Minutes
of
103rd PCC Meeting

Date: 02.07.2021
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 103RD PROTECTION COORDINATION SUB-COMMITTEE MEETING HELD ON 17.06.2021 AT 10:30 HOURS

Member Secretary, ERPC chaired the meeting. The meeting was conducted through Microsoft Teams online platform.

List of participants is enclosed at **Annexure-A.**

PART – A

ITEM NO. A.1: Confirmation of minutes of 102nd Protection Coordination sub-Committee Meeting held on 13th May 2021 through MS Teams.

The minutes of 102nd Protection Coordination sub-Committee meeting held on 13.05.2021 circulated vide letter dated 28.05.2021.

Members may confirm.

Deliberation in the meeting

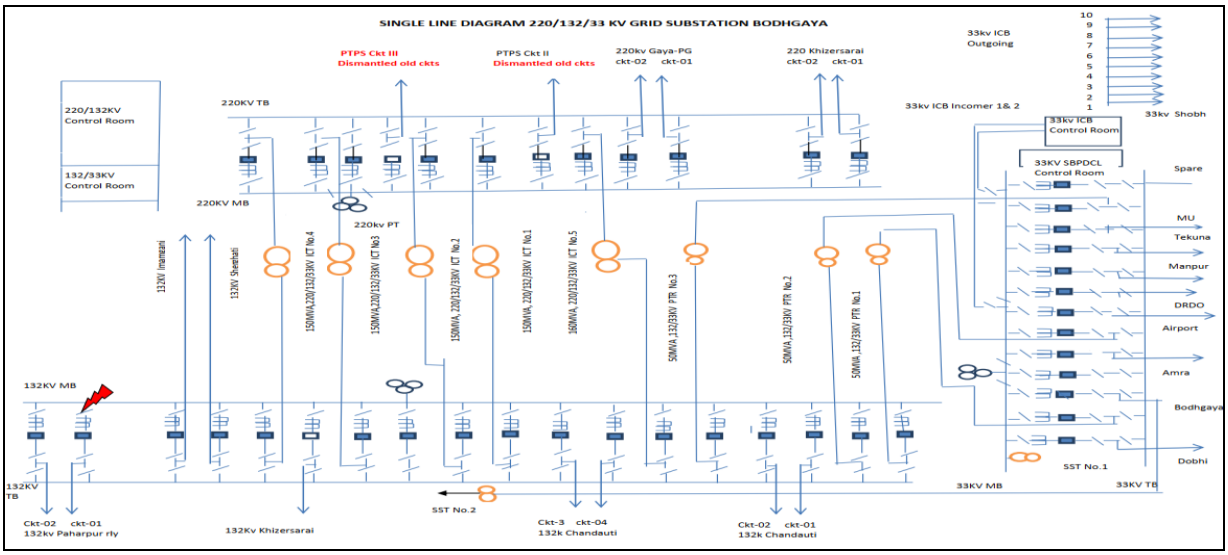
Members confirmed the minutes of 102nd PCC Meeting.

PART – B

ITEM NO. B.1: Disturbance at Bodhgaya S/S on 17/05/2021 at 23:06 Hrs

At 23:06 hrs, 220 kV Gaya-Bodhgaya-1 & 2 tripped from Gaya end only. At the same instance, all 220/132 KV ICTs at Bodhgaya also tripped causing load loss of 150 MW at Chandauti, Sherghati, Imamganj, Bodhgaya & Rafiganj Traction. 220 KV Bodhgaya-Khijasarai D/C was hand-tripped from Bodhgaya end.

The detailed report by ERLDC is attached at **Annexure B.1.**



Relay Indications :

Time	Name	End 1	End 2	PMU Observation
23:06	132 kV Bodhgya-Paharpur 1	R phase to earth fault, IR=12.1 kA. IN>1 and O/C> 1 operated in 500 ms (non-directional definite time 500 ms)	No tripping	Around 4 kV dip has been observed in R phase voltage at Maithon PMU data. The fault clearing time was around 1000 ms (> 160 ms)
23:06	220/132 kV 150 MVA ICT 1,2,3 and 4	Backup over current Earth fault protection operated (as per relay flag intimate substation personnel)	No tripping	
23:06	220/132 kV 160 MVA ICT 5	LV side breaker tripped on E/F protection.	No tripping	
23:06	220 kV Gaya Bodhgaya - 1	R-N, Zone-3, Fc= 2.167 kA, 6.7 km	No tripping	
23:06	220 kV Gaya Bodhgaya - 2	R-N, Z-3, Fc= 2.14 kA	No tripping	

Load Loss: 150 MW

Outage Duration : 00:40 Hrs

The following issue needs clarification:

a) Distance protection relay has not picked for 132 kV Bodhgaya-Paharpur circuit-1.
b) 220/132 kV ICTs backup protection needs proper coordination with 220 kV Gaya-Bodhgaya D/C zone-3 from the Gaya end.
c) DR of ICTs have not been shared which has led to difficulty in event analysis.

BSPTCL may explain.

Deliberation in the meeting

BSPTCL explained the disturbance as follows:

- *The fault occurred due to snapping of R-phase jumper of 132 kV Bodhgaya-Paharpur-1 within substation switchyard and resulted in bus fault in 132 kV Bodhgaya s/s.*
- *132 kV Bodhgaya – Paharpur circuit-1 tripped in non-directional backup overcurrent protection in 500 milisecond from Bodhgaya end. There was no tripping at Paharpur end.*
- *All the 220/132 kV ICTs at Bodhgaya got tripped on backup overcurrent earthfault protection.*
- *220 kV Gaya-Bodhgaya-1 & 2 tripped in Zone-3 protection from Gaya end in 800ms.*

During analysis of the event the followings were observed:

- *For 132 kV Bodhgaya – Paharpur circuit-1, the power flow at Bodhgaya end was reversed during the fault which indicates the fault was within the substation and at bus side of the CT. The maximum fault current was 11 kA.*

- *It was apprehended that the high reverse fault current indicates either presence of other sources at Paharpur end feeding the fault or issues in neutral earthing of the transformers at Paharpur end. The reason could not be explained and PCC advised BSPTCL to carry out further investigation of the issue at Paharpur end.*

- *From the DR of 220/132 kV 160 MVA ICT-5, it was observed that the fault duration was 1000 ms. DR of other ICTs i.e.150 MVA ICT #1,2,3,&4 were not available. As the ICT-5 tripped at 1000 msec, before tripping of this ICT, 220 kV Gaya-Bodhgaya D/C lines got tripped from Gaya end in 800 msec in zone-3 protection. This indicates coordination issue between backup protection of ICT and zone-3 of line protection at Gaya end.*

After detailed deliberation PCC advised followings to BSPTCL:

- *To check reason for non-operation of zone-4(reverse zone) in distance relay for 132 kV Bodhgaya-Paharpur-1 circuit.*

- *To check whether all five ICTs were tripped at the same time during disturbance. In case of difference in tripping time, review of the backup overcurrent & earthfault protection of ICTs is required taking into consideration of the fact that capacity of ICT-5 is 160 MVA and capacity of all other ICTs are 150 MVA.*

- *The reviewed backup protection settings of ICTs need to be communicated to Gaya end of Powergrid so that zone-3 timing for 220 kV Gaya-Bodhgaya D/C lines can be coordinated accordingly.*

- *To configure the disturbance recorders at Bodhgaya end as per the PCC guidelines finalized in 79th PCC meeting and also to time synchronize all the relays at Bodhgaya end.*

- *To upgrade relay of ICTs at Bodhgaya end so that DR can be extracted for disturbance analysis.*

PCC also advised BSPTCL to explore for implementation of double main transfer bus (DMT) or Double bus switching scheme for 220 kV Bodhgaya S/s and also to implement busbar protection at 220 kV level as per the CEA guidelines.

ITEM NO. B.2: Total Power Failure at Sonenagar S/S on 20/05/2021 at 03:41 Hrs

At 03:41 hrs, 220 kV Chandauti-Sonenagar D/C tripped from Chandauti end. This has led to total power failure at 220/132 kV Sonenagar (BSPTCL) and radially connected 132 kV substations. At the same time 132 kV Sonenagar – Japla S/C also got tripped.

Relay Indications :

Time	Name	End 1	End 2	PMU Observation
03:41 Hrs.	220 kV Chandauti - Sonenagar - 1	B-N, Zone 2. 76.2km, 0.7 kA	Did not trip	Around 4 kV dip has been observed in B phase voltage at Gaya PMU. Fault clearing time was around 500 ms.
	220 kV Chandauti - Sonenagar - 2	B-N, Zone 2. 76.2km, 0.7 kA	Did not trip	
	132 kV Sonenagar – Japla S/C	B-N, Directional O/C, E/F, I_B- 3.170 KA	Yet to be received	

Load Loss : 92 MW

Outage Duration : 00:42 Hrs

BSPTCL may explain.

Deliberation in the meeting

BSPTCL informed that there was a B-phase to ground fault in 132 kV Sonenagar(old)- Japla S/C. Backup overcurrent protection operated from both the end. At the same time, 220 kV Chandauti-Sonenagar(new) D/C got tripped from Chandati end in 500 msec in zone-2 of distance protection.

BSPTCL explained that distance protection relay for 132 kV Sonenagar-Japla line at Sonenagar end was found to be faulty and the same would be replaced soon. They added that after this incident, they had enabled high set in backup O/C relay with delay of 60msec as an interim measure till the time new distance relay is being installed.

Regarding non-operation of relay for 132 kV Sonenagar(new)-132 kV Sonenagar(old)lines, they pointed out that the line length is 0.5 km only. Further they informed that high set has been enabled for both the ends of this line with 100 msec delay after this incident.

PCC opined that 220/132 kV ICTs at Sonenagar(new) should have cleared the fault in case of delayed clearance of fault in 132 kV downstream and advised BSPTCL to check the ICT backup protection settings as well as the relay healthiness. The settings may be reviewed and coordinated properly.

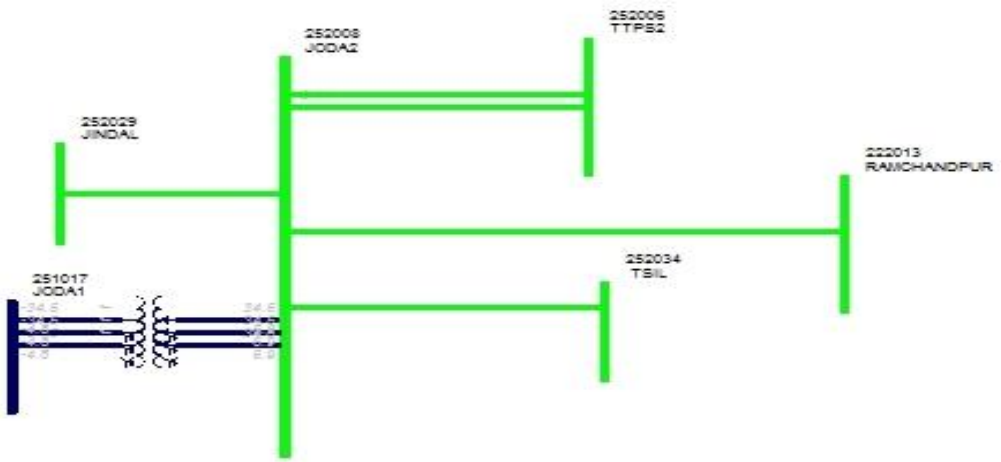
Regarding tripping of 220 kV Chanduati – Sonenagar circuits from Chandauti end, PCC advised Powergrid to check the reach settings of distance relay at Chandauti end.

ERLDC pointed out that in various tripping incidences it has been observed that carrier is not sent from Sonenagar to Chandauti end which resulted in delayed tripping from remote end. PCC advised BSPTCL to check and resolve carrier related issue at Sonenagar end.

ITEM NO. B.3: Total Power Failure at Joda(OPTCL) S/S on 23/05/2021 at 10:17 Hrs

On 23-05-2021 at 10:15 Hrs., all 220 kV feeders connected to 220/132 kV Joda S/S got tripped due to operation of bus bar protection. This led to total power failure at 220/132 kV Joda and 220 kV TSIL S/S and loss of 100 MW load.

After investigation, it was found that Y-phase CT of 220 kV Joda –TSIL feeder blasted at Joda end. The power at Joda substation was restored at 11:07 Hrs. by extending power from 220 kV JSPL substation through 220 kV Joda-JSPL Line.



Relay Indications :

Time	Name	End 1	End 2	PMU Observation
10:17 Hrs	220 kV Joda – TTPS - 1	Bus bar protection operated	Did not trip	Around 7 kV dip has been observed in Y phase voltage at Jamshedpur PMU. Fault clearing time was less than 100 ms
	220 kV Joda – JSPL S/C			
	220 kV Joda - Ramchandrapur S/C			
	220 kV Joda TSIL S/C	Y-N, Zone-1, 0.15 Km, F/C 7.8 kA, three phase trip	Vector shift tripped, DP relay, Distance- 30KM, IR=56.2A, Iy=326.5A, Ib=156.6A	

Load Loss: 100 MW

Outage Duration : 00:50 Hrs

The following issues need clarification:

- Reason for delayed clearing of Y pole of the breaker (faulted phase) even after sensing the fault in zone – 1 and bus bar protection
- Reason for non-tripping of feeders from remote end.
- No sequence of events data is recorded at ERLDC SCADA data for this grid events.

OPTCL may explain.

Deliberation in the meeting

OPTCL informed that there was a bus fault at 220 kV Joda S/s due to blasting of Y-phase CT of 220 kV Joda –TSIL feeder at Joda end. They added that bus bar protection operated and all 220 kV feeders connected to 220 kV Bus got tripped from Joda end.

They further clarified that the fault was cleared in 74 msec as per DR analysis. However, high current was observed in the relay of 220 kV Joda-TSIL feeder upto 130 msec due to infeed from TSIL end.

They informed that though direct trip command was sent to TSIL end, the breaker at TSIL end might have opened with a delay which resulted in current feeding from TSIL end till 130 msec. They submitted that the issue has been taken up with TSIL for detailed checking of the PLCC and other trip circuits at TSIL end.

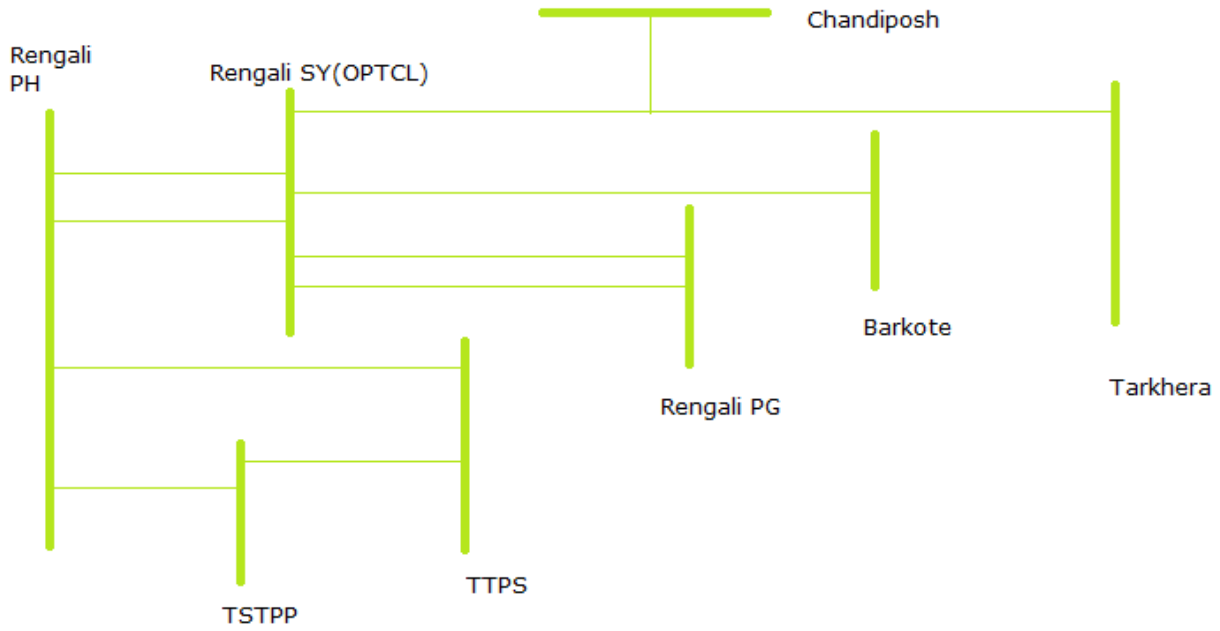
On query regarding sending of direct trip command to remote end on operation of bus bar protection, OPTCL replied that as per their settings if breaker of a particular feeder is open and infeed current is sent from remote end then direct trip signal would be sent. Therefore, in the present instance, direct trip signal was send only to TSIL end and not for other 220 kV feeders.

Regarding non-availability of sequence of events at ERLDC SCADA system, they informed that the issue had already been communicated to their SCADA wing to resolve the issue.

ITEM NO. B.4: Disturbance at Rengali S/s on 28/05/2021 at 07:45 Hrs

Due to CVT failure of 220 kV Rengali-TSTPP S/C at Rengali end, all 220 kV lines connected to 220 kV Rengali (OPTCL) S/S and 220 kV Rengali PH got tripped. Y phase jumper snapping of 220 kV Rengali-Rengali – 2 at 220 kV Rengali (OPTCL) Bus A was also reported at the same time.

The event has led to total power supply failure at 220 kV Rengali Hydropower station and 220 kV Rengali (OPTCL) S/s.



No Load loss and Gen. loss

Outage Duration : 05:27 Hrs

OPTCL & OHPC may explain.

Deliberation in the meeting

OPTCL explained that the fault occurred due to jumper snapping of Y-phase of 220 kV Rengali(OPTCL)- Rengali (PG)-2 line at Bus A of Rengali(OPTCL) switchyard resulting in a bus fault.

The following elements were tripped to clear the fault:

Name	End 1	End 2
220 kV Rengali(OPTCL)-Rengali PG-I	*Backup protection operated*	*Did not trip*
220 kV Rengali(OPTCL)-Rengali PG-2	*Did not trip*	*Zone-1*
220 kV Rengali(OPTCL)-Barkote	*Did not trip*	*Zone-2, F.D-49.7kM*
220 kV Rengali(OPTCL)-Tarkera	*Did not trip*	*Zone-2, F.D-141 kM*
220 kV Rengali(OPTCL)-Rengali PH-I	*Did not trip*	*Did not trip*
220 kV Rengali(OPTCL)-Rengali PH-II	*Zone-4 picked up*	*Did not trip*

220 kV Rengali PH- TSTPP	*Did not trip*	*Zone-3*
220 kV Rengali PH- TTPS	*Did not trip*	*Tripped from TTPS end*

They informed that being an old substation, busbar protection was not available at 220 kV Rengali(OPTCL) end.

It was informed that due to CVT failure of 220 kV Rengali PH -TSTPP S/C line at Rengali PH end, relay at Rengali PH end was unable to sense the fault and hence the 220 kV Rengali – TSTPP S/C tripped in zone 3 from TSTPP end.

The tripping detail at TTPS end for 220 kV Rengali PH-TTPS line was not available.

The reason for non-operation of any protection system at Rengali PH end could not be explained in absence of any DR/EL or report from OHPC. OHPC representative was not available in the meeting.

PCC expressed serious concern for non-submission of relevant details for analyzing the grid disturbance and advised SLDC Odisha to collect all the details and submit a report for this disturbance at the earliest.

PCC advised OPTCL to review zone-4 settings for 220 kV Rengali(OPTCL)-Rengali PH lines at OPTCL end so that in case of any bus fault at 220 kV Rengali(OPTCL) end the same can be cleared at minimum time.

PCC also advised OPTCL to implement busbar protection at 220 kV Rengali(OPTCL) at the earliest.

ITEM NO. B.5: Total Power Failure at Dumka S/s on 15/05/2021 at 12:01 Hrs

Due to tower collapse of 220 kV Farakka-Lalmatia S/C in April 2021, local load at 220 kV Dumka and Godda S/S were being radially fed from 400/220 kV Maithon S/S through 220 kV Maithon-Dumka D/C and 220 kV Dumka-Godda D/C. 220 kV Maithon-Dumka-1 was under shutdown for attending the hotspot at connector of R-phase pole circuit breaker of the line.

At 12:02 hrs 220 kV Maithon Dumka – 2 tripped on R phase to earth fault resulting in total power failure at Goda, Dumka S/S and nearby areas.

The detailed report by ERLDC is attached at **Annexure B.5.**

Relay Indications:

Time	Name	End 1	End 2	PMU observation
12:02 Hrs	220 kV Maithon Dumka - 1	R-N, 4.7 kA, 45km	R-N, Zone-1, 23 km, 0.9 KA	Around 2.5 kV dip has been observed in R phase voltage at Maithon PMU data. The fault clearing time was less than 100 ms. No Auto reclose attempt has been captured in PMU data.

Load Loss: 185 MW

Outage Duration: 00:49 Hrs

JUSNL may explain**.**

Deliberation in the meeting

JUSNL informed that a shutdown was availed for 220 k V Maithon – Dumka circuit 1 on 15/05/2021 at 10:45 hrs for attending hotspot at connector of R-phase pole circuit breaker of the line*. At 12:02 hrs, 220 kV Maithon – Dumka circuit-2 tripped on R-N fault in zone 1 protection from both the end. The fault distance was 23 km from Dumka end.*

Regarding non-operation of autorecloser of the line, Powergrid informed that though autorecloser is enabled for the line, the same is not operating due to issues in PLCC. They further clarified that the issue has been communicated to JUSNL several times, however the same has not been resolved yet. They added that there was no formal O&M agreement by JUSNL with Powergrid for maintenance of bay equipment at Maithon end.

PCC opined that at present 220 kV Maithon-Dumka D/C line is the primary and main source for power supply to Dumka/Lalmatia area of Jharkhand and tripping of this line results into huge load loss every time. PCC raised serious concern on non-availability of autorecloser in the line and lack of proper maintenance of the line.

PCC advised JUSNL to take immediate steps to rectify the autorecloser issue in the line and referred the issue to forthcoming OCC meeting for further discussion.

ITEM NO. B.6: Disturbance at Jasidih(JUSNL) S/S on 27/05/2021 at 10:13 Hrs

On 27-05-2021, demand in Jharkhand system was low because of thunderstorm and heavy rainfall caused by Cyclone Yaas. This had resulted in high voltage at various parts of JUSNL network.

At 03:22 hrs, 220 kV Dumka-Jasidih D/C were hand tripped at Dumka end because of overvoltage. Charging of 220 KV Dumka-Jasidih – 1 was attempted at 03:51 Hrs and 07:01 Hrs and finally it was charged at 09:50 Hrs.

At 10:13 hrs, 220 kV Dumka Jasidih – 1 tripped from Dumka end due to operation of overvoltage stage 1. With this 132 kV Dumka – Dumka D/C and 132 kV Dumka – Deoghar D/C also got tripped. This has led to loss of supply at 220/132 kV Jasidih and 132 kV Dumka substation.

Load Loss: 30 MW

Outage Duration : 00:19 Hrs

JUSNL may explain.

Deliberation in the meeting

JUSNL informed that on 27/05/2021 demand of Jharkhand system was low because of thunderstorm and rainfall caused by Yaas cyclone. This resulted in overvoltage at various parts of JUSNL network due to which at 10:13 hrs , 220 k V Dumka- Jasidih -1 tripped from Dumka end due to overvoltage protection stage 1 and simultaneously 132 kV Dumka – Dumka D/C and 132 kV Dumka – Deoghar D/C also tripped in overvoltage protection from Dumka end .

JUSNL further informed that overvoltage protection was enabled for all 132 kV S/S which were commissioned/renovated under PSDF project, however as per advice of ERLDC, they had disabled overvoltage protection at these Substations.

PCC advised JUSNL to disable O/V protection in all 132 kV lines in their system.

Regarding overvoltage protection settings in 220 kV lines, JUSNL informed that the same has been enabled for some of the selected lines and the settings are uniform across all the lines.

PCC opined that in case the O/V protection has been enabled for 220 kV lines, time grading as well as voltage grading shall be followed for parallel lines emanating from a substation to avoid simultaneous tripping of the lines.

PCC enquired about philosophy for overvoltage protection settings for 220 kV level lines being followed by ER utilities to which the utilities responded as follows:

- *Powergrid, DVC, WBSETCL & OPTCL informed that overvoltage settings are not enabled at 220 kV level for their systems.*
- *BSPTCL informed that O/v settings have been enabled in some of the selected substations where overvoltage are being observed.*
- *CESC informed that the voltage at 220 kV level can be controlled through changing the ICT taps and opined that O/V settings is not required at 220&132 kV level.*

Based on the feedback of all utilities, PCC observed that in general overvoltage settings is not required at 220 kV level and the same may be enabled on case to case basis depending on the local voltage condition.

PCC advised JUSNL to develop a philosophy for overvoltage settings at 220 kV level for their system in line with the above discussion. In case they decide to enable O/V setting in some of the lines, the list of such lines along with proposed settings may be submitted to ERPC/ERLDC.

ITEM NO. B.7: Total Power Failure at Khagaria(BSPTCL) S/S on 27/05/2021 at 23:22 Hrs

220 kV Khagaria S/S is radially connected to New Purnea S/S through 220 kV Khagaria-New Purnea-2. On 27-05-2021, demand in Bihar was low because of thunderstorm and heavy rainfall due to depression caused by Cyclone Yaas.

At 23: 22 hrs, 220 kV Khagaria-New Purnea-2 tripped due to Y-B fault resulting in total power failure at Khagaria S/S. Power supply restored at 00:50 hrs.

Relay Indications :

Time	Name	End 1	End 2	PMU Observation
23:22 Hrs.	220 kV Khagaria-New Purnea-2	Y-B, 36KM, F/C 5.6 kA	Yet to be received	Around 10 kV dip has been observed in Y and B phase voltage at New Purnea PMU. Fault clearing time was around 100 ms.

Load Loss: 5 MW

Outage Duration : 01:28 Hrs

BSPTCL may explain.

Deliberation in the meeting

BSPTCL informed that on 27/05/21 the demand of Bihar System was low due to thunderstorm and heavy rainfall. At 23:22 hrs, 220 kV Khagaria-New Purnea tripped from New Purnea end in zone 1 protection due to Y-B phase to phase fault. They added that as Khagaria was radially connected from new Purnea end, there was no tripping from Khagaria end.

ERLDC informed that 220 kV New Purnea-Khagaria-2 has been tripped multiple times in the month of May'21 and in all the incidents, there was phase to phase fault with same location which indicates sag or clearance issue.

BSPTCL submitted that patrolling was being carried out by the concerned team and shutdown of the line has been planned to solve the clearance and sag related issue.

PCC advised BSPTCL to resolve the clearance issue in concerned location and submit a report to ERPC and ERLDC.

ITEM NO. B.8: Bus tripping occurred in Eastern Region during May 2021

During May 2021, following incidents of bus bar tripping have been observed in Eastern Region.

Element Name	Tripping Date	Reason	Revival Date& time
400 kV Main bus - 2 at Teesta V	17-05-2021at 18:08 Hrs.	Unit 3 at Teesta-V was synchronized with the grid at 18:04:30 hrs and load was raised up to around 40 MW. Unit#1 and Unit#2 were already running at full load. At 18:08:13 hrs, 400 kV Teesta V - Rangpo - 2 (tripped only from Teesta V end), Unit#3 and Bus coupler Circuit Breakers at Teesta V tripped simultaneously due to operation of bus bar protection at Teesta V. Fault was in B phase and Fault current was around 11 kA. Fault clearing time was less than 100 ms.	20-05-2021 at 00:01 Hrs.
400 kV Main bus - 1 at New Ranchi	27-05-2021at 00:18 Hrs.	Master trip relay operated. No fault signature was captured in PMU at the time of event. Heavy rain and storm was observed at site at the time of the event	27-05-2021 at 02:16 Hrs.

NHPC & Powergrid may explain.

Deliberation in the meeting

Regarding tripping of Main Bus-2 at Teesta-V, the event could not be discussed as Teesta-V(NHPC) representative was not available in the meeting.

It was decided to communicate the issue to NHPC for submission of necessary details related to the above tripping.

Regarding tripping of 400 kV Main Bus -1 at New Ranchi, Powergrid informed that due to Yass cyclone, the weather was rainy for the whole day which caused moisture ingress in SF6 gas density monitor of CT of tie bay(Chandwa-2 and future bay) which resulted in operation of busbar protection.

They added that the SF6 gas density monitor was sealed with extra cover and remedial actions were taken to avoid such tripping incidents in future.

*The report submitted by Powergrid in this regard is enclosed at **Annexure B8**.*

ITEM NO. B.9: Repeated tripping of Transmission lines due to same nature of fault and location.

A) 400 kV Gokarna Sagardighi – 2

In May'21, 400 kV Gokarna Sagardighi – 2 tripped 11 times due to R phase to earth fault at 6 km from Sagardighi. Details of tripping incidents in April and May 2021along with ERLDC's observation are provided in **Annexure B.9.A**.

Following points may be discussed:

- Healthiness of this transmission lines
- Non-operation of Autoreclose from Sagardighi end
- Non-receipt of DR/EL from Gokarna end

WBSETCL and WBPDCL may explain.

Deliberation in the meeting

It was informed that WBSETCL had submitted a report regarding actions taken for repeated tripping of 400 kV Gokarna – Sagardighi circuit 2. The report is attached at Annexure B9.

WBSETCL stated that OEM had conducted signature analysis on the line and based on their findings as well as physical patrolling, it was found that jumper length was little higher at tower loc no. 94 which caused flashover and tripping of the line. The issue has been rectified.

Regarding issue in autorecloser, they informed that the issue in communication panel at Sagardighi end has been taken up with the PLCC vendor (M/s GE) for resolving the issue at the earliest. They further informed that in the mean time, their telecom wing had visited Sagardighi and rectified the issue in PLCC channel of Sagardighi-Gokarna-2 circuit and the autoreclosure is being operated successfully after the rectification work.

They submitted that to resolve the pending issues related to PLCC panel at Sagardighi end, their telecom wing is taking up the issue with the vendor and the same would be resolved at the earliest.

B) 765 kV New Ranchi Medinipur D/C

765 kV New Ranchi Medinipur D/C tripped 6 times during May 2021. Details of tripping incidents in May 2021along with ERLDC's observation are provided in **Annexure B.9.B.** As per analysis at ERLDC end, following issues have been observed:

- **Healthiness of this transmission lines:** From DR signature analysis it is observed that fault seems to be due to vegetation issue as all faults are occurring at voltage peak as arc over is occurring at voltage peak due to high electrical stress. Fault currents are symmetrical and have no Dc offset due to vegetation fault occurring at peak and with increasing nature of current. PMJTL may maintain the healthiness of this transmission line. In case of any ROW issue, same may be shared.

- **Non operation of Auto reclose from New Ranchi end:** It has been observed that instantaneous three phase tripping is taking place at New Ranchi end for single phase to earth fault. Reason for non auto-reclose at New Ranchi end may be shared by POWERGRID.

Powergrid may explain.

Deliberation in the meeting

Powergrid informed that on line patrolling, clearance issue was found at one location and the was rectified. Apart from this, vegetation at several locations has also been cleared for this line.

Regarding non-operation of auto- reclosure at New Ranchi end, Powergrid informed that there was issue in BCU logic which has been rectified in consultation with OEM.

ITEM NO. B.10: Tripping Incidents in the month of May-2021

Other tripping incidents in the month of May-2021 which needs explanation from constituents of either of the end is enclosed at **Annexure B10 .A .**

Concerned utilities may explain.

Deliberation in the meeting

*Members explained the tripping incidences. Updated status is enclosed at **Annexure B10.B .***

PCC advised all the concern constituents to take necessary corrective actions to resolve the issues.

PART- C:: OTHER ITEMS

ITEM NO. C.1: Collection of substation data by PRDC

PRDC is collecting the substation data and maintaining the database for the Eastern Region. The data for following new substations are to be collected:

Sl No	SS Name	Data Collection	Owner	State
1	Bagmundi		WBSETCL	West Bengal
2	Dinahata		WBSETCL	West Bengal
3	Goghat		WBSETCL	West Bengal
4	Saltlake Stadium		WBSETCL	West Bengal
5	Mathabhanga		WBSETCL	West Bengal
6	Kashipur		OPTCL	Odisha
7	Betanati		OPTCL	Odisha
8	Aska New		OPTCL	Odisha
9	Udala		OPTCL	Odisha
10	Narashinghpur		OPTCL	Odisha
11	IBTPS		OPGC	Odisha
12	Mancheswar		OPTCL	Odisha
13	North Karanpura		NTPC	Jharkhand
14	TingTing		….	Sikkim
15	Lethang		….	Sikkim
16	Rongichu		……	Sikkim

In 100th PCC Meeting, PRDC informed that they had visited new substations in West Bengal and collected relevant data. They further informed that they data collection for Odisha substations would be completed by March 2021.

PCC advised all concerned utilities to facilitate the visit by PRDC personnel for collection of substation/relay data.

In 101st PCC ,PRDC informed that they had visited all new substations except few in Sikkim.

Deliberation in the meeting

PCC advised PRDC to submit the present status of data collection from new substations.

ITEM NO. C.2: Submission of protection settings in PDMS

Relay settings of many transmission elements are not available in the protection database. The list has been prepared and forwarded to all the concerned utilities.

Relay settings had been received from CESC, Haldia Energy Limited and for few Substations from Powergrid ER-1. OPTCL, WBSETCL, JUSNL, BSPTCL, WBPDCL,Powergrid ER-II ,NTPC and other constituents are required to submit relay settings at earliest.

In 100th PCC Meeting, it was informed by ERPC secretariat that an audit by PSDF audit team was carried out for protection Database project on 19.02.2021 and it was noted that around 7 percent of protection settings was not available in PDMS.

PCC advised all concerned utilities to upload the pending relay settings in PDMS or send the relay settings to erpcprotection@gmail.com.

In 102nd PCC , PCC advised ERPC to share updated list of pending relay settings to all the concerned utilities. It further advised all concerned utilities to upload the pending relay settings in PDMS or send the relay settings to erpcprotection@gmail.com.

Members may update.

Deliberation in the meeting

PCC advised all concerned utilities to upload the pending relay settings in PDMS or send the relay settings to erpcprotection@gmail.com.

ITEM NO. C.3: Backup Overcurrent Relay coordination of Sikkim Complex

In 97th PCC following deliberations were made,

It was informed that IDMT characteristics were implemented at Jorethang and Tashiding.

102nd PCC advised PRDC to carry out revised study considering the modified CT ratio i.e. 3000A at Kishanganj end for 400 kV Kishanganj-Teesta III line and share the report among concerned utilities for implementation of the revised settings at their end.

Subsequently the revised study result was shared with concerned utilities vide mail dated 28/05/21 for implementation of the DEF settings at their respective end.

Concerned utilities may update.

Deliberation in the meeting

Powergrid informed that the protection philosophy for backup protection of lines & ICTs being followed by them in Sikkim Complex is as follows:

- *Philosophy of T-op for Lines = (Z3 + 0.1) Sec,*
- *Philosophy of T-op for Transformer = (Z3+0.1) for O/C & (Z3+0.2) for E/F*

However, the proposed settings for ICTs based on PRDC study is:

- *T-op for HV & LV side=0.8 Sec for O/C and T-op for HV & LV= 1.4 sec for E/F*

They suggested to review the proposed settings in line with their existing settings for lines & ICTs in Sikkim Complex.

They further informed that zone 3 settings of 400 kV Kishangunj -Rangpo line is 1.5 second whereas proposed settings for backup overcurrent relay of line is 1.2 second which would result in tripping of DEF before zone 3 of distance protection.

PCC advised PRDC to carry out revised study considering the existing zone-3 settings by Powergrid and share report among concerned utilities for implementation of revised settings at their end.

ITEM NO. C.4: Transformer overcurrent earthfault Setting Guidelines-ERLDC

In the recent past few uncoordinated tripping of Transformers have been observed where conservative earth fault overcurrent setting is found to be the main reason.

As presently there are no setting guidelines in the protection philosophy of ERPC on this aspect, there is a need for introducing a general guideline to help utilities avoiding any conservative setting and uncoordinated tripping. One such general guideline for the earth fault overcurrent setting is provided below for discussion.

A. The primary requirement for the stage 1 setting should be to detect earth faults at the local bus bar, where the transformer winding is connected. Therefore, a fault calculation should be made as per figure 1. This calculation provides the current fed to the protection i.e. $3I_{0fault1}$. To assure that step 1 calculation to have selectivity for other earth-fault protection in the network, a short delay may be selected. Normally, a delay in the range of 0.3 – 0.4 s is appropriate under such conditions.

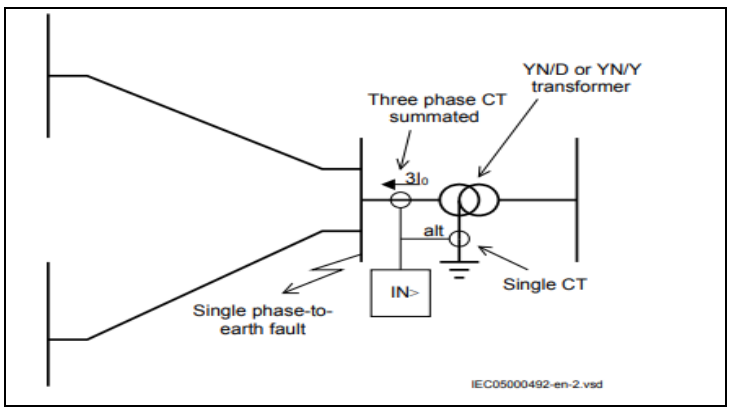


Figure 1: Step 1 fault calculation 1

Further to ensure selectivity to delayed line faults clearance at the local bus (typically distance protection operation in zone 2 in 0.5 sec), the current setting must be set high enough so that these faults do not result in unwanted step 1 trip of transformer on earth fault stage 1 setting.

Therefore, a fault calculation as shown in figure 2 is also required to be done. If the fault is located at the borderline between the instantaneous and delayed operation of the line protection (such as Distance protection or line residual overcurrent protection), the above calculation gives the current fed to the protection i.e. $3I_{0fault2}$ the setting of step 1 can be chosen within the interval shown relation given below for the above calculations.

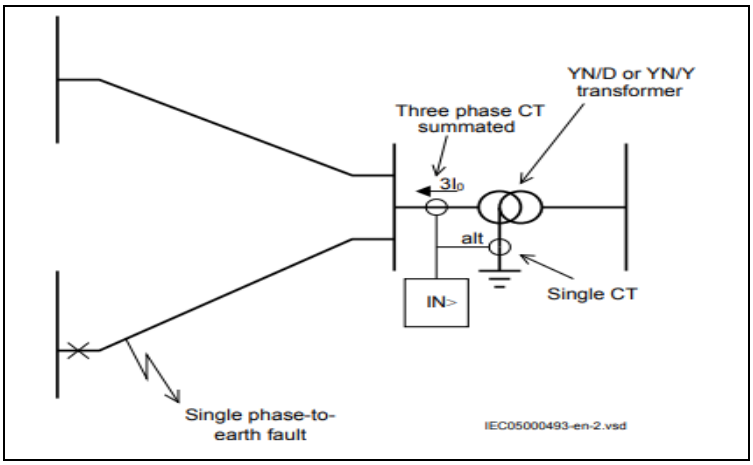


Figure 2: Step 1 fault calculation 1

$$3I_{0fault2} \cdot lowmar < I_{step1} < 3I_{0fault1} \cdot highmar$$

Where **lowmar** is a margin to assure selectivity (typical 1.2) and **highmar** is a margin to assure fast fault clearance of busbar fault (typical 1.2)

Earth fault overcurrent Stage 2 setting:

The setting of the sensitive step-2 is dependent on the chosen time delay therefore often a relatively long definite time delay or inverse time delay is selected. For this, a very low current setting (Minimum setting possible) can be selected as it is required to detect earth faults in the transformer winding, close to the neutral point. However, zero-sequence currents that can occur during normal operation of the power system are also required to be considered while selecting this current value for pickup.

In 101st PCC following deliberations were made –

Powergrid informed that they are following the guidelines of Ramkrishna Committee for setting of the E/F overcurrent relays in transformers for 220 & 400 kV level. The settings was calculated by considering fault in remote end substation and the level of fault feeding by the connecting lines to that substation from the ICT .

CESC informed that setting of E/F overcurrent relay in transformer would depend on zero sequence current flowing through ICTs during the fault in a connected line and further value of zero sequence current would dependent on no. of ICTs connected to the bus.

DVC informed that at their substations time setting of E/F overcurrent relay in transformer is coordinated with zone 3 settings of line.

In 102nd PCC Meeting,

It was informed that WBSETCL has shared their protection philosophy for setting the earth fault relay in transformers. As per their practice, the earthfault relay is not being used in the transformers in their system.

PCC advised all the other utilities to share their existing practice of setting the E/F overcurrent relays in transformers through email and also submit their comments regarding the proposed guidelines as above.

Members may update.

Deliberation in the meeting

It was informed that Powergrid had submitted their protection philosophy for earth fault relay in transformers. CESC had shared the backup protection setting details of their transformers

DVC informed that they would share their philosophy within a week.

PCC advised al other utilities to share their practice used for defining E/F overcurrent settings in transformer to ERPC and ERLDC.

Further PCC advised ERLDC to prepare a draft report/recommendation for backup E/F overcurrent relay settings in transformer based on the philosophies received from utilities and share the same to all utilities so that the recommendations can be finalized in next PCC Meeting.

PART- D:: FOLLOW-UP OF PREVIOUS PCCM

ITEM NO. D.1: Repeated Tripping of 220 kV Daltonganj-Garwah (New) D/C in the month of April' 21.

D.1.1: On 08.04.2021 at 17:39 hrs

At 17:39 hrs, 220 kV Daltongunj-Garwah-2 tripped on B-N fault and at 17:43 Hrs 220 kV Daltongunj-Garwah-1 also tripped on B-N fault with same relay indication as of circuit-2. As a result, around 40 MW load loss occurred at Garwah.

D.1.2 : On 21.04.2021 at 15:40 hrs

At 15:40 hrs 220 kV Daltongunj – Garwah 1 & 2 tripped on B-N fault. As a result, around 40 MW load loss occurred at Garwah .

D.1.3 : On 29.04.2021 at 13:30 hrs

At 12:34 hrs, 220kV Daltongunj-Garwah-2 tripped on B-N fault during restoration of said line after necessary checking.

220kV Daltongunj-Garwah (New)-1 also tripped on B-N fault at 13:30 hrs leading to power failure at 220kV Garwah substation. Around 20MW of traction load and 15 MW of New Garwah local load loss occurred. Traction load immediately shifted on Sonenagar (BSEB) source through Japla.

D.1.4 : On 29.04.2021 at 22:37 hrs

At 22:37 Hrs, 220 KV Daltonganj-Garwah-2 tripped on R-Y-Earth fault leading to power failure at 220/132 Garwah (New) S/s. (220 KV Daltonganj-Garwah (New)-I was already under tripped condition). Total around 20 MW load loss occurred (including 15 MW traction loss of Garwah). Inclement weather was reported around Garwah.

In 102nd PCC Meeting,

PCC advised JUSNL to share a report indicating the location, reason of the fault and remedial action taken thereof for each of the disturbances mentioned above.

PCC also advised JUSNL to do line patrolling on regular basis to avoid unwanted tripping of the lines due to clearance issues.

PCC advised JUSNL to implement the week infeed protection in the relay at Garwah end and intimate the same to ERLDC/ERPC. PCC opined that incase of week infeed protection is being enabled at Garwah end, permissive overreach protection can be enabled at 220 kV Daltonganj end for better performance in protection coordination.

PCC further advised JUSNL to upload the DR/EL files for every disturbance/event occurred in their system in PDMS portal for analysis of the event. JUSNL was also advised to check the DR for the event occurred on 29/04/21 at 12:34 hrs to find out any carrier related issues at Garwah end.

JUSNL vide e-mail dated 10/06/2021 updated followings:

1. Work regarding patrolling, tree & bamboo cutting along the corridor, jumper shortening, jumper tightening has been carried out at each and every tower from dtd-04.05.2021 to 16.05.2021 up to tower no 231 out of 305. In between tower no 1 to 231 there were many trees and bamboo making clearance issues. All trees and bamboos has been cut now there is no clearance issues. All jumper has been tightened. Shutdown afterwards 16.05.2021 was differed as per order of higher officials of JUSNL due to COVID-19 situation & imposed lockdown. Regarding Leftover work shutdown has been allowed from dtd-09.06.2021 to 13.06.2021. work has been started today's onwards.

2. At tower No-2 near Bhagodih GSS there was a lengthy jumper and pilot insulator was missing in 220 KV Bhagodih-Pgcil Ckt-1 which was making repeated tripping of line at a distance of 303 meter from Bhagodih GSS in heavy wind conditions. The problem has been sort out by putting the pilot insulator and shortening the jumper. Now there is no tripping at this location.

3. At tower no-81 & 83 loose and damaged jumpers were found which were tripping the line. The problem has been rectified.

4.At tower no-231 there was a lengthy jumper in 220KV Bhagodih-Pgcil ckt-2, B-phase. It was tmaking contact with the tower in heavy wind conditions. jumper has been shortened. The problem has been rectified.

5. Week infeed protectionin the relay at Bhagodih end in both the 220 kV Bhagodih-pgcil ckt-1&2 has been enabled.

6.DR/EL files for every disturbances/event occurred at Bhagodih GSS are being sent to CRTIL within 24 Hrs.

Deliberation in the meeting

JUSNL informed that remaining pending work related to line maintenance of 220 kV Daltonganj-Garwa D/C lines have been completed and no further tripping had been observed in the line.

PCC enquired about enabling permissive overreach protection at 220 kV Daltongunj end for 220 Daltonganj-Garwah line.

Powergrid replied that the same had been communicated to Substation for implementation as soon as possible.

ITEM NO. D.2: Disturbance at 220 kV Rangpo Substation on 08.04.2021 at 15:53 hrs

400/220 kV ICT-2 at Rangpo was out for SF6 gas leakage rectification work. At 15:53 hrs, all four running ICTs 1,3,4,5 at Rangpo tripped from HV side on backup impedance protection with inter trip to LV side.

In 101st PCC following deliberations were made –

Powergrid informed that there was a fault in downstream side of the ICTs and all four running 400/220 kV ICTs got tripped on backup impedance protection. There was no tripping in the 220 kV lines at Rangpo end.

They added that as there was minimal generation at 220 kV level, the fault was entirely feed by the ICTs at Rangpo S/s and ICT got tripped from HV side after 800 msec.

In 102nd PCC Meeting,

Powergrid informed that there was no downstream fault at that time. Further, a thorough checking of external system outside the GIS component was also carried out by their internal team however the fault location could not be identified.

They apprehended that the fault location may pertain to busbar portion inside the GIS chamber and added that the same would be checked by the OEM personnel. They further informed that OEM personnel could not visit the substation due to ongoing Covid pandemic situation.

PCC advised Powergrid to get the GIS chamber inspected by the OEM at the earliest and share the outcome to ERPC/ERLDC.

Powergrid may update.

Deliberation in the meeting

Powergrid stated that OEM could not visit the site due to Covid Pandemic and travel restrictions.

PCC advised Powergrid to get the GIS chamber inspected by the OEM as soon as the covid situation improves and submit a report to ERPC/ERLDC.

ITEM NO. D.3: Total Power Failure at 220 kV Jorethang HEP & 220 kV Tashiding HEP on 09.04.2021 at 17:47 hrs

At 17:47 hrs 220 kV Rangpo – New Melli S/C tripped from Rangpo end in Zone-1 and same fault was sensed by 220 k V Tashding –New Melli and this line also tripped from Tashding end in zone-3 due to non-clearance of fault from New melli end. 220 kV Rangpo-Tashding S/C also tripped on the same time on R-Y phase fault encroaching the same fault from Rangpo end in Zone-3. As a result, around 36 MW generation loss occurred at Jorethang HEP due to loss of evacuation path.

There was no generation at Tashiding. Delayed clearance of fault (around 800 ms) has been observed in PMU data

In 102nd PCC Meeting,

PCC observed that the relay at New Melli end should have picked up the fault in zone-2 protection and advised Powergrid to check the relay performance of the relay at New Melli end for 220 kV N. Melli-Rangpo line.

Regarding tripping at Tashiding and Rangpo end, PCC opined that the tripping could have been avoided had there been a proper time grading for zone-3 setting between the relays at New Melli, Tashiding and Rangpo end.

Members opined that proper time grading of zone-3 setting for the relays at 220 kV Rangpo-New Melli, 220 kV Rangpo-Tashiding and 220 kV Tashiding-N. Melli line is necessary to avoid this type of multiple tripping of the lines and advised Powergrid to carry out necessary protection simulation study for getting the required settings for proper coordination.

PCC also advised Powergrid to rectify the SOE related issues at 220 kV Rangpo end in consultation with ERLDC SCADA team.

Powergrid may update.

Deliberation in the meeting

Powergrid informed that the time settings for zone-3 protection at New Meli, Tashiding and Rangpo had been revised and are set as 0.7, 0.8 and 0.9 second respectively.

Regarding SOE related issues at 220 kV Rangpo end, Powergrid submitted that the issue had been resolved in coordination with ERLDC SCADA team.

ITEM NO. D.4: Disturbance at 220 kV Tashiding S/s on 16.04.2021 at 16:46 hrs

At 16:46, 220 KV New Melli- Tashiding tripped on 3-phase fault. At the same time, 220 KV Rangpo-Tashiding also tripped from Rangpo end on 3-phase fault isolating 220 KV Tashiding station. There was no generation loss as Tashidig had no schedule at that time.

Frequent faults are being observed in this corridor, resulting in station blackout and generation loss, hence proper line patrolling, maintenance needs to be ensured

In 102nd PCC Meeting,

Members opined that line differential protection may be implemented in the said line to get satisfactory response in this type of composite conductor configuration. Powergrid intimated that OPGW is not available in the line. PCC advised Powergrid to explore the possibility of implementing line differential protection using PLCC network in consultation with OEM.

Members also suggested Powergrid to implement permissive overreach protection in 220 kV Rangpo-Tashiding line for better performance.

PCC opined that by connecting the 220 kV Tashiding HEP with dedicated bays at New Melli S/s, the protection related issue can be resolved and the reliability in power evacuation from 220 kV Tashiding as well as Jorethang HEP would further improve. PCC advised Powergrid to take necessary action to remove the LILO connection of 220 kV Rangpo-N.Melli line at Tashiding and to connect the 220 KV Tashiding HEP directly to New Melli S/s.

Powergrid & Tashiding HEP may update.

Deliberation in the meeting

Regarding removal of LILO connection of 220 kV Rangpo-N.Melli line at Tashiding, Powergrid updated that commissioning work related to PLCC panel is pending at New Melli end. The same would be completed after visit of OEM engineers to the site. Thereafter necessary reconfiguration of 220 kV N.Melli-Tashiding circuits at N. Melli end would be completed subject to necessary shutdown approval from Tashiding HEP.

PCC advised Powergrid to complete the work in coordination with Tashiding HEP.

ITEM NO. D.5: Total power failure at 400 kV Teesta–III Substation on 23.04.2021 at 13:21 hrs

At 13:21 Hrs, 400 kV Teesta-3-Kishangunj tripped on B-N fault and at the same time 400 kV Teesta-3 -Dikchu also tripped on same fault . As a result, around 148 MW generation loss occurred at Teesta-Ill due to loss of evacuation path. There was no generation at Dikchu.

In 102nd PCC meeting,

PCC advised Powergrid & Dikchu to implement the revised settings for DEF relay at their end in order to have a proper coordination among the relays.

Powergrid & Dikchu HEP may update.

Deliberation in the meeting

It was decided that PRDC would do revised study for DEF relay settings considering the existing zone-3 settings at Kishanganj end and share it with concerned utilities.

PCC advised Powergrid and Dikchu to implement the revised settings for DEF relay at their end in order to have a proper coordination among the relays.

ITEM NO. D.6: Disturbance at 400 kV Farakka S/S on 29.04.2021 at 20:40 hrs

At 20:40 Hrs, 400 KV FSTPP-Durgapur D/C, 400 KV FSTPP-New Purnea (From New Purnea end only), FSTPP U#6 tripped. Multiple faults in PMU were observed. It was reported that 220 kV Farakka-Lalmtia S/C which was out due to tower collapse since 21st april 2021 has observed another tower collpase near Farraka end and as it was passing above 220 kV Farakka-Durgapur D/C so resulted in the fault on these circuits.

In 102nd PCC meeting,

PCC advised NTPC to check and rectify the A/R issue of 400 kV Farakka-Durgapur-2 line at Farakka end.

PCC advised NTPC to place the details related to autorecloser issue at FSTPS with all the facts and the findings of their engineering wing so that it can be addressed.

Regarding overvoltage in R & B phase for Farakka-Durgapur-2 line during the disturbance, NTPC informed that the issue has been taken up with OS team. PCC advised to share the findings of the above analysis with ERLDC.

NTPC may update.

Deliberation in the meeting

Regarding autorecloser issue at FSTPS, NTPC updated that they have planned to replace the faulty relays at staged manner.

Regarding overvoltage in R and B phase for Farakka – Durgapur -2 line, they informed that OS team is looking into the issue. and they would share the findings to ERPC and ERLDC once the same is received from OS team.

ITEM NO. D.7: Disturbance at 220 kV Budhipadar S/s at 13:47 Hrs on 08.04.2021.

220 KV Budhipadar-Lapanga ckt-1&2 tripped at 13:47 and 13:49 hrs respectively, followed by tripping of Budhipadar-Raigarh on 14:03 hrs, due to B phase fault.

At increased loading of Tarkera D/C , circuit-1 also developed B phase fault at 14:06:27 Hrs and tripped .

At 14:07:24 Hrs bus fault was created at Bus-1 (with snapping of R-Ph pipe bus from isolator to Breaker of 220KV Budhipadar- Tarkera Ckt-2). All the remaining feeders with Bus -1 tripped.

With all evacuating sources out ,IBTPS and Vedanta,Bhusan formed Island with its own CPP load but due to excess generation of approx. 560 MW (Vedanta=250, IB=250 , Bhusan=50, pre event exchange with grid) over frequency occurred and also all generators tripped on Over frequency .

In 102nd PCC Meeting,

OPTCL stated that based on the decision taken in the special meeting held on 10/05/21, their planning team is carrying out the necessary study. Based on the study results the required SPS would be designed.

PCC advised OPTCL to complete the study at the earliest and share the report to ERPC secretariat and ERLDC.

Regarding unsuccessful islanding at Vedanta during the disturbance on 08/04/21, Vedanta informed that simulation studies has been carried out to study the governor response and as per the study, tuning of the governor is required for islanding mode of operation. They informed that the issue has been taken in priority and the report will be submitted at the earliest.

OPTCL & Vedanta may update.

Deliberation in the meeting

OPTCL informed that the study had been completed and the report would be shared to ERPC/ERLC within a week.

PCC advised SLDC Odisha to coordinate with Vedanta for submission of report for unsuccessful islanding at Vedanta CPP during the disturbance on 08/04/21.

ITEM NO. D.8: Grid event at 132 k V Motihari (DMTCL) S/S on 21-04-2021 at 20:19 hrs

On 21st April 2021 at 19:00 hrs, 132 kV side of 400/132 kV 315MVA ICT-3 (Ownership is with Powergrid Mithilanchal Transmission Ltd) at Motihari was being charged through 132 kV GIS Bus 1. Just after charging of new ICT, 132kV Main bu\s-1 at Motihari tripped due to Bus extension module SF6 gas pressure low trip at 19:01 Hrs. Following feeders which were connected with 132kV Main bus – 1 at Motihari tripped:

- 132 kV side of 400/132 kV ICT – 1 at Motihari
- 132 kV Betiya – 1
- 132 kV Motihari – 1
- 132 kV Raxaul – 1

In 102nd PCC Meeting,
DMTCL informed *the details of the incident on 21/04/21 along with the findings were shared with both the OEMs for root cause analysis of the event. As two OEMs are involved in GIS system at Motihari, they were discussing with each other and the report would be submitted by them to DMTCL within a week. The same would be shared with ERPC/ERLDC once they receive the report.*

They mentioned that 132 kV Motihari – Raxaul circuit -2 and 132 kV Bus-1 at Motihari had not been restored yet due to non-availability of shutdown by SLDC Bihar.

PCC advised SLDC Bihar to consider the proposal of operating the grid in closed loop mode by connecting 132 kV Motihari(BSPTCL) to 132 kV Motipur station and submit their observation to ERLDC.

DMTCL & BSPTCL may update.

Deliberation in the meeting

Powergrid informed that to find out the root cause of the incident, both the OEMs involved in GIS system at Motihari were discussing with each other. Also, a joint investigation of affected GIS module at Motihari (DMTCL) in presence of both the OEM engineers is to be planned after getting shutdown consent from SLDC, Bihar. The report would be submitted after the investigation.

DMTCL informed that 132 kV bus along with 132 kV Motihari – Raxaul-2 can be restored after assessing the damage in the GIS system during the proposed joint inspection by OEM engineer.

PCC advised Powergrid to coordinate with DMTCL & SLDC Bihar for getting the necessary shutdown at Motihari S/s to carry out the inspection by OEM engineers.

ITEM NO. D.9: Tripping of 400/220 kV Biharshariff ICT-1,2 &3 on 03-04-2021 at 19:45 hrs

On 03-04-2021 at 19:45 hrs,400/220 kV ICT 1,2 &3 tripped due to R phase CT blast of ICT-2 at 220 kV side. 220 kV Biharshariff-Khezisarai D/C also got tripped.

ICT 1&2 tripped from Powergrid side and Inter-trip sent to BSPTCL end while ICT-3 tripped from only BSPTCL side.ICT-4 was in service with loading of 350 MW. Biharshariff-Khezesarai D/C tripped from Khezesarai end on Zone -2 from Khezesarai end .There is no Bus bar scheme at Present at 220 k V Biharshariff.

In 102nd PCC meeting,

PCC advised BSPTCL following:

- *To carry out detail checking of the cables/wirings between HV and LV side of the 400/220 kV ICTs at Biharshariff S/s. Also to check substation DC healthiness on 220 kV side.*
- *To configure the disturbance recorder of the relays for LV side of the ICTs so that DRs can be available during tripping of the ICTs for analysis.*
- *To submit the status of busbar protection for 220 kV bus of Biharshariff S/s.*

Regarding tripping of 220 kV Biharshariff-Khezesarai D/C from Khezesarai end in Zone -2 protection, BSPTCL informed that Khizersarai S/s is maintained by BGCL and the issue has been intimated to them for necessary checking of the relay settings at their end.

BSPTCL may update.

Deliberation in the meeting

BSPTCL updated as follows:

- *The shutdown has been planned for ICT-2 on 18th June 2021 for thorough checking of cables/wirings between HV and LV side of the ICTs.*
- *Regarding configuring of disturbance recorder of the relays for LV side of ICTs, they stated that since the relays are of new make and model, they had contacted with OEM for necessary configuration.*

- *Regarding status of busbar protection, they informed that the wiring for busbar panel had been completed for some of the bays. However, the work has been stopped due to Pandemic situation.*

Regarding tripping of 220 kV Biharshariff-Khezesarai D/C from Khezesarai end, BGCL informed that the tripping was due to wrong settings in the relay and the same had been rectified..

ITEM NO. D.10: Repeated tripping of 400 kV New Purnea Muzaffarpur-1 due to similar nature of fault

400 kV New Purnea-Muzaffarpur D/C plays important roles in the evacuation of hydropower in the North Eastern Region, Sikkim and Bhutan. During April 2021, 400 kV New Purnea-Muzaffarpur D/C had tripped repeatedly due to similar nature of faults.

In 102nd PCC meeting, Powerlink was advised to check tower footing resistance of the towers in the above section and submit the findings of the same to ERPC and ERLDC.

Powerlink vide e-mail dated 29/05/21 updated that the tower footing resistance in the concerned section of the line had been measured. The report submitted by them is attached at Annexure.

Members may discuss.

Deliberation in the meeting

It was observed that the tower footing resistance value of all the towers in the concerned section of the line is within the limit i.e. 10 ohm.

It was informed by ERLDC that no further trippings had been observed in this line.

ITEM NO. D.11: Total power failure at JSPL on 09.03.2021 at 08:02 hrs

At 07:50 hrs, 400 kV JSPL-Meramundali - 2 got tripped after unsuccessful auto-reclose attempt due to persistent Y phase to earth fault.

At 08:02 hrs, 400 kV JSPL – Meramundali-1 got tripped after unsuccessful auto-reclose attempt due to persistent Y phase to earth fault resulting in total power failure at JSPL plant. During line patrolling, it was observed that “Y” Phase Insulators of both the circuits were damaged and conductors were lying on top of Blue Phase cross arms at tower location at 111.

PCC advised OPTCL to enable the Trip on reclose (TOR)/SOTF function in the distance relay at Meramundali end.

In 102nd PCC Meeting,

JSPL informed that new relay had already been procured however the revised dead time settings could not been implemented in BCU as GE engineers could not visit the site due to ongoing lockdown in the state in view of Covid situation. The settings would be implemented once the lockdown situation gets normalized.

JSPL may update.

Deliberation in the meeting

JSPL informed that the revised dead time settings had not been implemented in BCU as GE engineers could not visit the site due to ongoing lockdown in the state in view of Covid situation. The settings would be implemented once the lockdown situation gets normalized.

PCC advised JSPL to provide confirmation to ERPC and ERLDC once the issue gets resolved.

ITEM NO. D.12: Repeated delayed clearance of faults at 220 kV Chandil STPS S/C

In March 2021, 220 kV Chandil STPS S/C tripped repeatedly due to various short circuit faults at 6-12 km from STPS.

In 102nd PCC Meeting,

JUSNL informed that rectification of PLCC issue is to be carried out by third party agency and the same is being taken up by their telecom wing..

PCC advised JUSNL to expedite the process and resolve the PLCC issue at Chandil end at the earliest and also advised to submit the status of the work to ERPC secretariat within a week.

JUSNL vide email dated 10/06/21 submitted following:

The cost estimate for replacement of STPS feeder PLCC panel along with all auxiliary equipments has already been submitted to Divisional Office, Chandil and the process to replace the PLCC panel is in progress. It will take approximately 3 months subjected to the issue of work order by concerned higher authorities.

JUSNL may update.

Deliberation in the meeting

JUSNL informed that they have taken up the issue with OEM for through checking of PLCC panel at Chandil end. The OEM visit is expected in first week of July'21.

PCC advised JUSNL to expedite the process to resolve the PLCC issue at Chandil end.

ITEM NO. D.13: Total Power Failure at 400 kV Motihari Substation on 21.01.2021 at 11:20 hrs

400 kV Motihari-Gorakhpur D/C and 400 kV Motihari Barh-1 were out of service due to tower collapse. Motihari was connected to rest of the grid through 400 kV Barh Motihari - 2.
On 21-01-2021 at 11:20 hrs, a transient Y-phase to earth fault occurred at 400 kV Barh-Motihari - 2. Successful auto reclose operation was occurred at Motihari end.

In 102nd PCC meeting,

NTPC informed that they had not received any communication from their engineering wing regarding the modification of scheme/relay configuration for the line reactor of 400 kV Barh-Motihari-2 line till date.

PCC advised NTPC to follow up with their corporate team for expediting the process.

NTPC may update.

Deliberation in the meeting

NTPC informed that they had not received any communication from their engineering wing.

PCC expressed serious concern for delay in getting the confirmation from engineering wing of NTPC and advised NTPC to expediate the issue with their corporate for expediting the process.

ITEM NO. D.14: Disturbance at 220 kV Hatia Substation on 29.01.2021 at 10:44 hrs

220 kV Ranchi - Hatia - 3 was being shifted from 220 kV bus-1 to 220 kV bus-2 at Hatia. During changeover, sparking was observed in 220 kV bus-2 isolator at Hatia of Ranchi-3 feeder. Bus bar protection was not in service at Hatia at 220 kV voltage level. All 220 kV feeders tripped from remote ends.

In 102nd PCC.

JUSNL informed that shutdown was not allowed by SLDC Jharkhand due to COVID 19 pandemic situations. The shutdown would be availed once the Covid situation improves.

JUSNL may update.

Deliberation in the meeting

PCC advised JUSNL to complete the relay testing at the earliest.

ITEM NO. D.15: Repeated disturbances at 132/66 kV Melli S/S in March 2021

The occurrence of repeated grid events at 132/66 kV Melli S/S has been reported in March 2021 resulting in power failure at Melli and Kalimpong areas. A summary of the grid events in March 2021 is given in the following table:

Sr No	Date	Time (Hrs.)	Brief Description	Relay Indication of RangpoMelli S/C	Relay Indication of SiliguriMelli S/C	Power loss
1	11-03-2021	16:17	132 kV SiliguriMelli S/C was out of service. Kalimpong was radially fed from Melli through 66 KV Kalimpong-Melli D/C. 132 kV Rangpo – Melli S/C tripped ON R-Y phase fault leading to power failure at Melli.	R-Y, IR=1.2 kA, IY=1.1 kA, 2.1 km from Rangpo	--	Melli: 15 MW Kalimpong: 5 MW
2	24-03-2021	18:41	Both 132 kV Rangpo-Melli S/C and 132 KV Siliguri-Melli S/C tripped due to R & Y phase to earth fault resulting in total power failure at Melli and Kalimpong. Kalimpong was radially fed from Melli through 66 KV Kalimpong-Melli D/C.	R-Y, IR=1.6 kA, IY=1.5 kA, 2.1 km from Rangpo	R-Y, IR=1.4 kA, IY=1.3 kA, 104 km from Siliguri;	Melli: 12 MW Kalimpong: 6 MW

Sr No	Date	Time (Hrs.)	Brief Description	Relay Indication of RangpoMelli S/C	Relay Indication of SiliguriMelli S/C	Power loss
3	28-03-2021	16:42	132 kV Rangpo-Melli S/C and 132 KV Siliguri-Melli S/C tripped due to R & Y phase to earth fault resulting in total power failure at Melli and Kalimpong. Kalimpong was radially fed from Melli through 66 KV Kalimpong-Melli D/C.	R-Y, IR=1.4 kA, IY=1.4 kA, 2 km from Rangpo	R-Y, IR=1.4 kA, IY=1.3 kA, 105 km from Siliguri	Melli: 15 MW Kalimpong: 5 MW

In 101st PCC Meeting held on 13.04.2021, the agenda was placed for discussion. PCC referred the issue to OCC for discussion as Sikkim representative were not present in the meeting.

In 179th OCC meeting, Powergrid informed that the team comprising of experts from Powergrid, WBSETCL and Sikkim visited the site on 05.05.2021 but as the lockdown had been announced from 6th May 2021 in Sikkim, major testing could not be done. The following were pointed out by the team:

- *It was found that from the Melli end for Zone-2 fault of 132 kV Rangpo-Melli line, the distance protection relay is not operating in desired manner.*
- *As they could not perform major testing due to paucity of time they could not access the healthiness of distance relay. However, as a temporary measure, the Zone 2 settings had been changed from 350 ms to 100msand kept in observation for any further tripping.*
- *Whenever the lockdown restriction eases, Powergrid would mobilize the workforce and do a thorough testing of the said relay. In case there is any problem found during the testing, the relay would be replaced by a spare one.*
- *There is single DC source for all the 132 kV elements in Melli S/s which is an EHV S/s. It is suggested that for ensuring reliable protection operation, there should be one more redundant set of DC supply, which is also as per CEA standards.*

Regarding DC supply, OCC advised Sikkim to check the PSDF proposal for Melli S/s, whether there is proposal for two sets of DC supplies. Sikkim representative informed that as of now there is only single DC source. OCC further advised Sikkim to include dual DC supplies under PSDF renovation proposal.

On query, Powergrid informed that they had checked the breaker and some minor issues had been found which were already rectified. Regarding the repeated faults at a particular location, Powergrid informed that they had visited the site and it had been found that there was some clearance issue at that particular location and to mitigate the issue some temporary measures had been taken. Powergrid further suggested that in case of further tripping, restringing of the conductor has to be done for that particular location where the fault is occurring.

In conclusion, OCC advised Powergrid to send updates about the issues observed at Melli S/s, if any, to ERPC/ERLDC so that the issue can be followed up in the PCC forum. Further OCC advised Sikkim to check the PSDF scheme for Melli whether there is proposal for two sets of DC supplies or not. If not, the proposal for dual DC supplies may be included under PSDF proposal.

Sikkim vide email dated 09/06/2021 confirmed that provision of two sets of DC supplies at 132 kV

Melli S/s has been included in the PSDF proposal.

Deliberation in the meeting

It was informed that no tripping of subjected line was reported after the temporary measures were taken by the team.

Powergrid informed that they would carry out a thorough testing of the said relay once lockdown restriction eases. In case the problem persists after the testing, the relay would be replaced by a spare one .

PCC advised Powergrid to keep in observation regarding the temporary measures taken and to submit a report to ERPC and ERLDC as soon the testing is completed.

****

Annexure A

LIST OF ATTENDEES OF 103RD PCC MEETING HELD ON 17/06/2021

Full Name	Join Time	Email
ERPC Kolkata	6/17/2021, 10:19:43 AM	ERPC@KolkataMST.onmicrosoft.com
CH PRADIPTA KUMAR PATRO	6/17/2021, 10:19:58 AM	
BIHAR GRID COMPANY	6/17/2021, 10:21:18 AM	admin@bgcl710.onmicrosoft.com
Amaresh Mallick, CGM(SO), ERLDC (Guest)	6/17/2021, 10:21:31 AM	
Arindam BSPTCL	6/17/2021, 10:22:14 AM	
CE CTD	6/17/2021, 10:24:22 AM	admin@WBSETCL570.onmicrosoft.com
Debdas Mukherjee WBPDCL	6/17/2021, 10:24:46 AM	
CRITL	6/17/2021, 10:26:27 AM	
SMS SAHOO,DGM,OPTCL, BHUBANESWAR	6/17/2021, 10:27:54 AM	
Akhand Pratap	6/17/2021, 10:28:00 AM	
D K Bauri, ERPC (Guest)	6/17/2021, 10:28:10 AM	
Prasanna Kumar Sahoo	6/17/2021, 10:29:06 AM	PRASANNASAHOO@NTPC.CO.IN
Raj Protim ERLDC (Guest)	6/17/2021, 10:29:37 AM	
ROHIT VIKRANT	6/17/2021, 10:30:22 AM	rohitv.phd19.me@nitp.ac.in
DGM EMR, OPTCL, Jajpur Road (Guest)	6/17/2021, 10:31:11 AM	
Rahul Anand	6/17/2021, 10:31:21 AM	RAHULANAND@NTPC.CO.IN
Amresh Prusti	6/17/2021, 10:31:49 AM	amresh.prusti@opgc.co.in
ERPC- Kumar Satyam	6/17/2021, 10:32:01 AM	
saurabh (Guest)	6/17/2021, 2:04:28 PM	
Sukdev (PG) (Guest)	6/17/2021, 10:33:02 AM	
D.K.JAIN ED ERLDC (Guest)	6/17/2021, 10:33:10 AM	
Pravin Ram	6/17/2021, 10:33:30 AM	
DILSHAD ALAM	6/17/2021, 10:33:39 AM	
Rambaboo Singh (Guest)	6/17/2021, 10:33:58 AM	
Saugato Mondal ERLDC (Guest)	6/17/2021, 10:34:22 AM	
DEEPAK THAKUR , AEE/BSPTCL	6/17/2021, 10:34:44 AM	
Aee CRITL (Guest)	6/17/2021, 10:35:39 AM	
Varun Vineet, EEE/ CRITL/BSPTCL	6/17/2021, 10:35:39 AM	
MS ERPC (Guest)	6/17/2021, 10:36:31 AM	
Chandan Kumar	6/17/2021, 10:36:40 AM	admin@POSOCO965.onmicrosoft.com
Ankur Kumar (Guest)	6/17/2021, 10:37:11 AM	

Dilip kant Jha	6/17/2021, 10:37:19 AM	
gaurav	6/17/2021, 10:37:34 AM	
SANJEEV KUMAR (Guest)	6/17/2021, 10:37:41 AM	
Nishant Kumar Shankwar	6/17/2021, 10:37:42 AM	Nishant.Kumar@SEKURA.IN
D K Singh (Guest)	6/17/2021, 10:37:48 AM	
Cornelius marandi	6/17/2021, 10:39:19 AM	
Rakesh	6/17/2021, 10:39:38 AM	
Saibal Ghosh,ERLDC (Guest)	6/17/2021, 10:40:13 AM	
NISAR HUSAIN (Guest)	6/17/2021, 10:40:18 AM	
GAGAN KUMAR EEE SLDC	6/17/2021, 10:40:29 AM	
U K MISHRA (Guest)	6/17/2021, 10:40:33 AM	
sk	6/17/2021, 10:42:00 AM	
Ch Mohan Rao ,PGCIL, Odisha (Guest)	6/17/2021, 10:42:20 AM	
P P Jena,	6/17/2021, 10:42:25 AM	
pritam mukherjee	6/17/2021, 10:43:23 AM	
Dharmbeer Singh	6/17/2021, 10:43:33 AM	
rajendra prasad (Guest)	6/17/2021, 10:44:37 AM	
Laldhari ERLDC (Guest)	6/17/2021, 10:44:41 AM	
Deepak v	6/17/2021, 10:46:56 AM	
shadab hasan	6/17/2021, 10:46:57 AM	
Prachi Gupta (Guest)	6/17/2021, 10:47:05 AM	
SLDC ODISHA (Guest)	6/17/2021, 10:48:12 AM	
ESE CRITL (Guest)	6/17/2021, 10:48:17 AM	
Rahul kumar	6/17/2021, 10:49:48 AM	
Dharm Das Murmu, JE, CRITL, JUSNL (Guest)	6/17/2021, 10:49:53 AM	
EMR MERAMUNDALI (Guest)	6/17/2021, 10:50:07 AM	
rupa	6/17/2021, 10:50:34 AM	
Pooja Gautam	6/17/2021, 10:51:56 AM	
critl	6/17/2021, 10:53:32 AM	
dolagobind patel	6/17/2021, 10:53:33 AM	
eee critl	6/17/2021, 11:02:33 AM	
abhishek kumar	6/17/2021, 11:02:33 AM	
vinay Kumar Kishku	6/17/2021, 11:02:33 AM	

Saurav Kumar Sahay ERLDC	6/17/2021, 11:07:53 AM	
Priyanka	6/17/2021, 11:09:41 AM	
PP CHAND ERLDC (Guest)	6/17/2021, 11:16:10 AM	
Rajdeep Bhattacharjee, RE, BSPHCL, Kolkata	6/17/2021, 11:24:16 AM	admin@BSPHCL317.onmicrosoft.com
Rajiv	6/17/2021, 11:25:06 AM	
Sarfraj Akhtar Critl Bsptcl	6/17/2021, 11:27:56 AM	
s choudhary	6/17/2021, 11:30:43 AM	
aditya jha	6/17/2021, 11:34:34 AM	
Alok Pratap Singh ,ERLDC (Guest)	6/17/2021, 11:40:12 AM	
Manoranjan Panigrahi	6/17/2021, 11:41:12 AM	MPANIGRAHI@NTPC.CO.IN
Sucharit Mondal	6/17/2021, 11:41:25 AM	
abhinaba basu	6/17/2021, 11:41:41 AM	
Diptikanta Panda	6/17/2021, 11:48:46 AM	
kundan Kumar	6/17/2021, 11:53:13 AM	
ele.smajhi	6/17/2021, 11:56:44 AM	
Binod Sahoo	6/17/2021, 12:22:49 PM	binod.sahoo@opgc.co.in
Pankaj Mishra Critl Bsptcl	6/17/2021, 12:28:30 PM	
DEEPAK THAKUR , AEE/BSPTCL	6/17/2021, 12:30:43 PM	
Ashish kumar	6/17/2021, 2:01:08 PM	
Tanushree Hansda	6/17/2021, 2:28:15 PM	tanushree.hansda@Cenergist.com

पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Government of India Enterprise)
Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.
CIN: U40105DL2009GOI188682
फ़ोन: 033- 24235755, 24174049 फैक्स : 033-24235809/5029 Website:www.erldc.org, Email ID- erldc@posoco.in

घटना संख्या: **17-05-2021/1** दिनांक: **18-05-2021**

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

Summary of the event (घटना का सारांश):

On 17-05-2021, 220 kV Gaya-Bodhgaya-1 & 2 tripped at 23:06 hrs from 765/400/220 kV Gaya S/s end only. At that moment, all 220/132 KV ICTs at Bodhgaya also tripped, causing load loss of 150 MW at Chandauti, Sherghati, Imamganj, Rafiganj Traction & Bodhgaya. 220 kV Bodhgaya-Khijasarai D/C was hand-tripped from Bodhgaya end on no load later on.

It was intimated by BSPTCL that 132 kV Bodhgaya (PG)-Paharpur R phase jumper snapped causing R phase to earth fault. Its protection operated however the breaker did not trip causing a persisting fault.

- **Date / Time of disturbance:** 15-05-2021 at 12:01 hrs.
- **Event type:** GD - 1
- **Load and Generation loss during the event:**
  - 150 MW load loss at Chandauti, Sherghati, Imamganj, Rafiganj & Bodhgaya
  - No generation loss occurred during the event

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Gaya Bodhgaya D/C
- 220/132 kV ICTs at Bodhgaya (4 X 150 MVA and 1X 160 MVA)

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

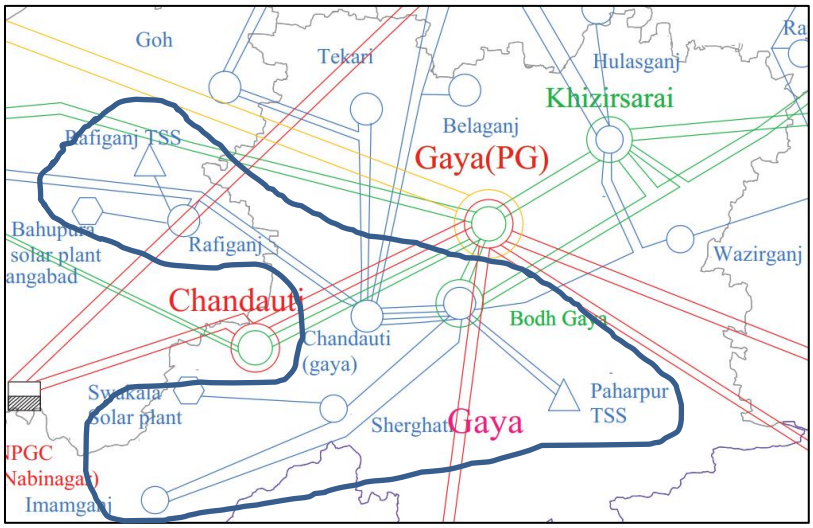


Figure 1: Network across the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
23:06	132 kV Bodhgya-Paharpur 1	R phase to earth fault, IR=12.1 kA. IN>1 and O/C> 1 operated in 500 ms (non-directional definite time 500 ms)	No tripping	Around 4 kV dip has been observed in R phase voltage at Maithon PMU data. The fault clearing time was around 1000 ms (> 160 ms)
23:06	220/132 kV 150 MVA ICT 1,2,3 and 4	Backup over current Earth fault protection operated (as per relay flag intimate substation personnel)	No tripping	
23:06	220/132 kV 160 MVA ICT 5	LV side breaker tripped on E/F protection.	No tripping	
23:06	220 kV Gaya Bodhgaya - 1	R-N, Zone-3, Fc= 2.167 kA, 6.7 km	No tripping	
23:06	220 kV Gaya Bodhgaya - 2	R-N, Z-3, Fc= 2.14 kA	No tripping	

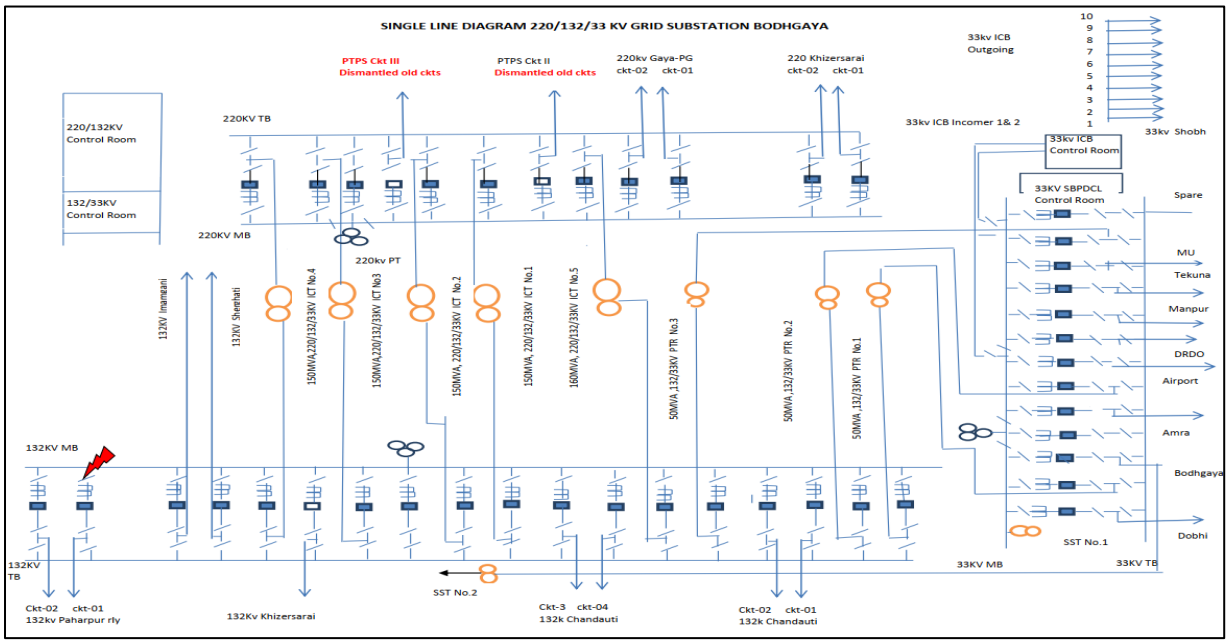
Figure 2: Three phase voltage captured at Maithon S/S shows the existence of R phase to earth fault at 23:06:29 hrs. Around 4 kV dip has been observed in R phase voltage at Maithon PMU data. The fault clearing time was around 1000 ms.

Restoration (पूर्वावस्था की प्राप्ति):

- 220 KV Gaya-Bodhgaya-1 & 2 were charged at 23:45 hrs and 23:46 hrs respectively.
- All 220/132 KV ICTs at Bodhgaya were restored by 23:50 hrs.
- 220 KV Bodhgaya-Khijasarai D/C were restored at 00:45 hrs

Analysis of the event (घटना का विश्लेषण):

- 220/132 kV Bodhgaya substation is the oldest substation in Bihar which was energized in 1971. This substation has 220 kV and 132 kV buses with a single main and transfer scheme. Both 220 and 132 kV do not have any bus bar protection in service. 132 kV Bodhgaya-Paharganj circuit 2 is, in general, kept out.
- On 17-05-2021, R phase jumper of 132 kV Bodhgaya-Paharganj circuit 1 (132 kV D/C traction feeder to railway with 25 kV R-B phase utilization) snapped within Bodhgaya substation yard. Thunderstorms and rain were prevailing at the substation during this event which has led to jumper snapping event. 132 kV bus side R phase jumper broke for this circuit has resulted in 132 kV bus fault. The fault was in the reverse direction for the distance protection relay of this circuit as per the information provided from the substation.
- As there is no bus bar protection in 132 kV bus, therefore, this fault had to be isolated with the tripping of all 220/132 kV ICTs at Bodhgaya substation which acts as the only source. During the event, it was reported that all 220/132 kV ICTs had tripped on backup overcurrent and earth fault protection (Although No DR is available and the information is based on prima facie relay flag indication). Even after all ICTs tripping, 220 kV Gaya-Bodhgaya circuit got tripped on Zone 3 from Gaya end in 800 ms from initial fault indicating that fault persisted for 800 ms and ICTs have not cleared the same in 800 ms.
- It was observed that the fault current was around 12.1 kA and the jumper was found to be disconnected and fallen on the ground during the yard visit indicating its detachment due to high fault current.
- Loss of ICTs has led to the loss of supply at 220/132 kV Bodhgaya substation causing load loss of 150 MW at Chandauti, Sherghati, Imamganj, Rafiganj Traction & Bodhgaya.



Sequence of Event based on available information

- From Main as well as backup DR of 132 kV Bodhgaya-Paharganj circuit 1 (Attached as an annexure, DR is not time-synchronized), it was observed that fault on this circuit was observed for 560 ms in R phase with a fault current of 12.1 kA. While the voltage observed in this DR which is 132 kV bus voltage was there for 1000 ms indicating that 132 kV Bus was live for 1000ms
    - In main distance protection DR, one-time Timer T1 has started immediately after fault however no zone protection has picked up. There is no further tripping command issued. However, the fault current was found to become zero after 580 ms. It was expected that the pre-fault current in the R-B phase should be equal as these are being used for railway traction load. However, it is observed that the Y and B phases are swapped in the relay. This needs to be corrected by BSPTCL as protection may either mal-operate or not operate. As fault was in the reverse direction so it was expected that Zone 4 should have picked up in the distance protection, however, that had also not picked up based on DR analysis **(DR attached in Annexure 1).**
    - The fault was in the reverse zone as it before the CT of the 132 kV circuit i.e. towards the bus side. The non-directional definite time (500 ms) over current and earth fault both had operated and thus tripped the circuit breaker. This line breaker tripping will however not clear the fault from the system as it was on the bus side. However, with breaker opening the current observed by the CT became zero with load disconnection and open-ended condition. This aspect needs further analysis as does not substantiate the reasoning for the fault location.
- As the fault was not cleared from the 132 kV bus due to the non-availability of bus bar protection so it was being fed from the 220/132 kV ICTs and 132 and 33 kV systems were radial. It was intimated by the substation that for all 220/132 kV ICTs Backup overcurrent protection had operated. Without DRs for these five 220/132 kV ICTs, it is not clear up to what duration time fault was being fed by ICTs.
- In the meantime, 220 kV Gaya-Bodhgaya-1 & 2 tripped from Gaya end only in Zone – 3 by sensing the R phase fault. The operational time for zone 3 was 800 ms. With this, the only remaining source was 220 kV Bodhgaya-Khizesarai D/C.
- The net fault current fed by 220 kV Gaya-Bodhgaya-1 & 2 (17 km each) was 4.307 in the R phase which on the 132 kV side would be around 7.17 kA. The remaining fault current will be fed by 220 kV Bodhgaya-Khizesarai D/C (58 km each). However, 220 kV Bodhgaya-Khizesarai D/C did not trip during the event. This indicates that the 220/132 kV have tripped after tripping of 220 kV Gaya-Bodhgaya-1 & 2 but before any tripping of 220 kV Bodhgaya-Khizesarai D/C. The total fault clearing time observed from PMU was around 1000 ms which indicates that all 220/132 kV ICTs had tripped within 1000ms. This should have cleared the fault from the system.

Protection issues Observed (सुरक्षा समस्या):

- Issues with 132 kV Bodhgaya-Paharganj circuit 1
    - Why 132 kV Bodhgaya-Paharganj circuit 1 distance protection relay has not picked up during the fault?
    - The site has intimated regarding the fault location i.e. 132 kV bus and 132 kV Bus isolator for 132 kV Bodhgaya-Paharganj circuit 1. However, the available DR is not substantiating the exact location due to the following facts and **BSPTCL may kindly analyze**:
        - CT is measuring the fault current even if the feeder is radial and fault is between CT and towards the 132 kV Bus section.
        - Fault current seen by line CT is not observed after its breaker operation on non-direction definite time E/F and O/C relay operation.
        - The fault is persisting in the system even after 500 ms as 220/132 kV ICTs (1000 ms based on PMU) and 220 kV Gaya-Bodhgaya circuits (800 ms based on DR) had tripped.
    - Main distance protection seems to have B and Y phase current swapped which need to be corrected after checking in the field.
    - DRs are found to be not time-synchronized.
- 220/132 kV ICTs backup protection needs proper coordination with 220 kV Gaya-Bodhgaya D/C zone-3 from the Gaya end. (**POWERGRID ER-1 and BSPTCL/Bihar SLDC to update**).
- DR of ICTs has not been shared which has led to difficulty in event analysis. BSPTCL CRITL team must visit substation after events and collect all event details and analyze them to make proper sequence and requirement of corrective action. **BSPTCL/Bihar SLDC to update**.
- Both 220 kV and 132 kV buses do not have bus bar protection which is a gross violation of CEA regulation. The substation has 4 X140 + 1 X160 MVA transformation capacity meeting huge load and any such delayed fault will directly impact the lives of all instruments especially power transformers. **BSPTCL may kindly update on Bus bar protection implementation for such a critical substation in their system.**

Operation issues Observed (प्रचालन समस्या):

- The 220 kV, as well as 132 kV Buses at Bodhgaya, is having a single main transfer scheme. **BSPTCL may kindly update on the plan for R&M activities and up-gradation of the substation.**

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	**BSPTCL & POWERGRID ER-1**
Non-Submission of Details for the tripping which is required for appropriate analysis for GD/GI	1. IEGC 5.2 (r), 5.9.6.c (VI) 2. CEA grid Standard 15.3 3. CEA (Technical standards for connectivity to the Grid) Regulation, 2007-6. 4.d	**BSPTCL**
Incorrect/ mis-operation / unwanted operation of Protection system	1. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4 .A. 2. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	**BSPTCL**
Fault clearance in more than 100 ms at 400 kV level and above and 160 ms at 220 kV levels	CEA Grid standard 2010 -3.e CEA Transmission Planning Criteria	**BSLTCL**
Non-Availability of Numerical Bus Bar/LBB Protection at 220 kV and above S/s	1. CEA Technical Standard for Construction of Electrical Plants and Electric Lines 43.4 .A 2. CEA Technical Standard for Construction of Electrical Plants and Electric Lines 43.4 .C.4 3. CEA (Technical standards for connectivity to the Grid) Regulation, 2007 – 6.1, 6.4.	**BSPTCL**
Bus Bar protection at 132 kV level not present	CEA Regulation: Measures relating to Safety and Electric Supply 2010 -45.2.vii	**BSPTCL**
DR/EL are not time-synchronized	1. Indian Electricity Grid Code 4.6.3 2. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4 .D. 3. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1.7.	**BSPTCL**

Status of Reporting (रिपोर्टिंग की स्थिति):

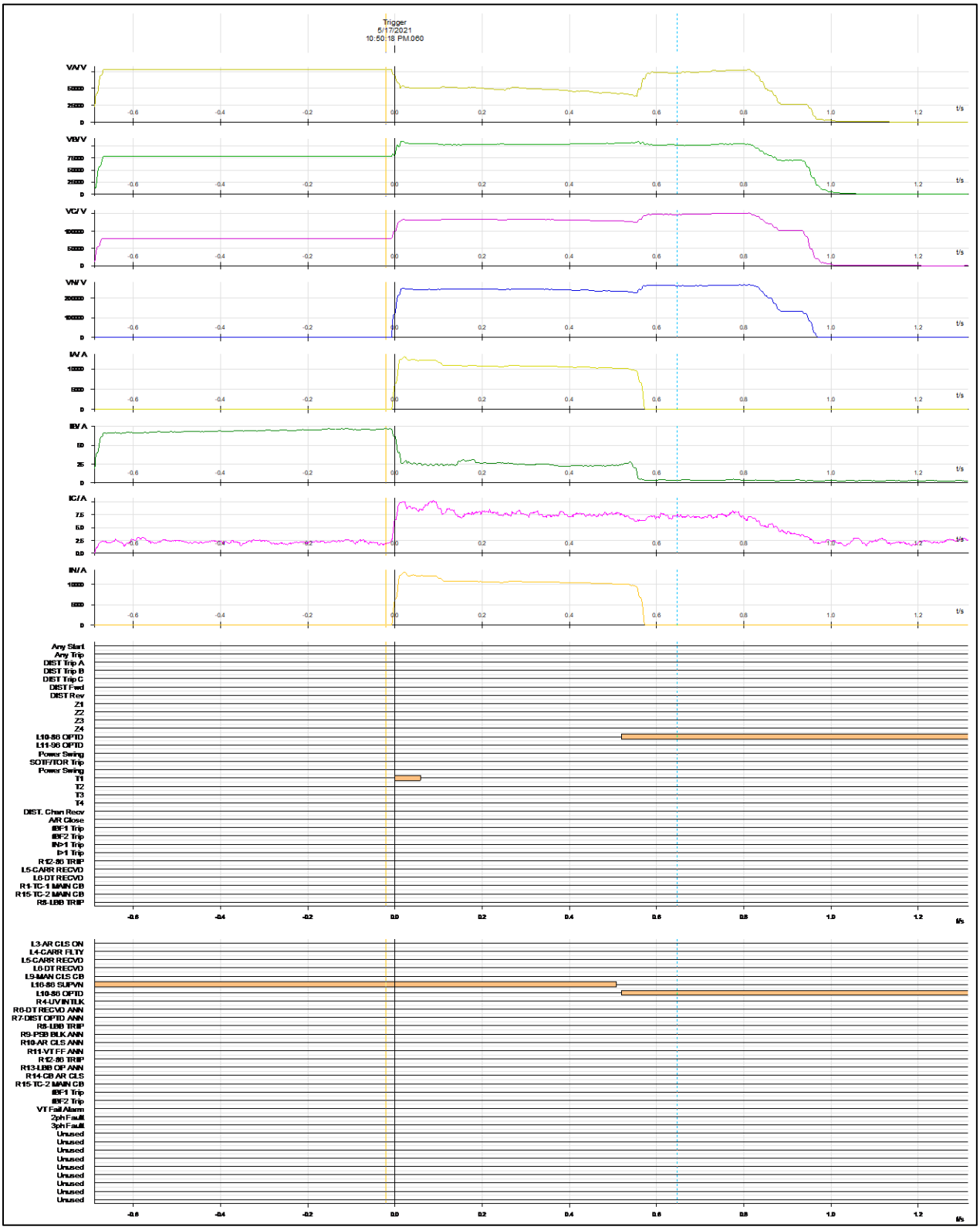
- Complete DR/EL yet to be received from BSPTCL.

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

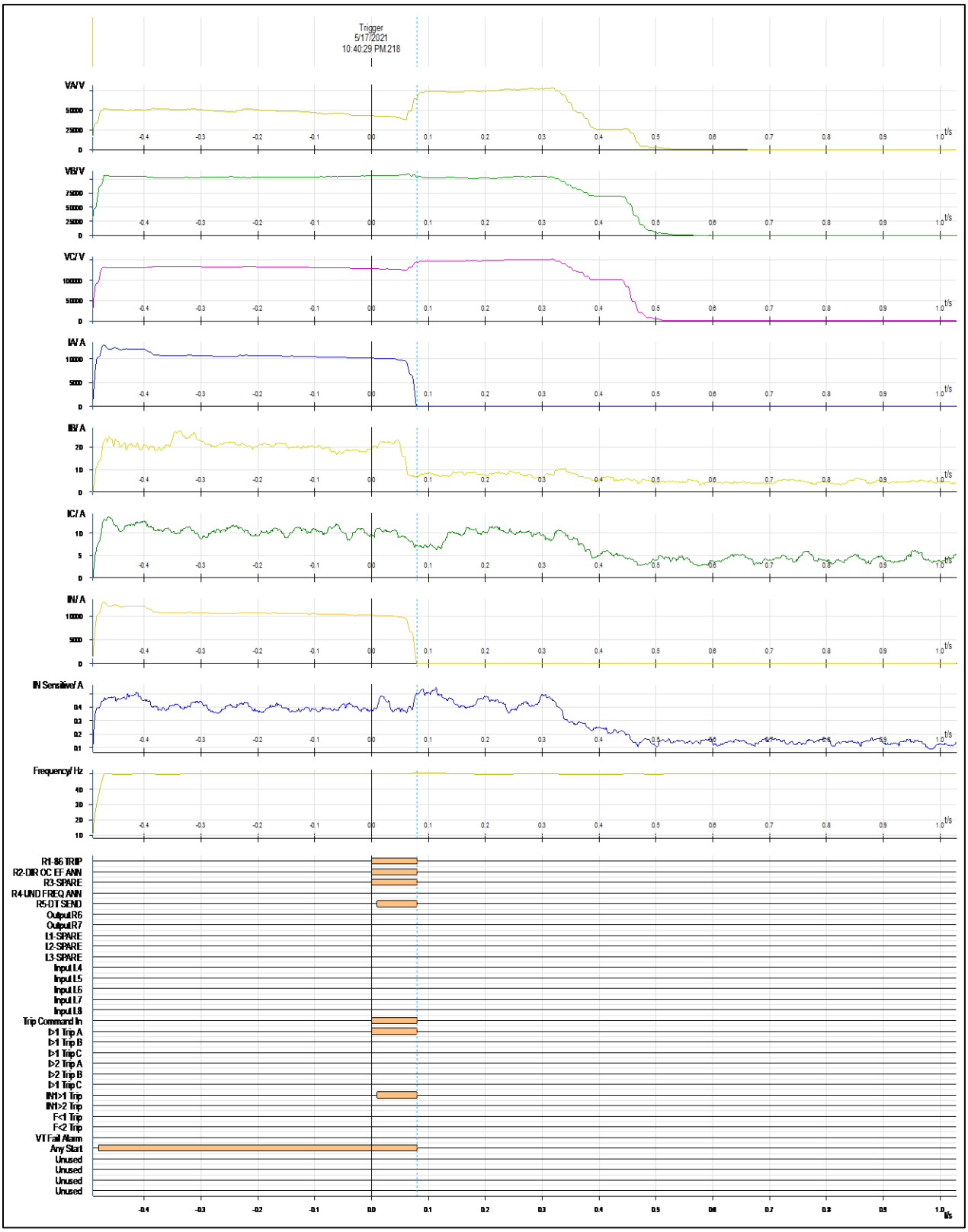
TIME	MILLI_SEC	STATION	DESCRIPTION	STATUS
22:24:46	718	GAYA__PG	220_DHRIN_BH_1_CB	Closed
22:24:46	799	GAYA__PG	220_DHRIN_BH_1_CB	Open
22:58:15	209	GAYA__PG	220_DHRIN_BH_1_CB	Closed
23:01:46	511	GAYA__PG	400_KODAM_DV_1_ICT2_Tie	Closed
23:06:30	443	GAYA__PG	220_BODHN_BH_2_CB	Open
23:06:30	451	GAYA__PG	220_DHRIN_BH_1_CB	Open
23:44:53	172	GAYA__PG	220_DHRIN_BH_1_CB	Closed
23:46:11	184	GAYA__PG	220_BODHN_BH_2_CB	Closed

Annexure 2: DR

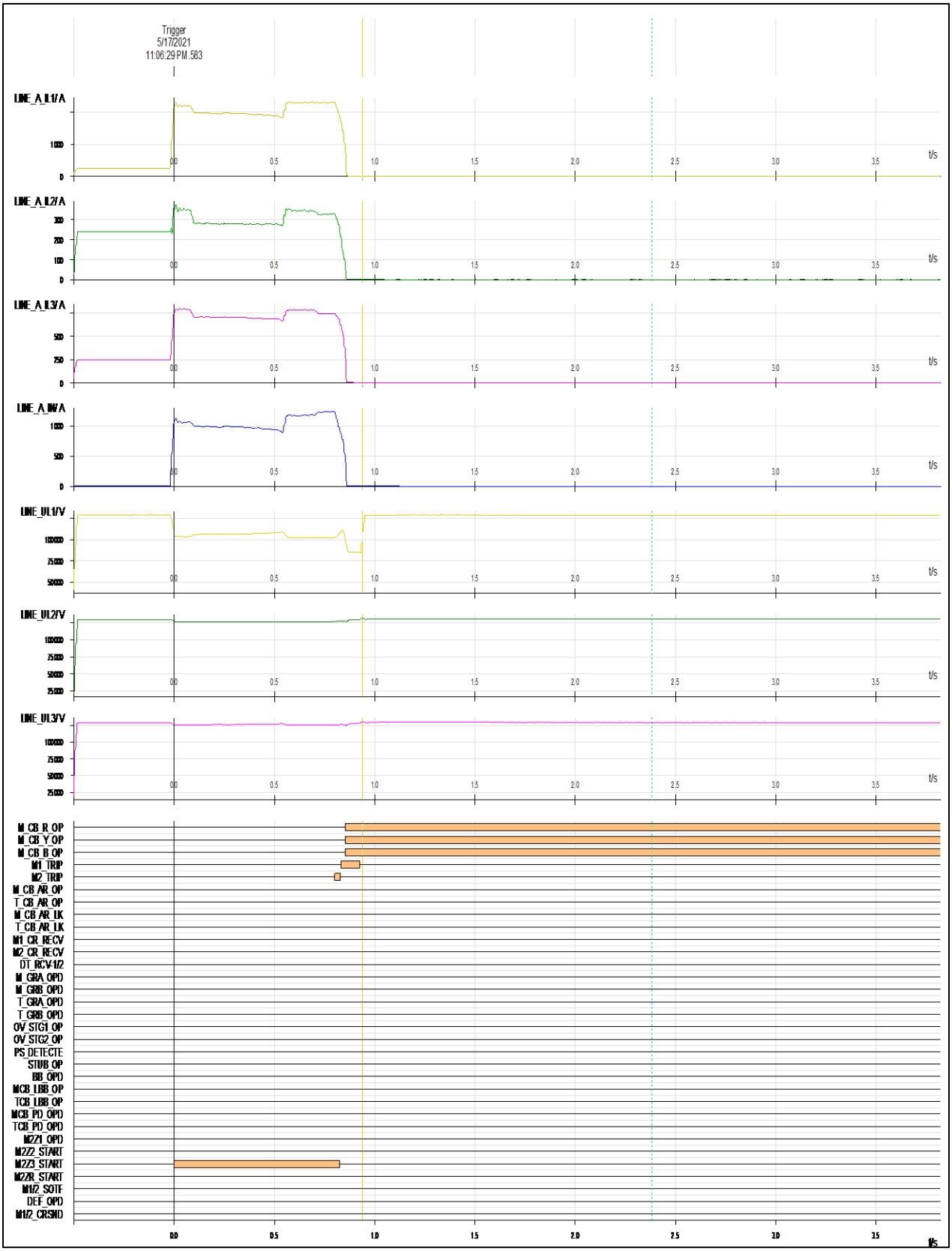
1. Main Distance Protection DR from Bodhgaya (PG) End for 132 kV kV Bodhgaya-Paharpur 1 (Traction) line



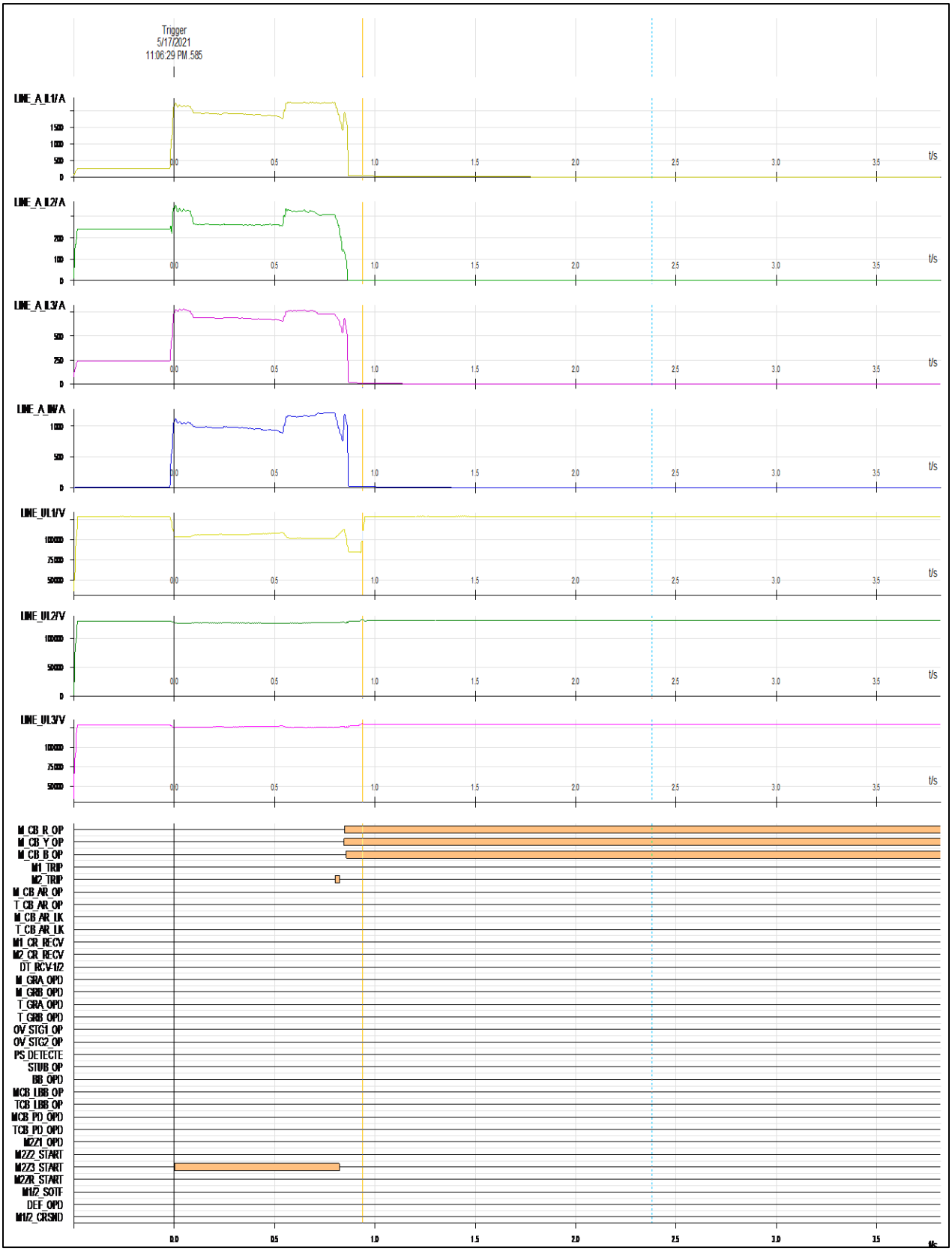
2. Backup OC and EF DR from Bodhgaya (PG) End for 132 kV kV Bodhgaya-Paharpur 1 (Traction) line



3. DR from Gaya (PG) End for 220 kV Gaya-Bodhgaya 1



4. DR from Gaya (PG) End for 220 kV Gaya-Bodhgaya 2



Annexure B.5

पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Government of India Enterprise)
Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.
CIN: U40105DL2009GOI188682
फ़ोन: 033- 24235755, 24174049 फैक्स : 033-24235809/5029 Website:www.erldc.org, Email ID- erldc@posoco.in

घटना संख्या: **15-05-2021/1** दिनांक: **18-05-2021**

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

Summary of the event (घटना का सारांश):

Due to tower collapse of 220 kV Farakka-Lalmatia S/C in April 2021, local load at 220 kV Dumka and Godda S/S were being radially fed from 400/220 kV Maithon S/S through 220 kV Maithon-Dumka D/C and 220 kV Dumka-Godda D/C. Shutdown of 220 kV Maithon Dumka – 1 was taken by JUSNL at 10:51 hrs to attend rectify red hot at connector of R- phase pole of circuit breaker of the line. Hence load at Dumka was fed through 220 kV Maithon Dumka – 2. At 12:02 hrs 220 kV Maithon Dumka – 2 tripped on R phase to earth fault resulting in total power failure at Goda, Dumka S/S and nearby areas.

- **Date / Time of disturbance:** 15-05-2021 at 12:01 hrs.
- **Event type:** GD - 1
- **Load and Generation loss during the event:**

Generating station/ Area	Amount of Load Loss (MW)	Amount of Generation Loss (MW)
Dumka	35	0
Giridih	20	0
Jasidih	15	0
Rajmahal	20	0
Godda	25	0
Gobindpur	30	0
Pakur	40	0
Total	**185**	0

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Maithon Dumka - 2

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

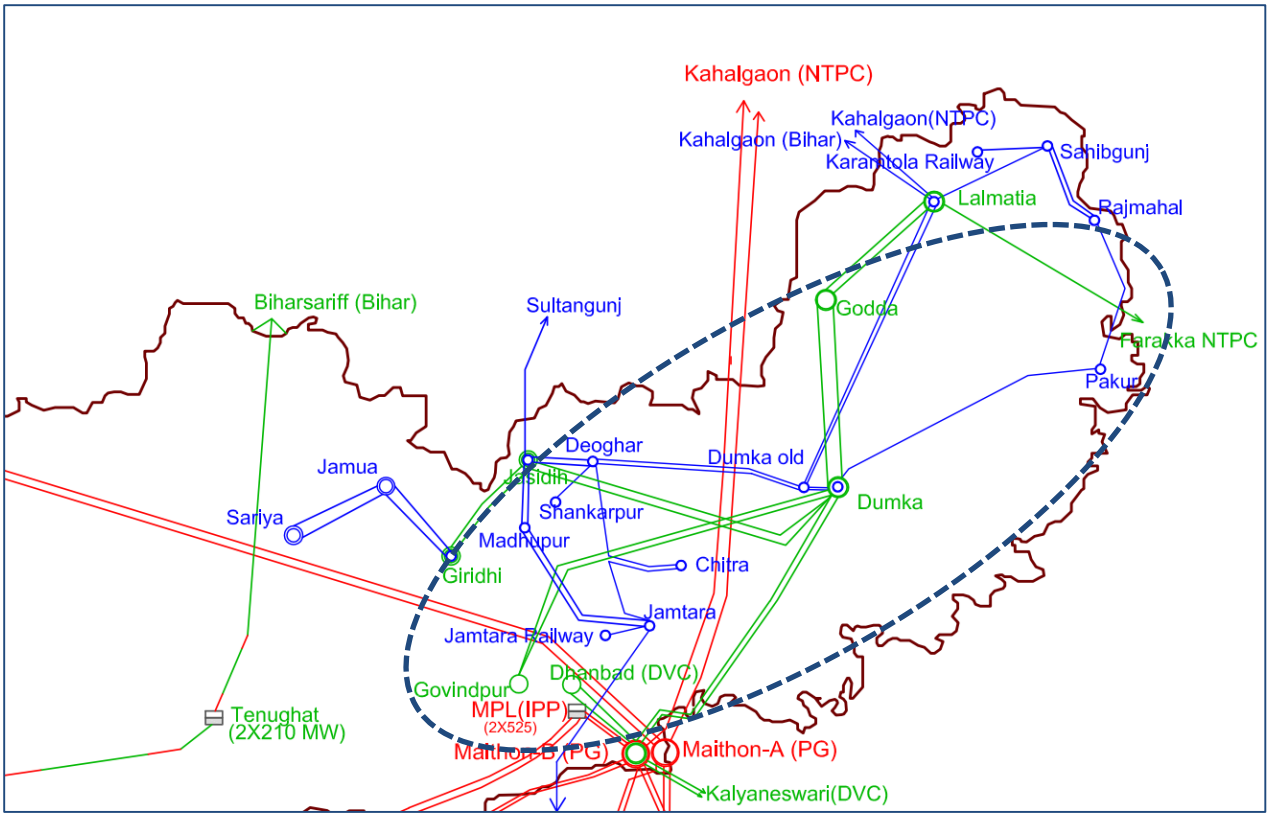


Figure 1: Network across the affected area

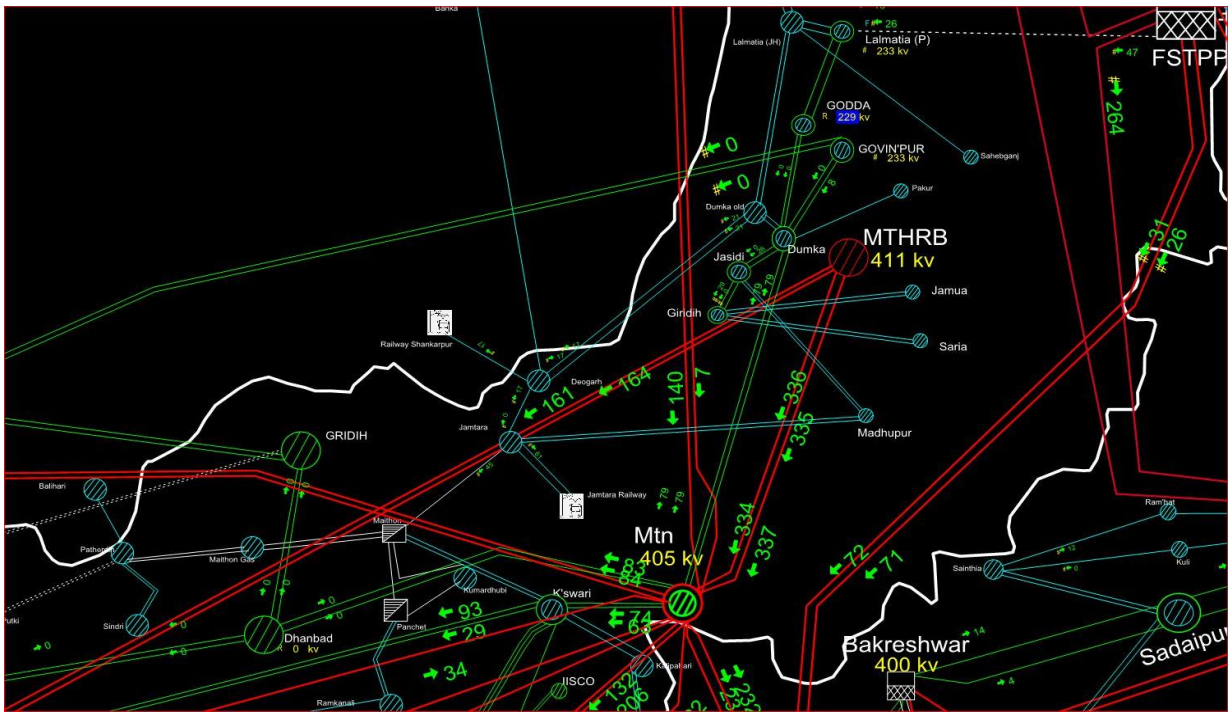


Figure 2: SCADA snapshot of the affected network

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
12:02 Hrs	220 kV Maithon Dumka - 1	R-N, 4.7 kA, 45km	R-N, Zone-1, 23 km, 0.9 KA	Around 2.5 kV dip has been observed in R phase voltage at Maithon PMU data. The fault clearing time was less than 100 ms. No Auto reclose attempt has been captured in PMU data.

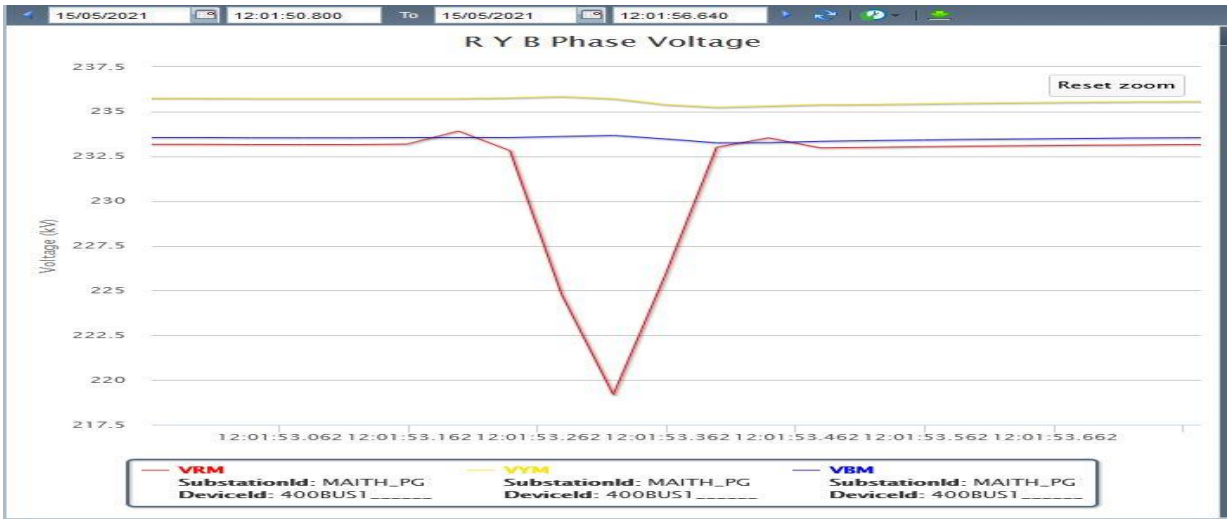


Figure 3: Three phase voltage captured at Maithon S/S shows the existence of R phase to earth fault at 12:01:53 hrs. Around 2.5 kV dip has been observed in R phase voltage at Maithon PMU data. The fault clearing time was less than 100 ms. No Auto reclose attempt has been captured in PMU data.

Restoration (पूर्वावस्था की प्रप्ति):

- 220 kV Maithon Dumka – 2 was restored at 12:50 hrs.
- 220 kV Maithon Dumka – 1 was restored at 16:15 hrs. (shutdown was from 10:00 to 12:00 hrs)

Analysis of the event (घटना का विश्लेषण):

- Due to tower collapse of 220 kV Farakka-Lalmatia S/C in April 2021, local load at 220 kV Dumka and Godda S/S are being radially fed from 400/220 kV Maithon S/S through 220 kV Maithon Dumka D/C.
- Emergency shutdown of 220 kV Maithon Dumka – 1 was taken by JUSNL at 10:51 hrs to attend rectify red hot at connector of R- phase pole of circuit breaker of the line. Hence load at 220/132 kV Dumka, 220/132 kV Godda and 220/132 kV Govindpur and connected 132 kV radial loads were being radially fed through 220 kV Maithon Dumka – 2. At 12:02 hrs, 220 kV Maithon Dumka – 2 tripped on R phase to earth fault resulting in total power failure at Godda, Dumka, Govindpur S/S and nearby areas.
- This had led to loss of 185 MW loss in Godda, Dumka, Govindpur, Giridih, Jasidih, Rajmahal and Pakur area.

- The 220 kV Dumka-Maithon 2 fault got cleared within 100 ms as observed from the PMU data. However, no attempt of auto-reclose operation has been captured in PMU data.

Operational issues Observed (प्रचालन समस्या):

- Due to ownership/maintenance/court litigation issue, tower erection and conductor stringing for restoration of 220 kV Farakka-Lalmatia S/C is not taking place. Thus, Godda and Dumka are being radially fed from Maithon S/S. In case breakdown of this circuit, reliability of power supply to Dumka and Goda area may be compromised during this COVID pandemic situation. Hence NTPC Farakka, ECL and JUSNL/Jharkhand SLDC may share the restoration plan of 220 kV Farakka Lalmatia S/C. (**NTPC Farakka, ECL and JUSNL/Jharkhand SLDC to update**).
- 220 kV TTPS-Govindpur D/C need to be expedited by JUSNL as it will provide an alternate path to the Dumka, Godda and Lalmtia areas. **(JUSNL to expedite)**
- Shutdown allowed for 220 kV Maithon – Dumka – 1 was for 10:00 hrs to 12:00 hrs. But 220 kV Maithon – Dumka – 1 was restored at 16:15 hrs. As the Dumka S/S was radially connected through 220 kV Maithon – Dumka – 2, early restoration 220 kV Maithon – Dumka – 1 during shutdown time could save the power interruption at Dumka, Godda and adjoining area. **(JUSNL may explain the reason for delay in restoration)**

Protection issues Observed (सुरक्षा समस्या):

- No autoreclose attempt has been observed in PMU data. POWERGRID ER-2 and JUSNL may confirm whether auto-reclose attempt was taken place or not. (**POWERGRID ER-2 and JUSNL/Jharkhand SLDC to update**).

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL yet to be received from POWERGRID.
- DR/EL yet to be received from Dumka.

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

TIME	MILLI_SEC	STATION	DESCRIPTION	STATUS
12:01:53	355	DUMK2_JH	220_MAITH_PG_2_CB	open
12:01:53	420	MAITH_PG	220_DUMKA_JH_2_CB	Open
12:39:06	934	DUMK2_JH	132_PAKUR_1_CB	open
12:47:26	774	DUMK2_JH	220_MAITH_PG_2_CB	closed
12:50:13	289	DUMK2_JH	220_MAITH_PG_2_CB	open
12:51:12	743	MAITH_PG	220_DUMKA_JH_2_CB	Closed
12:51:37	479	DUMK2_JH	220_MAITH_PG_2_CB	closed
12:51:39	579	DUMK2_JH	220_GODDA_2_MAST_TRIP	Operated
12:51:39	584	DUMK2_JH	220_GODDA_1_MAST_TRIP	Operated
12:51:39	701	DUMK2_JH	220_GODDA_2_CB	open
12:51:39	704	DUMK2_JH	220_GODDA_1_CB	open

Annexure B.8

REPORT ON DISTURBANCE AT 765/400 KV NEW RANCHI SUB-STATION ON 27.05.2021

In wake of YAAS cyclone ,all necessary preventive measures circulated by Regional AM has been taken to avoid any disturbance during Yaas cyclone which was scheduled to be crossed on 27.05.2021 from Ranchi.

On dated 27.05.2021 at around 12:15 Hrs Eye of cyclone YAAS crossed from the vicinity of New Ranchi sub-station (Approx10 – 10 km from the sub-station), which caused very heavy rainfall with strong wind before 48 hours of cyclone. As reported from the weather report due to YAAS cyclone around 151 mm rain fall record in Ranchi on dated 27.05.2021, which broke previous record of rain fall of 30 years in Ranchi. Due to cyclonic effect continuous moderate to very heavy rainfall of 2-3 days occurred in Ranchi.

09:50

epaper.prabhatkhabar.com/n

प्रभात खबर

1/16

बुंडू प्रखंड के कांची नदी पर तीन साल पहले आठ करोड़ की लागत से बना पुल गुरुवार
जांच के आदेश दिये हैं. यह पुल सरायकेला खरसावां जिला को जोड़ते हुए पश्चिम बंगाल
प्रखंड को भी जोड़ता है. अब लोगों को नदी पार करने के लिए 12 किलोमीटर दूरी तय
इससे इचाडीह सहित आसपास के दर्जनों गांवों का आवागमन बाधित हो गया है.

17 मई 1990 को रांची में 24 घंटे में 72.2 मिमी बारिश हुई थी

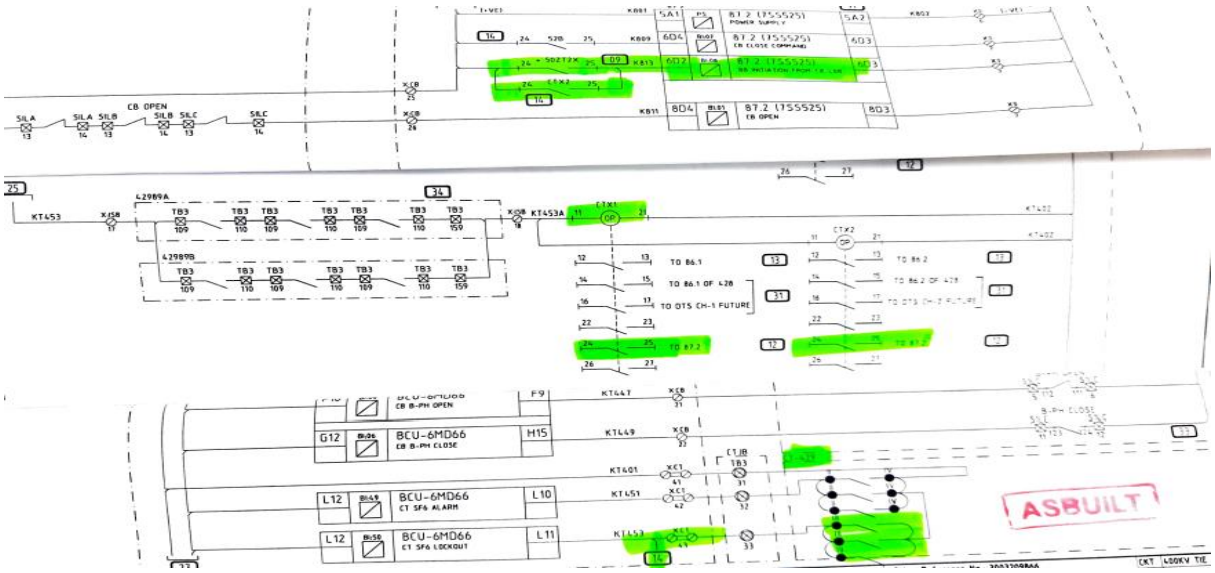
मौसम केंद्र के अनुसार, यास के कारण पूरे राज्य में बारिश हुई है. सबसे अधिक बारिश चाईबासा में हुई. यहां 26 मई की सुबह साढ़े आठ बजे तक 207.8 मिमी बारिश हुई. राजधानी में इस अवधि में 151 मिमी बारिश हुई थी. यह मई माह में रिकॉर्ड अब तक की सबसे अधिक बारिश है. इससे पूर्व रांची में एक दिन में सबसे अधिक बारिश 17 मई 1990 को हुई थी. उस दिन 24 घंटे में 72.2 मिमी बारिश हुई थी.

Multiple trippings have been occurred at New Ranchi sub-station in the late night of 27.05.2021. 400kV Bus-1 at New Ranchi also tripped at 00:18 hrs of 27.05.2021 with following relay indication:

Element	Outage Date	Outage Time	Relay Indication
400KV BUS-I AT NEW RANCHI	27.05.21	0:18	Check Zone OPTD AS PER SOE

Analysis of tripping and findings:

Tripping of 400 kV Bus-I at New Ranchi: – 400 KV Bus -I at New Ranchi tripped on 00:18 hrs ON 27.05.2021. As per MCU trip log and B/U events, the trip was initiated from BU-11 (Tie Bay -429, Chandwa Ckt-2 & Future) which is meant for BUS BAR-1 protection in half DIA of 400 KV Chadwa Ckt-2.As per the scheme (Scheme copy attached) BUS BAR-1 will trip in case of SF6 lockout signal becomes high as the CT is directly connected with 400KV BUS BAR-1.



Observations: The said Bay was taken out of service and WIKA make SF6 Gas density monitor installed in 429 Bay CT has been inspected. The traces of moisture was observed at terminal contacts of gas density monitor causing oxidation of contacts (photograph attached). The IR value of contacts also found low i.e in the range of 02-05 M ohm.

(TRACES OF MOISTURE INGRESS & OXIDATION)

Remedial action:

The contacts were cleaned properly and dried up with the help of hot air gun. The IR value of contact has been improved up to 100-150 M ohm. Further, to avoid ingress of moisture, silicon sealant applied at the cover of the terminal block.

(SILICON APPLIED)

Further, it has been observed that density monitor was installed in slightly inclined position however Ü" shaped cover has been provided to protect the water ingress from vertical rain fall only. In the present situation, continuous torrential rain fall due to cyclonic effect may cause ingress of moisture into the terminal contact of SF6 gas density monitor. OEM provided canopy of SF6 density monitor installed in the CT may not be sufficient to avoid moisture ingress during torrential rain as it is open from both side. Accordingly it has been has been

planned to install additional canopies in all SF6 gas density monitor of CT to prevent such moisture ingress. Photograph of additional installed canopy in below picture:

Conclusion for tripping: 765/400 KV New Ranchi Substation was first commissioned in December, 2013. Since then, there is no incidence of tripping due to moisture ingress in CT gas density monitor. The occurrence of trippings on 27.05.2021 was due to water ingress in CT gas density monitor because of continuous rain fall for more 48 hours with high speed wind due to YAAS cyclone.

Repeated Tripping of 400 kV Gokarno-Sagrdighi -II with same nature of Fault & location:

It has been observed that 400 kV Gokarno-Sagrdighi -II is tripping frequently with same nature of fault and outage of the circuit reduces the reliability of Gokarno/Sagardighi substation. It has been observed that during April-May 2021, 400 kV Gokarno-Sagrdighi -II has tripped on multiple occasions with same fault location and fault parameter. Details are as mentioned below which indicates that line is tripping with R-earth fault at a distance of approx. 6Km from Sagradighi substation.

It may also be noted that such repeated faults near generating station is also hampering the Generator and tripping of line also reducing the reliability of both interconnecting substations.

In this regard proper line patrolling, maintenance be ensured for line healthiness. Kindly do the root cause analysis and mitigation for the same for such repeated fault at same location and share the outcomes.

Non operation of Auto reclose from Sagardighi end: It has also been observed from DR analysis that for single phase faults ,3 Phase tripping is occurring each time at the instant of fault from Sagardighi end ,while from Gokarno end single phase tripping is occurring and A/R is taking attempt for reclosure after dead time .

DR/EL has not been received from Gokarno end for any event till date is also Non compliance of IEGC. DR/EL may also be shared as soon as possible.

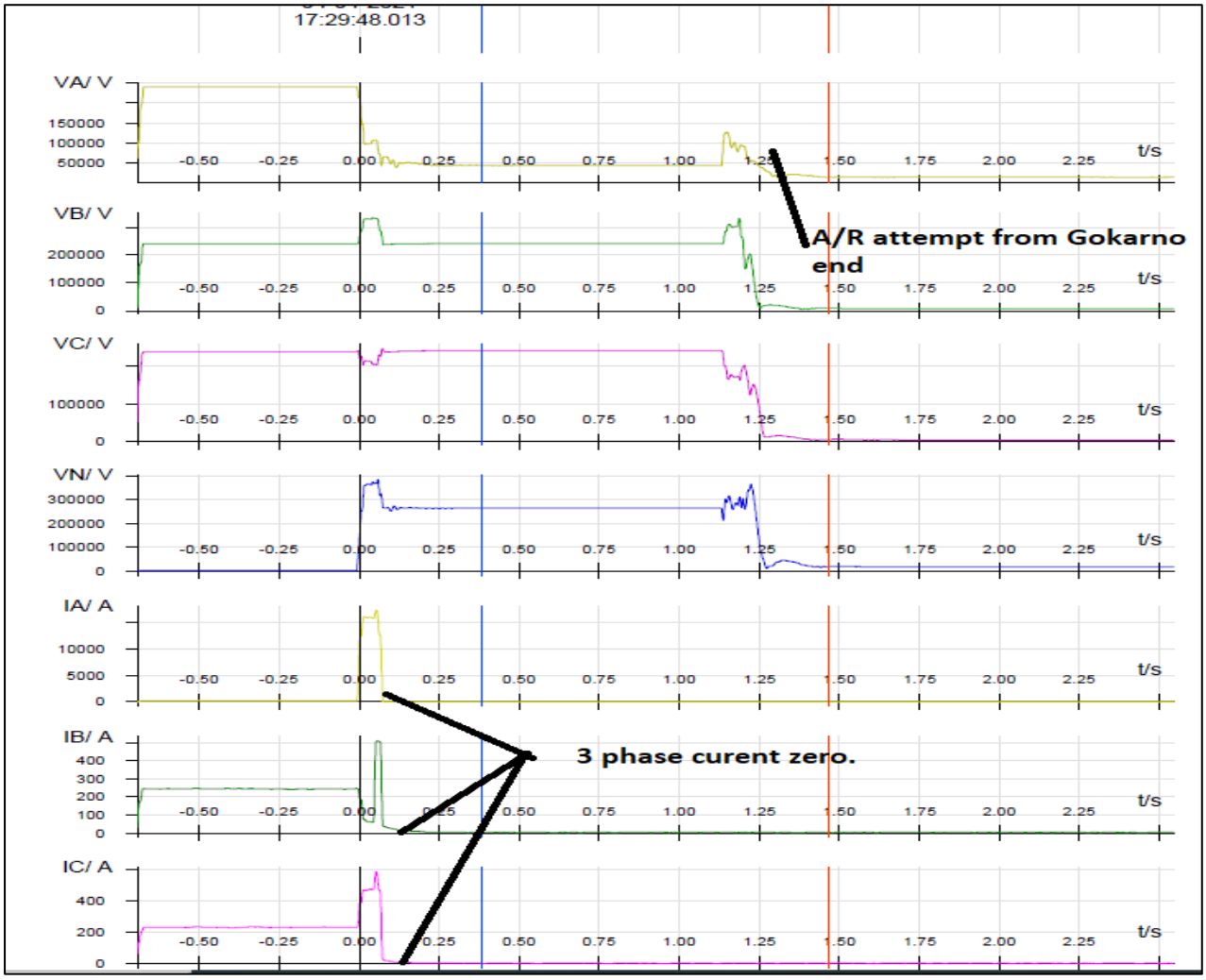
Reason for non operation of Auto Reclose may also be shared and mitigated. Details are attached in annexure.

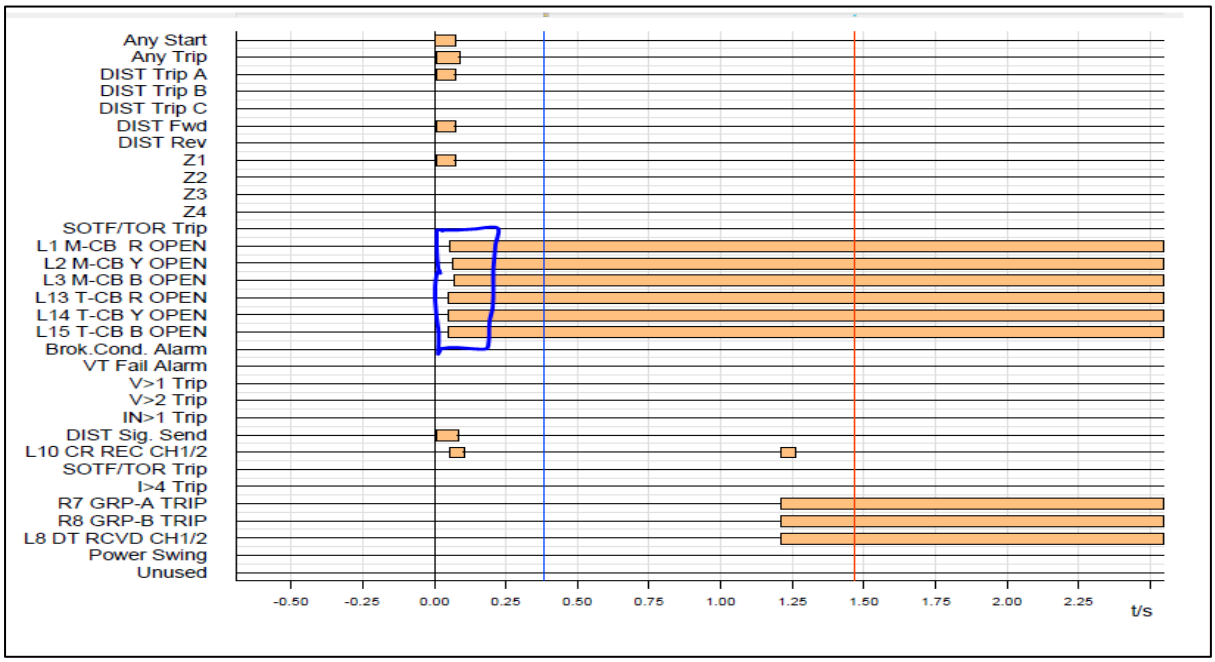
Sr.NO	Element Name	Tripping Date	Tripping Time	Relay (Sagardighi end)	Relay (Gokarno end)	REMARKS
1	400KV-GOKARNA-SAGARDIGHI-2	27-05-2021	21:17	Sagardighi: Z1, R ph,Fault current : 15.31 KA, Fault Distance : 6.5 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
2	400KV-GOKARNA-SAGARDIGHI-2	27-05-2021	05:51	Sagardighi: Z1, R ph,Fault current : 15.51 KA, Fault Distance : 5.92 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
3	400KV-GOKARNA-SAGARDIGHI-2	27-05-2021	02:28	Sagardighi: Z1, R ph,Fault current : 16.51 KA, Fault Distance : 6.292 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
4	400KV-GOKARNA-SAGARDIGHI-2	26-05-2021	10:39	Sagardighi: Z1, R ph,Fault current : 16.51 KA, Fault Distance : 6.292 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
5	400KV-GOKARNA-SAGARDIGHI-2	26-05-2021	11:43	Sagardighi: Z1, R ph,Fault current : 16.51 KA, Fault Distance : 6.292 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.

6	400KV-GOKARNA-SAGARDIGHI-2	25-05-2021	02:09	Sagardighi: Z1, R ph,Fault current : 16.51 KA, Fault Distance : 6.292 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
7	400KV-GOKARNA-SAGARDIGHI-2	25-05-2021	02:34	Sagardighi: Z1, R ph,Fault current : 16.51 KA, Fault Distance : 6.292 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
8	220KV-GOKARNA-SAGARDIGHI-2	17-05-2021	15:46	Sagardighi: R-N, 6km, 16kA	Gokarna:R-N, 19.59 Km, 10.84 KA;	
9	220KV-GOKARNA-SAGARDIGHI-2	15-05-2021	13:27	Sagardighi-R-N,Z-1,F/D-6Km	GOKARNA: R-N, 25KM, 11KA	
10	400KV-GOKARNA-SAGARDIGHI-2	07-05-2021	18:19	Sagardighi: Z1, R ph,Fault current : 16.51 KA, Fault Distance : 6.292 km	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
11	400KV-GOKARNA-SAGARDIGHI-2	07-05-2021	17:54	SGTPP: Z1 Phase : R ph Fault current : 16.63 KA Fault Distance : 5.617 km	Gok: Z-1, R Ph, 25.49 km, 11.45 KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
12	400KV-GOKARNA-SAGARDIGHI-2	21-04-2021	17:53	Sagardighi end: Z1, R Ph, 5.73Km, 16.42KA	Gokarna end: Z1, R-N, 18.58 KM, 11.17KA.	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.
13	400KV-GOKARNA-SAGARDIGHI-2	21-04-2021	16:59	Sagardighi end: Z1, Y Ph, 21.32Km, 11.46KA.	Gokarna end: Z1, Y-N, 12.56 KM, SOTF, AR Lockout, 12.8KA	
14	400KV-GOKARNA-SAGARDIGHI-2	04-04-2021	17:29	SGTPP END : ZONE 1, R-N, DISTANCE 5.72KM , F/C 15.92KA	GOKN END : ZONE 1, R-N , DISTANCE - N/A , F/C 10.08KA, SOTF , A/R L/O,	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.

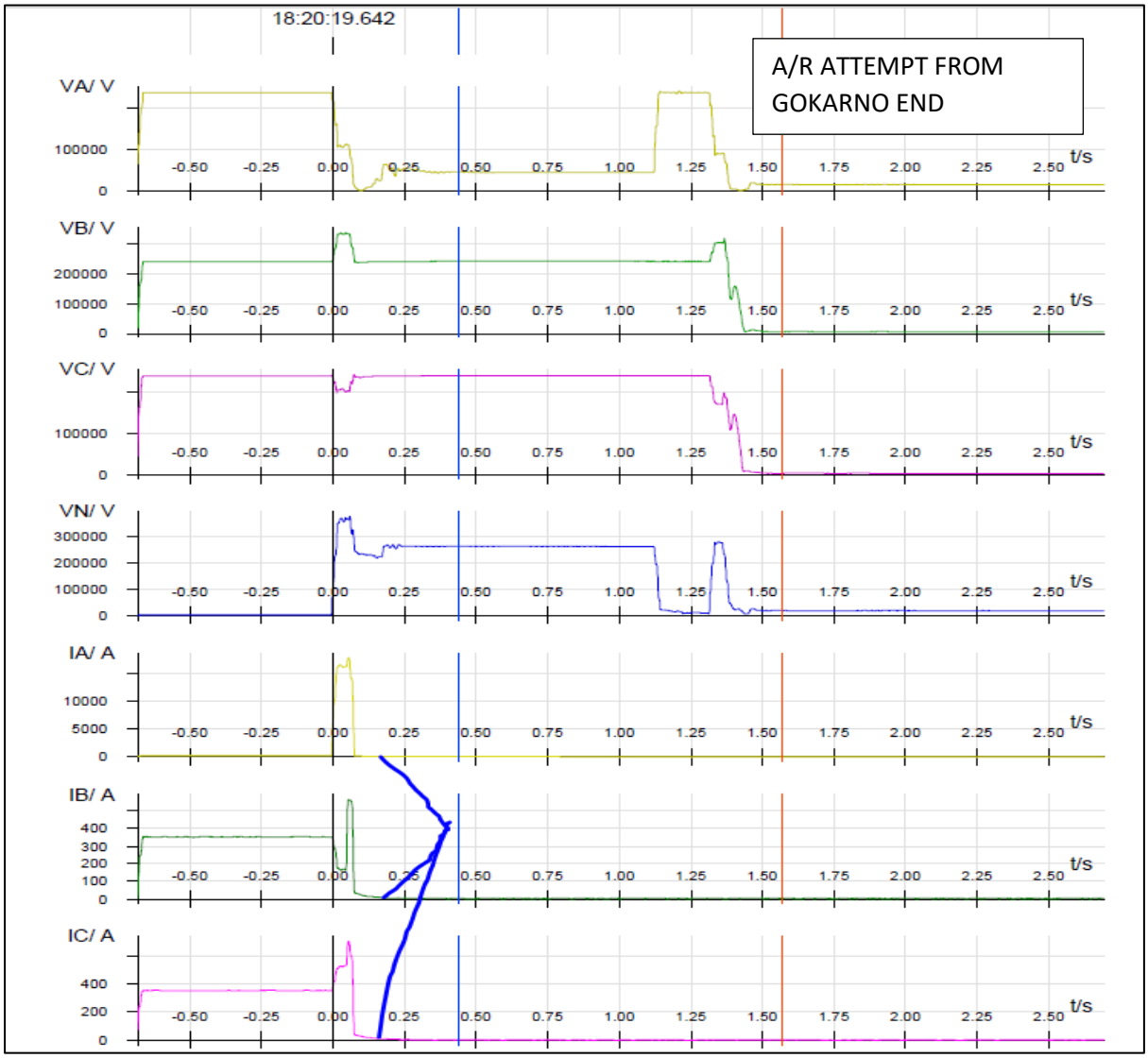
Non operation of Auto reclose from Sagardighi end for Faults in 400 kV Gokarno -Sagardighi -II :

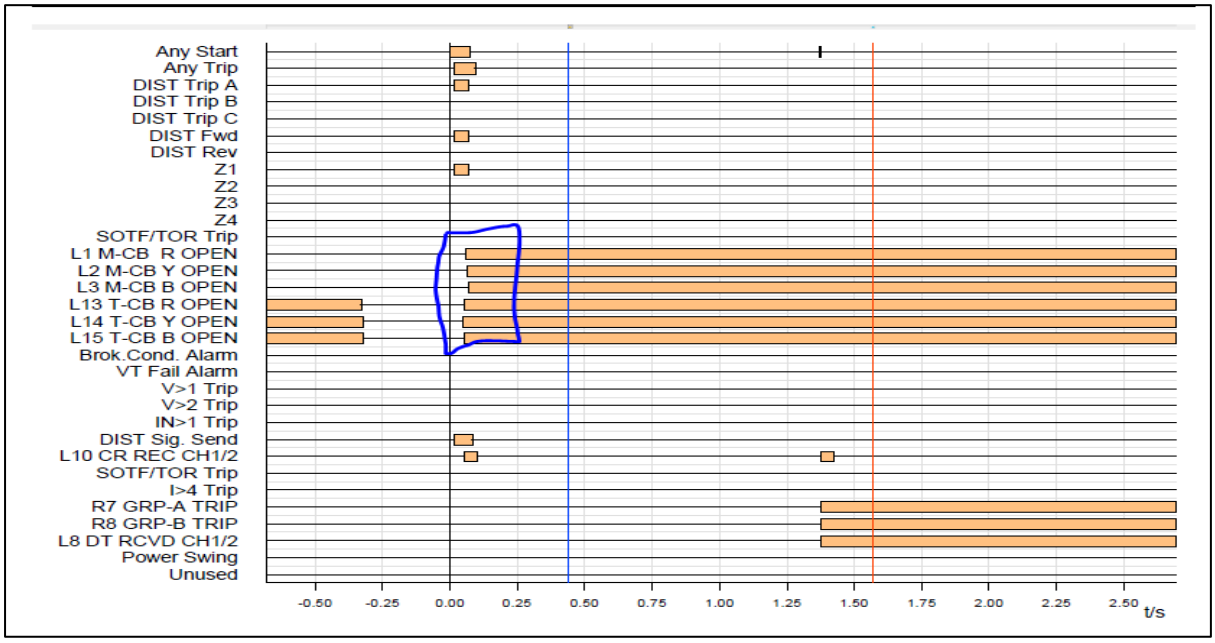
Tripping on 04th April 17:29 Hrs(Sagardighi end DR):





Tripping on 07TH May 18:19 Hrs(Sagardighi end DR):



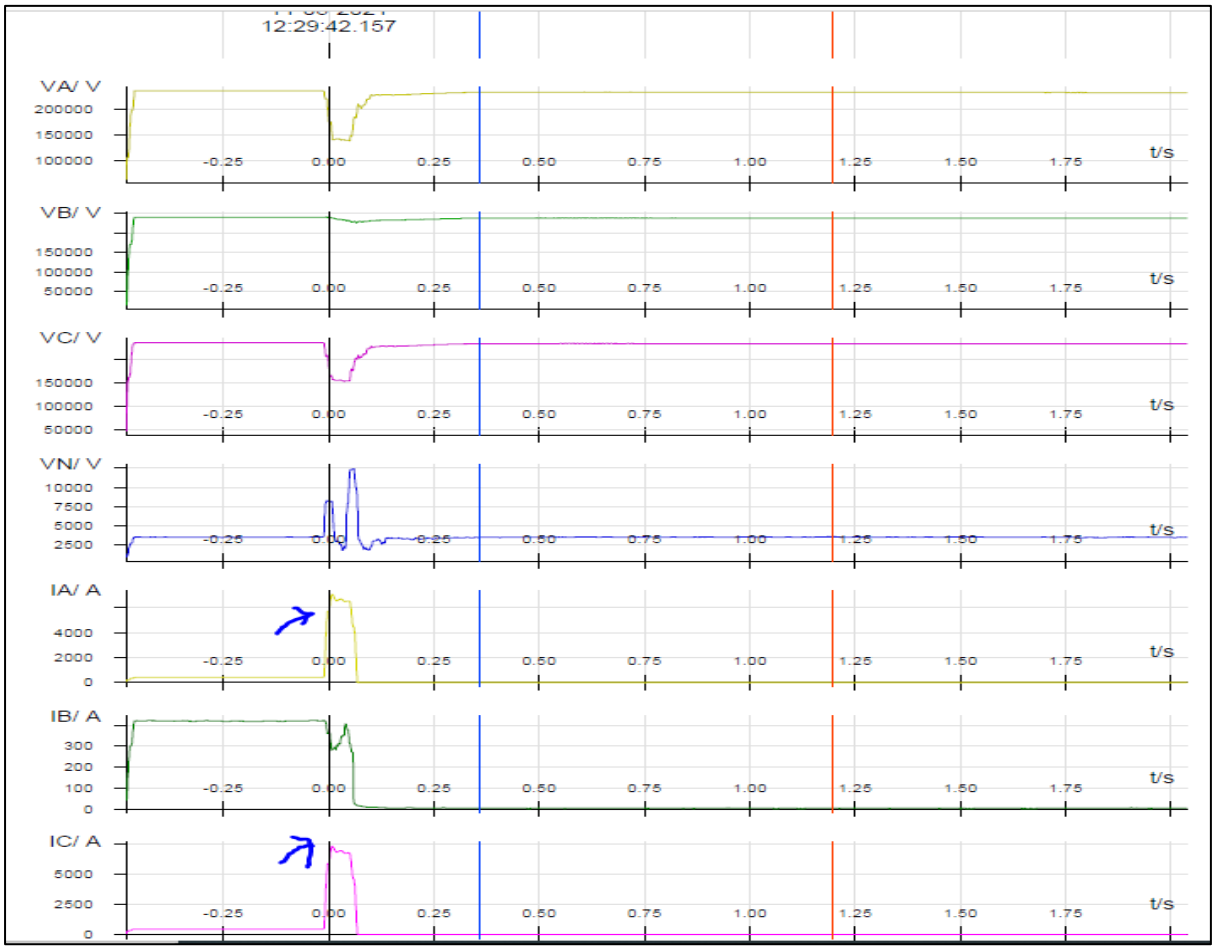


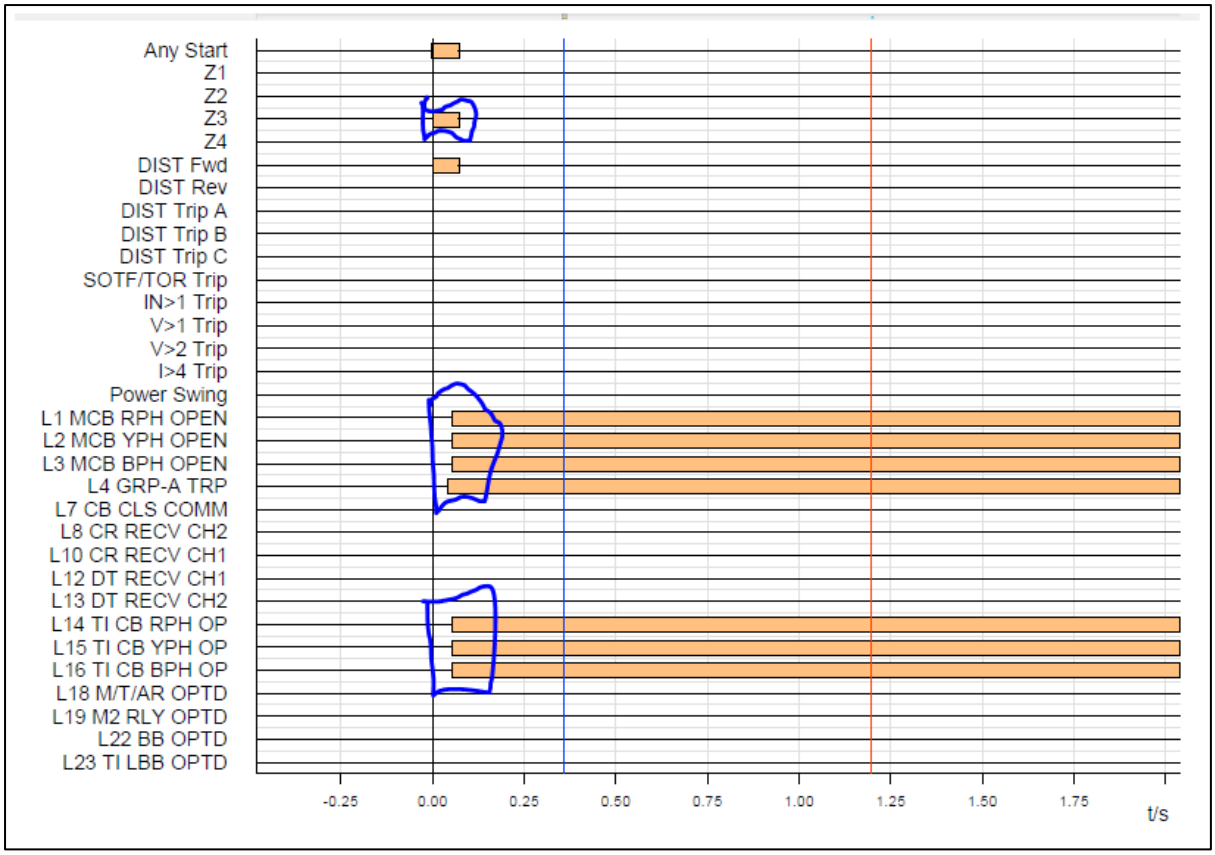
Tripping of 400 Kv Behrampur -Sagardighi I :

It has been observed that from Sagardighi end this line tripped , on 2 occasions sensing the fault of some other line , in Zone-3 instantaneously ,without delay ,while line was holding from Behrampur end .This is causing un necessary tripping of line and reducing the reliability of system .Root cause may be identified and mitigated as soon as possible.

400KV-BAHARAMPUR-SAGARDIGHI-1	11-05-2021	12:30	Tripped from sagrdighi end only.R-B, Zone-3	Some other line fault was sensed in zone-3 from sagardighi end and ,3 phase tripped immediately from sagardighi end , No tripping from behrampur end.
400KV-BAHARAMPUR-SAGARDIGHI-1	21-04-2021	18:54	Tripped from sagrdighi end only. Zone 3, y-b, If(Y) 3.09KA, If(B)2.9KA. location 171.1km	Some other line fault was sensed in zone-3 from sagardighi end and ,3 phase tripped immediately from sagardighi end , No tripping from behrampur end.

DR at Sagardighi End for Tripping on 11/05/2021 at 12:30 Hrs:




Any Start
Z1
Z2
Z3
Z4
DIST Fwd
DIST Rev
DIST Trip A
DIST Trip B
DIST Trip C
SOTF/TOR Trip
IN>1 Trip
V>1 Trip
V>2 Trip
I>4 Trip
Power Swing
L1 MCB RPH OPEN
L2 MCB YPH OPEN
L3 MCB BPH OPEN
L4 GRP-A TRP
L7 CB CLS COMM
L8 CR RECV CH2
L10 CR RECV CH1
L12 DT RECV CH1
L13 DT RECV CH2
L14 TI CB RPH OP
L15 TI CB YPH OP
L16 TI CB BPH OP
L18 M/T/AR OPTD
L19 M2 RLY OPTD
L22 BB OPTD
L23 TI LBB OPTD
-0.25
0.00
0.25
0.50
0.75
1.00
1.25
1.50
1.75
t/s

Annexure B.9.B

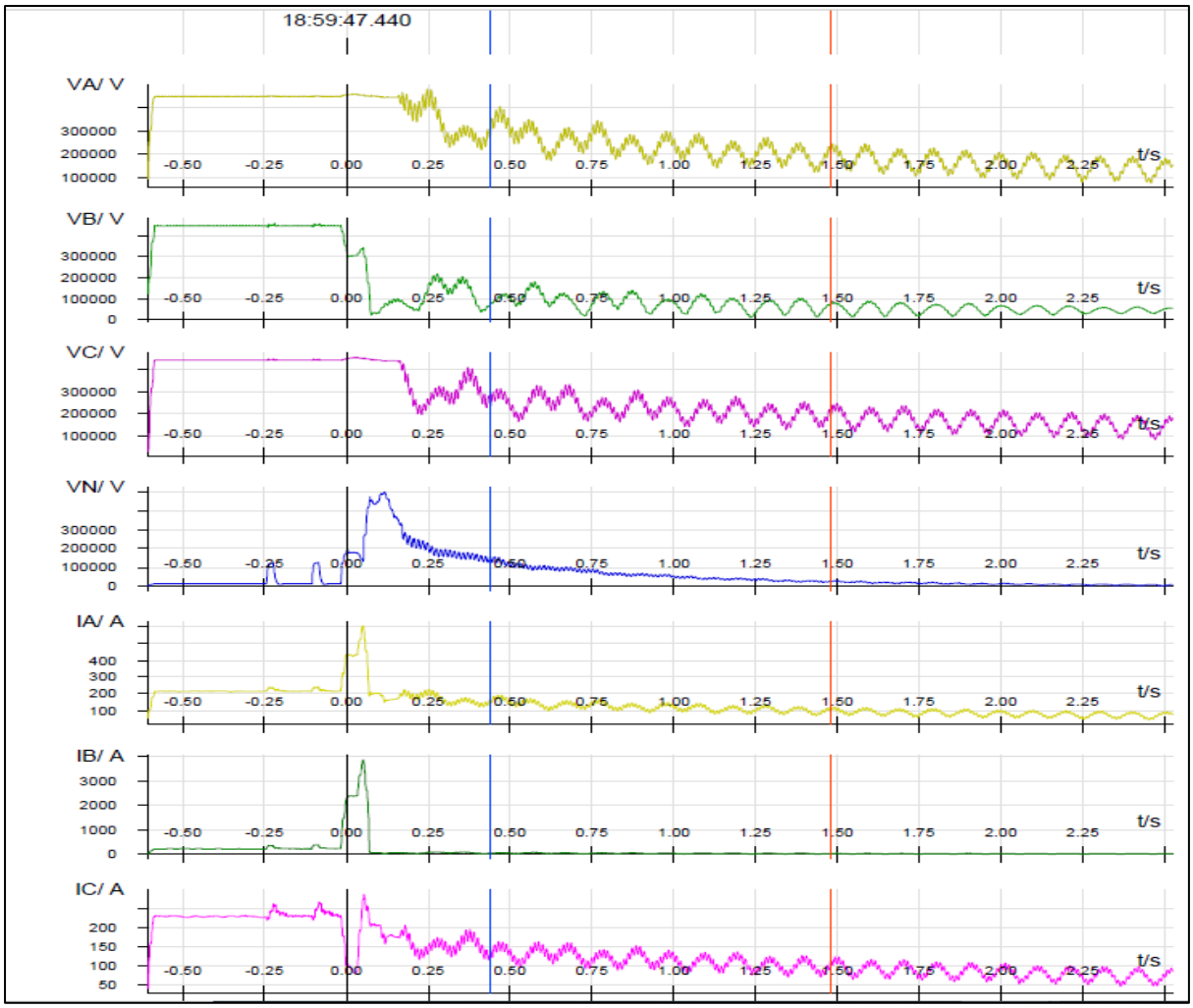
It has been observed that 765 kV New Ranchi -Mednipur lines have tripped 6 times in past few days. Line tripping details are mentioned below along with remarks .

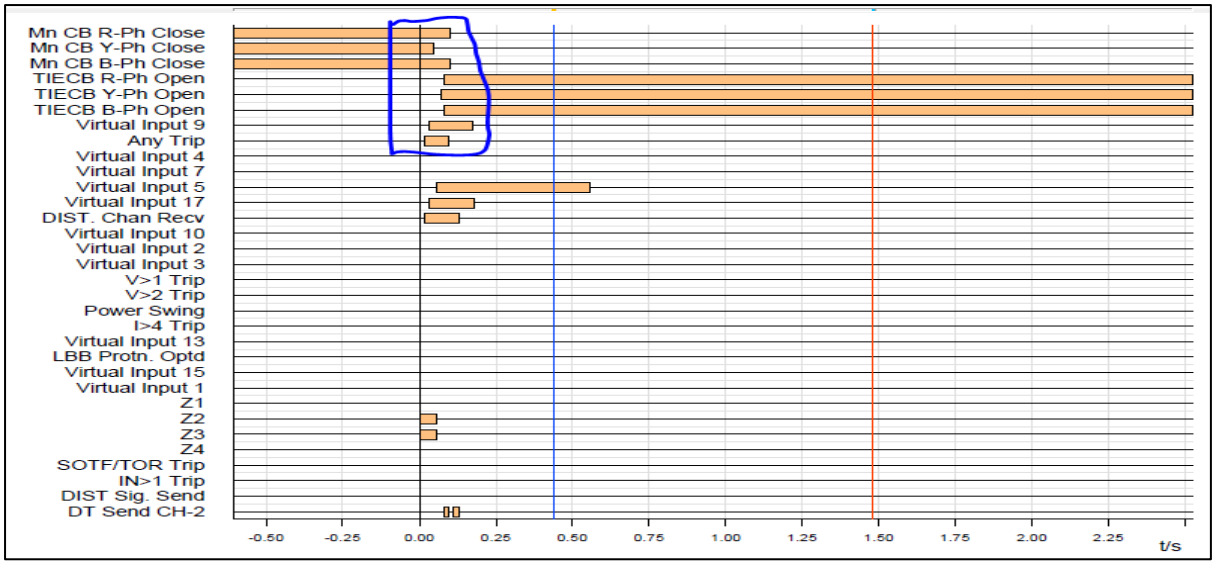
Sr.No	Element Name	Tripping Date	Tripping Time	Relay(Ranchi end)	Relay(Medinipur end)	REMARKS
1	765KV-NEW RANCHI-MEDINIPUR-1	21-05-2021	14:52	N Ranchi: RN, 71.5km 6.26ka	Medinipur:A/R successful	For single phase fault ,3 phase tripping instantaneously, without A/R attempt from New Ranchi end.
2	765KV-NEW RANCHI-MEDINIPUR-2	19-05-2021	15:02	New Ranchi: B_N, 3.72 kA, 137.1 KM	Medinipur: B_N, 79.1 KM, 0.65 kA	For single phase fault ,3 phase tripping instantaneously, without A/R attempt from New Ranchi end.
3	765KV-NEW RANCHI-MEDINIPUR-2	18-05-2021	18:43	N Ranchi: YN, 2.10KA, 255.3km	MEDINIPUR: Y-N, Z1, FD: 9.10KM, FC: 5.592 KA	For single phase fault ,3 phase tripping instantaneously, without A/R attempt from New Ranchi end.
4	765KV-NEW RANCHI-MEDINIPUR-1	18-05-2021	17:47	N Ranchi: RN, 169.5km 3.26ka	Medinipur: Z1, RN, 92km, 3KA	For single phase fault ,3 phase tripping instantaneously, without A/R attempt from New Ranchi end.
5	765KV-NEW RANCHI-MEDINIPUR-1	07-05-2021	15:26	New Ranchi End:R_N FD:8.05km FC: 9.3 kA	Medinipur end:R_N FD:234km FC: 1.98 kA	For single phase fault ,3 phase tripping instantaneously, without A/R attempt from New Ranchi end.
6	765KV-NEW RANCHI-MEDINIPUR-2	03-05-2021	18:59	N. Ranchi: Y-N, 3.8kA, 79.1Km	Medinipur: Y-N, 4.8kA, 25.9Km	For single phase fault ,3 phase tripping instantaneously, without A/R attempt from New Ranchi end.

Following observations in regard to these tripping have been found based on DR/EL analysis .Which needs to be attended and resolved to avoid unnecessary trippings.

Non-operation of Auto Reclose:

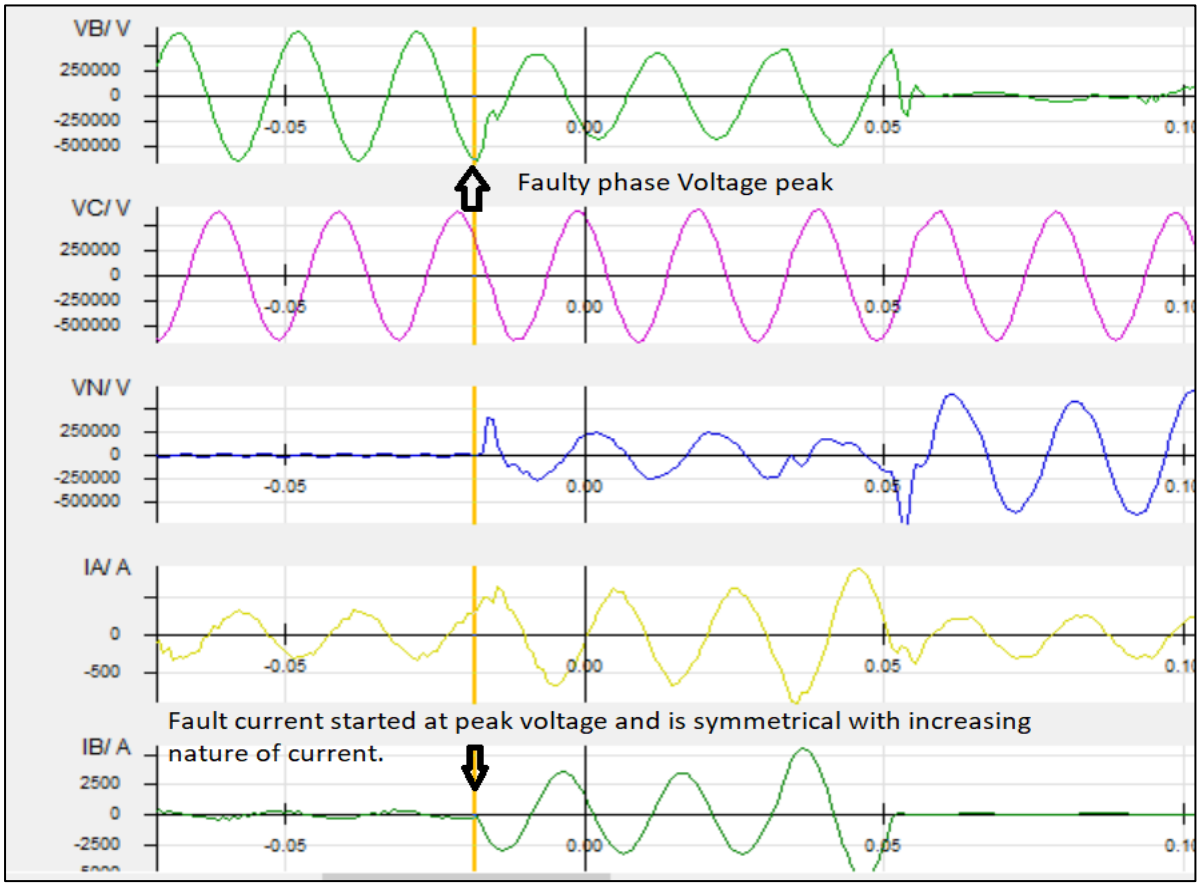
It has been observed from DR that in all the above tripping incidents, there was no Auto reclose attempt from New Ranchi end and 3 phase tripping occurred instantaneously at the instant of fault .Whether A/R is disabled or anti-theft setting is there inadvertently .Root cause may be found and mitigated.





Fault due to Arc over / Tree Fault:

From DR signature analysis it is observed that fault seems to be due to vegetation issue as all faults are occurring at voltage peak as arc over is occurring at voltage peak due to high electrical stress. Fault currents are symmetrical and have no Dc offset due to vegetation fault occurring at peak and with increasing nature of current.



Annexure B.10.A

List of important transmission lines in ER which tripped in MAY-2021

S.NO	LINE NAME	TRIP DATE	TRIP TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	DR CONFIGURATION DESC	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE	LOCAL END UTILITY	REMOTE END UTILITY
1	400KV-BINAGURI-TALA-1	05-01-2021	05:32	BINAGURI: B-N, 101.39 KM, 3.772 KA; TALA: B-N, 2.88 KA, 56 KM	B-N, 2.88 KA, 56 KM	B-Earth	<100	Binaguri end A/R successful , but after 1.5 sec DT received from Tala end due to PD operation.		YES	NO	PG-ER-2	BHUTAN
2	220KV-NEW PURNEA-MADHEPURA-1	05-01-2021	13:14	Madhepura: B-N z1, dist-40.2km IL3-1.31kA	N_Purnea: B-N, 60.62KM, 1.2kA	B-Earth	300	High resistive fault observed ,from one end(purnea) 3 phase line tripping occurred and other end only B phase opened but A/R attempt not occurred ,and tripped through PD.	DR time frame not sufficient.	YES	NO	PG-ER-1	BSPTCL
3	220KV-NEW PURNEA-MADHEPURA-1	05-01-2021	12:16	New_Purnea: B-N, FD: 61.59kM, FC: 1.265kA	Madhepura: B-N ,Z1,DIST-40.3KM,IL3-1.34KA	B-Earth	300	High resistive fault observed ,from one end(purnea) 3 phase line tripping occurred and other end only B phase opened but A/R attempt not occurred ,and tripped through PD.			NO	PG-ER-1	BSPTCL
4	400KV-MAITHON-MEJIA-3	05-02-2021	16:03	Line only tripped from Mejia end only	NO FAULT		N/A	From Mejia end Z-3 started Fault of DSTPS-RTPS sensed and tripped within 100ms, Reson may be explained?		NO	YES	PG-ER-2	DVC
5	400KV-DSTPS(ANDAL)-RAGHUNATHPUR-	05-02-2021	16:03	Carrier send, Tripped Phase- A, Fault Current Ia = 9.395 KA, Fault Distance= 35.30 KM. Relay: 86A1,86A1X, 86, 79		R-Earth	<100	Even after unsuccessful MCB A/R , TCB reclosed from DSTPS end leading to repeted fault feeding from generating station.MaY EB CORRECTED AS SOON AS POSSIBLE.		YES	YES	DVC	
6	400KV-FSTPP-KHSTPP-3	05-03-2021	18:30		Z-1, B-ph, F.C.-21kA, F.D.-10kM (KHSTPP)	B-Earth	<100	From kahalgaon end 3 phase tripping occurred no A/R.		YES	YES	FSTPP	KHSTPP
7	765KV-NEW RANCHI-MEDINIPUR-2	05-03-2021	18:59	N. Ranchi: Y-N, 3.8kA, 79.1Km	Medinipur: Y-N, 4.8kA, 25.9Km	Y-Earth	<100	3 PHASE tripping from ranchi end .Reason may be shared?,3 ph tripping from Mednipur end also		YES	NO	PG-ER-1	
8	400KV-MAITHON-KHSTPP-2	05-03-2021	18:35	Tripped from KHSTPP end only	NO FAULT		N/A	Reason may be shared.		NO	NO		KHSTPP
9	400KV-MAITHON-KHSTPP-1	05-03-2021	18:30	Tripped from KHSTPP end only during tripping of 400kV FSTPP-KHSTPP #3.	NO FAULT		N/A	Reason may be shared.		NO	YES		KHSTPP

10	400KV-KHSTPP-BANKA (PG)-2	05-03-2021	18:53		Banka: Y_N, 48.8 KM, 5.1 kA	Y-Earth	<100	3 Phhase tripping from Banka and KHSTPP end.Whether A/R was disabled or fault was in reclaim time?		YES	YES	KHSTPP	PG-ER-1
11	400KV-BIHARSARIFF(PG)-BANKA(PG)-2	05-03-2021	17:45	Biharsharif: Y_N, 108.4 KM, 3.1 kA	Banka: Y_N, 67.1 KM, 4.4 kA	Y-Earth	<100	3 Phhase tripping from Banka and BSF end.A/R was under shutdown.		YES	YES	PG-ER-1	
12	400KV-PUSAULI(PG)-DALTONGANJ-2	05-03-2021	13:37	Sasaram: Y_N, 74.4 KM, 4.5 kA	Daltonganj: Y_N, 91 KM, 2.05 kA	Y-Earth	200	MCB A/R failed and 3 phase MCB opened and immediately Y phase tcb also reclosed and failed but R&Y phase remain closed hence after 2.5 sec PD operated .Also oscillating voltage in Faulty phase during dead time observed.		YES	YES	PG-ER-1	
13	400KV-FSTPP-KHSTPP-1	05-03-2021	18:00	FSTPP: Y-N, 5.7 KA, 70 km		Y-Earth	<100	From kahalgaon end 3 phase tripping occurred no A/R.		NO	YES	NTPC	
14	400KV-LAKHISARAI-KHSTPP-2	05-05-2021	16:43	Lakhisarai: Y_N, 46.04 KM, 10.48 kA	KHSTPP: Y_N, 114.2 KM, 3.82 kA	Y-Earth	<100	A/r successful from KHSTPP only,3 phase trip from Lakhisarai end		YES	YES	PG-ER-1	KHSTPP
15	220KV-CHANDIL-RANCHI-1	05-05-2021	13:46	Tripped from Ranchi end(Ranchi: R_N, 68.2 KM, 2.4 kA)	Chandil: R-N, 19.3Km, 4.3kA	R-Earth	500	Reason for delayed clearance ?		NO	NO	JUSNL	PG-ER-1
16	400KV-GOKARNA-SAGARDIGHI-2	05-07-2021	17:54	Gok: Z-1, R Ph, 25.49 km, 11.45 KA.	SGTPP: Z1 Phase : R ph Fault current : 16.63 KA Fault	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBPDCL
17	220KV-MAITHON-DUMKA-1	05-07-2021	15:45	Maithon End:B_N Fault Z2 FD-61 Km FC- 2.915 kA	Dumka End:B_N Fault Z1 FD-1.137 Km Fc-4.46 kA	B-Earth	<100	Fault clearing time from Dumka end around 550msec		NO	NO	PG-ER-2	JUSNL
18	765KV-NEW RANCHI-MEDINIPUR-1	05-07-2021	15:26	New Ranchi End:R_N FD:8.05km FC: 9.3 kA	Medinipur end:R_N FD:234km FC:	R-Earth	<100	3 PHASE tripping from ranchi end .Reason may be shared?		YES	NO	PG-ER-1	
19	220KV-GAYA-KHIZERSARAI-1	05-08-2021	00:19	Gaya: R-N, 21.3Km, 6.6kA	Khizersarai: Did not trip	R-Earth	<100	From Gaya end 3 phase tripping while from khezesari A/R successful		YES	NO	PG-ER-1	BSPTCL
20	400KV-GOKARNA-SAGARDIGHI-2	05-07-2021	18:19	Gok:- R Ph, Z-1, 25.5 Km, 6.5 KA.	R ph,Fault current : 16.51 KA, Fault Distance : 6.292	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBSEDCL
21	220KV-CHANDIL-STPS(WBPDCL)-1	05-09-2021	12:52		STPS: Z-1, Y_N, FD-26.21 KM, FC-4.66 KA: CHANDIL:	Y-Earth	<100	A/R from Chandil end ,STPS end no A/R ,3 phase trip.		YES	NO	JUSNL	WBPDCL
22	220KV-MUZAFFARPUR-KANTI-1	05-10-2021	17:19	Tripped from Muzaffarpur end only		R-Earth	<100	From Muzzafferpur end only R phase opened but didn't reclosed and after 1.5 sec all 3 pole tripped dur to PD OPERATION.		YES	NO	PG-ER-1	BSPTCL
23	400KV-BAHARAMPUR-SAGARDIGHI-1	05-11-2021	12:30	Details awaited	Tripped from sagrdighi end only.	NO FAULT	N/A	Some other line fault was sensed in zone-3 from sagrdighi end and ,3 phase tripped immediately from sagrdigi end , No tripping from behrampur end.		NO	YES	PG-ER-2	WBPDCL
24	400KV-FSTPP-KHSTPP-1	05-11-2021	11:35	B_N		B-Earth	<100	3 Phase tripping from farakka end while from kahalgaon end A/R successful.		YES	YES	NTPC	

25	400KV-NEW PPSP-NEW RANCHI-2	05-12-2021	14:17	NPPSP-AR successful Z1 R-N FD-1.9km FC-13.53kA	NRanchi- Z1 R-N FD-79.9km FD-4.6kA	R-Earth	500	NPPSP end Z-2 detected but no carrier recvd hence 3 phase tripping from ranchi end afterz-2 time while from ppsp end A/R was successful.Reason for non receipt of carrier may be investigated,to avoid such delayed clarance and line trippings.		NO	YES	WBSETCL	PG-ER-1
26	220KV-DALTONGUNJ-GARWAH (NEW)-1	13/05/2021	02:39	Daltongunj: BN, 70.1km, 1.63 kA,	Bad weather at Garwah	B-Earth	<100	Once A/R was successful but again fault in reclaim time in zone-2 from daltonganj but this time no carrier receipt so tripped after z-2 time ,this needs to be avoided ,reason for the same may be faound and rectified.		YES	NO	PG-ER-1	JUSNL
27	220KV-CHANDAUTI (PMTL)-SONENAGAR	13/05/2021	02:08	Chandauti- B-N, 76.2kM, If-76A		B-Earth	500	Fault was in z-2 of Chandauti and tripped after z-2 time ,seems no carrier based communication else tripping coild have been avoided with A/R.?		YES	NO	PG-ER-1	BSPTCL
28	220KV-CHANDAUTI (PMTL)-SONENAGAR	13/05/2021	02:08	Chandauti- B-N, If-679A		B-Earth	500	Fault was in z-2 of Chandauti and tripped after z-2 time ,seems no carrier based communication else tripping coild have been avoided with A/R.?		YES	NO	PG-ER-1	BSPTCL
29	400KV-DURGAPUR-SAGARDIGHI-2	15/05/2021	14:07	Durgapur: B-N, 3.44kA, 113km	ZONE 1, B-PHASE, 18.02 KA,8.74 KM	B-Earth	<100	3 phase tripping from Sagardighi end no A/R?		YES	YES	PG-ER-2	WBPDCL
30	220KV-GOKARNA-SAGARDIGHI-2	15/05/2021	13:27	GOKARNA: R-N, 25KM, 11KA	Sagardighi: R-N, 15kA, 5.7km	R-Earth	<100	3 phase tripping from Sagardighi end no A/R?		NO	YES	WBSEDCL	WBSETCL
31	220KV-MAITHON-DUMKA-2	15/05/2021	12:01	MAITHON- R-N, 4.7KA, 45KM	Dumka : R-N, Z1, 23KM, 0.9KA.	R-Earth	<100	3 phase tripping from both end ,No A/R operation?		YES	YES	PG-ER-1	JUSNL
32	220KV-SUBHASGRAM-SUBHASGRAM-2	15/05/2021	06:23	SUBHASGRAM(PG) -POWER SWING	NO TRIPPING AT SUBHASGRAM	NO FAULT	NA	No fault in Line reason may be shared?		NO	YES	WBSETCL	PG-ER-2
33	400KV-RANCHI-RAGHUNATHPUR-3	16/05/2021	15:34	Ranchi: BN, 58km, 5.52KA, RTPS: Z1, BN, 120km, 3.39KA	RTPS: Z1, BN, 120km, 3.39KA	B-Earth	<100	At the fault instance ,3 phase TCB also got opened along with R phase MCB at Ranchi end .	DR configuration at each end may be	YES	YES	PG-ER-1	DVC
34	220KV-DEHRI-GAYA-1	17/05/2021	22:24	B-N FAULT, 50.86 km, Fc= 2.91 kA	FAULT, 50.86 km, Fc= 2.91 kA	B-Earth	<100	A/R successful from Gaya end , Dehri end 3 phase tripping no A/R?		YES	YES	PG-ER-1	BSPTCL
35	220KV-GOKARNA-SAGARDIGHI-2	17/05/2021	15:46	Gokarna:R-N, 19.59 Km, 10.84 KA;	Sagardighi: R-N, 6km, 16kA	R-Earth	160	3 phase tripping from Sagardighi end no A/R?		NO	YES	WBSETCL	WBPDCL
36	765KV-ANGUL-JHARSUGUDA-3	17/05/2021	15:31	Angul: B-N, 10kA, 2km	JHARSUGUDA: B-N fault, 3.1kA, 280km,	B-Earth	<100	and after 1 second MCB did not got closed,and after 2 seconds TCB reclosed and was successful so line was charged from Angul end ,while from Jharsuguda end after 1 second A/R unsuccessful and line tripped.		YES	YES	PG-ER-3	

37	400KV-FSTPP-GOKARNA (N Purnea bypass t	18/05/2021	21:41	FSTPP- B-N, Z2, 4kA, 115km	GOKARNA: Z1,B-N, 16.78KM,11.04KA; FSTPP- B-N, Z2, 4kA, 115km	B-Earth	500	Tripped in zone-2 from Farakka , No carrier received at Fstpp end .Carrier communication issue?		YES	NO	NTPC	WBSETCL
38	765KV-NEW RANCHI-MEDINIPUR-2	18/05/2021	18:43	N Ranchi: YN, 2.10KA, 255.3km	N, Z1, FD: 9.10KM, FC: 5.592 KA	Y-Earth	<100	3 phase tripping from new ranchi no auto reclsoe.		NO	NO		
39	765KV-NEW RANCHI-MEDINIPUR-1	18/05/2021	17:47	N Ranchi: RN, 169.5km 3.26ka	Medinipur: Z1, RN, 92km, 3KA	R-Earth	<100	3 phase tripping from new ranchi no auto reclsoe.		YES	NO	PG-ER-1	PMJTL
40	220KV-DALTONGUNJ-GARWAH (NEW)-1	18/05/2021	14:51	Dal-B-ph,37.16kM,2.784kA	Garwah: Ir-301, Iy-374, Ib-305	B-Earth	<100	As one ckt was out ,radial feed from only pg end so line B phase tripped from pg end while no tripping from garwa end but after 1 sec when A/R unsuccessful from Pg end and 3 phase tripping occurred.Radial feed protection or week infeed required at Garwa end.		YES	YES	PG-ER-1	JUSNL
41	220KV-DALTONGUNJ-GARWAH (NEW)-2	18/05/2021	14:46	Dal-Rph,18.46kM,3.706kA	Garwah: Ir-678A, Iy-73.7A, Ib-188A	R-Earth	<100	A/R unsuccessful from Garwa end,from Daltonganj end R phase opened but didn't reclosed hence it seems PD operated after 2.5 seconds.		YES	YES	PG-ER-1	JUSNL
42	765KV-NEW RANCHI-MEDINIPUR-2	19/05/2021	15:02	New Ranchi: B_N, 3.72 kA, 137.1 KM	Medinipur: B_N, 79.1 KM, 0.65 kA	B-Earth	<100	3 phase tripping on 1 phase fault		YES	NO	PG-ER-1	PMJTL
43	220KV-GAYA-KHIZERSARAI-1	20/05/2021	13:16	Gaya Z1 R-N FC-15.8kA FD-6.25km		R-Earth	<100	3 phase tripping from gaua end at the instance of fault.		YES	NO	PG-ER-1	
44	220KV-CHANDAUTI (PMTL)-SONENAGAR	20/05/2021	03:41	CHANDAUTI: B-N,Z2. 76.2KM, 0.664KA	Not tripped from Sonenagar End	B-Earth	560	Fault was in z-2 of Chandauti and tripped after z-2 time ,seems no carrier based communication else tripping coild have been avoided with A/R.?		YES	NO	PMTL	BSPTCL
45	220KV-CHANDAUTI (PMTL)-SONENAGAR	20/05/2021	03:41	CHANDAUTI: B-N,Z2. 76.2KM, 0.665KA	Not tripped from Sonenagar End	B-Earth	560	Fault was in z-2 of Chandauti and tripped after z-2 time ,seems no carrier based communication else tripping coild have been avoided with A/R.?		YES	NO	PMTL	BSPTCL
46	765KV-NEW RANCHI-MEDINIPUR-1	21/05/2021	14:52	R_N, 71.6 KM, 5.8 6kA (New Ranchi);	R_N, 211 KM, 1.871 kA (Medinipur);A/r successful from	R-Earth	<100	A/R successful from Medinapur , from N ranchi 3 phase trippign.		YES	NO	PG-ER-1	PG-ER-2
47	400KV-GOKARNA-SAGARDIGHI-2	25/05/2021	02:34	Z-1,R-N fault,FC-16.17KA,FD-6.409KM from Gokarna end.	Z-1,R-N fault,FC-16.16KA,FD-6.25KM from Sagardighi end	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBPDCL
48	400KV-GOKARNA-SAGARDIGHI-2	25/05/2021	02:09	Z-1,R-N fault,FC-16.07KA,FD-6.22KM from Gokorna end.	Z-1,R-N fault,FC-16.12KA,FD-6.36KM from Sagardighi end	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBPDCL
49	400KV-RENGALI-KEONJHOR(PG)-1	26/05/2021	20:06	DT RECEIVED AT RENGALI, KEONJHOR RELAY DID NOT TRIP		NO FAULT	NA	No fault in PMU reason may be shared.		NO	NO	PG-ER-3	

50	400KV-GOKARNA-SAGARDIGHI-2	26/05/2021	11:43		Phase: R, Distance: 6.192 KM, Fault current: 15.95 KA, ZONE: 1	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBP DCL
51	400KV-GOKARNA-SAGARDIGHI-2	26/05/2021	10:39	Gokona: Z-I, R-N, 11.1KA, 25.5km	Sagardighi: Z-I, R-N, 15.7KA, 6.6km	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBP DCL
52	400KV-GOKARNA-SAGARDIGHI-2	27/05/2021	05:51	Gokarno End: R-N, Z1, FD: 25.39 Km, FC: 10.85 KA		R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBP DCL
53	400KV-GOKARNA-SAGARDIGHI-2	27/05/2021	02:28	Gokarna: Z1, R-N, 25.47Km, 11.68KA.	SgTPP: Z1, R-N, 6.347Km, 15.98 KA	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBP DCL
54	400KV-GOKARNA-SAGARDIGHI-2	27-05-2021	21:17	GOKARNO Z1 R PH 6.15 KM 16 ka	FC: 15.34 KA, Zone: 1, FD: 6.589 KM	R-Earth	<100	No A/r observed from sagardighi end ,3 phase tripping occurred while at gokarno end A/R operated but was unsuccessful.		NO	YES	WBSETCL	WBP DCL

Annexure B.10.B

Sr .No	LINE NAME	TRIP DATE	TRIP TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	Utility to update	Utility Response
1	765KV-NEW RANCHI-MEDINIPUR-2	05-03-2021	18:59	N. Ranchi: Y-N, 3.8kA, 79.1Km	Medinipur: Y-N, 4.8kA, 25.9Km	Y-Earth	<100	3 PHASE tripping from ranchi end .Reason may be shared?,3 ph tripping from Mednipur end also	PG-ER-1	OEM M/s Siemens has been consulted and testing of the bays have been conducted after updation of AR block logic.
2	400KV-BIHARSARIFF(PG)-BANKA(PG)-2	05-03-2021	17:45	Biharsharif: Y_N, 108.4 KM, 3.1 kA	Banka: Y_N, 67.1 KM, 4.4 kA	Y-Earth	<100	3 Phhase tripping from Banka and BSF end.A/R was under shutdown.	PG-ER-1	A/R was off due to OPGW work.
3	400KV-PUSAULI(PG)-DALTONGANJ-2	05-03-2021	13:37	Sasaram: Y_N, 74.4 KM, 4.5 kA	Daltonganj: Y_N, 91 KM, 2.05 kA	Y-Earth	200	MCB A/R failed and 3 phase MCB opened and immediately Y phase tcb also reclosed and failed but R&Y phase remain closed hence after 2.5 sec PD operated .Also oscillating voltage in Faulty phase during dead time observed.	PG-ER-1	At Sasaram end:- Main bay tripped in persistent fault but Tie bay attempted AR and then opened only Y pole. The other poles opened in PD. Subsequent AR event have been found alright. The events have been referred to OEM for further analysis and the testing will be done in opportunity SD.
4	400KV-LAKHISARAI-KHSTPP-2	05-05-2021	16:43	Lakhisarai: Y_N, 46.04 KM, 10.48 kA	KHSTPP: Y_N, 114.2 KM, 3.82 kA	Y-Earth	<100	A/r successful from KHSTPP only,3 phase trip from Lakhisarai end	PG-ER-1	A/R lockout operated due to non receipt of status of B pole momentarily during the event. The wiring etc have been checked and found OK.
5	765KV-NEW RANCHI-MEDINIPUR-1	05-07-2021	15:26	New Ranchi End:R_N FD:8.05km FC: 9.3 kA	Medinipur end:R_N FD:234km FC: 1.98 kA	R-Earth	<100	3 PHASE tripping from ranchi end .Reason may be shared?	PG-ER-1	OEM M/s Siemens has been consulted and testing of the bays have been conducted after updation of AR block logic.
6	220KV-GAYA-KHIZERSARAI-1	05-08-2021	00:19	Gaya: R-N, 21.3Km, 6.6kA	Khizersarai: Did not trip	R-Earth	<100	From Gaya end 3 phase tripping while from khezesari A/R successful	PG-ER-1	Bay maintained by BGCL.

7	220KV-MUZAFFARPUR-KANTI-1	05-10-2021	17:19	Tripped from Muzaffarpur end only		R-Earth	<100	From Muzzafferpur end only R phase opened but didn't reclosed and after 1.5 sec all 3 pole tripped dur to PD OPERATION.	PG-ER-1	Due to cable puncture of the CB tripping ckt. The cable has been replaced and then rectified the issue.
8	400KV-NEW PPSP-NEW RANCHI-2	05-12-2021	14:17	NPPSP-AR successful Z1 R-N FD-1.9km FC-13.53kA	NRanchi-Z1 R-N FD-79.9km FD-4.6kA	R-Earth	500	NPPSP end Z-2 detected but no carrier recvd hence 3 phase tripping from ranchi end afterz-2 time while from ppsp end A/R was successful.Reason for non receipt of carrier may be investigated,to avoid such delayed clarance and line trippings.	PG-ER-1	PLCC issue has been taken up with ABB as even though counter increased, the signal was not rceeived in relay.
9	220KV-CHANDAUTI (PMTL)-SONENAGAR-2	13/05/2021	02:08	Chandauti- B-N, 76.2kM, If-76A		B-Earth	500	Fault was in z-2 of Chandauti and tripped after z-2 time ,seems no carrier based communication else tripping coild have been avoided with A/R.?	PG-ER-1 ,BSPTCL	PLCC maintained by BSPTCL. However, fault location may be confirmed by BSPTCL
10	220KV-CHANDAUTI (PMTL)-SONENAGAR-1	13/05/2021	02:08	Chandauti- B-N, If-679A		B-Earth	500	Fault was in z-2 of Chandauti and tripped after z-2 time ,seems no carrier based communication else tripping coild have been avoided with A/R.?	PG-ER-1 ,BSPTCL	PLCC maintained byBSPTCL. However, fault location may be confirmed by BSPTCL
11	765KV-NEW RANCHI-MEDINIPUR-2	18/05/2021	18:43	N Ranchi: YN, 2.10KA, 255.3km	MEDINIPUR: Y-N, Z1, FD: 9.10KM, FC: 5.592 KA	Y-Earth	<100	3 phase tripping from new ranchi no auto reclsoe.	PG-ER-1	OEM M/s Siemens has been consulted and testing of the bays have been conducted after updation of AR block logic.
12	765KV-NEW RANCHI-MEDINIPUR-1	18/05/2021	17:47	N Ranchi: RN, 169.5km 3.26ka	Medinipur: Z1, RN, 92km, 3KA	R-Earth	<100	3 phase tripping from new ranchi no auto reclsoe.	PG-ER-1	OEM M/s Siemens has been consulted and testing of the bays have been conducted after updation of AR block logic.
13	220KV-DALTONGUNJ-GARWAH (NEW)-2	18/05/2021	14:46	Dal-Rph,18.46kM,3.706kA	Garwah: Ir-678A, Iy-73.7A, Ib-188A	R-Earth	<100	A/R unsuccessful from Garwa end,from Daltonganj end R phase opened but didn't reclosed hence it seems PD operated after 2.5 seconds.	PG-ER-1	Fault in reclaim time after 18 sec. The second DR has been sent by mail on 05.06.21 at 16:51 hours.

14	765KV-NEW RANCHI-MEDINIPUR-2	19/05/2021	15:02	New Ranchi: B_N, 3.72 kA, 137.1 KM	Medinipur : B_N, 79.1 KM, 0.65 kA	B-Earth	<100	3 phase tripping on 1 phase fault	PG-ER-1	OEM M/s Siemens has been consulted and testing of the bays have been conducted after updation of AR block logic.
15	220KV-GAYA-KHIZERSARAI-1	20/05/2021	13:16	Gaya Z1 R-N FC-15.8kA FD-6.25km		R-Earth	<100	3 phase tripping from gaua end at the instance of fault.	PG-ER-1	Line maintained by BGCL
16	765KV-NEW RANCHI-MEDINIPUR-1	21/05/2021	14:52	R_N, 71.6 KM, 5.86kA (New Ranchi);	R_N, 211 KM, 1.871 kA (Medinipur);A/r successful from Medinipur only	R-Earth	<100	A/R successful from Medinapur , from N ranchi 3 phase trippign.	PG-ER-1	OEM M/s Siemens has been consulted abd testing of the bays have been conducted and found OK. Further, checking of the same is under progress by OEM.
17	765KV-ANGUL-JHARSUGUDA-3	17/05/2021	15:31	Angul: B-N, 10kA, 2km	JHARSUGUDA: B-N fault, 3.1kA, 280km,	B-Earth	<100	From Angul end all 3phase MCB opened and after 1 second MCB did not got closed,and after 2 seconds TCB reclosed and was successful so line was charged from Angul end ,while from Jharsuguda end after 1 second A/R unsuccessful and line tripped.	PG-ER-3	After the fault, AR was successful from sundargarh after 1 sec of AR deadtime. But the fault was persisting and line got tripped at sundargarh. Meanwhile, Main CB AR was unsuccessful at Angul due to DIGSI 5 BCU issue and tie CB AR after priority timing (2 sec) taken place thereby holding the line. Temporary persisting fault might have cleared during first AR attempt by sundargarh after 1 sec. Line got charged from angul after closing attempt taken by Tie CB after 2sec. Main CB AR unsuccessful issue was taken up with OEM for review of setting" Start signal supervision" and CFC logic of AR operation in main CB BCU.

18	400KV-RENGALI-KEONJHOR(PG)-1	26/05/2021	20:06	DT RECEIVED AT RENGALI, KEONJHOR RELAY DID NOT TRIP		NO FAULT	NA	No fault in PMU reason may be shared.	PG-ER-3	During cyclone, heavy rain with gusty winds were present. DC E/F occurred due to water ingression into CB MB and DT was extended to remote end. NO tripping at Keonjhar and line got tripped form Rengali only. Reports with DRs of Rengali uploaded in PDMS.
19	400KV-MAITHON-MEJIA-3	05-02-2021	16:03	Line only tripped from Mejia end only		NO FAULT	N/A	From Mejia end Z-3 started Fault of DSTPS-RTPS sensed and tripped within 100ms, Reson may be explained?	DVC	Yet to be rectified. Delay due to Covid.
20	400KV-DSTPS(ANDAL)-RAGHUNATHPUR-1	05-02-2021	16:03	DSTPS-: Zone-1, R- Phase , Carrier send, Tripped Phase- A, Fault Current Ia = 9.395 KA, Fault Distance= 35.30 KM. Relay: 86A1,86A1X, 86, 79		R-Earth	<100	Even after unsuccessful MCB A/R , TCB reclosed from DSTPS end leading to repeted fault feeding from generating station.MaY EB CORRECTED AS SOON AS POSSIBLE.	DVC	Yet to be rectified. Delay due to Covid.
21	400KV-RANCHI-RAGHUNATHPUR-3	16/05/2021	15:34	Ranchi: BN, 58km, 5.52KA, RTPS: Z1, BN, 120km, 3.39KA	RTPS: Z1, BN, 120km, 3.39KA	B-Earth	<100	At the fault instance ,3 phase TCB also got opened along with R phase MCB at Ranchi end .	DVC	Yet to be rectified. Delay due to Covid.