



Agenda
for
114th PCC Meeting

Date: 13.05.2022
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 114th PROTECTION COORDINATION SUB-COMMITTEE MEETING TO BE HELD ON 13.05.2022 AT 10:30 HOURS

PART – A

ITEM NO. A.1: Confirmation of minutes of 113th Protection Coordination sub-Committee Meeting held on 12th April 2022 through MS Teams online platform.

The minutes of 113th Protection Coordination sub-Committee meeting held on 12.04.2022 was circulated vide letter dated 09.05.2022.

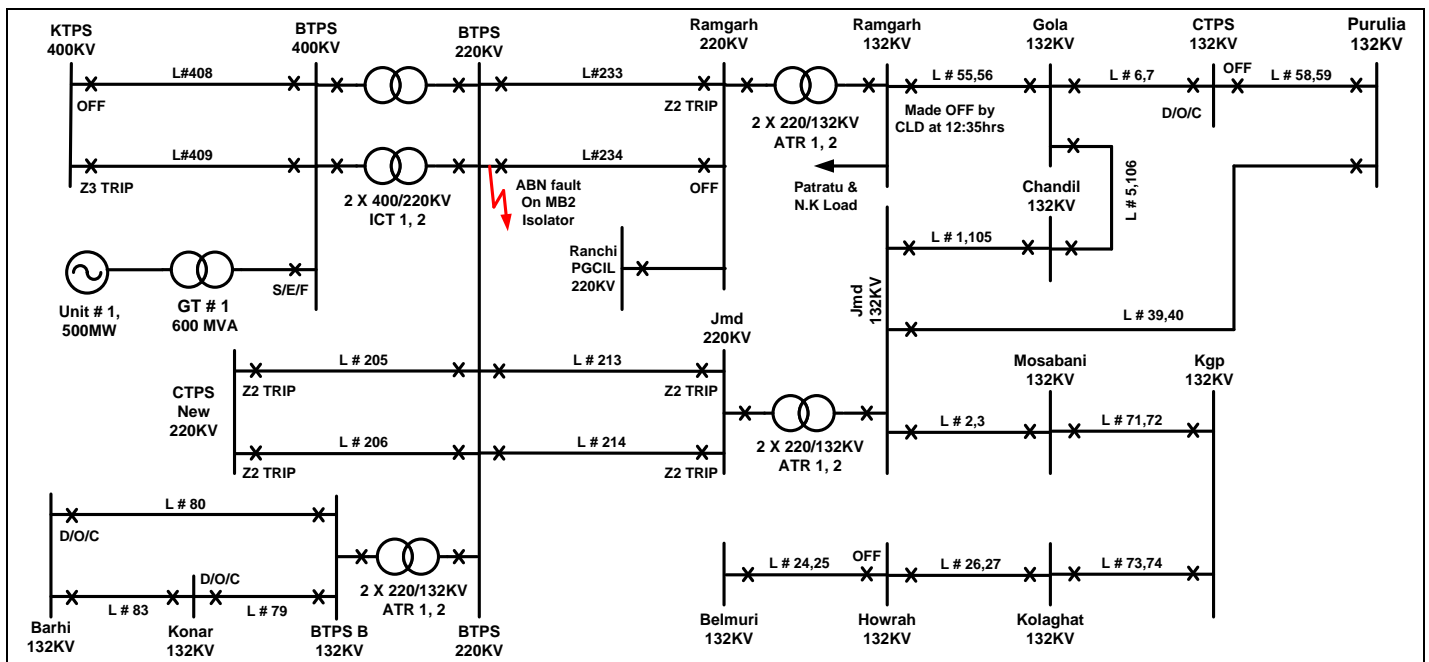
Members may confirm the minutes of meeting.

PART – B

ITEM NO. B.1: Disturbance at 220 kV Ramgarh (DVC) S/s on 09/04/2022 at 12:31 Hrs

On 09/04/2022 at 12:31 Hrs, during diversion of 220 kV Ramgarh-Bokaro-2 at Ramgarh from main bay to tie-bay, bus fault occurred at Ramgarh. Subsequently total power failure occurred at 220 kV Bokaro & Ramgarh S/s due to delayed clearance of the fault. Consequently as entire load of Jamshedpur shifted to 220 kV Joda-JSPL-Jamshedpur, the line got tripped on overcurrent protection. 400 kV Koderma-Bokaro-1 and unit 1 at Bokaro A also tripped at the same time.

Detailed report from DVC is attached at **Annexure B.1**.



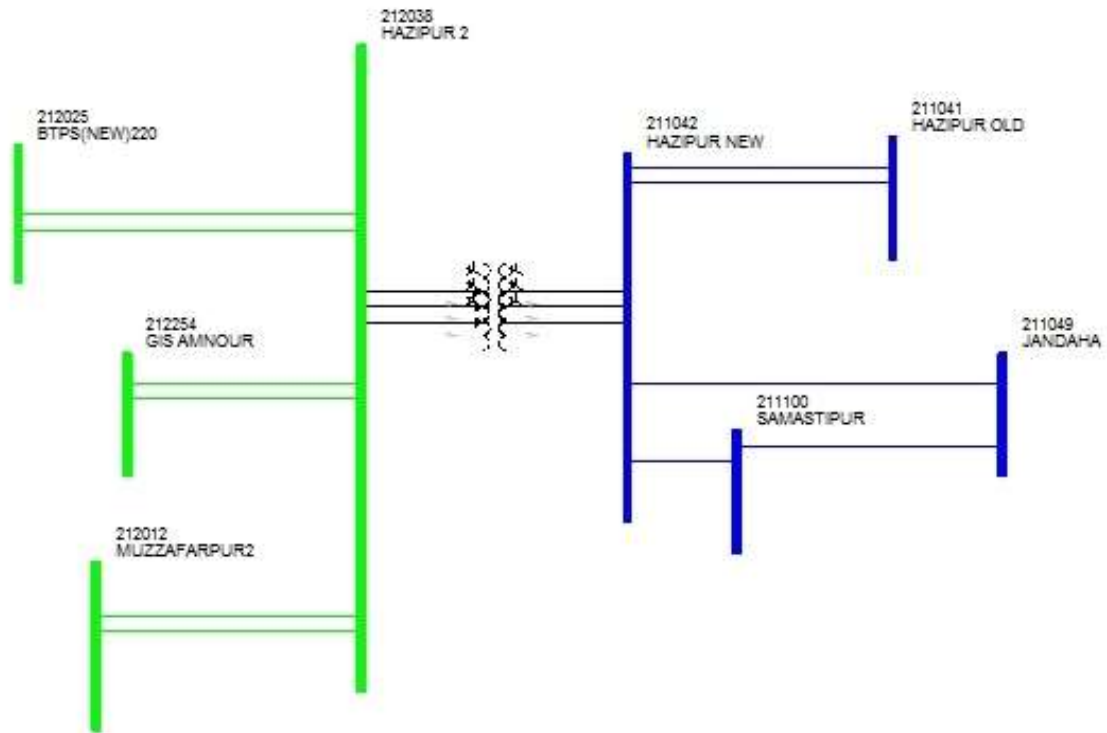
Gen. Loss: 470 MW, Load Loss: 400 MW
Outage Duration: 01:04 Hrs

DVC may explain.

ITEM NO. B.2: Total Power Failure at 220 kV Hajipur S/s on 05/04/2022 at 18:03 Hrs

The disturbance occurred due to failure of Y-phase LA of 220 kV Barauni-Hazipur circuit-1 at Hazipur end. Subsequently all lines emanating from 220 kV Hazipur tripped resulting in total supply failure at Hazipur & Amnour.

Grid disturbance report is attached at **Annexure B.2.**



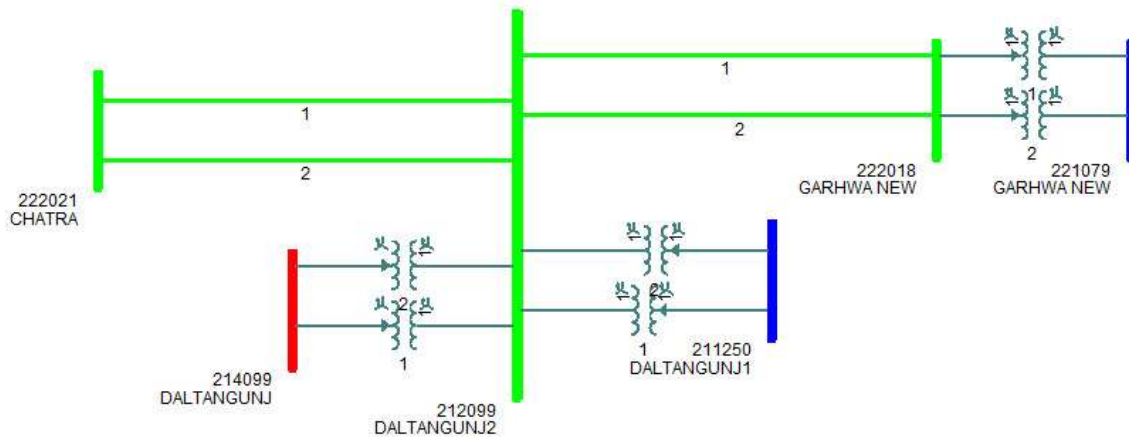
Load Loss: 260 MW
Outage Duration: 00:21 Hrs

BSPTCL may explain.

ITEM NO. B.3: Total Power Failure at 220 kV Garhwa S/S on 05/04/2022 at 12:19 Hrs

220 kV Daltonganj-Garhwa D/c tripped due to B-N fault in 220 kV Daltonganj-Garwah circuit-1. Subsequently total power failure occurred at Garhwa S/s as well as radially fed downstream S/s.

Grid disturbance report is attached at **Annexure B.3.**



Relay Indications:

Time	Name	End 1	End 2	PMU Observation
12:19	220 kV Daltonganj-Garhwa-1	Daltonganj: B_N, Zone-1, 2.4 kA, 32.5 km, A/r successful, tripped again within reclaim time	Garhwa: B_N, Zone-1, 1.24 kA, 58.17 km	35 kV dip in B_ph voltage at Daltonganj. A/r successful after 1 sec. Line tripped again within reclaim time after 600 msec.
	220 kV Daltonganj-Garhwa-2	Daltonganj: Didn't trip	-	

Load Loss: 40 MW

Outage Duration: 01:42 Hrs

JUSNL may explain.

ITEM NO. B.4: Total Power Failure at 400 kV Teesta V S/s

1. On 23/04/2022 at 12:37 Hrs

400 kV Teesta V-Rangpo-2 was under shutdown. 400 kV Teesta V-Rangpo-1 tripped from Teesta V end due to delayed clearance of fault in 400 kV Rangpo-Binaguri-1. Subsequently one running unit at Teesta-5 got tripped due to loss of evacuation path.

Relay Indications:

Time	Name	End1	End2	PMU Observations
12:37	400 kV Teesta 5-Rangpo-1	Teesta 5: DEF	Didn't trip	Gradual dip in voltage at Rangpo. 21 kV dip observed. Fault clearance time: 1.8 sec
	400 kV Binaguri-Rangpo-1	Binaguri: DT received	Rangpo: DEF, Ir: 2.7 kA	

Detailed report from ERLDC is attached at **Annexure B.4.**

Gen. Loss: 168 MW
Outage Duration: 00:19 Hrs

2. On 26/04/2022 at 18:20 Hrs

400 kV Teesta V-Rangpo-2 was under shutdown. 400 kV Teesta V-Rangpo-1 tripped due to R_B_N fault resulting in tripping of all three running units at Teesta-V due to loss of evacuation path.

Gen. Loss: 512 MW
Outage Duration: 00:22 Hrs

3. On 26/04/2022 at 18:59 Hrs

400 kV Teesta V-Rangpo-2 was under shutdown. 400 kV Teesta V-Rangpo-1 tripped due to R_B_N fault resulting in tripping of all three running units at Teesta-V due to loss of evacuation path.

Gen. Loss: 350 MW
Outage Duration: 03:34 Hrs

NHPC & Powergrid may explain.

ITEM NO. B.5: Total Power Failure at 220 kV Jorethang S/S

1. On 08/04/2022 at 10:15 Hrs

220 kV Jorethang-New Melli D/c tripped from Jorethang end due to DC Earth fault in trip coil. subsequently one running unit at Jorethang tripped.

Relay Indications:

Time	Name	End1	End2	PMU Observations
10:15	220 kV Jorethang-New Melli D/c	Jorethang: DC Earth Fault	New Melli: Didn't trip	No fault observed from PMU data

Gen. Loss: 48 MW
Outage Duration: 00:03 Hrs

2. On 26/04/2022 at 19:24 Hrs

220 kV Jorethang-New Melli-2 tripped due to R-N fault subsequently total power failure occurred at Jorethang HEP as 220 kV Jorethang-New Melli-1 had already tripped at 19:11 Hrs.

Relay Indications:

Time	Name	End1	End2	PMU Observation
19:24	220 kV Jorethang-New Melli-2	Jorethang: R_N	New Melli: R_N	35 kV dip in R_ph voltage for 350 msec

Detailed report from ERLDC is attached at **Annexure B.5.**

Load & Generation Loss: Nil
Outage Duration: 00:41 Hrs

Jorethang HEP may explain.

ITEM NO. B.6: Total Power Failure at 400 kV Dikchu S/s on 17/04/2022 at 15:07 Hrs

On 17/04/2022 at 15:07 Hrs, 400 kV Rangpo-Dikchu tripped on R phase to earth fault. As main bay of 400 kV Teesta 3-Dikchu was already under breakdown, total power failure occurred at Dikchu HEP.

Relay Indications:

Time	Name	End 1	End 2	PMU Observations
15:07	400 kV Rangpo- Dikchu	Rangpo: R_N, 11.4 km, 10.8 kA	Dikchu: R_N, 48.4 km, Zone-2	156 kV dip in R_ph voltage at Rangpo.
	400 kV Teesta 3-Dikchu	-	Tripped due to tripping of Rangpo-Dikchu line as main bay out of service	

Detailed report from ERLDC is attached at **Annexure B.6.**

Gen. Loss: 55 MW
Outage Duration: 01:08 hrs

Dikchu HEP may explain.

ITEM NO. B.7: Bus tripping occurred in Eastern Region during April 2022

During April 2022, following incidents of bus bar tripping was reported in Eastern Region.

Element Name	Tripping Date	Reason	Utility
400 kV Main Bus-1 & 2 at Meramundali B	07-04-2022 at 17:16 Hrs	-	OPTCL
220 kV Main Bus-1 at Durgapur (PG)	28-04-2022 at 05:58 Hrs		PG ER-2
400 kV Main Bus-2 at Malda	29-04-2022 at 20:01 Hrs	R_ph bus connector of 400 kV New Purnea-2 snapped	PG ER-2
220 kV Main Bus-1 at Kishanganj New (BSPTCL)	29-04-2022 at 23:00 Hrs	Bus bar protection operated	BSPTCL

Concerned utilities may explain.

ITEM NO. B.8: Repeated Tripping of Transmission Lines and associated issues

Following lines had tripped repeatedly in the month of April'22 and it was observed that in almost all cases faults are of similar nature.

Sl. No.	Name of the Element	No. of times Tripped	Remarks	Utility
1	400 kV Meramundali-Mendhasal-2	5	R_ph fault in all instances. 9-25 km from Meramundali	OPTCL
2	400 kV New PPSP-Arambagh-1	4	B_ph fault in all instances. Line charged within an hour in three instances	WBSETCL
3	220 kV Tenughat-Biharsharif	7	Fault in either B_ph or R_ph. Fault around 65 km or 120 km from Tenughat	JUSNL, BSPTCL
4	132 kV Lakhisarai-Lakhisarai-1	4	R_ph fault in all instances	BSPTCL
5	132 kV Lakhisarai-Lakhisarai-2	5		

Concerned utilities may explain.

ITEM NO. B.9: Tripping Incidence in month of April-2022

Tripping incidents in the month of April-2022 which needs explanation from constituents of either of the end is attached at **Annexure B.9.**

Concerned utilities may explain.

PART-C::OTHER ITEMS

ITEM NO. C.1: Follow-up of Decisions of the Previous Protection Sub-Committee Meeting(s)

The decisions of previous PCC meetings are attached at **Annexure C.1**.

Members may update the latest status.

ITEM NO. C.2: Information regarding auto-synchronization settings :: ERLDC

To enhance operational capabilities and better situational awareness, operational practices of auto synchronization of islands implemented in field need to be properly understood subsequently following information may be shared by PGCIL or any other transmission licensee-

- Auto synchronization operation principle, time delay, setting, checks, communication delay
- Maximum allowable angular difference for breaker closing operation at each voltage level
- Whether auto synchronization setting can be changed remotely (from RTAMC or NTAMC in case of PGCIL)
- Digital Auto synchronization display availability for RTAMC operator and substations SA
- How to avoid wrong synchronization, preventive, and precautionary measures

Members may discuss.

ITEM NO. C.3: Schedule of Training Program on PSCT and PDMS by PRDC

As part of 5th year support period, PRDC is going to conduct online training program for West Bengal, Jharkhand as per the following schedule.

SI No.	Date	State
1	19.05.2022-20.05.2022	West Bengal
2	26.05.2022-27.05.2022	Jharkhand

Members may note.

ITEM NO. C.4: Automation of Protection Settings extraction from PDMS

To facilitate protection co-ordination and protection audit, automation of protection setting extraction from the database is required. In this regard, a model excel sheet was shared with PRDC and automation of extraction of settings from PDMS was also discussed.

In 112th PCC, PRDC representative informed that their IT team is looking into it and the facility of relay data extraction from protection database is expected to be implemented by July-2022.

In 113th PCC, ERPC secretariat informed that a meeting would be held on 19th April 2022 among ERPC, ERLDC & PRDC to discuss the above issue.

PRDC may update.

ITEM NO. C.5: Protection Audit in Eastern Region

In 110th PCC Meeting, ERPC Secretariat informed that third party protection audit for the year 2022 would be commenced as soon as the current covid situation gets improved.

It was further informed that protection audit of following substations in Odisha would be carried out at first.

- 765/400 kV Jharsuguda (Powergrid) S/s
- 765 kV NTPC Darlipalli S/s
- 400/220kV Lapanga(OPTCL) S/s
- 220 kV Budhipadar(OPTCL) S/s
- 220 kV IB TPS(OPGC) S/s

PCC advised the concerned utilities to verify and update existing relay data and protection settings available in PDMS for the above-mentioned substations before the field visit by audit team.

PCC further advised utilities to submit their comments, if any, regarding the protection audit procedure and format for finalization of the document.

In 112th PCC, PCC informed that protection audit of mentioned substations would be carried out in tentatively in second week of April 2022 and further advised concerned utilities of Odisha to verify and update existing relay data and protection settings available in PDMS before the field visit by audit team.

In 113th PCC, it was decided that the protection audit of various substations in Odisha would be carried out during last week of April-22.

Members may update.

ITEM NO. C.6: New Element Integration

C.4.1: LILO of 220 kV Arrah-Khagaul D/c at Naubatpur

As per information received at ERLDC, 220 kV Arrah -Khagaul will be LILLOed at 220 kV Naubatpur.

Line parameters are as below:

Name	Conductor Type	Length (km)
220 kV Arrah -Naubatpur D/c	ACSR Zebra	43.05 km
220 kV Khagaul -Naubatpur D/c	ACSR Zebra	16.9 km

Protection coordination may be required as per the following table

Reason	S/S may be affected	Remarks	Utility to respond
220 kV Arrah -Khagaul D/C	Arrah & Khagaul	Protection coordination to be done for all newly connected elements as per ERPC's guidelines	POWERGRID ER-1&BSPTCL
	Naubatpur	Protection coordination to be done for all newly connected elements as per ERPC's guidelines.	BGCL

LILO at Naubatpur	S/S connected to Arrah & Khagaul: Patna, Sipara, Dumrao New	For all adjacent substations connected to Khagaul, which is Patna and Sipara adjacent shortest line length will reduce significantly, so Zone-2 settings will be affected. Now Naubatpur-Khagaul will be shortest (16.9km) For Substation connected to Arrah which is Dumrao new adjacent line length will reduce to 43km (Arra- Naubatpur). In case of Zone 2 & Zone 3 overlap of adjacent sections Time grading to be ensured. Kindly check and confirm any setting revision if required.	POWERGRID ER-1, BSPTCL
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Following Details to be shared:

- POWERGRID ER-1, BSPTCL, BGCL may share whether revision of any existing protection setting at above mentioned S/S is required or not. In case of any revision, the revised setting may be shared with ERPC and ERLDC.
- The protection setting at Arrah, Khagaul, Naubatpur may be shared with ERPC and ERLDC.
- Status of carrier protection and PLCC channel in all above-mentioned section may be shared.

Concerned utilities may update.

C.4.2: LILO of 400 kV Darbhanga-Kishanganj D/c at Saharsa

As per information received at ERLDC, 400 kV Darbhanga-Kishanganj D/c was LILOed at 400 kV Saharsa S/s.

Line parameters along with configuration are as below:

Name	Conductor Type	Length
400 kV Kishanganj-Saharsa-3 & 4	Quad Moose ACSR	158.677 km
400 kV Saharsa-Darbhanga-1 & 2	Quad Moose ACSR	86.684 km

Protection Co-ordination maybe reviewed as per following table:

Reason	Settings to be reviewed	At S/s	Utility	Remarks
	400 kV Kishanganj-Saharsa 3&4	Kishanganj, Saharsa	PG ER-1, PMTL	Protection coordination to be done for newly connected element as per ERPC guidelines.
	400 kV Darbhanga-Saharsa D/c	Darbhanga, Saharsa	ATL, PMTL	Protection coordination to be done for newly connected element as per ERPC guidelines.

LILO of 400 kV Darbhanga-Kishanganj D/c at Saharsa	400 kV New Purnea-Kishanganj D/c	New Purnea	PG ER-1	Adjacent longest line for these lines will now be 400 kV Rangpo-Kishanganj D/c (189 km-QM). Hence Zone-3 settings at respective S/s may be reviewed keeping in view it should not encroach next voltage level
	400 kV Saharsa-Kishanganj D/c	Saharsa	PMTL	
	400 kV Binaguri-Kishanganj D/c	Binaguri	PG ER-2	
	400 kV Rangpo-Kishanganj-1&2	Rangpo	PG ER-2	Adjacent longest line for these lines will now be 400 kV Saharsa-Kishanganj D/c (183 km-QM). Hence Zone-3 settings at respective S/s may be reviewed keeping in view it should not encroach next voltage level
	400 kV Sitamarhi-Darbhanga D/c	Sitamarhi	PMTL	Adjacent longest line will now be 400 kV Muzaffarpur-Darbhanga D/c (62 km-QM). Hence Zone-3 settings at respective S/s may be reviewed keeping in view it should not encroach next voltage level.
	400 kV Muzaffarpur-Darbhanga D/c	Muzaffarpur	PG ER-1	Adjacent longest line will now be 400 kV Sitamarhi-Darbhanga D/c (80 km-QM). Hence Zone-3 settings at respective S/s may be reviewed keeping in view it should not encroach next voltage level.

Concerned utilities may update.

C.4.3: FTC of 220 kV Muzaffarpur-Garaul D/c

As per information received at ERLDC, 220 kV Muzaffarpur-Garaul D/c is going to be first time charged.

Line parameters are as below

Name	Conductor type	Length
220 kV Muzaffarpur-Garaul I	ACSR Zebra	19.9 km
220 kV Muzaffarpur-Garaul II	ACSR Zebra	19.9 km

Protection coordination may be required as per the following table.

Reason	S/S may be affected	Remarks	Utility to respond
FTC of 220 kV Muzaffarpur-Garaul	220 kV Muzaffarpur	Protection coordination to be done for all newly connected elements as per ERPC's guidelines	POWERGRID ER-1& BSPTCL

	Garaul	Protection coordination to be done for all newly connected elements as per ERPC's guidelines. <ul style="list-style-type: none"> Status of carrier protection and PLCC channel in all above-mentioned section may be shared. 	
	S/S connected to Muzaffarpur Hazipur,MTPS	As per ERLDC no change in adjacent short and long length of line. Kindly check and ensure the co-ordination at your end Kindly check and confirm any setting revision if required.	POWERGRID ER-1, BSPTCL

Following Details to be shared:

- POWERGRID ER-1, BSPTCL, may share whether revision of any existing protection setting at above mentioned S/S is required or not. In case of any revision, the revised setting may be shared with ERPC and ERLDC.
- Protection settings may be shared with ERPC and ERLDC.
- Status of carrier protection and PLCC channel in all above-mentioned section may be shared.

Concerned utilities may update.

INVESTIGATION REPORT REGARDING TOTAL POWER FAIL OF BTPS 220 KV & 400KV SYSTEM ALONG WITH OUTAGE OF UNIT # 1 ON 09.04.2022.

Brief History:

At about 12:00hrs of 09/04/22, Low Air Pressure L/O along with TC1 & TC2 Faulty annunciation appeared in Line # 234 [BTPS B – Ramgarh Line 2] panel. Air Pressure of the said CB was checked and found to be very low at 3-4kg/cm² as opposed to normal operating pressure of about 15kg/cm². As the CB was not in a condition to operate, it was planned to isolate the breaker to attend to the trouble. Accordingly L # 234 was made OFF from Ramgarh End and after checking zero current in all three phases, it was attempted to open the bus side isolator in line charged condition. As soon as the Main Bus 2 side isolator was opened, huge flashing occurred due to arcing and ionization of associated air creating a bus fault in Main bus 2. During the fault Bus Bar Protection Check Zone appeared but no Main Zone appeared as reported by BTPS B (O & M). As the fault was not cleared by operation of Busbar Protection, there was widespread trippings at respective remote ends and other area leading to TPF in BTPS B 220KV, BTPS 400KV and some 132KV systems.

System Conditions prior to Event:

1. 400KV BTPS A – KTPS Line 1 was charged only from BTPS A End.
2. L # 234 BTPS B – Ramgarh was charged only from BTPS B End. Ramgarh End CB was OPEN.
3. 132 KV CTPS – Purulia Lines were OFF from CTPS End.
4. Howrah Belmuri loop was OPEN from Howrah End.

Relevant SLD of affected area: Attached as Annexure – A in last page of report.

Chronology of Events and Tripping Analysis:

From the downloaded DR and fault report read out from HMI of the various numerical relays at BTPS and others the following chronology of faults and subsequent line trippings could be established:

1. There was a bus fault on BTPS B 220KV Main Bus 2. As the fault was not correctly cleared vide operation of Bus Differential Relay, all the other 220KV lines tripped from remote end by Distance Protection Zone 2 to clear the fault. At 132KV level the lines emanating from BTPS B 132KV [BTPS B – Barhi & BTPS B – Konar] both tripped through O/C Protection to clear this fault. These lines tripped before ATRs tripped as the D/O/C pick up of these lines are 540A in comparison to ATR O/C pick up of 800A.
2. As there was only one BTPS A – KTPS 400KV line in service, the infeed current to the fault via both ICTs was lesser than when both BTPS A – KTPS lines are in service. This lesser infeed caused the 220KV bus fault to be seen within Zone 3 reach of KTPS BTPS A line from KTPS end. As the ICT O/C & E/F Protection is coordinated to trip in about 1.2sec for other voltage level bus fault and the KTPS End Zone 3 timer was set at standard setting of 1.0sec, the 400KV line tripped earlier than the ICT relays. Calculations in ASPEN Oneliner as well as manual impedance calculations showed that this encroachment of Zone 3 into BTPS B 220KV bus fault would not have taken place if both BTPS A – KTPS lines were in service. The Zone 3 timer at KTPS End of the said line has already been revised to 1.5s to remain coordinated with ICT protection in case of encroachment in case only one line is in service.

3. The tripping of GT Standby E/F earlier than ICTs was due to a wrong setting implemented in the GT S/E/F relay. This setting has now been corrected to be properly coordinated with ICT O/C & E/F protection for ICT LV (i.e. BTPS 220KV) bus faults.
4. After tripping of BTPS B 220KV source (due to tripping of L # 213, 214 & 233 from remote ends) the load of Gola, Ramgarh, Patratu, North Karanpura region shifted to 220KV Ramgarh – Ranchi line. In order to restrict the overload of the above line, 132KV Ramgarh Gola lines [L # 55 & 56] were made OFF at about 12:35hrs. This action had saved the overloading of 220KV Ranchi Ramgarh line and thus Ramgarh, Patratu and North Karanpura region did not face power outage.
5. After Ramgarh – Gola lines were made OFF manually by CLD, the load of Gola Chandil region began to be fed from CTPS End via Line # 6 & 7, both of which tripped on overload from CTPS End by D/O/C Protection. Probably about the same time both Jamshedpur – Mosabani Lines (Line # 2 & 3) tripped from Jamshedpur End through D/O/C Protection due to overloading.

Corrective Actions taken:

1. The Zone 3 time delay of KTPS – BTPS A line at KTPS end has been increased to 1.5 seconds to ensure time coordination with ICT relays even in case only one KTPS BTPS line is in service.
2. The GT Standby E/F Protection Time delay has been increased to allow ICTs to trip earlier for LV bus faults even if one KTPS – BTPS A line is not in service.

Tests done in Busbar Circuit:

1. Operation and Pick Up of Main Bus-1, Main Bus-2 and Check Zone Bus Bar Protection Relays was checked through current injection and the relevant Bus Bar Relay operation was found as desired. Tripping of individual Bus Zones were checked at the same time (after drawing out all 96 relays from various bays) and also found O.K.
2. Operation of Bus Wire Supervision relays 95A, 95B, 95CH, 95AX, 95BX, 95CHX were checked and found O.K except for 95AX whose coil was found damaged. The damaged relay has been replaced.
3. Healthiness of Bus-Differential protection circuit in the relay panel was thoroughly checked through current injection from Relay panel and I.R checking, and no such abnormality was found on protection panel CT Circuitry.
4. Continuity of Bus wire of CT cables from S/Y to Control panel of Main Zone # 1 and Main Zone # 2, was checked and no abnormality (i.e. discontinuity or break) observed.

Remarks about Bus Bar Protection non-operation:

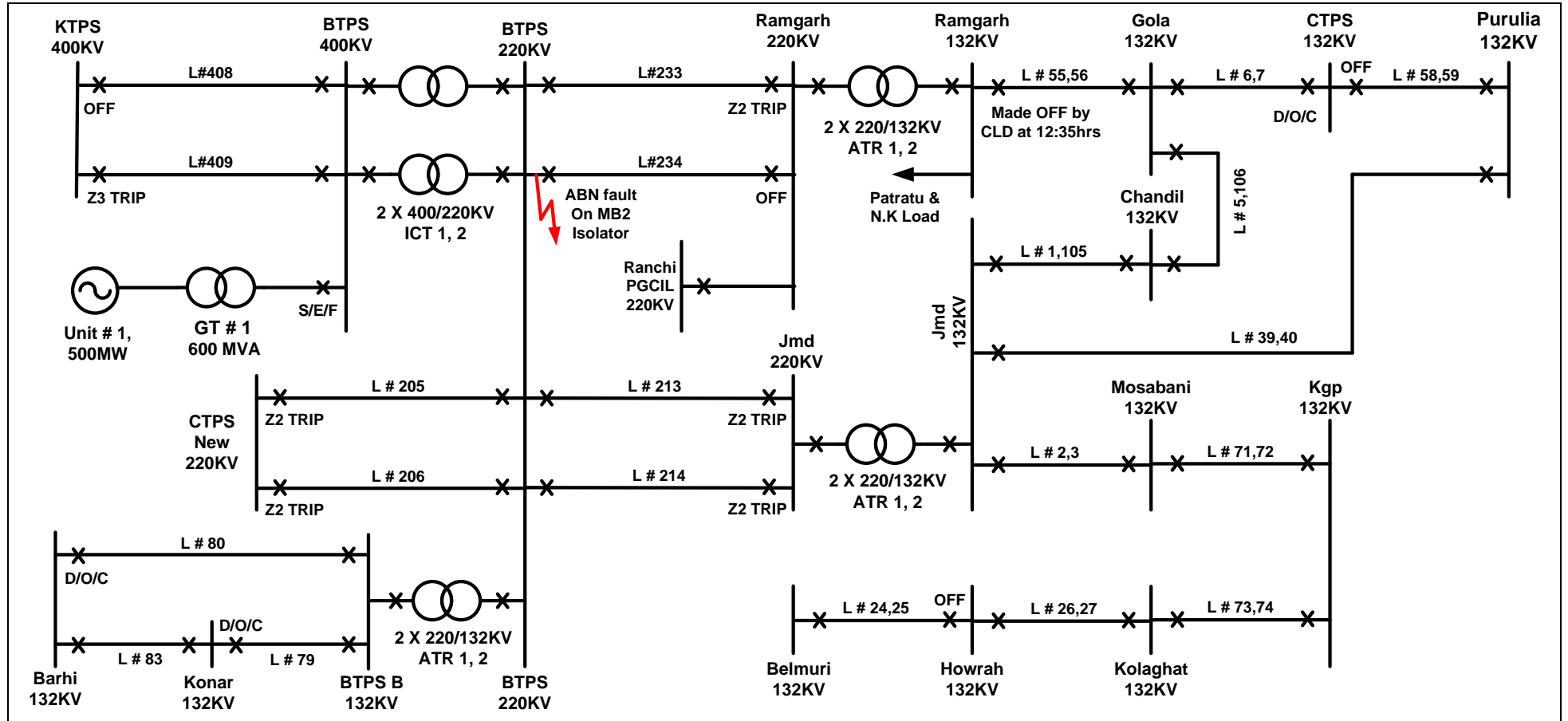
1. As checking of busbar differential relays, bus wire supervision relays and related circuitry revealed no abnormality in the busbar protection scheme no real reason could be established for it's non-operation during the said fault.
2. However it is a conjecture that as the isolator was opened manually it actually took some seconds to open the isolator blades. It might be possible that in the initial stages before creation of the major fault (sparking between isolator blades) the current mismatch caused during

opening of the isolator blades had caused the CT Supervision relay of Bus 2 to operate thereby blocking of the Busbar protection of Main Bus 2 (Bus Wire supervision time is 3 sec).

Recommendations:

1. A complete refurbish of Bus Differential Scheme with Numerical Relays is strongly recommended.
2. Complete retrofitting of all the relay panels at BTPS B 220 & 132KV Control room along with implementation of SAS (to understand chronological event records) is necessary as done in all DVC 220KV substations under PSDF project.

ANNEXURE 1: Relevant SLD of affected area:



पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.

CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website:www.erldc.org, Email ID- erldc@posoco.in

घटना संख्या: 05-04-2022/1

दिनांक: 05-04-2022

Report on the grid event in Eastern Region (पूर्वी क्षेत्र में ग्रिड घटना पर रिपोर्ट)

1. Summary of the event (घटना का सारांश):

At 18:03 hrs, 220kV switchyard at Hajipur (BSPTCL) became dead after tripping of 220KV Hajipur-Muzaffarpur D/c and 220KV Hajipur -Barauni II ,(Other ckt under breakdown) due to Y phase LA blast of Barauni -II at Hajipur end. Total load loss occurred of 260 MW. Area affected Chapra Siwan, Amnour ,Sheetalpur, Ekma ,Raghunathpur, Hajipur. Power extended to Hajipur thro' 220KV Hajipur-Muzaffarpur D/c. All load restored by 18:35 hrs.

Date / Time of disturbance: 05-04-2022 at 18:03 hrs.

- **Event type:** GD- 1

Systems/ Subsystems affected: Chapra, Siwan, Amnour, Sheetalpur, Ekma ,Raghunathpur and Hajipur Traction load from Chhapra and Siwan(13mw)

Load and Generation loss.

- Nil.
- 260 Mw load loss reported during the event

2. Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- 220KV Hajipur -Barauni I under breakdown

3. Major elements tripped (प्रमुख ट्रिपिंग)

Transmission/Generation element name संचरण लाइन / विद्युत उत्पादन इकाई का नाम	Trip Date बंद होने की तिथि	Trip Time बंद होने का समय
220KV-MUZAFFARPUR(PG)-HAZIPUR-1	05-04-2022	18:03
220KV-MUZAFFARPUR(PG)-HAZIPUR-2		
220KV-HAJIPUR-BARUANI-1		
220KV-HAJIPUR-AMNOUR 1		
220KV-HAJIPUR-AMNOUR 2		

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

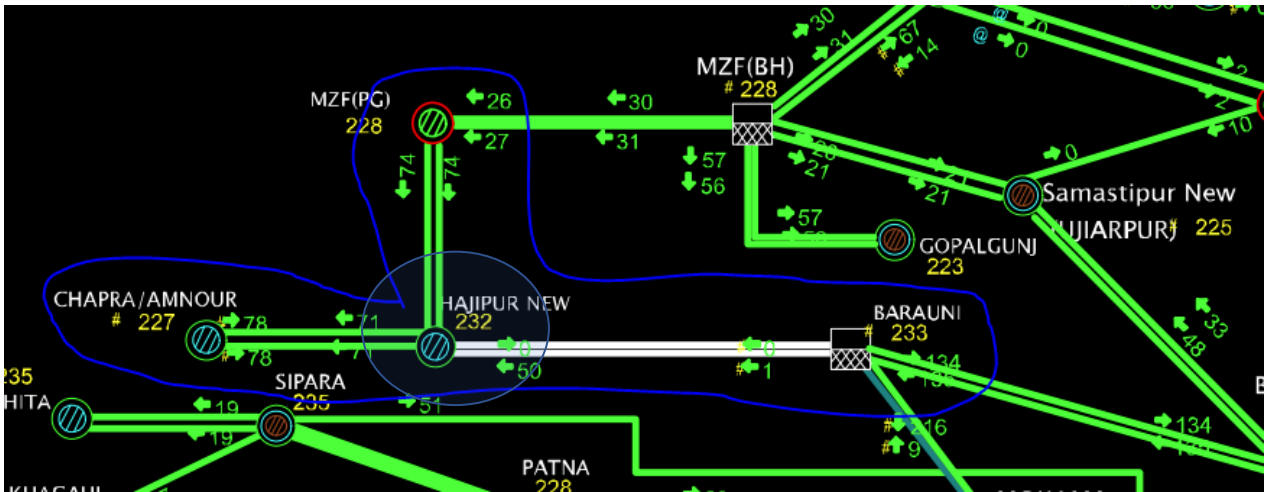


Figure 1: SCADA snapshot for of the system

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण): Not received till date

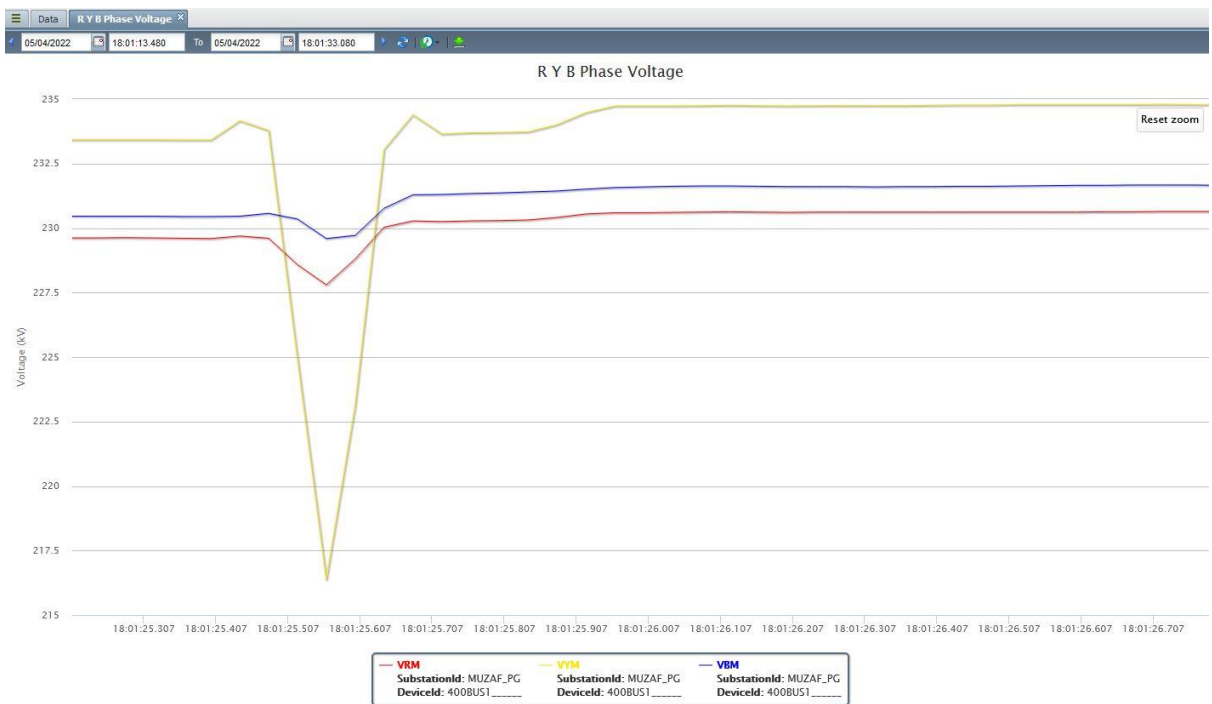


Figure 2: PMU voltage snapshot of 400/220 kV Muzafferpur S/s

5. Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name संचरण लाइन / विद्युत उत्पादन इकाई का नाम	Trip Date बंद होने की तिथि	Trip Time बंद होने का समय	Restoration Date वापस आने की तिथि	Restoration time वापस आने का समय
220KV-MUZAFFARPUR(PG)-HAZIPUR-1	05-04-2022	18:03	05-04-2022	18:24
220KV-MUZAFFARPUR(PG)-HAZIPUR-2				18:24
220KV-HAJIPUR-BARUANI-1				Under Outage
220KV-HAJIPUR-AMNOUR 1				18:35
220KV-HAJIPUR-AMNOUR 2				18:35

6. Analysis of the event (घटना का विश्लेषण):

At 18:03 Hrs ,220 kv Muzafferpur -Barauni -II ,Y phase LA bursted at Hazipur end and the same line tripped within 100 ms .From PMU it appears fault was cleared within 100 ms .Same fault was also sensed by Muzafferpur- Hazipur D/C and tripped immediately .

This caused Hazipur substation blackout as 220 kv Muzafferpur -Barauni -I was already under breakdown and both the sources of Hazipur S/s which are Muzaffarpur & Barauni were cut off ,leading to load loss at HAZIPUR .

Muzaffrepur-Hazipur DR at Hazipur end shows the tripping of line immediately sensing Y-ERATH fault of Hazipur -Barauni ,but this fault should be sensed in reverse direction by hazipur end and should be delayed tripping if fault persists .**This should be checked by BSPTCL .**

7. Protection issue (सुरक्षा समस्या):

- Muzaffrepur-Hazipur DR at Hazipur end shows the tripping of line immediately sensing Y-ERATH fault of Hazipur -Barauni ,but this fault should be sensed in reverse direction by hazipur end and should be delayed tripping if fault persists .**This should be checked by BSPTCL .**
- Carrier signal unhealthy was also high in DR ,Whether carrier is unhealthy should be also checked for successful A/R and Transfer trip scheme operation .
- No DR/EL, relay details, or report received regarding event from Powergrid ER-1 .Whether any tripping occurred from Pg end or any relay picked up .
- DR of Barauni end not received .

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

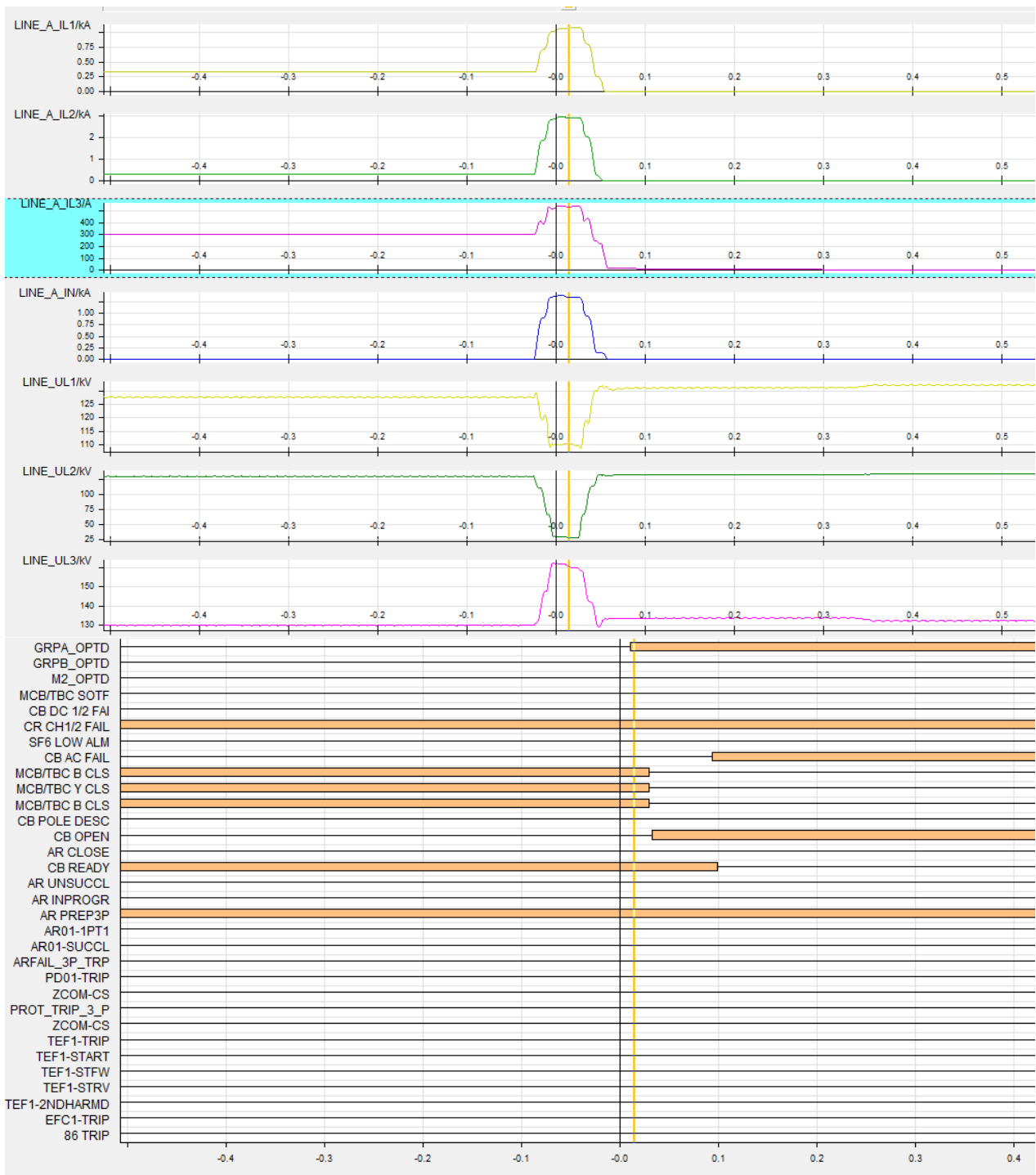
Issues	Regulation Non-Compliance	Utility
DR/EL not provided within 24 Hours	1. IEGC 5.2 (r) 2. CEA grid Standard 15.3	BGCL,BSPTCL
Incorrect/ mis-operation / unwanted operation of Protection system	1. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4.A. 2. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	BSPTCL
Non-Availability of Numerical Bus Bar/LBB Protection at 220 kV and above S/s	1. CEA Technical Standard for Construction of Electrical Plants and Electric Lines 43.4.A 2. CEA Technical Standard for Construction of Electrical Plants and Electric Lines 43.4.C.4 3. CEA (Technical standards for connectivity to the Grid) Regulation, 2007 – 6.1, 6.4.	
DR/EL are not time synchronized	1. Indian Electricity Grid Code 4.6.3 2. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4.D. 3. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1.7.	BSPTCL

9. Status of Reporting (रिपोर्टिंग की स्थिति):

DR/EL not received from BGCL , PG-ER-1 , Muzaffrepur-HAZIPUR -I at Hazipur end not received by BSPTCL .

10. Annexure DR

220 kV Muzafferpur-Hazipur -II DR at Hazipur end :



पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.

CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website: www.erldc.org, Email ID- erldc@posoco.in

घटना संख्या: 05-04-2022/1

दिनांक: 28-04-2022

Report on the grid event in Eastern Region (पूर्वी क्षेत्र में ग्रिड घटना पर रिपोर्ट)

1. Summary of the event (घटना का सारांश):

At 12:19 Hrs on 05th April 2022, 220 kV Daltonganj-Garhwa D/c tripped leading total supply failure at Garhwa and radially fed downstream S/s. As reported by SLDC Jharkhand, 40 MW load loss occurred at Garhwa.

- **Date / Time of disturbance:** 05-04-2022 at 12:19 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 220/132 kV Garhwa S/s
- **Load and Generation loss.**
 - No generation loss occurred during the event.
 - 40 MW load loss reported during the event by SLDC Jharkhand

2. Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- NIL

3. Major elements tripped (प्रमुख ट्रिपिंग)

- 220 kV Daltonganj-Garhwa D/c

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

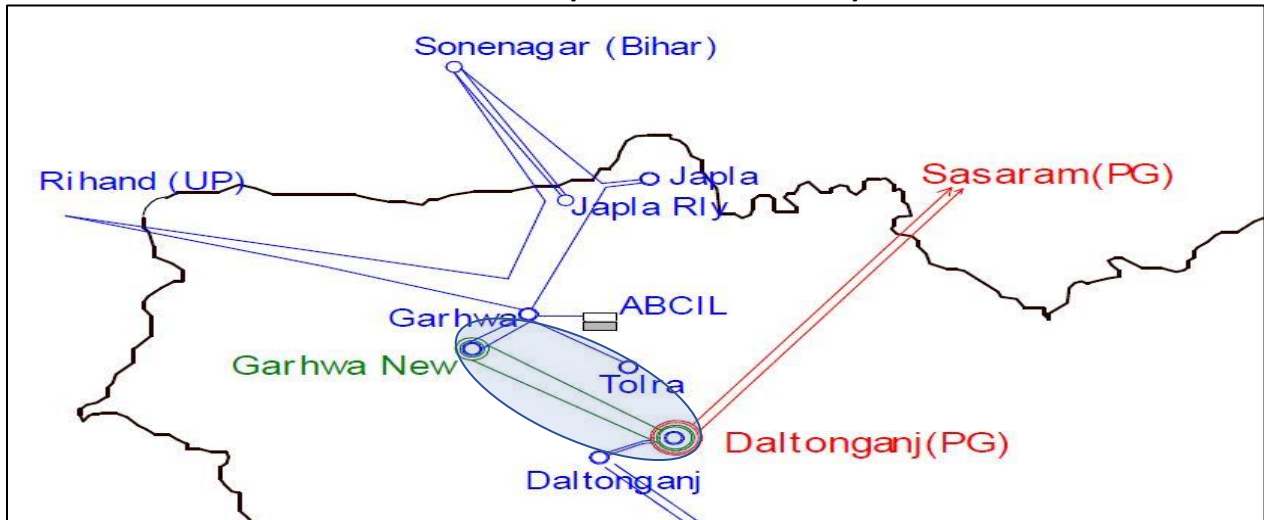


Figure 1: Network across the affected area

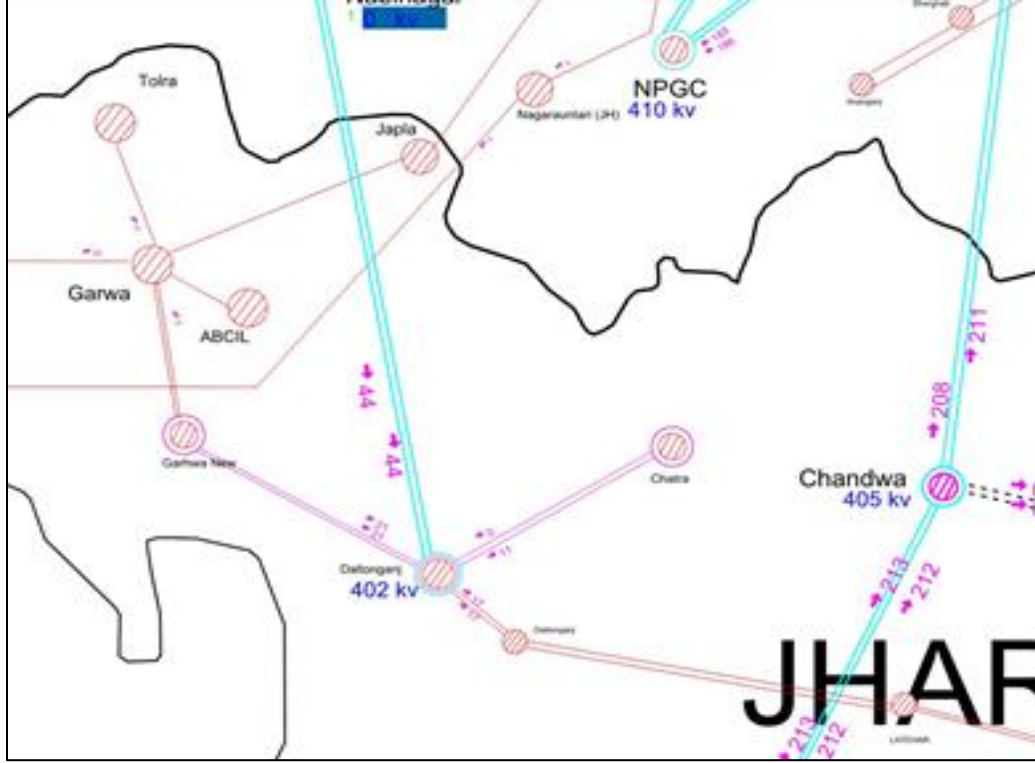
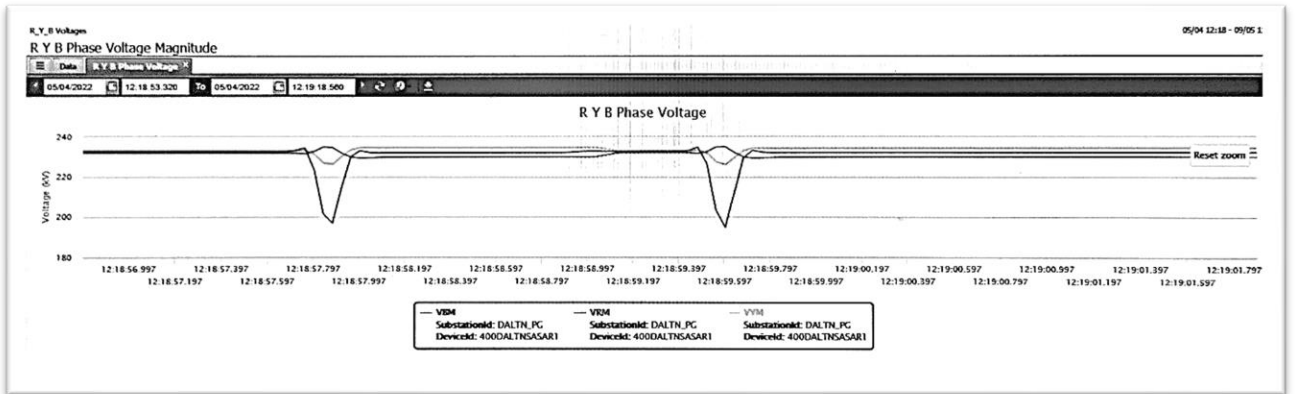


Figure 2: SCADA snapshot for of the system

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
12:19	220 kV Daltonganj-Garhwa-1	Daltonganj: B_N, Zone-1, 2.4 kA, 32.5 km, A/r successful, tripped again within reclaim time	Garhwa: B_N, Zone-1, 1.24 kA, 58.17 km	35 kV dip in B_ph voltage at Daltonganj. A/r successful after 1 sec. Line tripped again within reclaim time after 600 msec.
	220 kV Daltonganj-Garhwa-2	Daltonganj: Didn't trip	-	



PMU Voltage snapshot of 400/220 kV Daltonganj S/s

5. Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Daltonganj-Garhwa-1	14:02
220 kV Daltonganj-Garhwa-2	14:01

6. Analysis of the event & Protection issue (घटना का विश्लेषण और सुरक्षा समस्या):

- There was a B_N fault in 220 kV Daltonganj-Garhwa-1.
- A/r successful from both ends after 1 second. Line tripped again after 600 msec in reclaim time.
- Single phase tripping at Garhwa end during tripping in reclaim time. JUSNL may explain.
- Reason for tripping of 220 kV Daltonganj-Garhwa-2 from Garhwa end maybe shared by JUSNL.

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

Issues	Regulation Non-Compliance	Utility
DR/EL not provided within 24 Hours	1. IEGC 5.2 (r) 2. CEA grid Standard 15.3	JUSNL, PG
Incorrect/ mis-operation / unwanted operation of Protection system	1. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4.A. 2. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	JUSNL
DR/EL are not time synchronized	1. Indian Electricity Grid Code 4.6.3 2. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4.D. 3. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1.7.	JUSNL

8. Status of Reporting (रिपोर्टिंग की स्थिति):

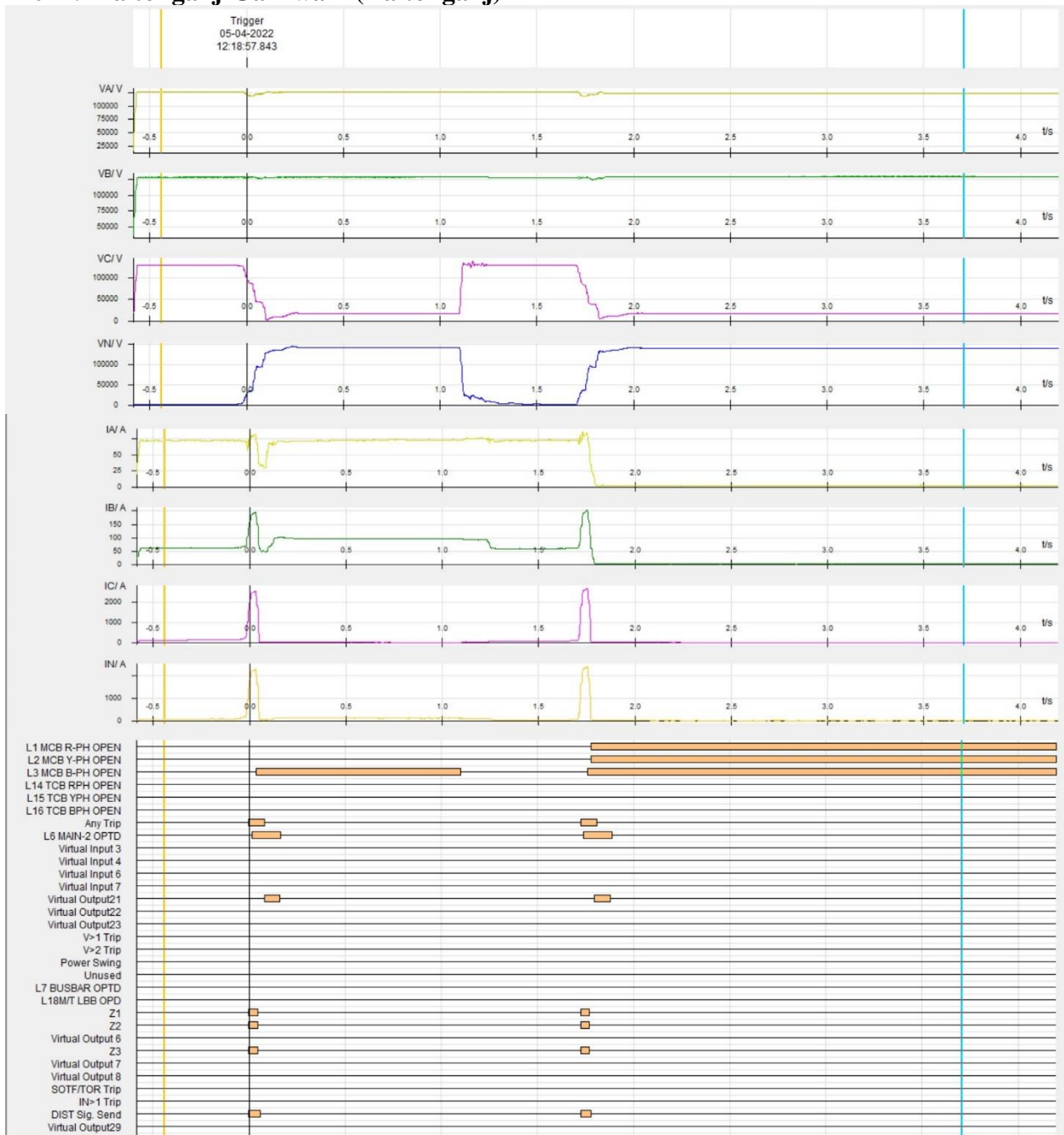
- DR/EL received from PG ER-1.
- Complete DR/EL yet to be received from JUSNL.

Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event.

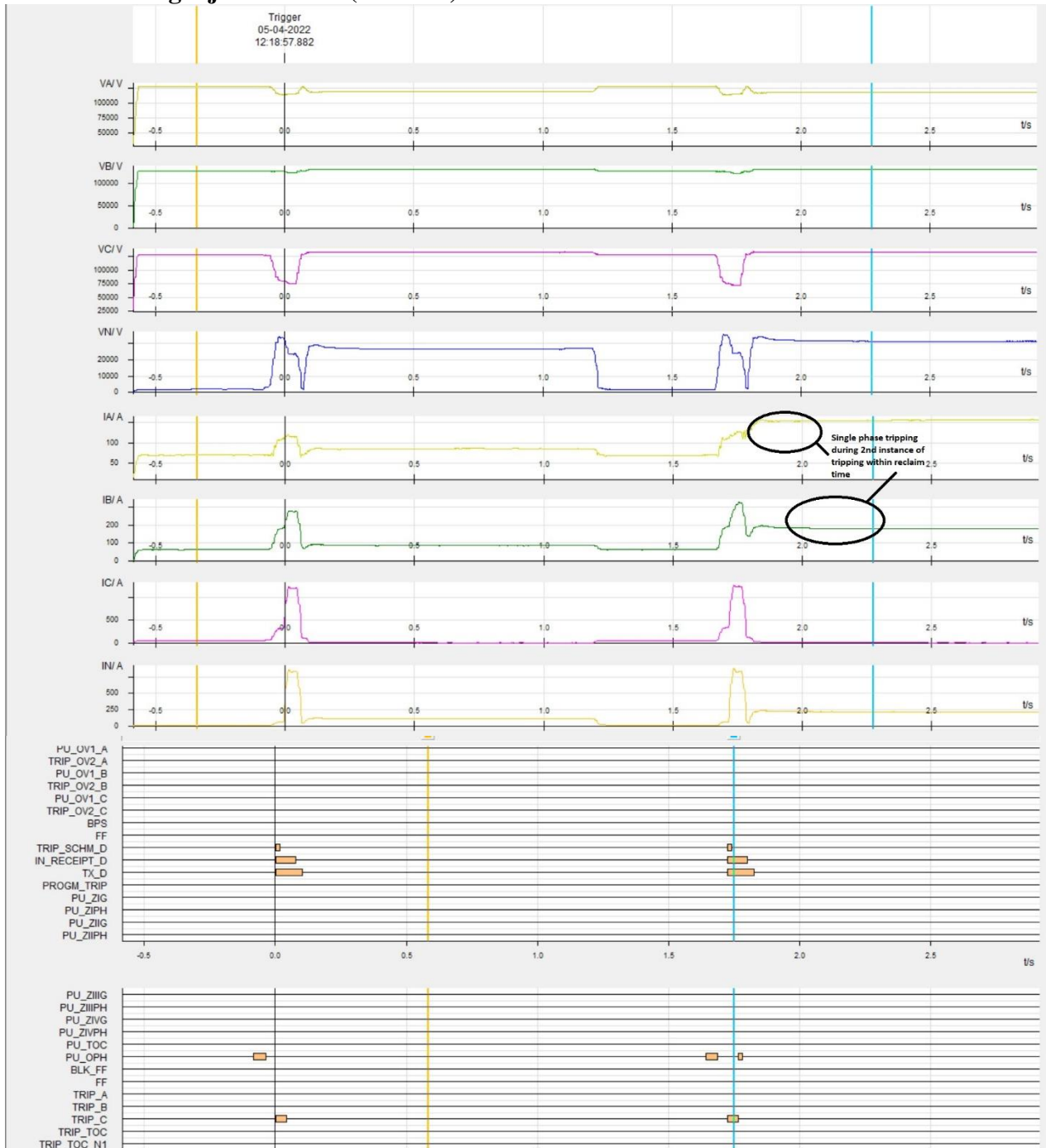
TIME	STATION	DESCRIPTION	STATUS
12:18:58.739	DALTN_PG	220_GARHWA_1_CB	Travel
12:18:59.816	DALTN_PG	220_GARHWA_1_CB	Closed
12:19:00.484	DALTN_PG	220_GARHWA_1_CB	Open

Annexure 2: DR recorded

220 kV Daltonganj-Garhwa-1 (Daltonganj)



220 kV Daltonganj-Garhwa-1 (Garhwa)



पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड

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फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website:www.erldc.org, Email ID- erldc@posoco.in

घटना संख्या: 23-04-2022/1

दिनांक: 28-04-2022

Report on the grid events in Eastern Region (पूर्वी क्षेत्र में ग्रिड घटना पर रिपोर्ट)

Summary of the events (घटनाओं का सारांश):

Event 1: At 12:37 Hrs on 23-04-2022, 400 kV Teesta 5-Rangpo-1 tripped from Teesta 5 end only due to delayed clearance of fault in 400 kV Rangpo-Binaguri-1. This led to total power failure at Teesta 5 (400 kV Teesta 5-Rangpo-2 was under shutdown). One running unit at Teesta-5 tripped and 168 MW generation loss occurred.

Event 2: At 18:20 Hrs on 26-04-2022, 400 kV Teesta 5-Rangpo-1 tripped due to R_B_N fault. This led to total power failure at Teesta 5 (400 kV Teesta 5-Rangpo-2 was under shutdown). All three running units at Teesta-5 tripped and 512 MW generation loss occurred.

Event 3: At 18:59 Hrs on 26-04-2022, 400 kV Teesta 5-Rangpo-1 tripped again due to R_B_N fault. This led to total power failure at Teesta 5 (400 kV Teesta 5-Rangpo-2 was under shutdown). Two running units at Teesta-5 tripped and 340 MW generation loss occurred.

Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- 400 kV Teesta 5- Rangpo-2

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

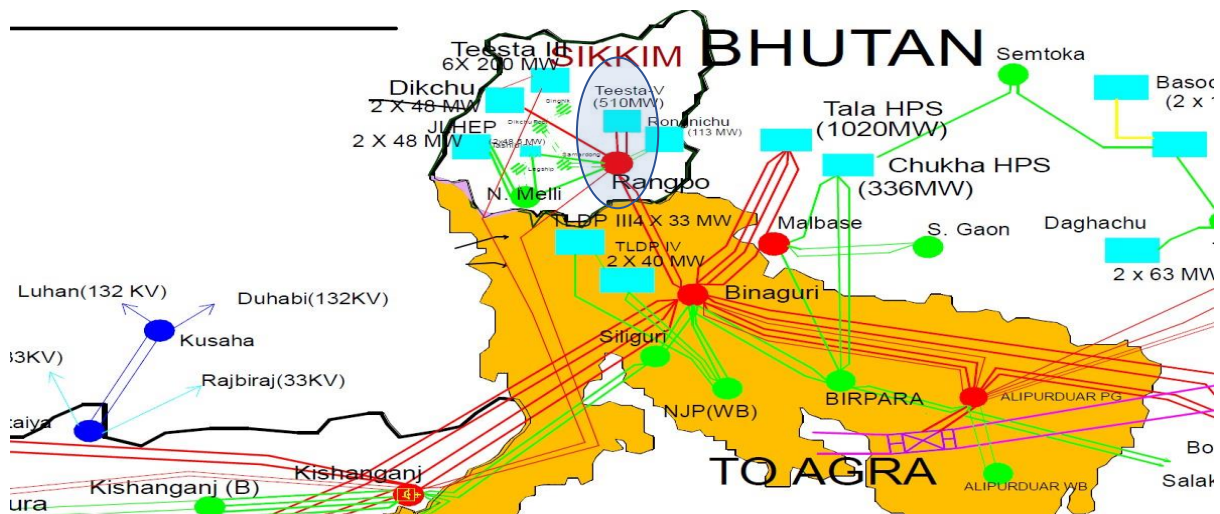


Figure 1: Network across the affected area

Event 1: 12:37 Hrs on 23.04.2022

At 12:37 Hrs, 400 kV Teesta 5-Rangpo-1 tripped from Teesta 5 end only due to delayed clearance of fault in 400 kV Rangpo-Binaguri-1. This led to total power failure at Teesta 5 (400 kV Teesta 5-Rangpo-2 was under shutdown). One running unit at Teesta-5 tripped and 168 MW generation loss occurred.

- **Date / Time of disturbance:** 23-04-2022 at 12:37 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta-5 S/s
- **Load and Generation loss.**
 - 168 MW generation loss reported during the event.

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
12:37	400 kV Teesta 5-Rangpo-1	Teesta 5: DEF	Didn't trip	Gradual dip in voltage at Rangpo. 21 kV dip observed. Fault clearance time: 1.8 sec
	400 kV Binaguri-Rangpo-1	Binaguri: DT received	Rangpo: DEF, Ir: 2.7 kA	



Figure 2: PMU voltage snapshot of 400/220/132 kV Rangpo S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 5-Rangpo-1	12:56
400 kV Binaguri-Rangpo-1	13:20

Analysis of the event (घटना का विश्लेषण):

- There was a highly resistive fault in 400 kV Rangpo-Binaguri-1 line, which was cleared in around 1.8 seconds by Rangpo.
- 400 kV Teesta 5-Rangpo-1 tripped from Teesta 5 end on DEF in 1.6 seconds prior to tripping of 400 kV Binaguri-Rangpo-1. **DEF settings to be co-ordinated to avoid tripping of healthy lines.**

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL received from Teesta-5 and PG ER-2.

Event 2: 18:20 Hrs on 26.04.2022

At 18:20 Hrs, 400 kV Teesta 5-Rangpo-1 tripped due to R_B_N fault. This led to total power failure at Teesta 5 (400 kV Teesta 5-Rangpo-2 was under shutdown). All three running units at Teesta-5 tripped and 512 MW generation loss occurred.

- **Date / Time of disturbance:** 26-04-2022 at 18:20 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta-5 S/s
- **Load and Generation loss.**
 - 512 MW generation loss reported during the event.

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
18:20	400 kV Teesta 5-Rangpo-1	Teesta 5: R_B_N, Ir: 1.96 kA, Ib: 2.6 kA	Rangpo: R_B_N, Ir: 13.7 kA, Ib: 14.3 kA	

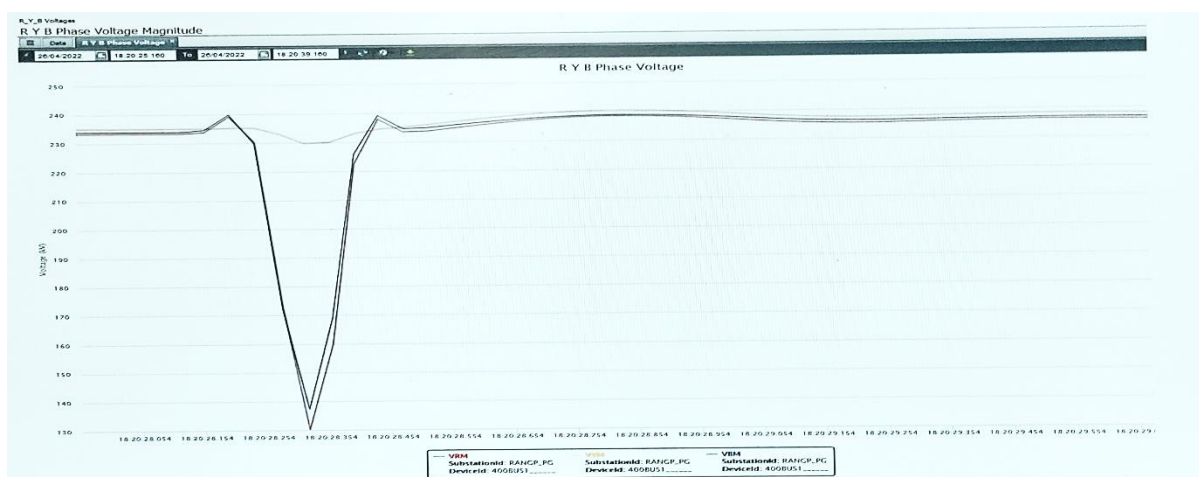


Figure 3: PMU voltage snapshot of 400/220/132 kV Rangpo S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 5-Rangpo-1	18:42

Analysis of the event (घटना का विश्लेषण):

- There was a R_B_N fault in the line. All three running units tripped after tripping of line due to loss of evacuation path.

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL received from Teesta-5 and PG ER-2.

Event 3: 18:59 Hrs on 27.04.2022

At 18:59 Hrs, 400 kV Teesta 5-Rangpo-1 tripped again due to R_B_N fault. This led to total power failure at Teesta 5 (400 kV Teesta 5-Rangpo-2 was under shutdown). Two running units at Teesta-5 tripped and 340 MW generation loss occurred.

- **Date / Time of disturbance:** 27-04-2022 at 18:59 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta-5 S/s
- **Load and Generation loss.**
 - 340 MW generation loss reported during the event.
 - No load loss occurred during the event.

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
18:59	400 kV Teesta 5-Rangpo-1	Teesta 5: R_B_N, Ir: 1.39 kA, Ib: 2.39 kA	Rangpo: R_B_N, 9.9 km Ir: 3.14 kA, Ib: 9.9 kA	

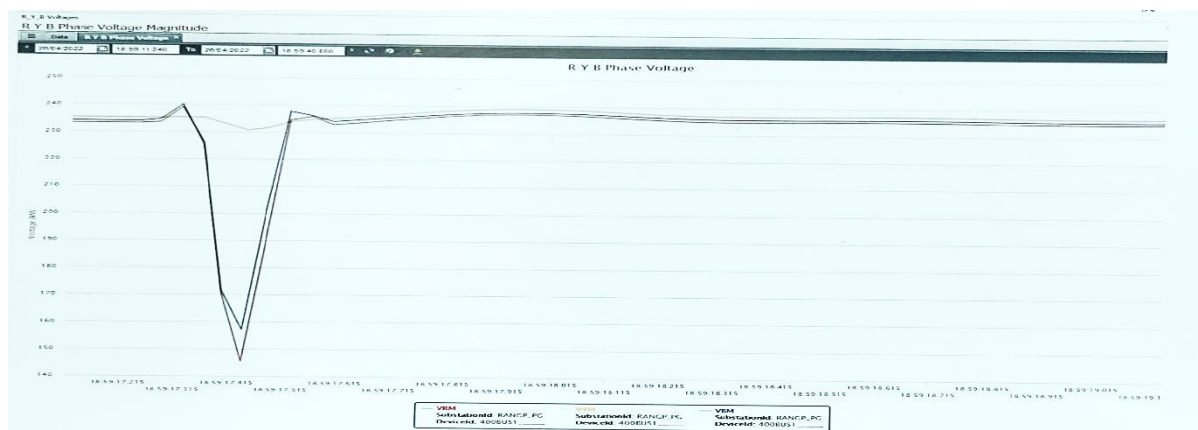


Figure 4: PMU voltage snapshot of 400/220/132 kV Rangpo S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 5-Rangpo-1	21:33

Analysis of the event (घटना का विश्लेषण):

- There was a R_B_N fault in the line. All three running units tripped after tripping of line due to loss of evacuation path.

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL received from Teesta-5 and PG ER-2.

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

Issues	Regulation Non-Compliance	Utility
DR/EL not provided within 24 Hours	1. IEGC 5.2 (r) 2. CEA grid Standard 15.3	PG ER-2
Incorrect/ mis-operation / unwanted operation of Protection system	1. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4.A. 2. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Teesta 5, PG ER-2
DR/EL are not time synchronized	1. Indian Electricity Grid Code 4.6.3 2. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4.D. 3. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1.7.	Teesta 5

Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event.

Event 1

TIME	STATION	DESCRIPTION	STATUS
12:37:09.562	SI400_PG	400_RANGP_PG_1_Main_CB	Open
12:37:09.577	RANGP_PG	400_SI400_PG_1_CB	Open
12:37:13.766	TEEST_PG	400_Unit3_CB	Open

Event 2

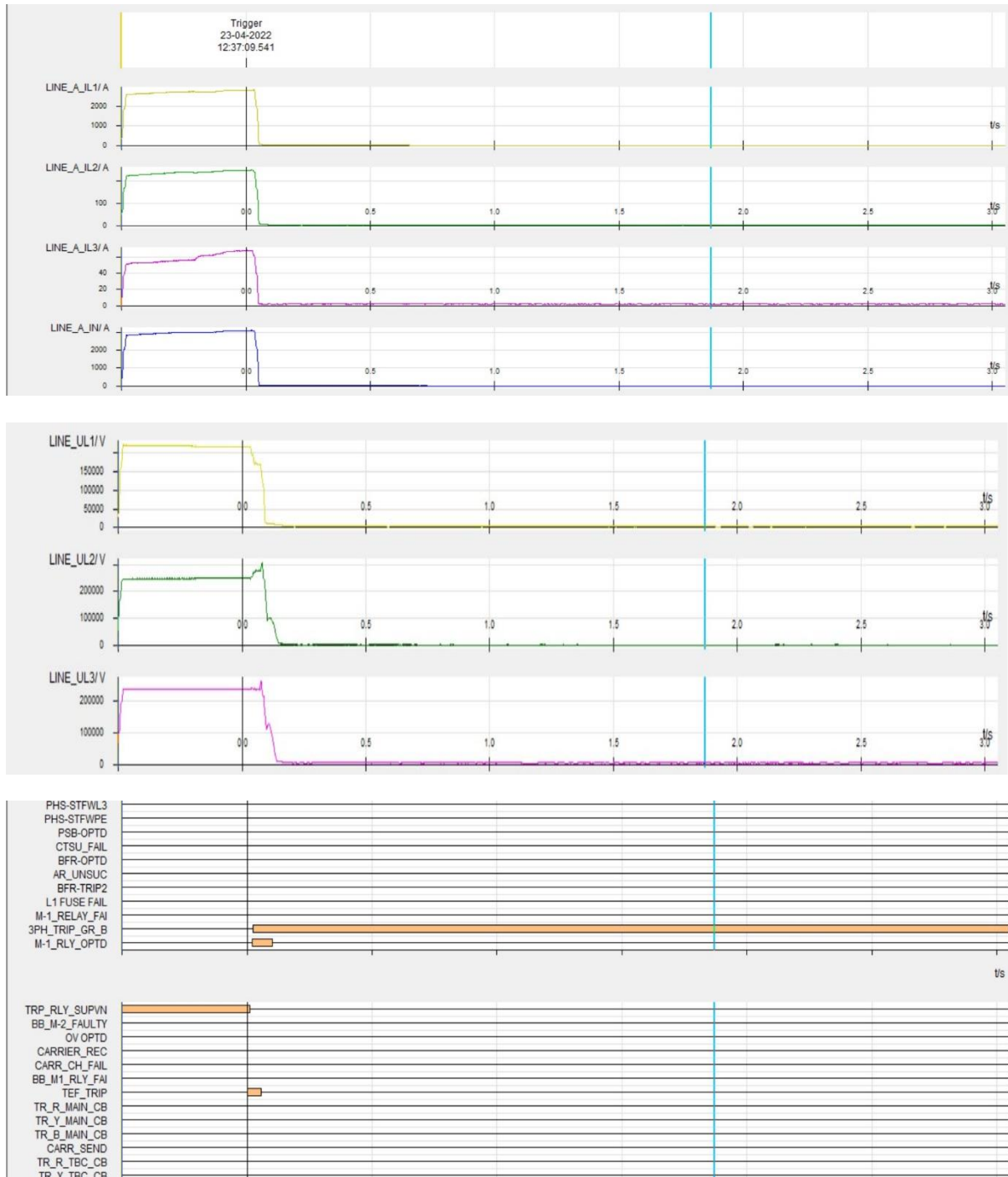
TIME	STATION	DESCRIPTION	STATUS
18:20:27.168	TEEST_PG	400_RANGP_PG_1_CB	Open
18:20:28.359	RANGP_PG	400_TEEST_PG_1_CB	Open
18:20:31.336	TEEST_PG	400_Unit1_CB	Open
18:20:31.339	TEEST_PG	400_Unit3_CB	Open
18:20:31.343	TEEST_PG	400_Unit2_CB	Open

Event 3

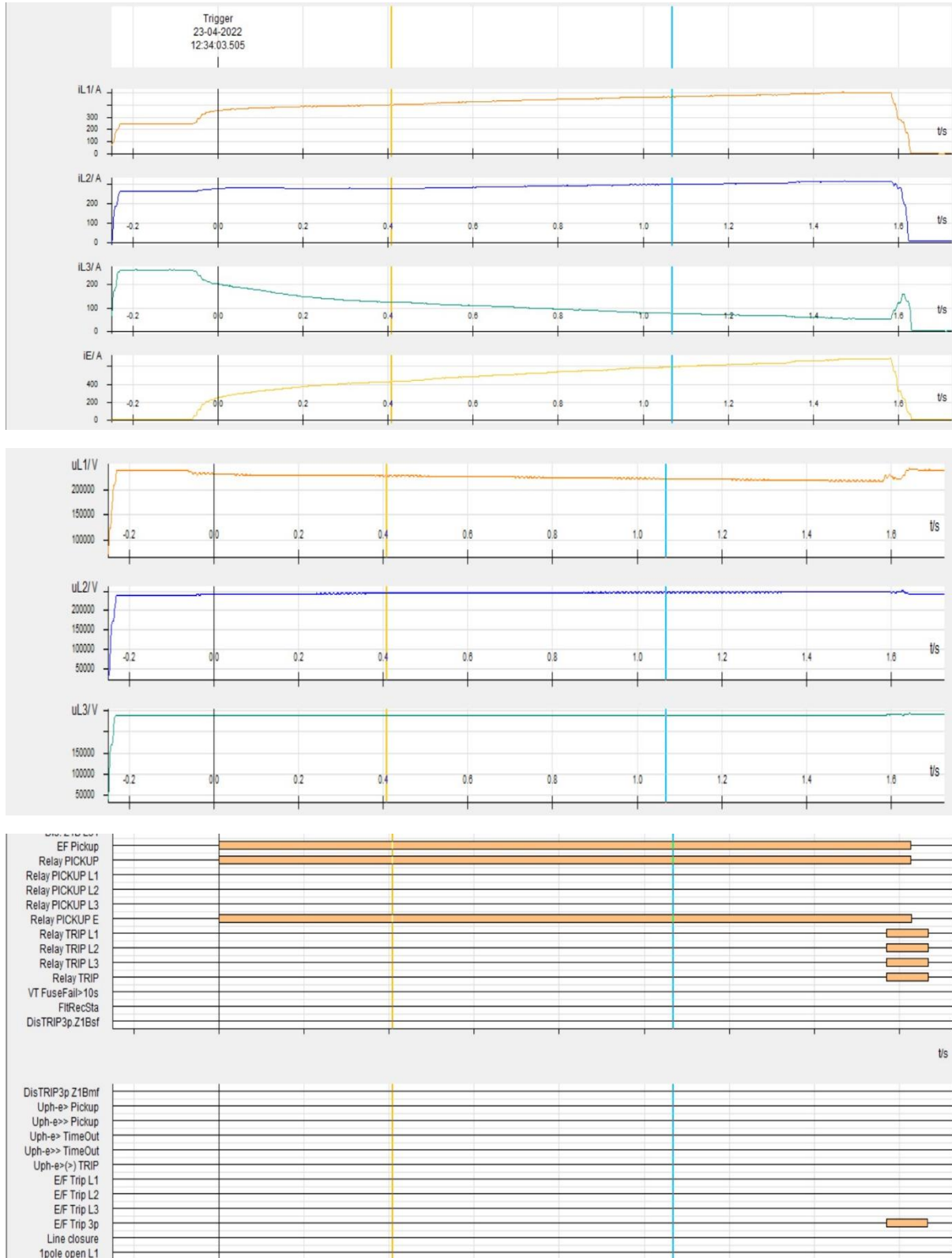
TIME	STATION	DESCRIPTION	STATUS
18:59:16.247	TEEST_PG	400_RANGP_PG_1_CB	Open
18:59:17.464	RANGP_PG	400_TEEST_PG_1_CB	Open
18:59:20.500	TEEST_PG	400_Unit3_CB	Open
18:59:20.506	TEEST_PG	400_Unit1_CB	Open

Annexure 2: DR recorded

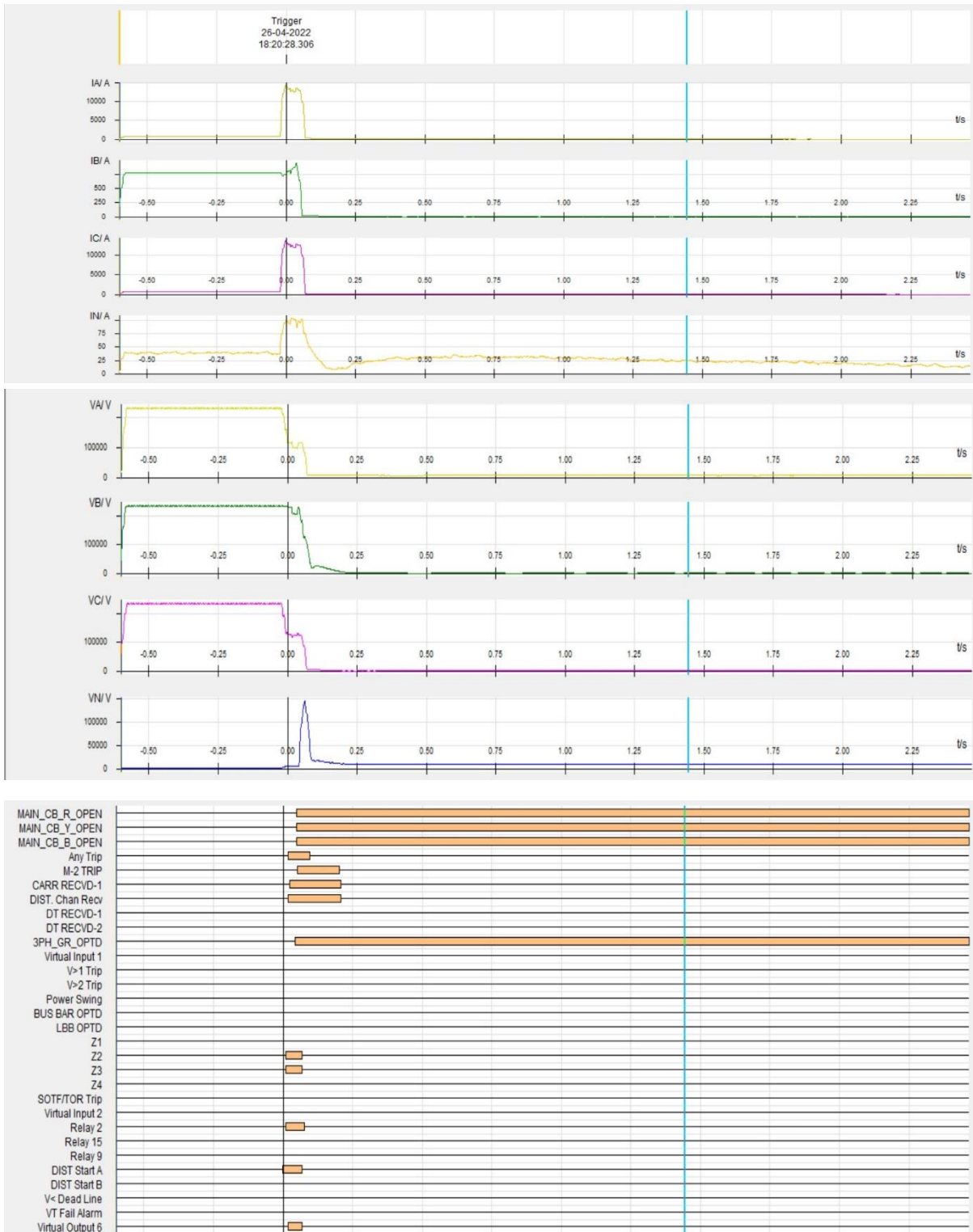
Event 1: 400 kV Binaguri-Rangpo-1 (Rangpo end)



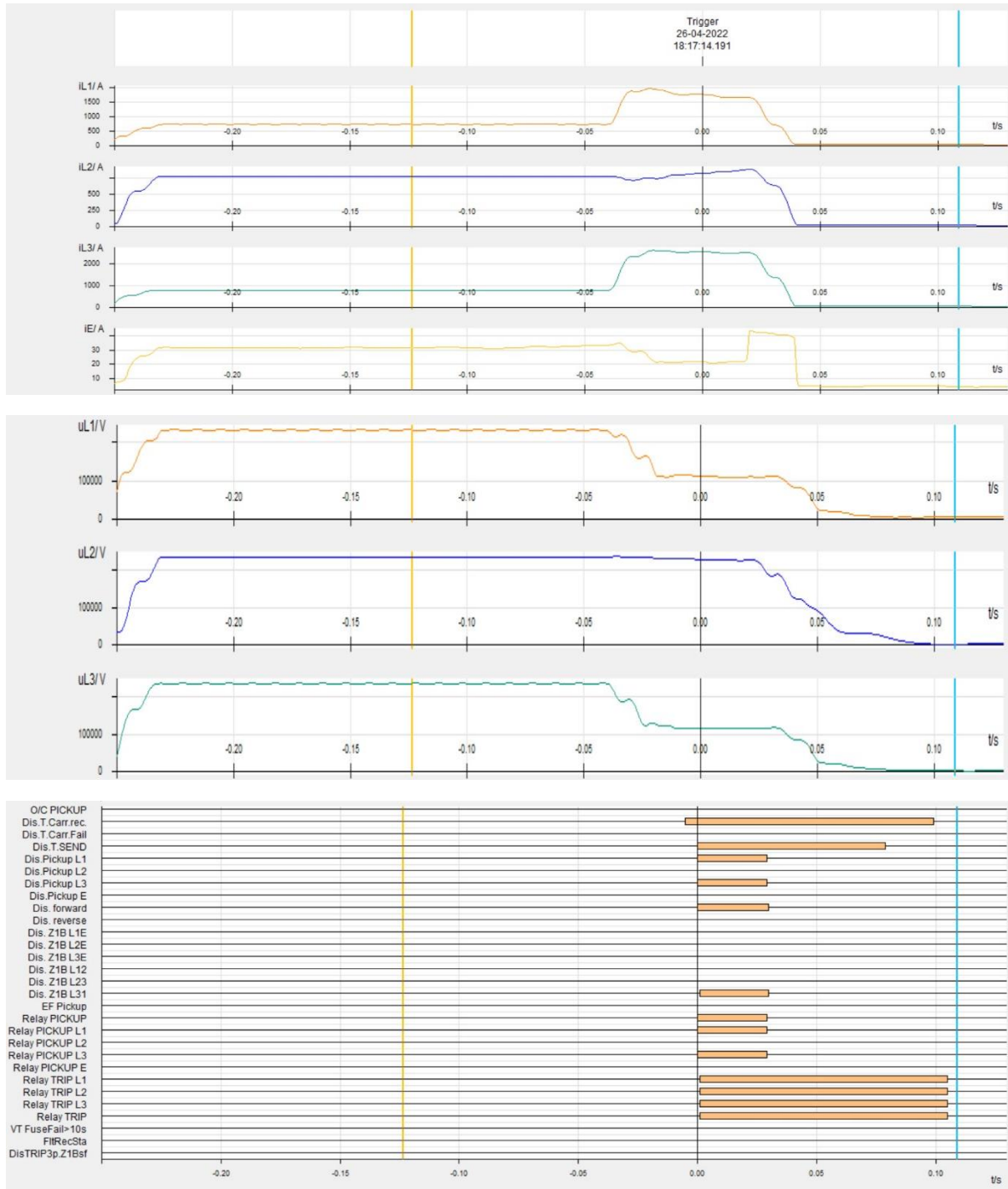
Event 1: 400 kV Teesta 5-Rangpo-1 (Teesta 5 end)



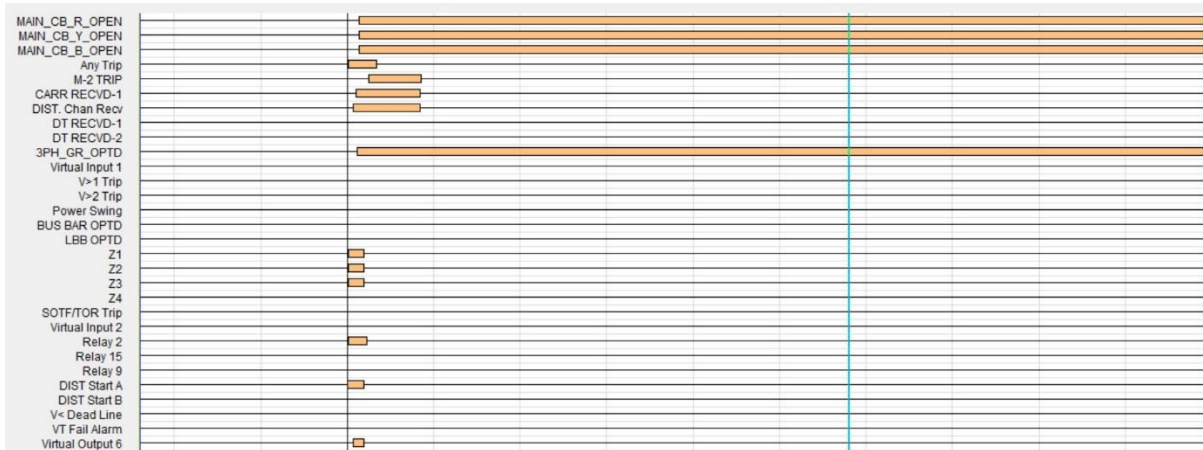
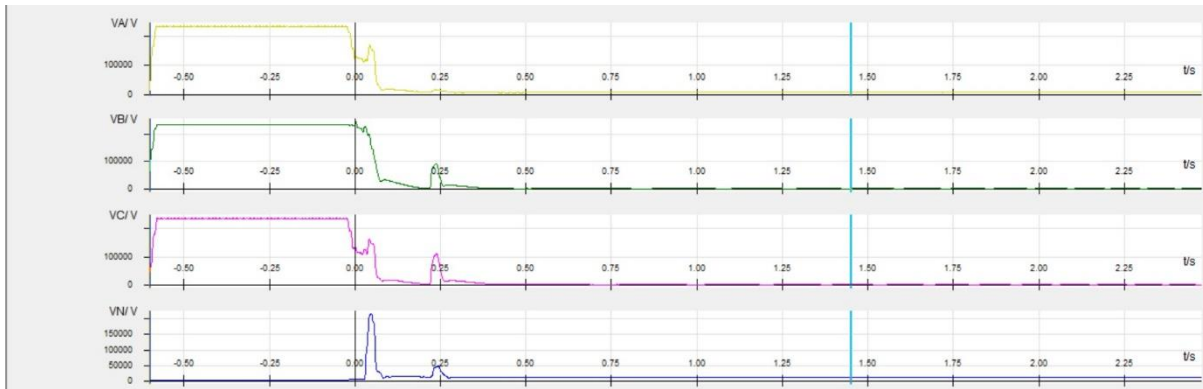
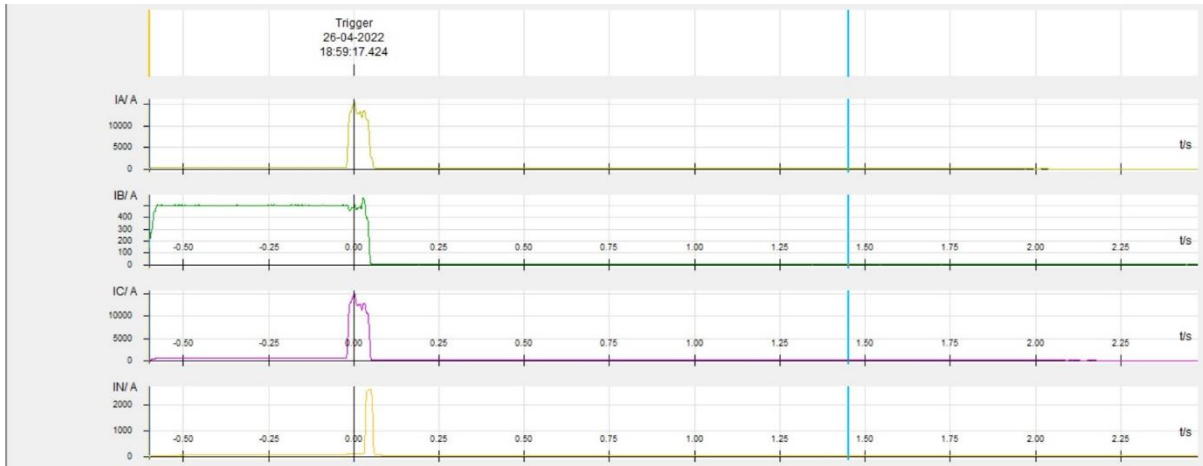
Event 2: 400 kV Teesta 5-Rangpo-1 (Rangpo end)



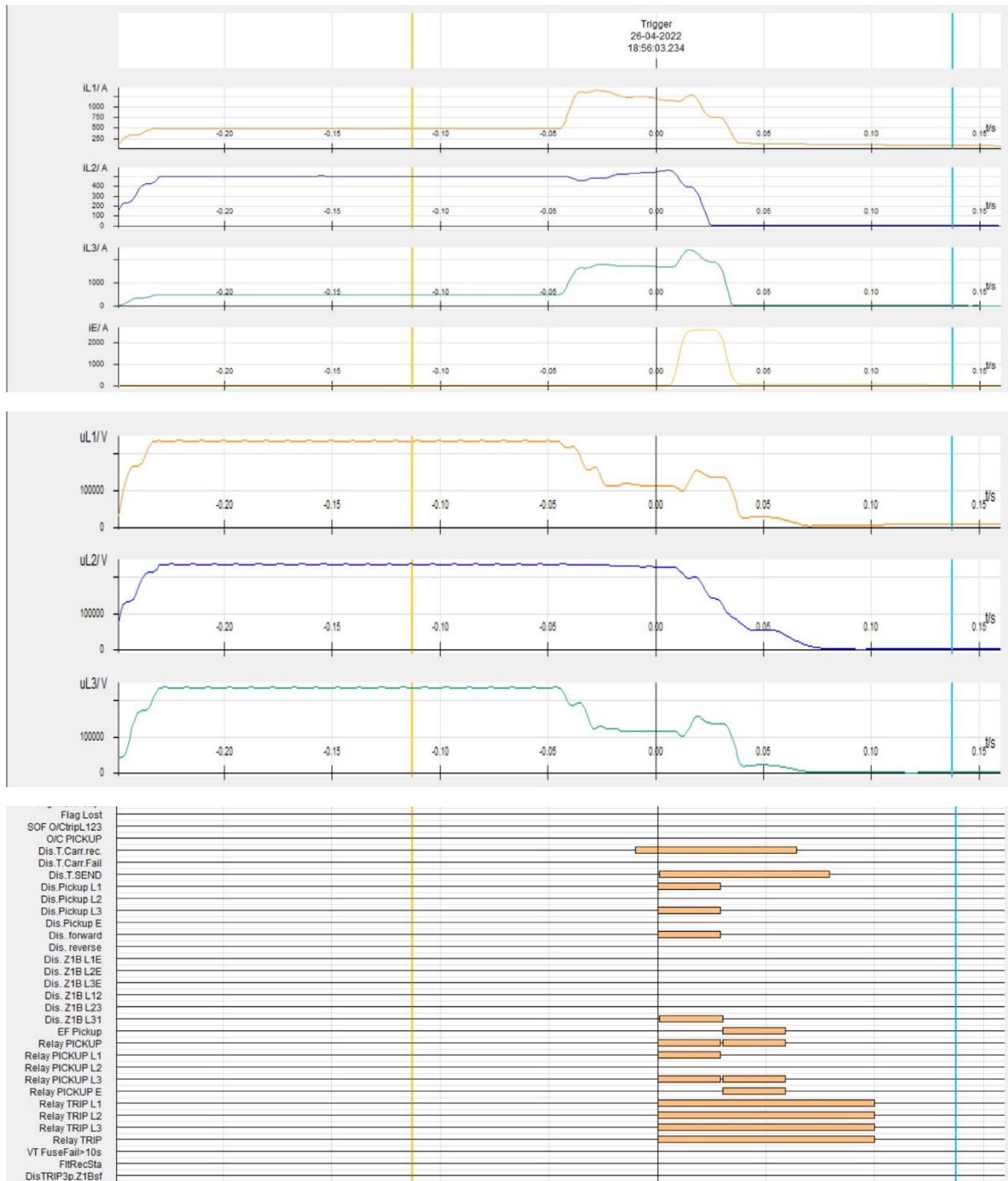
Event 2: 400 kV Teesta 5-Rangpo-1 (Teesta end)



Event 3: 400 kV Teesta 5-Rangpo-1 (Rangpo end)



Event 3: 400 kV Teesta 5-Rangpo-1 (Teesta 5 end)



पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



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CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website:www.erldc.org, Email ID- erldc@posoco.in

घटना संख्या: 26-04-2022/1

दिनांक: 28-04-2022

Report on the grid event in Eastern Region (पूर्वी क्षेत्र में ग्रिड घटना पर रिपोर्ट)

1. Summary of the event (घटना का सारांश):

At 19:24 Hrs on 26th April 2022, 220 kV Jorethang-New Melli-2 tripped due to R_N fault leading to total power failure at Jorethang as 220 kV Jorethang-New Melli-1 already tripped at 19:11 Hrs. No generation loss occurred.

- **Date / Time of disturbance:** 26-04-2022 at 19:24 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 220 kV Jorethang S/s
- **Load and Generation loss.**
 - No generation loss or load loss reported during the event.

2. Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- 220 kV Jorethang-New Melli-1

3. Major elements tripped (प्रमुख ट्रिपिंग)

- 220 kV Jorethang-New Melli-2

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

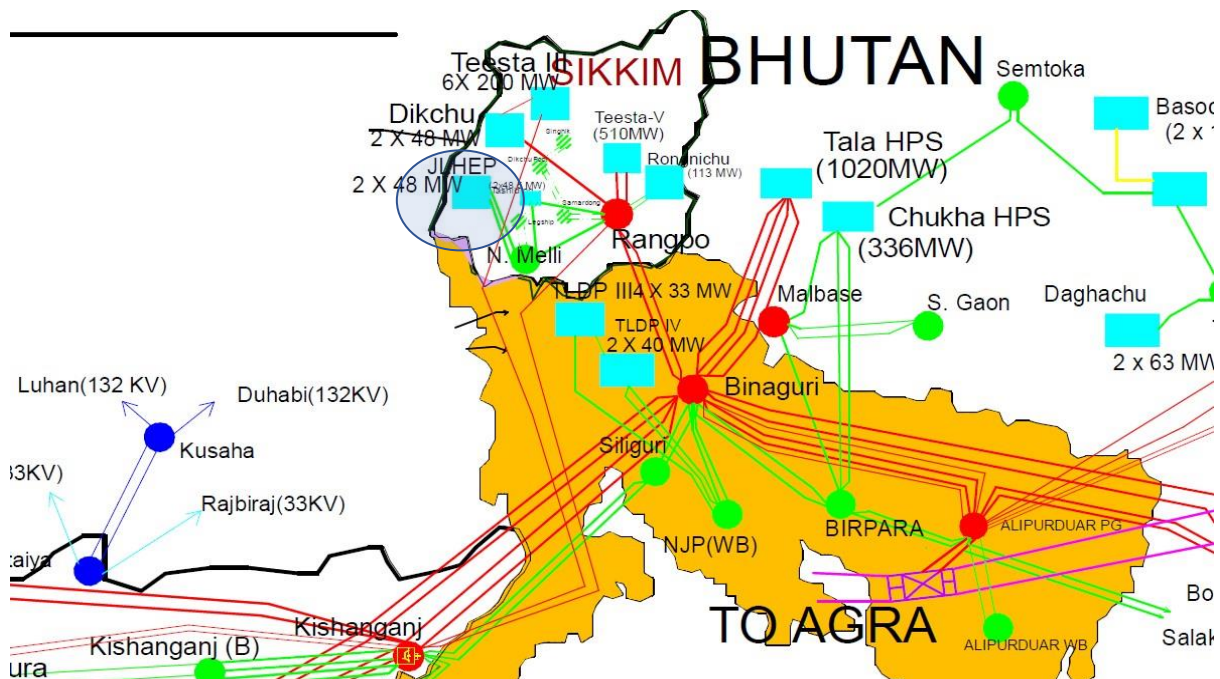


Figure 1: Network across the affected area

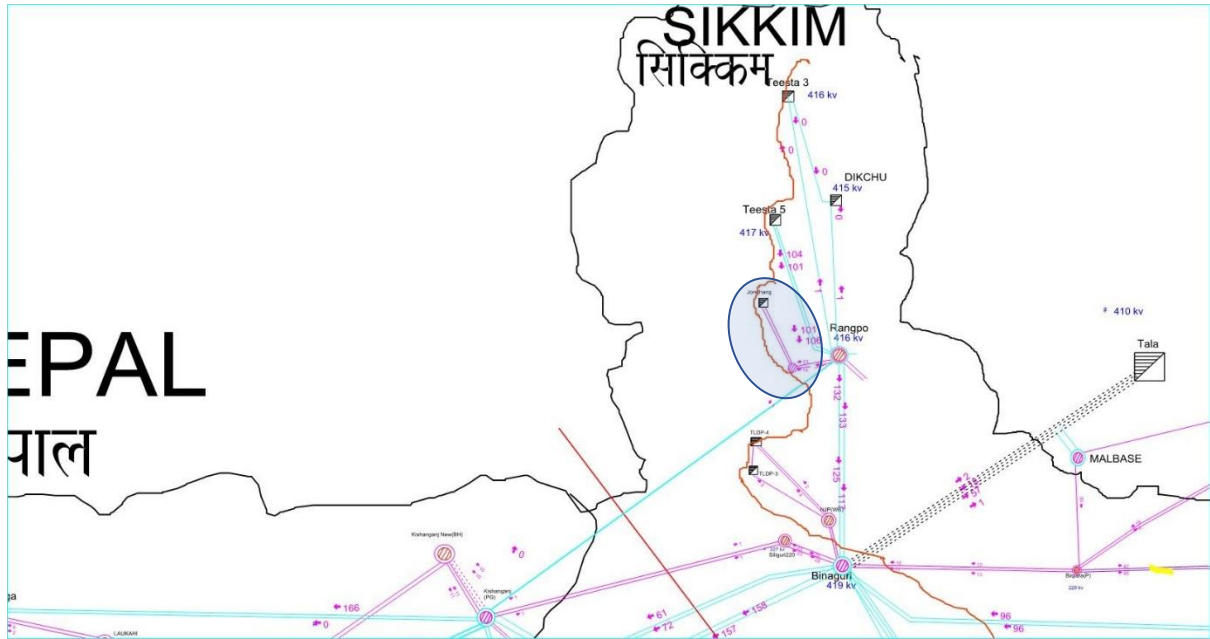


Figure 2: SCADA snapshot for of the system

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
19:24	220 kV Jorethang-New Melli-2	Jorethang: R_N	New Melli: R_N	35 kV dip in R_ph voltage for 350 msec

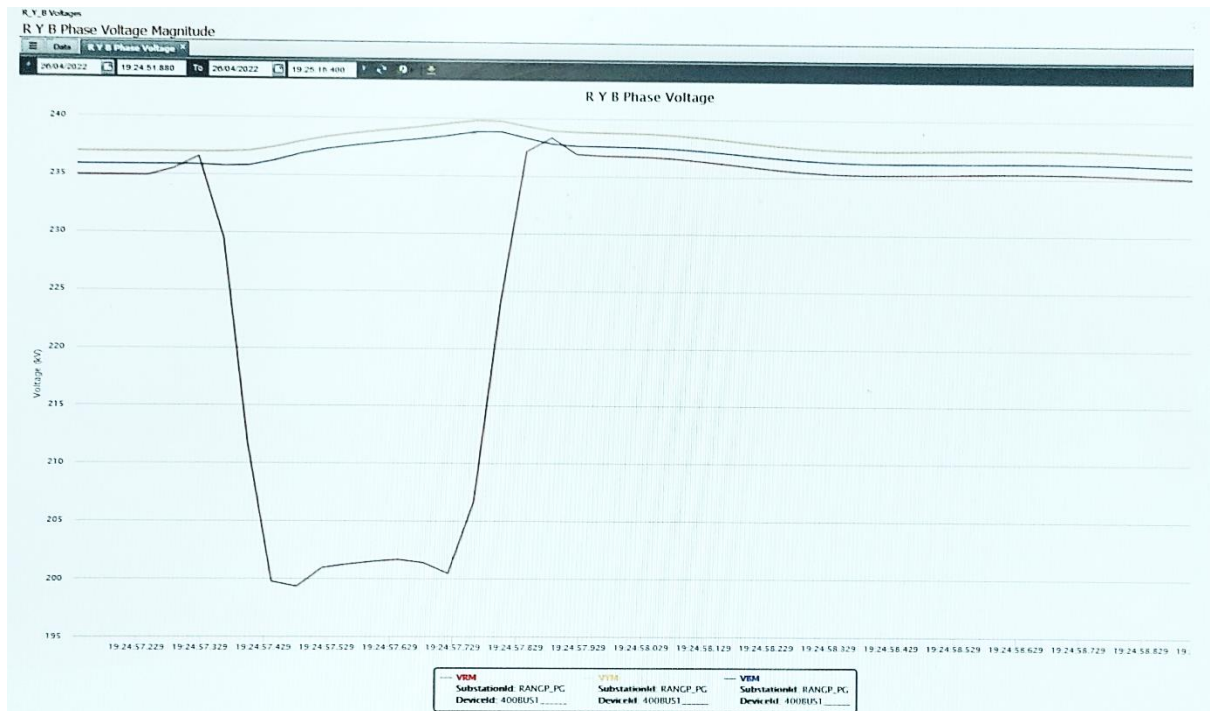


Figure 3: PMU voltage snapshot of 400/220/132 kV Rangpo S/s

5. Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Jorethang-New Melli-1	20:03
220 kV Jorethang-New Melli-2	20:05

6. Analysis of the event (घटना का विश्लेषण):

- 220 kV Jorethang-New Melli-2 tripped in Zone-2 time (350 msec) from Rangpo. No carrier signal received at Rangpo. Carrier healthiness maybe ensured for A/r operation.

7. Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL yet to be received from Jorethang & New Melli.

Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event.

TIME	STATION	DESCRIPTION	STATUS
19:11:34.167	MELNW_PG	220_JORET_PG_1_CB	Open
19:11:35.231	JORET_PG	220_MELNW_PG_1_CB	Open
19:24:57.790	MELNW_PG	220_JORET_PG_2_CB	Open

Annexure 2: DR recorded

DR/EL not received.

पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.

CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website:www.erldc.org, Email ID- erldc@posoco.in

घटना संख्या: 17-04-2022/1

दिनांक: 28-04-2022

Report on the grid event in Eastern Region (पूर्वी क्षेत्र में ग्रिड घटना पर रिपोर्ट)

1. Summary of the event (घटना का सारांश):

At 15:07 Hrs, 400 kV Rangpo-Dikchu tripped due to R_N fault. This led to total power failure at Dikchu as main bay of 400 kV Teesta 3-Dikchu was already under breakdown, which caused loss of evacuation path. One running unit at Dikchu also tripped. 55 MW generation loss occurred.

- **Date / Time of disturbance:** 17-04-2022 at 15:07 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Dikchu S/s
- **Load and Generation loss.**
 - 55 MW generation loss reported during the event.
 - No load loss was reported during the event.

2. Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- 400 kV Main Bus-2 at Dikchu
- 400 kV Main bay of Teesta 3-Dikchu at Dikchu

3. Major elements tripped (प्रमुख ट्रिपिंग)

- 400 kV Rangpo-Dikchu
- 400 kV Teesta 3-Dikchu

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

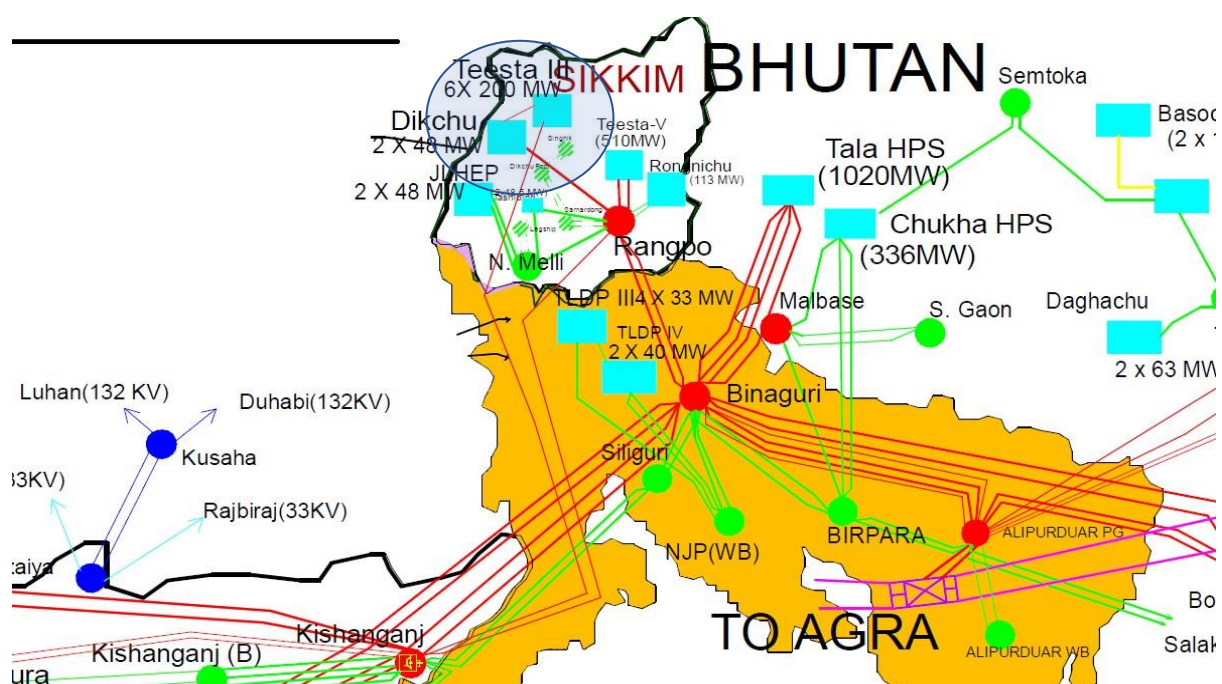


Figure 1: Network across the affected area

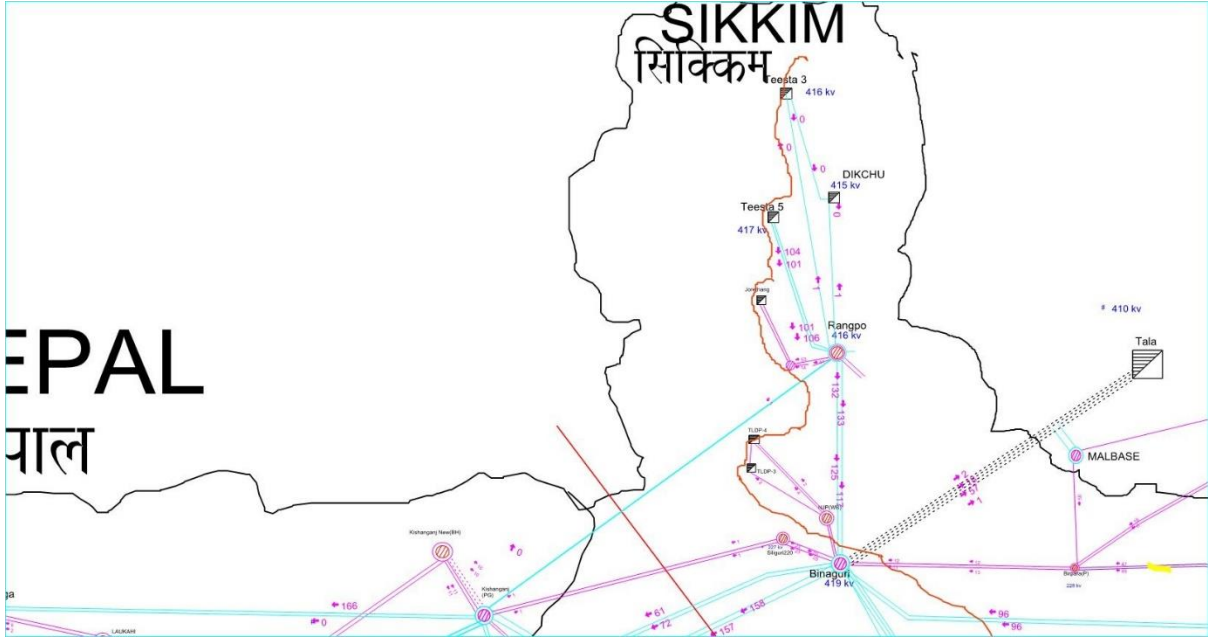


Figure 2: SCADA snapshot for of the system

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
15:07	400 kV Rangpo- Dikchu	Rangpo: R_N, 11.4 km, 10.8 kA	Dikchu: R_N, 48.4 km, Zone-2	156 kV dip in R_ph voltage at Rangpo.
	400 kV Teesta 3-Dikchu	-	Tripped due to tripping of Rangpo-Dikchu line as main bay out of service	

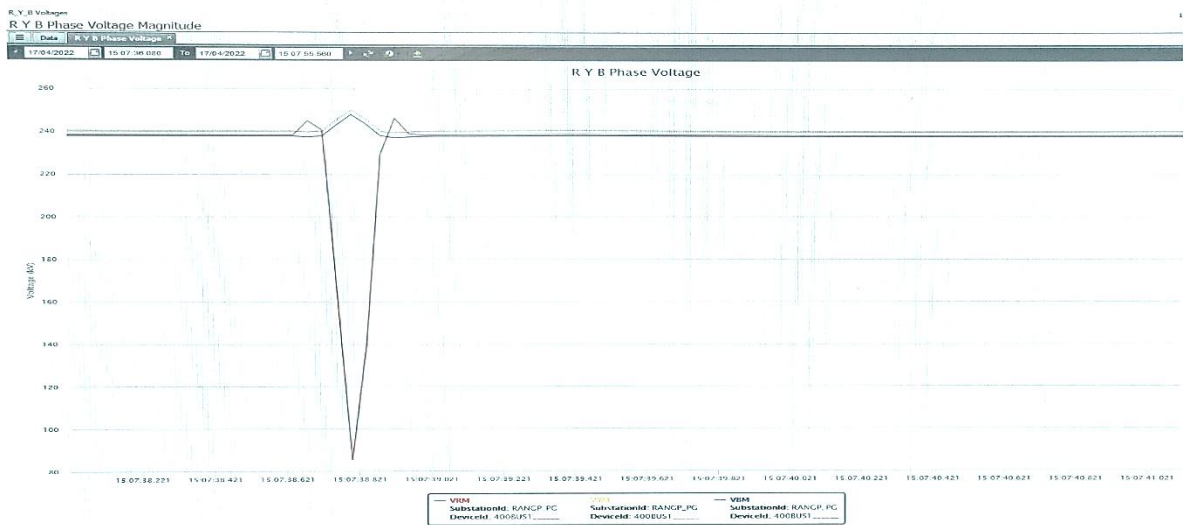


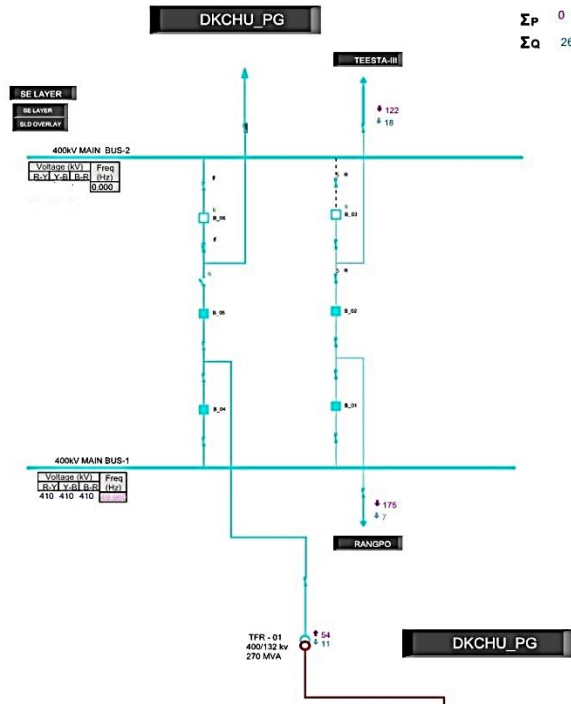
Figure 3: PMU voltage snapshot of 400/220 kV Rangpo S/s

5. Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Rangpo-Dikchu	16:15
400 kV Teesta 3-Dikchu	16:16

6. Analysis of the event (घटना का विश्लेषण):

- 400 kV Rangpo-Dikchu tripped due to R_N fault and A/r was under shutdown for OPGW work. This led to total power failure at Dikchu S/s



- 400 kV Main Bus-2 and main bay of 400 kV Teesta 3-Dikchu may be updated by Dikchu, which is out since 05-05-2021. Dikchu to take necessary action to restore the bay at the earliest to ensure reliability of generation evacuation.

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

Issues	Regulation Non-Compliance	Utility
DR/EL not provided within 24 Hours	1. IEGC 5.2 (r) 2. CEA grid Standard 15.3	Dikchu, PG ER-2

8. Status of Reporting (रिपोर्टिंग की स्थिति):

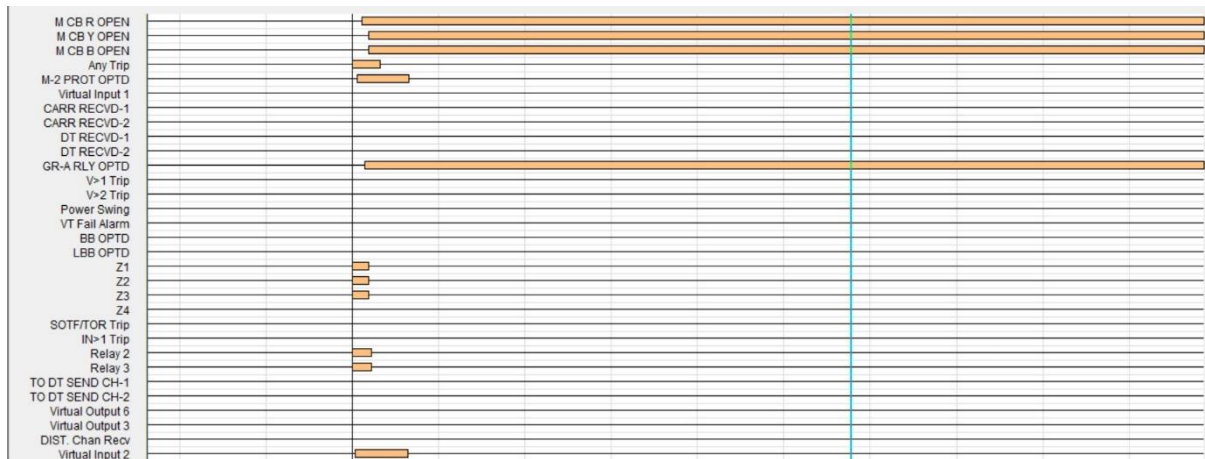
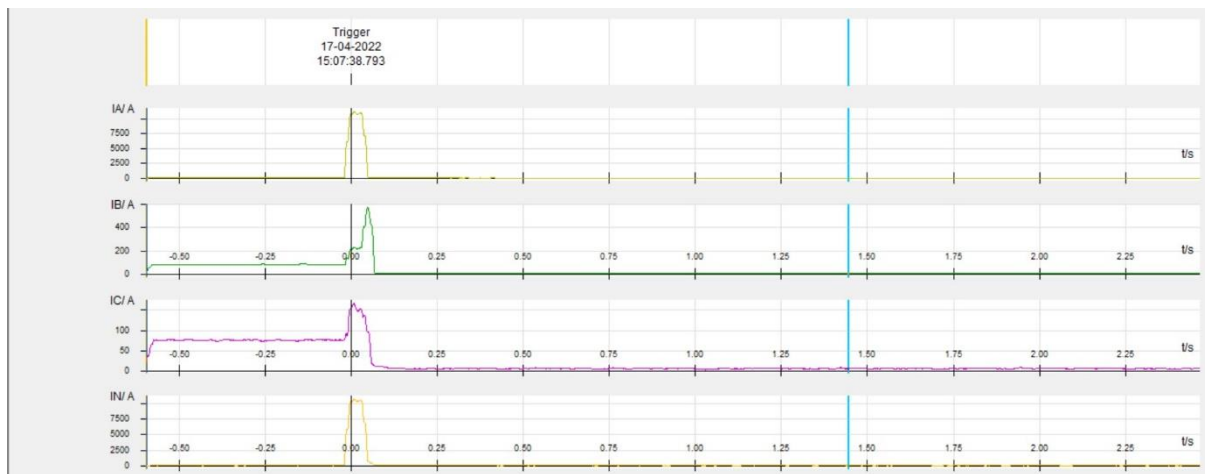
- DR/EL received from PG ER-2, Dikchu.

Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event.

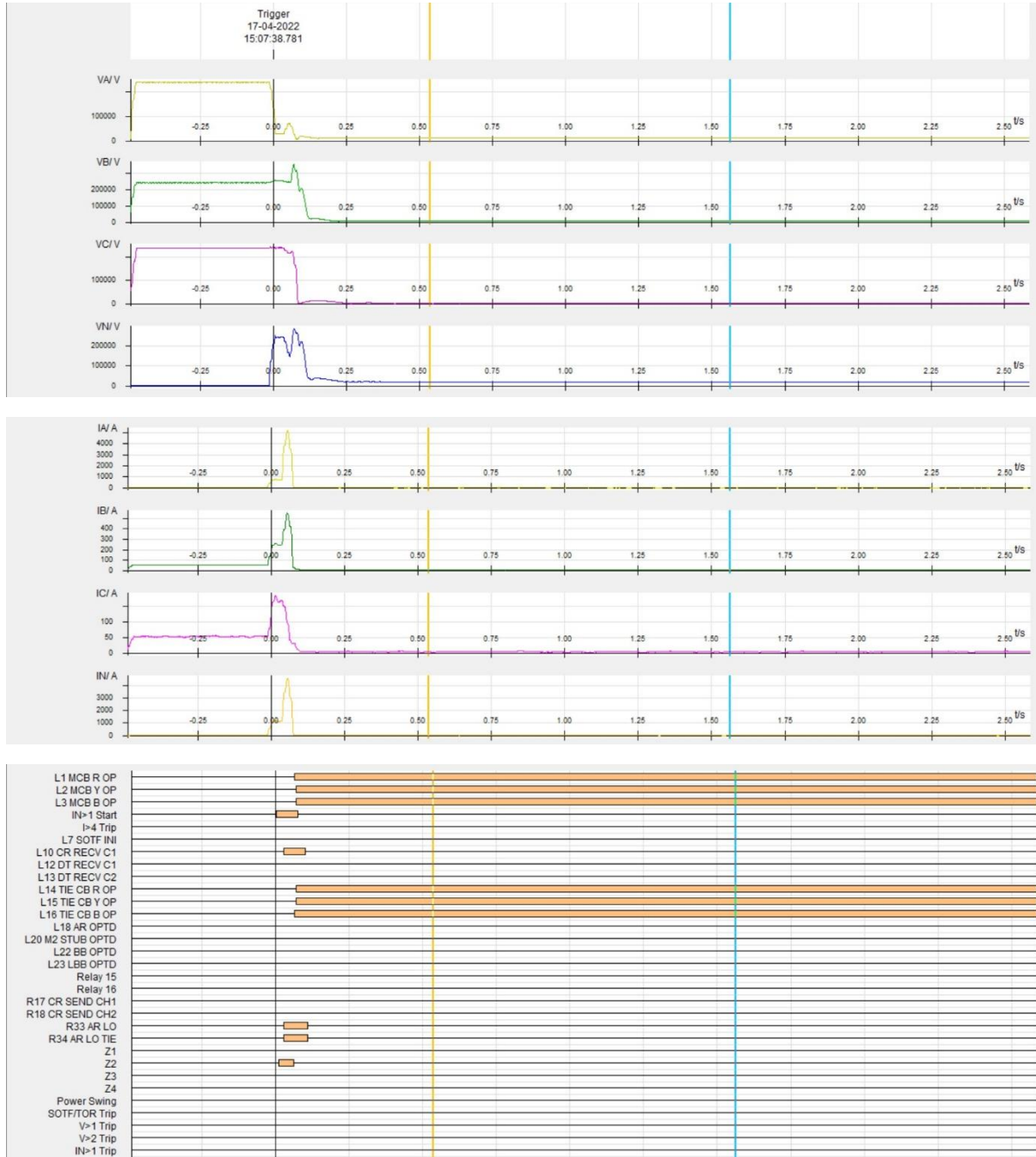
TIME	STATION	DESCRIPTION	STATUS
15:07:38.843	DKCHU_PG	400_TEES3_PG_RANGP_PG_Tie	Open
15:07:38.843	DKCHU_PG	400_RANGP_PG_Main_CB	Open
15:07:38.844	RANGP_PG	400_DIKCHU_PG_CB	Open

Annexure 2: DR recorded

DR of 400 kV Rangpo-Dikchu (Rangpo)



DR of 400 kV Rangpo-Dikchu (Dikchu)



List of important transmission lines in ER which tripped in April-2022

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	PMU Location	LOCAL END UTILITY	REMOTE END UTILITY
1	220KV-TENUGHAT-BIHARSHARIF	01-04-2022	10:20	01-04-2022	10:54	Biharshariff : Y_N 98.72km, Ib:- 1.374kA	TTPS: Y_N, Z-1, 66.30 km, Ib-1.097kA	Y-Earth	200	Resistive fault. Three phase tripping for single phase fault	Tenughat	TVNL	BSPTCL
2	400kV-ALIPURDUAR (PG)-PUNASANGCHUN-2	04-04-2022	05:03	04-04-2022	05:33	Alipurduar: R- N Z-1 ,90.2km, Ir-10.4kA	Punagsangchu: R-N, O/C, Ir-1.18kA	R-Earth	100	A/r successful from Alipurduar only	Alipurduar	PG ER-2	BHUTAN
3	400kV-PATNA-SAHARSA-1	04-04-2022	06:00	04-04-2022	06:38	Patna: Y_N, 3.09 kA	SAHARSA: Y-N 44.9 km Iy=4.307 kA	Y-Earth	100	A/r failed after 1 second (Fault appeared in R_ph immediately after A/r)	Patna	PG ER-1	PMTL
4	220kV-TENUGHAT-BIHARSARIF-1	04-04-2022	10:33	04-04-2022	11:35	Tenughat: B_N, Z1, 120.9km, 1.03kA	Biharshariff: B_N, 51.32km, 2.47kA	B-Earth	100	Three phase tripping for single phase fault	Tenughat	TVNL	BSPTCL
5	400kV-PPSP-BIDHANNAGAR-1	04-04-2022	10:58	04-04-2022	11:12	PPSP: Y_N, Z1, 71km	Bidhannagar: Y_N, Z1, 123.7km, 2.09kA	Y-Earth	100	Three phase tripping for single phase fault	Bidhannagar	WBSEDCL	WBSETCL
6	220kV-DALTONGANJ-CHATRA-2	04-04-2022	11:06	04-04-2022	19:11	Daltonganj: Y-B, Z1 , 64.26 km, Iy=2.04 kA Ib= 2.02kA	Chatra : Y-B, 116km, 0.6 kA	Y-B	100	Phase-to-phase fault	Daltonganj	PG ER-1	JUSNL
7	400kV-NEW PPSP-ARAMBAGH-1	04-04-2022	13:54	04-04-2022	14:12	New PPSP: B-N, Z-1, 69.9 km, Ib-3.90 kA	Arambag : B-N, Z1, 121 km Ib-2.54 kA	B-Earth	100	A/r failed after 1 second	Arambag	WBSETCL	WBSETCL
8	400kV-ALIPURDUAR (PG)-JIGMELING-2	06-04-2022	04:50	06-04-2022	05:27	Alipurduar: R-N, Z1, 10.6km, 10.7kA	Jigmelling: R_N, Z1, 190.5km	R-Earth	100	A/r successful from Alipurduar only.	Alipurduar	PG ER-2	BHUTAN
9	220kV-DALKHOLA-PURNEA-2	05-04-2022	18:21	06-04-2022	14:51	Dalkhola: CT secondary metering core Ir=0 A			NA	Details maybe shared by PG ER-2	New Purnea	PG ER-2	PG ER-1
10	220kV-TENUGHAT-BIHARSARIF-1	06-04-2022	10:34	06-04-2022	11:24		Biharshariff: B_N, 52.13km, Ib-2.36 kA	B-Earth	100	Three phase tripping for single phase fault	Tenughat	TVNL	BSPTCL
11	400kV-NEW PPSP-ARAMBAGH-1	06-04-2022	12:31	06-04-2022	13:00	New PPSP: B_N, 3.64 kA	Arambagh: B_N Z-1, 126.2 km, Ib-2.6 kA	B-Earth	100	A/r failed after 1 second	Arambag	WBSETCL	WBSETCL
12	400kV-NEW PPSP-ARAMBAGH-1	06-04-2022	13:02	06-04-2022	18:34	New PPSP: B_N, 2.76 kA	Arambagh: B_N, Zone-1, 130 km, 2.52 kA	B-Earth	100	A/r failed after 1 second	Arambag	WBSETCL	WBSETCL
13	220kV-JEYPORE-JAYNAGAR-2	06-04-2022	14:44	06-04-2022	15:28	Jepore: B-N , 2.5 km Ib- 10 kA	Jaynagar: B_N Z-1	B-Earth	260	A/r successful from Jeypore only	Jeypore	PG ODISHA	OPTCL
14	400kV-RANCHI-ROURKELA-2	07-04-2022	02:52	07-04-2022	05:02	Ranchi: Y-N, 130.6km 2.943 kA	Rourkela : Y-N, 3.016 kA, 0 km	Y-Earth	100	DT received at Ranchi. Teed protection operated at Rourkela. PG Odisha may explain the event	Ranchi	PG ER-1	PG ODISHA
15	400kV JHARSUGUDA-ROURKELA-3	07-04-2022	02:52	07-04-2022	07:32	Jharsuguda: Y_N	Rourkela: Y_N, 2.943 kA, 130.6 km	Y-Earth	100	DT received at Jharsuguda. TEED and later LBB also operated.	Rourkela	PG ODISHA	PG ODISHA
16	400kV-BARIPADA-KEONJHOR(PG)-1	07-04-2022	14:24	07-04-2022	16:15	Baripada: B_N, 155.401km Ib= 2.541kA, Zone-2	Keonjhor: B_N, 4.155 kA, 0.899 km	B-Earth	100	Single phase fault. DT received at Baripada alongwith carrier signal and all three phase tripped	Baripada	PG ODISHA	PG ODISHA
17	400kV-RANCHI-RAGHUNATHPUR-2	08-04-2022	13:16	08-04-2022	14:12	Ranchi: Y_B_N, Z2, 159.6 km , Iy-2.22 kA, Ib-2.57 kA		Y-B	100	Phase-to-phase fault. DVC may explain	Ranchi	PG ER-1	DVC
18	400kV-DSTPS(ANDAL)-RAGHUNATHPUR-2	08-04-2022	13:16	08-04-2022	16:36	DSTPS: Y_B Z-1 , 10.54km, Iy=14.617kA, Ib=14.7854kA	RTPS: B_N, 53.55km ib=5.343 kA, ic= 5.171kA.	Y-B	100	Phase-to-phase fault. DVC may explain	DSTPS	DVC	DVC
19	220kV-SUBHASGRAM(PG)-SUBHASGRAM(WB)-2	09-04-2022	10:42	09-04-2022	11:01	Differential Protection operated		No fault	NA	Differential relay maloperated. WBSETCL may explain	Subhashgram	PG ER-2	WBSETCL
20	220kV-SUBHASGRAM(PG)-SUBHASGRAM(WB)-2	09-04-2022	11:40	09-04-2022	15:37	Differential Protection Operated		No fault	NA	Differential relay maloperated. WBSETCL may explain	Subhashgram	PG ER-2	WBSETCL
21	220kV-JODA-RAMCHANDRAPUR-1	09-04-2022	12:36	09-04-2022	13:13	Joda: O/c in all three phase	Ramchandrapur: O/c	No fault	NA	Tripped on O/c after total supply failure at Bokaro, Jamshedpur (DVC)	Jamshedpur	OPTCL	JUSNL
22	220kV-JSPL-JAMSHEDPUR(DVC)-1	09-04-2022	12:37	09-04-2022	13:35	-	-	No fault	NA	Tripped on O/c after total supply failure at Bokaro, Jamshedpur (DVC)	Bokaro	OPTCL	DVC
23	400kV-NEW PPSP-ARAMBAGH-2	09-04-2022	13:00	09-04-2022	13:10	New PPSP: Y-Earth,79km	Arambagh-Y-Earth,Z-1,144km, 2.15kA	Y-Earth	100	A/r successful. Tripped again within reclaim time	Arambag	WBSETCL	WBSETCL
24	400kV-MEERAMUNDALI-JSPL-2	09-04-2022	17:02	09-04-2022	18:02	Meeramundali: B_N DT Received , Ib= 1.6 kA	JSPL: B_N , Ib=6.7 kA	B-Earth	100	Three phase tripping for single phase fault	Meeramundali	OPTCL	OPTCL
25	220kV-CHUKHA-BIRPARA-1	09-04-2022	22:43	09-04-2022	23:02		Birpara: B_N A/R successful,	B-Earth	100	A/r successful from Birpara only	Binaguri	BHUTAN	PG ER-2
26	220kV-CHUKHA-BIRPARA-2	09-04-2022	22:43	09-04-2022	23:04		Birpara: B_N A/R successful,	B-Earth	100	A/r successful from Birpara only	Binaguri	BHUTAN	PG ER-2

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	PMU Location	LOCAL END UTILITY	REMOTE END UTILITY
27	400kV-ALIPURDUAR (PG)-PUNASANGCHUN-2	10-04-2022	00:01	10-04-2022	00:25	Alipurduar: R-N, Z-1, 72.3km, Ir=5.929kA		R-Earth	100	Single phase fault. DT received from Bhutan, all three phase at Alipurduar tripped.	Alipurduar	PG ER-2	BHUTAN
28	400kV-MEERAMUNDALI-MENDHASAL-2	10-04-2022	13:49	10-04-2022	17:43	MEERAMUNDALI: R-N, 25km, Ir= 5.6kA	Mendhasal: R_N, 4.31 kA	R-Earth	100	A/r attempt failed after 1 sec	Meramundali	OPTCL	OPTCL
29	400kV-KODERMA-BOKARO-1	11-04-2022	14:33	11-04-2022	15:57	Koderma: Y_B Z1 , 81.9 km	Bokaro: Y_B, Z-1, 4.79 km Iy = 8.384 kA , Ib = 8.480kA	Y-B	100	Phase to phase fault	Bokaro	DVC	DVC
30	400kV-MALDA(PG)-NEW PURNEA-1	12-04-2022	08:53	12-04-2022	13:23	Malda : Y-N, 56.4km, Iy= 4.8 kA	New Purnea: Y_B_N, 79.3km, Iy:3.93 kA, Ib: 4.06 kA	Y-B-Earth	100	Single phase fault from Malda end, DT received at Malda after 1 second. Phase to phase fault from New Purnea end. PG may share the findings if any	New Purnea	PG ER-2	PG ER-1
31	400kV-TEESTA-III-DIKCHU-1	12-04-2022	12:48	12-04-2022	15:50	Teesta-III, B_N, Z-2, 15.8km Ib :2.74kA,	Dikchu: B_N, 4.94 kA	B-Earth	500	Highly resistive fault	Rangpo	TUL	DIKCHU
32	220kV-TTPS-TSTPP-1	12-04-2022	17:19	12-04-2022	20:34	TTPP: B_N, 5.64 kA	TSTPP: B_N, 4.9 km	B-Earth	160	Three phase tripping for single phase fault	TSTPP	OPTCL	NTPC TSTPP
33	220kV-KHAGARIA-NEW PURNEA-1	14-04-2022	12:03	14-04-2022	12:40	Khagaria: B_N, Z-1, 25.1km, Ib=2.72 kA		B-Earth	100	A/r successful after 800 msec from Khagaria end only	New Purnea	BSPTCL	PG ER-1
34	400kV-LAKHISARAI-KHSTPP-2	14-04-2022	14:40	14-04-2022	15:19	Lakhisarai: R-N , 79.05 km Ir= 3.38 kA	kahalgaon: R_N 326.7km Ir=3.40 kA	R-Earth	100	A/r successful from Lakhisarai only	Lakhisarai	PG ER-1	NTPC KHSTPP
35	400kV-MEERAMUNDALI-MENDHASAL-2	14-04-2022	12:23	14-04-2022	16:52	Meramundali: R-N, 15.6km, Ir=6.18 kA	Mendhasal: R-N, 67.2km Ir=3.66 kA	R-Earth	100	A/r failed after 1 sec	Meramundali	OPTCL	OPTCL
36	400kV-RAJARHAT-GOKARNA-1	14-04-2022	17:10	14-04-2022	19:59	RAJARHAT: R_Y Z-1, 182km,Ir=3.109kA,Iy=3.15kA	Gokarna: R_Y Z-1, 56.73km Ir: 8.348 kA, Iy: 7.904 kA	R-Y-Earth	100	Phase to phase fault	Rajarhat	PG ER-2	WBSETCL
37	400kV-ALIPURDUAR (PG)-PUNASANGCHUN-2	14-04-2022	18:58	15-04-2022	14:29	APD: R-N, 27.8km Ir=7.4kA		R-Earth	100	A/r failed after 1 second	Alipurduar	PG ER-2	BHUTAN
38	400kV-ALIPURDUAR (PG)-BONGAIGAON-2	14-04-2022	19:13	14-04-2022	20:33	Alipurduar=DT sent, Directional Earth Fault		R-Earth	4500	Highly resistive fault, persisted for 4.5 seconds (As per PMU)	Alipurduar	PG ER-2	NER
39	400kV-ALIPURDUAR (PG)-PUNASANGCHUN-1	15-04-2022	01:45	15-04-2022	02:30	APD: R-N, 4.3 kA, 68 km	Punatsangchun: R_N	R-Earth	100	A/r successful from Alipurduar end	Alipurduar	PG ER-2	BHUTAN
40	400kV-DURGAPUR-JAMSHEDPUR-1	15-04-2022	12:06	15-04-2022	12:37	Durgapur: Y_N, 65.3km, 2.87 kA	Jamshedpur: Y_N, 104km, Iy= 3.5 kA	Y-Earth	100	A/r failed after 1 sec	Durgapur	PG ER-2	PG ER-1
41	400kV-JAMSHEDPUR-MEJIA-1	15-04-2022	12:06	15-04-2022	12:38	In same dia of Durgapur-Jamshedpur, main bay at Jamshedpur was under		No fault	NA	No fault	Jamshedpur	PG ER-1	DVC
42	400kV-PUSAULI(PG)-DALTONGANJ-2	15-04-2022	12:37	15-04-2022	13:06	Pusauli : B-N ,54.16km, Ib=5.06kA,	Daltonganj: B_N, 1.71 kA	B-Earth	100	A/r failed after 1 second	Pusauli	PG ER-1	PG ER-1
43	400kV-BIDHANNAGAR-NEW CHANDITALA-1	15-04-2022	12:42	15-04-2022	13:13	Bidhannagar : Y_N Z1, 7.1 km, Iy=16.49 kA	N.Chanditala: Y_N Z2, 131.6km, Iy=2.477 kA	Y-Earth	100	A/r successful from both ends. Line tripped again within reclaim time	Bidhannagar	WBSETCL	WBSETCL
44	765kV-GAYA-VARANASI-1	15-04-2022	14:58	15-04-2022	15:40	Gaya: R-N, 98.38km, Ir=4.7kA.	Varanasi: R-N,168.48 km, Ir=3.6kA	R-Earth	100	A/r failed after 1 sec	Gaya	PG ER-1	NR
45	400kV-MEERAMUNDALI-MENDHASAL-2	15-04-2022	10:44	15-04-2022	16:41	Meeramundali: R-ph, 9.2 km, Ir=16 kA;	Mendhasal: R-ph, 76.1 km, Ir= 3.83 kA	R-Earth	100	A/r failed after 1 sec	Meramundali	OPTCL	OPTCL
46	400kV-BIDHANNAGAR-NEW CHANDITALA-1	15-04-2022	13:18	15-04-2022	17:51	Bidhannagar : Y_N Z1, Iy=15.5 kA	New Chanditala: SOTF	Y-Earth	100	A/r failed after 1 sec	Bidhannagar	WBSETCL	WBSETCL
47	220kV-BOLANGIR (PG)-KESINGA-1	15-04-2022	18:27	15-04-2022	19:06	Bolangir: Y-B, Iy: 1.03kA, DT received	Kesinga: R_N Z1, 28.3km, Ir=2.48kA, A/R successful	R-Earth	1000	Fault persisted for 1 second. DT received at Bolangir end. OPTCL may explain	Bolangir	PG ODISHA	OPTCL
48	220kV-BOLANGIR (PG)-KESINGA-1	16-04-2022	10:30	16-04-2022	11:11	Bolangir- DT received		No fault	NA	DC Earth fault in carrier protection cable at Kesinga	Bolangir	PG ODISHA	OPTCL
49	220kV-BOLANGIR (PG)-KESINGA-1	16-04-2022	11:12	16-04-2022	13:44	Bolangir: DT received		No fault	NA	DC Earth fault in carrier protection cable at Kesinga	Bolangir	PG ODISHA	OPTCL
50	220kV-CHANDIL-STPS(WBPDCL)-1	16-04-2022	13:55	16-04-2022	14:27	Chandil: R_N Z-1, 52km, Ir= 1.66kA	Santaldih TPS: R-N, Z-1,71 km, Ir=1.88 kA	R-Earth	100	A/r attempt failed at Santaldih. A/r operation can't be ascertained at Chandil	Ranchi	JUSNL	WBPDCL
51	220kV-CHUKHA-BIRPARA-1	16-04-2022	15:16	16-04-2022	15:44		Birpara: R-Y-N , 70.2km Ir=2.3kA Iy=1.2kA	R-Y-Earth	160	Phase-to-phase fault	Binaguri	BHUTAN	PG ER-2
52	220kV-BARIPADA-BALASORE-2	16-04-2022	17:19	16-04-2022	17:48	Baripada: R-N , 25.07km Ir= 5kA		R-N	100	Three phase tripping at Baripada end. Pole discrepancy appeared at Baripada after 100 msec and other two phase tripped.A /r successful at Balasore end	Baripada	PG ODISHA	OPTCL
53	220kV-MAITHON-DUMKA-1	17-04-2022	11:25	17-04-2022	12:17	Maithon: Y-B , Z-2, 67.4km Iy=3.4kA, Ib=3kA	Dumka: Y-B, 4.645km, Iy:4.292kA, Ib:4.64kA	Y-B	500	Tripped after 500 msec from Maithon end. Carrier protection status may be checked.	Maithon	PG ER-2	JUSNL
54	220 KV-TENUGHAT-BIHARSHARIF	17-04-2022	16:08	17-04-2022	16:46	Tenughat: R_N 119.5km, Ir= 1.197 kA	Biharsariff : R_N , Ir= 2.3 kA	R-Earth	100	Three phase tripping for single phase fault	Tenughat	TVNL	BSPTCL
55	400kV-MEERAMUNDALI-MENDHASAL-2	17-04-2022	18:46	17-04-2022	19:58	MRDL:-R-N, Z1 12.6km, Ir=8.66 kA, A/R Unsuccessful	Mendhasal:-R-N, Z1, 112km Ir=4.05 kA	R-Earth	100	A/r successful from both ends. Line tripped again within reclaim time	Meramundali	OPTCL	OPTCL
56	400kV-GAYA-CHANDWA-1	17-04-2022	23:41	18-04-2022	00:03	Gaya: R_N, 11.7 kA	Chandwa: R_N, 95.55 km, 4.16 kA	R-Earth	100	A/r failed after 1 sec	Gaya	PG ER-1	PG ER-1
57	220kV-JODA-RAMCHANDRAPUR-1	18-04-2022	10:25	18-04-2022	11:00	Joda: Y_N Z-1, 17.84 km Iy= 3.817kA	Ramchandrapur: Y_N Z-1, 120 km 1.7kA	Y-Earth	100	A/r successful from Joda end only	Jamshedpur	OPTCL	JUSNL
58	220kV-CHANDIL-STPS(WBPDCL)-1	18-04-2022	12:24	18-04-2022	16:15	Chandil:B_N Z-1,3.8km,Ib=5.04kA	STPS:B_N Z-2,107.8km,Ib=1.56kA	B-Earth	350	Tripped in Zone-2 time from Santaldih. Carrier not received	Ranchi	JUSNL	WBPDCL
59	220kV-CHANDIL-RANCHI-1	18-04-2022	12:44	18-04-2022	12:44	Chandil- B-N, Z-1, 48km, FC: 0.89kA	Ranchi: B-N, Z-1, 53km , Ib=2.9kA	B-Earth	100	A/r attempt successful at Ranchi end only	Ranchi	JUSNL	PG ER-1
60	220kV-KARAMNASHA (NEW)-SAHUPURI-1	18-04-2022	14:13	18-04-2022	16:40	Karmansha: B_N, Z1, 3.66km Ib=4.99kA	Sahupuri: B_N,Z2, 38.99km Ib=2.978kA	B-Earth	100	As per PMU, A/r successful. Tripped again within reclaim time	Pusauli	BSPTCL	NR
61	220kV-KATAPALLI-BOLANGIR(PG)-1	19-04-2022	14:31	21-04-2022	15:10	Katapalli: Y-N, Z-2, 105km, Iy=1.32 kA		Y-Earth	500	Y_ph insulator decapped at loc. 4. Tripped in Zone-2 time from Bolangir. A/r attempt failed at Katapalli	Bolangir	OPTCL	PG ODISHA

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	PMU Location	LOCAL END UTILITY	REMOTE END UTILITY
62	220KV-DARBHANGA(DMTCL)-LAUKAHI-1	19-04-2022	22:22	22-04-2022	13:39	Darbhanga: Y_N, Z1, 45.2km, Ib=2.23kA.	.Laukahi: Y_N, Z-1, ly=1.387kA	Y-Earth	100	A/r successful at Laukahi	Muzaffarpur	DMTCL	BSPTCL
63	220KV-NEW PURNEA-MADHEPURA-1	20-04-2022	00:35	20-04-2022	01:25	New purnea: Y-B, 13.9km , 10.26kA	Madhepura: Y_B, ly=lb=2.29 kA	Y-B	400	Tripped in Zone-2 time from Madhepura	New Purnea	PG ER-1	BSPTCL
64	220KV-KHAGARIA-NEW PURNEA-1	20-04-2022	01:02	20-04-2022	01:40	khagarla: Y_B, 39.03km, ly=3.623kA, lb: 3.717kA	New Purnea: Y-B 56.5km , ly=5.8kA, lb=3.48kA	Y-B	100	Phase-to-phase fault	New Purnea	BSPTCL	PG ER-1
65	400KV-TEESTA-III-DIKCHU-1	20-04-2022	07:58	20-04-2022	10:38	Over voltage at Teesta III, DT sent to Dikchu.	Dikchu: DT received	R_N	100	Bus bar differential operated at Teesta-3 during desynchronization of U#3. TUL may explain	Rangpo	TUL	DIKCHU
66	220KV-TENUGHAT-BIHARSARIF-1	20-04-2022	11:50	20-04-2022	12:28	Tenughat: Z3 , 273km	BSF: R-N, Ir=0.9kA Trip time-501.1msec,	R-N	3900	Highly resistive fault. DEF operated at Biharsharif in 800 msec. DEF didn't operate at Tenughat. TVNL may check	Tenughat	TVNL	BSPTCL
67	220KV-TENUGHAT-PATRATU-1	20-04-2022	11:50	20-04-2022	12:13	Tripped from Tenughat only		R-N	1200	Tripped from Tenughat end only in 1200 msec on DEF	Tenughat	TVNL	JUSNL
68	220KV-RENGALI(PH)-TSTPP-1	20-04-2022	14:52	20-04-2022	15:38	Rengali(PH): R_N, Z-2, 34.88km Ir=0.5 kA	Talcher: R_N, Z -1 , 5.6km	R-Earth	400	Tripped in Zone-2 time from Rengali	TSTPP	OHPC	NTPC TSTPP
69	220KV-DALTONGANJ-CHATRA-1	20-04-2022	20:07	21-04-2022	01:18	DT RECEIVED AT DALTONGANJ		No fault	NA	DT received at Daltonganj. JUSNL may explain	Daltonganj	PG ER-1	JUSNL
70	765KV-NEW RANCHI-MEDINIPUR-1	21-04-2022	17:49	21-04-2022	18:36	New Ranchi : B ph, 137 km, 4.16 kA	Medinipur : B ph, Z-1, 139 km, lb=3.287 kA	B-Earth	100	A/r failed after 1 sec	New Ranchi	PG ER-1	PMJTL
71	765KV-NEW RANCHI-DHARAMJAIGARH-2	21-04-2022	21:41	23-04-2022	22:19	NEW RANCHI: B-N, 100% DISTANCE, 1.7KA (DT RECEIVED)		R-Earth	100		New Ranchi	PG ER-1	WR
72	765KV-DHARAMJAIGARH-JHARSUGUDA-2	21-04-2022	21:41	24-04-2022	01:10		JHARSUGUDA: R-N, 145km, 5.2kA (DT received)	R-Earth	100	R_ph CT failure at Dharamjaigarh.DT received at New Ranchi, Jharsuguda	Jharsuguda	WR	PG ODISHA
73	765KV-DHARAMJAIGARH-JHARSUGUDA-1	21-04-2022	21:41	22-04-2022	05:21	CT failure at Dharamjaigarh	Jharsuguda: R-N, 151km, 2.6kA (DT received)	R-Earth	100		Jharsuguda	WR	PG ODISHA
74	765KV-NEW RANCHI-DHARAMJAIGARH-1	21-04-2022	21:41	22-04-2022	03:56	Didn't Trip at New Ranchi		No fault	NA	Tripped from Dharamjaigarh only	New Ranchi	PG ER-1	WR
75	400KV-RANCHI-SIPAT-2	21-04-2022	23:51	22-04-2022	01:30	Ranchi: DT received		No fault	NA	DT received from Sipat. Details may be shared by PG	Ranchi	PG ER-1	WR
76	400KV-KOLAGHAT-KHARAGPUR-2	22-04-2022	08:49	22-04-2022	09:16	Kolaghat: R_Y Z-1, 58.23 km, Ir - 5.352 kA, ly - 5.32 kA.	Kharagpur: R_Y Z-1, 36.26 km, Ir- 7.997 kA, ly - 8.041 kA.	R-Y	100	Phase-to-phase fault	Kolaghat	WBPDCL	WBSETCL
77	220KV-ATRI-PANDIABILI-2	22-04-2022	13:38	22-04-2022	17:32	Atri: R_N, 21.8 km	Pandiabili: R-N, 2km 5.8kA	R-Earth	800	Highly resistive fault. Distance protection operated. 120 msec DEF also operated	Pandiabili	OPTCL	PG ODISHA
78	400KV-BINAGURI-RANGPO-1	23-04-2022	12:37	23-04-2022	13:20	Binaguri: DT received	Rangpo: DEF, R-2.7 kA	R-Earth	1800	Highly resistive fault.	Rangpo	PG ER-2	PG ER-2
79	220KV-DALTONGANJ-CHATRA-1	23-04-2022	12:56	23-04-2022	13:49	DALTONGUNJ: Y-B , Z-1 11.38km, ly=lb= 4.39kA,	Chatra: Y-B, 207.14 km, ly= 182.4A, lb=171.6A	Y-B	100	Phase-to-phase fault	Daltonganj	PG ER-1	JUSNL
80	400KV-PATNA-SAHARSA-1	24-04-2022	18:23	24-04-2022	19:43	MASTER RELAY OPERATED AT PATNA	DT RECEIVED AT SAHARSA	No fault	NA	PRV-2 trip at Patna. PG ER-1 may explain	Patna	PG ER-1	PMTL
81	400KV-KHARAGPUR-CHAIBASA-1	25-04-2022	10:17	25-04-2022	10:30	Kharagpur: Yph, Z2, 72.9km, ly=2.52kA	Chaibasa: A/R Successful	Y-Earth	550	Highly resistive fault. Tripped in Zone-2 time from Kharagpur	Kharagpur	WBSETCL	PG ER-1
82	220KV-KHAGARIA-NEW PURNEA-1	25-04-2022	11:35	25-04-2022	12:14	New Purnea: B-N 29.9 km, lb=1.71 kA	Khagarla: B-N , 25.76 km, lb= 3.370kA	B-Earth	100	A/r successful. Line tripped again within reclaim time	New Purnea	BSPTCL	PG ER-1
83	400KV-ARAMBAGH-BAKRESWAR-1	25-04-2022	12:24	25-04-2022	12:55	Arambag : B-Ph, Z1, 77.1km, lb= 4.76kA	BKTPP: B-Ph, Z1, 65.8km, lb= 6.04kA	B-Earth	100	A/r failed after 1 sec	Arambag	WBSETCL	WBPDCL
84	220KV-DEHRI-GAYA-1	25-04-2022	12:42	25-04-2022	13:00	Dehri: B-Ph, Z-1, 53.8km, lb=1.288kA	GAYA:B-Ph, 32.107km, lb=3.55kA	B-Earth	265	Highly resistive fault. A/r failed after 1 sec	Gaya	BSPTCL	PG ER-1
85	220KV-BUDHIPADAR-KORBA-1	25-04-2022	13:05	25-04-2022	14:10	Budhipadar: B_N, Z-1, 60.6 km, lb=1.63 kA		B-Earth	100	A/r attempt failed after 1 sec (As per PMU)	Budhipadar	OPTCL	WR
86	400KV-NEW PPSP-ARAMBAGH-1	25-04-2022	13:05	25-04-2022	13:56	N.PPSP: B-Ph, Z1, 69.5km, lb=3.9kA	Arambag : B-Ph, Z1, 118km, lb= 2.86kA	B-Earth	150	A/r attempt failed after 1 sec	Arambag	WBSETCL	WBSETCL
87	400KV-MEERAMUNDALI-MENDHASAL-II	25-04-2022	13:18	25-04-2022	14:50	Meramundali : R-Ph; 18.8 km, Ir= 10 kA		R-Earth	100	No A/r attempt at Meramundali. Other two phase might have tripped in PD after 2.5 seconds. A/r successful from Mendhasal	Meramundali	OPTCL	OPTCL
88	400KV-TSTPP-MEERAMUNDALI-1	25-04-2022	12:41	25-04-2022	15:20	TSTPP: B-Ph, Z-1,21.2 km	Meramundali: B- Ph,7.11kA,45.8km	B-Earth	100	A/r failed after 1 second	Meramundali	NTPC TSTPP	OPTCL
89	220KV-BUDHIPADAR-KORBA-1	26-04-2022	12:57	26-04-2022	15:11	Budhipadar: Y_B		Y-B	100	Phase to phase fault	Budhipadar	OPTCL	WR
90	220KV-BUDHIPADAR-RAIGARH-1	26-04-2022	13:02	26-04-2022	18:18	Budhipadar: B-N , 23.8km , lb=2.93 kA	Raigarh: Y-B ly=3.24kA, lb=3.17kA	Y-B	800	Highly resistive fault.	Budhipadar	OPTCL	WR
91	220KV-TENUGHAT-BIHARSARIF-1	27-04-2022	13:27	27-04-2022	14:11	Tenughat: R_N , 69.92 km , Ir= 1.171 kA	Biharsharif: R_N , 97.29 km, 1.43 kA	R-Earth	160	Three phase tripping for single phase fault	Tenughat	TVNL	BSPTCL
92	220KV-BUDHIPADAR-KORBA-1	27-04-2022	13:25	27-04-2022	19:05	Budhipadar: R_N 23.7km 2.87 kA		R-Earth	550	Tripped in Zone-2 time	Budhipadar	OPTCL	WR
93	220KV-TENUGHAT-BIHARSARIF-1	27-04-2022	14:23	27-04-2022	19:37	Tenughat: B_N, 1.89 kA		B-Earth	100	Three phase tripping for single phase fault	Tenughat	TVNL	BSPTCL
94	220KV-DALKHOLA (WB)-DALKHOLA (PG)-1	28-04-2022	01:08	28-04-2022	01:59		PG: DT received	No fault	NA	WBSETCL may explain	Malda	WBSETCL	PG ER-2
95	765KV-MEDINIPUR-NEW JEERAT-1	28-04-2022	05:57	28-04-2022	07:00	Medinipur:DT received	Jeerat: OV Stage-1	O/V	NA	O/V settings maybe shared (Y_ph voltage touched 808 kV).	Medinipur	PMJTL	PMJTL
96	220KV-PARULIA-PARULIA(PG)-2	28-04-2022	05:58	28-04-2022	18:48	DVC: R_N , 27.1 kA	R phase to earth fault. BPI failed at PG end	R-Earth	450	Tripped in Zone-2 time (450 msec) from DVC end	Durgapur	DVC	PG ER-1
97	220KV-PARULIA-PARULIA(PG)-1	28-04-2022	05:58	28-04-2022	07:40	DVC: R_N , 10.7 kA	PG: Didn't trip	R-Earth	450	Tripped from DVC end in Zone-1 time. Zone settings maybe checked	Durgapur	DVC	PG ER-1
98	220KV-DALTONGANJ-CHATRA-2	28-04-2022	10:46	28-04-2022	13:01	Daltonganj: B_N Z1, 35.6km lb=2.71kA	Chatra:B_N, 60.20km	B-Earth	300	Three phase tripping for single phase fault	Daltonganj	PG ER-1	JUSNL

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	PMU Location	LOCAL END UTILITY	REMOTE END UTILITY
99	220KV-DALTONGUNJ-GARWAH (NEW)-2	28-04-2022	13:45	28-04-2022	16:33	Daltongunj: Y-B, 8.9 km I _y =I _b = 4.2 kA	Garwah:Y-B I _y =1.231 kA, I _b = 1.81 kA	Y-B	100	Phase to phase fault	Daltonganj	PG ER-1	JUSNL
100	220KV-BUDHIPADAR-RAIGARH-1	28-04-2022	13:40	28-04-2022	22:56	BUDHIPADAR B_N , 31.9 km I _b = 4.01 kA	RAIGARH : B_N 57.8 km , I _b = 2.5 kA	B-Earth	100	Three phase tripping for single phase fault	Budhipadar	OPTCL	WR
101	400KV-BINAGURI-TALA-4	29-04-2022	07:39	29-04-2022	09:46	Binaguri - R-B 138 km I _r =4.3kA, I _b = 4.57kA		R-B-Earth	100	Phase-to-phase fault. DT being received at Binaguri instead of carrier	Binaguri	PG ER-2	BHUTAN
102	400KV-MERAMUNDALI-MENDHASAL-1	29-04-2022	14:01	29-04-2022	15:02	Meramundali: B_N, 19.6 km, 8.29 kA	Mendhasal: B_N, 105.3 km, 5.8 kA	B-Earth	100	A/r successful. Tripped again within reclaim time	Meramundali	OPTCL	OPTCL
103	220KV-RENGALI-TTPS-1	29-04-2022	14:07	29-04-2022	15:54	Rengali: R_N, Zone-2, 40 km, 0.6 kA	TTPS: R_N, 22.2 km, 3 kA	R-Earth	500	Tripped in Zone-2 time from Rengali	Rengali	OPTCL	OPTCL
104	400KV-NEW PURNEA-GOKARNA-1	29-04-2022	17:25	30-04-2022	20:12	New Purnea: R_N, 40 km, 2.5 kA	Gokarna: R_N, 4 km, 14.75 kA	R-Earth	100	A/r failed after 1 sec	New Purnea	PG ER-1	WBSETCL
105	400KV-RANCHI-RAGHUNATHPUR-3	30-04-2022	15:57	30-04-2022	17:00	Ranchi: R_N, 127.7 km, 3.13 kA	Raghunathpur: R_N, 14.4 km, 8.295 kA	R-Earth	100	A/r successful. Line tripped again within reclaim time	Ranchi	PG ER-1	DVC
106	220 KV JSPL-JAMSHEDPUR-1	30-04-2022	17:16	30-04-2022	17:59	JSPL: R_N, Zone-2, 123.7 km, 1.187 kA	Jamshedpur: R_N, 25.9 km, 3.15 kA	R-Earth	100	Three phase tripping for single phase fault	Bokaro	OPTCL	DVC
107	400 KV BARIPADA-TISCO-1	30-04-2022	17:17	30-04-2022	17:46	Baripada: B_N, 4.03 kA	TISCO:B_N, 13.2 km, 8 kA	B-Earth	100	A/r successful from Baripada end only	Baripada	PG ODISHA	OPTCL
108	400KV-TEESTA 3-RANGPO-1	30-04-2022	17:44	30-04-2022	18:06	Teesta 3: R_N, Zone-2, carrier received, 67.55 km, 2.471 kA	Rangpo: R_N, 3.129 km, 14.23 kA	R-Earth	100	A/r successful. Tripped again within reclaim time	Rangpo	TUL	PG ER-2
109	400KV-MEDINIPUR-KHARAGPUR-2	30-04-2022	18:27	30-04-2022	18:54	Medinipur: Y_N, Zone-1, 87.6 km, 2.442 kA	Kharagpur: Y_N, 23 km, 8.8 kA	Y-Earth	100	A/r failed after 1 sec	Medinipur	PMJTL	WBSETCL
110	400KV-HALDIA-SUBHASHGRAM-1	30-04-2022	19:08	30-04-2022	21:15	Haldia: B_N, 66.57 km, 3.94 kA	Subhashgram: B_N, 87 km, 3.67 kA	B-Earth	100	Bus bar protection also operated. HEL may explain	Subhashgram	CESC	PG ER-2

SI No.	Name of the incidence	PCC Recommendation	Latest status
113th PCC Meeting			
1.	Disturbance at 220/132 kV CTPS A (DVC) S/s on 18.03.2022 at 20:05 Hrs	<p>PCC advised DVC to check power swing block settings for 220 kV CTPS B - BTPS B D/c line at BTPS end. The DR at BTPS end may also be checked.</p> <p>PCC advised DVC to recheck the settings of pole slip protection in the CTPS units. In case the settings are in order, then study may be carried out to find out the critical clearing time for the units for a 3-phase fault at CTPS bus.</p>	
2.	Disturbance at 220 kV Tenughat (TVNL) S/S On 24.03.2022 at 21:37 hrs	PCC advised JUSNL to complete the A/R testing for 220 kV Tenughat-Govindpur line and put the autorecloser in service at the earliest.	
3.	Total Power failure at 220 kV Garhwa(JUSNL) S/s on 30.03.2022 at 18:22 Hrs	PCC advised JUSNL to review the ICT overcurrent setting in coordination with Powergrid. The zone-3 timer setting at Daltonganj end may be increased to 1000msec and TMS of overcurrent relay for 220/132 kV ICT at Garwah may be reduced accordingly by JUSNL.	
111th PCC Meeting			
4.	DEF protection setting review in Sikkim complex in view of LILO of 400 kV Teesta 3-Kishanganj at Rangpo	In 111 th PCC, PCC decided that M/s PRDC would carry out the study for DEF relay setting coordination for Sikkim Complex with revised configuration of transmission network. PRDC was advised to coordinate with ERLDC for necessary information related to the study.	PRDC was advised to coordinate with ERLDC for necessary information related to the study.
106th PCC Meeting			

5.	Total Power Failure at Dumka S/s on 15/05/2021 at 12:01 Hrs	<p>JUSNL intimated that there was card issue in PLCC panel. The OEM (M/s ABB) had been communicated regarding the issue and the same would be resolved by September' 21.</p> <p>In 110th PCC Meeting, JUSNL informed that approval had been received from higher authority and they are in process to issue the tender. They further informed that PLCC link would be restored by March-2022.</p>	
6.	Grid event at 132 kV Motihari (DMTCL) S/S on 21-04-2021 at 20:19 hrs	<p>In 109th PCC Meeting, PMTL representative informed that they are in process of placing the work order with TBEA authorized partners. The quotation has been received and work order would be placed by end of December 2021.</p> <p>In 110th PCC Meeting, PMTL representative informed that LOA had been awarded to vendor in last week of December 2021. The material supply is expected by first week of March 2022 and restoration work would be completed by end of March 2022.</p>	PMTL representative informed that material had been dispatched from source and it will reach site by 25 th April 2022.