



Agenda for 128th PCC Meeting

Date: 20/07/2023
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 128th PROTECTION COORDINATION SUB-COMMITTEE MEETING TO BE HELD ON 20.07.2023 AT 10:30 HRS THROUGH MS TEAMS

PART – A

ITEM NO. A.1: Confirmation of Minutes of 127th Protection Coordination sub-Committee Meeting held on 22nd June 2023 through MS Teams online platform.

The minutes of 127th Protection Coordination sub-Committee meeting held on 22.06.2023 was circulated vide letter dated 10.07.2023.

Members may confirm.

PART – B

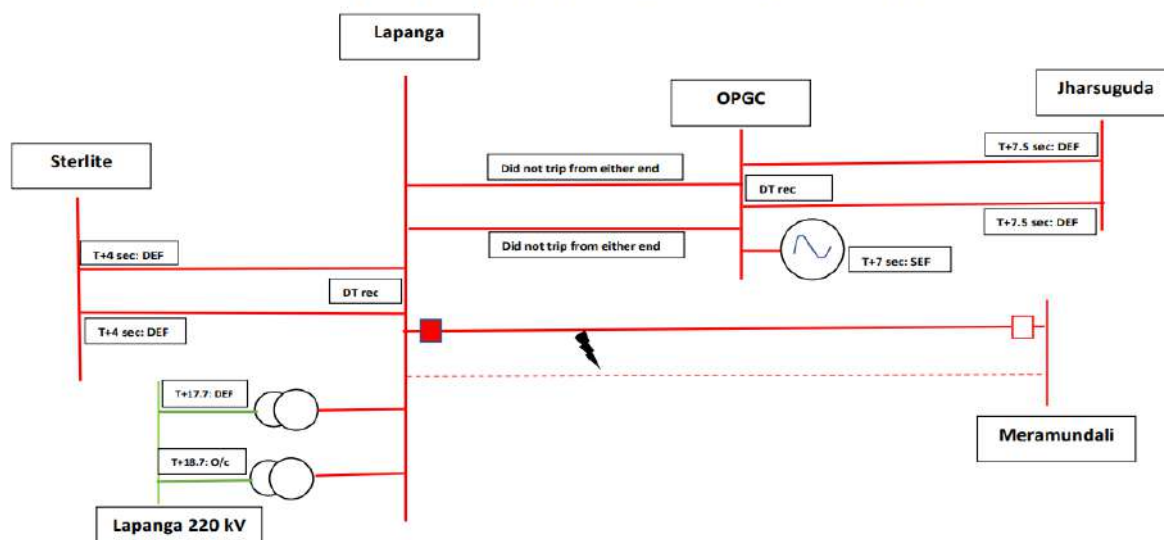
ITEM NO. B.1: Disturbance at 400 kV Lapanga (OPTCL) S/s and 400 kV OPGC S/s on 10.06.2023 at 17:27 Hrs

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

In 127th PCC Meeting, The event is explained as below:

- Due to due to bad weather conditions and localized storm, tower collapse occurred for 400 kV Meramundali-Lapanga D/C line at 16:21 hrs.
- At 17:26 Hrs, while charging attempt was made for 400 kV Meramundali-Lapanga-1 from Meramundali end, line got tripped in distance protection instead of SOTF protection. Subsequently after 1-minute charging attempt was again done from Lapanga end however line tripped after persistence of fault for 17-18 second.
- As fault was persisted for 17-18 seconds, other feeders also at 400 kV Lapanga S/s got tripped which led to total power failure at 400 kV Lapanga and OPGC S/s.

Disturbance at Lapanga, OPGC at 17:27 hrs on 10.06.2023



ERLDC representative enquired OPTCL about reason for taking charging attempt of line from Lapanga end even after failed attempt from Meramundali end to which OPTCL representative informed that due to communication gap between the two S/s, charging attempt was repeated for line.

PCC advised SLDC Odisha to ensure proper coordination between substations during charging of the line and advised OPTCL to sensitize the substation personnel for adhering the standard procedure during the charging of the line. This would avoid unwanted tripping and disturbance in the system which may affect reliability and security of the grid.

It was observed that instead of sufficient fault current, neither distance protection nor DEF operated for 400 kV Meramundali-Lapanga-1 at Lapanga end due to which fault got persisted for 17-18 seconds and led to tripping of other feeders from remote end.

GT of unit 4 at OPGC tripped in SEF protection in T+7 second. Further due to non- tripping of 400 kV OPGC -Lapanga-d/c from both ends, 400 kV OPGC – Jharsuguda d/c tripped in DEF from Jharsuguda end in T+7.5 second with DT sent to OPGC end. This led to total power failure at 400 kV OPGC S/s.

PCC advised OPTCL for root cause analysis of the event and a report along with DR/EL shall be submitted to ERPC/ERLDC. The issue would be discussed in next PCC Meeting.

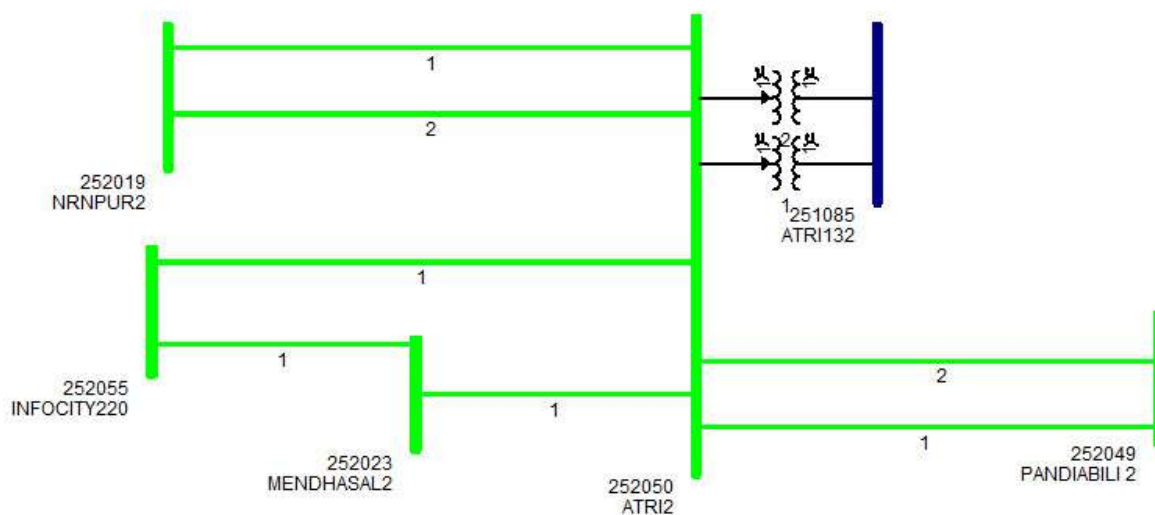
Gen. Loss: 580 MW

Outage Duration: 01:42 Hrs

OPTCL and OPGC may update.

ITEM NO. B.2: Total Power Failure at 220 kV Narendrapur (OPTCL) S/s and 220 kV Atri (OPTCL) S/s on 16.06.2023 at 10:40 Hrs.

On 16.06.2023 at 10:02 Hrs, HVDC Talcher-Kolar Pole-1 got blocked leading to high loading of 400 kV TSTPP-Meramundali D/c and 400 kV Meramundali-Mendhasal D/c. To control loading of these lines, load reconfiguration was being done in downstream at Narendrapur and Atri. Load of Aska, New Aska and Purushottampur which were fed from Bhanjnagar was shifted to Narendrapur. Entire load of Narendrapur and Atri was put on single line i.e., 220 kV Therubali-Narendrapur. This line got overloaded and tripped, leading to total supply failure at Narendrapur and Atri S/s.



Detailed report from ERLDC is attached at **Annexure B.2.**

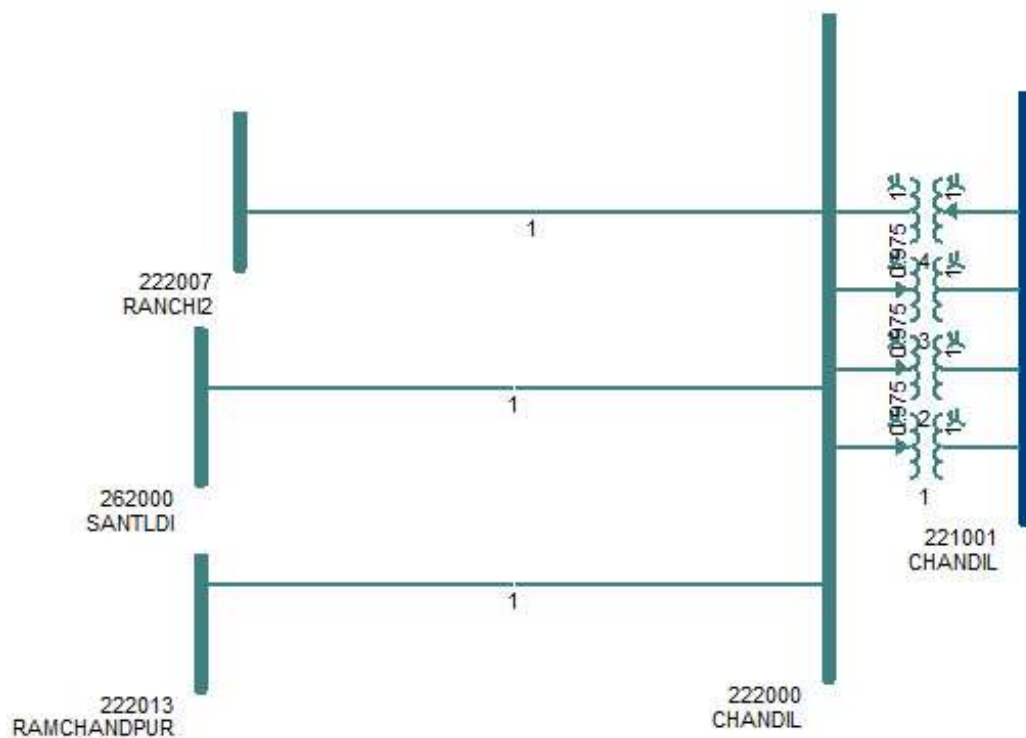
Load Loss: 244 MW
Outage Duration: 00:31 Hrs

OPTCL may explain.

ITEM NO. B.3: Total Power failure at 220 kV Chandil (JUSNL) S/s on 10.06.2023 at 17:00 Hrs.

220 kV Ranchi-Chandil was under breakdown and 220 kV Santaldih-Chandil was switched off to limit loading of 220 kV Ramchandrapur-Chandil. 220 kV Ramchandrapur-Chandil was the only source during the disturbance. 220 KV Ramchandrapur-Chandil line got tripped due to operation of LBB at Chandil S/s leading to total supply failure at Chandil S/s.

Detailed report from ERLDC is attached at **Annexure B.3.**



Load Loss: 170 MW
Outage Duration: 00:29 Hrs

JUSNL may explain.

ITEM NO. B.4: Disturbance at 400 kV Teesta III S/s and 400 kV Dikchu S/s on 28.06.2023 at 02:28 Hrs

On 28.06.2023 at 02:28 Hrs, Resistive fault struck at 400 kV Rangpo-Teesta 3 and 400 kV Rangpo-Dikchu and both lines got tripped. 400 kV Teesta 3-Dikchu also got tripped at the same time. All six units at Teesta 3 and two units at Dikchu also tripped during the incident.

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

Gen. Loss: 1410 MW

Outage Duration: 00:28 Hrs

TUL, Dikchu HEP & Powergrid may explain.

ITEM NO. B.5: Repeated tripping of 400 kV Meramundali-Mendhasal D/c on 12.06.2023

400 kV Meramundali-Mendhasal D/c got tripped thrice on 13.06.2023. As reported, 400 kV Meramundali-Mendhasal-2 got tripped due to R phase fault and other circuit got tripped on back Up O/c. It is observed that line loading was around 600 MW in each circuit.

In 123rd PCC, the issue of sag was already highlighted, and these lines were included for proactively taking up preventive maintenance, however the issue is persisting.

Reply for following issues are required from concerned utility:

- Nature of the fault and remedial measures taken for such tripping.
- Tripping of other parallel circuit in Back Up O/c.
- Enabling of Back Up O/c protection for any other lines in OPTCL system owing to transmission constraint.

In 127th PCC Meeting, ERLDC representative explained the incident with help of report which is attached at **Annexure B.5**. It was informed that 400 kV Meramundali-Mendhasal-2 got tripped due to R phase fault and subsequently other circuit got tripped on back up O/C protection. It was reported that circuit 2 had tripped due to clearance and sag issues in the line. It was highlighted that though O/C protection is not recommended for 400 kV lines, Meramundali-Mendhasal circuit-1 tripped on the O/C protection.

The reason keeping O/C protection in 400 kV line could not be explained by OPTCL in the meeting. It was decided that the issue would be discussed in next PCC meeting. OPTCL was advised to share the list of lines in their network where overcurrent protection has been implemented owing to transmission constraints and further the reason for enabling overcurrent protection in 400 kV Meramundali-Mendhasal line.

OPTCL may update.

ITEM NO. B.6: Major grid events other than GD/GI

A. Bus tripping occurred in Eastern Region during June 2023

Element Name	Tripping Date	Reason	Utility
400 kV Main Bus-1 at Durgapur	05.06.2023 at 00:08 Hrs	Bus bar protection operated	PG ER-2
400 kV Main Bus-2 at Jharsuguda	20.06.2023 at 20:26 Hrs	Bus bar protection operated due to failure of Y_ph CT of 407 bay	PG Odisha

Report from PG Odisha for Bus tripping at Jharsuguda is attached at **Annexure B.6**.

Concerned utilities may explain.

ITEM NO. B.7: Repeated Tripping of 400 kV FSTPP-Sagardighi-1

400 kV FSTPP-Sagardighi-1 had tripped thrice in the month of June without any fault. It is observed that both ends received DT signal.

On Investigation it was found that Sagardighi end had echo logic for direct trip signal and whenever it receives DT, it will echo it back to remote S/s. It is informed by concerned utility that PLCC channel-2 of the line is malfunctioning and is sending DT and thereafter Channel-2 was disabled.

WBPDC/NTPC may update.

ITEM NO. B.8: Review of existing islanding schemes in Eastern Region

In 127th PCC Meeting, SLDC Odisha representative informed that most of islanding schemes as listed are from Odisha system therefore a separate meeting may be convened in this regard with all the CPPs to review status of these islanding schemes.

Regarding islanding schemes in West Bengal, PCC advised WB SLDC to review status of these islanding schemes in consultation with the concerned utilities.

Members may discuss.

ITEM NO. B.9: Tripping Incidence in month of June-2023

Single line tripping incidents in the month of June-2023 which needs explanation from constituents of either end is attached at **Annexure B.9.**

Members may discuss.

PART- C :: OTHER ITEMS

ITEM NO. C.1: Implementation of Single-Phase Auto recloser feature in DEF Relays for the 400 kV transmission lines of TPTL

In 108th PCC meeting, the proposal of implementing auto reclosure with DEF protection was discussed and after discussion it was opined that the proposal needs elaborate technical discussion and confirmation from the relay manufacturers regarding provision of the single-phase auto reclosing functionality in DEF relay for which PCC had further advised TPTL to furnish relevant document / information for further discussion in this regard.

In 122nd PCC Meeting, ERLDC representative informed that as per communication received from NERLDC, single phase auto-recloser scheme in DEF relay had been implemented in 400 kV Silchar- Imphal d/c and 400 kV Silchar- Misa d/c line and it is operating satisfactorily. He further informed that current reversal guard need to be implemented along with auto recloser scheme in DEF relay for its successful operation.

In 124th PCC, Powergrid representative shared case study paper of IIT Mumbai describing about mal operation of DEF protection resulting in spurious tripping of healthy line. He suggested that comments may be shared by utilities before implementing single phase auto recloser feature in DEF Relays for the 400 kV transmission lines of TPTL.

ERLDC informed that spurious tripping of healthy line is even possible if single phase auto recloser feature is disabled in DEF relays however they requested all utilities to share the observation on the proposed scheme.

TPTL representative informed that as per communication made with M/s GE, the detail scheme & its implementation will be presented at the earliest.

In 125th PCC Meeting, TPTL representative informed that they had received scheme details from M/s GE and they are planning to have a discussion with the OEM before making the presentation in PCC meeting.

In 127th PCC Meeting, ERPC representative informed that scheme details received from TPTL had been shared to Powergrid. The same is enclosed at **Annexure C.1**.

PCC advised Powergrid representative to share observations on the scheme submitted by TPTL.

Further, TPTL has intimated that M/s GE is going to present the scheme in 127th PCC Meeting.

TPTL may update.

ITEM NO. C.2: Discussion on Protection Code of IEGC 2023

IEGC 2023 has been published by CERC and it is expected to be notified soon. As per Protection Code of IEGC 2023, several additional works have been assigned to each entity to ensure resilient system operation.

Members may discuss.

ITEM NO. C.3: Submission of protection settings for newly charged elements/change in network configuration

In 123rd PCC Meeting, PCC advised all the utilities to intimate any changes in network configuration in their intra state network regularly and review the settings accordingly & upload the relay settings in PDMS by using DMNS portal or by sending the settings file in desired format to erpc-protection@gov.in.

The updated status of protection settings for new elements charged in ER Grid from Nov 22 to May 2023 is given at **Annexure C.3**.

In 127th PCC Meeting, PRDC representative requested all the utilities to intimate any changes in network configuration in their intra state network regularly and review the settings accordingly & upload the relay settings in PDMS by using DMNS portal or by sending the settings file in desired format to erpc-protection@gov.in.

She further demonstrated the procedure to extract relay settings from PDMS portal and how to use the relay settings to in PSCT application for relay coordination study. She requested all concerned utilities to use the protection database and the PSCT application for relay coordination purpose and in case of any help/query they may take help of PRDC personnel.

Member Secretary advised utilities take necessary steps for timely Updation of settings data in protection database and also advised to use the database with the help of PSCT tool for relay coordination, setting review of their network.

Members may update.

ITEM NO. C.4: Follow-up of Decisions of the Previous Protection Sub-Committee Meeting(s)

The decisions of previous PCC meetings are attached at **Annexure C.4**.

Members may update the latest status.



घटना संख्या: 10-06-2023/2

दिनांक: 15-06-2023

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

Summary of the event (घटना का सारांश):

At 16:21 Hrs, 400 kV Meramundali-Lapanga-1 tripped due to Y_N fault. Subsequently, at 16:25 hrs, 400 kV Meramundali-Lapanga-2 tripped due to R_B_N fault. While taking charging attempt of 400 kV Meramundali-Lapanga 1 at 17:27 Hrs, 400 kV Side of Lapanga S/s and 400 kV OPGC S/s became dead. U#4 at OPGC also tripped due to loss of evacuation path. Generation loss of around 585 MW occurred at OPGC.

- **Date / Time of disturbance:** 10-06-2023 at 17:27 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 400 kV OPGC, 400/220 kV Lapanga S/s
- **Load and Generation loss.**
 - 585 MW generation loss occurred during the event at OPGC.
 - No load loss occurred during the event.

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

- NIL

Major elements tripped (प्रमुख ट्रिपिंग):

- 400 kV Meramundali-Lapanga D/c
- 400 kV Lapanga-Sterlite D/c
- 400 kV Jharsuguda-OPGC D/c
- 400/220 kV ICT-1&2 at Lapanga
- 660MW U#4 at OPGC

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

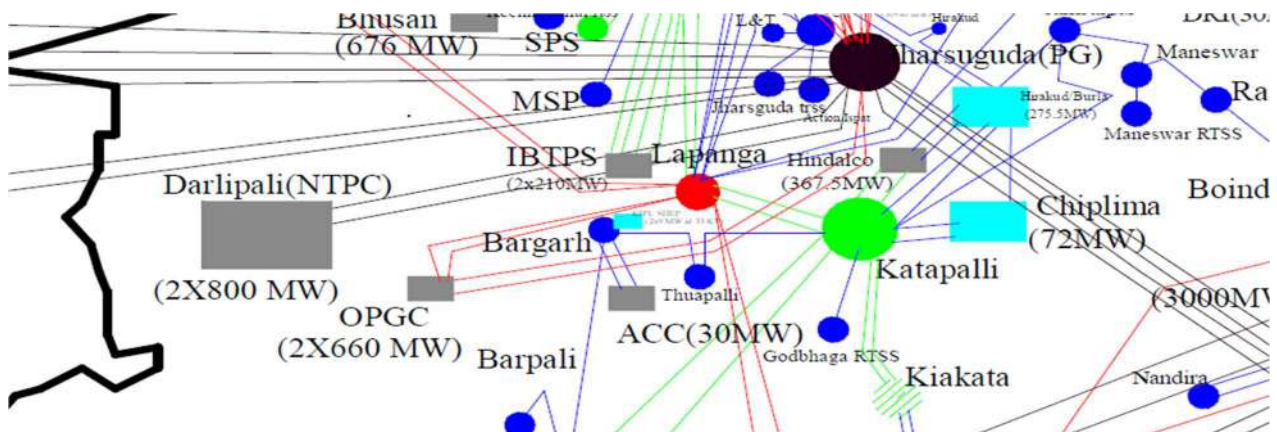


Figure 1: Network across the affected area

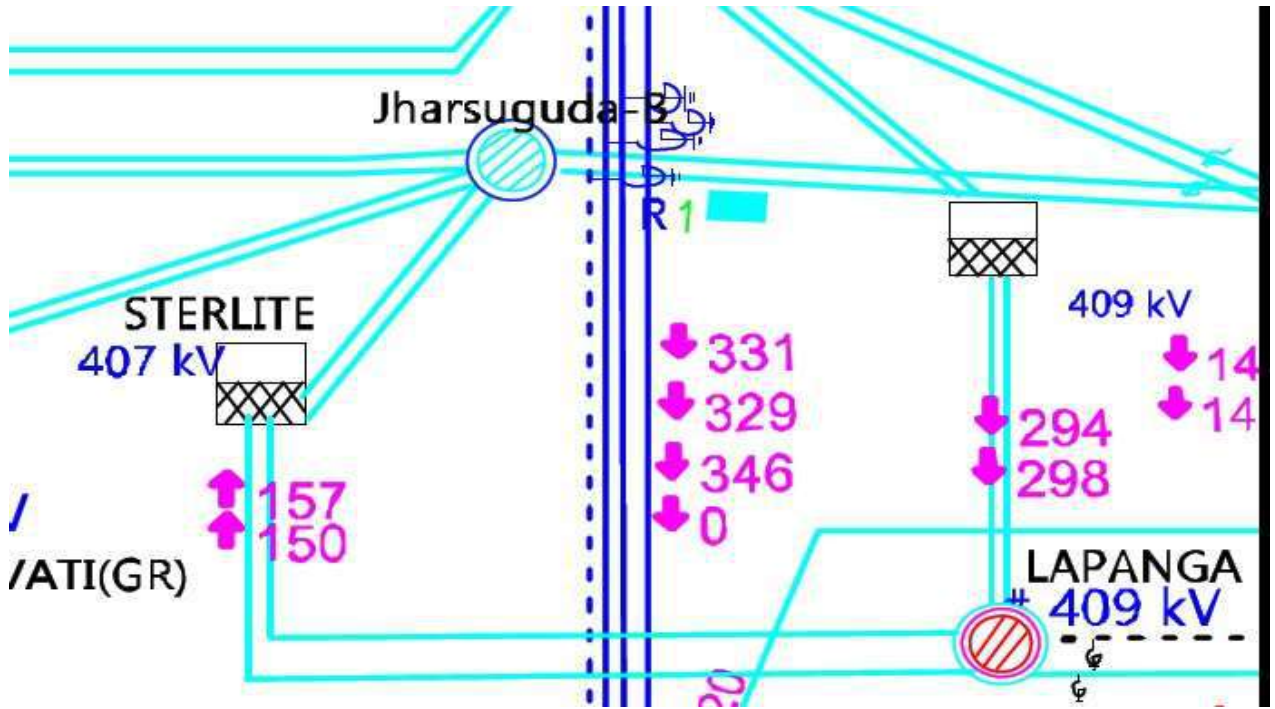


Figure 2: SCADA snapshot of the system

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
16:21	400 kV Meramundali-Lapanga-1	Meramundali: Y_N (Tripped at 16:25 Hrs)	Lapanga: Y_N, 1.09 kA	Fault in Y_ph
16:25	400 kV Meramundali-Lapanga-2	-	Lapanga: R_B, Zone-2, Ir=Ib=2.83 kA	Fault in R and B phase, cleared within 100 msec
17:27	400 kV Lapanga-Sterlite D/c	Lapanga: DT received	Sterlite: DEF operated	Fault in Y and B phase persisting for around 18 seconds
	400 kV Jharsuguda-OPGC D/c	Jharsuguda: DEF operated	OPGC: DT received	
	660 MW U#4 at OPGC	SEF operated		
	400/220 kV ICT-1&2 at Lapanga	Back Up O/c, E/f operated		

R Y B Phase Current

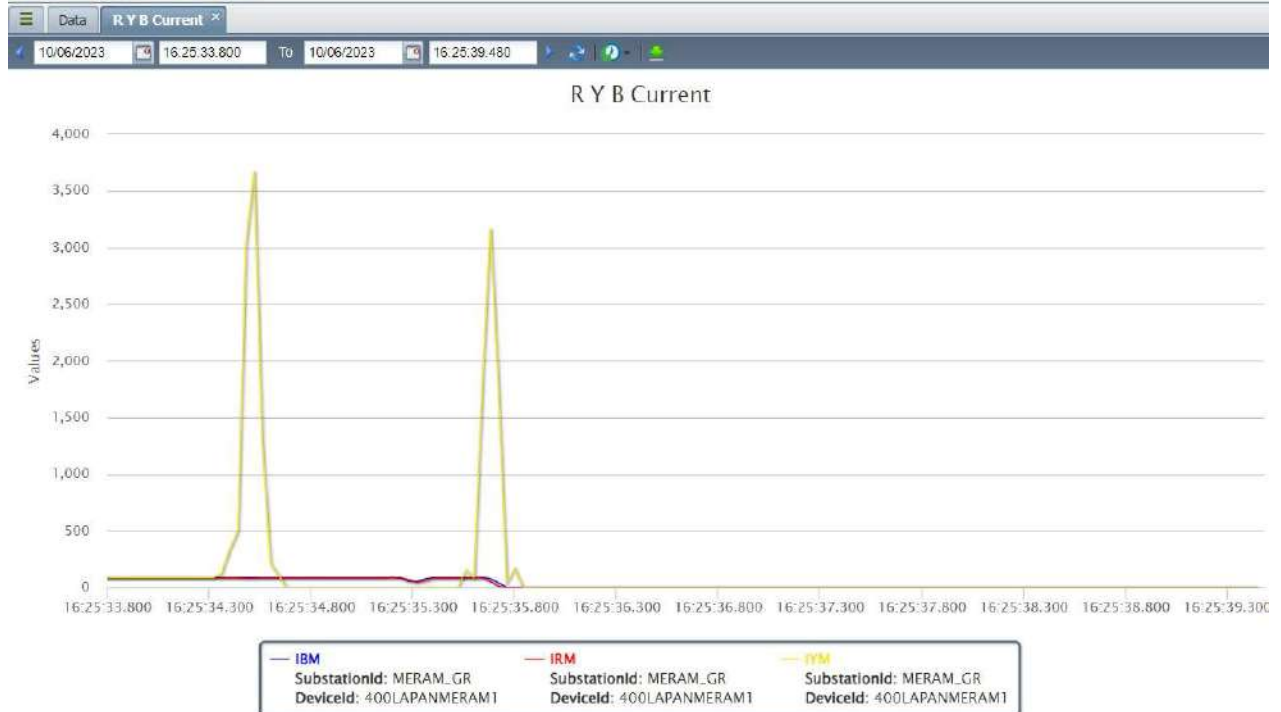


Figure 3: PMU Current snapshot of 400 kV Meramundali-Lapanga-1 @ Meramundali (16:25)

R Y B Phase Current

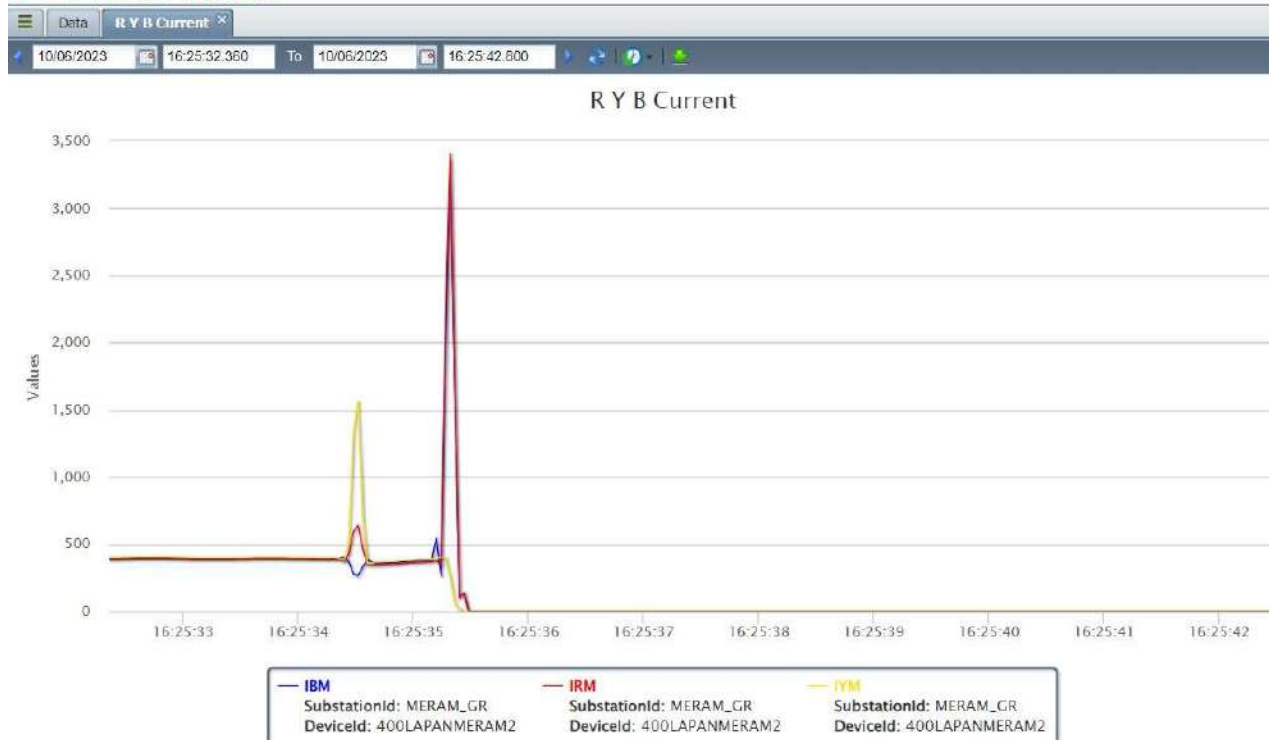


Figure 4: PMU Current snapshot of 400 kV Meramundali-Lapanga-2 @ Meramundali(16:25)

R Y B Phase Voltage Magnitude

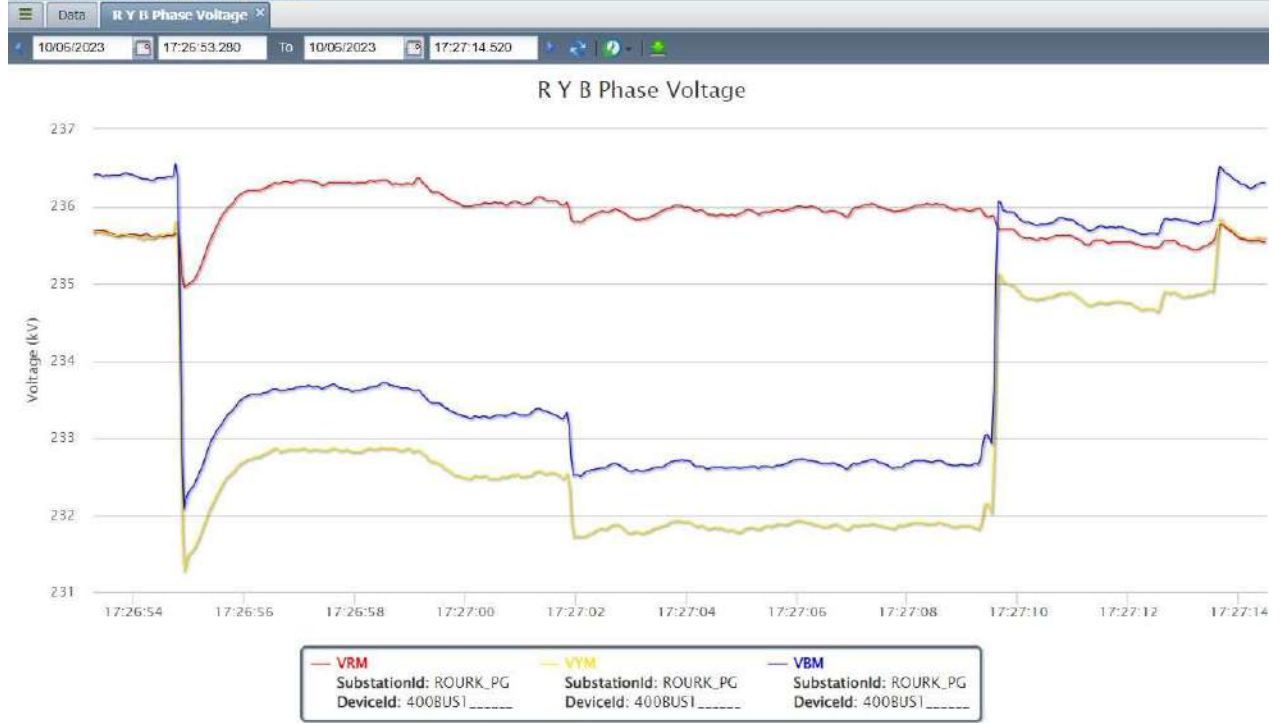


Figure 5: PMU Voltage snapshot of 400/220 kV Rourkela S/s (17:26)

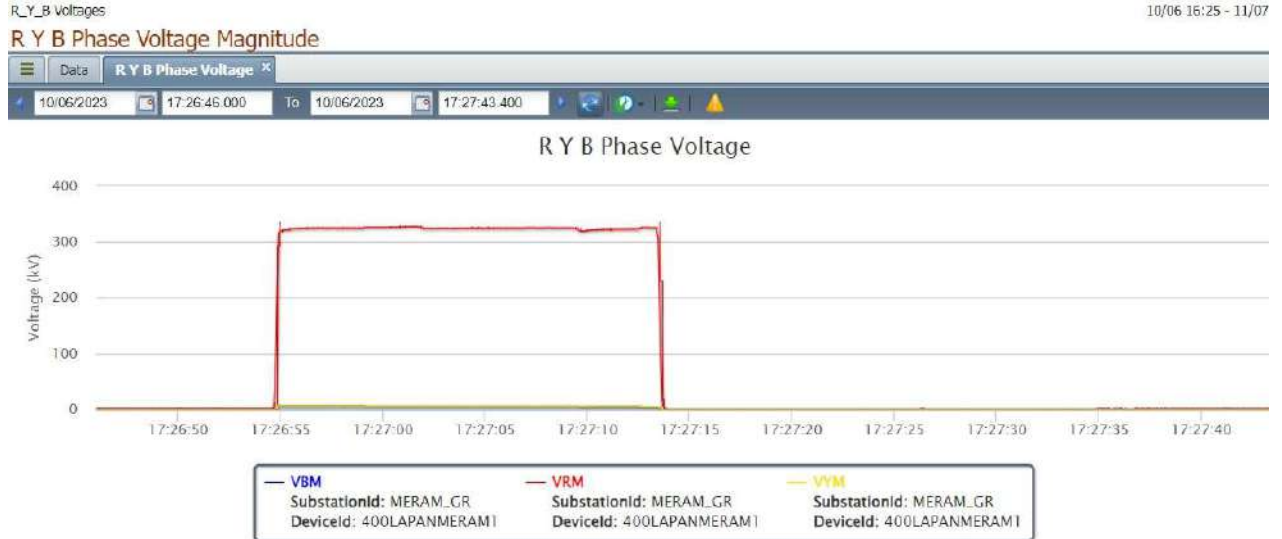


Figure 6: PMU Voltage snapshot of 400/220 kV Meramundali S/s (Charging attempt @ 17:26)

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Meramundali-Lapanga-1	03:15 (19.06.23)
400 kV Meramundali-Lapanga-2	03:28 (19.06.23)
400 kV Lapanga-Sterlite D/c	06:54/06:55 (11.06.23)
400 kV Jharsuguda-OPGC D/c	18:12/18:19
660 MW U#4 at OPGC	08:46 (11.06.23)
400/220 kV ICT-1&2 at Lapanga	-

Analysis of the event (घटना का विश्लेषण):

1. Tripping of 400 kV Meramundali-Lapanga 1 @ 16:21 Hrs

- Y_N fault struck the line, however line tripped from Lapanga end only.

At Lapanga:

- Y_ph breaker status is showing open for both main bay and tie bay, however, around 108 A current is available in Y_ph.
- After 1 second, tie bay Y_ph CB A/r attempted but failed current increase at the instant of A/R attempt was very less, at the failed A/R attempt, 3 phase tripping should have occurred but no distance Zones picked in DR and three phases also did not trip.
- At T+1.9 seconds, other two phase of only tie CB opened. R and B ph CB of main bay remained closed.
- As observed from SoE data, at T+3.2 seconds main bay R and B phase opened.

Issues: No A/r attempt by Main CB, single phase tripping by tie CB during failed AR attempt. Current in Y ph even after opening of CB.

At Meramundali (Tripped at 16:25 Hrs):

- Y_N fault struck the line, A/r attempt taken after 1 second which failed, and all three-phase tripped.

2. Tripping of 400 kV Meramundali-Lapanga 2 @ 16:25 Hrs

- During failed A/r attempt of 400 kV Meramundali-Lapanga-1 from Meramundali, R_B fault struck line-2.
- 400 kV Meramundali-2 tripped immediately from Meramundali within 100 msec, however it tripped after 400 msec in Zone-2 from Lapanga despite carrier receipt.

Issue: Delayed tripping from Lapanga despite carrier receipt.

3. Charging attempt of 400 kV Meramundali-Lapanga-1 from Meramundali @ 17:25 Hrs

Charging attempt of 400 kV Meramundali-Lapanga-1 was taken from Meramundali at 17:25 Hrs and line tripped on distance protection (Y_B_N fault) instead of SOTF.

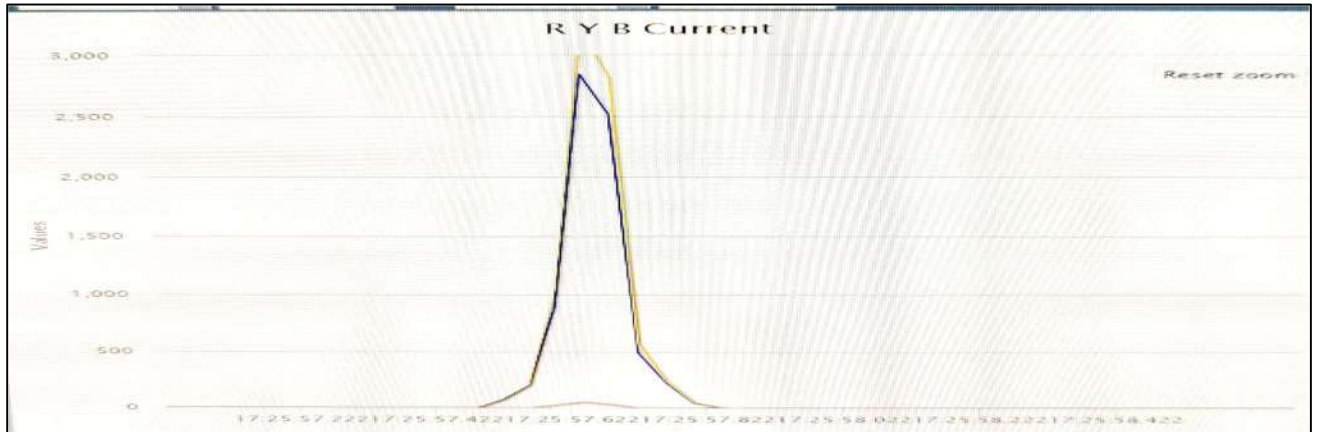
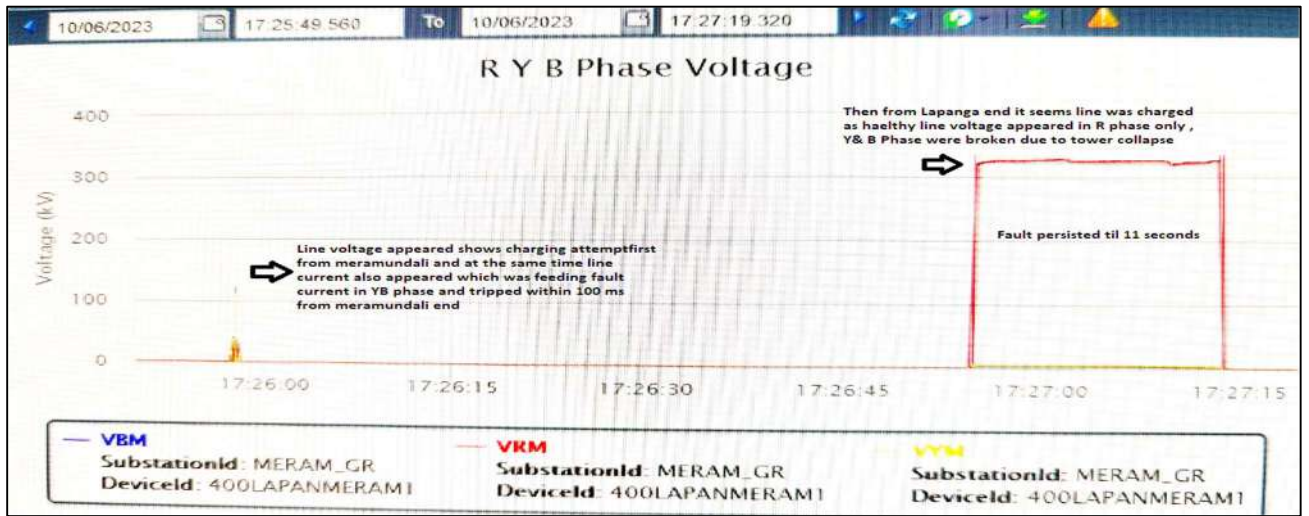
4. Charging attempt of 400 kV Meramundali-Lapanga-1 from Lapanga @ 17:27 Hrs

Just after 58 second from failed charging attempt of the line from Meramundali end, another charging attempt of the line taken from Lapanga and this time fault persisted for around 18 seconds till operation of DEF at adjacent S/s Sterlite, OPGC and Jharsuguda which led to total power failure at OPGC and 400 kV side of Lapanga S/s.

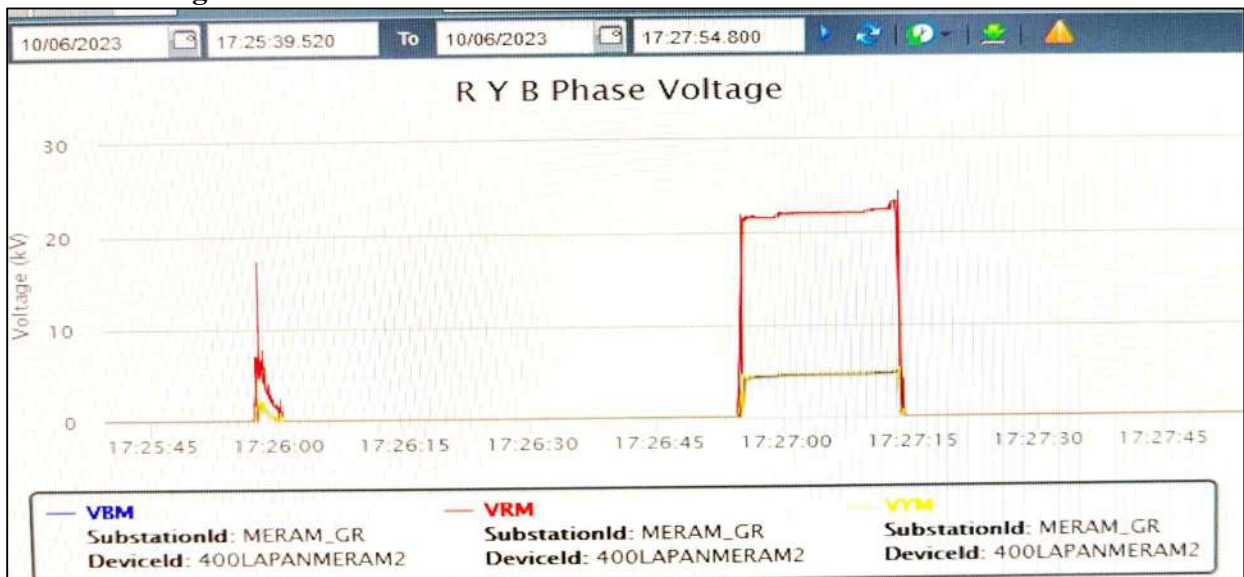
Below is the Line voltage & current plot at Meramundali end:

- Line voltage appeared shows charging attempt first from meramundali and at the same time, line current also appeared which was feeding fault current in YB phase and tripped within 100 msec from meramundali end.
- Then after 1 minute at 17:27 Hrs from lapanga end line was charged as healthy R phase line voltage appeared as Y&B Phase were already broken due to tower collapse and may

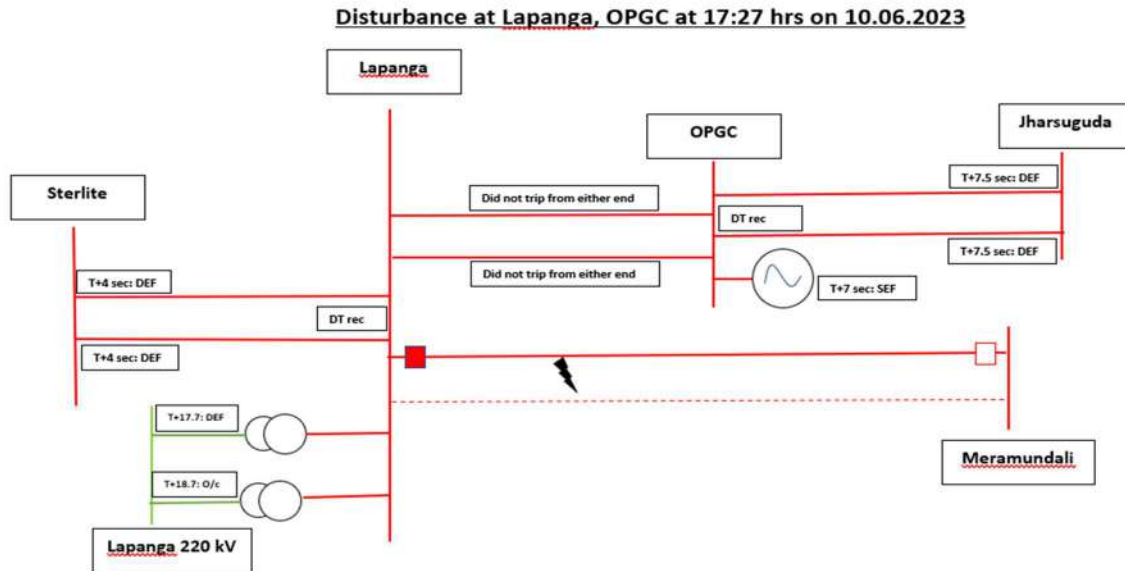
be only R phase was through. At this instant line current at Meramundali end was zero also indicating charging was done from Lapanga.



Induced voltage in circuit -2 as shown below also indicates the same .

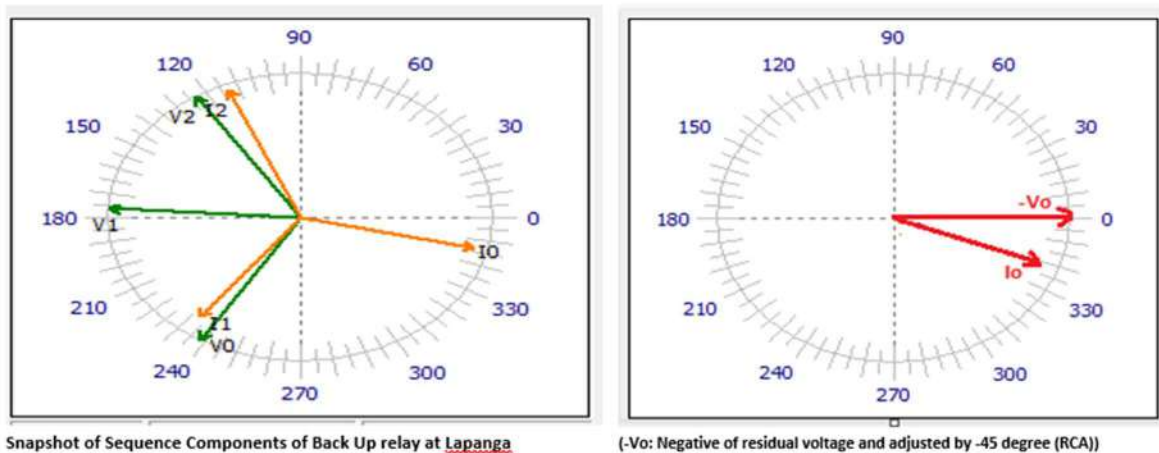


Sequence of events outlined as below snapshot:



- T+4 seconds: 400 kV Lapanga-Sterlite D/c tripped from Sterlite end on Directional Earth Fault and DT sent to Lapanga.
- T+7 seconds: U#4 at OPGC tripped on SEF. SEF setting should be co-ordinated with outgoing lines at OPGC. 400 kV Lapanga-OPGC D/c did not trip from either end.
- T+7.5 seconds: 400 kV Jharsuguda-Lapanga D/c tripped from Jharsuguda on Directional Earth fault and DT sent to OPGC.
- T+17.7 seconds: 400/220 kV ICT-1 at Lapanga tripped on Directional Earth Fault.
- T+18.7 seconds: 400/220 kV ICT-2 at Lapanga tripped on Back Up O/c protection. Both ICTs tripped at different time.

Sequence components of voltage and current for 400 kV Meramundali-Lapanga-1 at Lapanga during charging attempt indicating fault seen in forward direction.



Protection issues (सुरक्षा समस्या):

400 kV Meramundali-Lapanga-1

- Current in Y_ph at Lapanga to the tune of 100 A in 400 kV Meramundali-Lapanga-1 even after opening of breaker during 1st tripping.
- No A/r attempt by main CB at Lapanga.
- Single phase tripping by tie CB at Lapanga during failed A/r attempt.
- No SOTF operation at Meramundali end during charging attempt at 17:26 Hrs.
- No protection operation during charging attempt from Lapanga at 17:27 hrs despite fault seen in forward direction.

400 kV Meramundali-Lapanga-2

- Tripping in Zone-2 from Lapanga despite carrier receipt.

400 kV Lapanga-OPGC D/c

- No tripping from OPGC end. Directional Earth fault setting may be reviewed.

U#4 at OPGC

- SEF setting may be reviewed.

400/220 kV ICT-1&2 at Lapanga

- ICT-2 tripped after 1 second of tripping of ICT-1 at Lapanga. There might be issue of CT saturation as different current are being seen by two ICTs.

Operational Issues (परिचालन समस्या):

- Charging attempt instruction should be clearly directed by SLDC mentioning the end from which the charging attempt should be taken.
- Back-to-back charging attempts to be avoided when one charging attempt already failed, which resulted into disturbance in this case.
- Substations should co-ordinate and consult SLDC/RLDC before taking random charging attempts under stressed conditions.

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	OPTCL

Status of Reporting (रिपोर्टिंग की स्थिति):

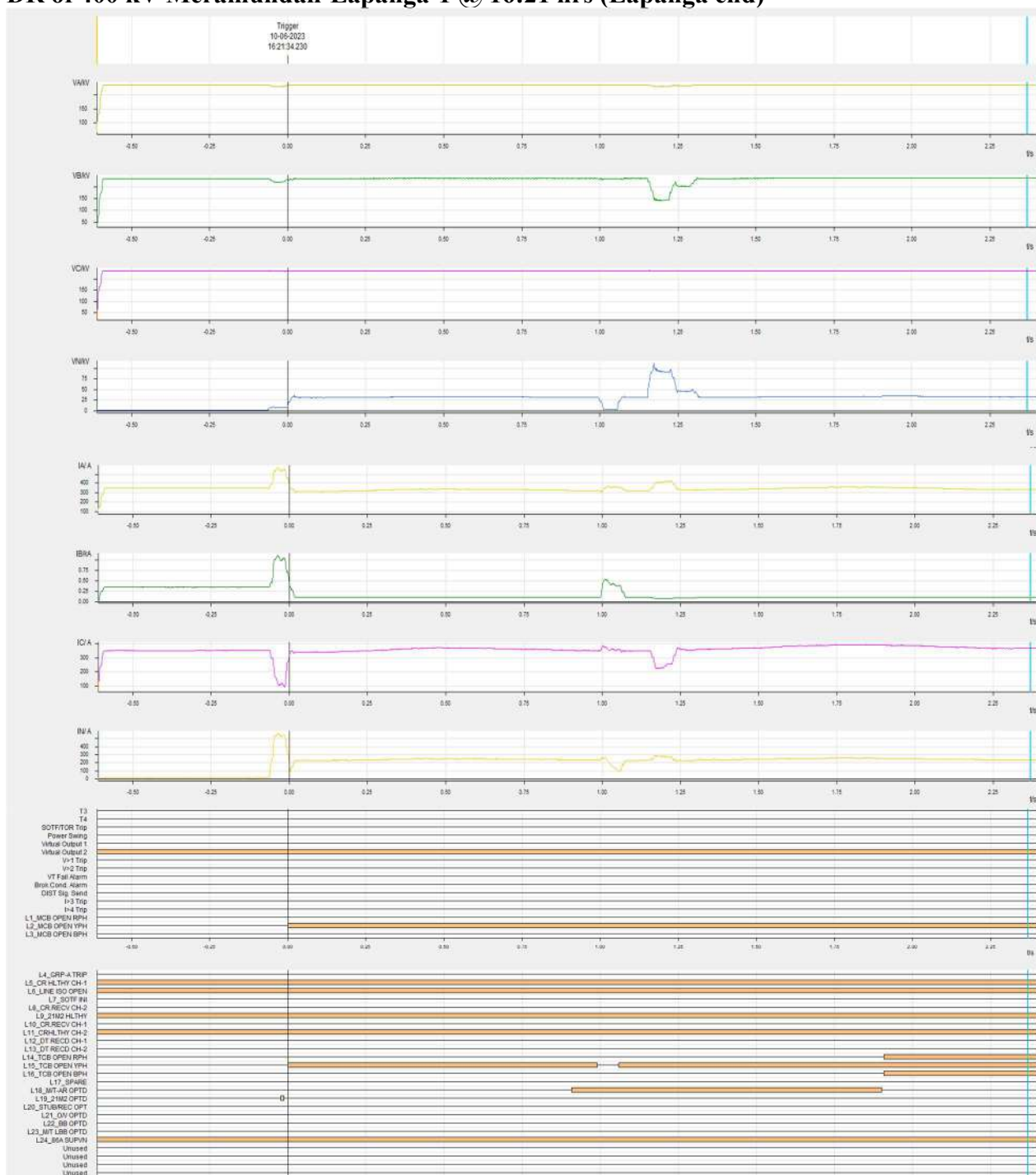
- DR/EL received from OPTCL, OPGC, Sterlite, PG Odisha.

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

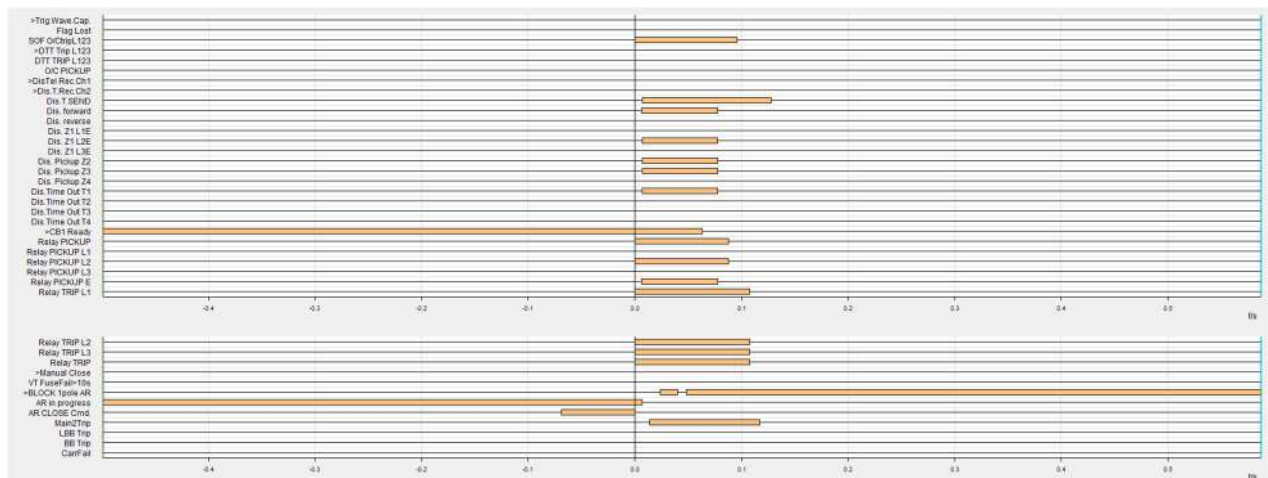
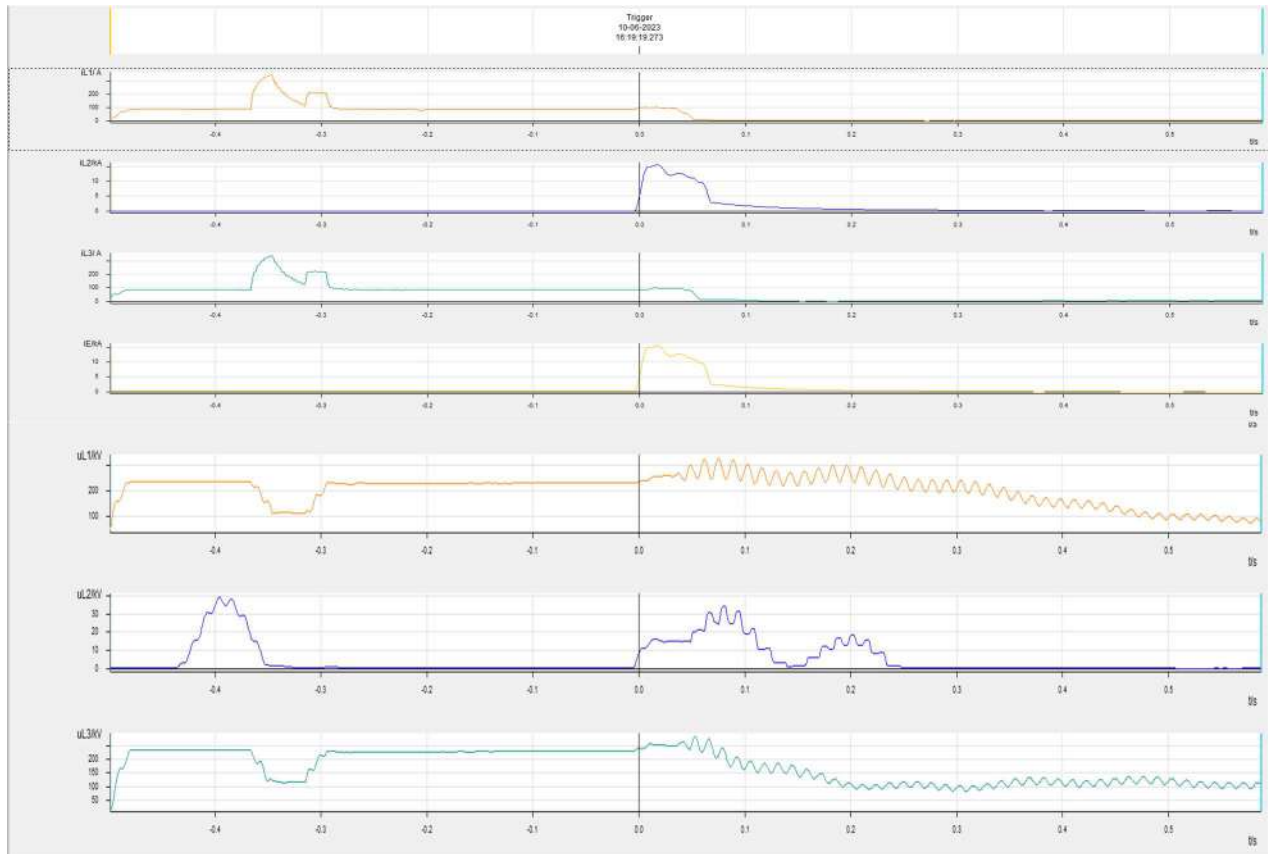
Sequence of event not recorded at time of event.

Annexure 2: DR recorded

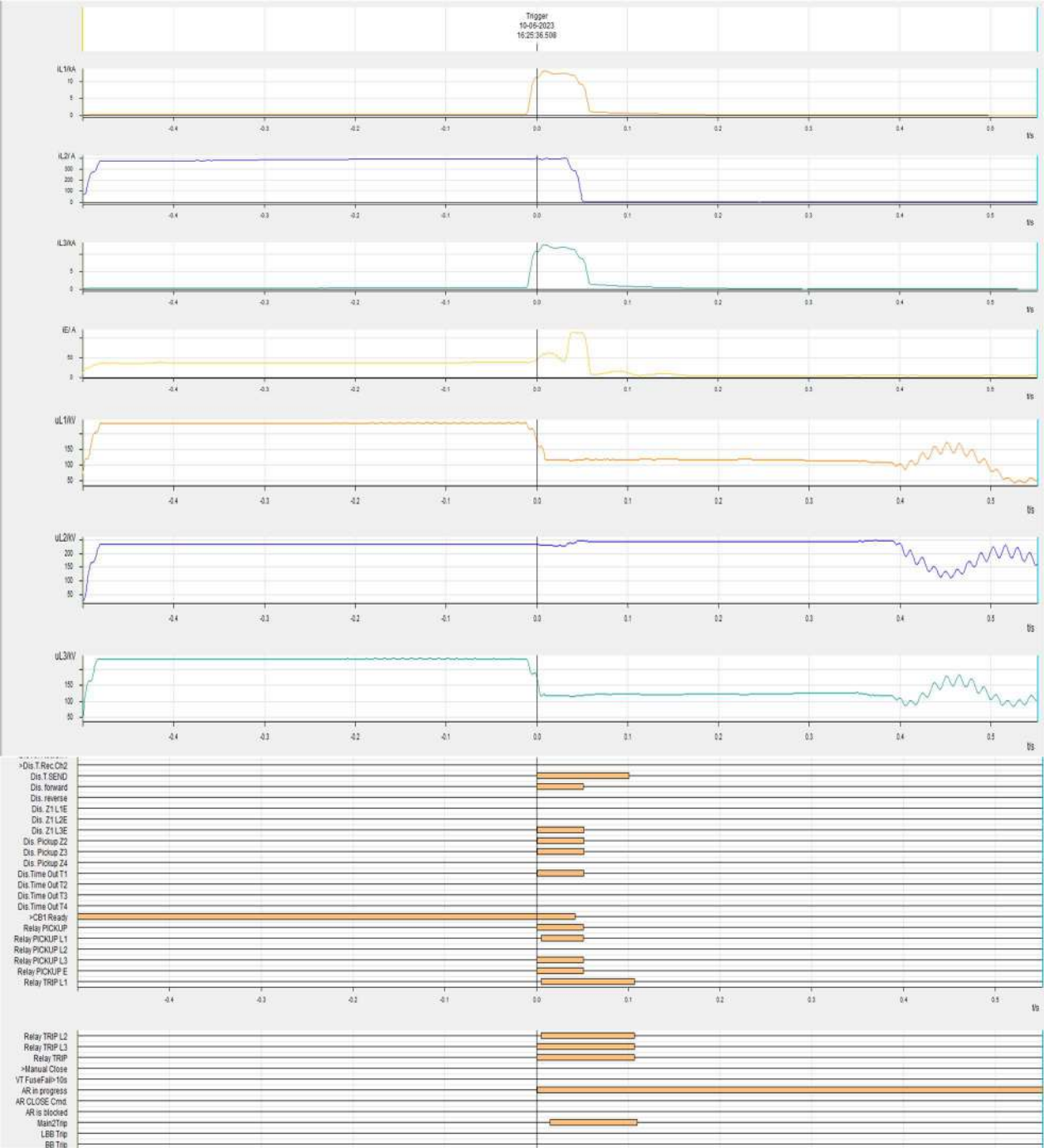
DR of 400 kV Meramundali-Lapanga-1 @ 16:21 hrs (Lapanga end)



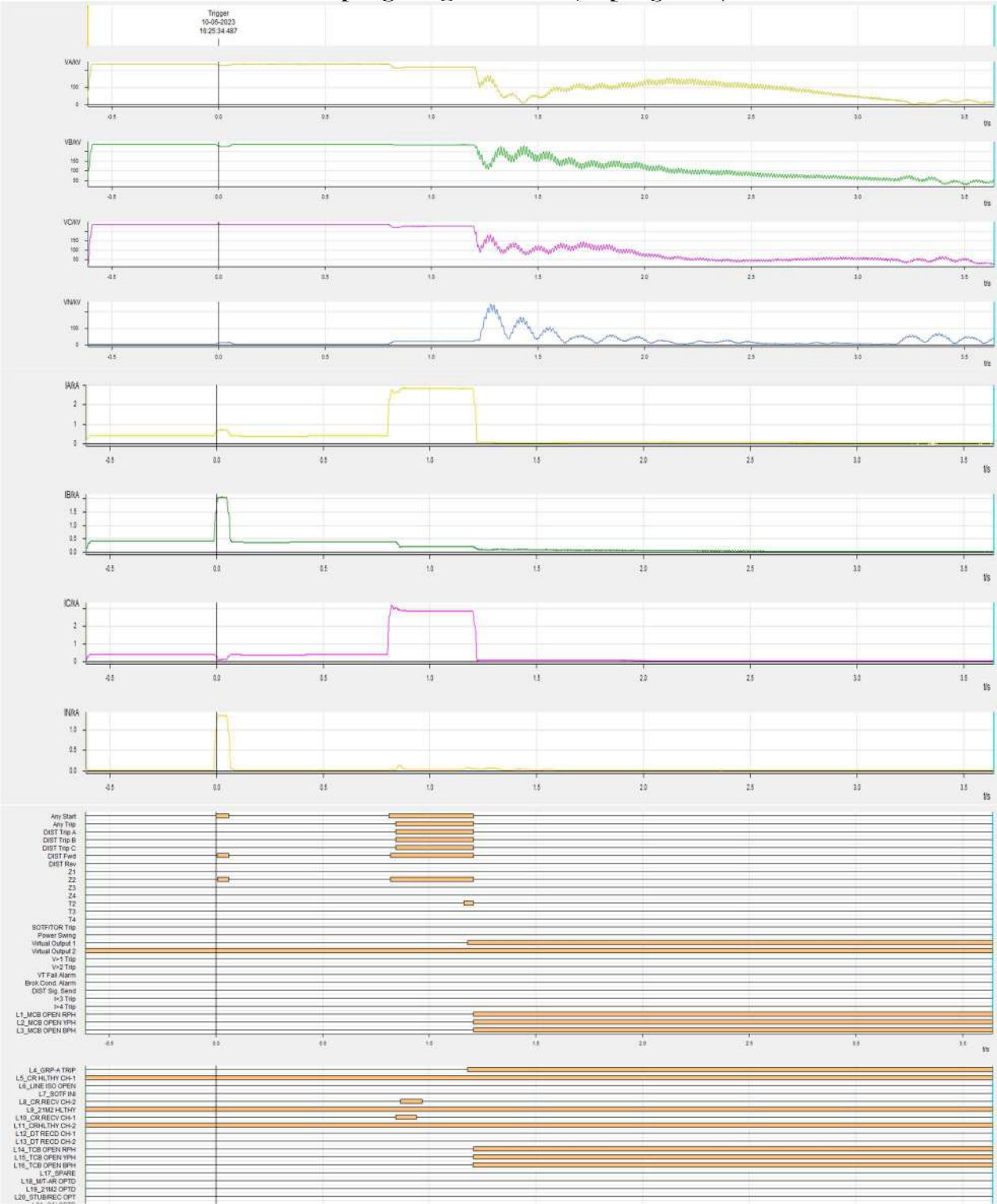
DR of 400 kV Meramundali-Lapanga-1 @ 16:25 hrs (Meramundali end)



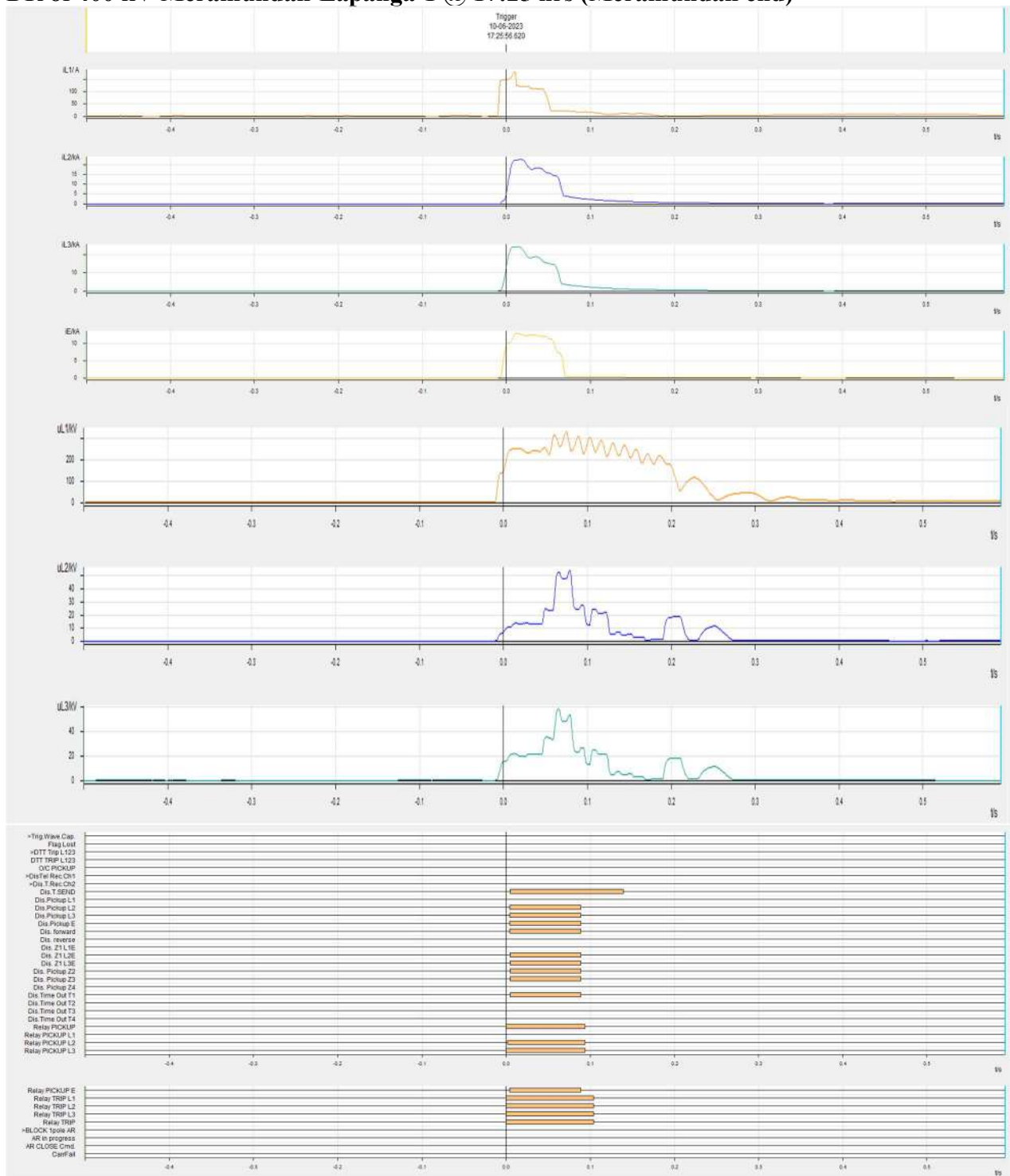
DR of 400 kV Meramundali-Lapanga-2 @ 16:25 hrs (Meramundali end)



DR of 400 kV Meramundali-Lapanga-2 @ 16:25 hrs (Lapanga end)



DR of 400 kV Meramundali-Lapanga-1 @ 17:25 hrs (Meramundali end)



[illegible]


ग्रिड-इंडिया
GRID-INDIA

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
GRID CONTROLLER OF INDIA LIMITED
 (भारत सरकार का उद्यम)
 (A Government of India Enterprise)
 [formerly Power System Operation Corporation Limited (POSOCO)]

पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre

कार्यालय : 14, गोल्फ क्लब रोड, टॉलीगंज, कोलकाता - 700033
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घटना संख्या: 16-06-2023/1

दिनांक: 07-07-2023

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

Summary of the event (घटना का सारांश):

At 10:02 Hrs, HVDC Talcher-Kolar Pole-1 blocked, leading to high loading of 400 kV TSTPP-Meramundali D/c and 400 kV Meramundali-Mendhasal D/c. To control loading of these lines, load reconfiguration was being done in downstream at Narendrapur and Atri. Load of Aska, New Aska and Purushottampur which were fed from Bhanjnagar was shifted to Narendrapur. Entire load of Narendrapur and Atri was put on single line i.e., 220 kV Therubali-Narendrapur. This line got overloaded and tripped at 10:40 Hrs, leading to total supply failure at Narendrapur and Atri S/s. Total 244 MW load loss occurred at Narendrapur and Atri.

- **Date / Time of disturbance:** 16-06-2023 at 10:40 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 220/132 kV Narendrapur, Atri S/s
- **Load and Generation loss.**
 - No generation loss occurred during the event
 - 244 MW load loss reported during the event

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

- 220 kV Therubali-Gunupur-Narendrapur
- 220 kV Atri-Pandiabili D/c

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Therubali-Narendrapur

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

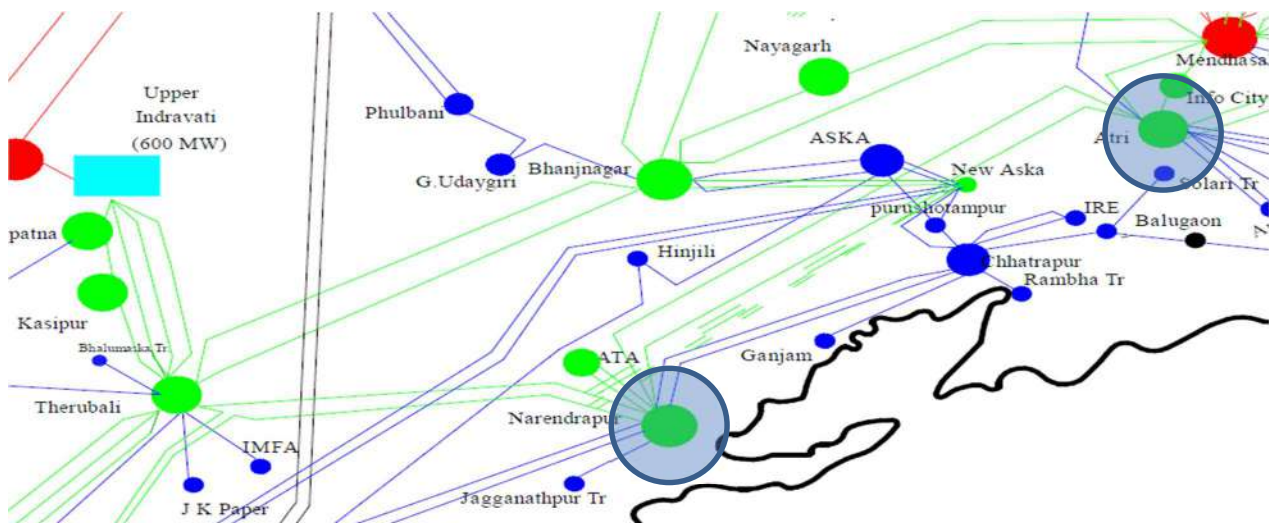


Figure 1: Network across affected area

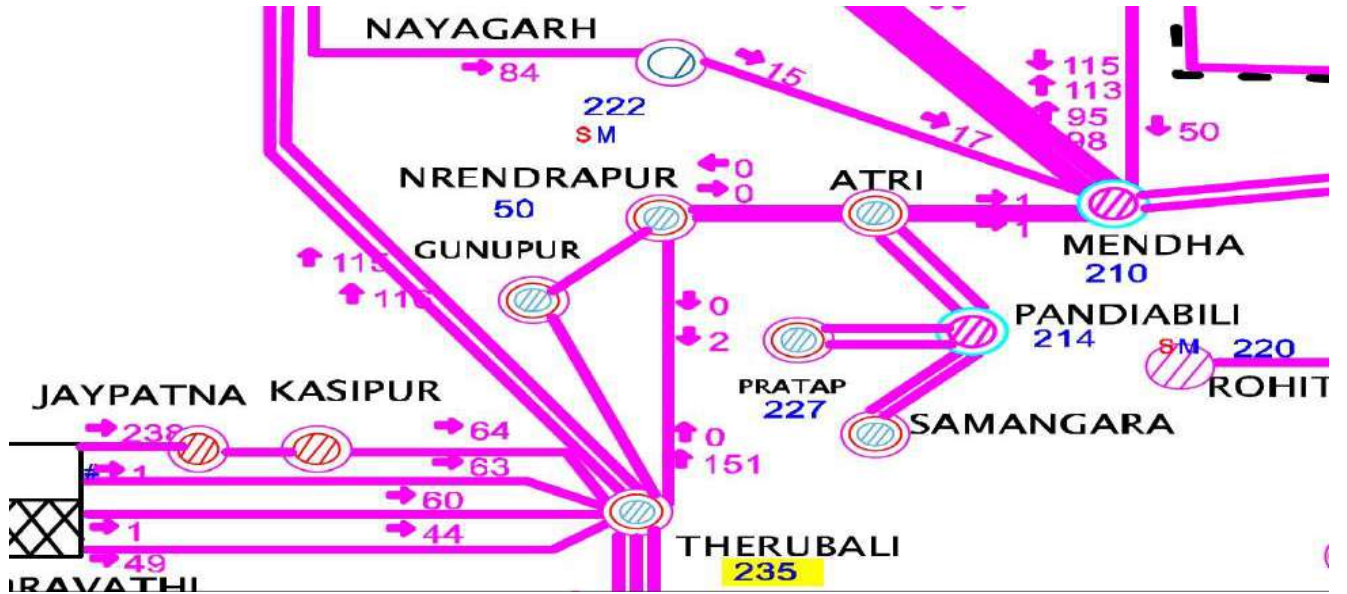


Figure 2: SCADA snapshot of the system

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
10:40	220 kV Therubali-Narendrapur	-	-	No fault observed from PMU.

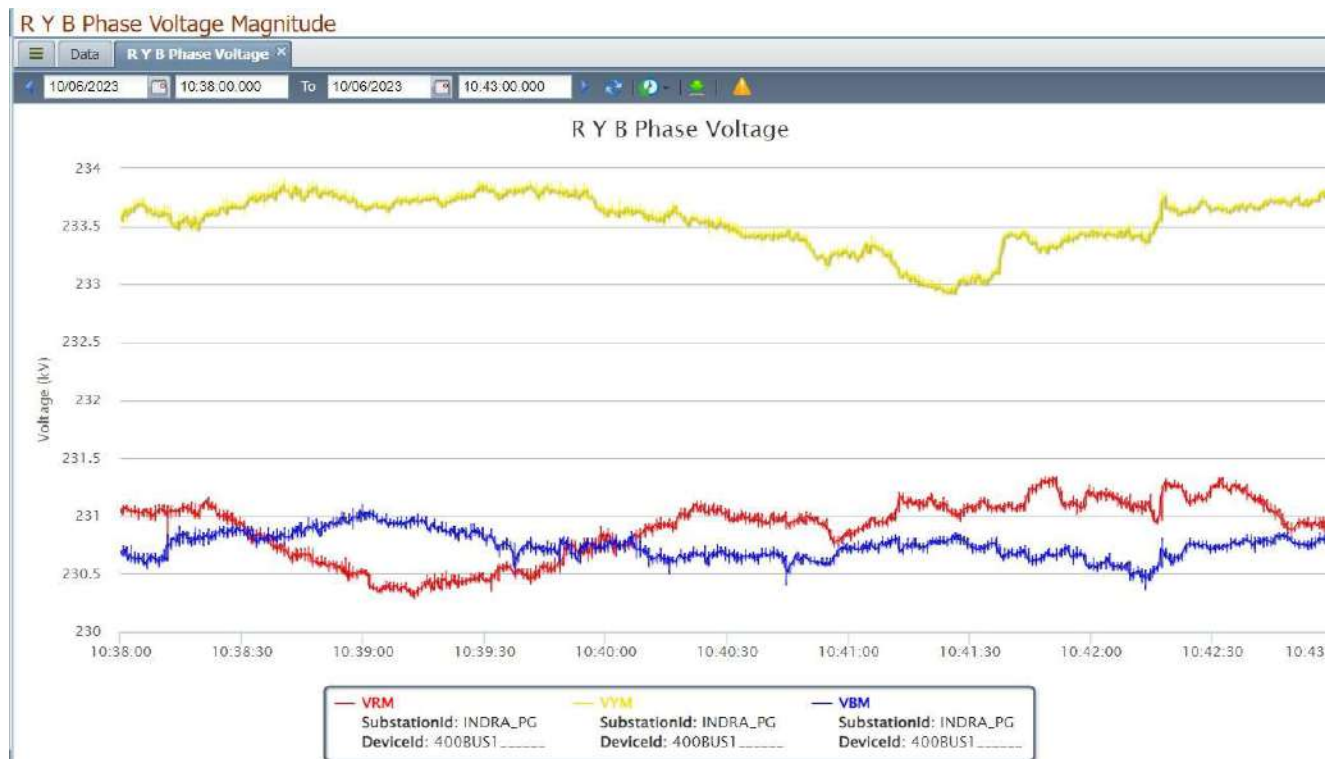


Figure 3: PMU voltage snapshot of 400 kV Indravati S/s

Restoration (पूर्वावस्था की प्रप्ति):

Sl. No.	Name of the Element	Restoration Time
1	220 kV Therubali-Narendrapur	11:11

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

- As reported, around 244 MW load was shifted on 220 kV Narendrapur-Therubali line, which later tripped due to overloading. OPTCL to share O/c settings. As per CEA guidelines, O/c settings not to be enabled when Main-1 & Main-2 distance protection are provided. OPTCL may explain.
- SLDC Odisha may explain why around 244 MW load was shifted to one single 220 kV line, which is more than its thermal rating.

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	OPTCL

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL yet to be received from OPTCL

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

Sequence of Events not recorded during the event.

Annexure 2: DR Recorded

DR/EL yet to be received from OPTCL.



घटना संख्या: 10-06-2023/1

दिनांक: 07-07-2023

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

Summary of the event (घटना का सारांश):

At 17:00 Hrs, 220 KV Ramchandrapur-Chandil tripped due to operation of LBB at Chandil S/s leading to total supply failure at Chandil S/s as 220 kV Ranchi-Chandil was under breakdown and 220 kV Santaldih-Chandil was switched off to limit loading of 220 kV Ramchandrapur-Chandil, which remained as the only source for Chandil. Around 170 MW load loss occurred at Chandil.

- **Date / Time of disturbance:** 10-06-2023 at 17:00 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 220/132 kV Chandil S/s
- **Load and Generation loss.**
 - No generation loss was reported during the event.
 - Around 170 MW load loss reported during the event at Rajkhasrawan, Chakradharpur, Jadugoda, Dalbhumgarh, Golmuri, Kendposi, Tamar, Khunti, Adityapur. (Including Railway) by Jharkhand SLDC.

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

- 220 kV Ranchi-Chandil
- 220 kV Santaldih-Chandil

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Ramchandrapur-Chandil

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

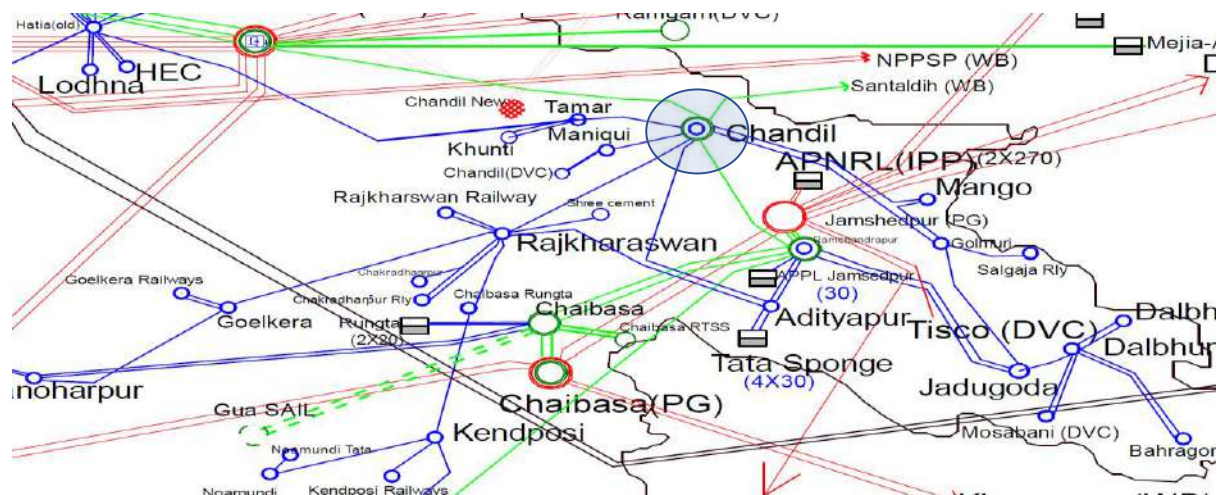


Figure 1: Network across the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
17:00	220 kV Ramchandrapur-Chandil	-	Chandil: LBB operated	No fault observed from PMU.

R Y B Phase Voltage Magnitude

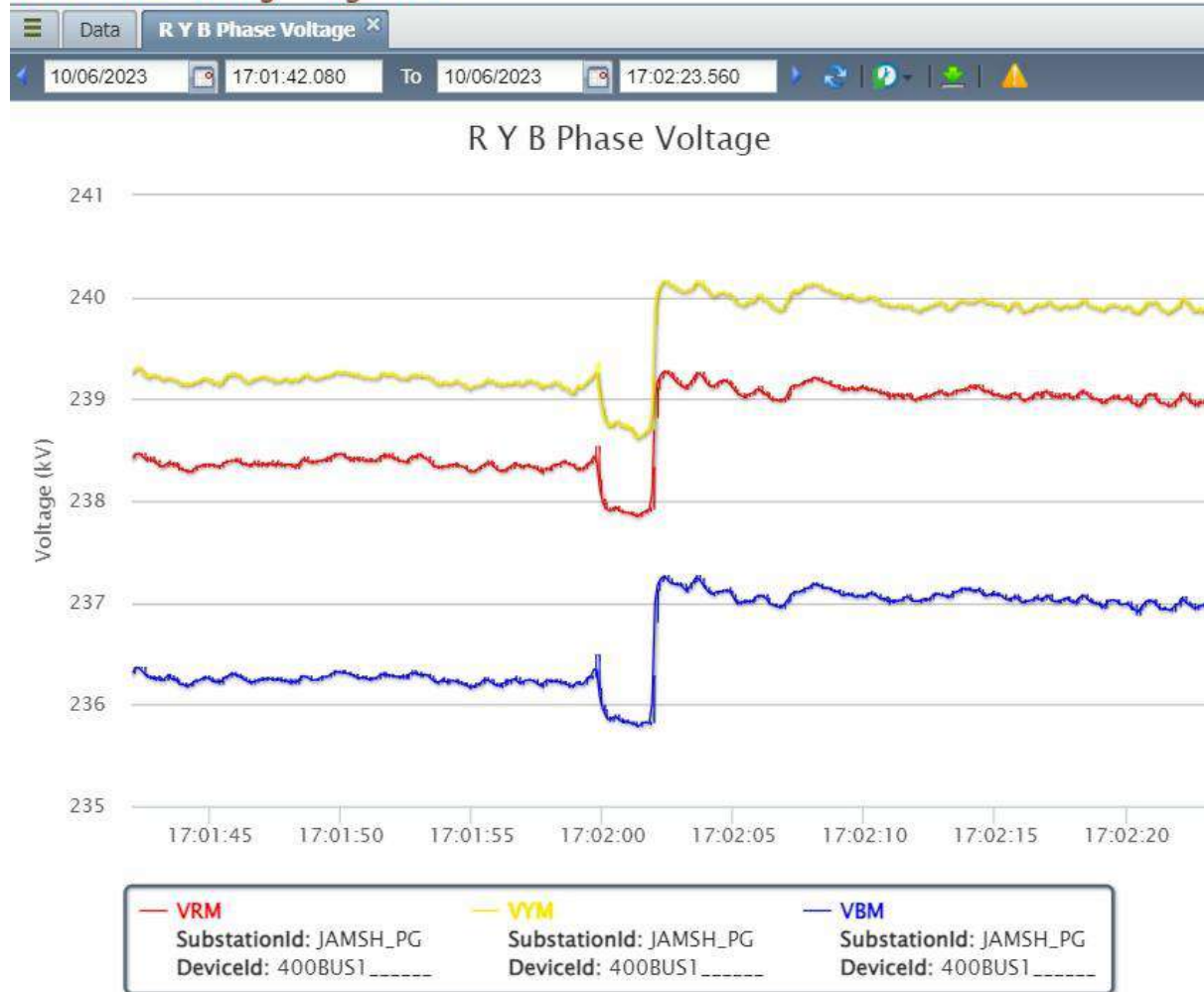


Figure 2: PMU snapshot of 400/220 kV Jamshedpur S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Ramchandrapur-Chandil	17:29

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

- Entire load of Chandil S/s was being fed through 220 kV Ramchandrapur-Chandil only. As informed, some shutdown activity was going on at Chandil S/s during which LBB of one 220/132 kV ATR operated and 220 kV Ramchandrapur-Chandil tripped.
- JUSNL may explain the reason of LBB operation. No fault observed from PMU.
- Since entire load was being fed through one line only, any testing or shutdown activity should be avoided as any maloperation would lead to total supply failure, as in the current case.

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

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL received yet to be received from JUSNL.

Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event
Sequence of Events not recorded at the time of event.

Annexure 2: DR recorded

DR/EL yet to be received from JUSNL.



घटना संख्या: 28-06-2023/1

दिनांक: 07-07-2023

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

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

At 02:28 Hrs, Resistive fault struck 400 kV Rangpo-Teesta 3 and 400 kV Rangpo-Dikchu and both lines tripped. 400 kV Teesta 3-Dikchu also tripped at the same time. All six units at Teesta 3 and two units at Dikchu tripped leading to generation loss of around 1410 MW (Teesta 3: 1304 MW, Dikchu-106 MW).

- **Date / Time of disturbance:** 28-06-2023 at 02:28 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta-3, Dikchu S/s
- **Load and Generation loss.**
 - Total 1410 MW generation loss reported at Teesta-3, Dikchu.
 - No load loss occurred during the event.

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

- NIL

3. Major elements tripped (प्रमुख ट्रिपिंग)

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

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

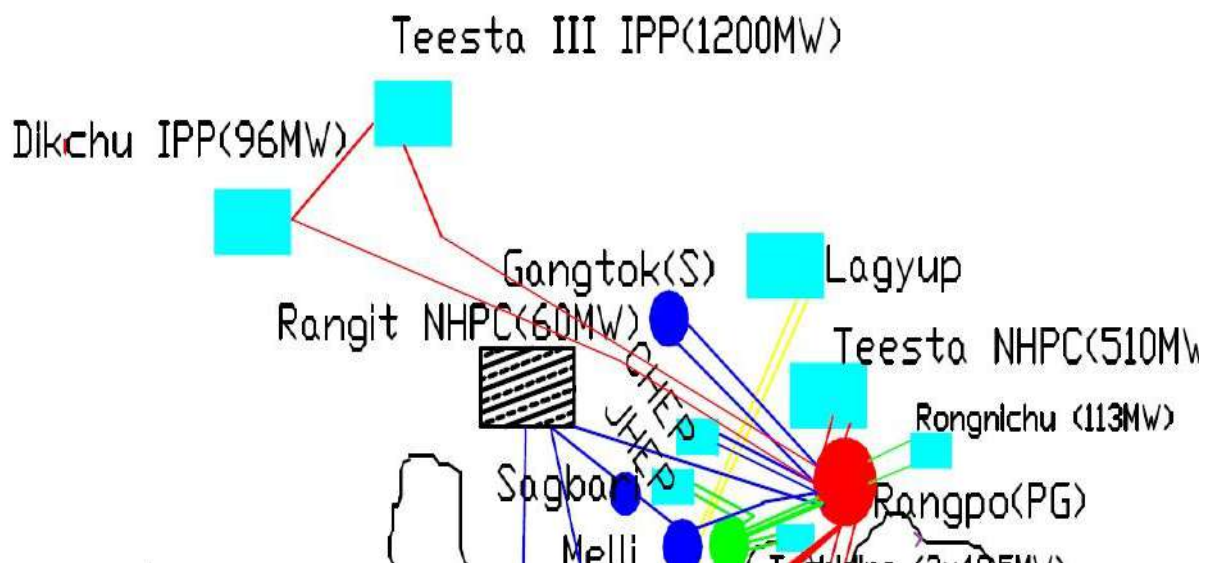


Figure 1: Network across the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
02:28	400 kV Teesta 3-Dikchu	Teesta 3: O/C, DEF	Dikchu: DT received	Gradually evolving resistive fault which persisted for around 3.2 seconds.
	400 kV Rangpo-Dikchu	Rangpo: Y_B_N, Iy: 12.9 kA, Ib: 11.9 kA	Dikchu: Didn't trip	
	400 kV Teesta 3-Rangpo	Teesta-3: Y_N, Zone-1, O/V St.2	Rangpo: DT received	
	6*200 MW Units at Teesta-3	Loss of evacuation path		
	2*48 MW units at Dikchu	-		

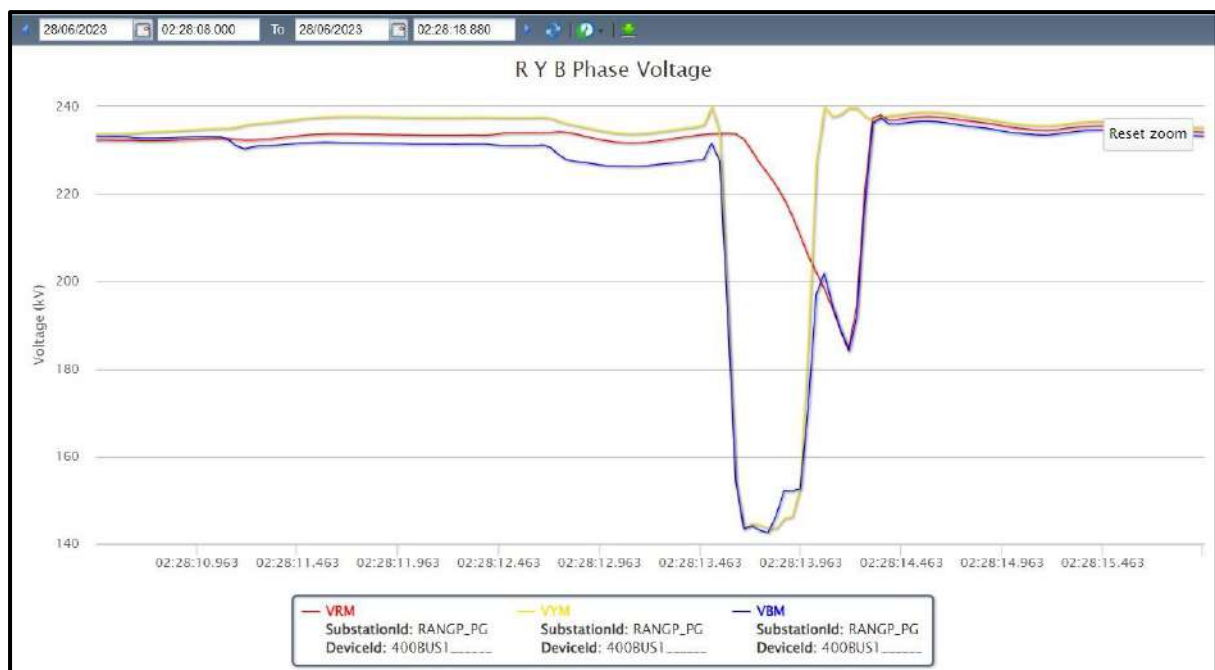
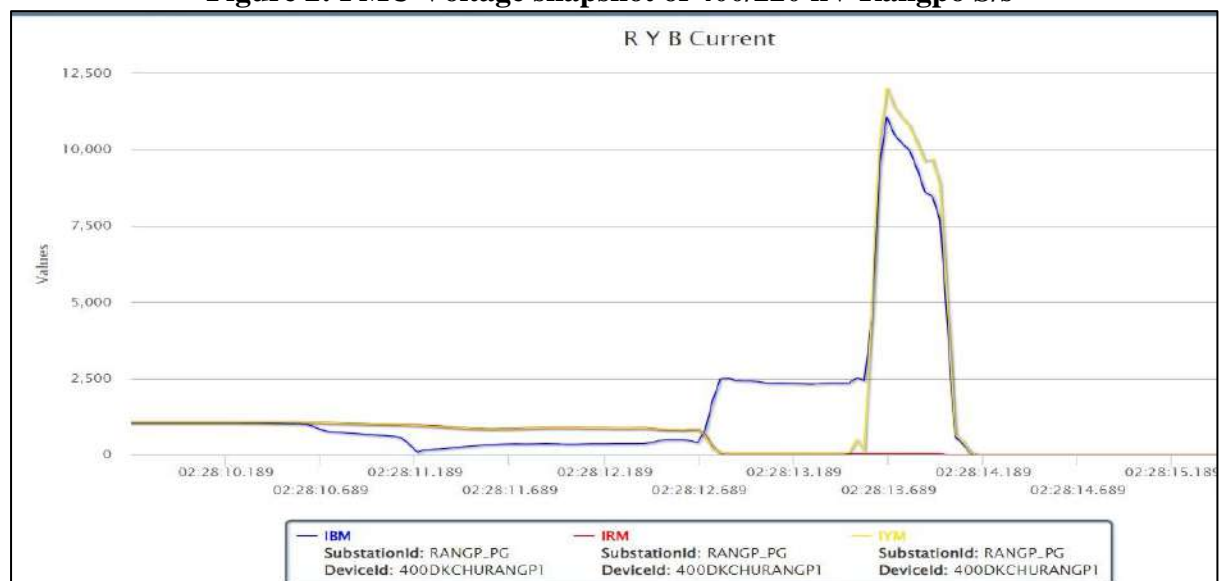


Figure 2: PMU Voltage snapshot of 400/220 kV Rangpo S/s



Line current plot of Dikchu -Rangpo line at Rangpo end shown above .

From above plot, it can be seen that B phase current reduced first at Rangpo end indicating high resistive fault started there first, if we will see current at dikchu end it will be increasing . Then after approx 1.6 sec, from dikchu end fault was isolated as Y-B became zero but fault was persisting and started getting fed from Rangpo end so B phase current increased and after some time got converted to Y-B phase fault and line tripped from Rangpo end in Phase to phase fault .

6. Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 3-Dikchu	03:04
400 kV Rangpo-Dikchu	02:56
400 kV Teesta 3-Rangpo	02:51
6*200 MW Units at Teesta 3	All restored by 02:58 Hrs
2*48 MW Unit at Dikchu	03:46/03:47

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

A resistive fault struck 400 kV Rangpo-Dikchu in Y_B phase, and 400 kV Rangpo-Teesta-3 also sensed the fault in Y_B phase later and changed subsequently to R_B fault.

Sequence of Events as below (Corroborated from PMU and DR data):

- 02:28:11.250-Resistive Fault initiated in 400 kV Dikchu-Rangpo line.
- 02:28:12.460-U#1 & U#2 at Dikchu tripped.
As per DR of 400 kV Rangpo-Dikchu at Dikchu end, it seems units already tripped before tripping of line. Dikchu may explain the reason of unit tripping.
- 02:28:12.750-400 kV Teesta 3-Dikchu tripped from Teesta-3 on DEF, O/c and DT received at Dikchu.
400 kV Teesta 3-Dikchu should not have tripped as fault was not in this line. As informed, Definite time of 1.5 seconds for O/c and DEF was kept enabled at Teesta-3 end besides IDMT for DEF. Definite time may be disabled immediately and O/c settings may also be disabled. TUL may explain.
- 02:28:14.000-400 kV Rangpo-Dikchu tripped from Rangpo end on Zone-2.
- 02:28:14.050-Y_ph of 400 kV Teesta-3-Rangpo tripped from Teesta 3 in Zone-1 and carrier sent to remote end, however, Rangpo did not sense the fault in any Zone yet.
- 02:28:14.255-Rangpo sensed the fault in Zone-2 in Teesta 3 line.

- 02:28:14.490- O/V St.2 operated at Teesta-3 for Rangpo and DT sent to remote end.
- ❖ TVTPL may explain the nature of fault and findings, if any.
- ❖ Further, Pick-up settings of DEF at Teesta-3 and Dikchu needs to be reviewed as they are set at 600 A which led to delayed pick up of fault around 1.5 seconds after fault initiation.

8. Status of Reporting (रिपोर्टिंग की स्थिति):

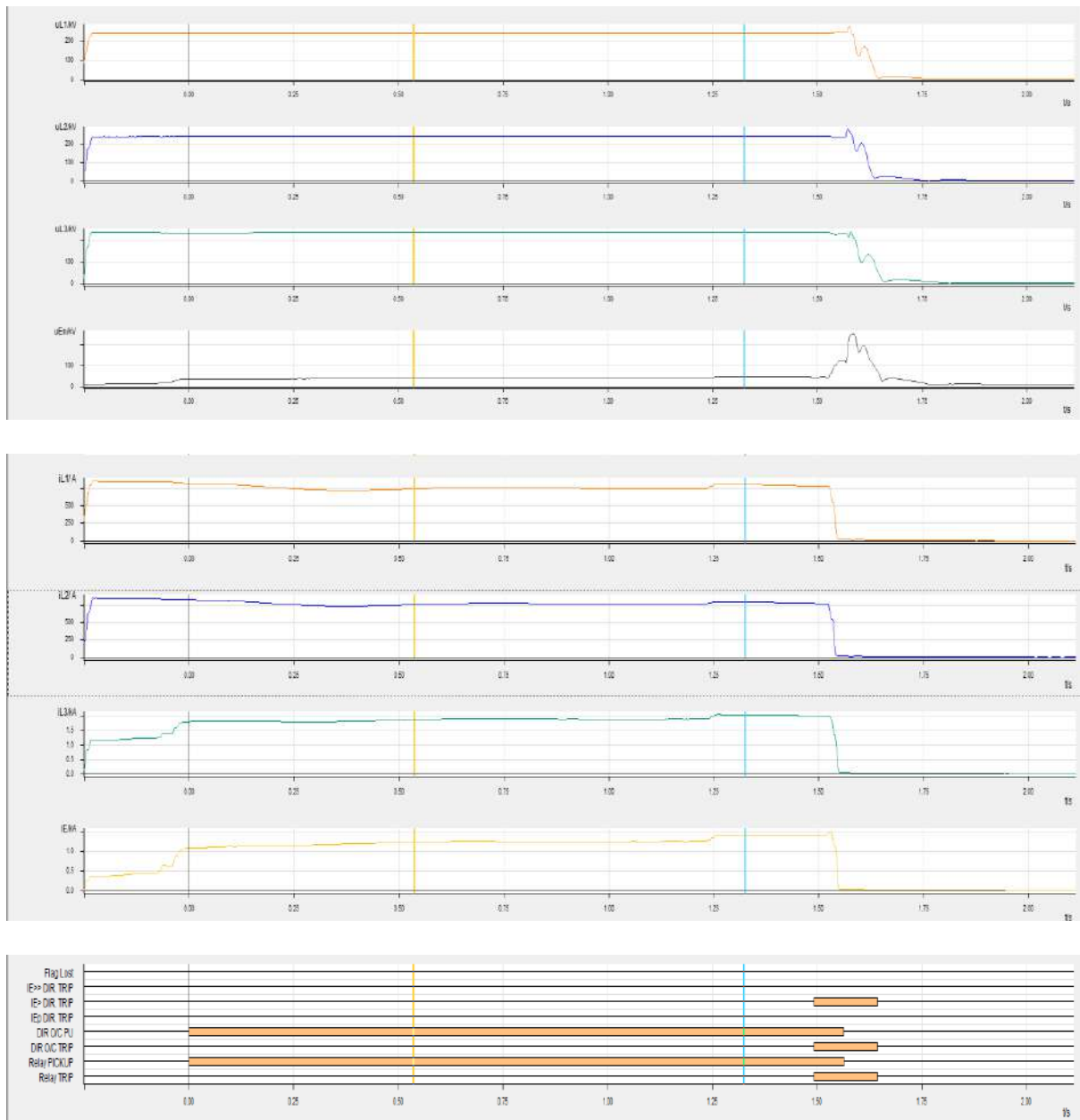
- DR/EL received from Teesta 3, Dikchu, PG ER-2

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

Sequence of Event not recorded at the time of event.

Annexure 2: DR recorded

DR of 400 kV Teesta 3-Dikchu (Teesta 3)

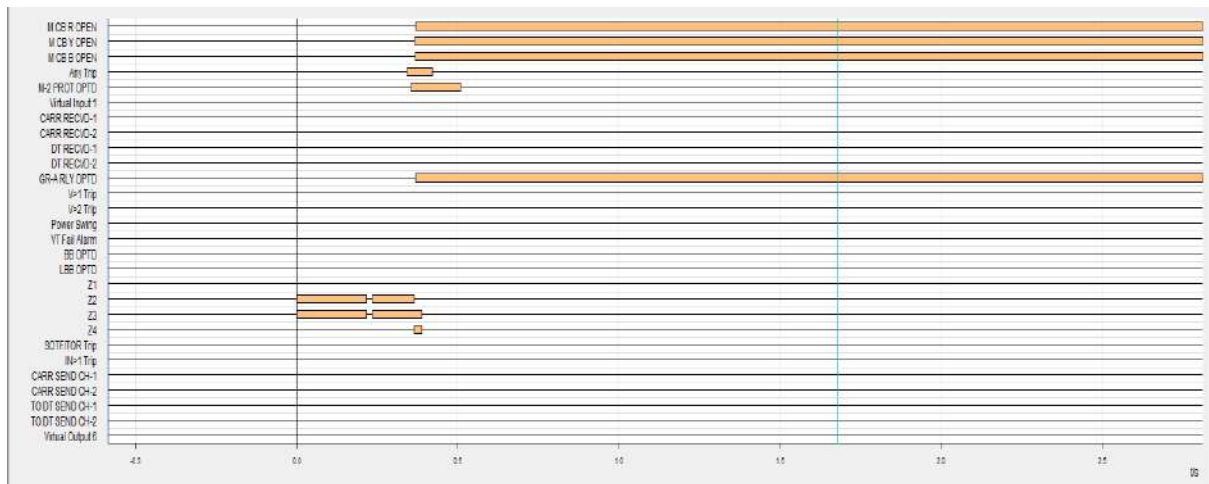
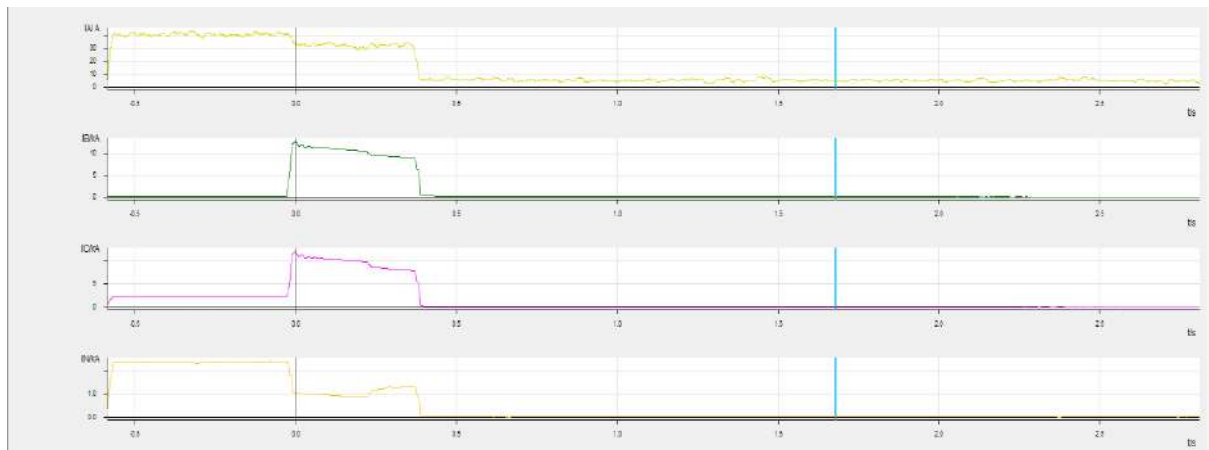
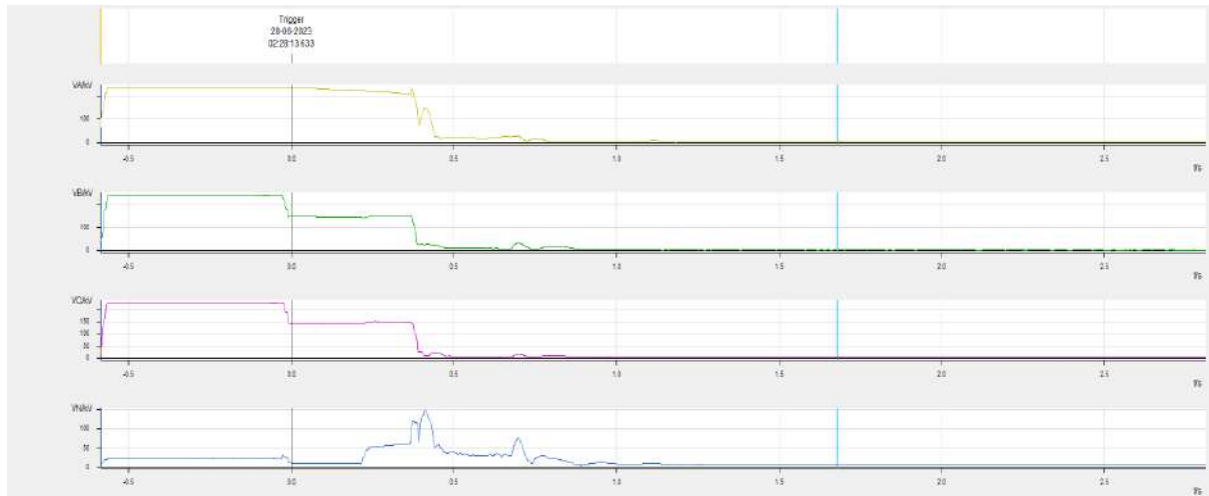


The image displays a power quality analysis software interface. The top section shows four time-series plots for voltage (VABV, VBCV, VCBV) and current (IABV) over a 4-second period. The bottom section shows a sequence of events timeline with various power quality events listed on the left and their durations represented by horizontal bars on the right. A specific event, 'L13 OT RECV C2', is circled in black.

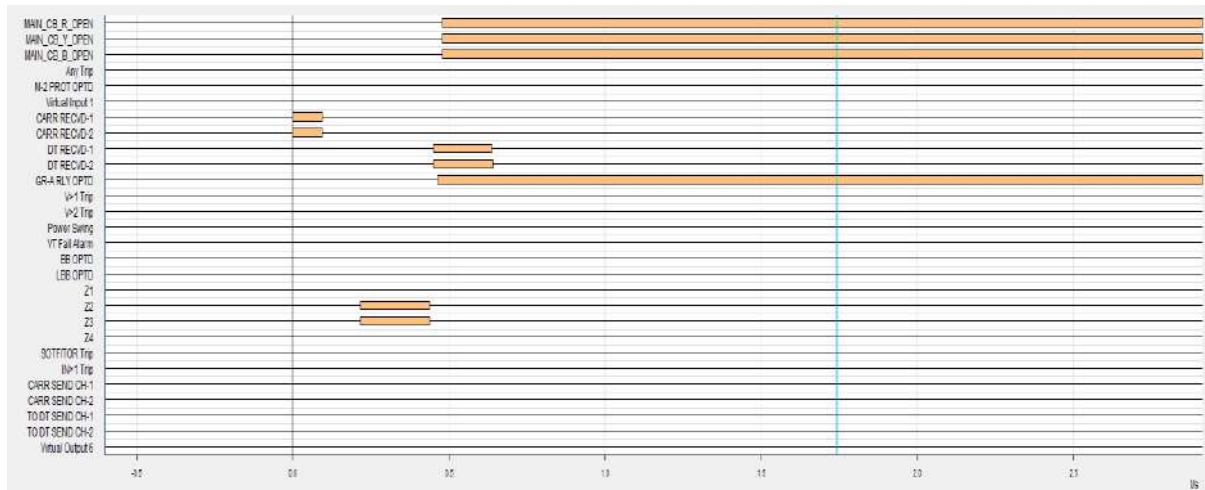
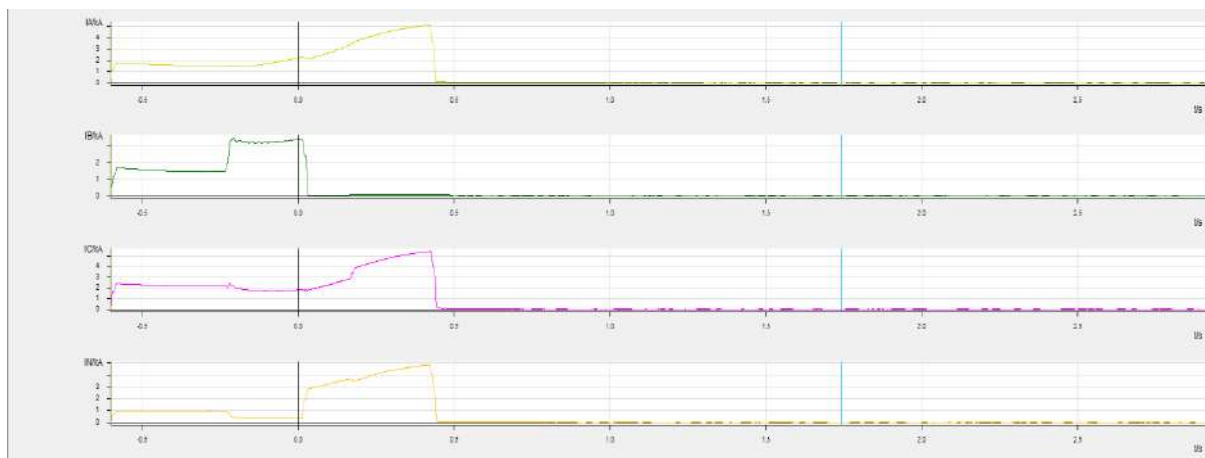
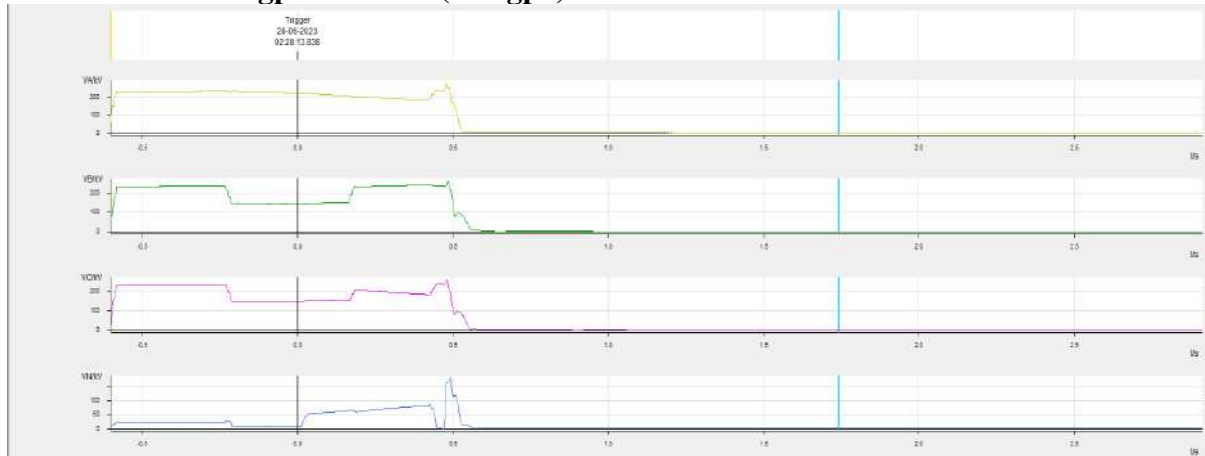
Sequence of Events Timeline:

Event	Start Time (s)	End Time (s)
L1 MCB R OP	1.6	2.6
L2 MCB Y OP	1.6	2.6
L3 MCB B OP	1.6	2.6
INV1 Start	0.0	1.6
INV1 Trip	1.6	2.6
L7 SOTF INI	1.6	2.6
L10 CB RECV C1	1.6	2.6
L12 OT RECV C1	1.6	2.6
L13 OT RECV C2	1.6	2.6
L14 RECB R OP	1.6	2.6
L15 TIE CB Y OP	1.6	2.6
L16 TIE CB B OP	1.6	2.6
L18 AR OPTD	1.6	2.6
L20 M2 STUB OPTD	1.6	2.6
L22 BB OPTD	1.6	2.6
L23 LBB OPTD	1.6	2.6
Relay 15	1.6	2.6
Relay 16	1.6	2.6
R17 CR SEND CH1	1.6	2.6
R18 CR SEND CH2	1.6	2.6
R33 AR LO	1.6	2.6
R34 AR LO TIE	1.6	2.6
Z1	1.6	2.6
Z2	1.6	2.6
Z3	1.6	2.6
Z4	1.6	2.6
Power Swing	1.6	2.6
SOTFTOR Trip	1.6	2.6

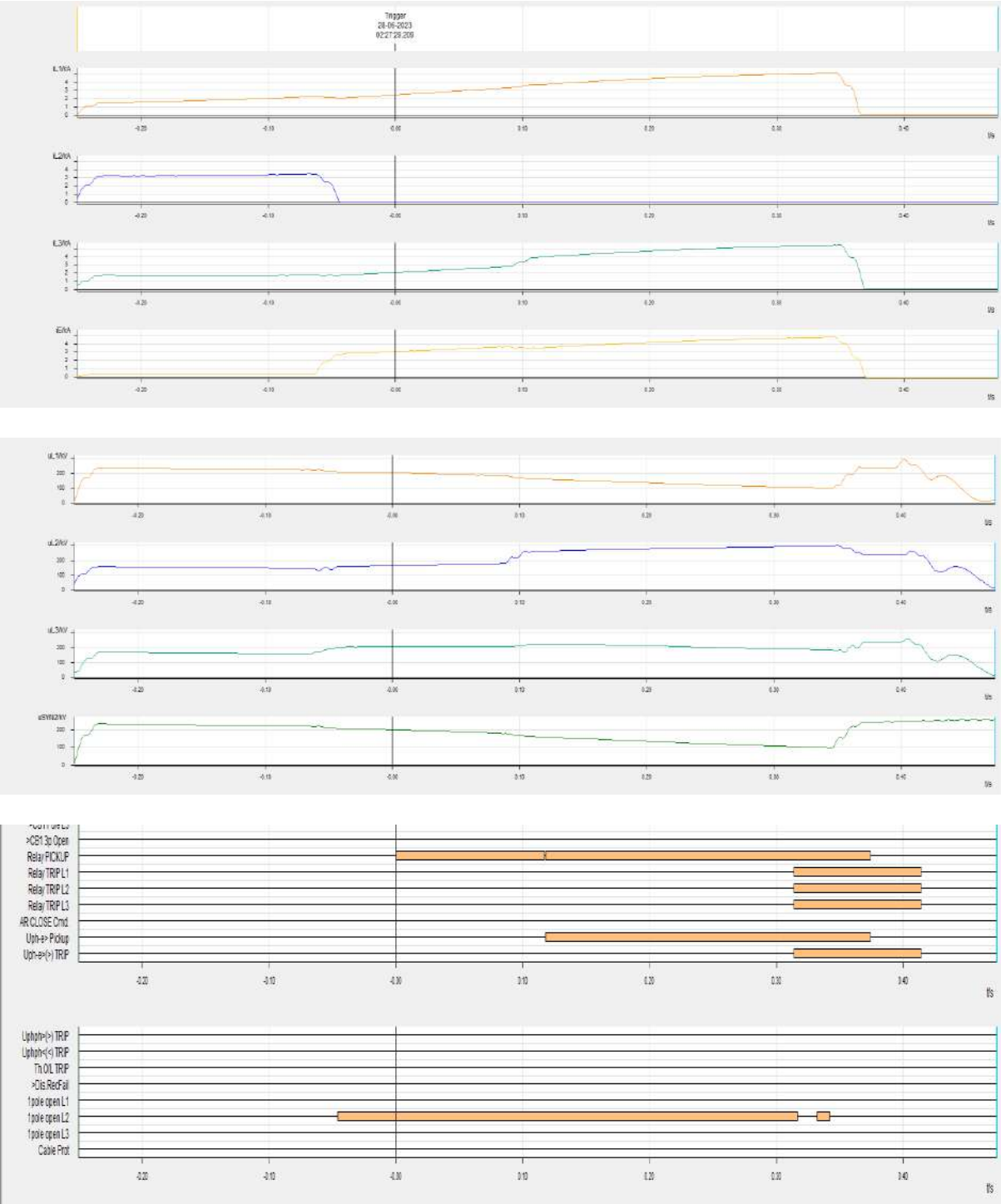
DR of 400 kV Rangpo-Dikchu (Rangpo)



DR of 400 kV Rangpo-Teesta 3 (Rangpo)



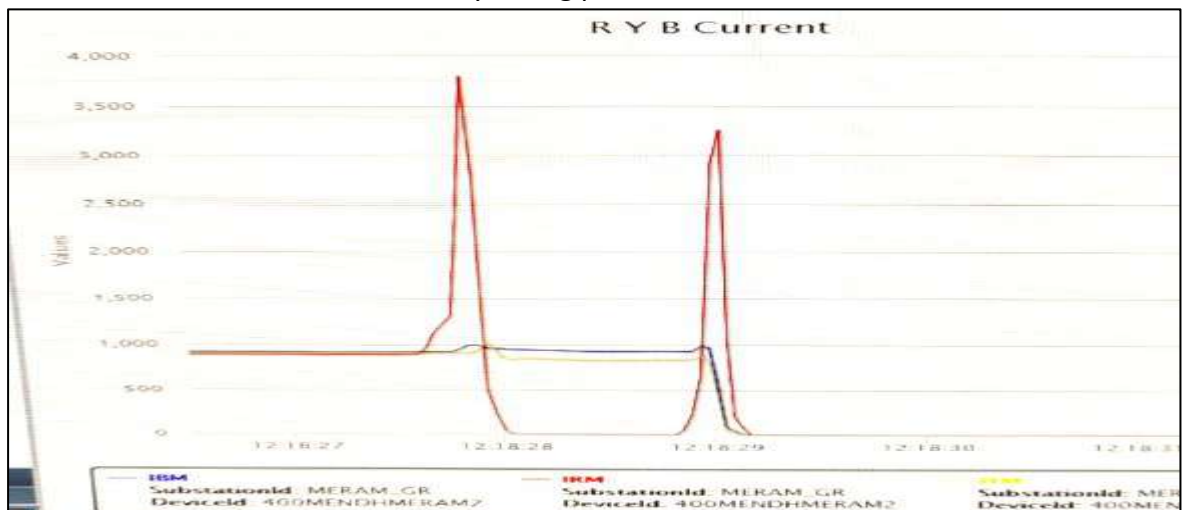
DR of 400 kV Rangpo-Teesta 3 (Teesta 3)

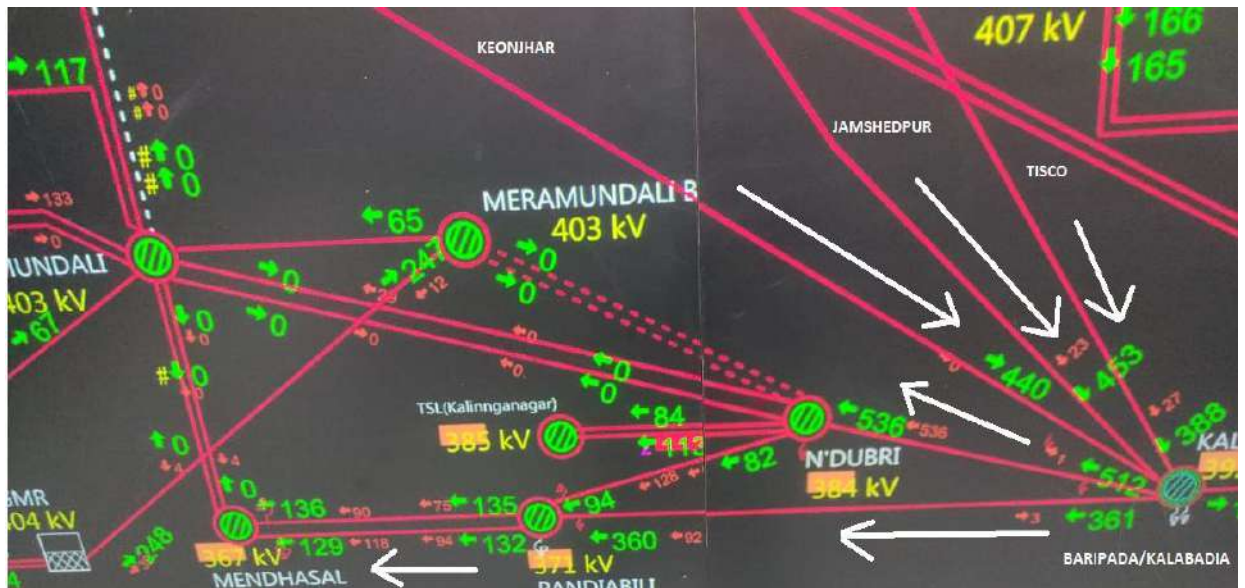


400 KV Meramundali – Mendhasal D/C multiple tripping Event

Event 1: 12:18 Hrs , Tripping of 400 KV Meramundali – Mendhsal D/C

- Mendhasal ckt-2 tripped on R-n fault at 34 km from Mendhasal , Pre tripping flow was 640MW Each it is suspected that fault was due to sag and clearance issue .ckt-1 tripped on overload, setting at 1200 Amps.
- Bus voltage dipped down to 340 Kv due to huge long haulage of power and low fault level of Mendhasal. Some of the induction and AC loads also got stalled leading to low voltage scenario.
- load shedding of around 500 MW near cuttak , bhadrak , balsore , paradeep was done to improve the voltage , which later was restored slowly.
- With Meramundali -Mendhasal D/C tripping only power source at 400 Kv was Baripada(Kalabadia) which was feeding the load of New dubri , Pandialbali , Mendhasal .
- Baripada was getting power from Keonjhar & Jamshedpur and Keonjhar to baripda flow increased to 650 MW.
- Power which was coming to baripda was going from baripda to pandiabali and baripada to new dubri to feed the load of New dubri , Pandialbali , Mendhasal. Hence loading of Baripada to pandiabali and Baripada to new dubri also increased significantly .
- Baripada -New dubri increased to 650 MW and baripad pandiaballi increased to 550 MW .
- Pandiabali -Mendhasal reversed flow from Pandibali to mendhasal to feed mendhasal load.250 MW Each which was intially taking power from Mendhasal.



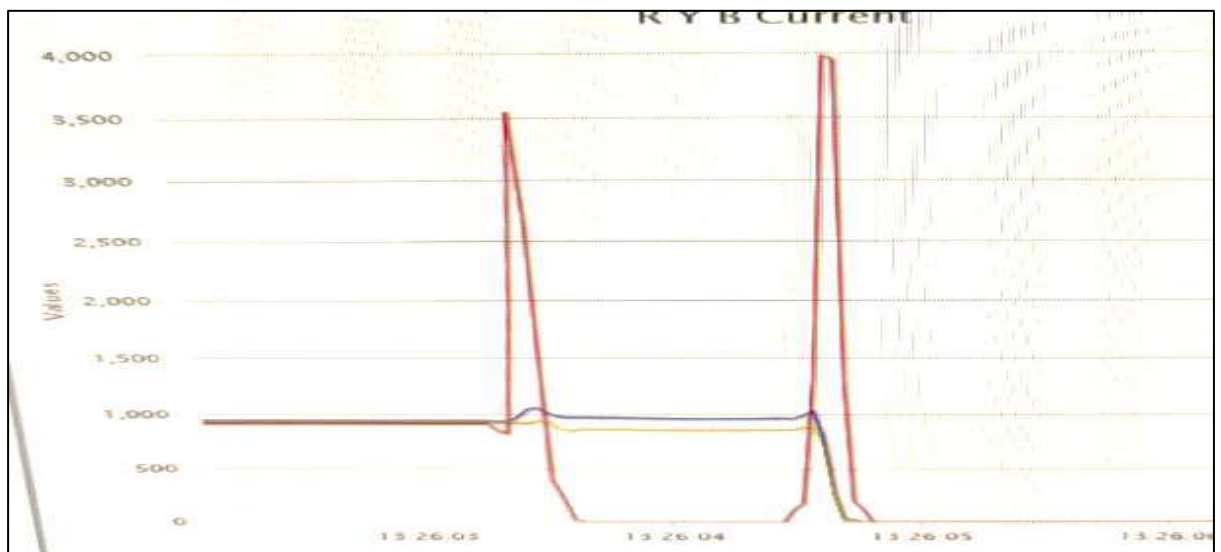


Event 2: 12:50 Hrs , restoration of Both circuits

- Meramundali -Mendhasal ckt 1 was tripped from only Meramundali end and was charged from mendhasal end so Bckup overcurrent setting was bypassed and later charging attempted and line charged and flow of line was 950 MW, after 5 minutes Line -1 also charged and line charged successfully with flow of 600 MW each.
- After charging again Backup O/C was enabled .

EVENT 3: 13:26 HRs ,Again Tripping of Meramundali -Mendhasal D/C

- Mendhasal ckt-2 again tripped on R-n fault at 34 km from Mendhasal , same relay indication this time also.
- Pre tripping flow was 640MW Each it is suspected that fault was due to sag and clearance issue .ckt-1 tripped on overload, setting at 1200 Amps.
- Similar power flow happened again and voltage variations at Mendhsal ,hovering near 360 KV .

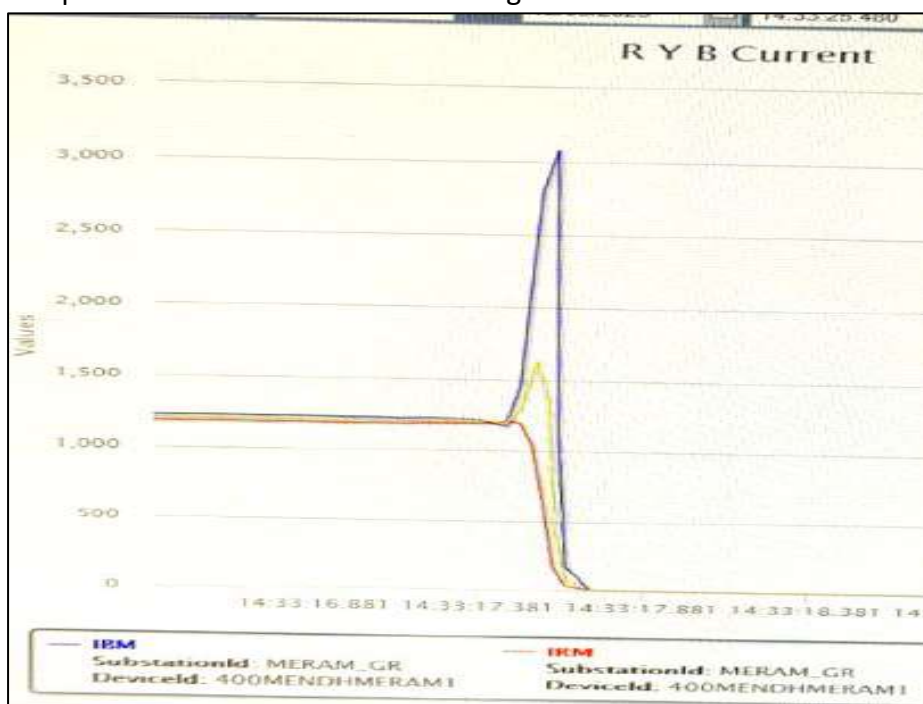


EVENT-4 , 13:52 Hrs ,Charging of Meramundali-Mendhasal -1

- SLDC Odisha charged the Line -1 by increasing Backup over current to 1500 Amps - 1040 MW .
- But as the line was charged flow was more than 1040 MW and it tripped within 2 Minutes.

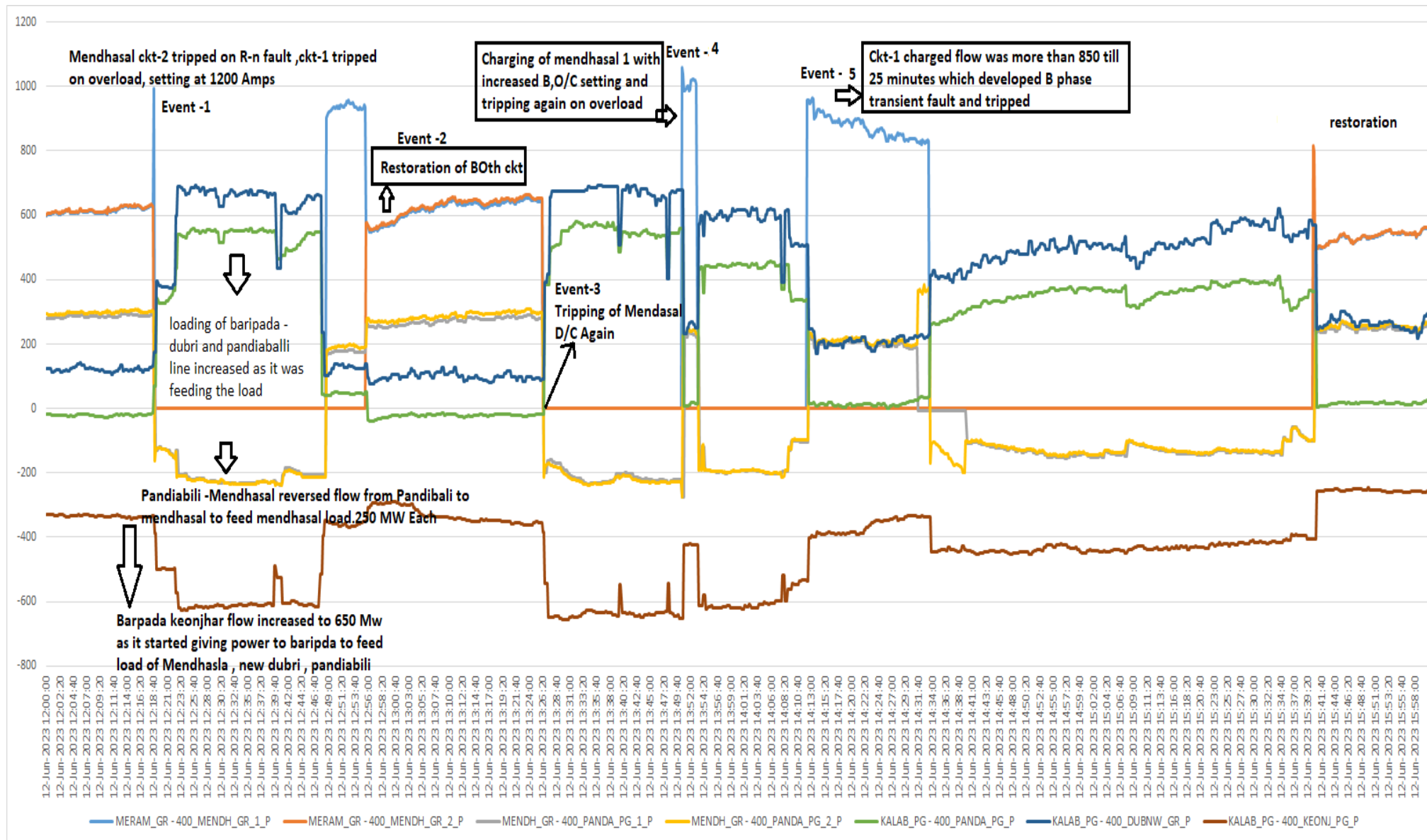
Event 5: at 14:13 Hrs Charging of Mendhasal-Meramundali -1 Again

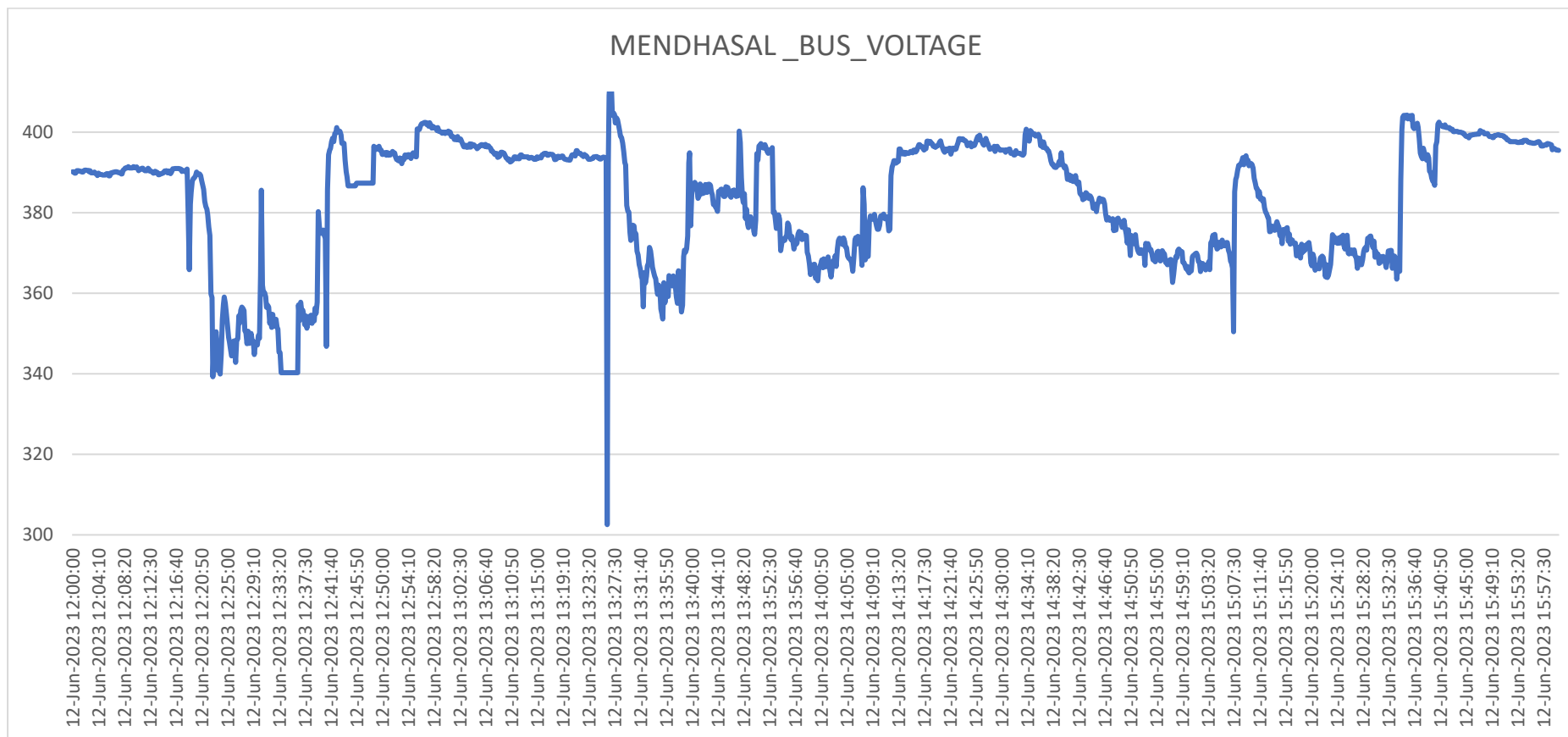
- SLDC Odisha charged the Line -1 and flow touched to 940 MW and some load re-arrangement done at 220 KV level, which reduced loading upto 820 MW also Talcher kolar increased to 1000 MW .
- Flow was more than 850 MW till 25 minutes ,But now ckt-1 developed a transient fault in B phase seems to be due to same sag issue .



Event 6: 15:40 Hrs , Final restoration of both circuits

- Meanwhile some load rearrangement and 220 Kv Network re-configuration was done , so that while charging Meramundali mendasal it do not cause overloading .
- Such as closing of Bhanjanagr-mendhasal and nayagarh-mendhasal loop .
- Shifting of some new dubri load to meramundali .
- In patrolling they have not found any fault so Meramundali Mendhasal D/C charged from Meramundali end and both line was holding and seems to be healthy and finally one by one both lines were charged .





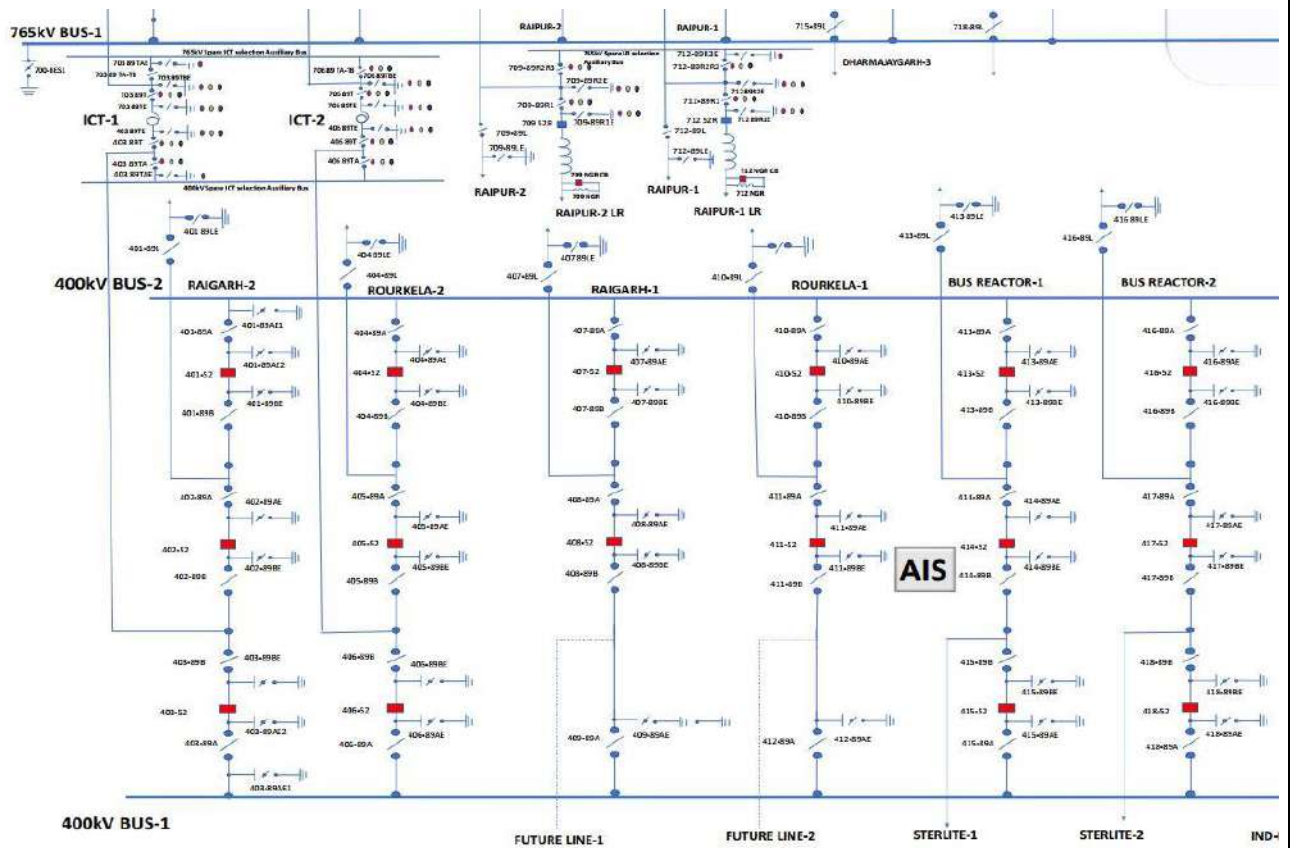
Report on Tripping of various elements of Sundargarh SS on Dt. 20.06.2023

Background:

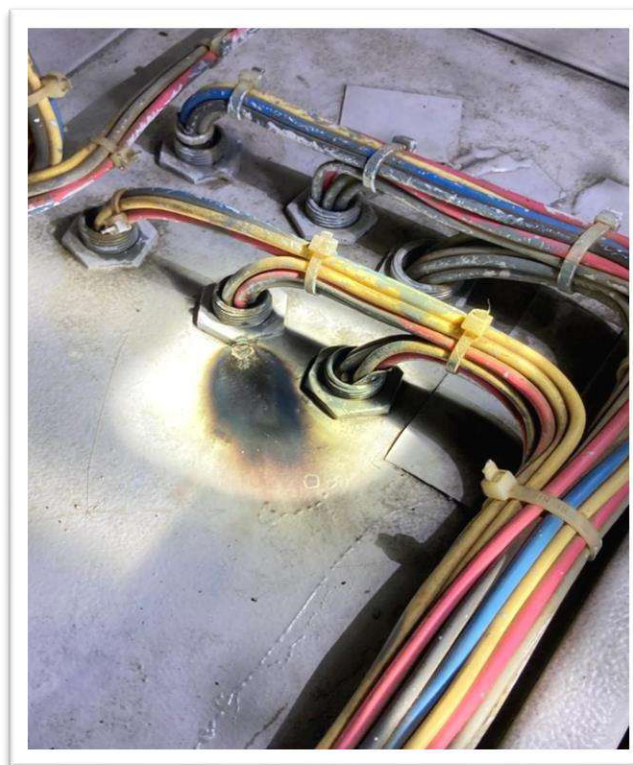
At the evening of Dt. 20.06.23 around 08:15 PM, severe thunderstorm and lightening started along with heavy run at Sundargarh SS and continued for 2-3 hours. During this adverse weather condition, 02 Nos. SIEMENS make CT failed in 400 kV Switchyard leading to tripping of 400 kV Busbar#2, ICT-1 and 400 kV Sundargarh-Raigarh Circuit#1&2

Sequenece of Events:

- 08:26:39:514** BN fault appeared in Raigarh Line#2 at a distance of 4.7 km from Sundargarh SS with fault current of 33 kA. B-Pole of both Main(401) & Tie Bay(402) opened and dead time started.
- 20:26:39:792** After nearly 300 ms of B-Pole opening, Y-Ph CT of Main Bay of Raigarh Line#1(407) and B-Ph CT of Tie Bay of ICT-1/Raigarh Line#2(402) Failed. Due to failure of 407-Y Ph-CT, 400 kV Busbar#2 tripped by tripping 401CB, 404CB, 407CB, 410CB, 413CB and 416 CB.
- 20:26:39:802** Due to failure of 402-B Ph-CT, fault feed continued through Main bay (403) of ICT#1 & HV side of ICT#1. Hence Tie LBB of 402 Bay sensed current in B-Phase though the B-Pole was already in open state for Raigarh-2 Line fault. Therefore Tie LBB operated and tripped ICT#1 & Raigarh#2 as per protection scheme.
- 20:26:39:911** Due to failure of 407-Y Ph-CT, YB-N fault appeared in 400 kV Raigarh Line-1 and the line tripped immediately



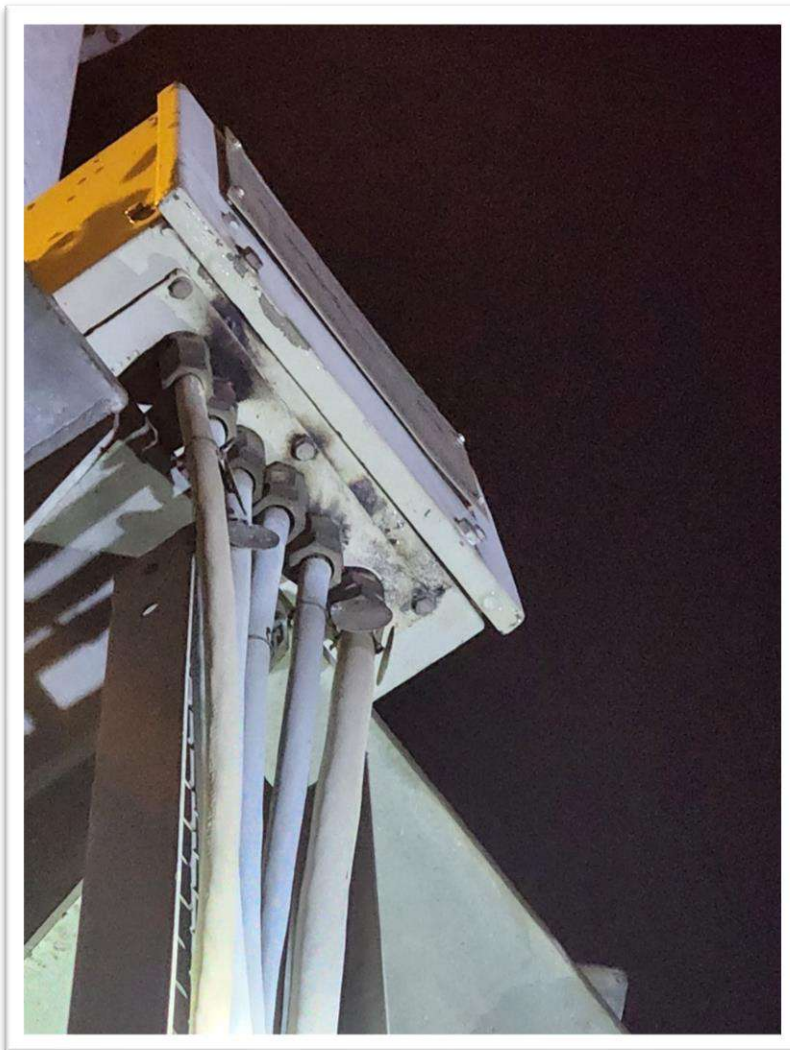
(SLD of 400 kV Switchyard)



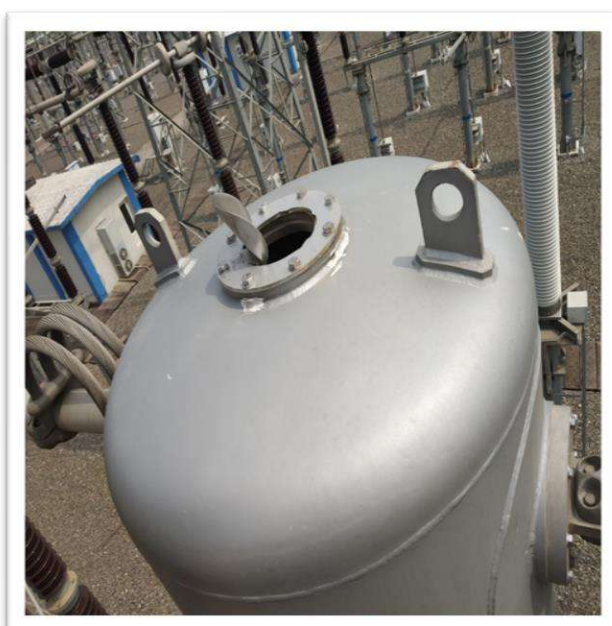
(Flashover mark near Cable gland in CTJB)



(Junction Box deformed due to CT Failure)



(Flash Over mark in Junction Box)



(Rupture Disc Operated)

Observation:

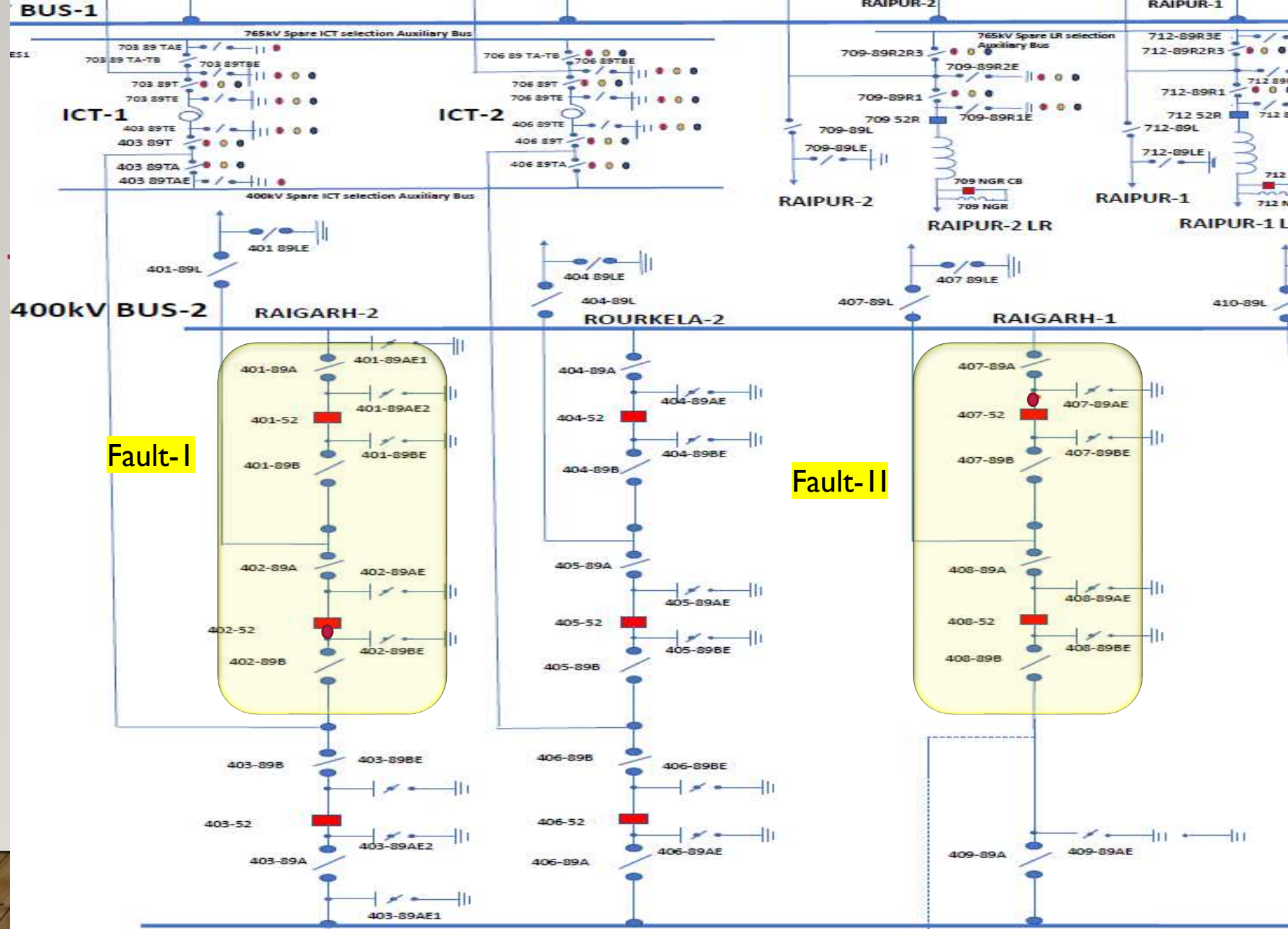
From the pictures of CT Failure, it is observed that some portion of the fault current travelled to ground through JB(top), Cable Gland and CT-JB in both cases. This fault current might have induced some current in secondary cable & Raigarh Line#1 sensed YB-N fault though the fault was in Y-Ph CT of 407 Bay.

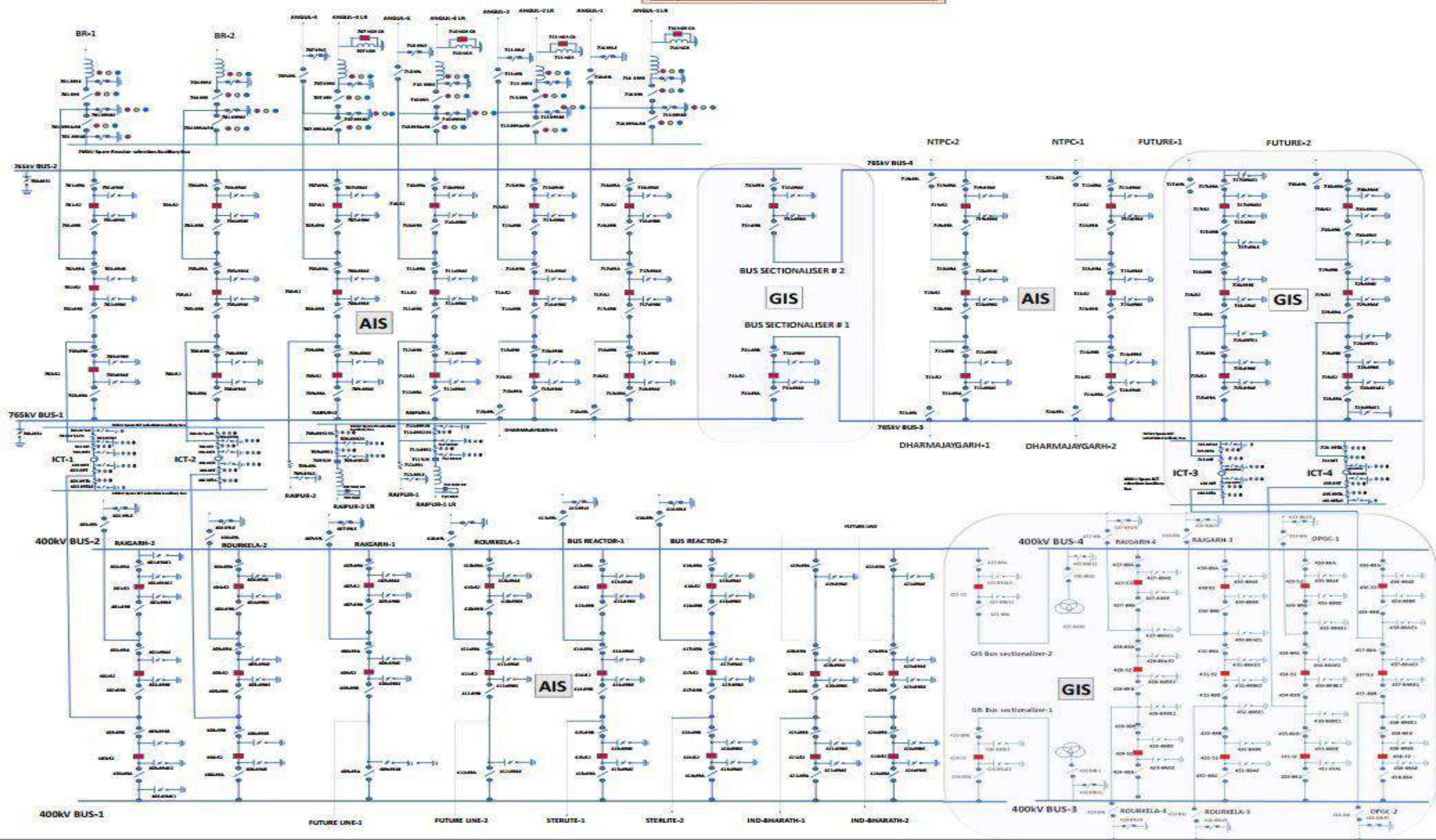
TRIPPINGS AT SUNDARGARH ON 20.06.2023

SI No.	Name of Equipment /Line	Fault time	Type of Fault	Fault Current	Fault Distance	Restoration Time
1	400kV Sundargarh-Raigarh # 2	20:26:39:514 Hrs	B-G	33.62KA	4.7KM	00:08 hrs
2	400 kV Busbar#2	20:26: 39:792 Hrs	Y-ph optd	Y Phase:60 kA		23:59 Hrs
3.	765/400 kV ICT#1	20:26:39:802 Hrs	Intertrip due to IV_Tie LBB OPTD	----	---	22:22 Hrs
4.	400kV Sundargarh-Raigarh # 1	20:26:39:911 Hrs	YB-G Fault	Y-Ph:18 kA B-Ph:0.6 kA	0.7KM	23:55 Hrs

During above tripping, severe lightening and thunderstorm with heavy rain persisting at site for 2-3 Hrs.

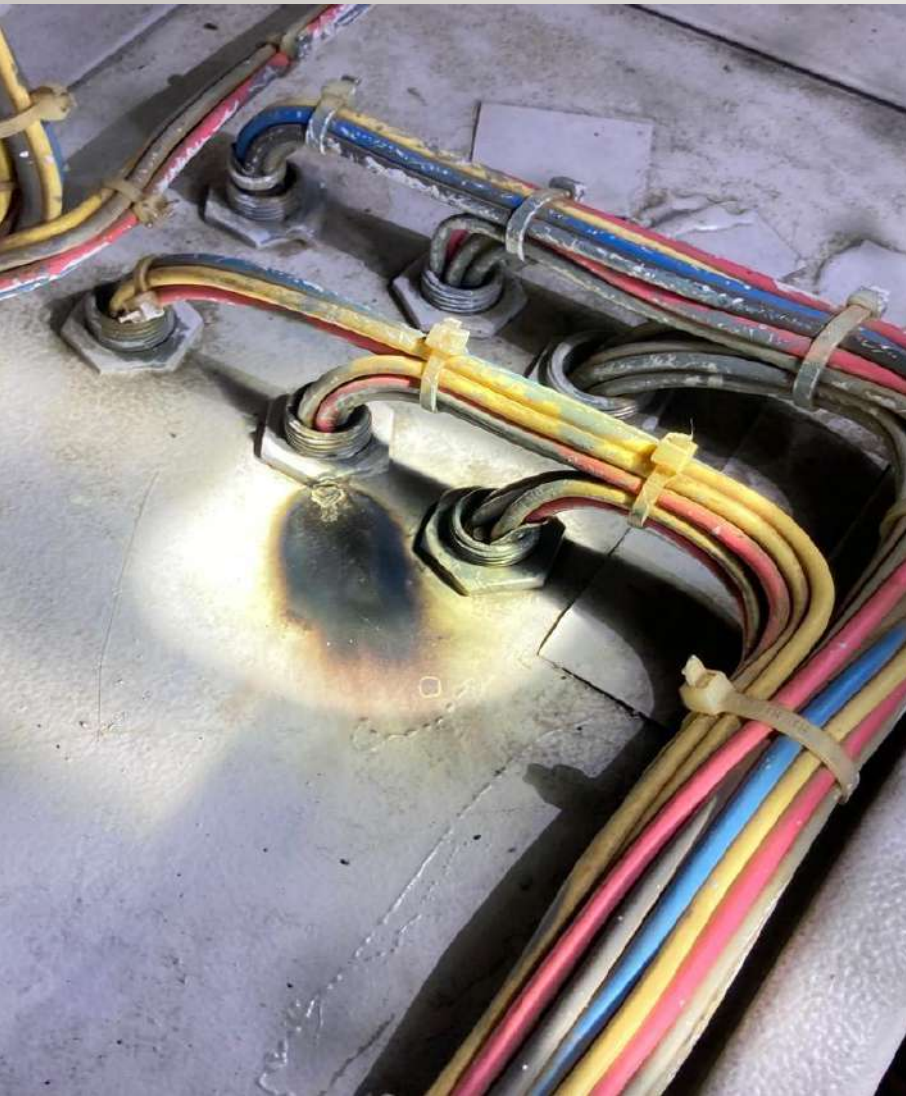


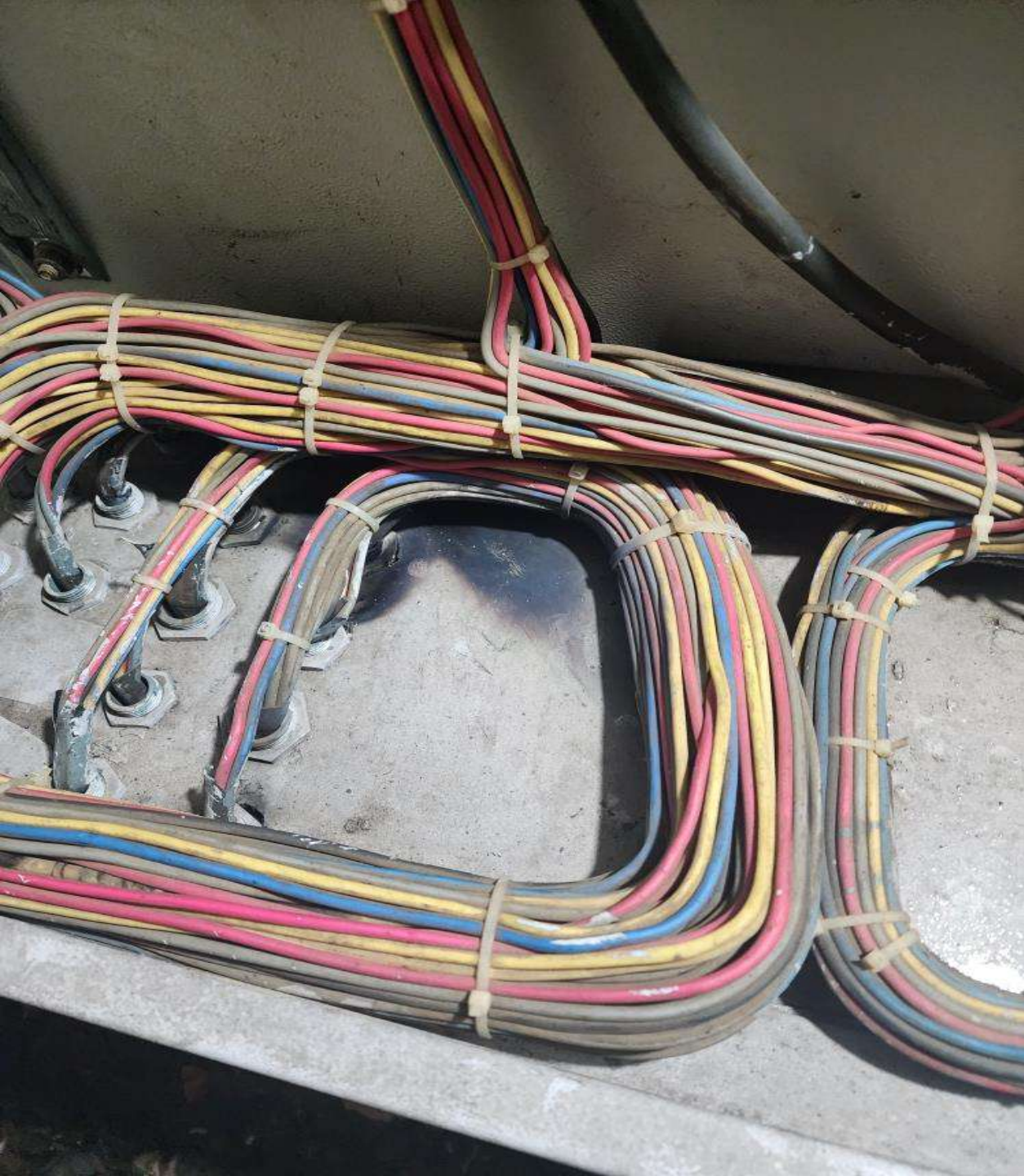




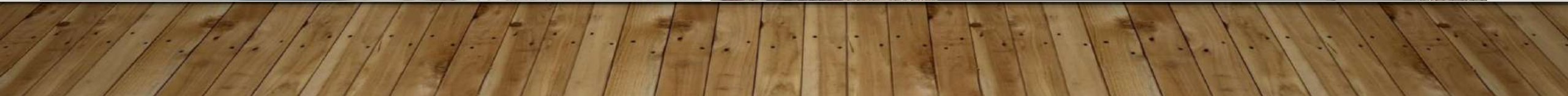
CT Failure Of 402-B Ph and 407- Y Ph

Year of MFG.:2013 CT Type:SAS420 CT Make:SIEMENS Date of Commissioning:31.03.2013









- Busbar Diff. current in Y-Ph : 60KA
 - Fault current through 401 Bay: 10 KA
 - Fault current through 407 Bay: 33 KA
 - Other Bays 404,410,413 and 416 contributed 3 kA each
-

THANK YOU

List of important transmission lines in ER which tripped in June-2023

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	DR Configuration Disc	DR/ELRECEIVED FROM COMPANY	DR/ELRECEIVED FROM COMPANY
1	400 KV BINAGURI-MALBASE-1	01-06-2023	00:04	01-06-2023	00:38	Binaguri: Y_N, 101 km, A/r successful	Malbase: Y_N, 49.4 km	Y-Earth	100	A/r successful from Binaguri only. Three phase tripping at Malbase.		Yes	NA
2	220KV DARBHANGA (DMTCL)-MOTIPUR-2	02-06-2023	11:07	02-06-2023	17:54	Dharbhanga:R_Y, 13.9 km, Ir=10.25 kA, Iy= 8.87 kA	Motipur: Y_N, A/r successful	R-Y-Earth	100	Phase to phase fault. Motipur sensed the fault in Y_ph only and A/r was successful.		Yes	Yes

3	220KV KHAGARIA-NEW PURNEA-1	02-06-2023	12:08	02-06-2023	12:47	Khagaria: Y_B , Zone -1, 6.41 km Iy- 2.694 kA, Ib- 2.625 kA	Purnea : Y_B , 35.6 km Iy= 5.35 kA, Ib= 5.42 kA,	Y-B	100	Phase to phase fault.		Yes	No
4	400KV MERAMUNDALI-LAPANGA-1	02-06-2023	13:53	02-06-2023	14:42	Meeramundali : B-N, 134.6km , 2.4 kA	Lapanga: B_N, 14.2 kA	B-Earth	100	A/r successful from Meramundali only. Line tripped on PD from Lapanga.		Yes	Yes
5	220KV BUDHIPADAR-RAIGARH-1	03-06-2023	12:44	03-06-2023	15:28	Budhipadar: B_N, 32.8 km, 3.62 kA	Raigarh:B_N, 61 km, 2.3 kA	B-Earth	100	A/r successful from Budhipadar only		No	NA
6	400KV SAHARSA-KISHANGANJ-1	04-06-2023	11:34	04-06-2023	12:00		Kishanganj: B_N, Zone-1, 128 km, 3.33 kA	B-Earth	100	A/r successful. Tripped again within reclaim time		Yes	Yes
7	400KV MERAMUNDALI-LAPANGA-2	04-06-2023	12:09	04-06-2023	15:28	Meramundali: R_E, Zone-1, 121.9 km, 2.41 kA	Lapanga: R_E, Zone-1, 27 km, 10 kA	R-Earth	100	A/r failed after 1 second		Yes	Yes
8	400KV SAHARSA-KISHANGANJ-1	04-06-2023	12:13	04-06-2023	18:10		Kishanganj: B_N, Zone-126.9 km, 4.2 kA	B-Earth	100	A/r failed after 1 second		Yes	Yes
9	400KV JHARSUGUDA-RAIGARH-4	04-06-2023	16:06	04-06-2023	17:58	Jharsuguda:R_E, Zone-1, 73.81 km, 4.75 kA		R-Earth	100	A/r succesful. Tripped again within reclaim time		Yes	NA
10	400KV JHARSUGUDA-RAIGARH-3	04-06-2023	16:11	04-06-2023	17:46	Jharsuguda: R_E, Zone-1, 70.7 km, 4.95 kA		R-Earth	100	Another fault in B_ph after 600 msec and three phase tripped.		Yes	NA
11	220KV NEW PURNEA-MADHEPURA-1	05-06-2023	09:57	05-06-2023	14:36	New Purnea: B_N, Zone-1, 34.4 km, 1.19 kA	Madhepura: Y_B, Iy=Ib=2.39 kA	Y-B	400	Tripped in Zone-2 time from Madhepura		No	Yes

12	400KV ARAMBAGH-BAKRESWAR-1	05-06-2023	14:27	05-06-2023	15:41	Arambag: R_N, 3.45 kA	Bakreswar: R_N, Zone-1, 28.24 km, 4.696 kA	R-Earth	100	A/r kept in non-auto mode for OPGW installation work	Yes	No
13	400KV DURGAPUR-SAGARDIGHI-1	05-06-2023	15:24	05-06-2023	16:07	Durgapur: B_N, 140 km, 2.75 kA	Sagardighi: B_N, 12.5 km, 15.54 kA	B-Earth	100	DT received at Durgapur. WBPDC/PG ER-2 may explain.	Yes	Yes
14	400KV DURGAPUR-SAGARDIGHI-2	05-06-2023	15:24	05-06-2023	16:11	Durgapur: B_N, 105.3 km, 2.939 kA	Sagardighi: B_N, Zone-1, 15.3 km	B-Earth	100	Three phase tripping for single phase fault. WBPDC/PG ER-2 may explain.	Yes	Yes
15	400KV JEERAT-SAGARDIGHI-2	05-06-2023	15:25	06-06-2023	00:20	Jeerat: R_N, 177 km, 3 kA	Sagardighi: R_N, 15 km	R-Earth	500	Tripped in Zone-2 time from Jeerat	Yes	No
16	400KV BIDHANNAGAR-NEW CHANDITALA-1	06-06-2023	14:29	06-06-2023	19:03	Bidhannagar: B_N, Zone-1, 102 km, 3.11 kA	Chanditala: B_N, Zone-1, 48.99 km, 5.77 kA	B-Earth	100	A/r successful. Tripped again within reclaim time.	Yes	Yes
17	400KV BINAGURI-RANGPO-1	08-06-2023	14:00	09-06-2023	12:27	Binaguri: R_N, Zone-1, 3.7 km	Rangpo: R_N, Zone-1, 52.766 km, 3.5kA	R-Earth	1100	Resistive Fault. A/r Failed after 1 second at Binaguri. Which protection operated at Rangpo? PG ER-2 may explain.	Yes	Yes

18	400KV NEW DUBURI-MEERAMUNDALI-1	08-06-2023	14:32	19-06-2023	01:19	New Duburi: B_N, 60.1 km, 4.02 kA	Meeramundali: Y_N, Zone-1, 37.7 km, 6.9 kA	Y-Earth	100	Fault in B_ph after 600 msec and three phase tripped		Yes	Yes
19	400KV NEW DUBURI-MEERAMUNDALI-2	08-06-2023	14:32	19-06-2023	02:03	New Duburi: Y_B, 69 km, Iy= 5.33 kA, Ib= 5.30 kA	Meeramundali: Y_B, 41.1 km, Iy= 8.9 kA, Ib= 8.37m kA	Y-B-Earth	100	Phase to phase fault		Yes	Yes
20	220KV PANDIABILI-PRATAPSASAN-1	08-06-2023	17:01	08-06-2023	20:09	Pandiabilli: B_N, Zone-2, 32 km, 3.1 kA		B-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	No
21	400KV GOKARNA-NEW CHANDITALA-1	09-06-2023	16:52	09-06-2023	23:16	Gokarna: Y_N, 130 km, 2.8 kA	Chanditala: Y_N, Zone-1, 24 kA	Y-Earth	100	A/r failed after 1 second		Yes	Yes
22	220KV TSTPP-MEERAMUNDALI-2	10-06-2023	16:21				Meramundali: R_N, 11.45 km, 10.76 kA	R-Earth	100	A/r failed after 1 second	DR length less at Talc her	Yes	Yes
23	400KV MEERAMUNDALI-TSTPP-2	10-06-2023	16:21	10-06-2023	17:35	Meramundali: Y_N, 19.2 km, 8.92 kA		Y-Earth	100	A/r failed after 1 second		Yes	Yes

24	400KV MERAMUNDALI B- MEERAMUNDALI-1	10-06-2023	16:21	10-06-2023	19:49		Meramundali: R_N, 21.76 kA	R- Earth	100	A/r successful. Tripped again within reclaim time.	DR leng th less at both ends .	Yes	Yes
25	220KV TSTPP- MEERAMUNDALI-1	10-06-2023	16:21	29-06-2023	19:10	Meramundali: B_N, 10.53 km, 27.8 kA		B- Earth	100	A/r failed after 1 second		Yes	Yes
26	400KV ALIPURDUAR (PG)- JIGMELLING-2	11-06-2023	03:35	11-06-2023	16:02	Alipurduar: RYB, 170 km, Ir= 4.4 kA, Iy= 3.8 kA, Ib= 4.6 kA		R-Y- B- Earth	500	Tripped in Zone-2 time from Alipurduar. Three phase A/r enabled at Jigmelling.		Yes	N A
27	765KV MEDINIPUR- NEW JEERAT-2	11-06-2023	18:33	11-06-2023	20:05	Medinipur: R_Y, 126.7 km, Ir= 4.54 kA, Iy= 3.26 kA	New Jeerat: R_Y, 49.2 km, Ir= 5.9 kA, Iy= 5.8 kA	R-Y- Earth	100	Phase to phase fault		Yes	Yes
28	220KV ATRI- PANDIABILI-1	12-06-2023	09:57	12-06-2023	10:18	Atri: Tripped	Pandiabili: Didn't trip	No fault	NA	OPTCL may explain		No	N A
29	400KV MEERAMUNDALI- MENDHASAL-1	12-06-2023	12:18	12-06-2023	12:47	Meramundali: O/c	Mendhasal: Didn't trip	No fault	NA	Tripped on O/c from Meramundali only. OPTCL may explain.		Yes	Yes
30	400KV MEERAMUNDALI- MENDHASAL-2	12-06-2023	12:18	12-06-2023	12:55	Meramundali: R_N, 6.44 kA	Mendhasal: R_N, 3.63 kA	R- Earth	100	A/r failed after 1 second		Yes	Yes

31	400KV MEERAMUNDALI- MENDHASAL-1	12-06-2023	13:27	12-06-2023	13:50	Meramundali: O/c	Mendhasal: Didn't trip	No fault	NA	Tripped on O/c from Meramundali only. OPTCL may explain.		Yes	N A
32	400KV MEERAMUNDALI- MENDHASAL-2	12-06-2023	13:27	12-06-2023	15:40	Meramundali: R_N, 7.09 kA	Mendhasal: R_N, 3.77 kA	R-Earth	100	A/r failed after 1 second		Yes	Yes
33	400KV MEERAMUNDALI- MENDHASAL-1	12-06-2023	14:33	12-06-2023	15:40	Meeramundali: Y_B_N, Zone-1, 72.2 km, Iy: 2.02 kA, Ib: 5.46 kA	Mendhasal: B_N, Zone-1, 43.5 km, 3.81 kA	Y-B-Earth	100	Phase to phase fault sensed at Meramundali and three phase tripped. At Mendhasal, B_ph breaker opened, later other two phase tripped on PD.		Yes	Yes
34	400KV PPSP- BIDHANNAGAR-1	12-06-2023	15:09	12-06-2023	15:46		Bidhannagar: B_N, Zone-1, 24.89 km, 7.748 kA	B-Earth	100	A/r disabled as per OEM advise		No	Yes
35	400KV PPSP- BIDHANNAGAR-2	12-06-2023	15:10	12-06-2023	15:48		Bidhannagar: B_N, 24.4 km, 3.79 kA	B-Earth	100	A/r disabled as per OEM advise		No	Yes

36	400KV MEDINIPUR-KHARAGPUR-2	12-06-2023	15:33	12-06-2023	16:01	Medinipur: M-I, R_Y, Zone-1, 79.60 km, 5.44 kA, M-2, Zone-1, 79.83 km, 5.399 kA	Kharagpur: R_Y, Zone-1, 9 km, Ir= 8.66 kA, Ib= 8.32 kA	R-Y-Earth	100	Phase to phase fault		Yes	Yes
37	220KV DARBHANGA(DMTCL)-LAUKAHI-1	13-06-2023	05:38	13-06-2023	05:52	DMTCL: R_N, 71.38 km, 1.7 kA	Laukahi: R_N, 7.33 kA	R-Earth	100	A/r couldn't be ascertained from PMU data. BSPTCL/DMTCL may confirm.	DR length less at Laukahi	No	Yes
38	400KV DURGAPUR-JAMSHEDPUR-1	13-06-2023	12:23	13-06-2023	12:57	Durgapur: R_N, Zone-1, 21.55 km, 7.203 kA	Jamshedpur: R_N, Zone-1, 120.68 km, 3.07 kA	R-Earth	100	A/r failed after 1 second		No	Yes
39	400KV ARAMBAGH-BAKRESWAR-1	13-06-2023	14:24	13-06-2023	18:00	Arambagh: R_N, Zone-2, 120 km, 3 kA	Bakreswar: R_N, Zone-1, 21.80 km, 5.9 kA	R-Earth	400	Tripped in Zone-2 time from Arambag and DT sent to Bakreshwar. WBSETCL may explain.		Yes	No
40	765KV NEW RANCHI-DHARAMJAIGARH-2	13-06-2023	14:36	13-06-2023	17:31	New Ranchi: B_N, 137 km, 3.675 kA	Dharamjaygarh: B_N, 258 km, 2.9 kA	B-Earth	100	A/r failed after 1 second		Yes	No

41	400KV MEDINIPUR-KHARAGPUR-2	13-06-2023	16:13	13-06-2023	17:06	Medinipur: B_N, 396 km, 6.79 kA	Kharagpur: B_N, Zone-1, 69 km, Ib= 4.1 kA	B-Earth	100	Fault in R_ph after 180 msec	No	Yes
42	220KV SAHARSA-BEGUSARAI-1	13-06-2023	19:15	13-06-2023	20:13	Saharsa: R_N, 24.9 km, 5.01 kA	Begusarai: R_N, 61.44 km, 2.43 kA	R-Earth	100	A/r successful. Tripped again within reclaim time	Yes	Yes
43	400KV KHSTPP-BARH-2	13-06-2023	21:03	14-06-2023	06:13	Kahalgaon: B_N, Zone-1, 12.5 km, Ir=1.255 kA, Ib=20.366 kA	Barh: R_B, Zone-2, 304 km, Ir= 3.004 kA, Ib= 1.03 kA	R-B-Earth	100	Phase to phase fault at Barh	No	Yes
44	400KV KHSTPP-BARH-1	13-06-2023	21:03	14-06-2023	05:18	Kahalgaon: R_B, Zone-1, 15.7 km, Ir=18.370 kA, Ib= 1.282 kA	Barh: B_N, 197 km, 2.24 kA	B-Earth	100	A/r failed from Barh after 1 second	No	Yes
45	400KV KHSTPP-BANKA (PG)-2	13-06-2023	21:04	14-06-2023	17:44	Kahalgaon: Y_N, Zone-1, 21 km, Iy= 11.97 kA	Banka: Y_N, 23 km, 5.39 kA	Y-Earth	100	A/r failed after 1 second	Yes	Yes
46	400KV BARIPADA-TISCO-1	14-06-2023	11:48	14-06-2023	13:03	Baripada: R_N, Zone-1, 48.9 km, 3.99 kA	Tisco: R_N, Zone-1, 60.05 km, 3.387 kA	R-Earth	100	A/r successful. Tripped again within reclaim time. A/r dead time set at 650 msec at TISCO	Yes	No
47	220KV KATAPALLI-BOLANGIR(PG)-1	14-06-2023	16:44	14-06-2023	17:10	Katapalli: Distance protection operated	Bolangir: Didn't trip	No fault	NA	No fault in line however three phase tripping occurred with Zone-1 indication at Katapalli. OPTCL may explain	Yes	No

48	220KV CHUKHA-BIRPARA-1	16-06-2023	14:37	16-06-2023	15:54		Birpara: R_N, 41.06 km, 2.94 kA	R-Earth	100	Fault in Y_ph after 100 msec		NA	Yes
49	220KV SAHARSA-BEGUSARAI-2	17-06-2023	12:15	17-06-2023	12:58	Saharsa: Didn't trip		No fault	NA	BSPTCL may explain.		No	No
50	400KV BAHARAMPUR-BHERAMARA-4	17-06-2023	14:20	17-06-2023	15:45	Baharampur: R_N, Zone-1, 14.94 km , 13.456 kA		R-Earth	100	A/r successful from Baharampur only		Yes	NA
51	220KV DEHRI-GAYA-2	17-06-2023	18:09	17-06-2023	20:07	Dehri: B_N, 1.98 kA	Gaya: B_N, Zone-1, 47 km, 3 kA	B-Earth	100	A/r failed after 1 second		Yes	No
52	400KV KHARAGPUR-CHAIBASA-1	17-06-2023	22:52	18-06-2023	14:26	Kharagpur: R_N, Zone-2, 156.8 km, Ir= 2.601 kA	Chaibasa: R_N, Zone-1, 16.7 km, 9.5 kA	R-Earth	100	A/r failed after 1 second		Yes	Yes
53	220KV CHUKHA-BIRPARA-1	18-06-2023	12:01	18-06-2023	12:52		Birpara: R_N, 8.61 km, 7.44 kA	R-Earth	100	A/r successful from Birpara only. Other two phase at Chukha tripped after 350 msec.		NA	No
54	400KV FSTPP-KHSTPP-2	18-06-2023	13:30	18-06-2023	15:48	Farakka: Y_N, Zone-1, 47.5 km, 6.13 kA	Kahalgaon: Y_N, Zone-1, 27.5 km, 10.13 kA	Y-Earth	100	A/r failed after 1 second	DR length less at both ends	Yes	Yes

55	220KV MAITHON-DUMKA-1	18-06-2023	15:15	18-06-2023	15:55	Maithon: B_N, Zone-1, 54 km, 2.4 kA	Dumka: Tripped	B-Earth	100	A/r successful from Maithon only	Yes	No
56	400KV BAHARAMPUR-BHERAMARA-2	18-06-2023	15:29	18-06-2023	17:20	Baharampur: R_N, Zone-1, 12.28 km, 13.08 kA		R-Earth	100	DT received at Baharampur and three phase tripped.	Yes	No
57	220KV CHANDAUTI (PMTL)-BODHGAYA-2	18-06-2023	15:56	20-06-2023	19:48	Chandauti: B_N, Zone-1, 16.23 km, 3.39 kA		B-Earth	100	A/r couldn't be ascertained from PMU data. PMTL/BSPTCL may confirm.	No	No
58	400KV ARAMBAGH-BAKRESWAR-1	18-06-2023	17:38	19-06-2023	10:42	Arambagh: Y_N, 122 km,	Bakreswar: Y_N, Zone-1, 8.8 km, 7.99 kA	Y-Earth	100	A/r in non-auto mode for OPGW installation work	No	No
59	220KV KATAPALLI-BOLANGIR(PG)-1	18-06-2023	21:34	19-06-2023	22:49	Katapalli: R_N, Zone-1, 18.56 km, 5.7 kA	Bolangir: R_N, 90.351 km, 1.508 kA	R-Earth	100	A/r successful from Katapalli. Tripped again within reclaim time.	Yes	No
60	400KV MEERAMUNDALI-MENDHASAL-1	18-06-2023	22:40	18-06-2023	23:01	Meeramundali: R_N, Zone-1, 47.7 km, 5.11 kA		R-Earth	100	A/r successful from Mendhasal. Other two phase from Meramundali tripped after 650 msec. OPTCL may explain.	Yes	Yes

61	400KV TSTPP-RENGALI-2	19-06-2023	00:58	19-06-2023	02:00	Talcher: Y_N, Zone-1, 12.1 km, 15 kA	Rengali: Y_N, Zone-1, 6.4 km, 13.845 kA	Y-Earth	100	A/r failed after 1 second. Tie bay attempted AR after failure of main bay AR attempt	No	Yes
62	400KV TSTPP-RENGALI-2	19-06-2023	02:11	19-06-2023	19:26	TSTPP Y_B, 13 km	Rengali: Y_B, 9 km, 8.5 kA	Y-B	100	Phase to phase fault	No	Yes
63	400KV RAJARHAT-GOKARNA-1	19-06-2023	05:57	19-06-2023	17:07	Rajarhat: Y_N, 110.88 km, 3.67 kA	Gokarna: Y_N, Zone-1, 1109 km, 3.55 kA	Y-Earth	100	A/r failed after 1 second	Yes	Yes
64	400KV RAJARHAT-FSTPP-1	19-06-2023	06:25	19-06-2023	06:45	Rajarahat: Y_N, 95.96 km, 4.35 kA	Farakka: Y_N, Zone-1, 2.58kA	Y-Earth	100	A/r failed after 1 second	Yes	Yes
65	765KV MEDINIPUR-NEW JEERAT-1	19-06-2023	10:53	19-06-2023	19:04	Medinipur: R_N, 118.1 km, 4.83 kA		R-Earth	100	A/r failed after 1.5 second	No	No
66	400KV MAITHON-GAYA-2	19-06-2023	13:09	19-06-2023	15:18	Maithon: B_N, 216 km, 1.61 kA	Gaya: B_N, 37.3 km, 4.32 kA	B-Earth	100	A/r failed after 1 second	Yes	Yes
67	220KV CHANDIL-RANCHI-1	19-06-2023	15:20	19-Jun	15:38	Chandil: B_N, 2.20 kA		B-Earth	100	Three phase tripping for single phase fault at Chandil	Yes	Yes
68	220KV CHANDIL-RANCHI-1	19-06-2023	15:51	20-06-2023	16:47	Chandil: B_E, 76.1 km, 1.08 kA	Ranchi: B_E, 77 km, 2.7 kA	B-Earth	100	Three phase tripping for single phase fault at Chandil	Yes	Yes

69	220KV BIRPARA-MALBASE-1	19-06-2023	17:49	19-06-2023	20:09	Bipara: B_N, 3.69 kA, A/r successful	Malabase: B_N, Zone-1, 2.8 km, 6.8 kA	B-Earth	100	A/r successful from Birpara only	Yes	N A
70	765KV GAYA-VARANASI-1	19-06-2023	18:10	29-06-2023	01:12	Gaya: R_N, 114.2 km, 4.48 kA	Varanasi: R_N, 133.5 km, 5.928 kA	R-Earth	100	A/r failed after 1.5 second	Yes	N A
71	220KV DALTONGUNJ-GARWAH (NEW)-2	19-06-2023	18:18	19-06-2023	19:56	Daltongunj: R_N, 17 km, 3.9 kA	Garhwa: R_N, 0.645 kA	R-Earth	100	A/r failed after 1 second	Yes	Yes
72	220KV DEHRI-GAYA-2	19-06-2023	18:25	19-06-2023	20:17	Dehri: B_N, 6.5 kA	Gaya: B_N, Zone-1, 98 km, 2.18 kA	B-Earth	100	A/r failed after 1 second	Yes	Yes
73	220KV DALTONGUNJ-GARWAH (NEW)-1	19-06-2023	19:30	19-06-2023	20:45	Daltongunj: R_N, Zone-1, 77 km		R-Earth	100	A/r failed after 1 second	Yes	Yes
74	220KV KARAMNASHA (NEW)-SAHUPURI-1	19-06-2023	20:00	19-06-2023	21:40	Karamnasa: Y_N, Ir= 0.534 kA, Iy= 0.5962 kA, Ib= 0.5676 kA		No fault	NA	BSPTCL may explain.	Yes	N A
75	220KV RANCHI-MTPS(DVC)-1	20-06-2023	15:24	20-06-2023	16:44	Ranchi: R_N, A/r successful	MTPS: R_N, 208.8 km, 1.11 kA	R-Earth	100	A/r successful from Ranchi. Other two phase at Mejia tripped after 1.5 seconds on PD	Yes	Yes

76	220KV RANCHI-RAMGARH-1	20-06-2023	15:30	20-06-2023	16:09	Ranchi:A/r successful	Ramgarh: R_N, Zone-2, 79.1 km, 1.78 kA	R-Earth	500	Tripped in Zone-2 from Ramgarh		Yes	Yes
77	220KV RANCHI-RAMGARH-1	20-06-2023	16:22	20-06-2023	20:24	Ranchi:R_N, 21.18 km, 7.03 kA	Ramgarh: R_N, Zone-2, 78 km, 1.8 kA	R-Earth	100	Three phase tripping at Ramgarh for single phase fault		Yes	Yes
78	220KV ROURKELA-TARKERA-1	20-06-2023	19:28	20-06-2023	20:32	Rourkela: R_N, Zone-2, 33.56 km, 3.74 kA	Tarkera: Didn't trip	R-Earth	800	DEF operated at Rourkela. Continuous fault current of around 3 kA, however only Zone-3 picked. Zone reach settings may be checked		Yes	No
79	220KV ROURKELA-TARKERA-2	20-06-2023	19:28	20-06-2023	20:32	Rourkela: R_N, Zone-2, 29.48 km, 3.7 kA	Tarkera: Didn't trip	R-Earth	800			Yes	No
80	400KV ALIPURDUAR (PG)-JIGMELLING-1	20-06-2023	19:36	20-06-2023	20:16		Tripped from Bhutan end only	No fault	NA	No fault observed from PMU.		NA	NA
81	400KV JHARSUGUDA-RAIGARH-1	20-06-2023	20:26	20-06-2023	23:55	Jharsuguda: Y_N, 0.7 km, Ib= 18 kA	Raigarh: DT received	Y-Earth	300	Y_ph CT failed at Jharsuguda. PG Odisha may explain the event		Yes	NA

82	400KV JHARSUGUDA- RAIGARH-2	20-06-2023	20:26	21-06-2023	00:08	Jharsuguda: B_N, 4.7 km, 33.62 kA	Raigarh: DT received	B- Earth	300	LBB operated at Jharsuguda due to non-opening of faulty B_ph breaker	Yes	N A
83	400KV JHARSUGUDA- STERLITE-2	20-06-2023	20:30	20-06-2023	22:40		Sterlite: B_N, Zone- 2, 58.2 km, 5.04 kA	B- Earth	350	Fault in Y_ph just after fault clearance. Tripped in Zone-2 time from Sterlite.	No	N o
84	220KV BUDHIPADAR- KORBA-2	20-06-2023	22:19	21-06-2023	00:04	Budipadar: R_N, Zone-1, 1.5 km, 22.09 kA	Korba: Tripped	R- Earth	100	Three phase A/r successful from Budhipadar only	Yes	N A
85	220KV ROURKELA- TARKERA-2	21-06-2023	02:51	23-06-2023	09:42	Rourkela: R_N, Zone-2, 15.34 km, 7.15 kA		R- Earth	100	Fault in Y_ph after 200 msec	Yes	Ye s
86	400KV NEW PURNEA- BIHARSARIFF(PG)-2	21-06-2023	04:48	21-06-2023	21:05	New Purnea: Y_B, 170.8 km, Iy= 4 kA, Ib= 4 kA	Biharshariff: Y_B, 51.4 km, Iy= 9.7 kA, Ib=9.78 kA	Y-B	100	Phase to phase fault	Yes	Ye s
87	765KV GAYA- VARANASI-2	21-06-2023	14:29	21-06-2023	15:11	Gaya: R_N, Zone- 1, 110 km, 4.69 kA	Varanasi: R_N, 162 km, 4.6 kA	R- Earth	100	A/r successful. Tripped again within reclaim time	Yes	N A

88	400KV GAYA-KODERMA-2	21-06-2023	14:55	21-06-2023	15:39	Gaya: Y_N, 78.253 km, 4.723 kA	Koderma: Y_N, 64 km, 5.82 kA	Y-Earth	100	A/r in non-auto mode	DR length less at Koderma	Yes	Yes
89	400KV PATNA-BALIA-1	21-06-2023	20:53	22-06-2023	07:08	Patna: R_N, 128.63 km, 3.282 kA		R-Earth	100	A/r failed after 1 second		Yes	NA
90	220KV MAITHON-DHANBAD-1	22-06-2023	02:41	22-06-2023	09:39	Maithon: Y_N, 47.1 km, 7.40 kA		Y-Earth	100	A/r successful. Y-B_Earth fault during reclaim time		Yes	Yes
91	400KV NEW DUBURI-PANDIABILI-1	22-06-2023	11:54	22-06-2023	15:53	New Dubri: Y_B, 73.9 km, Iy= 5.05 kA, Ib= 4.99 kA	Pandiabili: Y_B, 70 km, Iy= 4.5 kA, Ib= 4.75 kA	Y-B-Earth	100	Phase to phase fault		Yes	Yes
92	400KV GAYA-KODERMA-1	22-06-2023	18:49	22-06-2023	19:10	Gaya: Y_N, 47.2 km, 6.615 kA, A/r successful	Koderma: Y_N, Zone-1, 116.64 km, 4.05 kA	Y-Earth	100	A/r successful from Gaya only. DVC may explain.	DR length less at Koderma	Yes	Yes

93	220KV NEW MELLI-TASHIDING-2	23-06-2023	13:39	23-06-2023	15:38	New Melli: B_N, Zone-2, 15.63 km, 3.49 kA	Tashiding: B_N, Zone-1	B-Earth	100	Three phase tripping for single phase fault. DT sent from Tashiding. THEP may explain.		Yes	Yes
94	220KV DALTONGANJ-CHATRA-1	23-06-2023	15:13	23-06-2023	17:07	Daltonganj: DT received		No fault	NA	DT received at Daltonganj. JUSNL/PG ER-1 may explain.		Yes	No
95	400KV NEW JEERAT-SUBHASGRAM(PG)-2	24-06-2023	04:51	24-06-2023	19:15	New Jeerat: B_N, Zone-1, 69.9 km, 4.18 kA		B-Earth	100	A/r failed after 1 second		Yes	Yes
96	220KV KARAMNASHA (NEW)-PUSAULI-1	24-06-2023	13:39	24-06-2023	14:54	Karamnasha: Y_N, 15.6 km, 2.188 kA	Pusaui: Y_N, 19.33 km, 4.67 kA	Y-Earth	100	A/r failed after 1 second		No	Yes
97	400KV MERAMUNDALI-LAPANGA-2	24-06-2023	17:23	24-06-2023	18:28	Meramundali: B_N, Zone-1, 148.1 km, 2.18 kA	Lapanga: B_N, Zone-1, 34.59 km, 9.01 kA	B-Earth	100	A/r successful from Meramundali only. Line tripped on PD from Lapanga.	DR length less at Meramundali.	Yes	Yes

98	400KV LAPANGA-OPGC (IB THERMAL)-1	25-06-2023	04:40	25-06-2023	05:39	Lapanga: R_N, 13.95 km, 13.3 kA	OPGC: R_N, Zone-1, 8.9 km, 13.01 kA	R-Earth	100	A/r successful from Lapanga only		Yes	No
99	220KV CHANDAUTI (PMTL)-SONENAGAR-2	29-06-2023	07:43	29-06-2023	08:39	Chandauti:Y_B, Zone-2, 65.8 km, Iy=3.06 kA, Ib=2.9 kA		Y-B	100	Phase to phase fault		No	No
100	400KV KHSTPP-BANKA (PG)-2	30-06-2023	01:50	30-06-2023	02:58	kahalgaon: Y_N, 13.3 km, 17.14 kA	Banka:Y_N, 34.22 km, 4.75kA	Y-Earth	100	A/r failed after 1 second	DR length less at Kahalgaon	Yes	Yes
101	400KV NABINAGAR (NPGC)-JAKKANPUR(BH)-1	30-06-2023	02:09	30-06-2023	03:41	NPGC: B_N 10.7 kA	Jakkanpur: B_N, 75 km, 4.66 kA	B-Earth	100	Three phase tripping at Nabinagar. A/r successful at Jakkanpur		Yes	No
102	400KV MEDINIPUR-NEW CHANDITALA-1	30-06-2023	02:11	30-06-2023	13:37	Medinipur: Y_N, 3.489 km, 15.13 kA	New Chanditala:Y_N, Zone-1, 90.65 km, 1.72 kA	Y-Earth	100	A/r failed after 1 second from New Chanditala. Three phase tripping at Medinipur. PMJTL may explain.		No	Yes

Configuration of Single pole tripping and Auto reclose for Aided DEF Function

CB Control Configuration

CB CONTROL				
CB Control by	Disabled	07.01		
A/R Single Pole	Enabled	07.07		
A/R Three Pole	Disabled	07.08		

Distance & DEF Function Enable

CONFIGURATION				
Restore Defaults	No Operation	09.01		
Setting Group	Select via Menu	09.02		
Active Settings	Group 1	09.03		
Save Changes	No Operation	09.04		
Copy From	Group 1	09.05		
Copy To	No Operation	09.06		
Setting Group 1	Enabled	09.07		
Setting Group 2	Disabled	09.08		
Setting Group 3	Disabled	09.09		
Setting Group 4	Disabled	09.0A		
Dist. Protection	Enabled	09.0D		
Power-Swing	Disabled	09.10		
Back-up I>	Disabled	09.11		
Neg Sequence O/C	Disabled	09.12		
Broken Conductor	Disabled	09.13		
Earth Fault PROT	Disabled	09.14		
Aided D.E.F	Enabled	09.15		

Distance & PLCC Configuration

GROUP 1				
GROUP 1 DISTANCE EL...				
GROUP 1 DISTANCE SC...				
Program Mode	Standard Scheme	31.01		
Standard Mode	P.U.P Z2	31.02		
Fault Type	Both enabled	31.03		
Trip Mode	1P, Z1 & CR	31.04		
Aid Dist Dly	20.00 ms	31.07		
tReversal Guard	20.00 ms	31.08		
Unblocking Logic	None	31.09		
SOTF/TOR Mode	100000000110000	31.0A		
SOTF Delay	110.0 s	31.0B		
Z1Ext Fail	Disabled	31.0C		
GROUP 1 Weak Infeed		31.0D		
WI:Mode Status	Disabled	31.0E		
tOT Window	40.00 ms	31.0F		

DEF Setting (Default Setting)

GROUP 1		
GROUP 1 DISTANCE EL...		
GROUP 1 DISTANCE SC...		
GROUP 1 AIDED D.E.F		
Aided ch. Status	Enabled	39.01
Polarisation	Neg sequence	39.02
V> Voltage Set	1.000 V	39.03
IN Forward	100.0 mA	39.04
Time Delay	0 s	39.05
Scheme Logic	Permissive	39.06
Tripping	Any phase	39.07
IN Rev Factor	600.0e-3	39.09
Block. Time Add.	150.0 ms	39.0A

AR Configuration:

In Block A/R, '**OC Aided DEF Trip**' function should be untick.

[illegible]

DEF Channel Received logic:

4.8.3 Aided Directional Earth Fault (DEF) protection schemes

The option of using separate channels for Directional Earth Fault (DEF) aided tripping, and distance protection schemes, is offered in the P442 and P444 relays.

When a separate channel for DEF is used, the DEF scheme is independently selectable. When a common signalling channel is employed, the distance and DEF must **share** a common scheme. In this case a permissive overreach or blocking distance scheme must be used. The aided tripping schemes can perform single pole tripping.

✓/EN AP/Hb6

Application Notes

5-106

MiCOM P40 Agile P442, P444

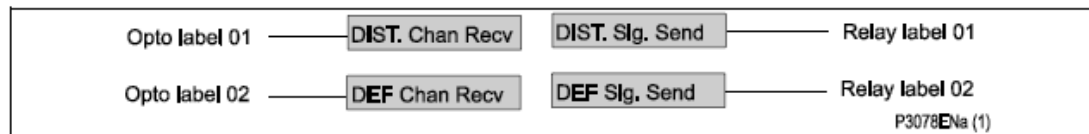


Figure 76: PSL required to activate DEF logic with an independant channel

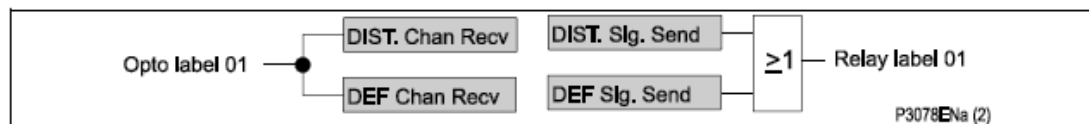


Figure 77: PSL required to activate DEF logic with **shared** channel

Note:

Aided Permission scheme will operate based on Independent and Shared Channel logic in PSL.

4.8.3.2 Aided DEF Schemes

4.8.3.2.1 Aided DEF Permissive Overreach Scheme

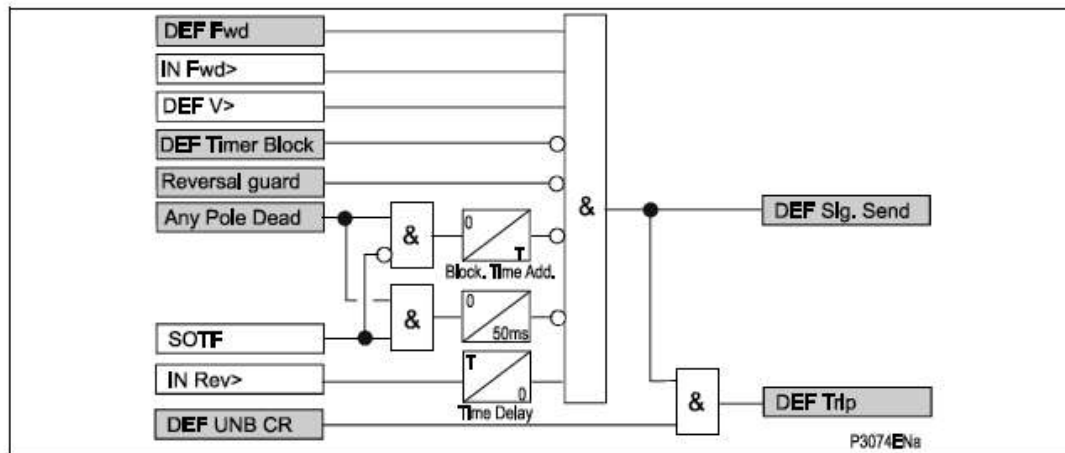


Figure 80: Independent channel – permissive scheme

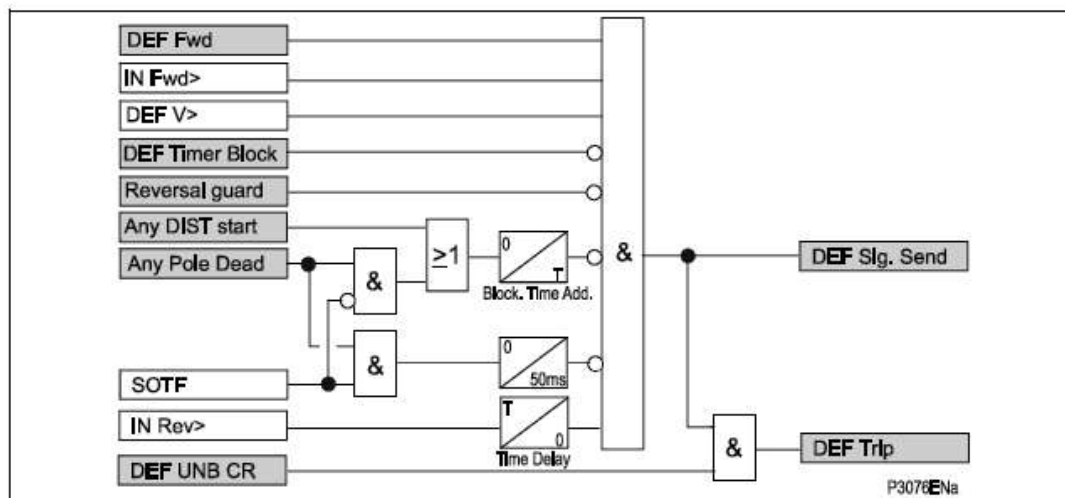
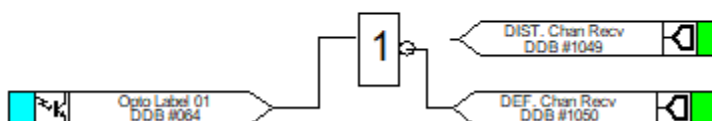


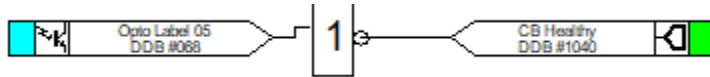
Figure 81: Shared channel – permissive scheme

In PSL logic (the opto input is inverted For testing purpose only)



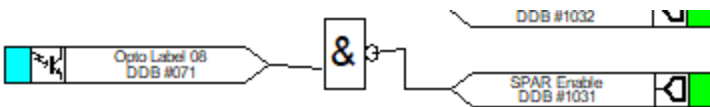
CB Healthy:

In PSL logic (the opto input is inverted For testing purpose only)



Single Pole AR:

In PSL logic (the opto input is inverted for testing purpose only)



Annexure C.3

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_NOV_2022	NTPC (North Karanpura)		660MW New Generating Unit charged a Tandwa,Jharkhand	DATA REQUIRED
2	OCC_NOV_2022	NTPC (North Karanpura)	ICT	400KV MAIN BAY OF 400KV/11.50KV 315 MVA ST-3 AT NORTH KARANPURA	PDMS AND PSCT DONE
3	OCC_NOV_2022	NTPC (North Karanpura)	GT-1	400KV MAIN BAY OF 400KV/21KV 265 MVA GT-1 AT NORTH KARANPURA	PDMS AND PSCT DONE
4	OCC_NOV_2022	NKTL	T/L	400 kV North Karanpura(NTPC)- Chandwa(PG) Transmission Line -1	PDMS AND PSCT DONE AT NORTH KARANPURA END AND DATA REQUIRED CHANDWA END
5	OCC_NOV_2022	NKTL	T/L	400 kV North Karanpura(NTPC)- Chandwa(PG) Transmission Line 2	PDMS AND PSCT DONE AT NORTH KARANPURA END AND DATA REQUIRED CHANDWA END
6	OCC_NOV_2022	JUSNL	T/L	400KV MAIN BAY OF LATEHAR(JUSNL)-1 AT CHANDWA(PG)	PDMS AND PSCT DONE AT CHANDWA END AND DATA REQUIRED AT LATEHAR END
7	OCC_NOV_2022	JUSNL	T/L	400KV MAIN BAY OF LATEHAR(JUSNL)-2 AT CHANDWA(PG)	PDMS AND PSCT DONE AT CHANDWA END AND DATA REQUIRED AT LATEHAR END
8	OCC_DEC_2022	BGCL	ICT	400KV MAIN BAY OF 400KV/220KV/132kv/33kv 500 MVA ICT 2 AT JAKKANPUR JIS	PDMS AND PSCT DONE
9	OCC_DEC_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV/33kv 315 MVA ICT 2 AT DURGAPUR SS	PDMS AND PSCT DONE
10	OCC_JAN_2023	JUSNL	T/L	400 kV Chandwa (PG) - Latehar (JUSNL) D/C Line	PDMS AND PSCT DONE AT CHANDWA END AND LATEHAR END DATA REQUIRED
11	OCC_JAN_2023	BSPTCL	T/L	220 kV Patna (PG) - Sipara (BSPTCL) D/C Line after reconducting	PDMS AND PSCT DONE
12	OCC_JAN_2023	OPTCL	B/R	400 kV 125 MVA Bus Reactor at Mendhasal GSS	PDMS AND PSCT DONE
13	OCC_JAN_2023	NTPC	T/L	Main Bays of 400 kV Gaya D/C Line at NTPC sitchyard	NOT CHARGED
14	OCC_JAN_2023	BSPTCL	T/L	132kV Ganwara-Pandaul line(reconducting)	PDMS AND PSCT DONE AT GANGWARA END
15	OCC_JAN_2023	BSPTCL	T/L	132kV Darbhanga-samastipur line(reconducting)	PDMS AND PSCT DONE AT DARBHANGA END
16	OCC_JAN_2023	PGCIL	T/L	PG-Patna-Gaurichak TL CKT-2(reconducting)	DATA REQUIRED
17	OCC_JAN_2023	PGCIL	T/L	PG-Patna-Gaurichak TL CKT-1(reconducting)	DATA REQUIRED
18	OCC_JAN_2023	BGCL	T/L	220kV JAKKANPUR NEW(BGCL)-KHAGAUL(BSPTCL)	PDMS AND PSCT DONE AT JAKKANPUR END AND DATA REQUIRED KHAGAUL END
19	OCC_JAN_2023	BGCL	T/L	220kV JAKKANPUR NEW(BGCL)-SIPARA(BSPTCL)	PDMS AND PSCT DONE AT JAKKANPUR END AND DATA REQUIRED KHAGAUL END
20	OCC_JAN_2023	BSPTCL	T/L	132kV Dumraon-Bikramganj line(reconducting)	In 132kV Dumraon Bikramganj line reconductoring has been done by panther equivalent HTLS conductor. In Distance relay, setting has been kept unchanged as data of both conductor (Panther and HTLS) are almost same.
21	OCC_JAN_2023	OPTCL	B/R	125kva bus reactorat Mendhasal	PDMS AND PSCT DONE

22	OCC_JAN_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT Lapanga	PDMS AND PSCT DONE
23	OCC_JAN_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-II ATGIS Hinjili	PDMS AND PSCT DONE
24	OCC_FEB_2023	PGCIL	T/L	220 kV Pusauli (PG) - Durgauti (IR) D/C Line	Data required in both end
25	OCC_FEB_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT ASKA NEW	PDMS AND PSCT DONE
26	OCC_FEB_2023	OPTCL	ICT	132kV Barbil-Kamanda line	Data required in both end
27	OCC_FEB_2023	OPTCL	T/L	132kV Switching station kutra 132Kv along with LILO of kuchinda rajgangpur s/c line to kutra	PDMS AND PSCT DONE
28	OCC_FEB_2023	OPTCL	T/L	132kV Kutra m/s shiva cement s/c line	Data required
29	OCC_FEB_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT 132/33 kV,GSS,CHANDIPUR	Data Recived
30	OCC_FEB_2023	OPTCL	T/L	132kV Switching station near M/s Ultrateh Cement ltd at Khamarnuagaon,Khuntuni,132kV LILO arrangement from Arati steel - TS alloys line	Data required
31	OCC_FEB_2023	OPTCL	T/L	12.5 MW Solar power plant at 33kV Level in 132/33kV witchyard M/S ARBEL having connectivity at 132kV With LILO switching station SAINTALA	Data required
32	OCC_FEB_2023	OPTCL	T/L	220kV Switchyard at 220/132/33kV GSS,BAMRA having LILO connectivity 220kV Budhipadar-Tarkera ckt-II	Data required
33	OCC_FEB_2023	OPTCL	ICT	220/132kV160MVA Power Auto TRF-1 AT 220/132/33 kV,GSS,BAMRA	PDMS AND PSCT DONE
34	OCC_FEB_2023	OPTCL	ICT	220/132kV160MVA Power Auto TRF-2 AT 220/132/33 kV,GSS,KURAMUNDA	PDMS AND PSCT DONE
35	OCC_FEB_2023	OPTCL	ICT	220/132kV 40MVA Power Auto TRF-1 AT 220/132/33 kV,GSS,KURAMUNDA	PDMS AND PSCT DONE
36	OCC_MAR_2023	NTPC		NTPC Barh Stage Unit #2, 24 kV, 660 MW is yet to be synchronized	Data required
37	OCC_MAR_2023	NTPC	GT(3* 260M VA)	400kV GT#2 of NTPC Barh	Data required
38	OCC_MAR_2023	BGCL	ICT-1	400/220/33kV ICT 1 500MVA at Naubatpur SS	Data required
39	OCC_MAR_2023	OPTCL	T/L	400 kV GMR - Meramundali-B S/C Line after LILO work of 400 kV GMR - Meramundali-A Line at Meramundali-B SS	DATA RECEIVED
40	OCC_MAR_2023	OPTCL	T/L	132kV 2 PH S/C LINE,132kV GSS,KAMAKHYANAGAR FOR EXTENTION OF P/S TO RTSS KAMAKHYANAGAR	Data required

41	OCC_MAR_2023	OPTCL	T/L	400kV GMR-MERAMUNDALI-B SC LINE & MERAMUNDALI-B TO MERAMUNDALI-A LINE AFTER LILO OF GMR-MERAMUNDALI-A SC LINE MERAMUNDALI-B GIS	DATA RECEIVED
42	OCC_MAR_2023	OPTCL	ICT	132/33kV 20MVA POWER TR NO-2 AND 1 132kV FEEDER BAY GSS BIRMAHARAJPUR	Data required
43	OCC_MAR_2023	BSPTCL	T/L	220kV BIHARSARIFF-TTPS S/C(RECONDUCTING)	Data required
44	OCC_MAR_2023	BSPTCL	T/L	132kV SONENAGAR(OLD)-NAGARUNTARI TSS,SCTL(RECONDUCTING)	Data required
45	OCC_MAR_2023	BGCL	ICT	500MVA ICT-1 400/220/132/33kV ,NAUBATPUR	Data required
46	OCC_MAR_2023	BGCL	T/L	132kV KHAGAU-BIHITA NEW(BGCL) S/L	PDMS AND PSCT DONE
47	OCC_MAR_2023	BGCL	T/L	132kVBIHITA NEW(BGCL)-DIGHA(BSPTCL)	PDMS AND PSCT DONE
48	OCC_MAR_2023	BSPTCL	T/L	132kV RAJGIR ASTHAWAN CKT1&2	Data required
49	OCC_APR_2023	NTPC	GT	NTPC Barh Stage 1 Unit #2 660MW	DATA REQUIRED
50	OCC_APR_2023	OPTCL	ICT	400KV MAIN BAY OF 400KV/220kV 315 MVA ICT-3 AT KALINGANAGAR	DATA REQUIRED
51	OCC_APR_2023	BSPTCL	T/L	220 kV Sitamarhi (PMTL) - Raxaul Line 1 along with associated bays at Raxaul end	DATA REQUIRED
52	OCC_APR_2023	BSPTCL	T/L	220 kV Sitamarhi (PMTL) - Raxaul Line 2 along with associated bays at Raxaul end	DATA REQUIRED
53	OCC_APR_2023	POWERGRID	T/L	132 kV Ranpo (PG) - Samardong (EPD, Sikkim) Line 1	PDMS AND PSCT DONE AT RANGPO END
54	OCC_APR_2023	POWERGRID	T/L	133 kV Ranpo (PG) - Samardong (EPD, Sikkim) Line 2	PDMS AND PSCT DONE AT RANGPO END
55	OCC_MAY_2023	BSPTCL	T/L	220 kV Muzzafarpur (PG) - Amnour (BSPTCL) Line 2 as anti-theft measure from Muzzafarpur end	Data required
56	OCC_MAY_2023	OPTCL	T/L	SYNCHRONIZATION OF 2MW GEDCOL SOLAR PV PLANT HAVING 33kV CONNECTIVITY AT 220/132/33kV,GSS BOLANGIR NEW FOR 2MW SOLAR PV PLANT	Data required
57	OCC_MAY_2023	OPTCL	T/L	220kV LILO LINE LOC NO 227 OF EXITING 220kV NEW DUBURI-BALASORE LINE UPTO GANTRY OF 220/132/33kV GRID S/S DHARMA	Data required
58	OCC_MAY_2023	OPTCL	T/L	SYNCHRONIZATION OF 3.64MW SOLAR PV PLANT HAVING 11kV LEVEL CONNECTIVITY AT 132/33kV,SWITCHYARD OF M/S SHREE CEMENT LTD CONNECTED WITH KHUNTUNI-SHREE CEMENT FEEDER	Data required
59	OCC_MAY_2023	OPTCL	ICT	220/33kV GSS,KANTABADA LILO CONNECTIVITY FROM LOC NO 453 AND 455 OF 220kV CHANDAKA-MENDASHAL CKT-III ALONG WITH 02 NOS OF 220/33 Kv 63mva power trf	Data required
60	OCC_MAY_2023	OPTCL	T/L	SYNCHRONIZATION OF 30MW THERMAL UNIT OF M/S JAGANNATH STEEL AND POWER KEONJHAR WITH OPTCL SYSTEM	Data required

SI No.	Name of the incidence	PCC Recommendation	Latest status
127th PCC Meeting			
1.	Total Power failure at 220 kV Therubali (OPTCL) S/s on 15.05.2023 at 11:13 Hrs.	<p>PCC observed that as the substation is quite old (more than 40 years), renovation and upgradation of the control and protection system should be taken up on priority basis for reliable and secure operation of the system.</p> <p>Further PCC advised following:</p> <ul style="list-style-type: none"> • SLDC Odisha representative to coordinate with Balimela HEP and share detailed report of unit tripping to ERPC/ERLDC. Further DR/EL at Indravati end for the above disturbance also to be shared. • To review zone-3 settings well as back up O/C and E/F setting of the feeders for other concerned substations of OPTCL as well as Indravati and Balimela end. • To test auto-reclose scheme for 220 kV Therubali-Laxmipur-2 at Therubali end. 	
2.	Total Power failure at 220 kV Chatra (JUSNL) S/s on 15.05.2023 at 14:22 Hrs	On enquiry from ERLDC regarding A/R issue at Chatra end, JUSNL representative informed that the matter is being taken up with the relay OEM. The timeline for rectification is Aug-23.	
3.	Tripping of 220 kV Main Bus-1 at Motipur on 14.05.2023 at 20:42 Hrs	<p>BSPTCL was advised following:</p> <ul style="list-style-type: none"> • The current waveform during the incident may be studied for CT saturation effect. • The pick-up value may also be checked and it should be 1.2 times of highest of all the CT ratio. 	

		<ul style="list-style-type: none"> CT knee point may be tested, and further busbar relay may be tested to ensure its stable operation. 	
4.	Tripping of 220 kV Main Bus-2 at Meramundali B on 25.05.2023 at 08:36 Hrs	PCC opined that both the bus should not be tripped during the above incident and advised OPTCL to check the busbar scheme and in case of any anomaly the same shall be rectified.	
5.	Non-Harmonization of UFLS relay settings and other associated issues	<p>Details of UFR as received from utilities is attached at Annexure C.4.5.</p> <p>Regarding time delay of UFR, PCC advised that no time delay should be present in any UFR relay time settings. Further, PCC advised that wherever static relays are present, the same shall be replaced with numerical relay for better performance.</p> <p>All SLDCs were advised to review the operation of UFR on the above event and also to review the load shedding quantum of feeders under UFR considering the change in network configuration and present load pattern of the feeders.</p>	
126th PCC Meeting			
1.	Total Power Failure at 220 kV Chandil S/s on 27.04.2023 at 07:12 Hrs	<p>PCC observed that the O/C settings of ICTs at RCP end is set with a conservative value and advised to review the o/c settings of 220/132 kV ICTs at Chandil and RCP S/s with proper coordination.</p> <p>Regarding tripping of 132 kV Chandil – Adityapur in zone-3 from Adityapur end, PCC advised JUSNL to review reach settings of zone 3 distance relay at Adityapur end.</p> <p>JUSNL was advised to review O/C settings of feeders and ICTs at each</p>	<p><i>JUSNL representative informed that settings had been revised.</i></p> <p><i>PCC advised JUSNL to share revised settings to ERPC.</i></p>

		S/s as per present fault level data available with SLDC Jharkhand	
125th PCC Meeting			
5.	Repeated Line tripping of 220 kV Ramchandrapur - Joda in April 2023	Regarding status of commissioning of DTPC in the line, PCC advised the matter may be taken with their telecom wing for early commissioning of the same.	<i>JUSNL representative informed that work order for commissioning of DTPC in the line will be issued shortly and it is expected that work will be completed by July 2023.</i>

SL. No.	NAME OF GRID	CONNECTED 33 KV FEEDER	LOAD IN MW	Frequency SETTING	Current Average Load During Solar Hours	Current Peak load	Relay Make	Relay type (Static /Numerical/Electromechanical)	Delay(if any intentional delay) apart from measurment delay	Measurment delay In(ms) or No of cycles	Last Testing done	Healthiness Status
1	132/33 KV Gaighat	Saidpur	20	48.8	7MW	12MW	SEL	Numerical	0	30		Healthy
		City Feeder	22	48.8	11MW	16.8MW	SEL	Numerical	0	30		Healthy
2	132/33 KV Mithapur	PESU II	18	49	11MW	14MW	MICOM	Numerical	0	30		Healthy
		PESU IV	32	49	13MW	15MW	MICOM	Numerical	0	30		Healthy
3	220/132/33 KV Fatuha	Katra (Danyawa)	14	49	7 MW	12MW	MICOM	Numerical	0	30		Healthy
		Meena Bazar	24	49	12MW	17MW	MICOM	Numerical	0	30		Healthy
		Fatuha	22	49.2	22MW	28MW	MICOM	Numerical	0	30		Healthy
		Dina Iron	12	49.2	6MW	10MW	MICOM	Numerical	0	30		Healthy
4	132/33kv Barh	Barh Town	23	49.2	11MW	20.5MW	Reyrolle	Static	0	100ms		Healthy
		Pandarak	7	48.6	05MW	06MW	Reyrolle	Static	0	100ms		Healthy
5	132/33 KV Bari Pahari	Bari Pahari I	11	49.4	9MW	12MW	AREVA	Static	0	100ms	31.05.23	Healthy
		Bari Pahari II	5.5	49.4	5MW	6MW	AREVA	Static	0	100ms	31.05.23	Healthy
		Sohsarai	10	49.4	16MW	22MW	AREVA	Static	0	100ms	31.05.23	not Healthy
		Ramchandrapur	15	48.8	16MW	22MW	AREVA	Static	0	100ms	31.05.23	Healthy
		Noorsarai	10	49.4	16MW	22MW	AREVA	Static	0	100ms	31.05.23	Healthy
		Asthama	5	49.4	9MW	14MW	AREVA	Static	0	100ms	31.05.23	Healthy
6	132/33 KV Harnaut	Line II Feeder (Charm)	1.5	49.2								
					6.32MW	6.32MW	AREVA	Static	0	100	tested on 04.03.23 test to be on 16.06.23	Healthy
		Kalyanbiga	0.5	48.8	3.67MW	3.67MW	AREVA	Static	0	100	tested on 04.03.23 test to be on 16.06.23	Healthy
7	132/33 KV Ekangarsarai	Harnaut	5	49.4	4.5MW	5MW	AREVA	Static	0	100	tested on 04.03.23 test to be on 16.06.23	Healthy
		Parwalpur	3	49.4				NA (Earlier notinstructed by ERPC)				
		Islampur	6	49.2				NA (Earlier notinstructed by ERPC)				
8	132/33 KV Katra	Ekangarsarai	5	49.2	2.23MW	12MW	combiflex	Electromechanical			test to be on 19.06.23	
		Hiisa	4	49.2	6.64MW	19.1MW	combiflex	Electromechanical			test to be on 19.06.23	
		Pahari	18	48.8	15MW	24MW	ABB	Static	100ms			Healthy
		Sabalpur	5	49	24MW	31MW	ABB	Static	100ms			Healthy
		Karmalichak	8	49	15MW	20MW	ABB	Static	100ms			Healthy
		Ashoknagar (Technotuff)	14	49	17MW	25MW	ABB	Static	100ms			Healthy
9	220/132/33 KV Sampatchak	Kankarbag (Malsalami)	18	49	10MW	19MW	ABB	Static	100ms			Healthy
		Bahadurpur (Beldarichak)	14	49.2	4MW	5MW	ABB	Static	100ms			Healthy
		Sampatchak	7	49.2	7MW	9MW	ABB	Static	100ms			Healthy
10	132/33 KV Purnea	KudaNawada	10	49.2	6.5MW	8MW	ABB	Static	100ms			Healthy
		Maranga	12	49.4	8MW	11MW	AREVA	Static	0	100	23.05.23	Healthy
11	132/33 KV Nalanda	Madhubani	10	49.4	4.5MW	6MW	AREVA	Static	0	100	23.05.23	Healthy
		Nalanda	6	49.4	10MW	16MW	AREVA	Static	0	100(ms)	02.06.23	Healthy
12	132/33 KV Rajgir	Silao	7	49.4	10MW	12MW	SEL	Numerical	0	100(ms)	tested on 04.03.23 test to be on 19.06.23	Healthy

WBSETCL UFR status

SI No	Stage	Name of the S/Stn.	Name of the Feeder	Maximum Load (MW)	Total Load (MW)	Relay Make	Relay Type (Static/Numeric)	Time Delay if any	Operating Time	Last Date Of Test	Healthyness tatus
1	STAGE-I (49.4HZ)	NBU	33 KV TCF	10	32	RMS	NUMERICAL	100ms	111ms	18.05.2023	DC SUPPLY ON & PT FUSE OK
2	STAGE-I (49.4HZ)	NBU	33KV KHARIBARI	7							
3	STAGE-I (49.4HZ)	NBU	33KV UJANU	11							
4	STAGE-I (49.4HZ)	NBU	11KV DURGAMANDIR	2							
5	STAGE-I (49.4HZ)	NBU	11KV PHASIDEWA	1							
6	STAGE-I (49.4HZ)	NBU	11KV BAGDOGRA	1							
7	STAGE-I (49.4HZ)	ULUBERIA	33KV BENITABLA	12	102	P442	NUMERICAL	200ms	209ms	25.05.2023	DC SUPPLY ON & PT FUSE OK
8	STAGE-I (49.4HZ)	ULUBERIA	33KV UIGC-1	4							
9	STAGE-I (49.4HZ)	ULUBERIA	33KV UIGC-2	10							
10	STAGE-I (49.4HZ)	ULUBERIA	33KV BAROGRAM	4							
11	STAGE-I (49.4HZ)	ULUBERIA	33KV FOODPARK	15							
12	STAGE-I (49.4HZ)	ULUBERIA	33KV SKIPPER	7							
13	STAGE-I (49.4HZ)	ULUBERIA	33KV POLY PARK	18							
14	STAGE-I (49.4HZ)	ULUBERIA	33KV BAGANDA	19							
15	STAGE-I (49.4HZ)	ULUBERIA	33KV GANES COMPLEX	13							
16	STAGE-I (49.4HZ)	GANGARAMPUR	33KV BUNIADPUR-1	12	43	ZIV -IRLF	NUMERICAL	200ms	210ms	06.12.2021	DC SUPPLY ON & PT FUSE OK
17	STAGE-I (49.4HZ)	GANGARAMPUR	33KV BUNIADPUR-2	8							
18	STAGE-I (49.4HZ)	GANGARAMPUR	33KV SALAS	8							
19	STAGE-I (49.4HZ)	GANGARAMPUR	33KV RAMPUR	5							
20	STAGE-I (49.4HZ)	GANGARAMPUR	2X10MVA (33/11KV) TR-1,2	10							
21	STAGE-I (49.4HZ)	LAKHIKANTAPUR	33KV BELIACHANDI	11	94	P3U3	NUMERICAL	200ms	211ms	30.05.2023	DC SUPPLY ON & PT FUSE OK
22	STAGE-I (49.4HZ)	LAKHIKANTAPUR	33KV PATHAR PRATIMA	17							
23	STAGE-I (49.4HZ)	LAKHIKANTAPUR	33KV DEULA	16							
24	STAGE-I (49.4HZ)	LAKHIKANTAPUR	33KV JAY NAGAR-1	24							

25	STAGE-I (49.4HZ)	LAKHIKANTAPUR	33KV JAY NAGAR-2	0							
26	STAGE-I (49.4HZ)	LAKHIKANTAPUR	33KV U. LAKHINARAYANPUR	15							
27	STAGE-I (49.4HZ)	LAKHIKANTAPUR	33KV JAMTALA	11							
28	STAGE-I (49.4HZ)	KAKDWEEP	33KV KAKDWEEP-1	10	45	P3U3	NUMERICAL	200ms	209ms	26.05.2023	DC SUPPLY ON & PT FUSE OK
29	STAGE-I (49.4HZ)	KAKDWEEP	33KV KAKDWEEP-2	11							
30	STAGE-I (49.4HZ)	KAKDWEEP	33KV KULPI-1	5							
31	STAGE-I (49.4HZ)	KAKDWEEP	33KV KULPI-2	8							
32	STAGE-I (49.4HZ)	KAKDWEEP	33KV RADHANGAR-1	7							
33	STAGE-I (49.4HZ)	KAKDWEEP	33KV RADHANGAR-2	4							
34	STAGE-I (49.4HZ)	CESC			65						
35	STAGE-I (49.4HZ)	WBSEDCL LAOD			316	Total Load (MW)			381		
36	STAGE-I (49.4HZ)	CESC LOAD			65						

SI No	Stage	Name of the S/Stn.	Name of the Feeder	Maximum Load (MW)	Total Load (MW)	Relay Make	Relay Type (Static /Numeric)	Time Delay if any	Operating Time	Last Date Of Test	Healthyness Status
1	STAGE-II (49.2HZ)	DOMJUR	33 KV JANGALPUR	11	52	MICOM-P442	NUMERICAL	200ms	212ms	20.02.2020	DC SUPPLY ON & PT FUSE OK
2	STAGE-II (49.2HZ)	DOMJUR	33KV JALADHULAGARI	11							
3	STAGE-II (49.2HZ)	DOMJUR	33KV MUNSIRHAT	17							
4	STAGE-II (49.2HZ)	DOMJUR	2X10 MVA TR-1,2	13							
5	STAGE-II (49.2HZ)	BAGNAN	33KV BAGNAN-1	21	61	MSVUM12	STATIC	200ms	223ms	21.01.2021	DC SUPPLY ON & PT FUSE OK
6	STAGE-II (49.2HZ)	BAGNAN	33KV BAGNAN-2	0							
7	STAGE-II (49.2HZ)	BAGNAN	33KV AMTA	11							
8	STAGE-II (49.2HZ)	BAGNAN	33 KV MUGKALYAN-1	16							
9	STAGE-II (49.2HZ)	BAGNAN	33 KV MUGKALYAN-2	13							
10	STAGE-II (49.2HZ)	N. BISHNUPUR	33KV SONAMUKHI/BELIATOR	14	21	P3U3	NUMERICAL	200ms	211ms	07.06.2023	DC SUPPLY ON & PT FUSE OK
11	STAGE-II (49.2HZ)	N. BISHNUPUR	33KV PATRASAYAR	7							
12	STAGE-II (49.2HZ)	N. BISHNUPUR	33 KV ROHIT	0							
13	STAGE-II (49.2HZ)	BARJORA	33KV BARJORA-2	18	24	MFVUM12	STATIC	200ms	213ms	13.12.2021	DC SUPPLY ON & PT FUSE OK
14	STAGE-II (49.2HZ)	BARJORA	2X6.3 MVA TR-1,2 (33/11KV)	6							
15	STAGE-II (49.2HZ)	MALDA	33KV SPARE EAST-1	0	126	ZIV-IRLF	NUMERICAL	200ms	211ms	08.02.2022	DC SUPPLY ON & PT FUSE OK
16	STAGE-II (49.2HZ)	MALDA	33KV MILKY	5							
17	STAGE-II (49.2HZ)	MALDA	33KV ENGLISH BAZAR-1	11							
18	STAGE-II (49.2HZ)	MALDA	33KV SOJAPUR	11							
19	STAGE-II (49.2HZ)	MALDA	33KV ENGLISH BAZAR-2	0							
20	STAGE-II (49.2HZ)	MALDA	33KV MOTHABARI	12							
21	STAGE-II (49.2HZ)	MALDA	33KV HABIBPUR	16							
22	STAGE-II (49.2HZ)	MALDA	33KV KALIACHAK	8							
23	STAGE-II (49.2HZ)	MALDA	33 KV NARAYANPUR-1	6							

24	STAGE-II (49.2HZ)	MALDA	33 KV NARAYANPUR-2	12						
25	STAGE-II (49.2HZ)	MALDA	33KV MANIKCHAK	15						
26	STAGE-II (49.2HZ)	MALDA	33KV KPS	12						
27	STAGE-II (49.2HZ)	MALDA	33KV RABINDRABHABAN	15						
28	STAGE-II (49.2HZ)	MALDA	33KV BALIA	3						
29	STAGE-II (49.2HZ)	CESC			90					
30	STAGE-II (49.2HZ)	WBSEDCL LAOD		284	284	Total Load (MW)			374	
31	STAGE-II (49.2HZ)	CESC LOAD		90	90					

Sl No	Stage	Name of the S/Stn.	Name of the Feeder	Maximum Load (MW)	Total Load (MW)	Relay Make	Relay Type (Static /Numeric)	Time Delay if any	Operating Time	Last Date Of Test	Healthyness Status
1	STAGE-III (49.0 HZ)	LILUAH	33 KV KONA	4	67	MICOM-P442	NUMERICAL	200ms	212ms	13.01.2020	DC SUPPLY ON & PT FUSE OK
2	STAGE-III (49.0 HZ)	LILUAH	33KV JNP	0							
3	STAGE-III (49.0 HZ)	LILUAH	33KV KTT	0							
4	STAGE-III (49.0 HZ)	LILUAH	33KV MKD	15							
5	STAGE-III (49.0 HZ)	LILUAH	33KV BALTIKURI-1	11							
6	STAGE-III (49.0 HZ)	LILUAH	33KV BALTIKURI-2	11							
7	STAGE-III (49.0 HZ)	LILUAH	33KV LLH-1	10							
8	STAGE-III (49.0 HZ)	LILUAH	33 KV LLH-2	16							
9	STAGE-III (49.0 HZ)	SALT LAKE AIS	33KV M5-1	12	24	MICOM-P442	NUMERICAL	200ms	211ms	31.01.2022	DC SUPPLY ON & PT FUSE OK
10	STAGE-III (49.0 HZ)	SALT LAKE AIS	33KV M5-2	12							
11	STAGE-III (49.0 HZ)	O. BISHNUPUR	33KV KOTOLPUR	6	58	P3U3	NUMERICAL	200ms	210ms	07.06.2023	DC SUPPLY ON & PT FUSE OK
12	STAGE-III (49.0 HZ)	O. BISHNUPUR	33 KV SIMLAPAL	13							
13	STAGE-III (49.0 HZ)	O. BISHNUPUR	33KV ONDA	13							
14	STAGE-III (49.0 HZ)	O. BISHNUPUR	33KV BAKADHAHA	5							
15	STAGE-III (49.0 HZ)	O. BISHNUPUR	2X10 MVA	7							
16	STAGE-III (49.0 HZ)	O. BISHNUPUR	33KV BANKURA	14							
17	STAGE-III (49.0 HZ)	NJP	33 KV RADHABARI	11		ZIV-IRLF	NUMERICAL	100ms	210ms	24.01.2022	DC SUPPLY ON & PT FUSE OK
18	STAGE-III (49.0 HZ)	NJP	33KV RABINDRANAGAR	10							
19	STAGE-III (49.0 HZ)	NJP	33KV DABGRAM-1	12							
20	STAGE-III (49.0 HZ)	NJP	33KV FATAPUKUR	11							
21	STAGE-III (49.0 HZ)	NJP	2X6.3MVA TR-1,2 (33/11KV)	7							
22	STAGE-III (49.0 HZ)	NJP	33KV TIN BATTI	15							
23	STAGE-III (49.0 HZ)	NJP	33 KV FULBARI IP-1	6	116						

24	STAGE-III (49.0 HZ)	NJP	33 KV FULBARI IP-2	6					
25	STAGE-III (49.0 HZ)	NJP	33KV GAZOLDOBA	10					
26	STAGE-III (49.0 HZ)	NJP	33KV DABGRAM-2	11					
27	STAGE-III (49.0 HZ)	NJP	33KV RANINAGAR	11					
28	STAGE-III (49.0 HZ)	NJP	33KV SUBHASPALLY	6					
29	STAGE-III (49.0 HZ)	CESC			125				
30	STAGE-III (49.0 HZ)	WBSEDCL LAOD			265	Total Load (MW)			390
31	STAGE-III (49.0 HZ)	CESC LOAD			125				

SI No	Stage	Name of the S/Stn.	Name of the Feeder	Maximum Load (MW)	Total Load (MW)	Relay Make	Relay Type (Static /Numeric)	Time Delay if any	Operating Time	Last Date Of Test	Healthyness Status
1	STAGE-IV (48.8HZ)	RISHRA	33 KV RAGHUNATHPUR	21	80	SIPROTEC-7SJ66	NUMERICAL	200ms	213ms	08.02.2022	ALL KEPT OFF, NOT INSTALLED AFTER PANEL SHIFTING
2	STAGE-IV (48.8HZ)	RISHRA	33KV KV DANKUNI-1	11							
3	STAGE-IV (48.8HZ)	RISHRA	33KV KV DANKUNI-2	15							
4	STAGE-IV (48.8HZ)	RISHRA	33KV KAIKALA-1	0							
5	STAGE-IV (48.8HZ)	RISHRA	33KV KAIKALA-2	10							
6	STAGE-IV (48.8HZ)	RISHRA	4X10 MVA TR-1,2,3,4	23							
7	STAGE-IV (48.8HZ)	RISHRA	33KV AJODHYA	7							
8	STAGE-IV (48.8HZ)	JANGIPARA	33 KV JANGIPARA	8	39	MICOMP442	NUMERICAL	200ms	211ms	21.01.2020	DC SUPPLY ON & PT FUSE OK
9	STAGE-IV (48.8HZ)	JANGIPARA	33KV SIAKHALA	13							
10	STAGE-IV (48.8HZ)	JANGIPARA	33KV SINGHATI	11							
11	STAGE-IV (48.8HZ)	JANGIPARA	2X6.3MVA TR-1,2	7							
12	STAGE-IV (48.8HZ)	TAMLUK	33 KV BARBEIYA	12	61	MSVUM12	STATIC	200ms	222ms	31.03.2022	DC SUPPLY ON & PT FUSE OK
13	STAGE-IV (48.8HZ)	TAMLUK	33KV MOINA	17							
14	STAGE-IV (48.8HZ)	TAMLUK	33KV GOPALPUR	9							
15	STAGE-IV (48.8HZ)	TAMLUK	33 KV TAMLUK	15							
16	STAGE-IV (48.8HZ)	TAMLUK	2X10MVA TR-1,2 (33/11KV)	8							
17	STAGE-IV (48.8HZ)	SILIGURI	33 KV SILIGURI-1	16	86	ZIV-IRLF	NUMERICAL	200ms	209ms	20.01.2022	DC SUPPLY ON & PT FUSE OK
18	STAGE-IV (48.8HZ)	SILIGURI	33 KV SILIGURI-2	21							
19	STAGE-IV (48.8HZ)	SILIGURI	33KV RABINDRANAGAR	15							
20	STAGE-IV (48.8HZ)	SILIGURI	33KV HOUSING BOARD	21							
21	STAGE-IV (48.8HZ)	SILIGURI	33KV DESBANDHUPARA	13							
22	STAGE-IV (48.8HZ)	DARJEELING	33KV LEBONG	15	0	ZIV-IRLF	NUMERICAL	200ms	207ms	30.05.2023	DC SUPPLY ON & PT FUSE OK
23	STAGE-IV (48.8HZ)	DARJEELING	33KV HAPPY VALLEY	6							

24	STAGE-IV (48.8HZ)	CESC		6	120						
25	STAGE-IV (48.8HZ)	WBSEDCL LAOD			266	Total Load (MW)			386		
26	STAGE-IV (48.8HZ)	CESC LOAD			120						