations have been noted: (Details enclosed)

1. Auto-reclosure feature of P543 Line Differential relay has been kept disabled at Luangmual end.
2. 132KV Aizawl-Luangmual Line was charged from Aizawl S/s and synchronized at Luangmual S/son 16:49 hrs of 15.12.23. However, the 132KV Aizawl-Luangmual tripped instantaneously on 3-phase Differential protection on charging of HV side of 132/33 KV ICT. Later, at 18:17 hrs, 132KVAizawl-Luangmual was charged with Current Differential Protection in disabled condition as per request of SLDC Mizoram.
3. Broken Conductor Alarm is recorded since charging of the line.
4. Following points maybe ensured at Luagmol end:
    a. CT and PT inputs to Relay to be provided in correct phase sequence after identification of actual R-phase and Y-phase secondary inputs from CT to P543 relay.
    b. CT ratio tapping and healthiness of CT Protection Core maybe ensured.
5. SLDC Mizoram may intimate POWERGRID when to put the Line Diff Protection in service.

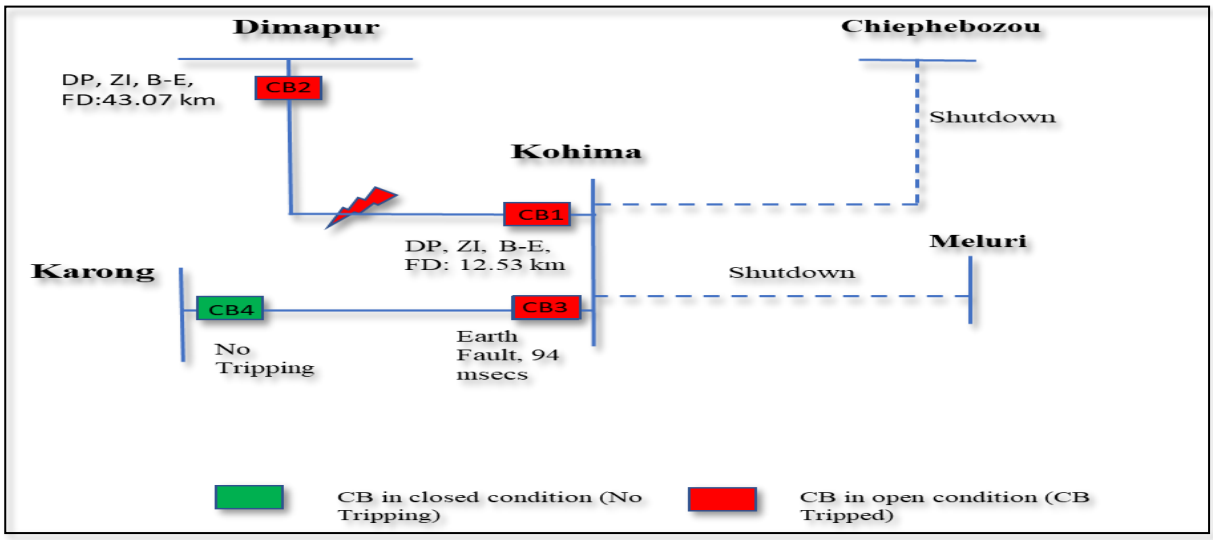
In 62nd PCCM, Forum directed Mizoram to check phase sequence of the CT and PT inputs to the relay in coordination with PGCIL.

C.9 <u>Blackout of Kohima area of Nagaland on 11-Dec-2023</u>

132 kV Kohima-Chiephobozou and 132 kV Kohima-Meluri line was under planned shutdown.

At 09:52 Hrs of 11-Dec-2023, 132 kV Dimapur (PG)-Kohima & 132 kV Kohima-Karong lines tripped. Due to tripping of these elements, 132 kV Kohima S/S of

Nagaland Power system got separated from rest of the grid. Load loss of **20 MW** observed in the capital area of Nagaland.



As per DR analysis, Metallic fault in 132 kV Dimapur (PG) – Kohima line successfully cleared from the Kohima end in 77 msecs on operation of DP, ZI, B-E, FD: 12.53 km. Fault current of 940 A observed in neutral.

However, 132 kV Karong – Kohima line tripped at Kohima on operation of Direction Earth Fault (i.e. Backup Relay) in 91 msecs seems unwanted and leads to the grid disturbance at Kohima area.

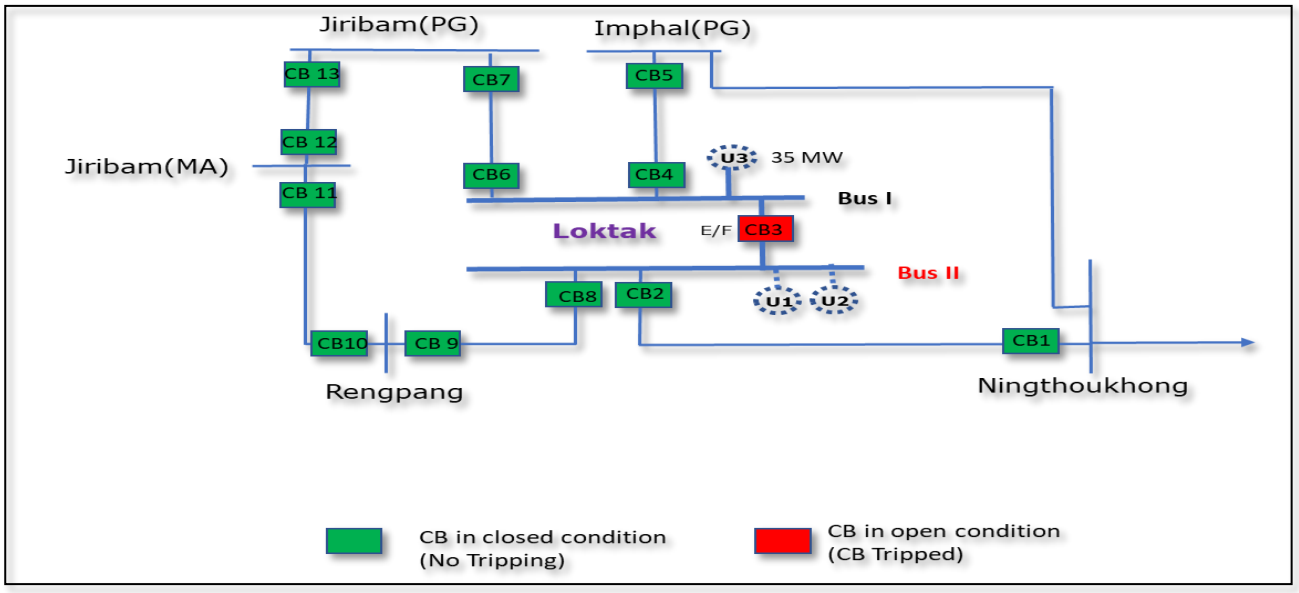
DoP, Nagaland is requested to ensure the directionality of Backup relay at Kohima for 132 kV Karong feeder. Also, the tripping time of the earth fault relay need to be coordinated with the ZIII time of the Distance (i.e. Main protection) at Kohima end.

In 62nd PCCM, DoP Nagaland was requested to ensure directionality of backup relay at Kohima end, voltage inputs to the B/U relay and to coordinate the overall backup relay settings at Kohima.

DoP Nagaland may update

C.10 Tripping of 132 kV Bus Coupler Loktak on 10th,16th and 17th Nov'2023

As per regular practice, 132 kV Loktak – Jiriabm(PG) & 132 kV Loktak – Imphal(PG) are connected in **Bus I** and 132 kV Loktak – Rengpang & 132 kV Loktak – Ningthoukhong are connected in **Bus II**



The blackout of Bus II at Loktak observed in the 3 occasions due to the tripping of Bus Coupler at Loktak are listed below:

Sl No.	Element Name	Tripping Date and Time	Restoration Date and Time	RELAY_A	RELAY_B
Event I	132 kV Loktak - Ningthoukhong Line	10-11-2023 11:15	10-11-2023 12:02	**No tripping**, Only Earth fault initiated at Loktak	Earth Fault
	132 kV Loktak Bus Coupler	10-11-2023 11:15	10-11-2023 11:40	EF	-
Event II	132 kV Loktak - Ningthoukhong Line	16-11-2023 11:54	16-11-2023 12:53	**No Tripping**, Only Earth fault initiated at Loktak	Earth Fault
	132 kV Loktak Bus Coupler	16-11-2023 11:54	16-11-2023 12:16	EF	-
Event III	132 kV Loktak - Rengpang Line	17-11-2023 02:52	17-11-2023 03:41	Not Furnished	No Tripping
	132 kV Loktak Bus Coupler	17-11-2023 02:52	17-11-2023 03:42	Not Furnished	-

As per detailed report submitted for Event II:

B-E fault in 132 kV Loktak - Ningthoukhong feeder cleared by the Bus Coupler at Loktak before opening the line CB at Loktak. Remedial measures taken at Loktak by changing Bus Coupler EF relay setting to Pick up Current of 100A from 80A and TMS-0.25 (Unchanged).

Loktak HEP is requested to provide the root cause for the Event I & Event III at Loktak. Also, requested to upgrade the Bus Coupler relay from Electromechanical to Numerical for proper analysis of the Grid Events.

In 62nd PCCM, Forum requested NHPC and MSPCL to undertake relay coordination in coordination with NERPC and NERLDC at the earliest.

Forum requested Loktak to replace the Bus Coupler relay with Numerical type.

NHPC may update

D. ITEMS FOR STATUS UPDATE

D.1. Status of auto-reclosure on *z*-1 operation for important lines:

In the discussions of the Sub-group on 12-04-2021 the following points were noted:

a. Auto-Reclosure is very much required for maintaining system stability, reliability and uninterrupted power supply.

b. Presently it will take some time for the state utilities to implement the PLCC and establish carrier communication between stations.

c. The operation of Auto-Reclosure on Z-I operation at the local end independent of carrier healthiness is required.

In the 57th and 56th PCC meeting the forum approved the implementation of Auto-Reclosure on Z-1 without carrier check for all lines except the lines with generating stations at both the ends and requested the utilities to implement the AR scheme at the earliest.

Status as updated in 62nd PCCM

Sl no	**State**	**Important Transmission lines where AR has to be enabled at the earliest**	**Lates status**
1.	Arunachal Pradesh	132kV Balipara-Tenga, 132kV Ziro-Daporijo-Along-Pashighat link	PLCC implementation under PSDF underway. SPAR have been enabled on the lines without PLCC 3-Ph AR will be enabled soon.
2.	Assam	All 220kV and 132kV lines	For 220kV sub stations- At Sonapur, GIS work underway, support of OEM required At Kathalguri, procurement of relays underway At Jawaharnagar, WIP All works at three substations to be completed by DEC'23 For 132kV substations- 80% work completed, by Dec'23 90% to be completed

			Assam informed all work at three substations will be completed by Jan/Feb 2024.
3.	Manipur	132kV Imphal-Ningthounkong	-
4.	Meghalaya	**Annexure (D.1)**	AR put in place for 5 lines but approval of MERC is still awaited. MePTCL to do double jumpering and improve strength at critical locations to ensure integrity of the old lines
7.	Tripura	132kV Agartala-S M Nagar (TSECL), 132kV Agartal-Rokhia DC, 132kV, 132kV Agartala-Budhjungnagar	To be commissioned by Jan'24

Utilities may update

D.2. <u>Installation of line differential protection for short lines:</u>

As per sub-regulation3 of Regulation 48 of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022-

"For short line (less than 10 km) or cable or combination of overhead line and cable, line differential protection shall be used with built-in backup distance protection."

As per discussion in 61st PCC meeting the status for different STUs/ISTS licensees are as follows:

Status as updated in 62nd PCCM

Name of utility	**Last updated status (62nd PCCM)**	**Latest status (63rd PCCM)**
AEGCL	DPR sent back by PSDF secretariat. Third party protection audit reports have to attached with the DPR. DPR being prepared as per new format and will be done by Jan'2024	
MSPCL	Revised DPR for 132kV Imphal-Imphal-III to be submitted. To be submitted soon	

MePTCL	Work completed Aug'21, but not commissioned yet. OPGW to be installed on some lines. LDP will be commissioned after OPGW link is established.	
P&ED Mizoram	Lines identified viz. 132kV Aizawl - Luangmual and 132kV Khamzawl - Khawiva. DPR submitted. PSDF approval awaited. For Aizawl – Luangmual line Power grid will complete the task by Jan'23 and for other PSDF approval still awaited,	
DoP Nagaland	LDP on Dimapur-Dimpaur lines completed. Regarding Doyang-Sanis line, NEEPCO to install LDR at Sanis end. Regarding Doyang-Sanis line, NEEPCO to install LDR at Sanis end will be done by Jan'24.	
TSECL	132kV 79 Tilla-Budhjungnagar. DPR to be prepared. Cost estimate submitted to TIDC to arrange for ADB funding. TIDC approval is still awaited for fund.	

Utilities may update

D.3. Status against remedial actions for important grid events:

Sl No	Details of the events(outage)	Remedial action suggested	Name of the utility & previous update	Latest status
1.	132 kV Balipara-Tenga line in May and June	Carrier aided inter-tripping to be implemented for 132kV Balipara-Tenga-Khupi at the earliest	DoP, Arunachal Pradesh. As per previous updates, PLCC Work covered	

		(PLCC has to be installed on the link. Under consideration of the higher authorities)	under PSDF. In progress	
2.	132 kV DoyangMokokchung line 132 kV Mokokchung - Mokochung (DoP, Nagaland) D/C lines on 30th July	Carrier inter-trip for 132kV DHEP-Mokokchung to be implemented by DoP Nagaland (NO PLCC on the line. Matter under consideration of Higher authorities)	DoP Nagaland (Work under progress. Will be completed soon.)	.
3.	Leshka-Khleihriat DC multiple tripping in April to September	TLSA installation along the line to be done by MePTCL	MePTCL (DPR submitted, Approval pending.)	
4.	132 kV Loktak-Jiribam line, 132 kV Loktak-Imphalline,132 kV Loktak-Ningthoukhong line, 132 kV Loktak-Rengpang line &Loktak Units 1,2 and 3 on 3rdAug	> 5MVA TRAFO (Aux. Transformer) to be repaired ->5MVA Auxiliary TRAFO panel to be repaired by NHPC	NHPC (Order to be placed soon. Will take 6months after placing the order)	
5.	Grid disturbance of category GD-1 (Load loss: 13MW) occurred at Karong areas of Manipur Power System at 07:41 Hrs on 4th August'22	MSPCL to check the following1. Protection setting at Karong along with circuit wirings from DPR to CB mechanism 2. Z-III setting at Imphal and its healthiness of correct operation by relay testing.	MSPCL	
7.	Grid Disturbance at Loktak HEP on 03rd Aug'22	NHPC-Loktak informed that LBB has been included under R&U scheme and the same shall be commissioned by Mar'23	NHPC (LBB to be commissioned under R&U project and by the end of Jan'24)	
10.	Review of SPS at Monarchak (item 2.22 of the sub-group held on4th May 23)	NERLDC requested NEEPCO and Tripura to implement the revised logic at Monarchak (as provided by NERLDC)	NEEPCO, TSECL (SLDC TSECL intimated that logic 1(to be configured	

		and Udaipur Rokhia ends respectively	at Udaipur and Rokhia to send DT to Monarchak) could not be implemented as there is no PLCC/OPGW connectivity in the LILO portion of Monarchak. NERLDC requested TSECL to explore installation of PLCC/FO for smooth functioning of SPS scheme for the reliability of Monarchak system)	
13.	132 kV Aizawl - Tipaimukh Line tripped at Aizawl end only on received of spurious DT signal on 16th and 26th Feb'23	rectification of PLCC issues at Tipaimukh end by MSPCL	MSPCL 48V DC battery issue. WIP	
14.	Outage of 220 KV Bus Bar Protection Scheme at 400/220/132 KV Killing SS	Bus-Bar protection of 220kV bus at Killing SS	MePTCL M/S ABB has given offer. Board's approval awaited. To be completed in 3-4 months	
15.	Retrip configuration in LBB scheme in AEGCL Hailakandi station:	In previous sub group meeting the forum opined that the retrip scheme in the LBB protection will increase reliability of the protection system and will help in preventing mal operations in	AEGCL Logic finalized, need to be tested. Whole work may be completed within Nov23	

		connecting feeders. AEGCL agreed to the suggestion and assured that the Retrip scheme, with time delay of 100msec will be configured in the LBB scheme in Silchar-Hailakandi Ckt 1 & 2 at Hailakandi end.		
16	Non-operation of AR for various lines at Byrnihaat end on 25th and 26th June'23	Rectification of PLCC issues by MePTCL Consultation with OEM underway for resolution	MePTCL Consultation with the OEM underway for resolution	
17	Non-operation of AR for various lines at Sonapur end in July and August	GIS related issues, coordination with OEM required	AEGCL GIS related issues, Coordination with OEM underway. WIP	
20	Tripping of 132kV Kahilipara- Sarusajai 1, 2 and 3 line, 132kV Kahilipara Main bus 1, 132kV Kahilipara transfer Bus 1 and 132kV Kahilipara-Kamalpur line on 2.08.2021	BB protection to be implemented at Kahilipara with procurement of 5 core CTs	AEGCL (will be done by April24)	

DATE AND VENUE OF NEXT PROTECTION SUB- COMMITTEE MEETING

The next Protection Sub-Committee meeting will be held in the month of February, 2024. The date and venue will be intimated separately.

****

Annexure B.3

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड

GRID CONTROLLER OF INDIA LIMITED

Formerly Power System Operation Corporation Limited

North Eastern Regional Load Despatch Centre, Shillong

माह अक्टूबर 2023 के ग्रिड घटनाओं की विस्तृत विश्लेषण रिपोर्ट

Detailed Analysis Report of Grid Event for the month of December, 2023

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ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
उत्तर पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / North Eastern Regional Load Despatch Centre
कार्यालय : लोवर, लापालांग, शिलांग -793006
Office : Lower Nongrah, Lapalang, Shillong- 793006
CIN : U40105DL2009GOI188682, Website : www.nerldc.in, E-mail : nerldc@grid-india.in, Tel.: 0364-2537470/427, Fax: 03642537486

Detailed Report of Grid Disturbance in Lakwa (LTPS) S/S of Assam of North Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))
(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date (दिनांक**):29-12-2023**

1. **Event Summary (घटना का सारांश):**

LTPS (Lakhwa Thermal Power Station) Substation of Assam Power System were connected with the rest of the grid by 132kV LTPS-Moran Line, 132kV LTPS-Mariani (AS) Line, 132kV LTPS-Nazira D/C Line, 132kV NTPS-LTPS Line and 132kV LTPS-Sonari line.

At 14:19 Hrs of 06th Oct'23, all the lines connected to 132 kV Bus at LTPS tripped which led to the blackout at LTPS Sub Station of Assam power system.

2. **Time and Date of the Event (घटना का स मय और दिनांक):** 14:19 Hrs on 06-12-2023
3. **Event Category** (ग्रिड **घटना का प्रकार**)**:** GD-I
4. **Location/Control Area** (स्थान/नियंत्रण क्षेत्र): Lakwa area of Assam Power System
5. **Antecedent Conditions (पूर्ववर्ती स्थिति)**:

	Frequency in Hz	Regional Generation(MW)	Regional Demand(MW)	State Generation(MW)	State Demand(MW)
Pre-Event (घटना पूर्व)	50.03	1720	1929	284.45	1159.76
Post Event (घटना के बाद)	50.03	1641	1953	184.47	1160.52

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (before the even))महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है(	NIL
Weather Condition (मौसम स्थिति)	Normal

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: **100 MW** collectively at LRPP and LTPS. There was no load loss recorded.

7. **Duration of interruption (रुकावट की अवधि): 2** Hr 19 min

8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा):**

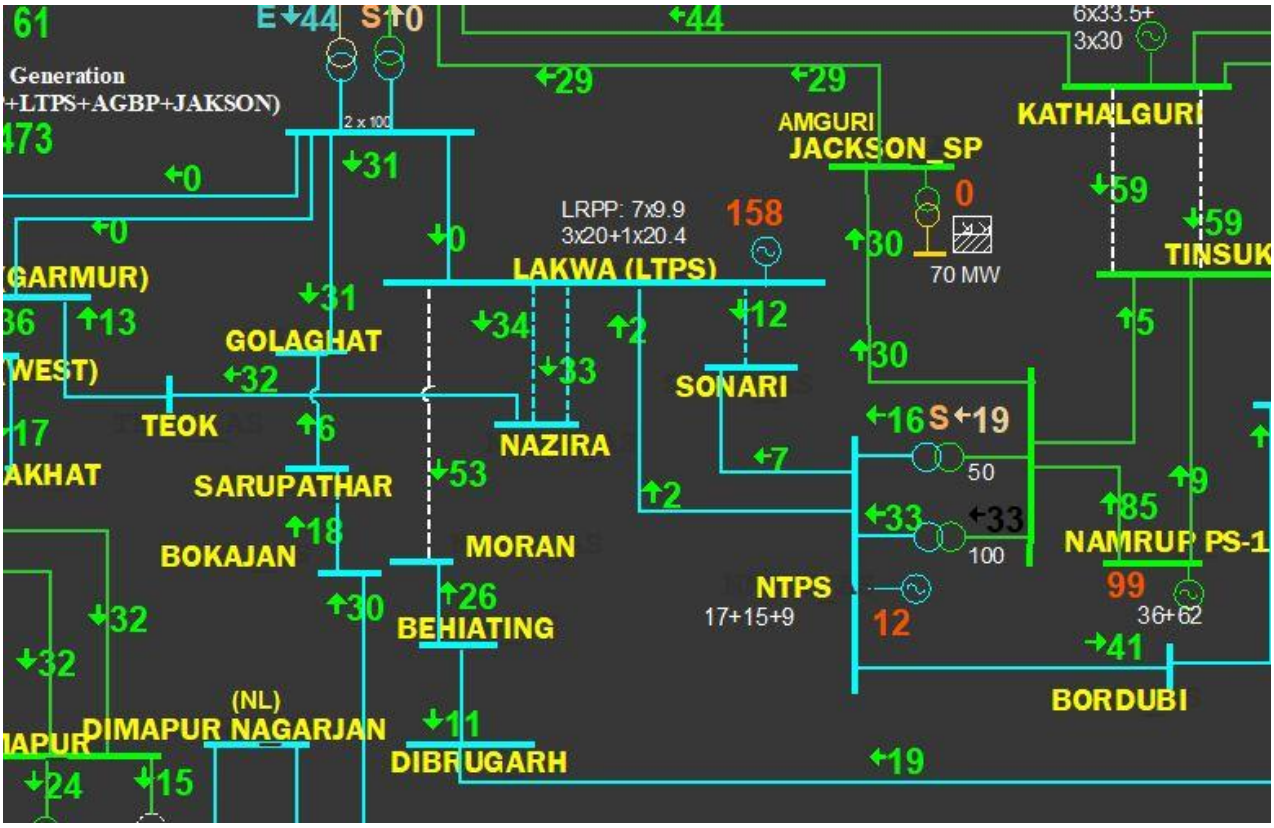


Figure 1: Network across the affected area

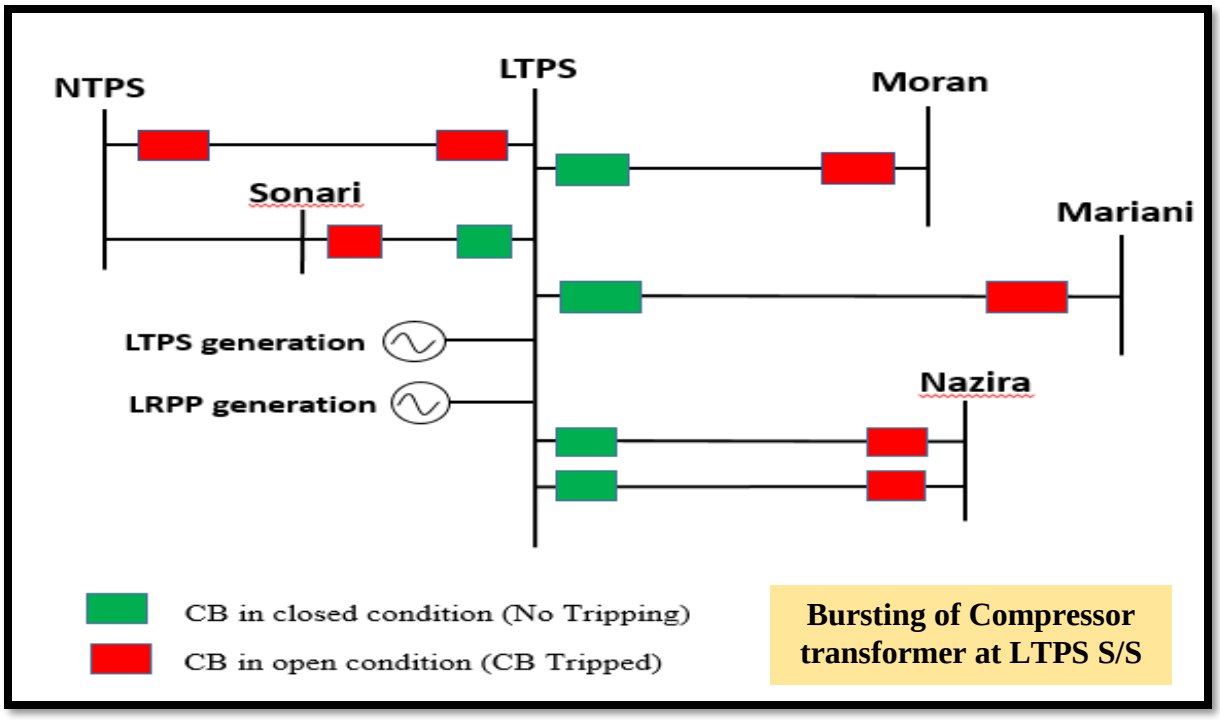
9. **Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण):**

Bursting and catching of fire at compressor transformer of LTPS (Lakwa Thermal Power Station)

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

Sl. No.	नाम	Trip time (hh:mm:ss)	Restoration time	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत
1	132 kV LTPS-NTPS line	14:19	16:38	DP, ZIV, FD: 0.5 km	DP, ZI, FD: 51 km
2	132 kV LTPS-Moran line	14:19	17:09	No tripping	DP, ZII, FD: 33.5 km
3	132 kV LTPS-Mariani	14:19	17:15	No tripping	DP, ZII, R-Y-B, FD: 85.9km
4	132 kV LTPS-Sonari	14:19	17:12	No tripping	DP, ZII, R-Y-B, FD: 125.9 km
5	132 kV LTPS-Nazira 1	14:19	17:26	No tripping	DP, ZII, R-Y, FD: 23.9 km
6	132 kV LTPS-Nazira 2	14:19	17:05	No tripping	DP, ZII, R-Y, FD: 25.6 km
7	LTPS Unit-5, 6, 8	14:19	-	Loss of evacuation path	
8	LRPP Generation	14:19	-	Loss of evacuation path	

11. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):



As per the PMU data of the Mariani (AS) S/S, fault initiated at 14:19:05.24 Hrs and cleared at 14:19:05.60 Hrs within 360 msec. Fault current of 203.29 A appears in R phase and 279.94 A appears in Y phase.

As per DR output signal, Z-II, R-Y-E phase fault recorded in 132 kV LTPS-Nazira I & II lines at 14:19:05.217 Hrs, which was cleared within 507 msecs & 120 msecs from Nazira end respectively.

As per flash report from AEGCL, fault was due to bursting and catching of fire at compressor transformer of LTPS, which led to tripping of all the elements connected to 132 kV LTPS S/S from remote end.

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- SOE (Sequence of events) not recorded from LTPS and from remote end for tripping of some of the lines viz. 132 kV LTPS-NTPS, 132 kV LTPS-Mariani & 132 kV LTPS-Sonari lines. The same needs attention by team AeGCL/SLDC Assam.
- 132 kV LTPS-Nazira II lines tripped within 120 msec on Z-II. Z-II times delay and zone reach setting needs to be checked by AEGCL.
- As the installed capacity of LTPS (along with LRPP) is currently at 150 MW, it is advisable to consider upgrading the existing bus Main & Transfer scheme to a Double Main Cum Transfer scheme. This enhancement is essential for ensuring reliability and preventing generation outage in the event of a bus fault.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- Power was extended to 132 kV Lakwa S/S by charging 132 kV LTPS-NTPS line at 16:38 Hrs. Subsequently, all other elements were restored.

14. Non-compliance observed (विनियमन का गैर-अनुपालन):

Sl.No.	Issues	Regulation Non-Compliance	Utilities
1.	**Flash Report received within 8hrs?**	IEGC section 37.2 (b)	No violation
2.	**Whether DR/EL provided within 24 Hours?**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**AEGCL**
3.	**Detailed Report received within 7 days?**	IEGC section 37.2 (e)	**AEGCL**
4.	**DR Time Synchronization Issues**	IEGC section 17.3	No violation
5.	**Any other non-compliance**		

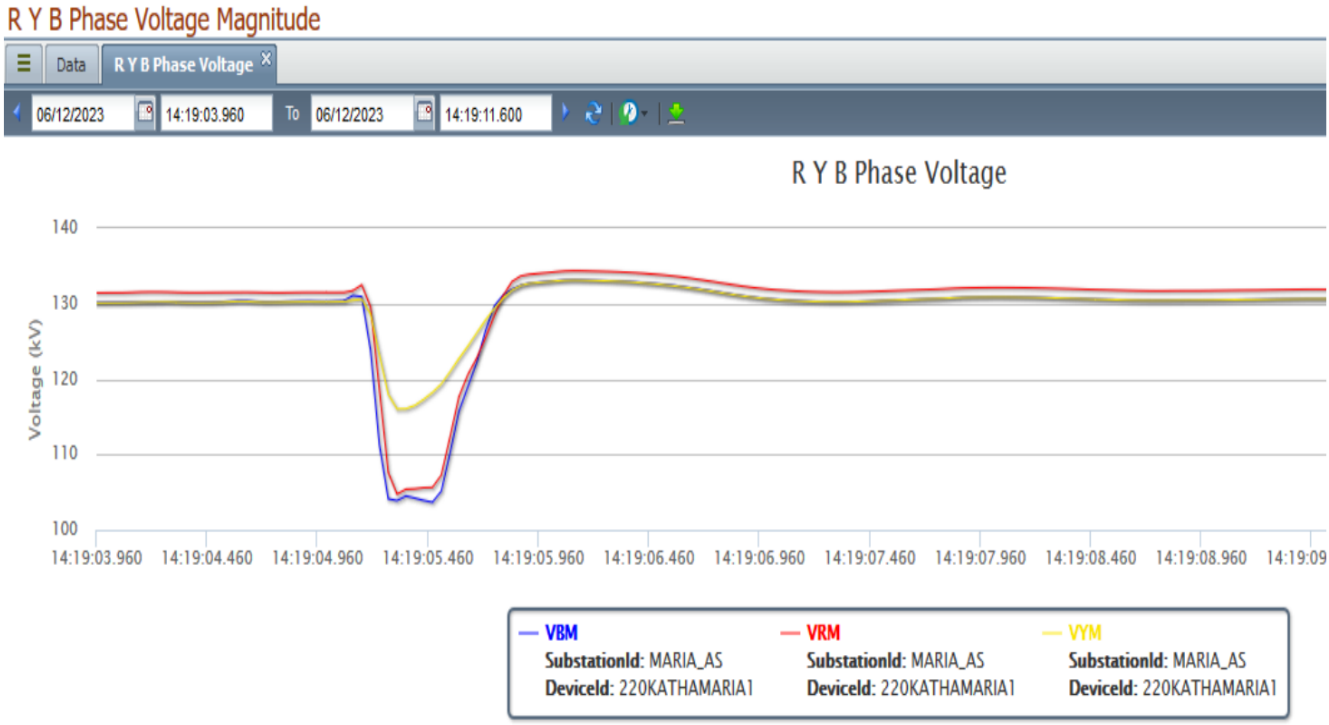
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु):

Periodic testing of all bay equipment is crucial to minimize the risk of equipment failures in critical substations.

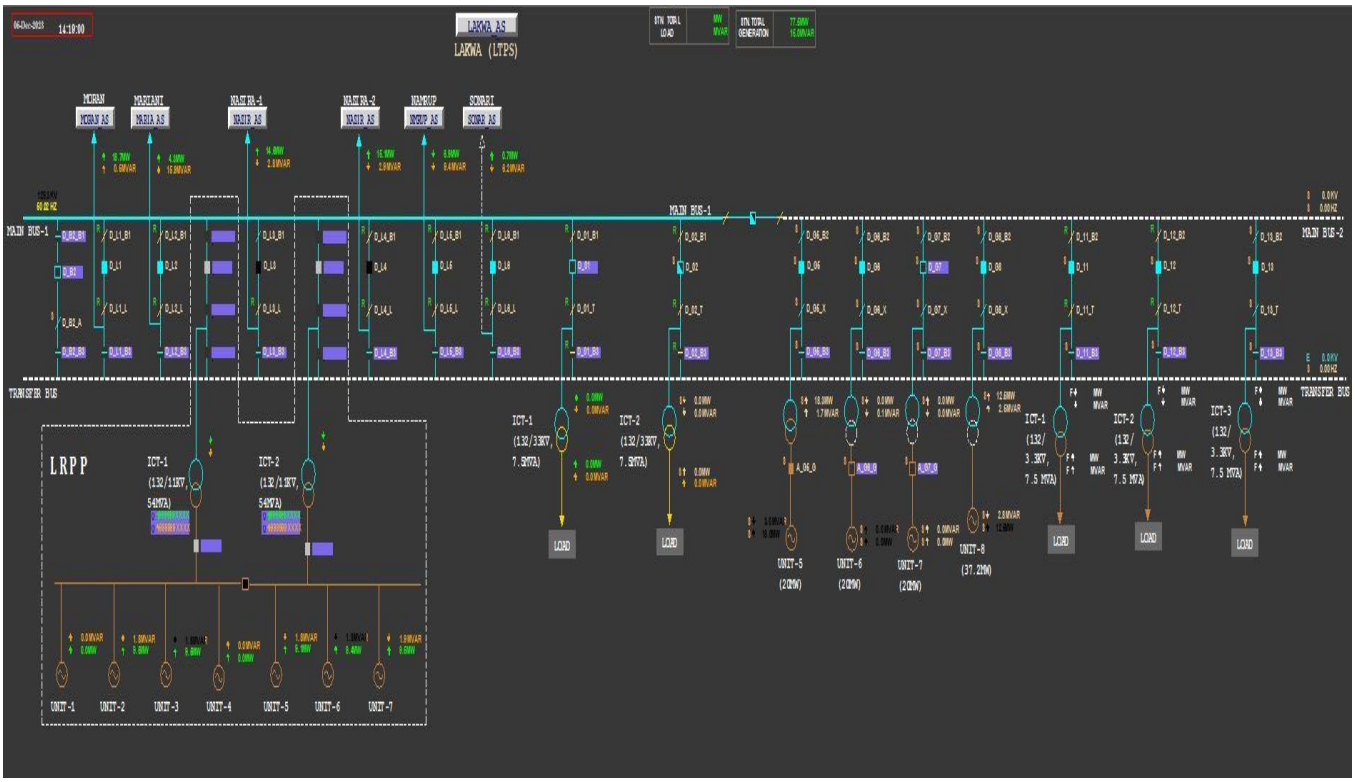
Annexure 1: Sequence of Events as per SCADA

AREA	CATEGORY	LOCATION	TEXT	SYSTEM_TIME	FIELD_TIME	MS
TSECL	1C	PKBAR_TE	PKBARI CB 132Kv LINE-1 TO KUMAR CLOSED	06 Dec 2023 13:52:08:000	06 Dec 2023 13:52:03:000	226000000
MEECL	1C	NANGA_ME	NANGALBIBRA CB 33Kv LOAD RONGJ CLOSED	06 Dec 2023 13:52:10:000	06 Dec 2023 13:52:05:000	952000000
TSECL	1C	PKBAR_TE	PKBARI CB 132Kv LINE-1 TO KUMAR OPEN	06 Dec 2023 13:52:56:000	06 Dec 2023 13:52:51:000	175000000
AEGCL	1C	BALIP_PG	BALIPARA CB MN CB 125 MVAR BR OPEN	06 Dec 2023 14:03:56:000	06 Dec 2023 14:03:52:000	57000000
AEGCL	1C	LAKWA_AS	LAKWA (LTPS) CB 11 KV UNIT G6 OPEN	06 Dec 2023 14:12:24:000	06 Dec 2023 14:12:03:000	335000000
AEGCL	1C	MARIA_AS	MARIANI CB 220 KV COUPLER (BC) BETWEEN	06 Dec 2023 14:19:20:000	06 Dec 2023 14:19:04:000	851000000
AEGCL	1C	NAZIR_AS	NAZIRA CB 132Kv LINE-1 TO LAKWA OPEN	06 Dec 2023 14:19:15:000	06 Dec 2023 14:19:05:000	732000000
AEGCL	1C	NAZIR_AS	NAZIRA CB 132Kv LINE-2 TO LAKWA OPEN	06 Dec 2023 14:19:15:000	06 Dec 2023 14:19:05:000	326000000
AEGCL	1C	MORAN_AS	MORAN CB 132Kv LINE TO LAKWA OPEN	06 Dec 2023 14:19:15:000	06 Dec 2023 14:19:10:000	331000000
TSECL	1C	PKBAR_TE	PKBARI CB 132Kv LINE-1 TO KUMAR CLOSED	06 Dec 2023 14:24:30:000	06 Dec 2023 14:24:25:000	79000000
TSECL	1C	PKBAR_TE	PKBARI CB 132Kv LINE-1 TO KUMAR OPEN	06 Dec 2023 14:24:33:000	06 Dec 2023 14:24:26:000	799000000
ARUNCH	1C	KMENG_NO	KAMENG CB 400 KV COUPLER (06) BETWEEN	06 Dec 2023 14:29:48:000	06 Dec 2023 14:29:43:000	567000000
ARUNCH	1C	KMENG_NO	KAMENG CB 11 KV UNIT (G01) CLOSED	06 Dec 2023 14:32:30:000	06 Dec 2023 14:32:21:000	617000000

Annexure 2: PMU snapshot 220 kV AGBPP-Mariani(AS) Line for Mariani(AS) end

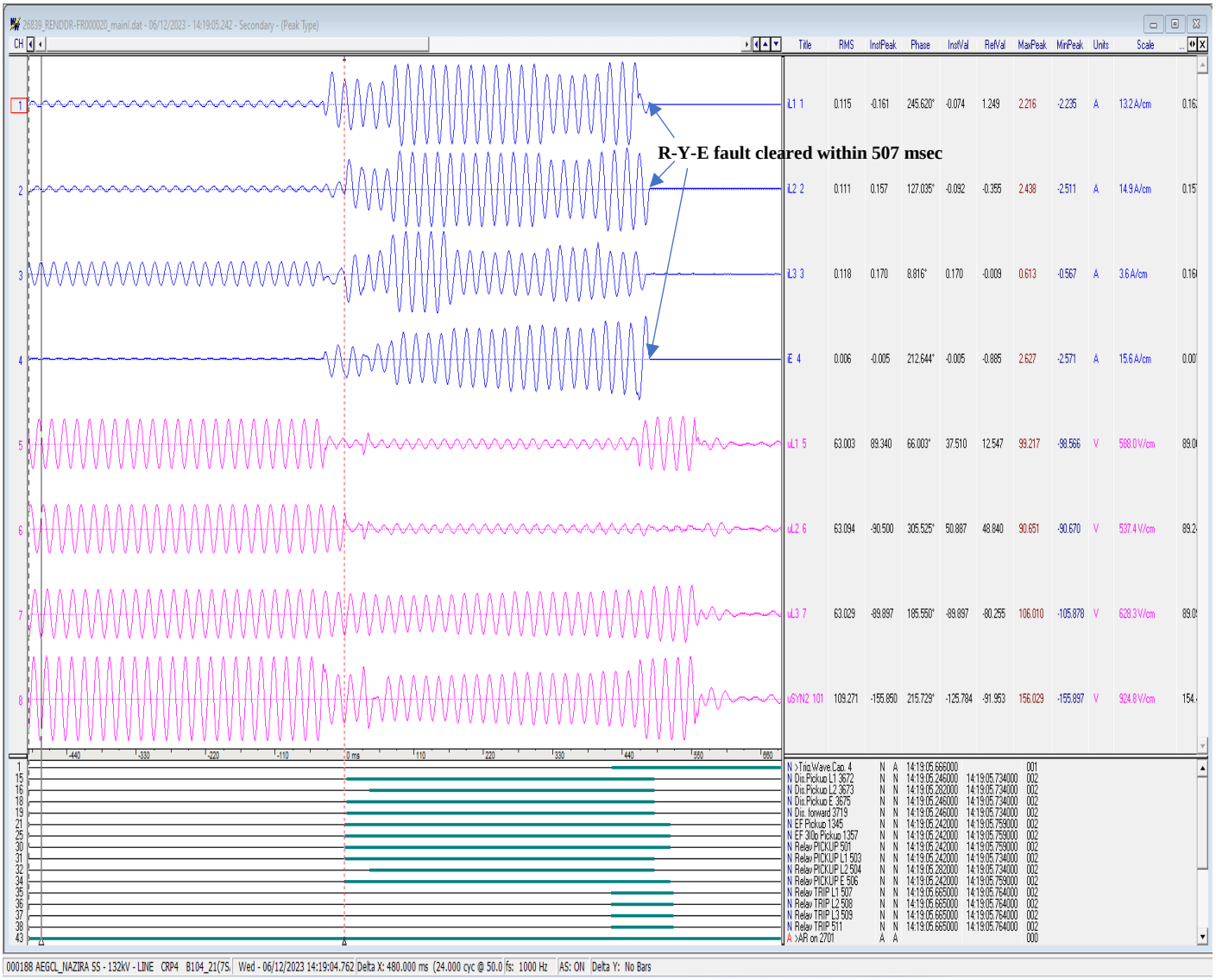


Annexure 3: SLD of the effected Substation

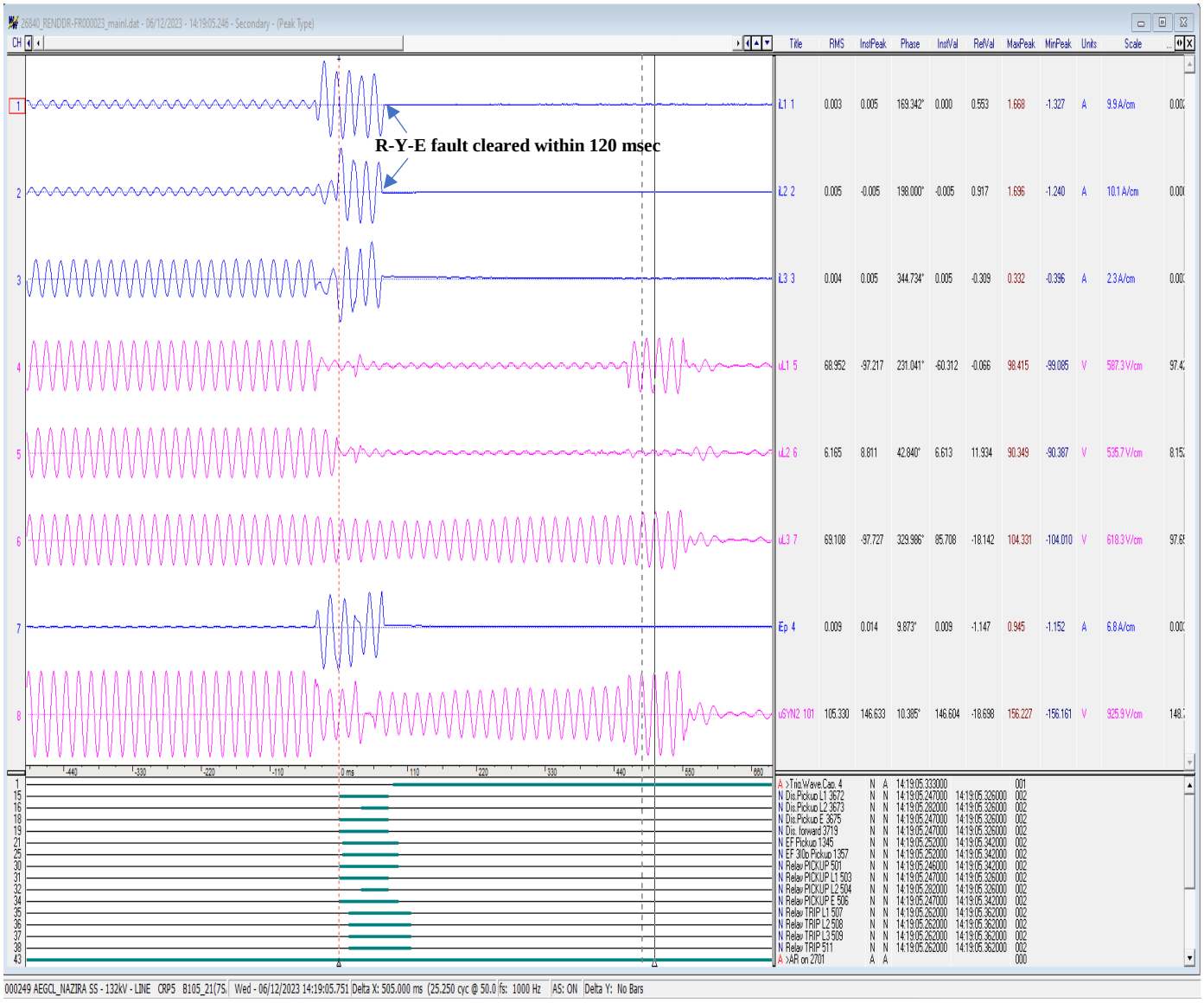


Annexure 4: Disturbance recorder snips showing faults and digital signals

4.1. DR Snapshot of Nazira for 132 kV LTPS-Nazira I line



4.2. DR Snapshot of Nazira for 132 kV LTPS-Nazira II line



ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
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Office : Lower Nongrah, Lapalang, Shillong- 793006
CIN : U40105DL2009GOI188682, Website : www.nerldc.in, E-mail : nerldc@grid-india.in, Tel.: 0364-2537470/427, Fax: 03642537486

Detailed Report of Grid Disturbance in Umiam Stg-II S/S of Meghalaya of North Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))
(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date (दिनांक)**: 29-12-2023**

1. **Event Summary (घटना का सारांश):**

Umian Stage 2 connected with rest of the grid with 132 kV Umiam Stage 1 – Umiam Stage 2 line only.

At 12:12 Hrs of 09-Dec-2023, 132 kV Umiam Stage 1 – Umiam Stage 2 line tripped at Stage 2 end led to the blackout at Umiam Stage 2 Sub Station of Meghalaya power system.

2. **Time and Date of the Event (घटना का स मय और दिनांक):** 12:12 Hrs on 09-12-2023
3. **Event Category** (ग्रिड **घटना का प्रकार**)**:** GD-I
4. **Location/Control Area** (स्थान/नियंत्रण क्षेत्र): Umiam Stage 2 of the Meghalaya power system
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency in Hz	Regional Generation(MW)	Regional Demand(MW)	State Generation(MW)	State Demand(MW)
Pre-Event (घटना पूर्व)	50.02	1703	1847	42	250
Post Event (घटना के बाद)	50.01	1706	1855	32	241

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (before the even))महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है(	NIL
Weather Condition (मौसम स्थिति)	Normal

6. **Load and Generation loss (लोड और जेनरेशन हानि):**

Generation loss: 2 **MW** (Umaim Stage II) and 8 **MW** (Umaim Stage I- Unit 3 & 4).

There was no load loss recorded.

7. **Duration of interruption (रुकावट की अवधि): 30** min

8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा):**

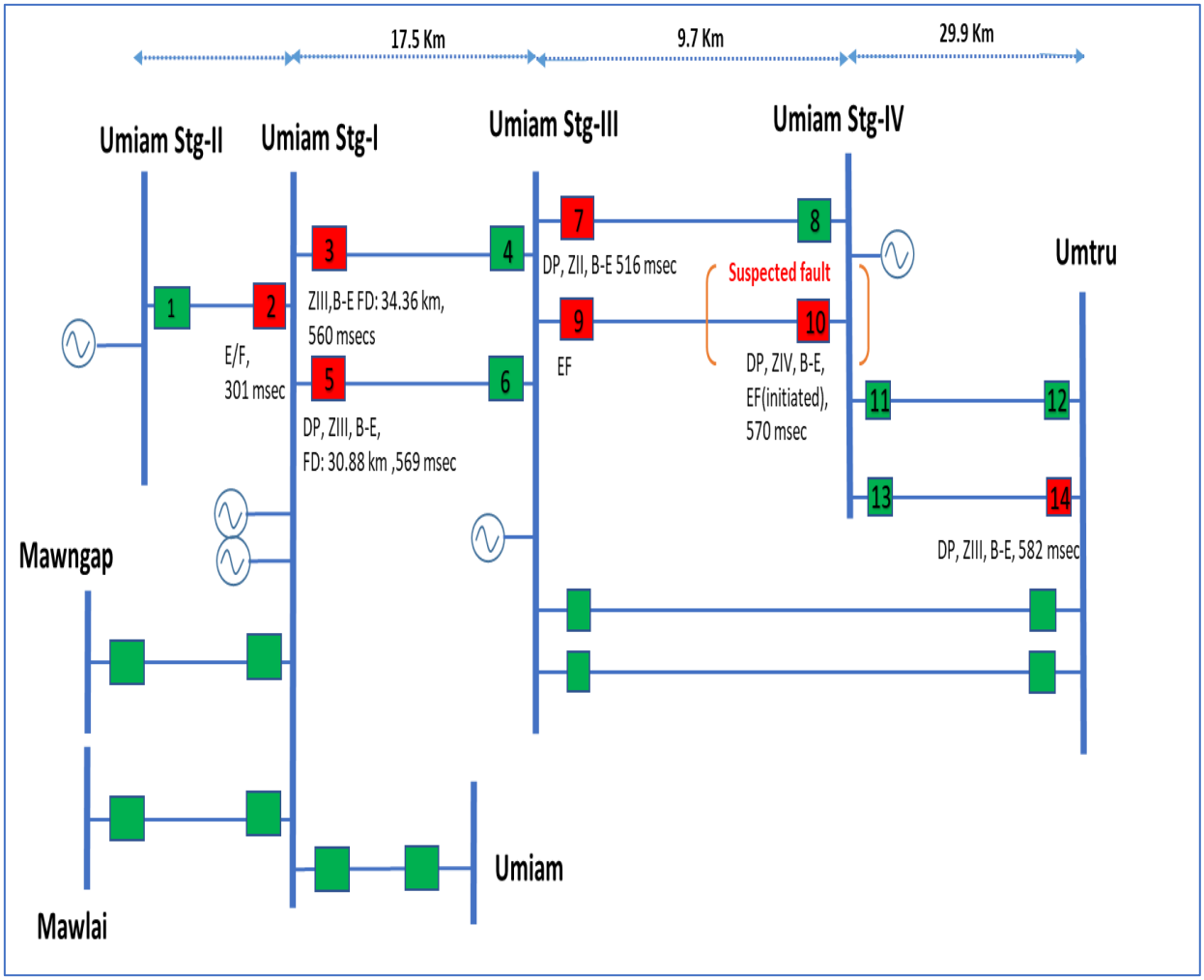


Figure 1: Network across the affected area

9. **Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण):**

At 12:51hrs the 132kV Umiam Stage 3 – Umiam Stage 4 (Line 2) line was test charged but it instantly tripped with directional overcurrent and directional earth fault and declared faulty w.e.f 12:51 hrs of 09 Dec 2023.

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

Sl. No.	नाम/ Name	Trip time (hh:mm)	Restoration time	Relay End 1/ उप केंद्र 1 रिले संकेत	Relay End 2/ उप केंद्र 2 रिले संकेत
1	Umiam Stage 1 – Stage 2	12:12	12:40	Earth Fault (no DR received)	No tripping
2	Umiam Stage 1- Umiam Stage 3 **(Line 1)**	12:12	12:42	DP, ZIII, B-E, FD: 34.36 km	No tripping
3	Umiam Stage 1- Umiam Stage 3 **(Line 2)**	12:12	12:43	DP, ZIII, B-E, FD: 30.88 km	No tripping
4	Umiam Stage 3- Umiam Stage 4 **(Line 1)**	12:12	12:37	DP, ZII, B-E	No tripping
5	Umiam Stage 3- Umiam Stage 4 **(Line 2)**	12:12	**Declared faulty and charged at 23:33 Hrs on 10th Dec'23**	Earth Fault (no DR received)	DP, ZIV, B-E, DEF initiated
6	Umiam Stage 4- Umtru P.S **(Line 2)**	12:12	13:01	No tripping	DP, ZIII, B-E, 574 msecs
7	Unit 3 @ Umian I	12:12	13:52	Tripped (reason awaited)	
8	Unit 4 @ Umian I	12:12	13:52	Tripped (reason awaited)	
9	Unit 1 @ Umian IV	12:12	13:34	Tripped (reason awaited)	
10	Unit 1 @ Umian II	12:12	13:58	Loss of Evacuation	

11. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):

As per DR analysis, Umiam Stage 1- Umiam Stage 3 Line 1 & 2 tripped at Umiam Stage 1 end in 560 msecs & 570 msecs on operation of DP, ZIII indicates the fault beyond the line.

Tripping of the Umiam Stage 3- Umiam Stage 4 Line 1 on DP,ZII from Stage 3 end and no tripping from Stage 4 end indicates the fault not in the line.

Tripping of Umiam Stage 4 - Umtru P.S (Line 2) on ZIII indicates the suspected fault around the Stage IV substation.

However, the actual fault location could not be concluded due to unavailability of the following DR/EL files:

1. Stage 3 end of the Umiam Stage 3- Umiam Stage 4 (Line 2)

2. Stage 4 end of the Umiam Stage 3- Umiam Stage 4 (Line 1)

3. Stage 4 end of the Umiam Stage 4- Umtru P.S (Line 2)

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- Tripping of multiple element observed due to relay coordination Issues. Tripping on DP, ZIII in 560-580 msecs indicates less time delay setting incorporated at Umiam Stage 3.
- Tripping 132 kV Umiam Stage 1 – Stage 2 at Stage 2 on Earth Fault indicates directionality issue in the backup relay.
- Tripping of Unit-3 & 4 at Umiam I and Unit1 at Umtru seems unwanted.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- Power extended to Umiam Stage 2 by charging Umiam Stage 1 – Stage 2 at 12:40 Hrs.

- MePGCL will check/test the Distance Protection Relays and the Tripping Circuits of the 132kV Umiam Stage 3 – Umiam Stage 4 (Line 1&2) on the first week on January 2024.

14. Non-compliance observed (विनियमन का गैर-अनुपालन):

Sl.No.	Issues	Regulation Non-Compliance	Utilities
1.	**Flash Report received within 8hrs?**	IEGC section 37.2 (b)	**MePGCL/ SLDC Meghalaya**
2.	**Whether DR/EL provided within 24 Hours?**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**MePGCL/ SLDC Meghalaya**
3.	**Detailed Report received within 7 days?**	IEGC section 37.2 (e)	**MePGCL/ SLDC Meghalaya**
4.	**DR Time Synchronization Issues**	IEGC section 17.3	**MePGCL**
5.	**Any other non-compliance**		**-**

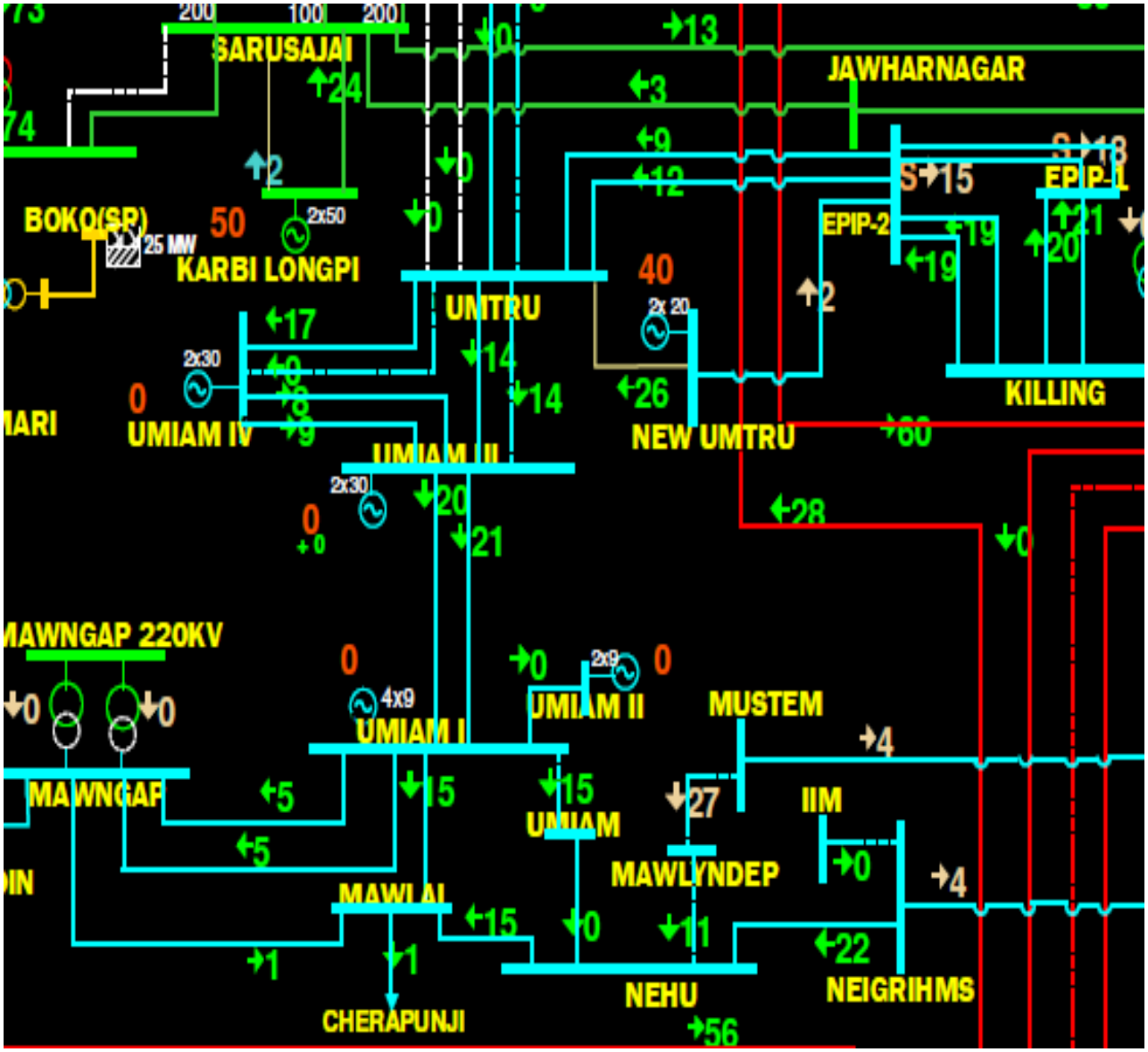
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु):

Importance of periodic review of the relay settings to avoid unwanted tripping of important lines due to relay coordination issue.

Annexure 1: Sequence of Events as per SCADA

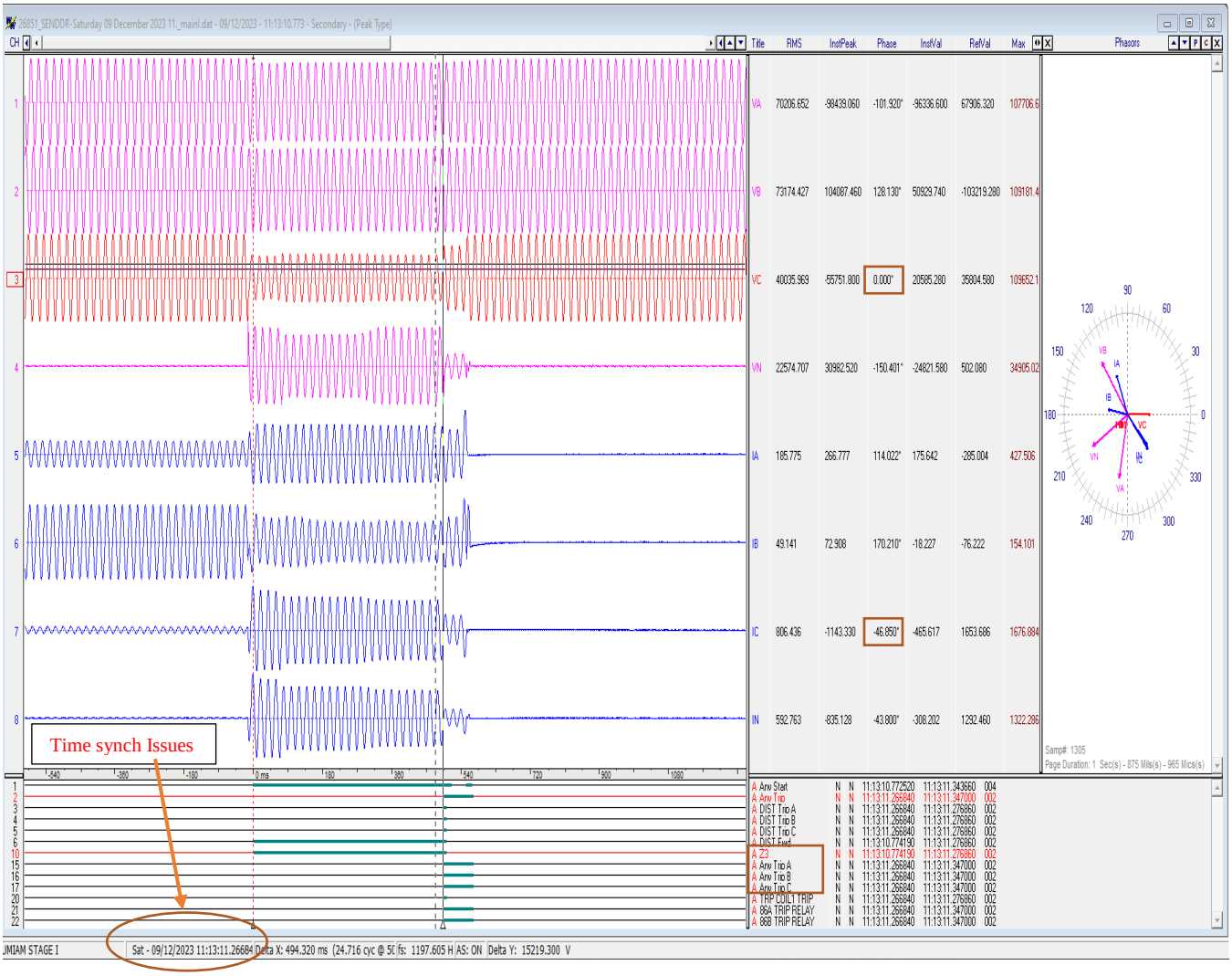
AREA	CATEGORY	LOCATION	Element	SYSTEM_TIME	FIELD_TIME
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H03) OPEN	09 Dec 2023 12:12:30:000	09 Dec 2023 12:12:20:000
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H04) OPEN	09 Dec 2023 12:12:30:000	09 Dec 2023 12:12:20:000
MEECL	1C	UMIA1_ME	UMIAM I CB 132Kv LINE-1 TO UMIA2 OPEN	09 Dec 2023 12:12:30:000	09 Dec 2023 12:12:20:000
MEECL	1C	UMIA1_ME	UMIAM I CB 132Kv LINE-1 TO UMIA3 OPEN	09 Dec 2023 12:12:30:000	09 Dec 2023 12:12:21:000
MEECL	1C	UMIA1_ME	UMIAM I CB 132Kv LINE-2 TO UMIA3 OPEN	09 Dec 2023 12:12:30:000	09 Dec 2023 12:12:21:000
MEECL	1C	UMIA3_ME	UMIAM III CB 132Kv LINE-1 TO UMIA4 OPEN	09 Dec 2023 12:12:30:000	09 Dec 2023 12:12:21:000
MEECL	1C	UMIA2_ME	UMIAM II CB 11 KV UNIT (H01) OPEN	09 Dec 2023 12:12:50:000	09 Dec 2023 12:12:41:000
MEECL	1C	NWUMT_ME	NEW UMTRU CB 132Kv LINE TO UMTRU OPEN	09 Dec 2023 12:12:54:000	09 Dec 2023 11:21:15:000
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H04) BETWEEN	09 Dec 2023 12:13:09:000	09 Dec 2023 12:13:02:000
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H04) OPEN	09 Dec 2023 12:13:12:000	09 Dec 2023 12:13:06:000
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H04) BETWEEN	09 Dec 2023 12:13:14:000	09 Dec 2023 12:13:06:000
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H04) OPEN	09 Dec 2023 12:13:20:000	09 Dec 2023 12:13:11:000
MEECL	1C	UMIA3_ME	UMIAM III CB 132Kv LINE-1 TO UMIA4 CLOSED	09 Dec 2023 12:37:19:000	09 Dec 2023 12:37:10:000
MEECL	1C	UMIA1_ME	UMIAM I CB 132Kv LINE-1 TO UMIA2 CLOSED	09 Dec 2023 12:40:22:000	09 Dec 2023 12:40:14:000
MEECL	1C	UMIA3_ME	UMIAM III CB 132Kv LINE-1 TO UMIA1 OPEN	09 Dec 2023 12:40:47:000	09 Dec 2023 12:40:40:000
MEECL	1C	UMIA1_ME	UMIAM I CB 132Kv LINE-1 TO UMIA3 CLOSED	09 Dec 2023 12:42:24:000	09 Dec 2023 12:42:18:000
MEECL	1C	UMIA3_ME	UMIAM III CB 132Kv LINE-1 TO UMIA1 CLOSED	09 Dec 2023 12:43:08:000	09 Dec 2023 12:43:01:000
MEECL	1C	UMIA1_ME	UMIAM I CB 132Kv LINE-2 TO UMIA3 CLOSED	09 Dec 2023 12:43:51:000	09 Dec 2023 12:43:45:000
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H04) BETWEEN	09 Dec 2023 13:40:54:000	09 Dec 2023 13:40:38:000
MEECL	1C	UMIA1_ME	UMIAM I CB 11 KV UNIT (H03) CLOSED	09 Dec 2023 13:42:42:000	09 Dec 2023 13:42:34:000
MEECL	1C	UMIA2_ME	UMIAM II CB 11 KV UNIT (H01) CLOSED	09 Dec 2023 13:58:59:000	09 Dec 2023 13:58:49:000
MEECL	1C	UMIAM_ME	UMIAM CB 132/33 T1 (PRIM) CLOSED	09 Dec 2023 14:34:25:000	09 Dec 2023 14:34:16:000
MEECL	1C	UMIAM_ME	UMIAM CB 132/33 T2 (PRIM) CLOSED	09 Dec 2023 14:35:33:000	09 Dec 2023 14:35:27:000

Annexure 3: SLD of the effected SS

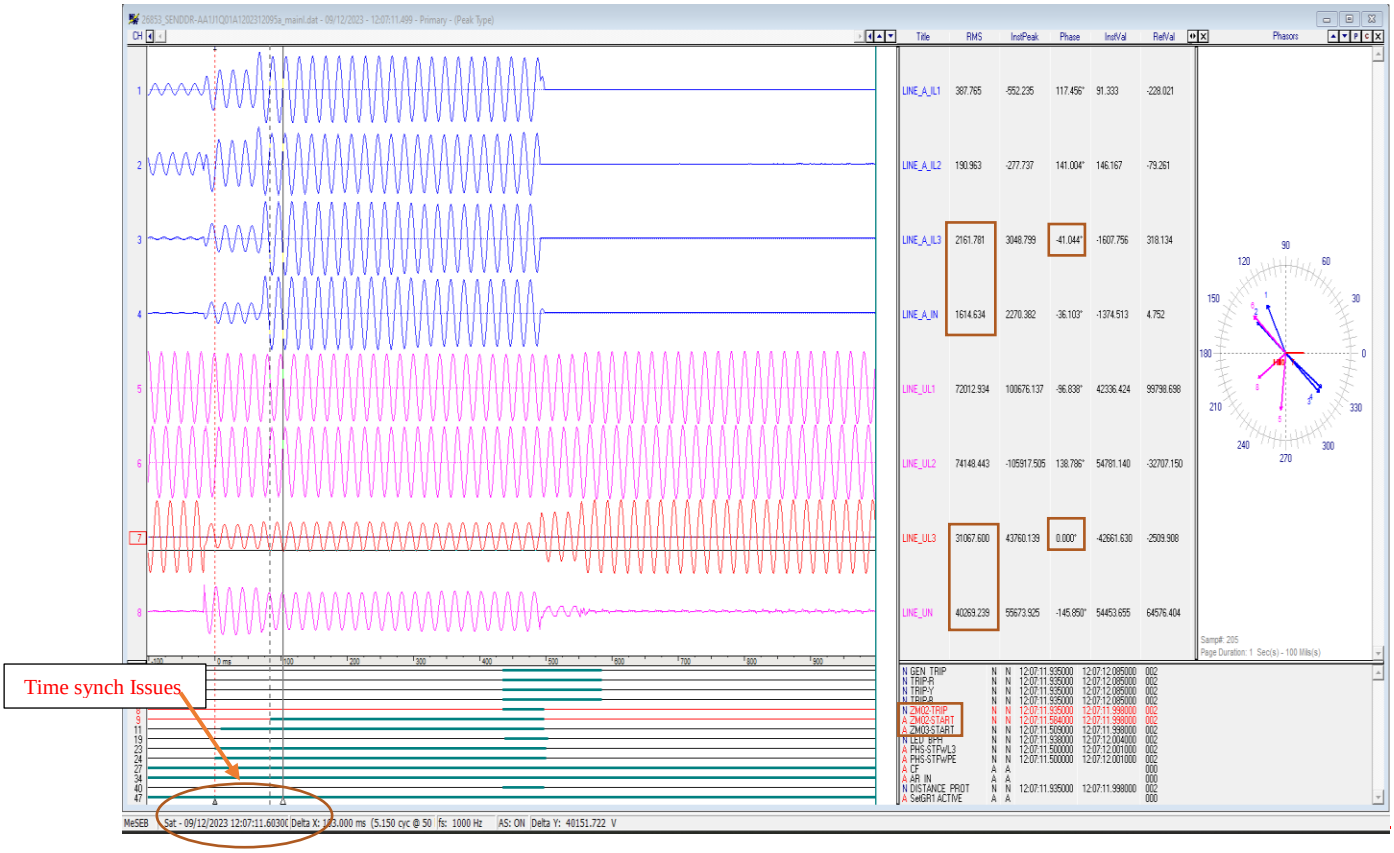


Annexure 4: Disturbance recorder snips showing faults and digital signals

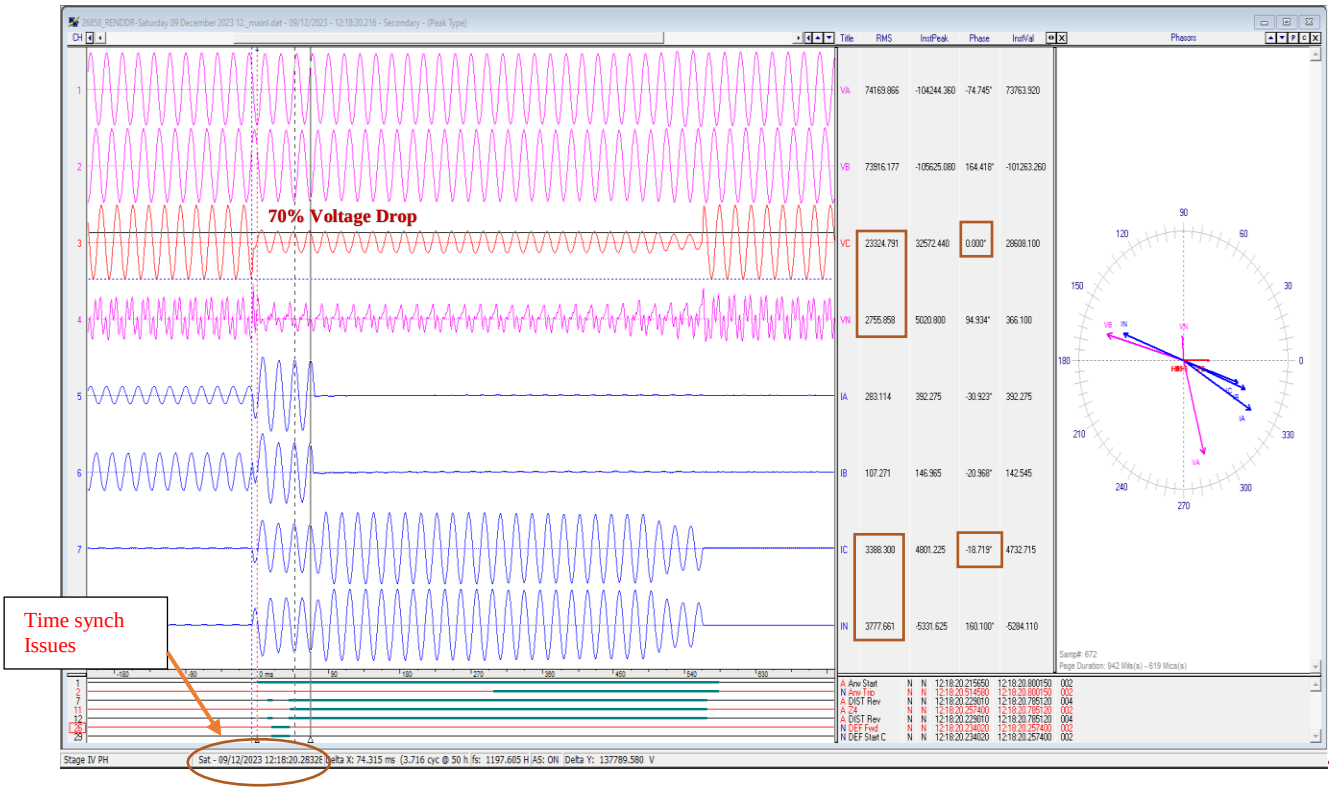
4.1. DR Snapshot of Stage 1 for Umiam Stage 1- Umiam Stage 3 (Line 1)



4.2. DR Snapshot of Stage 3 for Umiam Stage 3- Umiam Stage 4 (Line 1)



4.3. DR Snapshot of Stage 4 for Umiam Stage 3- Umiam Stage 4 (Line 2)



ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
उत्तर पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / North Eastern Regional Load Despatch Centre
कार्यालय : लोवर, लापालांग, शिलांग -793006
Office : Lower Nongrah, Lapalang, Shillong- 793006
CIN : U40105DL2009GOI188682, Website : www.nerldc.in, E-mail : nerldc@grid-india.in, Tel.: 0364-2537470/427, Fax: 03642537486

Detailed Report of Grid Disturbance in Kohima S/S of Nagaland of North Eastern Region
(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))
(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date (दिनांक)**: 26-12-2023**

1. **Event Summary (घटना का सारांश):**

Kohima Substation of Nagaland Power System is connected with the rest of the grid by 132 kV Kohima-Dimapur (PG) and 132 kV Kohima-Karong lines (132 kV Kohima-Meluri line was under planned shutdown & 132 kV Kohima-Chiephobozou-Wokha line was under OCC approved shutdown prior to the event).

At 09:52 Hrs of 11.12.2023, 132 kV Dimapur (PG)-Kohima & 132 kV Kohima-Karong lines tripped. Due to tripping of these elements, 132 kV Kohima S/S of Nagaland Power system got separated from rest of the grid due to no source available in this area.

2. **Time and Date of the Event (घटना का स मय और दिनांक):** 09:52 Hrs on 11-12-2023
3. **Event Category** (ग्रिड **घटना का प्रकार**)**:** GD-I
4. **Location/Control Area** (स्थान/नियंत्रण क्षेत्र): Kohima area of Nagaland System
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency in Hz	Regional Generation(MW)	Regional Demand(MW)	State Generation(MW)	State Demand(MW)
Pre-Event (घटना पूर्व)	50.03	2007	1979	6	97
Post Event (घटना के बाद)	50.03	2012	1962	6	77

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (before the even))महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है(	132 kV Kohima-Chiephobozou-Wokha line & 132 kV Kohima-Meluri line under planned shutdown
Weather Condition (मौसम स्थिति)	Normal

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Load loss of 20 MW at Kohima. There was no generation loss.
7. **Duration of interruption (रुकावट की अवधि): 24** min
8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा)**

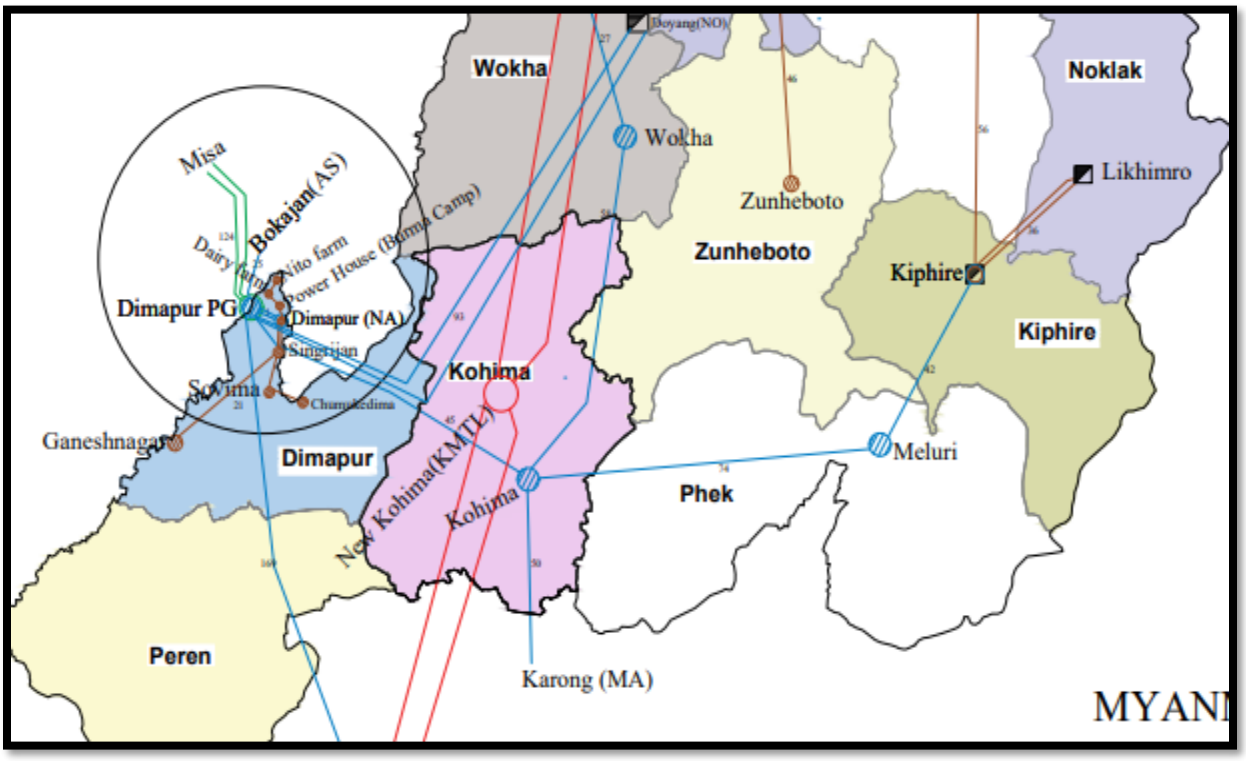


Figure 1: Network across the affected area

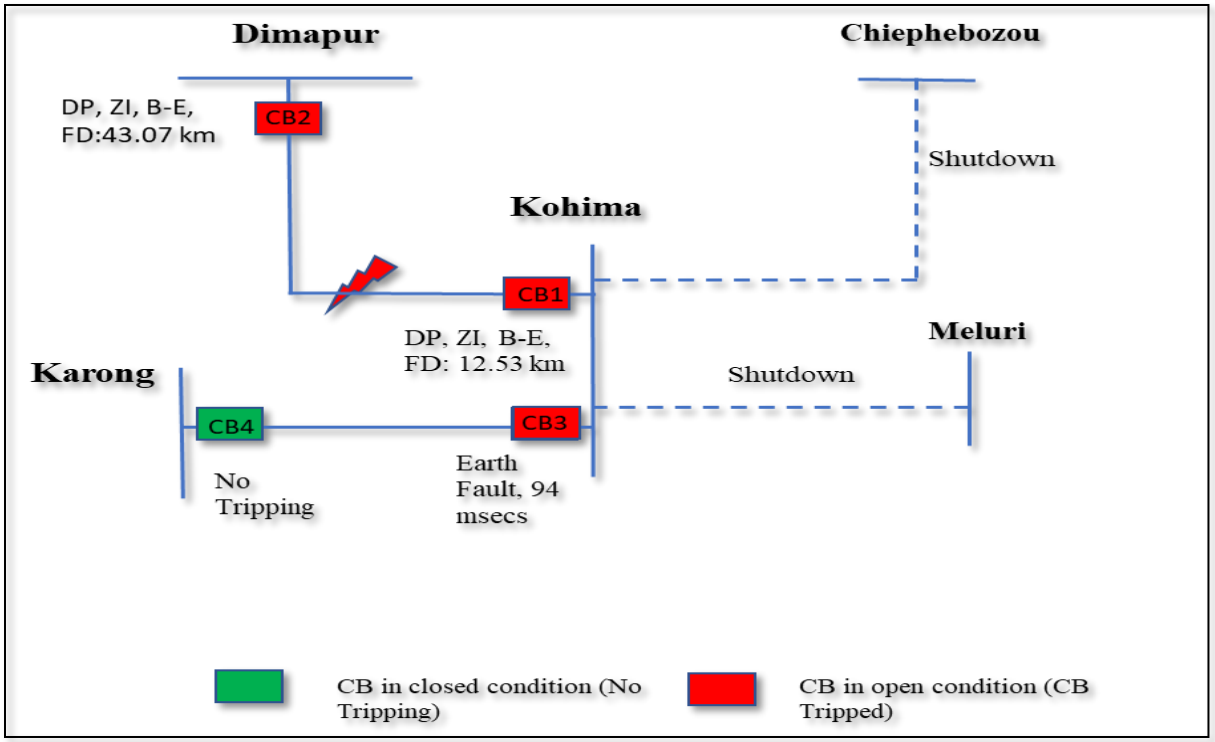
9. **Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण):**

B-phase conductor of 132kV Dimapur (PG)-Kohima snapped at Lalmati area (Tower no. 88)

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

Sl. No.	नाम	Trip time (hh:mm:ss)	Restoration time	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत
1	132 kV Dimapur(PG)-Kohima line	09:52	15:15	DP, ZI, B-E, FD: 43.07 Km	DP, ZI, B-E, FD: 12.53 km
2	132 kV Karong-Kohima line	09:52	10:16	No tripping	B-E, E/F

11. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):



As per the PMU snap of the Dimapur SS, fault initiated at 09:52:29.96 Hrs and cleared at 09:52:30.08 Hrs. Fault current of 1.01 kA appears in B phase.

As per DR analysis, metallic fault in 132 kV Dimapur (PG) – Kohima line successfully cleared from the Kohima end in 77 msec on operation of DP, ZI, B-E, FD: 12.53 km. However, 132 kV Karong – Kohima line tripped at Kohima on operation of Directional Earth Fault (i.e. Backup Relay) in 91 msec which seems unwanted and leads to the grid disturbance at Kohima area.

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- Tripping of 132 kV Karong -Kohima line on Backup protection from Kohima end in 91 msec seems unwanted. DoP, Nagaland to ensure directionality of backup relay to avoid re-occurrence.

- B/U O/C & E/F setting needs to be coordinated with ZIII time delay of distance protection (i.e. main protection) at Kohima end as per NERPC protection philosophy.

- Voltage inputs to the B/U relay needs to be checked and it is to be recorded and shared to this end.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- Power was extended to 132 kV Kohima S/S by charging 132kV Kohima – Karong at 10:16 Hrs. Subsequently, 132 kV Kohima – Dimapur line was charged at 15:15 Hrs of 11-Dec-2023.

- Broken B-phase conductor in between Kohima and Dimapur was restored.

- To ascertain the cause of reverse tripping of Karong at Kohima the following actions were taken:

  a) Directionality of BU relay was cross-checked again.

  b) CT star point connection was checked.

  c) Connection/source of AC for BU relay was checked. i.e connected to CVT.

  d) Output voltage of CVT secondary was checked. i.e 108.9 V.

  e) Output of ACDB was checked for all phases.

  f) Fuses were also checked.

  g) Phase to phase and Phase to neutral voltages at the relay connecting point were checked for all phases. Phase to Phase = 108.9V and Phase to Neutral = 62.9V

  h) Loose connection at BU relay connecting points was checked.

14. Non-compliance observed (विनियमन का गैर-अनुपालन):

Sl.No.	Issues	Regulation Non-Compliance	Utilities
1.	**Flash Report received within 8hrs?**	IEGC section 37.2 (b)	No violation
2.	**Whether DR/EL provided within 24 Hours?**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**MSPCL**
3.	**Detailed Report received within 7 days?**	IEGC section 37.2 (e)	No violation
4.	**DR Time Synchronization Issues**	IEGC section 17.3	No violation
5.	**Any other non-compliance**		-

15. Key Lessons Learnt (प्रमुख अधिगम बिंदु):

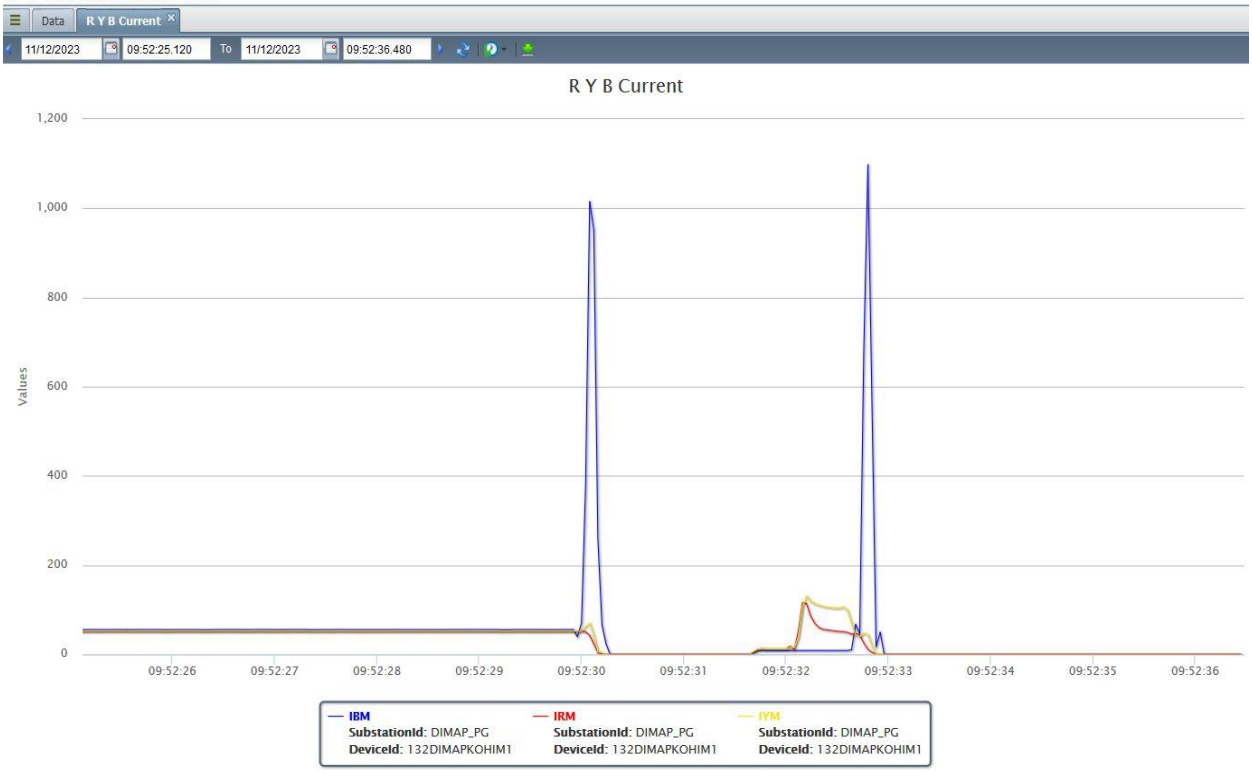
- Importance of periodic review of the relay settings to avoid tripping of important lines.
- Thermo-vision scanning of line is utmost importance to detect hot spot/loose joints and further remedial measures to prevent such events.

Annexure 1: Sequence of Events as per SCADA

AREA	CATEGORY	LOCATION	TEXT	SYSTEM_TIME	FIELD_TIME	MS
NAGALD	1C	SANIS_NA	SANIS CB 132Kv LINE TO WOKHA OPEN	11 Dec 2023 09:01:10:000	11 Dec 2007 09:01:04:000	3.7E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132 KV COUPLER (02) BETWEEN	11 Dec 2023 09:52:35:000	11 Dec 2007 09:52:29:000	6.88E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE-1 TO DIMAP OPEN	11 Dec 2023 09:52:35:000	11 Dec 2007 09:52:29:000	5.9E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE-1 TO KARON INVALID	11 Dec 2023 09:52:35:000	11 Dec 2007 09:52:29:000	5.95E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE-1 TO DIMAP CLOSED	11 Dec 2023 09:52:37:000	11 Dec 2007 09:52:31:000	5.92E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE-1 TO DIMAP OPEN	11 Dec 2023 10:05:33:000	11 Dec 2007 10:05:27:000	5.79E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE TO MELUR OPEN	11 Dec 2023 10:14:14:000	11 Dec 2007 10:14:08:000	89000000
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE-1 TO KARON CLOSED	11 Dec 2023 10:16:13:000	11 Dec 2007 10:16:08:000	14000000
NAGALD	1C	KOHIM_NA	KOHIMA CB 132 KV COUPLER (02) CLOSED	11 Dec 2023 10:19:25:000	11 Dec 2007 10:19:19:000	2.81E+08
AEGCL	1C	BIHIA_AS	BEHIATING CB 132Kv LOAD-1 BCPL_ OPEN	11 Dec 2023 11:00:24:000	11 Dec 2007 11:00:14:000	8.78E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE TO MELUR CLOSED	11 Dec 2023 12:21:51:000	11 Dec 2007 12:21:45:000	3.61E+08
AEGCL	1C	BIHIA_AS	BEHIATING CB 132Kv LOAD-1 BCPL_ CLOSED	11 Dec 2023 12:33:02:000	11 Dec 2007 12:32:16:000	5.58E+08
AEGCL	1C	BIHIA_AS	BEHIATING CB 132Kv LOAD-1 BCPL_ OPEN	11 Dec 2023 12:46:48:000	11 Dec 2007 12:46:40:000	9.94E+08
NAGALD	1C	KOHIM_NA	KOHIMA CB 132Kv LINE-1 TO DIMAP CLOSED	11 Dec 2023 15:15:10:000	11 Dec 2007 15:14:57:000	3.57E+08
AEGCL	1C	NALBA_AS	NALBARI CB 132Kv LOAD RLWAY OPEN	11 Dec 2023 16:29:45:000	11 Dec 2007 16:24:01:000	3.3E+08

Annexure 2: PMU snapshot 132 kV Dimapur(PG)-Kohima Line for Dimapur(PG) end

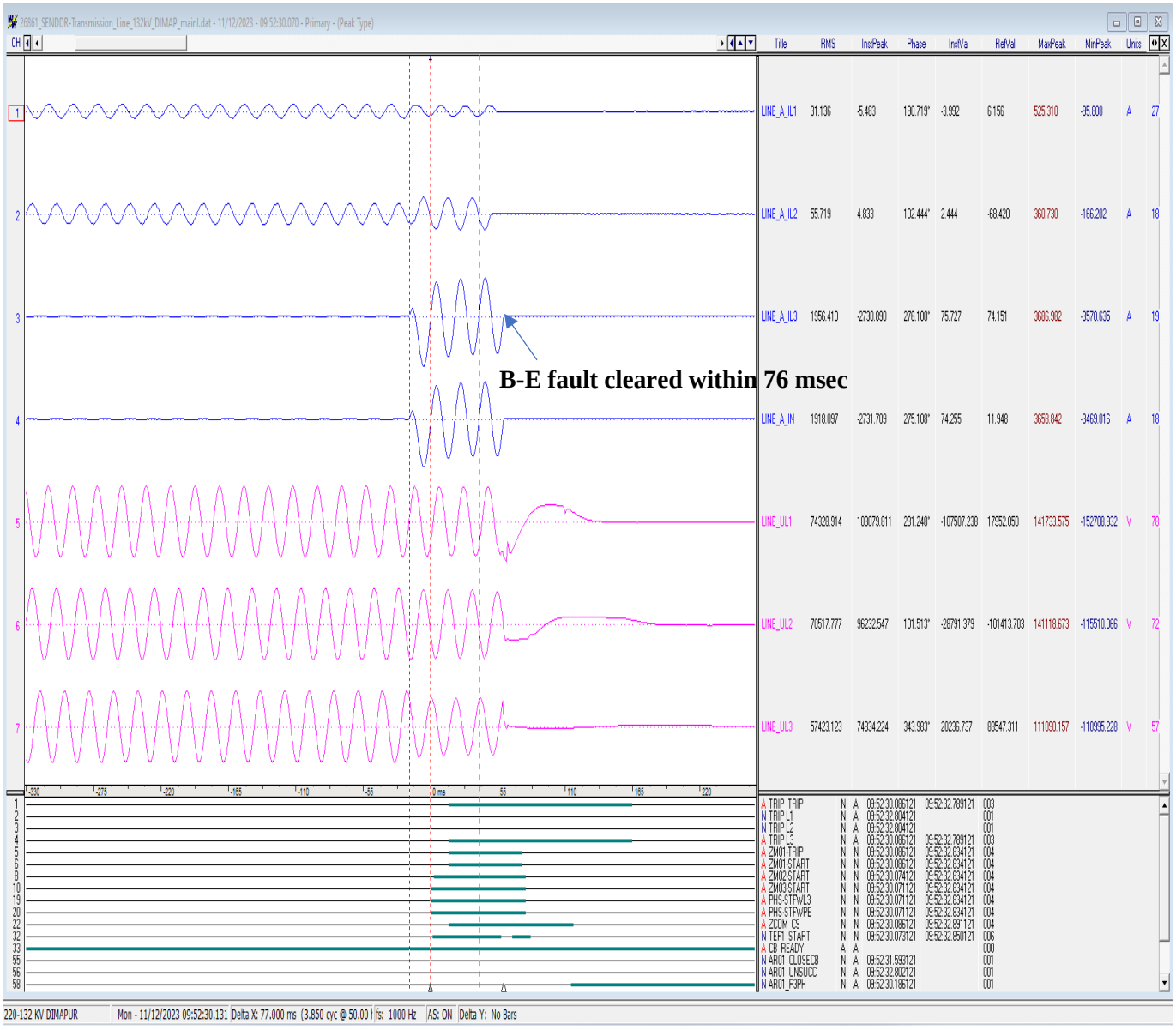
R Y B Phase Current



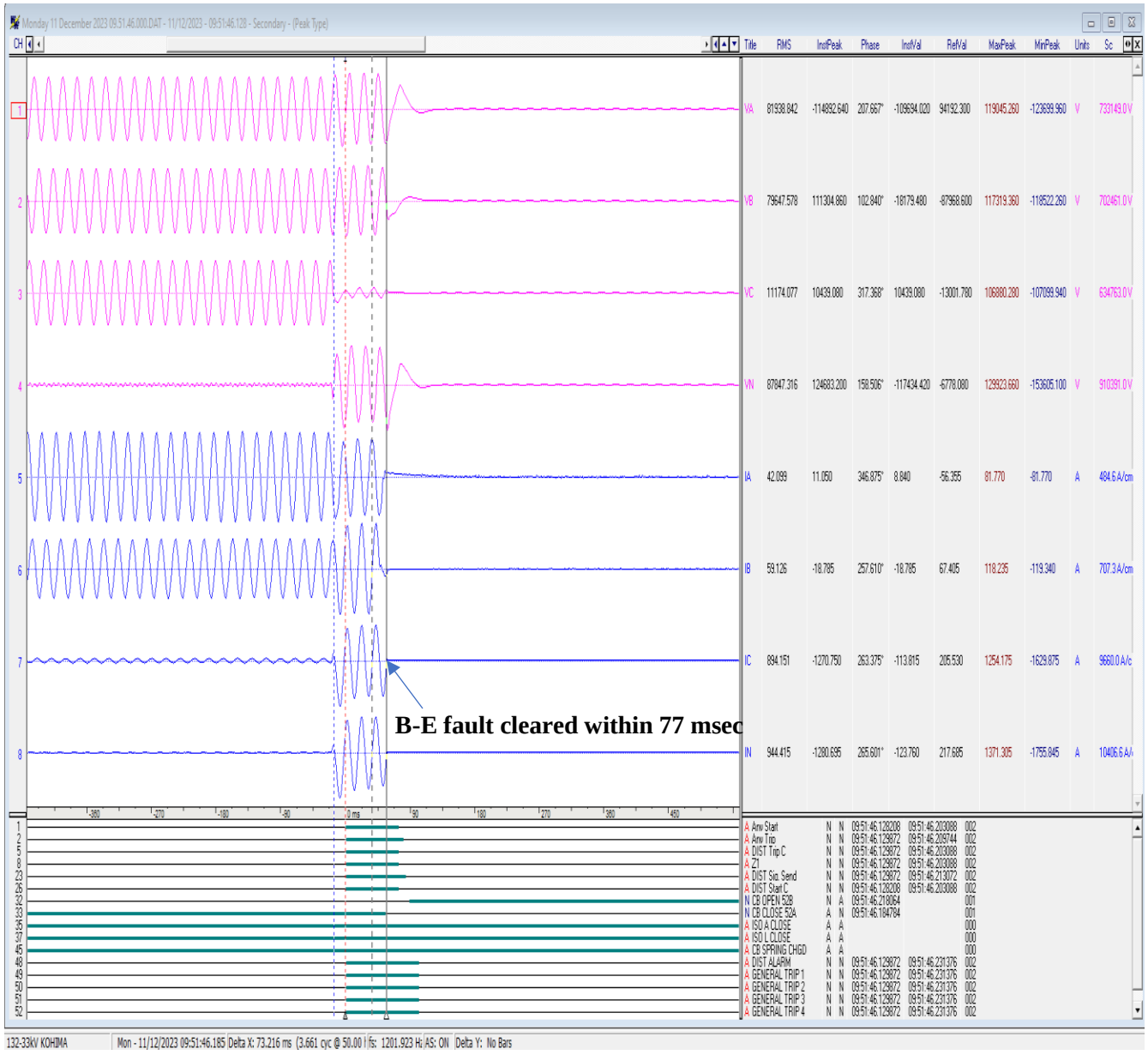
Annexure 3: SLD of the effected S/S

Annexure 4: Disturbance recorder snips showing faults and digital signals

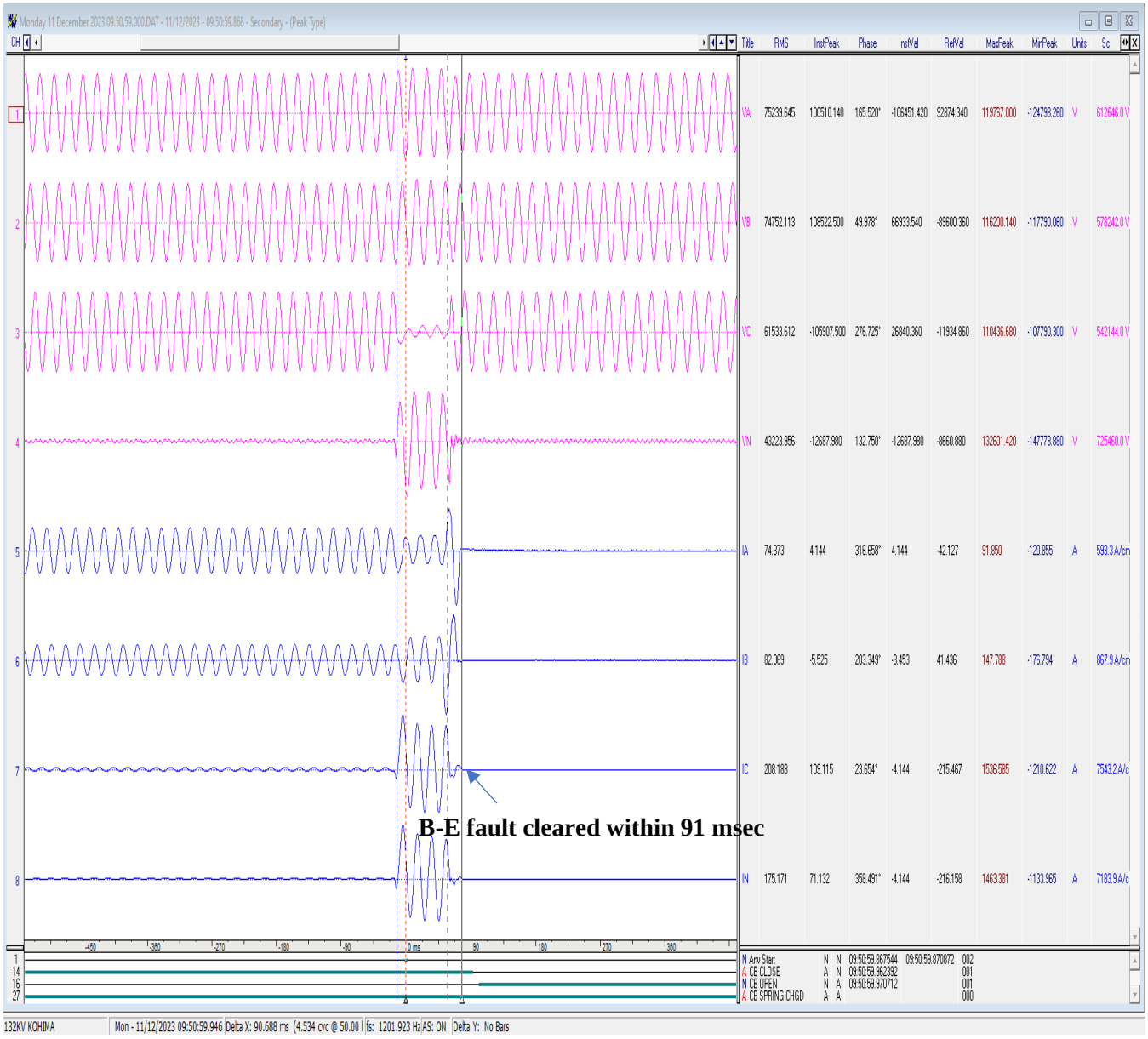
4.1. DR Snapshot of Dimapur(PG) for 132 kV Dimapur(PG)-Kohima line



4.2. DR Snapshot of Kohima for 132 kV Dimapur(PG)-Kohima line



4.3. DR snapshot of Kohima for 132 kV Kohima-Karong line



ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
उत्तर पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / North Eastern Regional Load Despatch Centre
कार्यालय : लोवर, लापालांग, शिलांग -793006
Office : Lower Nongrah, Lapalang, Shillong- 793006
CIN : U40105DL2009GOI188682, Website : www.nerldc.in, E-mail : nerldc@grid-india.in, Tel.: 0364-2537470/427, Fax: 03642537486

Detailed Report of Near Miss incident in Kopili S/S of North Eastern Region
(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))
(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date (दिनांक)**: 29-12-2023**

1. **Event Summary (घटना का सारांश):**

Kopili Substation of NEEPCO Power System is connected with the rest of the grid by 220 kV Misa-Kopili I, II & III and 220/132 kV ICT-I & II.

At 16:58 Hrs of 13.12.2023, Bus Bar protection operated at 220 kV Kopili Bus-II as a result of which all the elements connected to Bus-II tripped leading to near miss incident at Kopili area of NEEPCO Power system.

2. **Time and Date of the Event (घटना का स मय और दिनांक):** 16:58 Hrs on 13-12-2023
3. **Event Category** (ग्रिड **घटना का प्रकार**)**:** Near Miss
4. **Location/Control Area** (स्थान/नियंत्रण क्षेत्र): Kopili HEP of NEEPCO
5. **Antecedent Conditions (पूर्ववर्ती स्थिति)**:

	Frequency in Hz	Regional Generation(MW)	Regional Demand(MW)	ISGS Generation(MW)	ISTS Licensee (in kV)
Pre-Event (घटना पूर्व)	50.06	2732	2470	100	222
Post Event (घटना के बाद)	50.06	2807	2508	50	222

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (before the even))महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है(	Kopili Unit-I under forced outage
Weather Condition (मौसम स्थिति)	Normal

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss of 50 MW at Kopili.

   There was no load loss.

7. **Duration of interruption (रुकावट की अवधि):**

8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा)**

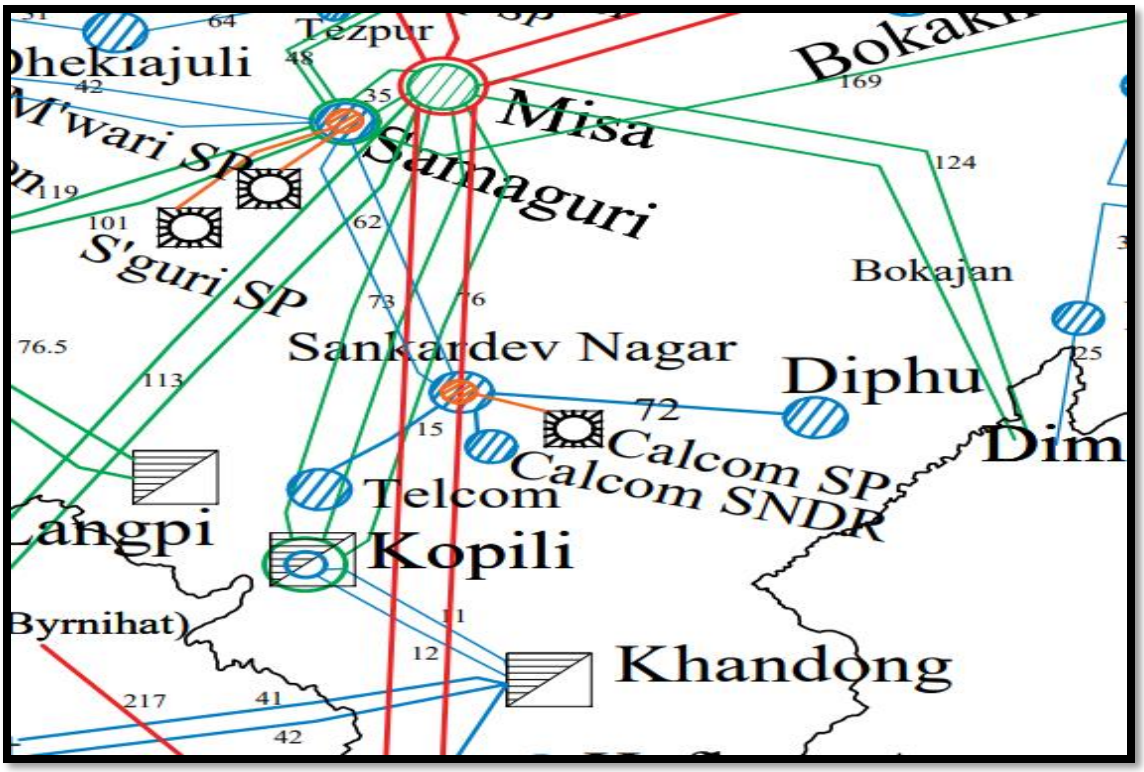


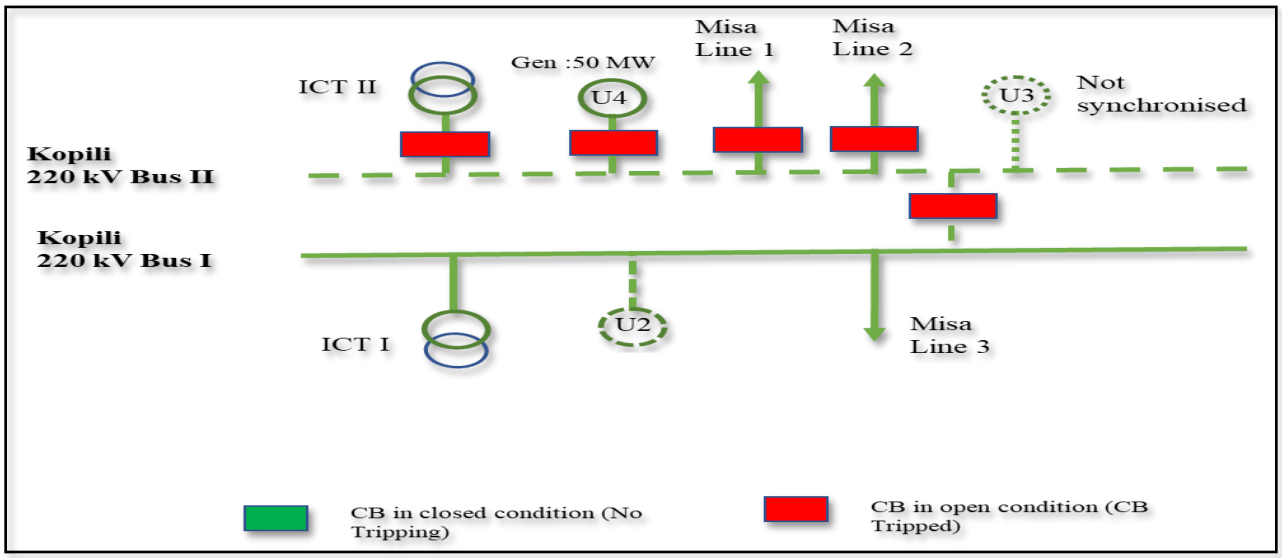
Figure 1: Network across the affected area

9. **Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): NIL**

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

Sl. No.	नाम	Trip time (hh:mm:ss)	Restoration time	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत
1	Kopili Unit-IV	16:58	19:58	Bus Bar protection operated	
2	220 kV Misa-Kopili I	16:58	19:53	DT recieved	Bus Bar protection operated
3	220 kV Misa-Kopili II	16:58	20:12	DT recieved	Bus Bar protection operated
4	220/132 kV ICT-II at Kopili	16:58	21:54	Bus Bar protection operated	
5	220 kV Bus Coupler at Kopili	16:58	-		

11. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):



As per the PMU snap of Kopili SS, Y-phase fault initiated at 16:58:53.44 Hrs and cleared at 16:58:53.56 Hrs. Fault current of 200 A appears in Y-phase.

As per information received from NEEPCO, breaker failure was initiated from Kopili Unit-III although circuit breaker was in open condition. As a result of which Bus Bar protection operated at Kopili causing tripping of all the elements connected to Bus-II of Kopili.

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- As per information from NEEPCO, CB pole of Kopili Unit-III got stuck due to which LBB got initiated leading to near miss incident at Kopili S/S. The exact reason and action taken may be shared.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- Power was extended to 220 kV Kopili Bus-II by charging 220 kV Misa-Kopili I at 19:53 Hrs. Subsequently, all other elements were charged.
- CB pole of Kopili Unit-III was replaced after the event as reported.

14. Non-compliance observed (विनियमन का गैर-अनुपालन):

Sl.No.	Issues	Regulation Non-Compliance	Utilities
1.	**Flash Report received within 8hrs?**	IEGC section 37.2 (b)	**NEEPCO**
2.	**Whether DR/EL provided within 24 Hours?**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**NEEPCO**
3.	**Detailed Report received within 7 days?**	IEGC section 37.2 (e)	**NEEPCO**
4.	**DR Time Synchronization Issues**	IEGC section 17.3	No violation
5.	**Any other non-compliance**		

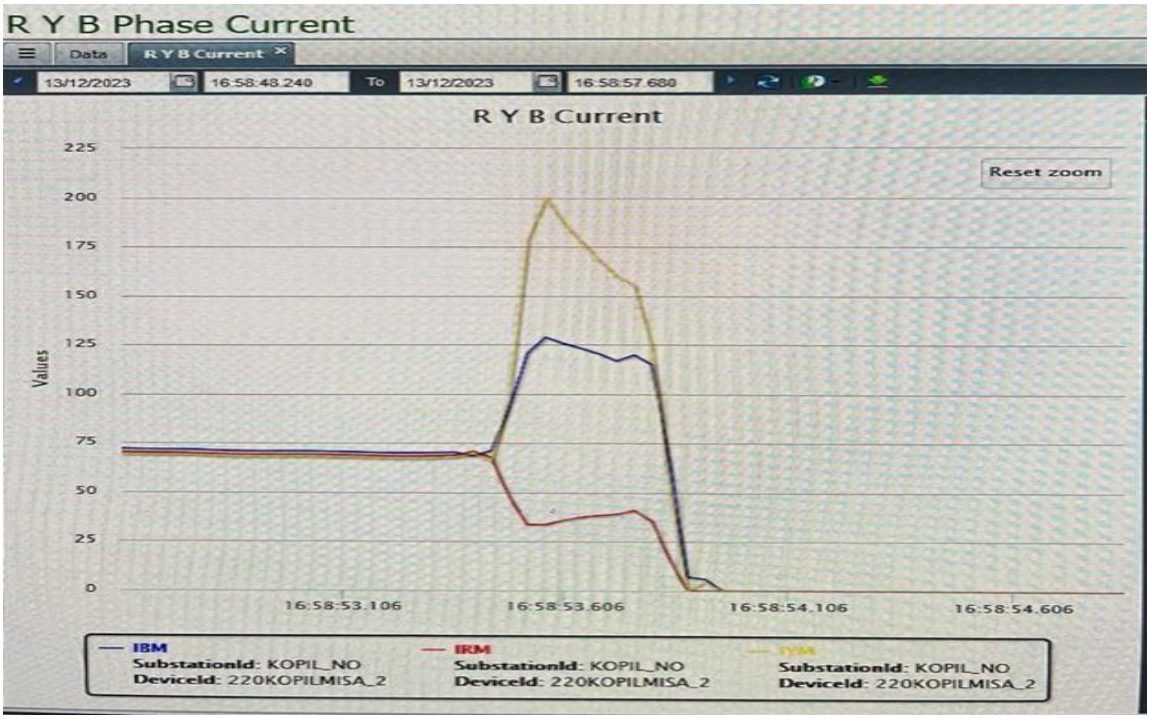
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु):

Healthiness of switchgear equipment and protection system needs to be checked regularly.

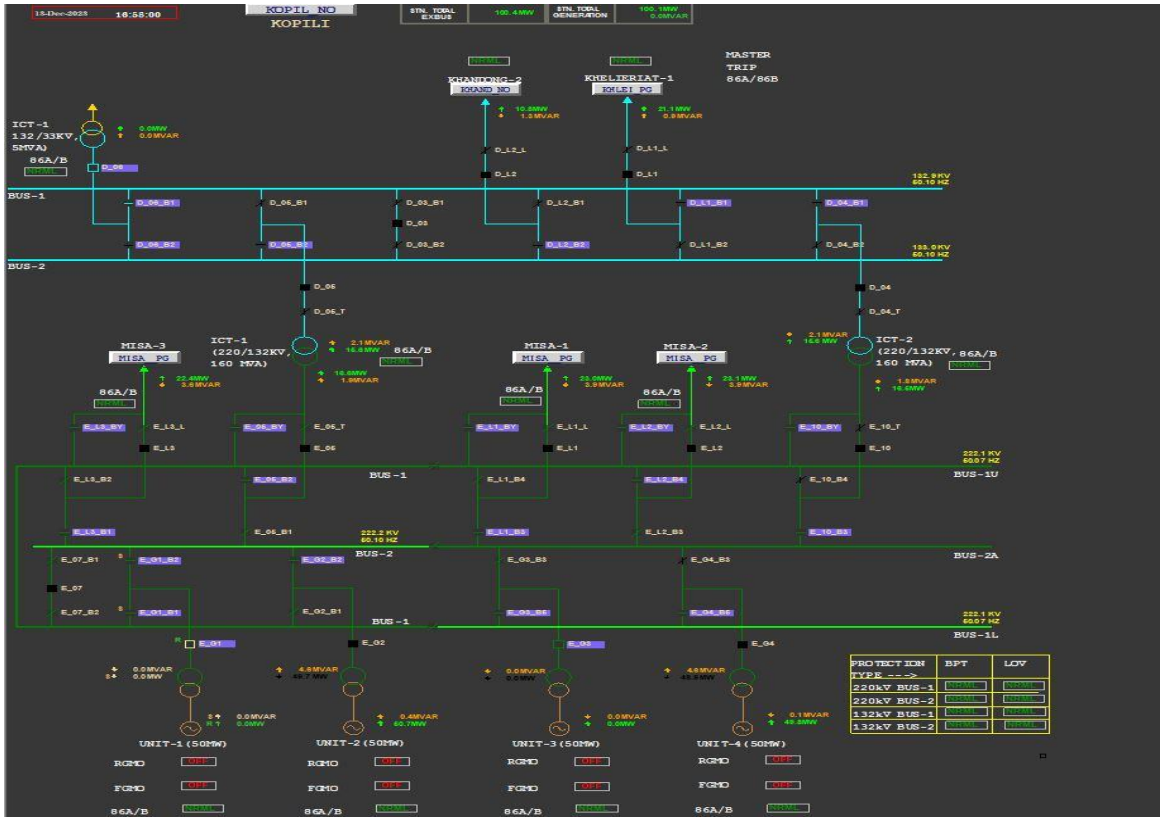
Annexure 1: Sequence of Events as per SCADA

AREA	CATEGORY	LOCATION	TEXT	SYSTEM_TIME	FIELD_TIME	MS
AEGCL	1C	BALIP_PG	BALIPARA CB CB BW BNC 4 & BONGA 2 CLOSED	13 Dec 2023 16:54:49:000	13 Dec 2023 16:54:47:000	4.77E+08
MEECL	1C	GANOL_ME	GANOL SHEP CB 132 KV UNIT (H02) CLOSED	13 Dec 2023 16:55:34:000	13 Dec 2023 16:55:29:000	7.23E+08
ARUNCH	1C	RANGA_NO	PANYOR CB 11 KV UNIT (H03) CLOSED	13 Dec 2023 16:57:11:000	13 Dec 2023 16:57:08:000	6.15E+08
MEECL	1C	LESKA_ME	LESKA CB 132 KV UNIT (H02) CLOSED	13 Dec 2023 16:57:35:000	13 Dec 2023 16:57:25:000	3.93E+08
AEGCL	1C	KOPIL_NO	KOPILI CB 220/132 T1 (PRIM) OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:53:000	9.5E+08
AEGCL	1C	KOPIL_NO	KOPILI CB 220 KV COUPLER (07) OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:53:000	9.5E+08
AEGCL	1C	MISA__PG	MISA CB 220Kv LINE-1 TO KOPIL OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:53:000	8.8E+08
AEGCL	1C	MISA__PG	MISA CB 220Kv LINE-2 TO KOPIL OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:53:000	8.84E+08
AEGCL	1C	KOPIL_NO	KOPILI CB 11 KV UNIT (H04) OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:54:000	4.5E+08
AEGCL	1C	KOPIL_NO	KOPILI CB 220Kv LINE-1 TO MISA_ OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:54:000	29000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220Kv LINE-2 TO MISA_ OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:54:000	49000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220/132 T2 (SEC) OPEN	13 Dec 2023 16:58:55:000	13 Dec 2023 16:58:54:000	49000000
AEGCL	1C	MIRZA_AS	MIRZA CB 400/220/33 T3 (SEC) CLOSED	13 Dec 2023 17:01:04:000	13 Dec 2023 17:00:54:000	5.8E+08
ARUNCH	1C	KMENG_NO	KAMENG CB 11 KV UNIT (G03) CLOSED	13 Dec 2023 17:02:16:000	13 Dec 2023 17:02:07:000	4.6E+08
NAGALD	1C	DOYAN_NO	DOYANG CB 11 KV UNIT (H01) CLOSED	13 Dec 2023 17:02:41:000	13 Dec 2023 17:02:37:000	2.97E+08

Annexure 2: PMU snapshot 220 kV Misa-Kopili I Line for Kopili end

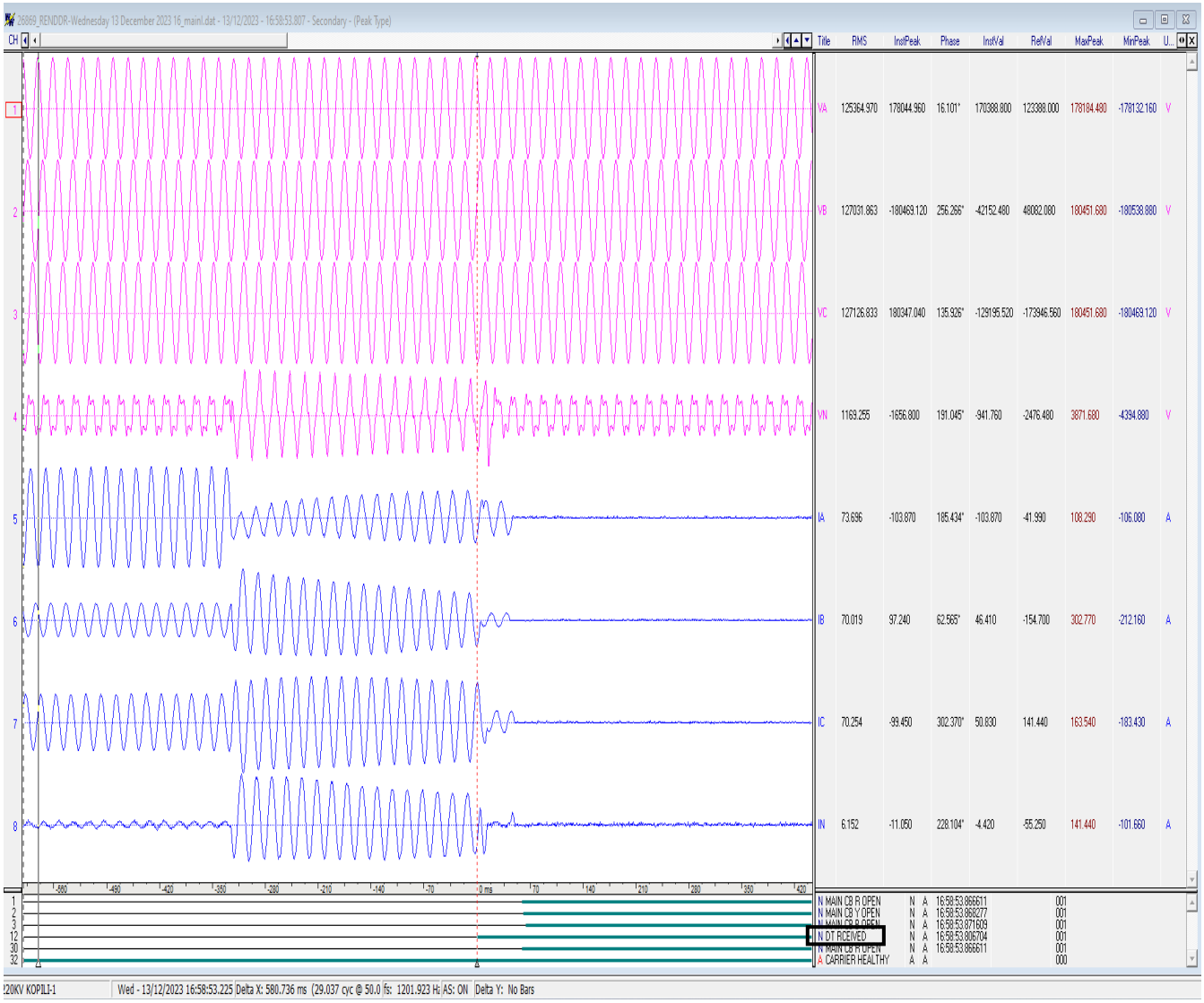


Annexure 3: SLD of the effected Substation

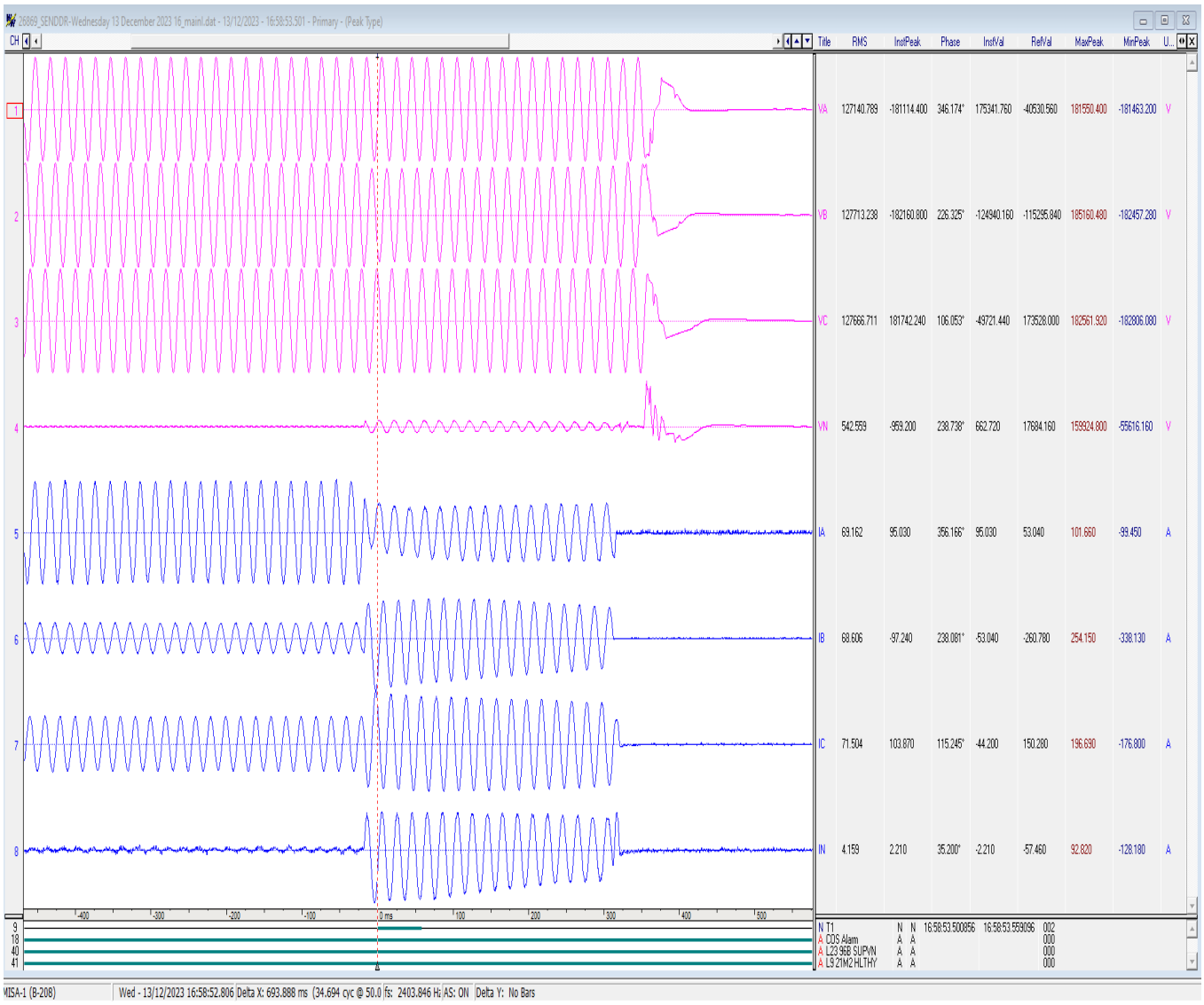


Annexure 4: Disturbance recorder snips showing faults and digital signals

4.1. DR Snapshot of Misa for 220 kV Misa-Kopili I line



4.2. DR Snapshot of Kopili from 220 kV Misa-Kopili I line



ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
उत्तर पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / North Eastern Regional Load Despatch Centre
कार्यालय : लोवर, लापालांग, शिलांग -793006
Office : Lower Nongrah, Lapalang, Shillong- 793006
CIN : U40105DL2009GOI188682, Website : www.nerldc.in, E-mail : nerldc@grid-india.in, Tel.: 0364-2537470/427, Fax: 03642537486

Detailed Report of Grid Disturbance in Kopili S/S of North Eastern Region
(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))
(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date (दिनांक)**: 28-12-2023**

1. **Event Summary (घटना का सारांश):**

Kopili Substation of NEEPCO Power System is connected with the rest of the grid by 220 kV Misa-Kopili I, II & III and 220/132 kV ICT-I & II.

At 16:31 Hrs of 14.12.2023, LBB protection operated at 220 kV Kopili as a result of which all the elements connected to Bus-I & II tripped along with bus coupler. Due to tripping of these elements, 220 kV Kopili S/S of NEEPCO Power system got separated from rest of the grid due to load generation mismatch in this area.

2. **Time and Date of the Event (घटना का स मय और दिनांक):** 16:31 Hrs on 14-12-2023
3. **Event Category** (ग्रिड **घटना का प्रकार**)**:** GD-I
4. **Location/Control Area** (स्थान/नियंत्रण क्षेत्र): Kopili area of NEEPCO
5. **Antecedent Conditions (पूर्ववर्ती स्थिति)**:

	Frequency in Hz	Regional Generation(MW)	Regional Demand(MW)	ISGS Generation(MW)	ISTS Licensee (in kV)
Pre-Event (घटना पूर्व)	49.99	2191	2253	50	222
Post Event (घटना के बाद)	49.99	2147	2268	0	0

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (before the even))महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है(	Kopili Unit-I under forced outage
Weather Condition (मौसम स्थिति)	Normal

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss of 50 MW at Kopili.

   There was no load loss.

7. **Duration of interruption (रुकावट की अवधि): 1 hour 46 min**

8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा)**

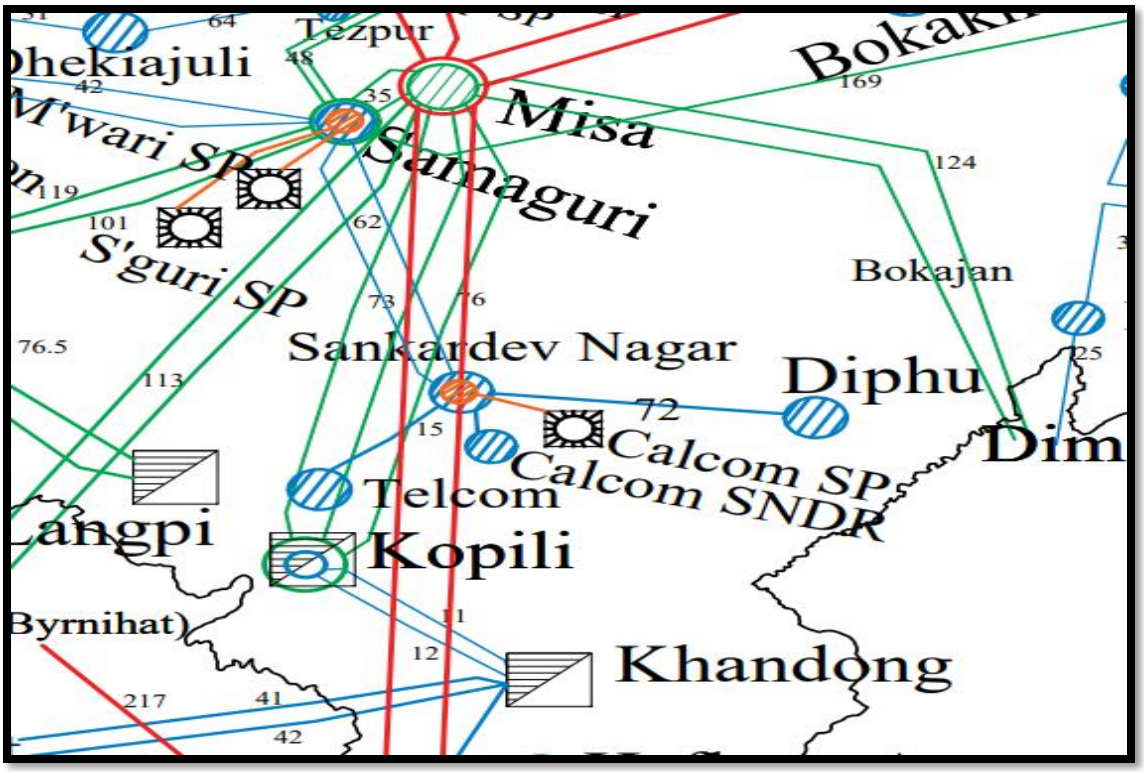


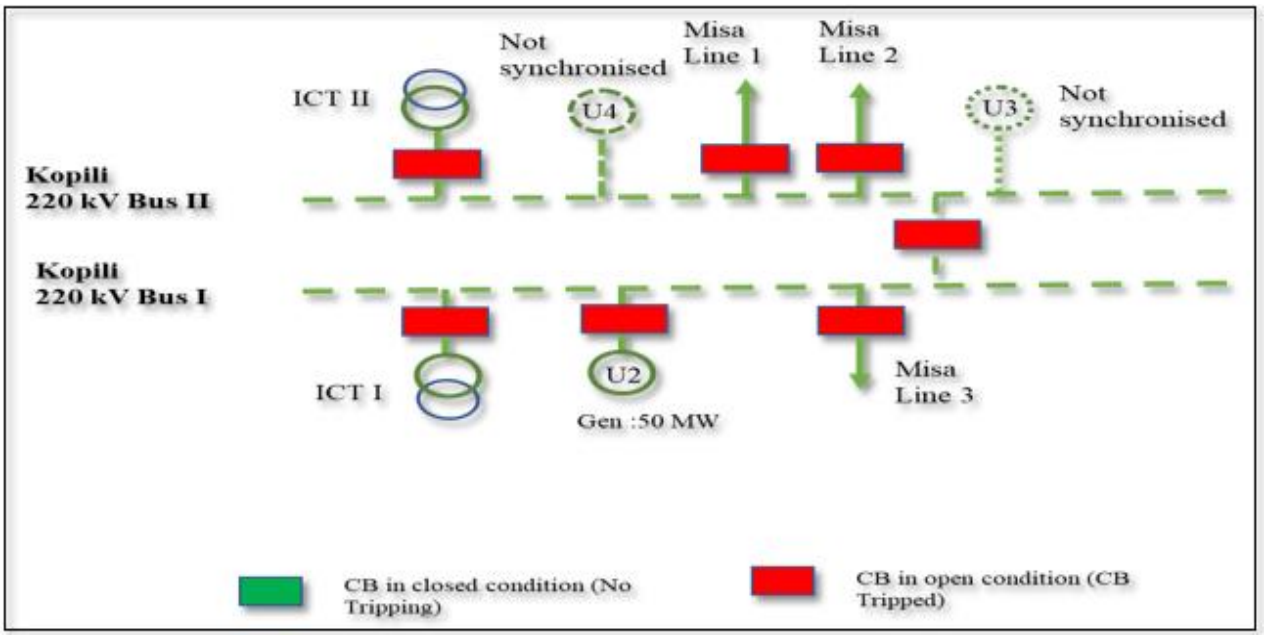
Figure 1: Network across the affected area

9. **Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): NIL**

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

Sl. No.	नाम	Trip time (hh:mm:ss)	Restoration time	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत
1	Kopili Unit-II	16:31	17:54	Over frequency	Not applicable
2	220 kV Misa-Kopili I	16:31	17:22	DT recieved	DP, ZI
3	220 kV Misa-Kopili II	16:31	17:52	DT recieved	DP, ZI
4	220 kV Misa-Kopili III	16:31	17:30	DT recieved	DP, ZIII
5	Bus Coupler at Kopili	16:31	17:33	LBB protection operated at Kopili	
6	Kopili Unit-IV	16:31	17:39		
7	220/132 kV ICT-I at Kopili	16:31	18:33		
8	220/132 kV ICT-II at Kopili	16:31	18:48		

11. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):



As per the PMU snap of Kopili SS, Y-phase fault initiated at 16:31:23.64 Hrs and cleared at 16:31:24.76 Hrs. Fault current of 241 A appears in Y phase.

As per DR analysis, Y-E fault initiated at 16:31:23.683 Hrs and cleared within 336 msec from Kopili end on operation of LBB protection. Y-phase current of 234 A was observed. DT received at Misa end for 220 kV Misa-Kopili I, II & III lines.

As per information received from NEEPCO, Kopili Unit-III tripped on Overcurrent, Out of step. Also, breaker failure was initiated from Kopili Unit-III although circuit breaker was in open condition. As a result of which LBB initiated at Kopili causing tripping of all the elements connected to Bus-I & II of Kopili. Kopili Unit-II tripped on operation of 2nd Stage Over frequency.

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- As per information from NEEPCO, CB pole of Kopili Unit-III got stuck due to which LBB got initiated leading to blackout of Kopili S/S. The exact reason and action taken may be shared.
- Tripping of 220 kV Bus-1 seems to be mis-operation as Kopili Unit-3 was connected with 220 kV Bus-II. It needs to be checked by Kopili, NEEPCO.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- Power was extended to 220 kV Kopili S/S by charging 220 kV Misa-Kopili I at 17:22 Hrs.
- CB pole of Kopili Unit-III was replaced after the event as reported

14. Non-compliance observed (विनियमन का गैर-अनुपालन):

Sl.No.	Issues	Regulation Non-Compliance	Utilities
1.	**Flash Report received within 8hrs?**	IEGC section 37.2 (b)	**NEEPCO**
2.	**Whether DR/EL provided within 24 Hours?**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**NEEPCO**
3.	**Detailed Report received within 7 days?**	IEGC section 37.2 (e)	**NEEPCO**
4.	**DR Time Synchronization Issues**	IEGC section 17.3	No violation
5.	**Any other non-compliance**		

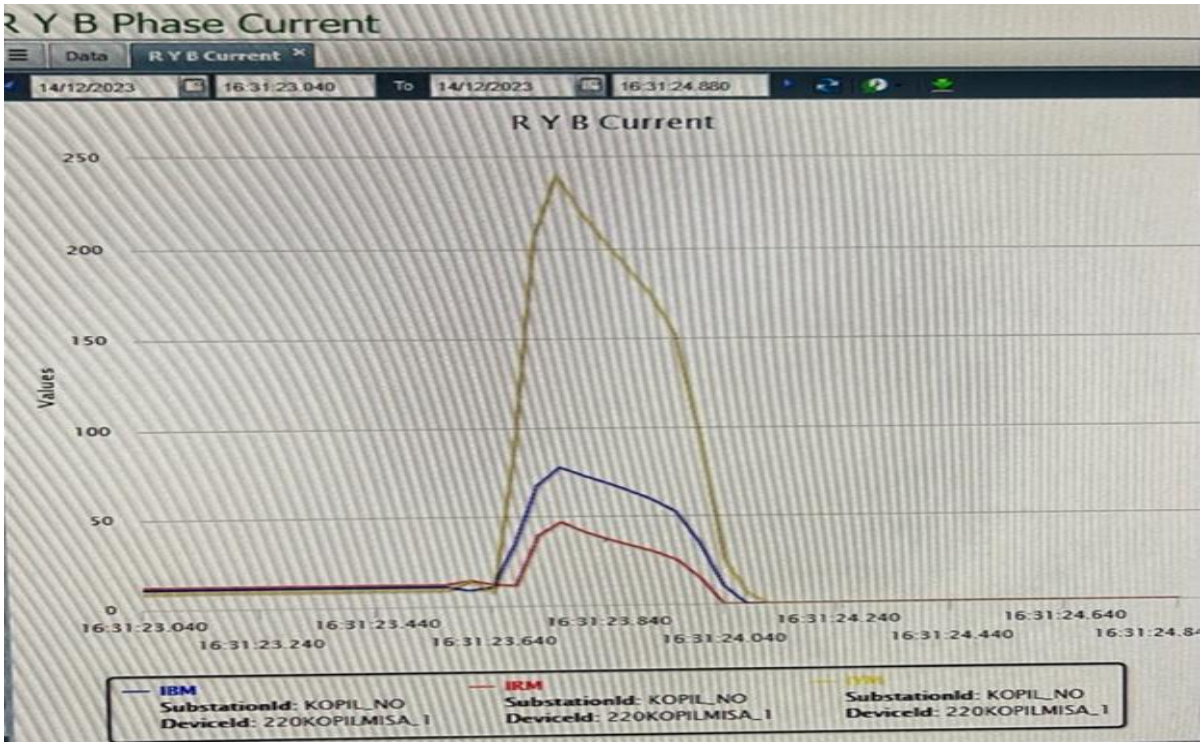
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु):

Healthiness of switchgear equipment and protection system needs to be checked regularly.

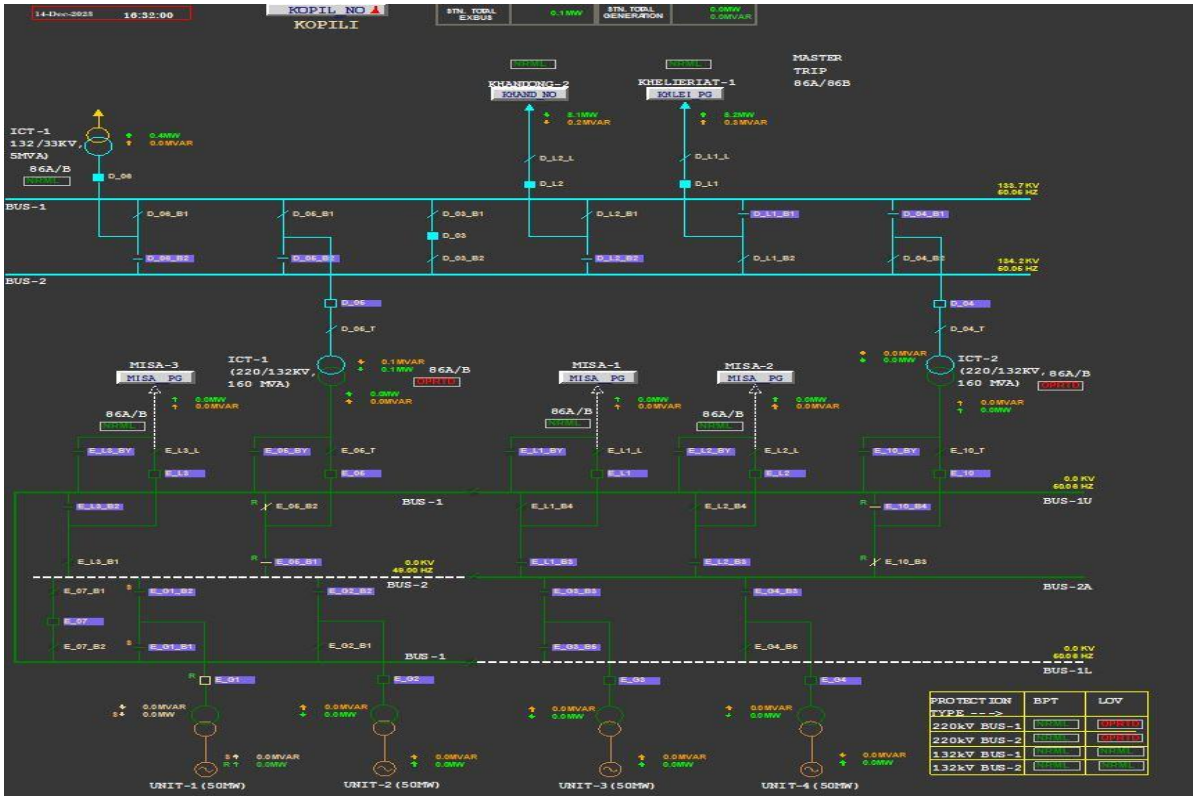
Annexure 1: Sequence of Events as per SCADA

AREA	CATEGORY	LOCATION	TEXT	SYSTEM_TIME	FIELD_TIME	MS
---	---	---	---	---	---	---
AEGCL	1C	HAILA_AS	HAILAKANDI CB 132Kv LINE-2 TO SILCR CLOSED	14 Dec 2023 17:05:49:000	14 Dec 2023 16:28:09:000	205000000
ARUNCH	1C	RANGA_NO	PANYOR CB 400/132 T4 (PRIM) CLOSED	14 Dec 2023 16:28:19:000	14 Dec 2023 16:28:18:000	95000000
ARUNCH	1C	RANGA_NO	PANYOR CB 400/132 T4 (SEC) CLOSED	14 Dec 2023 16:29:38:000	14 Dec 2023 16:29:38:000	74000000
AEGCL	1C	MISA__PG	MISA CB 220Kv LINE-1 TO KOPIL OPEN	14 Dec 2023 16:31:26:000	14 Dec 2023 16:31:24:000	80000000
AEGCL	1C	MISA__PG	MISA CB 220Kv LINE-2 TO KOPIL OPEN	14 Dec 2023 16:31:26:000	14 Dec 2023 16:31:24:000	77000000
AEGCL	1C	MISA__PG	MISA CB 220Kv LINE-3 TO KOPIL OPEN	14 Dec 2023 16:31:26:000	14 Dec 2023 16:31:24:000	288000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220/132 T1 (PRIM) OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220 KV COUPLER (07) OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220/132 T2 (PRIM) OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 11 KV UNIT (H02) OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220Kv LINE-1 TO MISA_ OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220Kv LINE-2 TO MISA_ OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220Kv LINE-3 TO MISA_ OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220/132 T2 (SEC) OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
AEGCL	1C	KOPIL_NO	KOPILI CB 220/132 T1 (SEC) OPEN	14 Dec 2023 16:31:28:000	14 Dec 2023 16:31:26:000	529000000
MSPCL	1C	LOKTA_NH	LOKTAK CB 11 KV UNIT (H01) CLOSED	14 Dec 2023 16:32:05:000	14 Dec 2023 16:31:39:000	783000000
NAGALD	1C	DOYAN_NO	DOYANG CB 11 KV UNIT (H03) CLOSED	14 Dec 2023 16:31:57:000	14 Dec 2023 16:31:51:000	502000000
AEGCL	1C	BONGA_PG	BONGAIGAON CB MAIN CB 50 MVAR BR 2 BETW	14 Dec 2023 16:32:35:000	14 Dec 2023 16:32:30:000	426000000

Annexure 2: PMU snapshot 220 kV Misa-Kopili I Line for Kopili end

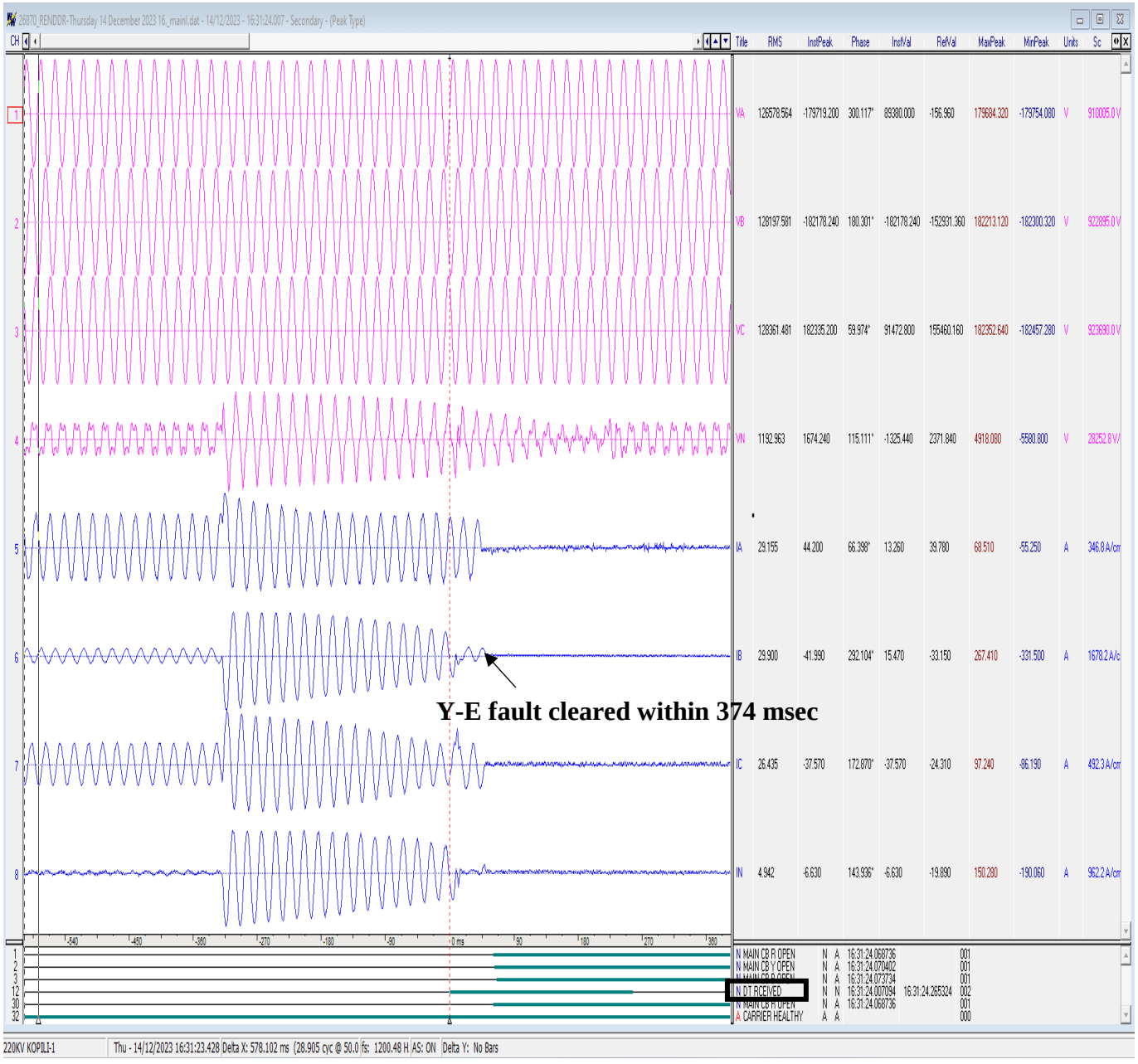


Annexure 3: SLD of the effected Substation

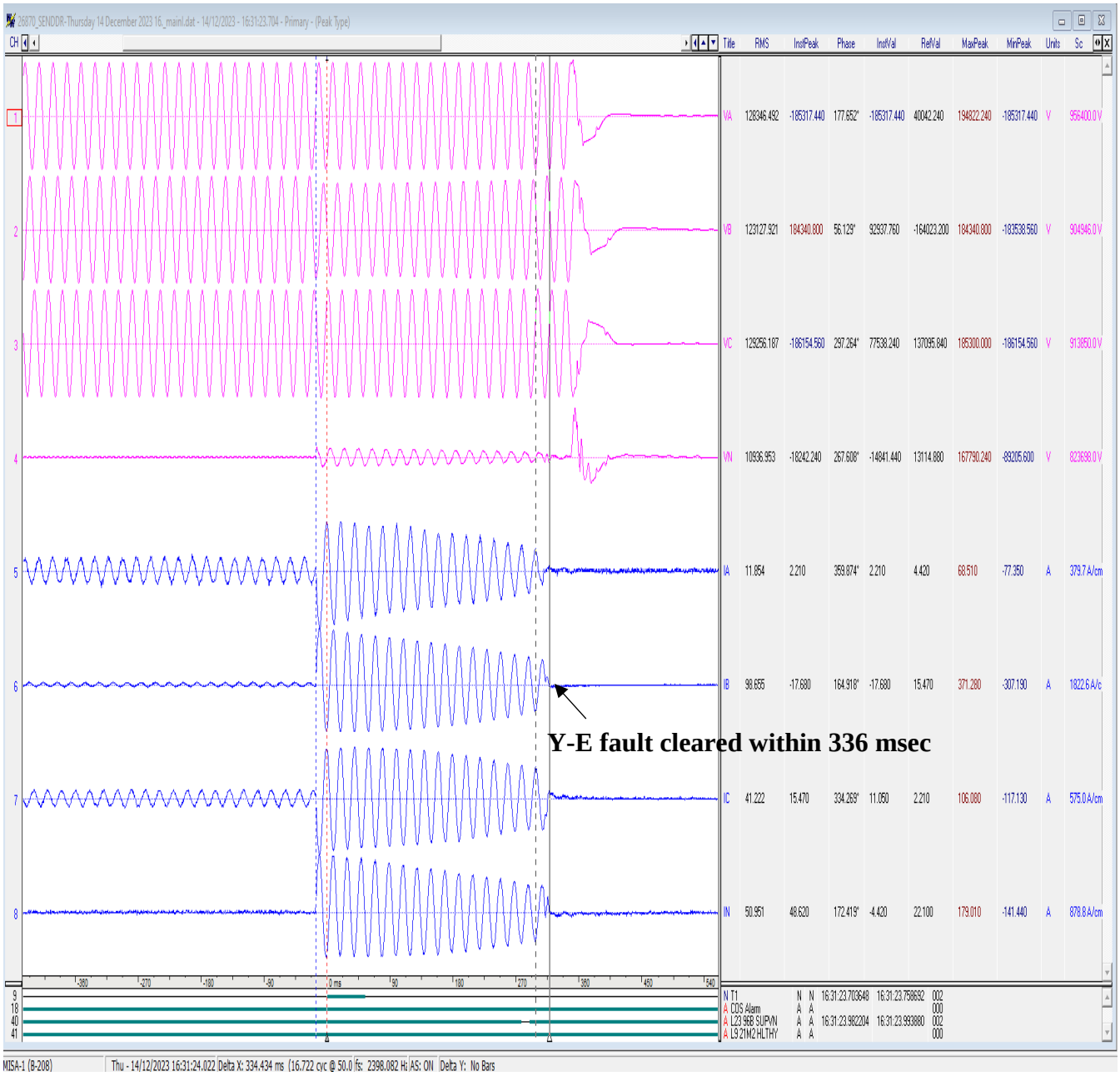


Annexure 4: Disturbance recorder snips showing faults and digital signals

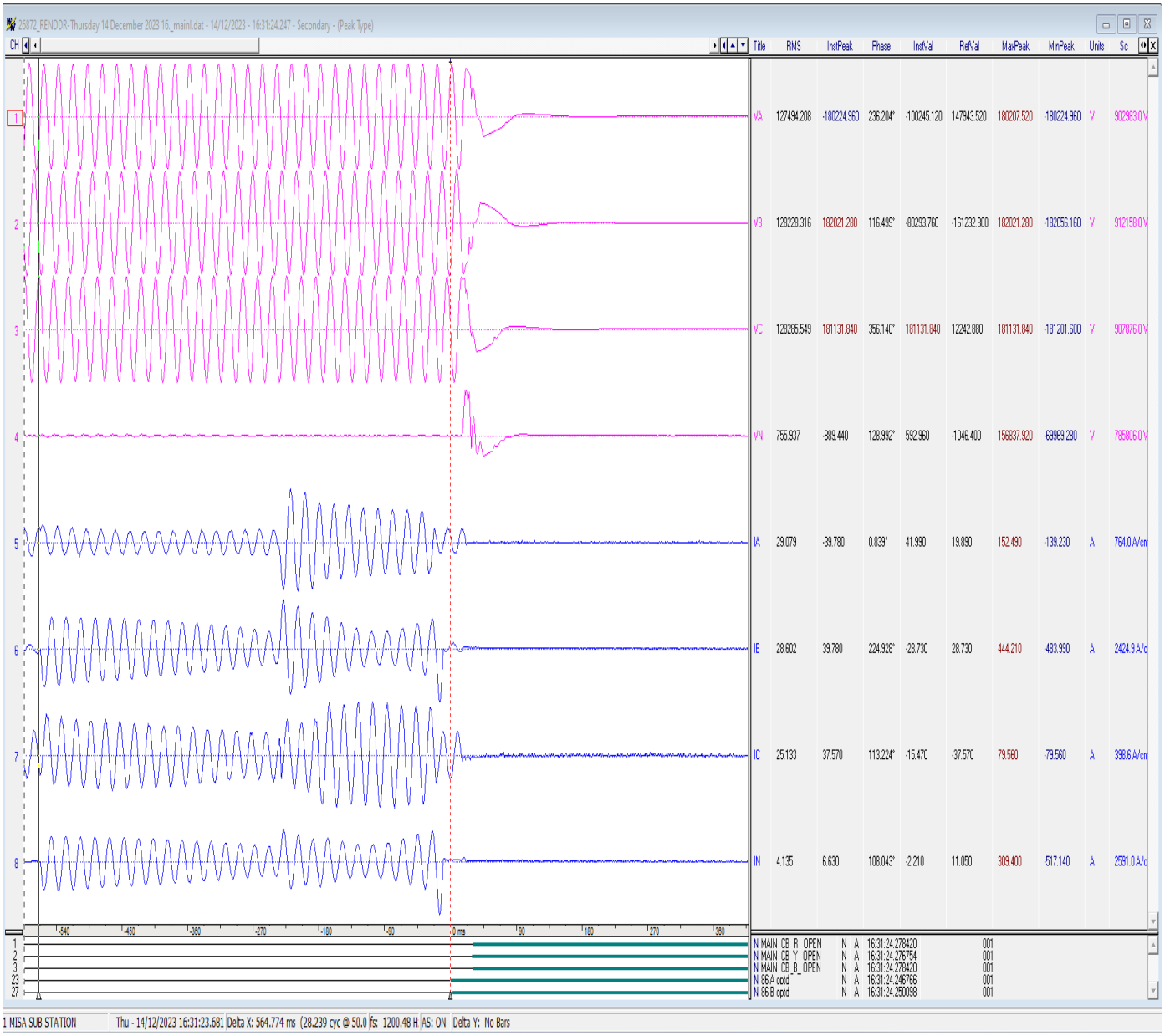
4.1. DR Snapshot of Misa for 220 kV Misa-Kopili I line



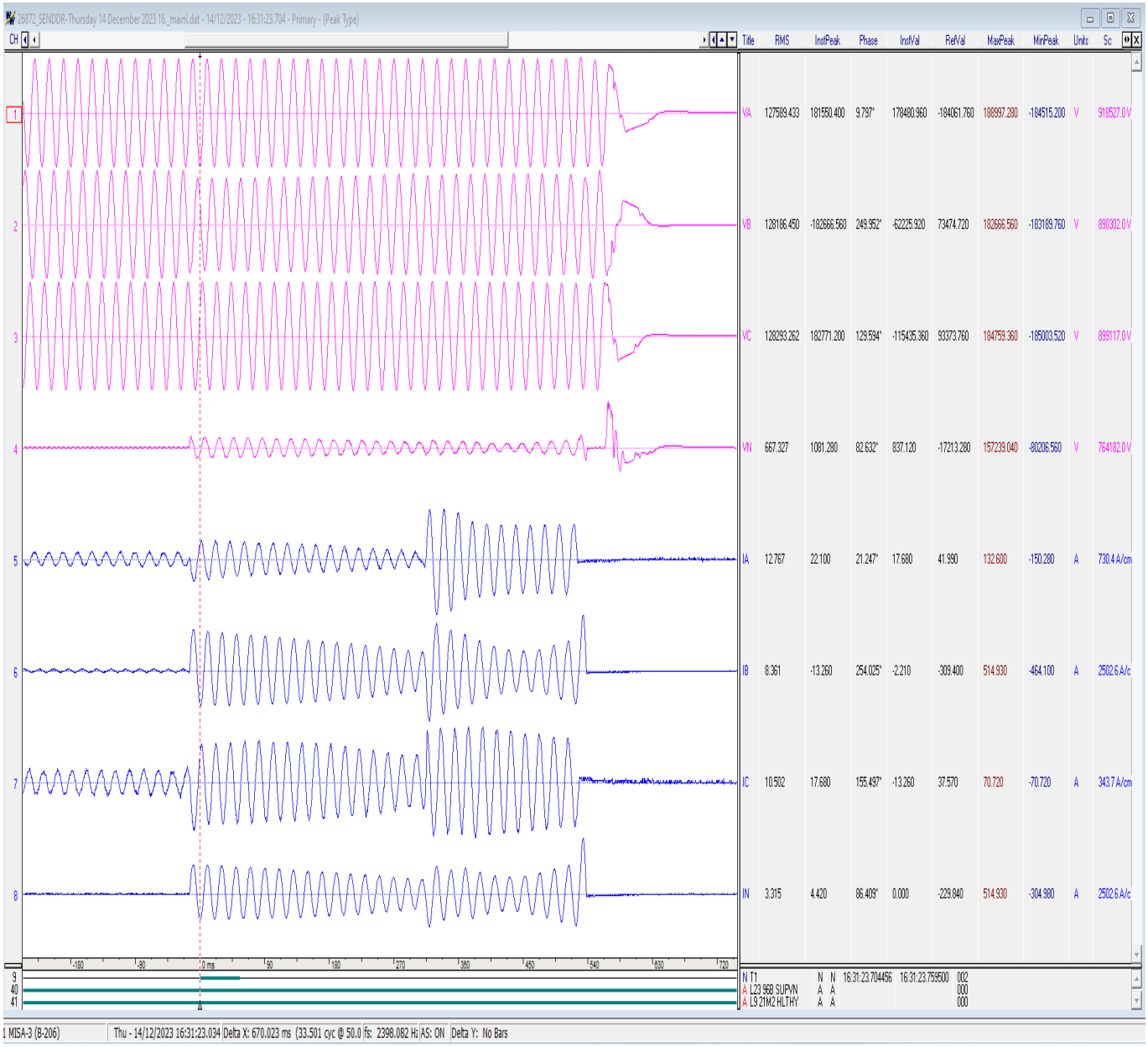
4.2. DR Snapshot of Kopili from 220 kV Misa-Kopili I line



4.3. DR snapshot of Misa for 220 kV Misa-Kopili III line



4.4. DR snapshot of Kopili for 220 kV Misa-Kopili III line



Annexure 1: Patrolling Report of POWERGRID for the month of November, 2023

1.1. 400 kV Silchar-Imphal II Line: Tripped on 04.11.2023

CHECK LIST FOR POST FAULT PATROLLING OF POWERGRID TRANSMISSION LINE

Name of Transmission Line:	400KV Silchar-Imphal-II	Tripping date :	04.11.2023
Type of Tower: Single Circuit	(Suspension/Tension) Tension	Tripping Time :	16:19 hrs
Location Patrolled	415-425	Line restored (Date) :	04.11.2023
Date of Post Fault Patrolling:	05.11.2023	Line restored (Time) :	17:05 hrs
Actual Fault Location:	420-421	Off Line fault locator Distance :	~~Taken/No taken /NA~~
Actual Fault Distance:	20.69 KM from Imphal	Signature Analysis -	~~Taken/No taken /NA~~
Relay Distance –Main #1-	24.26 KM, R-Ph, Z-1 (Imphal end)	Weather report –	Sunny
Main#2	21.9 Km, R-Ph, Z-1 (Imphal end)	Conductor Config.(Ph.) =Top	Y Middle B Bottom R (D/C)
		OR =One side (Top___ Bottom___) other side __	(S/C)

Sl. No.	Particulars	CKT#1	CKT#2
1	Damaged/Missing Counter poise earthing (Yes/No)	N/A	N/A
2	Value of Tower Footing Impedance (Ohm)	N/A	N/A
3	Clearance between bottom conductor & vegetation in ROW (m)	N/A	9.4
4	Side clearance of conductors from nearby tall object (tree, small hill, building, etc)near to ROW (m)	N/A	N/A
5	Vertical clearance between conductors at maximum sag (m)	N/A	7.9
6	Clearance between earth wire/OPGW & top conductor (m)	N/A	10.8
7	Minimum clearance of jumper from tower body (m)	N/A	N/A
8	Maximum value of jumper drop (m)	N/A	N/A
9	Presence of pilot insulator & counter weight on jumpers (Yes/No)	N/A	N/A
10	Clearance of bottom conductor from power line crossing (under crossing) (m)	N/A	N/A
11	Clearance of top conductor from earth wire of power line crossing (overhead crossing) (m)	N/A	N/A
12	No. of broken/ damaged insulators in each string	N/A	N/A
13	Deposition of pollutant (dirt/bird excreta/ coastal, etc) on insulator (Yes/No)	N/A	N/A
14	Flash over marks on insulator (Yes/No)	No	No
15	Result of PID scanning (if transmission line is older than 10 years and has history of flashover/decapping)	N/A	N/A
16	No. of missing/ Tilted/ broken Corona/ grading ring	0	0
17	Presence of foreign material on tower near to conductor (cross arm, insulator, earth peak, etc)	N/A	N/A
18	Missing/ disconnected copper bond/ Aluminum bond	N/A	N/A
19	Loose/ hanging bird guards	N/A	N/A
20	Loose/ Missing/ Hanging tower members	N/A	N/A

*_ High Resolution close photographs of indicated parts are to be taken during patrolling.

Observation in Patrolling - During Post fault patrolling, It is observed that an unknown person/miscreants has burnt down dry vegetation in below the R-phase conductor within the span 420-421. This is the cause of tripping on 04.11.2023. FIR copy and Photograph of residuals of burning of dry vegetation is enclosed herewith.

Patrolled by: T. Basanta Singh

Signature:

Reviewed by: N.H.Laskar

Signature:

1.2. 132 kV Dimapur-Imphal Line: Tripped on 11.11.2023

पावरग्रिड
POWERGRID

पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

No.NEDM/TL/GEN/32/ 75

Date:-13.11.2023

To
The Officer-in-charge
Zubza Police Station
Zubza,Kohima,Nagaland

Sub: Intimation of line tripping due to felling of Trees between Loc. 380-381 of 132 KV S/C Imphal-Dimapur Transmission Line.

Sir,

You are kindly aware that Power Grid Corporation of India Limited (A Govt. of India Enterprise and MAHARATNA) is engaged in effective transmission of Power in and across the regions in its Divisional office at Dimapur and is looking after the following Transmission lines beside a 220/132 kV Sub-station for supply of power to the state of Nagaland in particular and North eastern region in general .The Lines -i) 132 kV D/C Doyang-Dimapur Transmission line, ii) 132 kV S/C Imphal-Dimapur Transmission line ,iii) 220 kV Misa-Dimapur Transmission Line are traversing through the state of Nagaland.

That Sir, on 13.11.2023 , 12:33 HRS ,132 kV 132 KV S/C Imphal-Dimapur Transmission Line tripped showing following details as per Distance relay : R-Y phase fault at a distance of about 38.10 KM from Dimapur Substation end. Accordingly, Line maintenance team set out immediately on 11.06.2021 from Dimapur for patrolling of the line towards the affected section. The Patrolling team found many cut sections of big Himalu trees lying below and around adjacent areas of Location No. 380-381 of 132KV S/C Imphal-Dimapur Transmission line. There was also fresh flashover /contact spot of vegetation on the conductor. Local people also confirmed to have heard a loud crackling sound emanating from nearby the Location. The fault distance also coincides with the protective relay tripping distance.

The auto-reclose of the line caused disturbance in the Power system which further more may have caused tripping of the Line and interruption of bulk power supply to the constituents. Moreover, it may be mentioned that such type of felling of trees without proper safety measures near the live conductor and Tower location may invite various detrimental consequences as fatal incident to the person engaged in tree cutting and felling, damage/snapping of Line conductors, collapse of Line Towers.

In view of above and in the interest of uninterrupted Power supply and safeguard of precious Public property, it is our humble request to kindly look into the matter so as to prevent recurrence of such detrimental and hazardous activities.

A photograph showing the felled trees under and adjacent to the conductor of the affected location span is enclosed herewith.

Thanking you,

Yours Sincerely,

(M. Barman)
Deputy Manager, Dimapur S/S
Dimapur, Nagaland

Received 13/11/23
Officer-in-Charge
Zubza (Zubza) Police Station
Kohima : Nagaland

Copy to (i) GM , i/c. POWERGRID, Dimapur

एम. बर्मन/M. Barman
उप प्रबंधक/Dy. Manager
पावरग्रिड, दीमापुर/POWERGRID, Dimapur

220/132 के. वि. दीमापुर उपकेंद्र, फुल नागार्जन, दीमापुर (नागालैंड) - 797112, दूरभाष - 9435539231
220/132 kV Dimapur Substation, Full Nagarjan, Dimapur, (Nagaland) - 797112, Tele - 9435539231
केंद्रीय कार्यालय : "सौदामिनी", प्लाट न. 2, सेक्टर -29, गुरूग्राम - 122001 (हरियाना), दूरभाष : 0124 - 2571700 - 719
Corporate Office : "Suadamini", Plot No. - 2, Sector - 29, Gurugram - 122001 (Haryana), Tel : 0124 - 2571700 - 719
पंजीकृत कार्यालय बी - 9 कुतब इंस्टीटयूनल एरिया, कटवारिया सराय, नई दिल्ली - 0110016, दूरभाष : 011-26560112 / 26564812 , 26564892, सी आई एन L40101DL1989GO103812
Registered Office : B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi - 110016, Tel : 011-26560112 / 26564812 , 26564892, CIN :L40101DL1989GO103812
Website : www.powergridindia.com

1.3. 132 kV Loktak-Imphal Line: Tripped on 24.11.2023

CHECK LIST FOR POST FAULT PATROLLING OF POWERGRID TRANSMISSION LINE

Name of Transmission Line:	132KV Loktak-Imphal-II TL	Tripping date :	24.11.2023
Type of Tower: Single Circuit	(Suspension/Tension)	Tripping Time :	16:55 Hrs
Location Patrolled	90 to 116	Line restored (Date) :	24.11.2023
Date of Post Fault Patrolling:	24.11.2023 & 25.11.2023	Line restored (Time) :	20:30 hrs
Actual Fault Location:	111-112	Off Line fault locator Distance :	Taken/~~No taken /NA~~
Actual Fault Distance:	1.032KM from Imphal	Signature Analysis -	~~Taken~~/No taken /NA
Relay Distance –Main #1-	Imphal end :- R-Yph, Z-1, 1.15Km	Weather report –	Sunny
		Conductor Config.(Ph.) =Top	Middle Bottom (D/C)
		OR =One side (Top_Y_ Bottom_R_) other side _B (S/C)	

Sl. No.	Particulars	CKT#1	CKT#2
1	Damaged/Missing Counter poise earthing (Yes/No)	N/A	No
2	Value of Tower Footing Impedance (Ohm)	N/A	Not Measured
3	Clearance between bottom conductor & vegetation in ROW (m)	N/A	6.5
4	Side clearance of conductors from nearby tall object (tree, small hill, building, etc)near to ROW (m)	N/A	14
5	Vertical clearance between conductors at maximum sag (m)	N/A	3.8
6	Clearance between earth wire/OPGW & top conductor (m)	N/A	6
7	Minimum clearance of jumper from tower body (m)	N/A	NA
8	Maximum value of jumper drop (m)	N/A	NA
9	Presence of pilot insulator & counter weight on jumpers (Yes/No)	N/A	NO
10	Clearance of bottom conductor from power line crossing (under crossing) (m)	N/A	NA
11	Clearance of top conductor from earth wire of power line crossing (overhead crossing) (m)	N/A	NA
12	No. of broken/ damaged insulators in each string	N/A	0
13	Deposition of pollutant (dirt/bird excreta/ coastal, etc) on insulator (Yes/No)	N/A	NO
14	Flash over marks on insulator (Yes/No)	N/A	No
15	Result of PID scanning (if transmission line is older than 10 years and has history of flashover/decapping)	N/A	NA
16	No. of missing/ Tilted/ broken Corona/ grading ring	N/A	0
17	Presence of foreign material on tower near to conductor (cross arm, insulator, earth peak, etc)	N/A	No
18	Missing/ disconnected copper bond/ Aluminum bond	N/A	NO
19	Loose/ hanging bird guards	N/A	NO
20	Loose/ Missing/ Hanging tower members	N/A	NO

*_ High Resolution close photographs of indicated parts are to be taken during patrolling.

Observation in Patrolling: - During post fault patrolling on 24.11.2023 & 25.11.2023 it is found that an unknown person has fell a tree from outside line corridor at R-Y Phase side of conductor. This is the cause of tripping on 24.11.2023. FIR copy and photograph is enclosed herewith.

Patrolled by: _____

Signature: _____

T. BRAJMANI SINGH
JE, Imphal TLM

Reviewed by: Manager (Testing)/Mgr

Signature: _____

Engineer (Testing)
Imphal.

1.4. 132 kV Loktak-Imphal Line: Tripped on 29.11.2023

CHECK LIST FOR POST FAULT PATROLLING OF POWERGRID TRANSMISSION LINE

Name of Transmission Line: 132KV Loktak-Imphal-II TL
Type of Tower: Single Circuit (Suspension/Tension)
Location Patrolled 56-67
Date of Post Fault Patrolling: 30.11.2023
Actual Fault Location: 62-63
Actual Fault Distance: 16.22 KM from Imphal
Relay Distance –Main #1- Imphal end :- R-Yph, Z-1, 16.19 Km

Tripping date : 29.11.2023
Tripping Time : 21:21 Hrs
Line restored (Date) : 30.11.2023
Line restored (Time) : 22:08 hrs
Off Line fault locator Distance : Taken/~~No taken /NA~~
Signature Analysis - ~~Taken~~/No taken /~~NA~~
Weather report – Cloudy
Conductor Config.(Ph.) =Top Middle Bottom (D/C)
OR =One side (Top_Y_ Bottom_R_) other side _B (S/C)

Sl. No.	Particulars	CKT#1	CKT#2
1	Damaged/Missing Counter poise earthing (Yes/No)	N/A	No
2	Value of Tower Footing Impedance (Ohm)	N/A	Not Measured
3	Clearance between bottom conductor & vegetation in ROW (m)	N/A	7.9
4	Side clearance of conductors from nearby tall object (tree, small hill, building, etc)near to ROW (m)	N/A	NA
5	Vertical clearance between conductors at maximum sag (m)	N/A	3.8
6	Clearance between earth wire/OPGW & top conductor (m)	N/A	6.5
7	Minimum clearance of jumper from tower body (m)	N/A	NA
8	Maximum value of jumper drop (m)	N/A	NA
9	Presence of pilot insulator & counter weight on jumpers (Yes/No)	N/A	NO
10	Clearance of bottom conductor from power line crossing (under crossing) (m)	N/A	NA
11	Clearance of top conductor from earth wire of power line crossing (overhead crossing) (m)	N/A	NA
12	No. of broken/ damaged insulators in each string	N/A	0
13	Deposition of pollutant (dirt/bird excreta/ coastal, etc) on insulator (Yes/No)	N/A	NO
14	Flash over marks on insulator (Yes/No)	N/A	No
15	Result of PID scanning (if transmission line is older than 10 years and has history of flashover/decapping)	N/A	NA
16	No. of missing/ Tilted/ broken Corona/ grading ring	N/A	0
17	Presence of foreign material on tower near to conductor (cross arm, insulator, earth peak, etc)	N/A	No
18	Missing/ disconnected copper bond/ Aluminum bond	N/A	NO
19	Loose/ hanging bird guards	N/A	NO
20	Loose/ Missing/ Hanging tower members	N/A	NO

*_ High Resolution close photographs of indicated parts are to be taken during patrolling.

Observation in Patrolling: - During post fault patrolling it was found that the Y-Phase (top) conductor has snapped in between the location span 62-63 which was sabotage by unknown miscreant This was the cause of breakdown on 29.11.223 at 21:21 hrs. FIR copy and photograph enclosed.

Patrolled by: सागर एस. हिंगुलकर / Sagar S. Hingulkar
Signature: अभियंता (टीएलएम) / Engineer (TLM)
पावर ग्रिड / POWERGRID
इम्फाल / IMPHAL

Reviewed by: N.H. Laskar
Signature:
एन.एच. लस्कर / N.H. Laskar
प्रबंधक (टी एल)/ Manager (T/L)
पावरग्रिड / POWERGRID
इंफाल / Imphal Sub-station

Annexure C.1

Name of the line	Status as updated in 56/57th PCC meeting	Latest Status
132 kV Agia - Mendipathar	PLCC works completed. AR operation configuration to commence from March'22. Latest Status to be intimated.	
132 kV EPIP II - Byrnihat D/C		
132 kV EPIP II - Umtru D/C		
132 kV Kahilipara - Umtru D/C		
132 kV Khliehriat – Mustem		
132 kV Mustem - NEHU line		
132 kV Khliehriat (MePTCL) - Khliehriat (PG) Ckt#II		
132 kV Khliehriat- NEIGRIHMS		
132 kV NEHU – Mawlai		
132 kV Mawlai - Umiam Stage I		
132 kV Mawphlang - Nongstoin		
132 kV Mawphlang - Umiam Stg I D/C		
132 kV Mawphlang- Mawlai		
132 kV Mendipathar – Nangalbibra		
132 kV Myntdu Leshka - Khleihriat D/C		
132 kV Nangalbibra – Nongstoin		
132 kV NEHU – NEIGRIHMS		
132 kV NEHU – Umiam		
132 kV Sarusajai - Umtru D/C		
132 kV Umiam - Umiam St I	By March'22	
132 kV Umiam St I - Umiam St II		
132 kV Umiam St I - Umiam St III D/C		
132 kV Umiam St III -Umiam St IV D/C		
132 kV Umiam St III - Umtru D/C		
132 kV Umtru - Umiam St IV D/C		