Minutes
of
92nd PCC Meeting

Date: 22.07.2020
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 92ND PROTECTION SUB-COMMITTEE MEETING HELD ON 22.07.2020 AT 10:30 HOURS

The meeting was conducted through WEBEX online platform. List of participants is enclosed at **Annexure-A**.

PART – A

ITEM NO. A.1: Confirmation of minutes of 91st Protection sub-Committee Meeting held on 24th June 2020 at ERPC, Kolkata.

The minutes of 91st Protection Sub-Committee meeting held on 24.06.2020 circulated vide letter dated 13.07.2020 .

Members may confirm the minutes of 91st PCC meeting.

Deliberation in the meeting

Members confirmed the minutes of 91st PCC Meeting.

PART – B

FOLLOW-UP OF DECISIONS OF 91st PCC MEETING:

ITEM NO. B.1: Disturbance at 220 k V Darbhanga Substation on 05.05.2020 at 19:09 hrs.

On 5th May 2020, at 19:09 Hrs, 220 kV Darbhanga (DMTCL)-Darbhanga (BSPTCL) D/C tripped on Y phase to earth fault. At the same time 220 kV Dharbanga-Mushahari-1 also tripped resulting in load loss at Darbhanga, Madhubani and Pandaul. Later on it was informed by BSPTCL that there was a Y-phase jumper snapping of 220 kV Darbhanga (DMTCL)-Darbhanga (BSPTCL) - 2 which was the root cause of the event.

In 91st PCC, BSPTCL informed that snapping of Y-phase jumper of 220 kV Darbhanga (DMTCL)-Darbhanga (BSPTCL) circuit 1 was the root cause of the event. The line was tripped from BSPTCL end on zone 1 but with 600 msec delay.

BSPTCL explained that there could be delay in circuit breaker operation.

DMTCL informed that fault was on 220 kV Darbhanga (DMTCL)-Darbhanga (BSPTCL) circuit 2 near to BSPTCL end. The line got tripped from DMTCL end on zone 1. No fault pickup was observed for line 1.

After detailed deliberation, PCC observed that there could be confusion in nomenclature at BSPTCL and DMTCL end. PCC advised BSPTCL and DMTCL to check nomenclature of circuit 1 and circuit 2 on both sides and confirm it by today.

PCC also observed that LBB should be operated after 200 ms in case of delay in Circuit Breaker operation. PCC advised BSPTCL to test the Circuit Breaker, LBB operation and verify the distance relay settings of circuit 1 and circuit 2 and submit a detailed report to ERPC and ERLDC.

BSPTCL may update.

Deliberation in the meeting

PCC advised BSPTCL and DMTCL to check nomenclature being used for circuit 1 and circuit 2 on both sides along with the CT and PT connections to the respective relays.

BSPTCL informed that the confusion of 220 kV Darbhanga Darbhanga D/C nomenclature has been solved. Darbhanga DMTCL- Darbhanga (BSPCL) circuit -I bay is being used for musahari circuit -II.

BSPTCL informed that testing of LBB relay is in progress.

BSPTCL informed that construction of Bay for 220 kV Darbhanga (DMTCL)-Darbhanga (BSPTCL) circuit 1 at Darbhanga (BSPTCL) had been completed and it is ready for charging.

BSPTCL added that with the new configuration the unbalance issue at Darbhanga would be resolved.

ITEM NO. B.2: Total Power failure at 220 k V Sonenagar Substation on 10.05.2020 at 22:51 hrs.

220 kV Gaya-Sonenagar – D/C tripped at 22:51 hrs due to R phase to earth fault resulting total power failure at Sonenagar S/S. Around 130 MW load loss was reported at Aurangabad, Sonenagar, Rafi Ganj, Japla. Around 15 MW traction load loss was reported at Japla, Garwah and Rafi Ganj.

In 91st PCC Meeting, BSPTCL informed that 220 kV Gaya-Sonenagar line -I tripped from Sonenagar end in Zone 1 due to R phase to earth fault and 2kA fault current was observed.

Powergrid informed that 220 kV Gaya-Sonenagar line -II tripped on R-N fault and auto-reclose was successful.

ERLDC informed that there was much delay in restoration of circuit 2 as it was restored on next day at 12:24 hrs.

PCC advised BSPTCL to check the PLCC and autoreclose relay at Sonenagar end. PCC also advised BSPTCL to check the line parameters and relay reach settings and send detailed report to ERPC and ERLDC by next week.

BSPTCL may update.

Deliberation in the meeting

BSPTCL informed that auto-recloser of 220 kV Gaya-Sonenagar line -I at Sonenagar end was in service and operated successfully in first attempt. The line got tripped from Sonenagar end as the fault was appeared during reclaim time. Powergrid informed that fault was observed in zone 3 distance protection from Gaya end and it got reset after 400 ms hence there was no tripping from Gaya end for line-1.

Powergrid informed that 220 kV Gaya-Sonenagar line -II tripped on R-N fault. BSPTCL informed that there was no tripping from Sonenagar end. BSPTCL added that the Autorecloser at Sonenagar end was not in service for line 2.

Regarding delay in restoration of circuit 2, Bihar SLDC explained that because of severe rain, the

demand in the Sonenagar area was reduced from 160 MW to 4 MW hence the line 2 was not charged till next day to avoid the high voltage.

PCC advised BSPTCL and SLDC Bihar to submit these details in the preliminary report being submitted to ERLDC to avoid confusion.

ITEM NO. B.3: Total Power failure at 220/132 kV Chaibasa Substation on 06.05.2020 at 01:19 hrs.

At 01:13 hrs 400/220 kV ICT 1 & 2 at Chaibasa (PG) tripped from 220 kV side due to mal-operation of back up impedance relay. At 01:19 hrs, 220 kV Chaibasa (JUSNL) – Chaibasa (PG) D/C and 220 kV Chaibasa (JUSNL) – Ramchandrapur D/C tripped due to R phase to earth fault resulting in total power failure at 220/132 kV Chaibasa (JUSNL) S/S. 132 kV Rajkharswan – Goelkhera S/C also tripped at same time.

In 91st PCC, JUSNL explained that there was a R-N fault in 220 kV Chaibasa(JUSNL) – Ramchandrapur circuit 1 near to Chaibasa end. Chaibasa end identified the fault in zone 1 and issued trip command to respective circuit breaker to clear the fault. But circuit breaker at Chaibasa end failed to open. Both circuits of 220 kV Chaibasa(JUSNL) – Ramchandrapur tripped from Ramchandrapur on zone 2. 220 kV Chaibasa(JUSNL)- Chaibasa (PG) line 1 tripped from JUSNL end on zone 4 within 300 ms.

Powergrid explained that there was another fault (R-Y-B fault) simultaneously occurred in 220 kV Chaibasa(JUSNL)- Chaibasa (PG) line 1. The fault was cleared by line differential protection from PG end. But overvoltage protection also operated which was inadvertently kept enabled. 400/220 kV ICT 1 & 2 at Chaibasa (PG) were also tripped within 60 ms from 220 kV side due to incorrect relay settings.

Powergrid added that over voltage settings of line differential protection and relay settings of 400/220 kV ICT 1 & 2 have been reviewed after the disturbance.

JUSNL failed to explain how the fault in 220 kV Chaibasa – Ramchandrapur circuit 1 got cleared from 220kV and 132 kV side protection system.

PCC opined that since circuit breaker of Chaibasa (JUSNL) end failed to clear the fault in 220 kV Chaibasa – Ramchandrapur circuit 1, the fault should be cleared from 220/132 kV ATRs or 132kV transmission line backup protection. PCC observed that SLDC, JUSNL was not present the meeting and not submitted any report on trippings.

After detailed deliberation, PCC advised JUSNL to take the following action and submit a report to ERPC and ERLDC:

- SLDC, Jharkhand should check any tripping in 132kV system during this disturbance
- CB of Chaibasa(JUSNL) end of 220 kV Chaibasa – Ramchandrapur circuit 1 to be tested
- Zone 4 tripping time (300 ms) of 220 kV Chaibasa(JUSNL)- Chaibasa (PG) line 1 from Chaibasa(JUSNL) is not in order. The same needed to be verified and corrected.
- Protection system of 220/132 kV ATRs and 132kV transmission lines to be tested

JUSNL may update.

Deliberation in the meeting

JUSNL informed that 132kV Manoharpur-Goelkhera line was tripped from Goelkhara end on overcurrent protection. JUSNL further informed that DR of Goelkhara end was not received as it was overwritten.

JUSNL added that zone 4 time setting of 220 kV Chaibasa(JUSNL)- Chaibasa (PG) line 1 at Chaibasa(JUSNL) was revised from 300 ms to 500 ms.

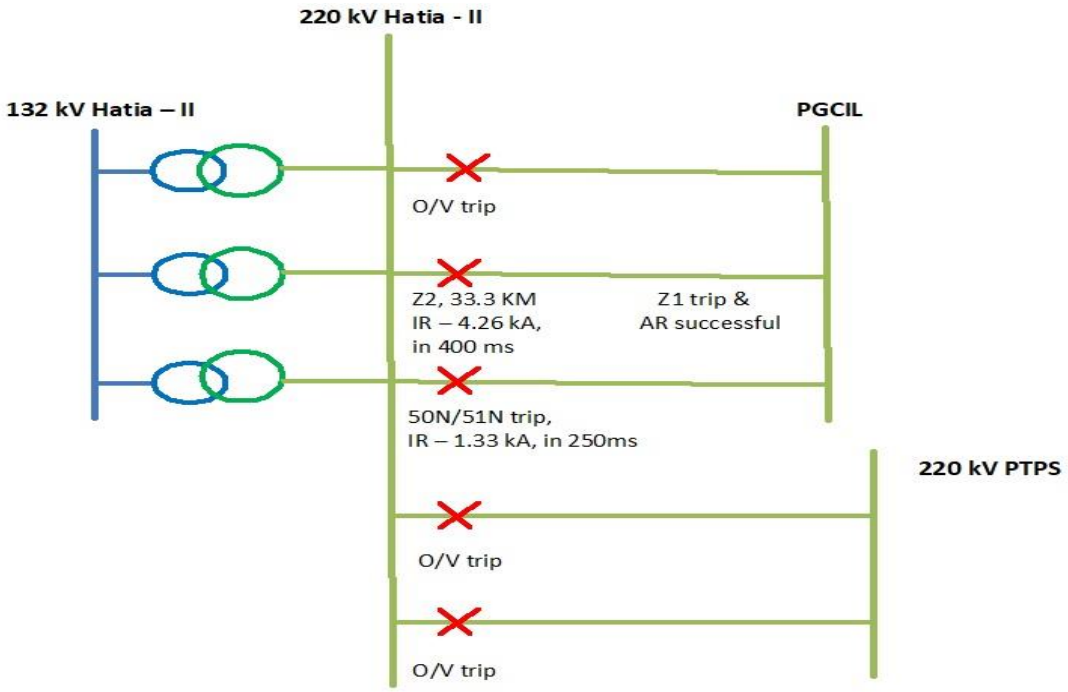
PCC observed that the fault in 220 kV Chaibasa – Ramchandrapur circuit 1 got cleared from 132kV transmission line protection which was the only source from 132kV side. PCC opined that 220/132 kV ATRs backup protection should clear the fault in this case. PCC explained that transformers would get damaged due to continuous fault feeding due to delay in protection system operation from 132 kV Side for a fault in 220 kV system.

PCC advised JUSNL to take the following corrective actions:

- *CB of Chaibasa(JUSNL) end of 220 kV Chaibasa – Ramchandrapur circuit 1 to be tested*
- *Protection system of 220/132 kV ATRs to be tested along with healthiness of DC and the respective CT, PT connections to be checked*

ITEM NO. B.4: Total Power failure at 220/132 k V Hatia Substation on 14.05.2020 at 15:33 hrs

220 kV Ranchi Hatia T/C, 220 kV Patratu-Hatia D/C and 220/132KV 150MVA ICT-1, 2 and 3 at Hatia tripped at same time resulting in total power failure at 220/132 kV Hatia S/S. In Jamshedpur PMU data, one R phase to earth fault has been captured. Fault was cleared at around 400 ms.



In 91st PCC, JUSNL explained that there was a transient fault in 220 kV Hatia(II) – Ranchi (PG) circuit 2 due to bad weather, the line got tripped on zone 2 from JUSNL end and on zone 1 from Powergrid end.

Powergrid explained that auto-reclose was successful for 220 k V Hatia(II) – Ranchi (PG) circuit 2 at Ranchi end.

JUSNL added that 220 kV Hatia(II) – Ranchi (PG) circuit 3 got tripped from JUSNL end on 50N/51N within 250 ms. JUSNL further added that 220 kV Hatia(II) – Ranchi (PG) circuit 1 and 220 kV Patratu-Hatia D/C got tripped due to overvoltage protection from JUSNL end.

PCC advised JUSNL to check the following and submit a report to ERPC and ERLDC:

- Verify the reason for non-operation of autorecloser and carrier inter tripping of 220 kV Hatia(II) – Ranchi (PG) circuit 2 from Hatia end
- Verify settings of backup overcurrent protection related to false tripping of 220 kV Hatia(II) – Ranchi (PG) circuit 3.

- Verify overvoltage settings of 220 kV Hatia(II) – Ranchi (PG) circuit 1 and 220 kV Patratu-Hatia D/C at Hatia especially pickup to drop off ratio.

PCC observed that as per the DR the voltage was went upto 190 kV (phase to ground) and opined that SLDC, Jharkhand should take necessary action to control the over voltage in their system so that unwanted trippings of the lines could be avoided.

Deliberation in the meeting

JUSNL explained that backup overcurrent protection settings of 220 kV Hatia(II) – Ranchi (PG) circuit 3 was kept at non-directional with definite time setting of 250 ms. JUSNL informed that the same was corrected to directional with the time setting of 1.25 sec definite time.

JUSNL further informed that overvoltage setting of 220 kV Hatia(II) – Ranchi (PG) circuit 1 and 220 kV Patratu-Hatia D/C at Hatia was 110 % and pickup to drop off ratio was changed from 0.98 to 0.9.

ERLDC advised JUSNL to increase pickup to drop off ratio to 0.99.

PCC opined that over voltage may appear due to improper earthing of the substation. PCC advised JUSNL to take the following actions and submit a report to ERPC and ERLDC

- *Verify the reason for non-operation of autorecloser and carrier inter tripping of 220 kV Hatia(II) – Ranchi (PG) circuit 2 from Hatia end*
- *Checking of earthing at 220kV Hatia II and Patratu S/s.*
- *Backup overcurrent protection time settings must be IDMT instead of definite time. It has to be rectified with proper time setting in consultation with ERPC and PRDC.*

ITEM NO. B.5: Disturbance at 220 k V TTPS Substation on 18.05.2020 at 0:53 hrs.

220 kV TTPS – PTPS S/C tripped from PTPS end only on B phase to earth fault. 220 kV TTPS – PTPS S/C, unit 2 at TTPS and station transformer 2 at TTPS were connected to 220 kV bus 2 at TTPS. So, both the running units at TTPS and 220 kV bus coupler at TTPS (tripping of bus coupler was verbally informed by TTPS) tripped to clear the fault. 220 kV TTPS – Bihar Sharif S/C and 220 kV bus 1 at TTPS did not trip during this event.Gen Loss: 749 MW

In 91st PCC, JUSNL explained that 220 k V TTPS – PTPS S/C tripped in zone 2 from PTPS end only due to B phase to earth fault. They added that on inspection no physical fault was found in the line.

TVNL explained that both the running units at TTPS and 220 kV bus coupler at TTPS tripped, more than 3kA current was observed at TTPS but line protection of 220 k V TTPS – PTPS S/C was not operated.

PCC opined that distance protection at TTPS end must had operated either in zone 1 or zone 4. PCC advised TTPS to verify the location of the fault once again and advised to submit the distance relay settings to ERPC and ERLDC.

PCC also advised TTPS to test the healthiness of the relay.

TTPS may update.

Deliberation in the meeting

JUSNL informed that line patrolling of 220 kV TTPS – Bihar Sharif S/C was carried out and the vegetation has been cleared on 2nd July 2020.

ERLDC informed that single line tripping of 220 kV Biharsharif –TTPS was occurred on 19th July 2020 and the fault location falls under Jharkhand control area.

*TVNL shared presentation which is enclosed at **Annexure B5** .It further informed that all the trippings were near to Jharkhand end, It further informed that tripping incidences were caused due to clearance issues in forest area.*

PCC advised JUSNL to once again carry out the line patrolling and resolve the clearance issues. PCC advised TVNL and BSPTCL to put the Autorecloser in service to avoid unwanted tripping of the line during transient faults.

ERLDC informed that 220kV Govindpur-TTPS line would be charged soon and advised JUSNL to share the line parameters to TVNL, BSPTCL and ERLDC to set the correct protection settings.

ITEM NO. B.6: Disturbance at 220 k V Jorethang and 220 k V Tashiding Substation on 27.05.2020 at 04:28 hrs.

220 kV New Melli - Jorethang - 1 tripped on Y phase to earth fault from Jorethang end. 220 kV New Melli - Jorethang - 2 tripped on overcurrent protection from Jorethang end only. At same time 220 kV Tashiding - New Melli S/C and 220 kV Tashiding - Rangpo S/C tripped from Tashiding end only on Y phase to earth fault.

Tripping of more than one circuits due to single fault is very common in 220 kV JLHEP – New Melli – Tashiding HEP – Rangpo section. Similar type of events has occurred on 16th January 2020, 25th February 2020, 01st April 2020 followed by loss of hydro generation. Due to variable hydro generation and high resistance of the fault, configuration of distance protection setting may be very challenging. Possibility of differential protection system may be explored for this section. JLHEP, THEP and POWERGRID may kindly review this for betterment of system.

Polarity of distance protection relay at Tashiding end of 220 kV Tashiding – Rangpo S/C may be reviewed. O/C protection setting at JLHEP may be reviewed also

Relay Indications:

Line name	End 1	End 2	PMU observation
220 kV Jorethang - New Melli -1	Y-N, Zone-1, IR=0.2 kA IY=1.7 kA, IB=0.3 kA	Y-N, Zone – 1, A/R successful	Around 25 kV dip has been observed in Y phase voltage at Rangpo PMU. Fault clearing time is less than 100 ms.
220 kV Jorethang - New Melli -2	O/C, IR=0.1 kA, IY=0.1 kA, IB=0.1 kA	Did not trip, Zone – 3 start in Y phase	
220 kV Tashiding - New Melli S/C	Y-N, Zone-1, 10.64 km, F/C 2.4 kA	Did not trip	
220 kV Tashiding - Rangpo S/C	Y-N, Zone-1, 28 km, F/C 1.75 kA	Did not trip	

In 91st PCC, DANS Energy informed that due to thunderstorm, 220 kV Jorethang - New Melli -1 got tripped from both ends. Because of low overcurrent setting, 220 kV Jorethang - New Melli -2 also tripped from Jorethang. The relay settings of 220 kV Jorethang - New Melli D/C lines were reviewed incoordination with ERPC and ERLDC and implemented the revised settings on 06-06-2020.

PCC observed that 220kV Tashiding – Rangpo S/C line tripped from Tashiding end is not in order PCC advised DANS ENERGY to verify the polarity and reach settings of distance protection relay at Tashiding end of 220 kV Tashiding – Rangpo S/C.

PCC also observed that 220kV lines under the jurisdiction of Govt. of Sikkim were not being maintained properly as a results repeated faults are being occurred due to lot of vegetation.

PCC advised Sikkim to take necessary action to avoid repeated faults in the lines.

Members may discuss.

Deliberation in the meeting

DANS Energy informed that the revised settings received from PRDC had been implemented at Jorethang and Tashiding ends thereafter no unwanted tripping was observed for the connected lines.

ERLDC pointed out that 220kV Tashiding – Rangpo S/C line tripped from Tashiding end is not in order, the polarity of the distance protection relay at Tashiding end of 220 kV Tashiding – Rangpo S/C is to be verified.

DANS Energy informed that they also observed that polarity of main I protection of 220kV Tashiding – Rangpo S/C line at Tashiding is not proper and the polarity would be corrected by taking shutdown.

PCC advised DANS Energy to check the CT star point, relay configuration settings etc. to find out the issue and accordingly correct the polarity at the earliest. PCC advised DANS ENERGY to disable the relay till the correction of polarity to avoid maloperation of the relay.

PCC also advised DANS ENERGY to explore implementation of Differential protection for the lines connected to Jorethang and Tashiding.

DANS Energy informed that OPGW implementation is in progress and the differential protection would be implemented once OPGW work would be completed.

ERLDC pointed out that relay coordination of backup overcurrent protection of transmission lines is required for different hydro generation in Sikkim.

PCC decided to discuss this issue in a separate meeting with the concerned utilities.

ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN JUNE 2020.

ITEM NO. B.7: Disturbance at 220 k V Darbhanga S/S on 10.06.2020 at 10:54 hrs.

On 10th June 2020, at 10:54 Hrs, 220 kV Darbhanga (DMTCL)-Darbhanga (BSPTCL) D/C tripped from BSPTCL end. At the same time 220 kV Darbhanga (BSPTCL) – Mushahari – 1 and 220 kV Darbhanga (DMTCL) – Motipur – 1 also tripped resulting in load loss at Darbhanga, Madhubani and Pandaul.

Load Loss: 135 MW

BSPTCL and DMTCL may explain.

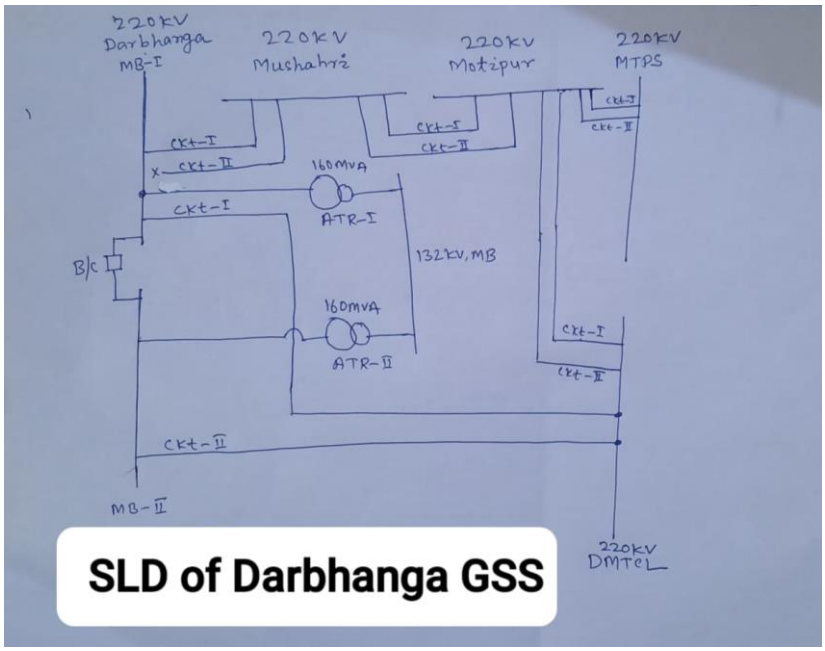
Deliberation in the meeting

BSPTCL explained that fault was in 220 k V Darbhanga(DMTCL) – Motipur -1 line, the line got tripped in zone 1 and the auto-reclose was successful at Motipur end.

DMTCL informed that auto-reclose was unsuccessful at Darbhanga(DMTCL) end.

BSPTCL informed that 220 kV Darbhanga (DMTCL)-Darbhanga (BSPTCL) circuit 2 got tripped from BSPTCL end on directional earth fault. Thereafter LBB protection at Darbhanga (BSPTCL) was operated due to loose connection and tripped 160 MVA ATR-2 which was connected to Bus II. As a result, 160 MVA ATR-I and 220 kV Darbhanga (BSPTCL) – Mushahari – 1 also got tripped due to overload.

ERLDC pointed out that when system remains on both buses (MB-1 & MB-2) through bus coupler then the current values are unsymmetrical resulting in abnormal neutral current. But when the system is put on the single bus the currents are in symmetrical.



After detailed deliberation, PCC advised DMTCL to check the reason for non-operation of auto-reclose of 220 kV Darbhanga(DMTCL) – Motipur -1 line from DMTCL end.

PCC advised BSPTCL to take the following corrective actions:

- *Test the breakers at 220/132 KV GSS Darbhanga (BSPTCL)*
- *Test the healthiness of LBB protection at Darbhanga (BSPTCL)*
- *Find out the reason for occurrence of unsymmetrical current at Darbhanga (BSPTCL) and resolve the issue.*

ITEM NO. B.8: Disturbance at 220 kV Joda Substation on 23.06.2020 at 11:58 hrs

At 11:41 hrs 220 kV Joda – TTPS D/C tripped on B phase to earth fault. At 11:57 hrs, 220 kV Ramchandrapur – Joda S/C tripped on overload. Prior to the tripping, power flow was 160 MW. At same time 220 kV Joda JSPL (Jindal) – Jamshedpur S/C tripped at same time from Ramchandrapur and Jamshedpur end respectively in overcurrent protection.

At 11:41 hrs 220 kV Joda – TTPS D/C tripped on B phase to earth fault. Fault clearing time was less than 100 ms. As per relay indication received, 220 kV Joda – TTPS – 1 tripped from TTPS end in zone -1. So, it is suspected fault was at this line. 220 kV Joda TTPS – 2 tripped at same time from Joda end only. Details of protection operated at Joda end for both 220 kV TTPS feeders are not mentioned in OPTCL report. OPTCL informed current was around 0.4, 0.2 and 0.6 kA in R, Y and B phases respectively at Joda end for 220 kV TTPS - 2 feeder. Neutral current was around 0.6 kA at Joda end of 220 kV Joda – TTPS feeder. OPTCL may share the reason for 220 kV Joda – TTPS - 2 at Joda end. After tripping of 220 kV Joda – TTPS D/C, power flow through 220 kV Ramchandrapur Joda S/C increased to 160 MW from 60 MW and power flow through 220 kV JSPL – Joda S/C decreased from around 90 MW to 30 MW. MW power flow through 220 kV Jamshedpur - JSPL- Joda shows that power flow reversed after the tripping of 220 kV Joda - TTPS - S/C at 11:41 hrs. Earlier around 60 MW power was flowing towards Jamshedpur. After the tripping, around 30 MW power was flowing from Jamshedpur to Jindal (around 30 MW was power was flowing towards Jindal from Joda at this time). At 11:57 hrs, 220 kV Ramchandrapur – Joda S/C and 220 kV Joda – JSPL - Jamshedpur S/C tripped from remote end on O/C protection. Prior to the tripping power flow through 220 kV Ramchandrapur – Joda S/C and 220 kV Joda – JSPL S/C was 160 MW (as per DR recorded at Ramchandrapur end

current in 3 phases was around 440 A, refer to Annexure 2) and 30 MW respectively Joda end as per ERLDC SCADA data. Around 30 MW power was flowing from Jamshedpur (DVC) to Jindal prior to the tripping. As per relay indication, current in all three phases of 220 kV Joda – JSPL – Jamshedpur S/C at Jamshedpur end was less than 0.5 kA prior to the tripping. Current in 220 kV Joda – Ramchandrapur S/C was around 0.1, 0.4 and 1.1 kA at Ramchandrapur end in R, Y and B phases respectively. No voltage dip has been observed at Jamshedpur PMU at this time. JUSNL and DVC may share DR recorded at Ramchandrapur and Jamshedpur end along with reason of 220 kV Ramchandrapur – Joda and 220 kV Jamshedpur – JSPL – Joda from Jamshedpur end.

No SOE recorded at the time of the event. GRIDCO SLDC/OPTCL are requested to check this issue
OPTCL may share the reason for 220 kV Joda – TTPS - 2 at Joda end. JUSNL and DVC may share DR recorded at Ramchandrapur and Jamshedpur end along with reason for tripping of 220 kV Ramchandrapur – Joda and 220 kV Jamshedpur – JSPL – Joda from Jamshedpur end

Relay Indications :

Time	Element Name	End 1	End 2	PMU observation
11:41 Hrs.	220 kV Joda – TTPS - 1	B-N, F/C 1.16 kA	B-N, Zone -1, F/C 1.8 kA, 69 km from TTPS	Around 2 kV voltage dip observed in B phase at Jamshedpur PMU at the time of tripping of 220 kV Joda – TTPS D/C. Voltage dip in R and Y phase was around 0.5 kV at Jamshedpur PMU. Fault clearing time was less than 100 ms. During the tripping at 11:57 hrs, no significant voltage dip has been observed in Jamshedpur PMU data
11:41 Hrs.	220 kV Joda – TTPS - 2	B-N, IR = 0.4kA, IY = 0.2kA, IB = 0.6kA, IN = 0.6kA	Did not trip	
11:57 Hrs.	220 kV Joda - Ramchandrapur S/C	Did not trip	O/C, Zone-3, 241km IR = 0.1kA, IY = 0.5kA, IB = 1.1 kA, B-N fault	
11:57 Hrs.	220 kV Joda-JSPL Jamshedpur S/C	Did not trip	Directional O/C, IR = 0.5kA, IY = 0.5kA, IB = 0.5kA, IN = 0.01kA	

Load Loss: 160 MW

OPTCL, JUSNL and DVC may explain.

Deliberation in the meeting

OPTCL explained that R-N fault occurred in 220 kV Joda – TTPS – 1 at 69 km from TTPS end and TTPS end got tripped on zone 1. OPTCL explained that due to high arc resistance, the fault was seen in zone 3 from Joda end, in the meantime backup overcurrent Earth fault was operated within 800 ms and tripped the line from Joda end. However, backup overcurrent protection of 220 kV Joda – TTPS – 2 at Joda end was also operated inadvertently and tripped the line from Joda

end. OPTCL explained that there was a problem in PT circuit of the said relay therefore the relay was operated in non-directional mode. OPTCL added that the relay has been replaced after the disturbance.

DVC informed that 220 kV Joda- JSPL-Jamshedpur S/C was tripped from Jamshedpur end on backup directional overcurrent protection due to low pickup setting. DVC added that the pickup value has been reviewed from 500 to 800 A.

JUSNL informed that there was no fault in 220 kV Joda - Ramchandrapur S/C, the line got tripped from Ramchandrapur end on operation of backup overcurrent protection due to overload. JUSNL added that EM type relay is installed for this line therefore they could not get the DR.

ERLDC pointed out that 220 kV Joda - Ramchandrapur S/C line was charged through bus coupler.

JUSNL informed that the line protection relay got hanged hence they charged the line through bus coupler.

PCC advised JUSNL to give a detailed report to ERLDC for charging of bay at Ramchandrapur through bus coupler.

ITEM NO. B.9: Disturbance at 400 k V GMR Substation on 26.06.2020 at 18:43 hrs.

GMR unit # 3 was connected to 400/220 kV Meramundali S/S of OPTCL STU network through 400 kV GMR – Meramundali S/C. At 18:43 hrs, 400 kV GMR Meramundali S/C tripped due to DT received at Meramundali end. This caused total power failure at GMR (OPTCL) section and GMR unit #3 tripped. In PMU data, no fault was observed at the time of event

Connecting one 350 MW generating unit with only one 400 kV transmission line may affect the reliability of the generating station. It may be treated as non-compliance of CEA grid standard and CEA planning criteria. GRIDCO SLDC/OPTCL to review such arrangement .Detail report along with DR/EL may be shared by GMR/GRIDCO SLDC/OPTCL. No SOE recorded at GMR end at the time of the event. GRIDCO SLDC/OPTCL are requested to check this issue.

Reason for DT received at Meramundali end may be shared by GRIDCO SLDC/OPTCL/GMR .

Relay Indications :

Time	**Element Name**	**End 1**	**End 2**	**PMU observation**
18:43 Hrs.	400 kV GMR – Meramundali S/C	Did not trip	DT received at Meramundali	No voltage dip observed at Meramundali end at the time of the tripping incident. Same has been observed in current of 400 kV GMR – Meramundali S/C captured by Meramundali PMU.

Gen Loss : 180 MW

OPTCL , GRIDCO SLDC and GMR may explain.

Deliberation in the meeting

OPTCL informed that on 26th June 2020, DT received at Meramundali from GMR end for 400 kV GMR – Meramundali S/C. It was informed that there was no tripping from GMR end and it may be the false tripping happened due to malfunction of PLCC system at GMR end.

PCC advised to GMR to check the PLCC to find out the root cause of sending the DT.

ITEM NO. B.10: Tripping of both units at BRBCL on 29.06.2020 at 21:53 hrs.

400 kV BRBCL – Sasaram – 2 was under break down due to rectification of tower bending. Unit 1 and 2 were in running condition at BRBCL. At 21:53hrs., 400kV Sasaram-BRBCL #1 tripped on R and Y phase fault. Both the units got tripped due to loss of evacuation path

BRBCL is connected to rest of the grid through only one circuit i.e. 400 kV BRBCL – Sasaram – 1. Tripping of this circuit may cause repeated GDs in BRBCL. POWERGRID ERTS – 1 is requested to maintain the healthiness of this line properly so that repeated outage can be avoided. This line tripped again on same fault at 05:50 hrs on 01st July 2020 resulting GD at BRBCL. Rectification work of tower bending may be expedited so that 400 kV BRBCL – Sasaram – 2 can be restored at the earliest. No SOE recorded at Sasaram the time of the event. POWERGRID ERTS – 1 is requested to check this issue.

Relay Indications :

<table>
<tr><th>Time</th><th>Element Name</th><th>End 1</th><th>End 2</th><th>PMU observation</th></tr>
<tr><td>21:53 Hrs</td><td>400 kV BRBCL – Sasaram – 1</td><td>Yet to be received</td><td>R-Y, 18.2 km from Sasaram, IR 9.3 kA, IY 9.3 kA</td><td rowspan="2">At Sasaram end PMU of 400 kV Sasaram – BRBCL – 1, around 5 – 5.5 kA fault current has been observed. Fault clearing time was less than 100 ms. Frequency decreased from 50.02 Hz to 49.98 Hz Later frequency stabilized at 50.01 Hz</td></tr>
<tr><td>21:53 Hrs.</td><td>Unit 1 and 2 at BRBCL</td><td colspan="2">Due to loss of evacuation path</td></tr>
</table>

Gen. Loss : 422 MW

BRBCL , Powergrid may explain.

Deliberation in the meeting

Powergrid explained that 400 kV BRBCL – Sasaram lines were charged using ERS for rectification of tower bent work. Due to heavy wind ph-ph fault was occurred at the ERS due galloping of conductors. Powergrid added that additional Guy has been provided after the

disturbance to avoid the galloping of the conductors.

ITEM NO. B.11: Disturbance at 220 k V Muzaffarpur Substation on 24.06.2020 at 18:23 hrs.

220 kV Muzaffarpur Dhalkebar D/C tripped at 18:23 hrs from Muzaffarpur end on R phase directional earth fault. Prior to the tripping schedule of Nepal drawal over this link was 74 MW and it would increase to 163 MW w.e.f. 18:30 hrs. There was no generation or load loss reported in Indian grid at the time of the event.

No load loss and gen loss

JUSNL, BSPTCL and TVNL may explain.

Deliberation in the meeting

Powergrid informed that 220 kV Muzaffarpur Dhalkebar D/C tripped from Muzaffarpur end on R phase directional earth fault due to a fault in downstream area of Nepal.

ITEM NO. B.12: Disturbance at 400 k V Rangpo and Dikchu S/S on 19.06.2020 at 12:54 hrs.

At 12:54 hrs. gas density high alarm initiated in 400 KV Rangpo-Binaguri Ckt-I at Rangpo and tripping command was sent to 400kV Main Bus-I at Rangpo. All feeders connected to 400 kV main bus 1 tripped. Due to unavailability of tie bay of 400/132 kV ICT at Dikchu, both the running units at Dikchu HEP were connected to bus 1 at Dikchu via 400/132 kV ICT. After tripping of 400 kV Dikchu – Rangpo S/C (it was also connected to bus 1 at both Rangpo and Dikchu) due to bus bar operation at Rangpo, both the units tripped due to loss of evacuation path.

Due to non-availability of tie bay of 400/132 kV ICT at Dikchu, both the generating units are connected to 400 kV bus 1 at Dikchu. Both units at Dikchu will trip when 400 kV Rangpo Dikchu S/C trips. As per Dikchu, restoration of tie bay will be done during lean period (After January, 2021). Hence tripping of 400 kV Rangpo – Dikchu S/C will result in repeated GD/GI at Dikchu. .Log and details of gas density monitor at Rangpo S/S recorded during the event may be shared. Whether gas density increase suddenly or gradually with time may be confirmed by POWERGRID.

Reason for tripping bus tripping at Rangpo may be explained by POWERGRID with detail report

Relay Indications :

<table>
<tr><th>Line name</th><th>End 1</th><th>End 2</th><th>PMU observation</th></tr>
<tr><td>400 KV Rangpo-Binaguri I</td><td rowspan="5">400kV Main BusI at Rangpo tripped due to gas density high alarm initiation</td><td rowspan="5">Yet to be received</td><td rowspan="7">No voltage has been observed in Binaguri bus voltage. Oscillation has been observed at 400 kV Binaguri bus voltage with dominant mode of 0.8 – 0.9 Hz. Oscillation was damped within 6 seconds.</td></tr>
<tr><td>400 KV Rangpo-Teesta V-I</td></tr>
<tr><td>400 KV Rangpo-Dikchu</td></tr>
<tr><td>400 KV Rangpo-Kishanganj</td></tr>
<tr><td>400 KV Rangpo-Binaguri I</td></tr>
<tr><td>315 MVA 400/220 KV ICT3, 4 & 5 at Rangpo</td><td colspan="2">400kV Main Bus-I at Rangpo tripped due to gas density high alarm initiation</td></tr>
</table>

Gen Loss : 109 MW

Powergrid , Rangpo and Dikchu may explain**.**

Deliberation in the meeting

Powergrid shared the presentation and informed that bus bar protection operated due to malfunction of relay contact. The issue of relay contact has been rectified after the disturbance.

ITEM NO. B.13: Disturbance at Jorethang and Dikchu HEP on 27.06.2020 at 14:48 hrs.

At 14:48 hrs 400 kV Rangpo – Kishangunj S/C tripped due to B phase to earth fault. At same time, unit 1 and 2 at Dikchu HEP and unit 2 at Jorethang tripped due to operation of differential relay.

At 14:42:42 hrs, 400 kV Rangpo Kishangunj S/C successfully auto-reclosed at both ends for transient B phase to earth fault. At 14:42:43 hrs due to another B phase to earth fault during reclaim time, it tripped from both ends. As per SPS for evacuation of hydro power, tripping of 400 kV Rangpo-Kishangunj S/C will result in tripping of one unit of Teesta-III, Teesta V, Dikchu, Jorethang, Chujachen and Tashiding provided pre-tripping flow of 400 kV Rangpo-Kishangunj S/C > 650 MW for more than 900 ms. During 161st OCC meeting, it was decided that POWERGRID will keep this SPS in standby mode. But during the event, SPS signal was received by JLHEP, THEP and Chujachen HEP. As per DR, power flow through 400 kV Rangpo – Kishangunj S/C was less than 650 MW (prior to the tripping, current in all three phases was < 810 A). POWERGRID may share the reason for triggering of SPS. SPS was enabled at JLHEP end. For this reason, unit 1 at JLHEP end tripped due to SPS operation. Unit 1 and 2 at Dikchu HEP tripped due to operation of differential relay.

During 161st OCC meeting, it was decided that POWERGRID will keep this SPS in standby mode. But during the event, SPS signal was received by JLHEP, THEP and Chujachen HEP. As per DR, power flow through 400 kV Rangpo – Kishangunj S/C was less than 650 MW (prior to the tripping, current in all three phases was < 810 A). POWERGRID may share the reason for triggering of SPS.

Reason for operation of differential relay may be shared.

Relay Indications :

<table>
<tr><th>Time</th><th>Line name</th><th>End 1</th><th>End 2</th><th>PMU observation</th></tr>
<tr><td>14:48 Hrs.</td><td>400 kV Rangpo – Kishangunj S/C</td><td>B-N, 24.68kM, F/C 9.9KA</td><td>Yet to be received</td><td rowspan="3">Around 70 kV dip has been observed in B phase voltage at Rangpo PMU. Fault clearing time was less than 100 ms. Line tripped due to occurrence of another fault in reclaim time after successful auto-reclose of initial transient fault.</td></tr>
<tr><td>14:48 Hrs.</td><td>Unit 1 and 2 at Dikchu HEP</td><td colspan="2">Operation of differential relay</td></tr>
<tr><td>14:48 Hrs.</td><td>Unit 1 at JLHEP</td><td colspan="2">Due to receipt of SPS signal from Rangpo end generated due to tripping of 400 kV Rangpo Kishangunj S/C</td></tr>
</table>

Gen loss: 161 MW

Dikchu, Jorethang , DANS Energy and Powergrid may explain.

Deliberation in the meeting

Powergrid informed that 400 kV Rangpo – Kishangunj S/C tripped due to B phase to earth fault. The SPS was inadvertently kept in enable mode as a result the SPS signal initiated.

PCC advised Powergrid to follow the OCC decision to avoid unwanted tripping of generators.

ITEM NO. B.14: Repeated Disturbance at 220 k V Jorethang and Tashiding S/S

1. Disturbance at 220 k V Jorethang and Tashiding S/S on 11.06.2020 at 22:38 hrs.

220 kV New Melli - Jorethang – D/C tripped from Jorethang end only resulting tripping of all running units at Jorethang. 220 kV Tashiding Rangpo S/C and 220 kV Tashiding New Melli S/C tripped.

Gen Loss : 166 MW

DANS Energy , Powergrid may explain.

2. Disturbance at 220 k V Jorethang and Tashiding S/S on 13.06.2020 at 04:54 hrs.

220 kV New Melli - Jorethang – D/C tripped from Jorethang end only resulting tripping of all running units at Jorethang. 220 kV Tashiding – New Melli S/C tripped from both ends. But both running units at Tashiding tripped on GT O/C protection.

Gen Loss : 175 MW

DANS Energy , Powergrid may explain.

3. Disturbance at 220 k V Jorethang and Tashiding S/S on 13.06.2020 at 07:18 hrs.

220 kV New Melli - Jorethang – D/C tripped from Jorethang end only resulting tripping of all running units at Jorethang. 220 kV Tashiding Rangpo S/C and 220 kV Tashiding New Melli S/C tripped.

Gen Loss : 117 MW

DANS Energy , Powergrid may explain.

Deliberation in the meeting

DANS Energy informed that the revised settings were implemented on 4th July 2020.

ERLDC pointed out that relay coordination of backup overcurrent protection of transmission lines is required for different hydro generation in Sikkim.

PCC decided to discuss this issue in a separate meeting with the concerned utilities.

ITEM NO. B.15: Repeated Disturbances at 400 k V Alipurduar Substation

1.Disturbance at 400 k V Alipurduar Substation on 25.06.2020 at 02:47 hrs

400 kV Alipurduar -Jigmelling D/C tripped at 02:47 Hrs due to R phase to earth fault. At Alipurduar, auto reclose was successful for both circuits. But both the circuits tripped from Jigmelling. Around 590 MW generation loss was reported at the time of the event. There was no generation or load loss reported in Indian grid at the time of the event.

No load loss and gen loss

Powergrid may explain**.**

2.Disturbance at 400 k V Alipurduar Substation on 26.06.2020 at 15:40 hrs

400 kV Jigmelling - Alipurduar – 1 along with all four running units (generating around 770 MW) of Mangdechu tripped at 15:40 hrs. DT signal was received at Alipurduar end of 400 kV Jigmelling Alipurduar – 1 at the time of the tripping. Later, at 15:53 hrs, 400 kV Jigmelling - Alipurduar – 2 also tripped due to B phase to earth fault. 400 kV Jigmelling - Alipurduar – 1 was extended from Alipurduar end at 16:24 hrs. But while synchronising at Jigmelling end, it tripped again at 16:49 hrs with DT received at received at Alipurduar. There was no generation or load loss reported in Indian grid at the time of the event.

No load loss and gen loss

Powergrid may explain**.**

Deliberation in the meeting

Powergrid informed that the fault was at 46.6 km from Alipurduar end which is under the Bhutan control area.

ERLDC informed that Bhutan was already informed about the trippings and was advised to carry out line patrolling to avoid unwanted tripping of the line.

ITEM NO. B.16: Tripping Incidences in month of June 2020

Other tripping incidences occurred in the month of June 2020 which needs explanation from constituents of either of the end is given in **Annexure-B16**

In 36th TCC, all the constituents were advised to use the PDMS on-line portal for uploading the single line tripping details along with DR (comtrade files), EL and other relevant files for all trippings of August 2017 onwards. Otherwise, it will be considered as violation of compliance of clause 5.2(r) & 5.9 of IEGC.

In 74th PCC, all the constituents were requested to submit the disturbance report along with DR through the new version of on-line portal which was implemented from 01st Jan. 2019.

Members may discuss.

Deliberation in the meeting

Details were received from concerned utilities and updated list is enclosed at ***Annexure B16.***

ITEM NO. B.17: Repeated tripping of transmission lines due to same reason/fault at nearby areas.

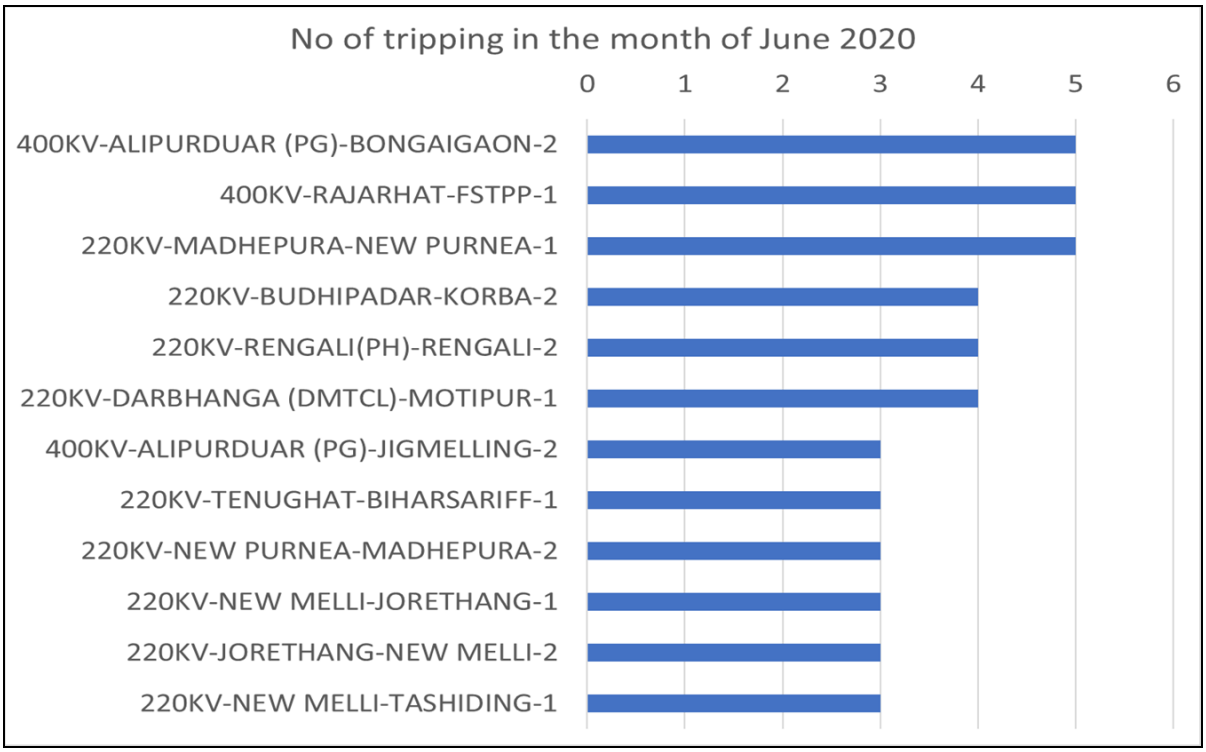


Figure 1: List of the transmission lines which tripped more than two times during the month of May 2020

As shown in Figure 1, there are 12 transmission lines having voltage level 220 kV and above and which tripped more than two times in the month of June 2020. Around 11 and 14 transmission lines having voltage level 220 kV and above tripped more than two times in the month of April and May 2020 respectively. Growing number of repeated tripping of transmission lines is putting grid in grid in vulnerable condition. Repeated tripping of some transmission lines resulted repeated grid disturbances and grid incidents along with load and generation loss.

Transmission lines utilities are requested to maintain line properly so that repeated tripping may be avoided. In some cases, lines tripped due to same reason or fault at nearby location. List of those lines is shown below.

Name of the line	Reason	No of tripping	Utility to respond
400KV-ALIPURDUAR (PG)-BONGAIGAON-2	R phase to earth fault with location 40 - 65 km from Bongaigaon end. 3 tripping incidents with fault distance at 60 - 65 km from Bongaigaon end.	5	ENICL
400KV-RAJARHAT-FSTPP-1	R phase to earth fault or R & B phase fault at location of 17-23 km from Rajarhat. Line is anti-theft charged from Rajarhat end up to 210 km from Rajarhat on 20th June 2020	4	POWERGRID ERTS - 2
220KV-MADHEPURA-NEW PURNEA-1	B phase to earth fault at 55 - 58 km from Madhepura	3	BSPTCL
220KV-MADHEPURA-NEW PURNEA-1 & 2	LBB operation at New Purnea	2	BSPTCL
220KV-RENGALI(PH)-RENGALI-2	Two incidents due to differential protection operation at PG end. Line did not trip from another end. During other two incidents, line tripped from Rengali (PH) end only on operation of master trip relay or pilot wire protection relay.	4	POWERGRID Odisha and GRIDCO SLDC

Name of the line	Reason	No of tripping	Utility to respond
220KV-DARBHANGA (DMTCL)-MOTIPUR-1	B phase to earth fault at 81 - 83 km from Darbhanga	3	BSPTCL
220KV-JORETHANG - NEW MELLI- D/C and 220 KV NEW MELLI - TASHIDING S/C	During all 3 events, three was a high resistance fault and then it got converted to Y and B phase fault at 220 kV New Melli - Tashiding. Directional E/F relay of Jorethang end of 220 kV Jorethang - New Melli D/C detected the fault and tripped. Generation loss occurred at Jorethang and Tashiding	3	POWERGRID, Sikkim SLDC, JLHEP and THEP

Deliberation in the meeting

ENICL explained that tripping incidences in 400KV-ALIPURDUAR (PG)-BONGAIGAON-2 were due to vegetation clearance issues.

BSPTCL explained that tripping incidences in 220KV-MADHEPURA-NEW PURNEA-1 and 2 were caused due to loose connection of LBB relay resulting in LBB operation and the issue was rectified.

PCC advised all concerned utilities to resolve such issues at earliest and send a detailed report to ERPC and ERLDC.

ITEM NO. B.18: Repetitive LBB operation at New Purnea S/S in the month of June 2020

On 5th June 2020 at 22:35 hrs and on 06th June 2020 at 03:18 hrs, LBB operation at New Purnea S/S resulted tripping of 220 kV New Purnea – Madhepura D/C and 220 kV bus 2 at New Purnea. Vide mail dated 30th June 2020, BSPTCL was requested to maintain the healthiness of 220 kV Madhepura New Purnea D/C share the auto-reclose status for the line at Madhepura and issue on the LBB for circuit 1 at New Purnea. But 220 kV New Purnea Madhepura – 1 already tripped 3 times in the month of July 2020 (as on 09th July 2020).

BSPTCL may share the remedial action taken after the communication from ERLDC.

BSPTCL may explain.

Deliberation in the meeting

BSPTCL informed that Y phase CT connection in LBB relay of TB of 220 KV Madhepura-I circuit was found loose and the issue was resolved on 13/6/2020 and the bay charged successfully at 15:47 Hrs. Since then they were not observed any maloperation of the LBB relay.

BSPTCL added that during tripping auto reclosing is initiated through the relay but the closing of breaker does not happen.

PCC advised BSPTCL to check the reason for not closing the CB during autoreclose operation.

ITEM NO. B.19: Repetitive tripping of Transmission Lines from 220/132 kV Baripada (PG) substation during March-June 2020

A significant number of repetitive tripping has been observed on the transmission lines from 220/132 kV Baripada substation since last Jan-June 2020. A list of such line tripping is provided below with fault remarks is attached in annexure 1.2. Vide mail dated 01st July 2020, both OPTCL

and POWERGRID Odisha were requested to perform root cause analysis of each event and to ensure proper operation and maintenance of transmission lines. But even after communication from ERLDC, reporting of tripping instances has been reported.

Both POWERGRID Odisha and OPTCL may share reason for repeated tripping of these lines along with remedial action taken after the communication from ERLDC

Powergrid and OPTCL may explain.

Deliberation in the meeting

OPTCL informed that lines got tripped due to malfunction of relay Powergrid end. They further informed that issue was rectified & vegetation has been cleared and no such tripping incidences were observed from 7th July 2020.

ITEM NO. B.20: Tripping of large no of transmission lines due to inclement weather condition

During the month of April 2020 to June 2020, more than 30 ISTS transmission lines tripping was reported due to inclement weather condition. Ideally construction, operation and maintenance of lines should take care of such thunderstorms or local effects of weather which are regular during summer season in India. Vide letter dated 08th July 2020, Director SO, POSOCO advised all ISTS and state transmission utilities to analyse these large numbers of line tripping during thunderstorm and carry out corrective actions.

Transmission utilities are requested to share action taken in this regard.

Members may discuss.

Deliberation in the meeting

PCC advised all concerned utilities to take corrective actions at earliest and send report to ERPC and ERLDC .

ITEM NO. B.21: Grid event at Arrah at 10:27 hrs on 09th June 2020

At 10:27 Hrs on 09th June 2020, 132 KV Bus at Arrah (PG) tripped along with 2 x 100 MVA 220/132 KV ICTs (ICT 1 & ICT II), 160 MVA 220/132 KV ICT III, 132 KV Arrah (PG)-Arrah (BSPTCL), 132 KV Arrah (PG) - Dumraon (BSPTCL) S/C and 132 KV Arrah (PG)-Jagdishpur (BSPTCL) D/C. Reason for bus tripping at Arrah may be shared.

Powergrid may explain.

Deliberation in the meeting

Powergrid informed that tripping occurred during maintenance work being carried out at Arrah, the trip wire of BB/LBB auxiliary 96 trip relay was in contact with positive.

PCC advised Powergrid to take proper care while doing the maintenance work to avoid unwanted tripping.

ITEM NO. B.22: Multiple Tripping's due to Over-voltage stage-II operation with issue of Secondary Arcing and LC Resonance.

During the month of June few tripping incidents were reported due to Over voltage Stage-II operation. After analysis with DR, it was observed it occurred due to Secondary arching issue

and LC resonance with the compensated lines where line reactors are installed. These incidents are vulnerable to grid operation as well as life of the equipment. List of lines are mentioned below.

Name of Line	Tripping Date /Time	Utility to Respond
400 kV PATNA- NPGC-1	17/06/2020 , 15:14 Hrs	POWERGRID ERTS-1 , NPGC
400 kV ALIPURDWAR-BINAGURI-2	10/06/2020 , 13:11 Hrs	POWERGRID ERTS-2
400 kV KAHALGAON-MAITHON -2	05/06/2020 , 16:08 Hrs	POWERGRID ERTS-2,NTPC KAHALGAON

Detailed report and analysis for above mentioned trippings citing the issue of secondary arching and LC resonance is attached for reference in the Annexure.
Utilities are requested to submit the details of NGR and whether NGR was in service during tripping.

Severe Over voltages are causing line tripping and can potentially damage equipment's, whether any equipment was damaged during tripping.

Utilities are requested to submit their analysis and observations regarding this.

LC resonance phenomenon due to which high line voltage is appearing even after 3 phase breaker opening may cause problems which requires detailed study and measures to mitigate the same ,Tripping of Line reactors scheme may be implemented after proper study .

Members may discuss.

Deliberation in the meeting

Powergrid informed that tripping of line reactor during autoreclose operation was implemented at Patna for 400kV PATNA- NPGC line.

ERLDC requested Powergrid to implement the same at Ranchi Substation for 400 kV MPL-Ranchi line.

Powergrid informed that at Binaguri, reactor can be tripped as it is switchable but it can't be implemented at Maithon as it is not switchable.

ERLDC informed that the issue was referred to CTU and CEA.

ITEM NO. B.23: Severe Oscillation at Gazuwaka resulting into Bi-Pole tripping.

Severe oscillations were observed on 23/06/2020 from 13:20 hrs in Jeypore and nearby area and lasted till 14:26 Hrs till both HVDC became out of service.

400 Jeypore – Gazuwaka Pole -2 tripped at 14:08 hrs due to minimum filter unavailability as filter tripped due to fundamental harmonic alarm protection. Pole-1 was hand tripped at 14:26 Hrs as noise was coming from converter Transformer due to these oscillations and after the outage of both poles oscillations vanished.

Similar event occurred again on 26/06/2020 where oscillations were observed from 19:54 Hrs to 20:20 Hrs causing Bi-Pole tripping.

Letter addressing the same issue was sent from NLDC to CEA and CTU for HVDC Gajuwaka fluctuations on multiple occasions is attached for reference.

Odisha may share any unit tripping or abnormality MW/MVARA plot if occurred during this span

of time. Power grid ERTS-3 may share details related to above events, root cause analysis.
Such severe oscillation are endangering grid security and also leading to pole tripping causing power interruption in ER-SR corridor hence a Detailed study regarding this is required to find root cause so that source can be identified and mitigation can be done to avoid any future instance.

Members may discuss.

Deliberation in the meeting

Powergrid informed that FSC was removed in order to resolve this issue but no improvement had been observed.

Powergrid added that the relevant details were forwarded to CTU and CTU is doing the study on this issue.

ITEM NO. B.24: Oscillations during 12:04:30 hrs to 12:06 hrs in ER and NER on 22/06/2020

Oscillations were observed from 12:04:36 to 12:06 in ER-NER corridor .In ER oscillations were prominent at NER interfacing areas such as Binaguri , Alipurdwar , Purnea , Kishnaganj .Frequency of Oscillation was 0.55 Hz ,which is inter –area mode.

Teesta3, Teesta5, Dikchu, Chuzachen, Tashiding, Jorethang, TLDP, Farakka, Sagardighi all are requested to share whether any problem is noticed at their units during the time 12:04 to 12:06 on 22.6.20 and whether any kind of control set points/setting change has been effected at their end in their units. MW vs time and Mvar vs time plot may also be shared by them. Alipurduar HVDC may also share whether any change is noticed at their set points during this time.

Members may discuss.

Deliberation in the meeting

ERLDC informed that they had not received any report from Farakka , Sagardighi. They had already informed NLDC about oscillations as it is related to both Eastern and North Eastern region.

PCC advised all concerned utilities to share report to ERPC and ERLDC.

ITEM NO. B.25: Protection Coordination for New Lines/ICTs Prior to First Time Charging

In the month of June 2 Nos of lines were charged first time which are as mentioned below, along with their adjacent substation which require protection co-ordination

400 kV Rajarhat-Gokarno	Adjacent Substation: New Purnea (PGCIL ERTS 2), Gokarna (WBSETCL)
400 kV Rajarhat-Farakka	Adjacent Substation: Rajarhat (PGCIL ERTS2), Farakka (NTPC)

PGCIL ERTS 2, PGCIL ERTS 1, NTPC Farakka and WBSETCL may kindly confirm the following:
Share the Main 1 and Main2 relay settings for these lines from respective ends (PDF format).
Whether with these line commissioning, is there any change in long and short lines happened at these substations.

- If there is a change in short and long lines from any of the above four substations, whether the protection setting of lines has been revised from these four substations as per ERPC protection Philosophy.

- List of lines for which protection setting has been revised to be intimated to ERLDC/ERPC (Along with downloaded relay setting of above four lines in Main 1 and Main2 as well as any other line setting change at these four substations)
- In case long lines and the short line has changed from any of the substations whether Remote End Substations have been informed and their protection setting has been revised by remote end utilities or not to be confirmed by respective substation Owners.

Members may discuss.

Deliberation in the meeting

PCC advised all concerned utilities to send the confirmation report along with the relay settings to ERPC and ERLDC .

PART- C:: OTHER ITEMS

ITEM NO. C.1: FOLLOW-UP OF DECISIONS OF THE PREVIOUS PROTECTION SUB-COMMITTEE MEETING(S)

The decisions of previous PCC Meetings are given at **Annexure-C1.**

In 73rd PCC, it was observed that latest status on the implementation of the previous PCC recommendations were not updated by the constituents regularly. All the constituents were advised to update the latest status of the recommendations as per the list given in Annexure.

Members may update the latest status.

Deliberation in the meeting

*Updated status is enclosed at **Annexure C1.***

ITEM NO. C.2: Status of Third-Party Protection Audit

The compliance status of 1st Third Party Protection Audit observations is as follows:

Name of Constituents	Total Observations	Complied	% of Compliance
Powergrid	54	46	85.19
NTPC	16	14	87.50
NHPC	1	1	100.00
DVC	40	26	65.00
WB	68	49	72.06
Odisha	59	42	71.19
JUSNL	34	25	73.53
BSPTCL	16	5	31.25

IPP (GMR, Sterlite and MPL)	5	5	100.00

** Pending observations of Powergrid are related to PLCC problems at other end.*

The substation wise status of compliance is available at ERPC website (Observations include PLCC rectification/activation which needs a comprehensive plan).

In 77th PCC, BSPTCL has submitted the updated status.

In 79th & 80th PCC, BSPTCL was advised to submit the details of the compliance report.

BSPTCL may update.

Deliberation in the meeting

Members noted.

ITEM NO. C.3: Non-commissioning of PLCC / OPGW and non-implementation of carrier aided tripping in 220kV and above lines.

According to CEA technical standard for construction of electric plants and electric lines -Clause 43(4) (c), transmission line of 220 KV and above should have single-phase auto-reclosing facility for improving the availability of the lines. However, from the tripping details attached June-August, 2016 it is evident that the some of 220kV above Inter & Intra-Regional lines do not having auto-reclose facility either at one end or at both ends. Out of these for some of the lines even PLCC/OPGW is not yet installed and carrier aided protection including Autorecloser facility is not yet implemented. Based on the trippings of June- August, 2016 and PMU analysis a list of such lines has been prepared and as given below:

List of line where auto reclose facility is not available(Information based on PMU data analysis)

S. No	Transmission Lines name	Date of Tripping	Reason of Tripping	Owner Detail		Present Status	
				End-1	End-2	OPGW/PLCC Link available	AR facility functional
13	220KV BUDIPADAR-KORBA-II	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC not available	will be activated in consultation with Korba
17	220 KV TSTPP-RENGALI	17.07.16	EARTH FAULT	NTPC	OPTCL	OPGW replaced PLCC.	by March 2018
18	220KV BUDIPADAR-RAIGARH	21.07.16	EARTH FAULT	OPTCL	PGCIL	PLCC defective.	To be commissioned be Chhatisgarh.
20	220 KV FARAKKA-LALMATIA	03.08.16	B-N FAULT .	NTPC	JUNSL	Yes	Old Relay and not functional. 7-8 months required for auto re-close relay procurement.
23	220 KV MUZAFFARPUR - HAZIPUR - II	10.08.16	B-N FAULT	PGCIL	BSPTCL	PLCC commissioned.	Voice established. For carrier required shutdown
24	220 KV ROURKELA - TARKERA-II	11.08.16	B-N FAULT	PGCIL	OPTCL	OPGW available	DTPC installed. A/R to be

							commissioned.
27	220 KV BIHARSARIF-TENUGHAT	07.09.16	B-N FAULT	BSPTCL	TVNL		
33	220KV Jamshedpur-Jindal-SC						

34th TCC advised all the respective members to update the above list along with the last tripping status in next PCC meeting.

TCC further advised all the constituents to give the latest status of PLCC of other 220kV and above lines under respective control area.

OPTCL:

1. 220kV Rengali(PG)-Rengali S/Y : *Contract awarded*
2. 220kV Indravati(PG)-Indravati(PH) : *Contract awarded*
3. 132kV Baripada(PG)-Baripada : *OPGW completed*
4. 132kV Baripada(PG)-Rairangpur : *OPGW completed*

BSPTCL:

Sl No.	***Lines***	***Status***
1	*220 kV Purnea(PG)-Madhepura*	*Protection through PLCC is working properly*
2	*220 kV Biharsharif-BTPS new*	*BHEL would complete this work*
3	*220 kV BTPS new- Begusarai*	*BHEL would complete this work*
4	*220 kV Biharshariff-Bodhgaya line LILO at Khizersarai*	*OPGW is present. Protection is done through DPC.*
5	*132 kV MTPS-Motiari line*	*OPGW is installed.*
6	*220KV Madhepura-New Purnea D/C*	*Protection through PLCC is working properly*
7	*220KV Muzaffarpur-Hajipur D/C line*	*Protection through PLCC is working properly*
8	*220KV Patna-Khagaul-SC*	*PLCC Panel working properly.*
9	*220 kV DMTCL(Darbhanga)-Laukhi Circuit-I*	*PLCC Panel working properly*
10	*220 kV Tenughat-Biharsharif S/C*	*PLCC to be commissioned*
11	*220 kV Gaya-Sonenagar New circuit-I*	*Communication through OPGW*
12	*220 kV Pusauli-Dehri S/C*	*PLCC not working. OPGW commissioned at Dehri end.*
13	*220 kV Begusarai-Purnea(PG) D/C*	*PLCC working properly*
14	*220 kV DMTCL-Motipur ckt-II*	*PLCC to be commissioned.*
15	*220 kV Dehri- Gaya D/C*	*PLCC working properly*
16	*220 kV Kishanganj(PG)-Kishanganj(B)-II*	*PLCC working properly*

In 79th PCC, BSPTCL submitted PLCC status of some of the lines. The details have been updated in above table.

In 80th PCC meeting, BSPTCL was advised to rectify the PLCC & Auto reclose issues in coordination with their communication wing.

Members may update.

Deliberation in the meeting

Members noted.

ITEM NO. C.4: Any additional agenda – with permission of the Chair.

****

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TVNL, Jharkhand

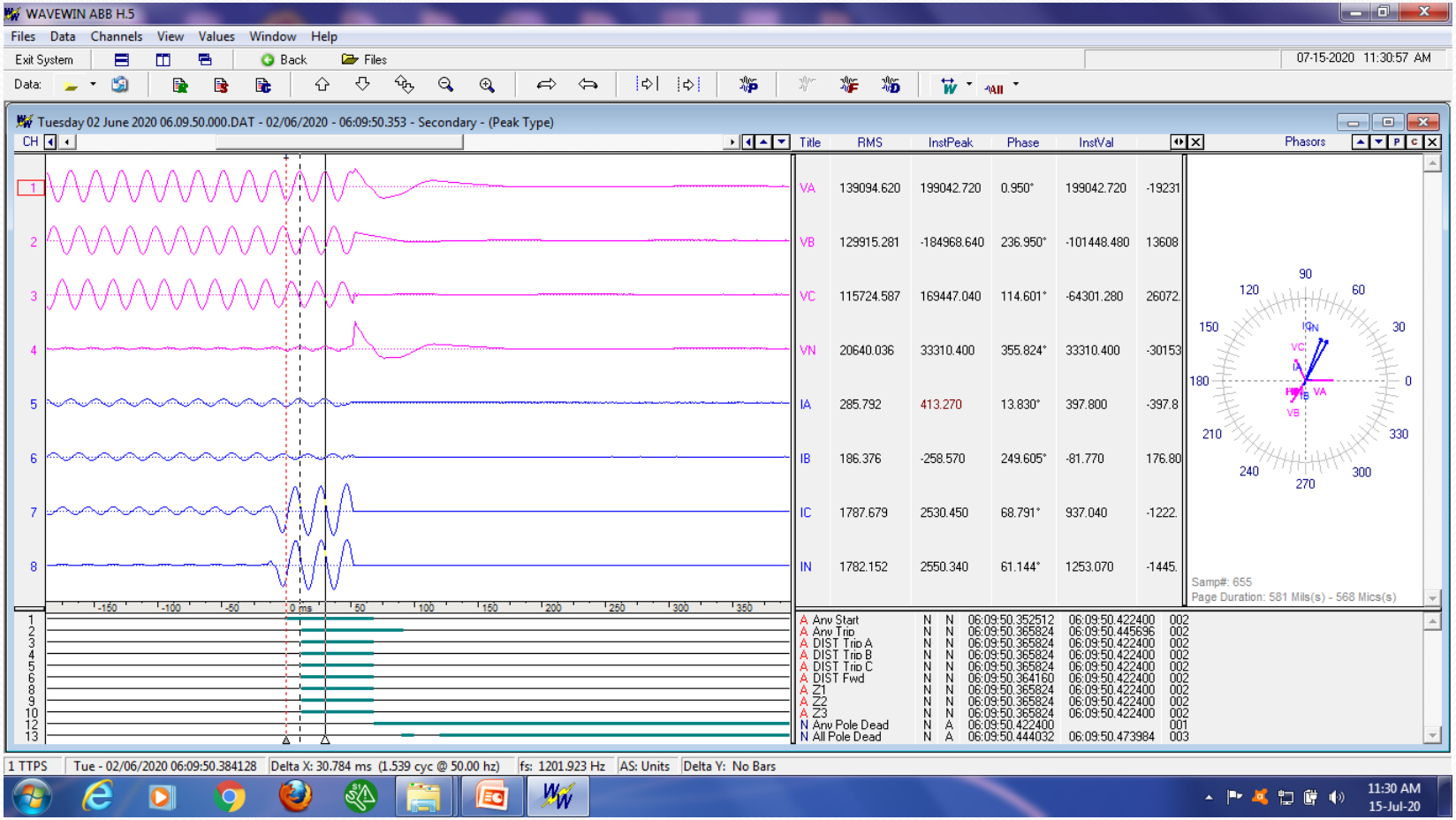
Annexure B5

- Feeder Tripping Report
  Month- June' 2020

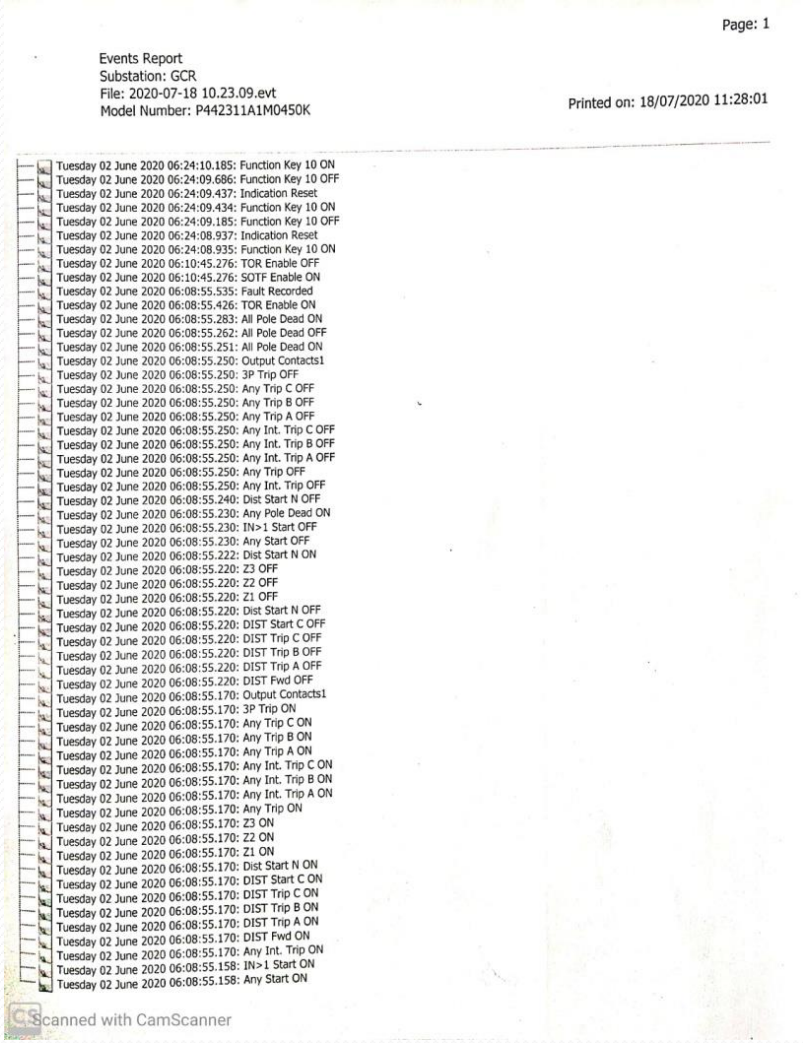
Feeder Tripping Report and Corrective Action Taken

SL. NO.	DATE/TIME OF TRIPPING/ SYNCHRONISING	FEEDER TRIPPED	RELAY INDICATION AT TTPS END	Remote end Relay
1	Tripping Date - 02.06.2020, Time 06:08 HRS Synch. Time – 06:57 HRS	T.T.P.S.- B.SHARIFF FEEDER TRIPPED FROM BOTH END	STARTED PHASE - CN, EARTHFAULT, DISTANCE TRIP Z1, FAULT DURATION – 71.55 ms, FAULT LOCATION - 93.30 KM , ZONE - ZONE 1	STARTED PHASE – CN, EARTHFAULT, TRIPPED PHASE ABC FAULT DURATION- 46.59 ms FAULT LOCATION – 96.51 KM FAULT IN ZONE- ZONE 1
	1. A/R Is not enabled and relay is configured for Three phase tripping. 2. Any Start at 06:08:55.158; Any Trip ON at 06:08:55.170, Any Pole Dead at 06:08:55.230 & All pole Dead at 06:08:55.251. At 06:08:55.198 after Any Trip ON current in all three phase :- IA – 285.741A, IB – 186.607A, IC – 1784.659A recorded at DR. ***No any pole was opened prior to fault.***			

MAIN 1- TTPS-BIHAR SARIFF FEEDER AT TTPS END, Dated 02.06.2020,



EVENT LOG OF MAIN-2 dt- 02-06-2020



Page: 1

Events Report
Substation: GCR
File: 2020-07-18 10.23.09.evt
Model Number: P442311A1M0450K

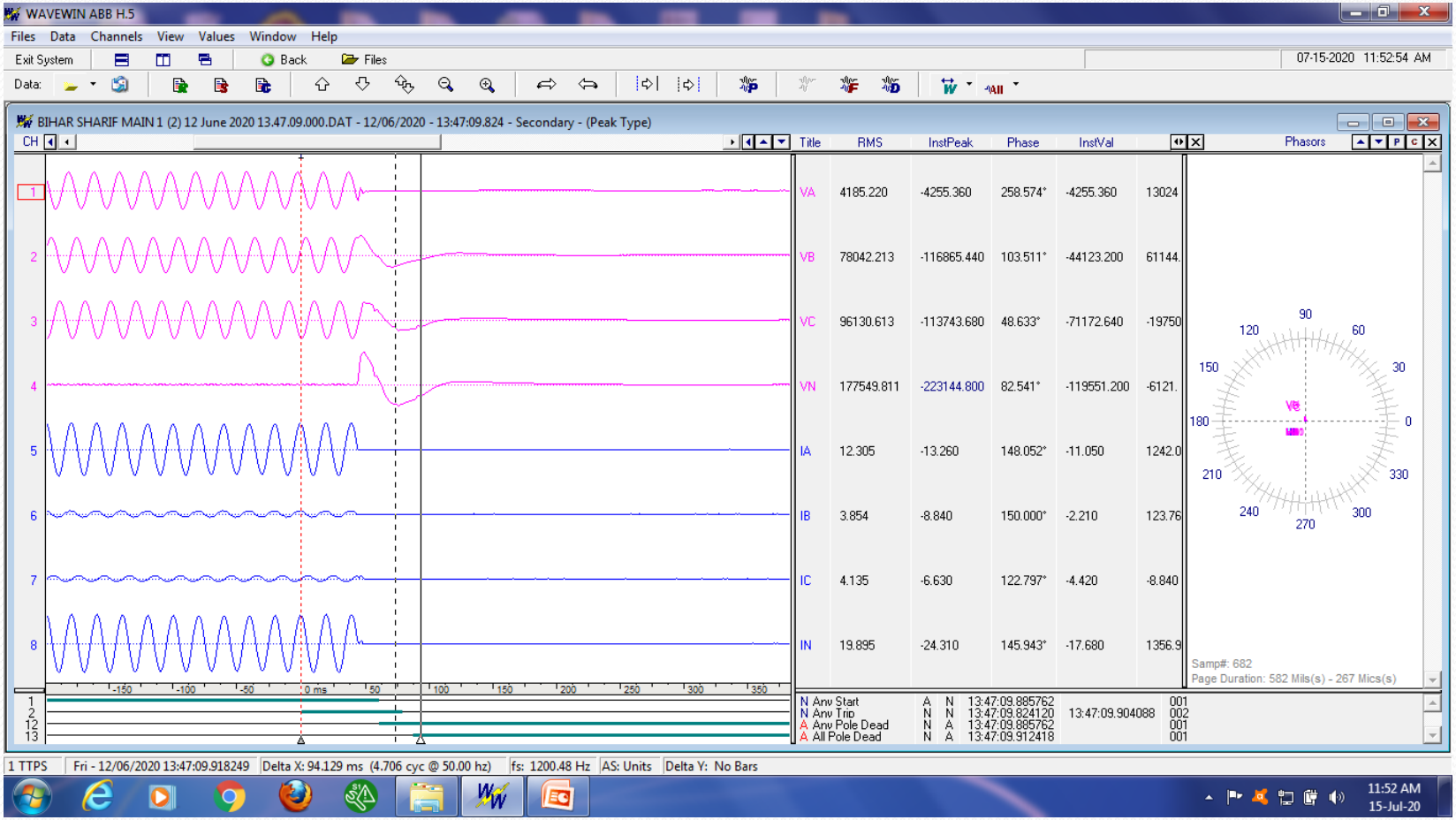
Printed on: 18/07/2020 11:28:01

Tuesday 02 June 2020 06:24:10.185: Function Key 10 ON
Tuesday 02 June 2020 06:24:09.686: Function Key 10 OFF
Tuesday 02 June 2020 06:24:09.437: Indication Reset
Tuesday 02 June 2020 06:24:09.434: Function Key 10 ON
Tuesday 02 June 2020 06:24:09.185: Function Key 10 OFF
Tuesday 02 June 2020 06:24:08.937: Indication Reset
Tuesday 02 June 2020 06:24:08.935: Function Key 10 ON
Tuesday 02 June 2020 06:10:45.276: TOR Enable OFF
Tuesday 02 June 2020 06:10:45.276: SOTF Enable ON
Tuesday 02 June 2020 06:08:55.535: Fault Recorded
Tuesday 02 June 2020 06:08:55.426: TOR Enable ON
Tuesday 02 June 2020 06:08:55.283: All Pole Dead ON
Tuesday 02 June 2020 06:08:55.262: All Pole Dead OFF
Tuesday 02 June 2020 06:08:55.251: All Pole Dead ON
Tuesday 02 June 2020 06:08:55.250: Output Contacts1
Tuesday 02 June 2020 06:08:55.250: 3P Trip OFF
Tuesday 02 June 2020 06:08:55.250: Any Trip C OFF
Tuesday 02 June 2020 06:08:55.250: Any Trip B OFF
Tuesday 02 June 2020 06:08:55.250: Any Trip A OFF
Tuesday 02 June 2020 06:08:55.250: Any Int. Trip C OFF
Tuesday 02 June 2020 06:08:55.250: Any Int. Trip B OFF
Tuesday 02 June 2020 06:08:55.250: Any Int. Trip A OFF
Tuesday 02 June 2020 06:08:55.250: Any Trip OFF
Tuesday 02 June 2020 06:08:55.250: Any Int. Trip OFF
Tuesday 02 June 2020 06:08:55.240: Dist Start N OFF
Tuesday 02 June 2020 06:08:55.230: Any Pole Dead ON
Tuesday 02 June 2020 06:08:55.230: IN>1 Start OFF
Tuesday 02 June 2020 06:08:55.230: Any Start OFF
Tuesday 02 June 2020 06:08:55.222: Dist Start N ON
Tuesday 02 June 2020 06:08:55.220: Z3 OFF
Tuesday 02 June 2020 06:08:55.220: Z2 OFF
Tuesday 02 June 2020 06:08:55.220: Z1 OFF
Tuesday 02 June 2020 06:08:55.220: Dist Start N OFF
Tuesday 02 June 2020 06:08:55.220: DIST Start C OFF
Tuesday 02 June 2020 06:08:55.220: DIST Trip C OFF
Tuesday 02 June 2020 06:08:55.220: DIST Trip B OFF
Tuesday 02 June 2020 06:08:55.220: DIST Trip A OFF
Tuesday 02 June 2020 06:08:55.220: DIST Fwd OFF
Tuesday 02 June 2020 06:08:55.170: Output Contacts1
Tuesday 02 June 2020 06:08:55.170: 3P Trip ON
Tuesday 02 June 2020 06:08:55.170: Any Trip C ON
Tuesday 02 June 2020 06:08:55.170: Any Trip B ON
Tuesday 02 June 2020 06:08:55.170: Any Trip A ON
Tuesday 02 June 2020 06:08:55.170: Any Int. Trip C ON
Tuesday 02 June 2020 06:08:55.170: Any Int. Trip B ON
Tuesday 02 June 2020 06:08:55.170: Any Int. Trip A ON
Tuesday 02 June 2020 06:08:55.170: Any Trip ON
Tuesday 02 June 2020 06:08:55.170: Z3 ON
Tuesday 02 June 2020 06:08:55.170: Z2 ON
Tuesday 02 June 2020 06:08:55.170: Z1 ON
Tuesday 02 June 2020 06:08:55.170: Dist Start N ON
Tuesday 02 June 2020 06:08:55.170: DIST Start C ON
Tuesday 02 June 2020 06:08:55.170: DIST Trip C ON
Tuesday 02 June 2020 06:08:55.170: DIST Trip B ON
Tuesday 02 June 2020 06:08:55.170: DIST Trip A ON
Tuesday 02 June 2020 06:08:55.170: DIST Fwd ON
Tuesday 02 June 2020 06:08:55.170: Any Int. Trip ON
Tuesday 02 June 2020 06:08:55.158: IN>1 Start ON
Tuesday 02 June 2020 06:08:55.158: Any Start ON

Feeder Tripping Report and Corrective Action Taken

SL. NO.	DATE/TIME OF TRIPPING/ SYNCHRONISING	FEEDER TRIPPED	RELAY INDICATION AT TTPS END	Remote end Relay
2	Tripping Date - 12.06.2020, Time 13:46 hrs Synch. Time – 14:33 HRS	T.T.P.S.- B.SHARIFF FROM BOTH END	EARTHFAULT START IN 1, FAULT DURATION – 1.560 s, ZONE - None, Ia-484.7A, Ib-336.5A, Ic-320.2A.	STARTED PHASE - CN TRIPPED PHASE ABC FAULT DURATION- 46.59 ms FAULT LOCATION – 96.51 KM FAULT IN ZONE- ZONE 1
	It was high resistive fault, may be touching of tree causing slow increase of current in R phase. Line tripped on Zone-none, Backup over current earth fault, IN › 1 time delay- 1.5Sec. PD was not operated.			

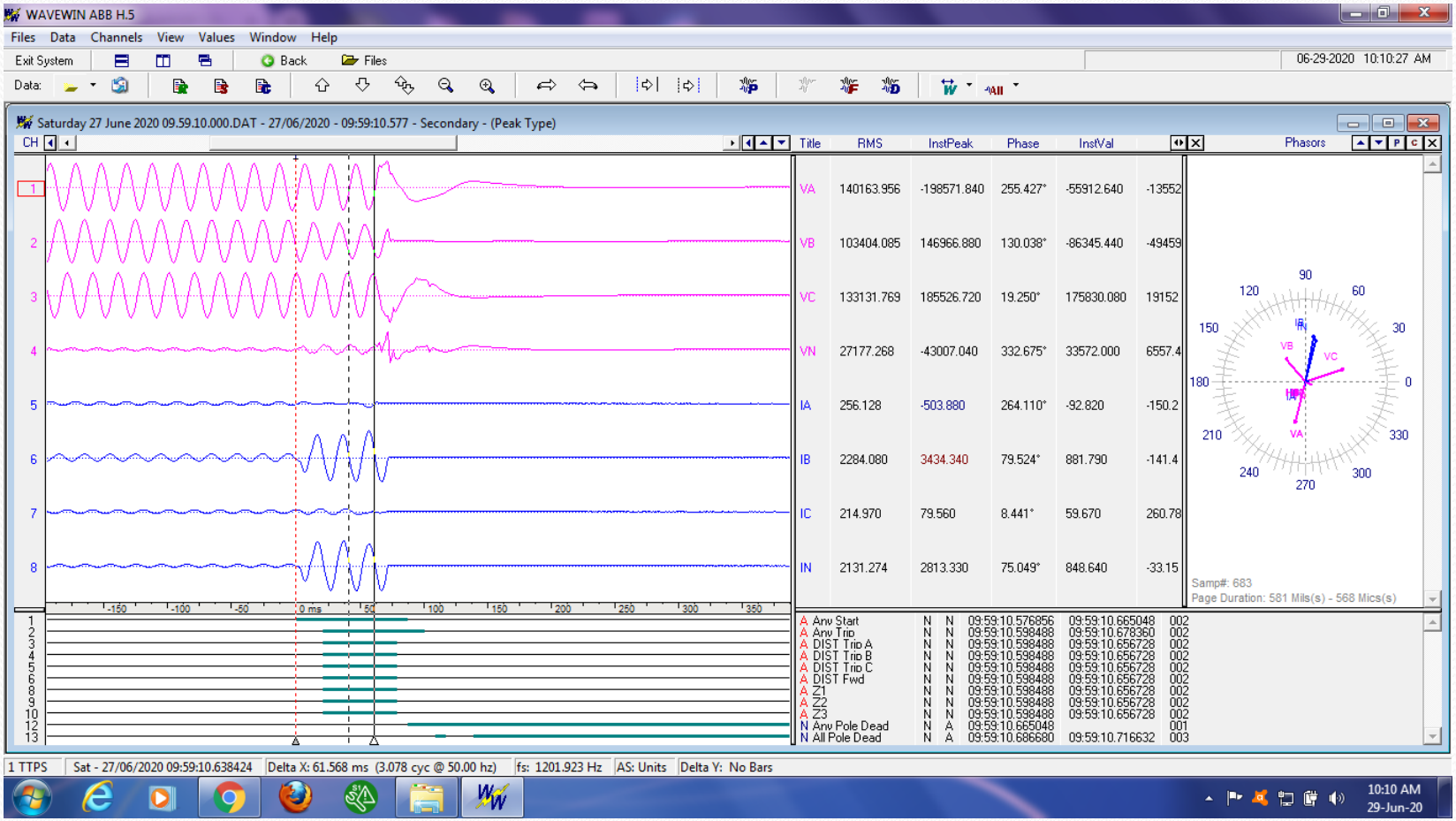
MAIN 1- TTPS-BIHAR SARIFF FEEDER AT TTPS END, Dated 12.06.2020,



Feeder Tripping Report and Corrective Action Taken

SL. NO.	DATE/TIME OF TRIPPING/ SYNCHRONISING	FEEDER TRIPPED	RELAY INDICATION AT TTPS END	Remote end Relay
3	Tripping Date- 27.06.2020, Time – 09:59HRS Synch. Time – 10:38 HRS	T.T.P.S.- B/S FEEDER TRIPPED FROM BOTH END	STARTED PHASE-BN, TRIPPED PHASE- ABC EARTHFAULT START IN 1, DISTANCE TRIP- Z1, FAULT DURATION – 88.21 ms, FAULT LOCATION- 76.25 KM ZONE – ZONE 1	STARTED PHASE - BN TRIPPED PHASE ABC EARTH FAULT START IN 1 DISTANCE TRIP Z1 FAULT DURATION- 46.6 ms FAULT LOCATION – 111.9 KM FAULT IN ZONE- ZONE 1
	A/R is not enabled and relay is configured for Three phase tripping.			

MAIN 1- TTPS-BIHAR SHARIFF FEEDER AT TTPS END, dated 27.06.2020



Thanks

Annexure B16 List of important transmission lines in ER which tripped in JUNE-2020

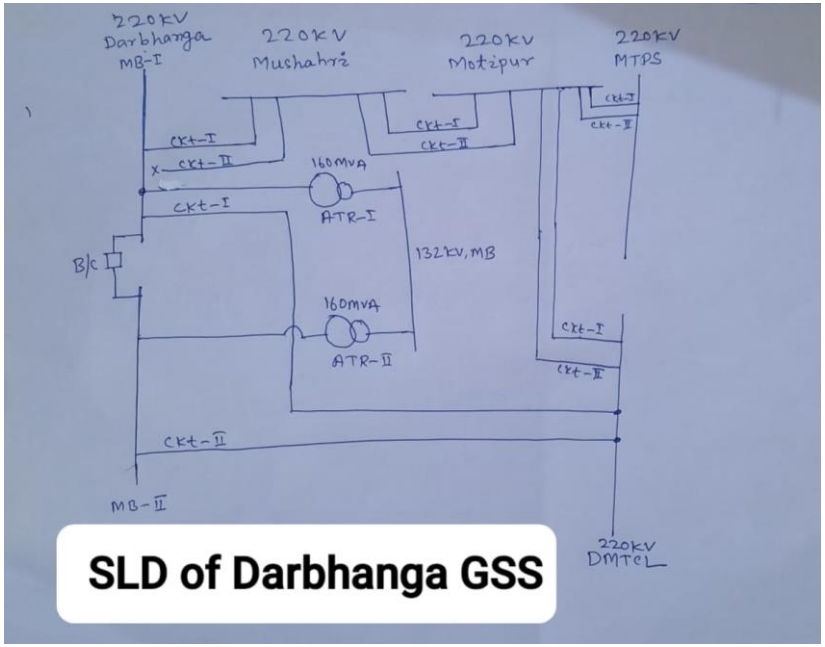
S.NO	LINE NAME	TRIP DATE	TRIP TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	PMU Location	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	Utility to update	Utility Response	ERLDC Comment on Utility Response
1	220KV-CHANDIL-RANCHI-1	01/06/2020	16:20	Ranchi: R-N, 25.7km, 4.14KA	Chandil: R-N, 72Km, 1.954ka	R-N fault .	100	transeient fault in R phase then after 500 ms again fault in Y phase and line tripped .	Ranchi	YES	YES	Powergrid ER-1 , Jharkhand		
2	400KV-FSTPP-MALDA(PG)-1	01/06/2020	00:57	Y-N FAULT,22,43.39 KM,4.76A	FSTPP: Y-N,21,FD 0.2 KM,446A	Y-N fault .	<100	Line tripped in reclaim time .DR pole status showing all 3 phase breaker opened during dead time but it is not the case as rest 2 phase R&B were intact .	Farakka	NO	YES	PG ER-II		
3	220KV-RENGALI(PH)-TSTPP-1	02/06/2020	15:31	ZONE-1 R,B FD-16.9KM FC-8.2 KM	As per PMU only B ph fault		160	No A/R operation.As all 3 phase breaker opened after 160 ms .	TALCHER	NO	YES	OPTCL.		
4	220KV-BUDHIPADAR-KORBA-2	02/06/2020	11:21	Y-N 21 , FD= 147.0 Kms, d(%)=81.2%, IL2= 1.17 KA	Korba-Zone-I Y-N FD=13.354ms Iy=9308Amp	Y-N fualt	900	o-2 picked up but line tripped in z-3 time reason may be explained	ROURKELLA	YES	NO	OPTCL.		
5	220KV-MADHEPURA-NEW PURNEA-1	02/06/2020	13:51	Madhepura :B-N, 21, 58.1km,1.19KA	Purnea : B-N, 84.7 Km, 1.98 KA	B-N FAULT	100	As per DR R &Y phase did not opened at purnea end .No A/R operation observed .Independent pole status not configured in DR.Status of A/r at madhepura.	PURNEA	NO	YES	PG ER-1 ,BSPTCL		
6	220KV-BUDHIPADAR-KORBA-3	02/06/2020	11:16	Direct trip received		No dip observed in PMU.	09/04/1900	No dip observed in PMU,Why DT received may be explained .	ROURKELLA	NO	NO	OPTCL		
7	220KV-TENUGHAT-BIHARSARIFF-1	02/06/2020	06:11	BIHARSARIF: B-N, 96KM, 1.5KA	TENUGHAT: B-N, 92KM, 1.7KA	B-N FAULT	<100	Why 3 phase tripping occurred in case of single phase fault ,Was A/R disabled .R phase breaker status showing as opened prior to fault .Satatus of A/R at Tenughat	BIHARSHARIFF	NO	YES	BSPTCL , JVUSNL		
8	400KV-KODERMA-BIHARSARIF(PG)-1	05/06/2020	20:12	R_N, 217 KM (Koderma)-Line length 130 KM		O/V STAGE -2	<100	While A/R was attempted very high voltage in healthy phases of Rand Y phase observed which caused O/V stag -2 operation .	BIHARSHARIFF	NO	YES	PG ER-1, DVC		
9	400KV-MAITHON-KHSTPP-2	05/06/2020	16:08	DT RECEIVED AT MAITHON		O/V STAGE -2	<100	At the same time A/R was successful in Y phase kahalgaon - farakka IV ,line which caused severe O/V in Khstpp-Maithon -2	KAHALGAON	YES	YES	NTPC KAHALGAON		
10	220KV-BUDHIPADAR-KORBA-2	08/06/2020	13:51	Budhipadar:b-n, 121 km,1.28ka	z1,t-n,43.72 km,3.062 ka from korba	B-N FAULT	160	z-2&z-3 started at Budhipadar end .Current became zero after 160 ms , SEEMS BUS VOLTAGE IS TAKEN AS I/P for line . pole opening status is not showing in DR .Stats of A/R ?	ROURKELLA	YES	NO	OPTCL.		
11	220KV-TTPS-TSTPP-1	09/06/2020	15:29	B_N, 5.6 kA, 24 KM (TTPS)	R_N, 13.76 kA, 3.7 KM (TSTPP)	B-N FAULT	<100	Breaker status may be configured in DR. What votage input has been selected line or Bus as ,Line voltage of R and Y phase are showing healthy voltages .	TALCHER	YES	NO	TSTPS		
12	400KV-ALIPURDUAR (PG)-BONGAIGAON-2	09/06/2020	14:41	APL 95.5 KM, R_N, 22, 1.868 kA	BNG R_N, 53.5 KM, 5.04 kA, 21	R-N fault .	600	Reason for delayed tripping may be explained .Pmu shows 600 ms fault clearance time .	ALIPURDWAR	NO	NO	PG, ER-II		
13	220KV-BOLANGIR(PG)-SADEIPALI-1	10/06/2020	16:52	Sadeipali : R ph, 1.47 Km, 1.02 kA		R-N fault .	<100	No A/r operation.	PANDIABILLY	NO	NO	OPTCL,PGCIB-2		
14	220KV-DARBHANGA (DMTCL)-MOTIPUR-1	10/06/2020	10:54	Darbhanga-2L, B-N FD-38.7km FC-2.9S	Motipur- 2L, B-N FC-0S54kA	B-N FAULT	<100	No A/r is observed whether A/R operated or not as Time frame is not suffisient in DR for A/R observation .	Muzaffarpur	NO	YES	DMTCL,BSPTCL		
15	400KV-BINAGURI-ALIPURDUAR (PG)-2	10/06/2020	13:11	Binaguri Y-N FD-71.56km FC-6.62kA	APD Y-N 21 FD-70km FC-4.08BkA	Y-N FAULT	<100	A/R unsuccessful.In B phase after unsuccessful A/R Line voltage was showing till 3 seconds , reason may be explained ?	SILIGURI			PG EB-2		
16	220KV-ATRI-PANDIABIL-2	10/06/2020	11:50	LBB protection Operated, BGA Trip Relay Operated, BGB Trip Relay Operated.		No fault observed in PMU		No DR received,No fault observed Reason for tripping may be explained.		NO	NO	OPTCL		
17	400KV-ALIPURDUAR (PG)-BONGAIGAON-2	11/06/2020	06:31	R-N,z2,carrier received,2.166 kA ,95.6 km, from alipurduar	R-N,z1,40.3km,5.4 KA at bongaigaon	R-N fault .	500 ms	Delayed clearance observed , Fault was in z-2 of APD although carrier received back.pole tripping occurred and line opened after z-2 time. Unsuccessful A/R observed at Bonaigaon end.	SILIGURI	YES	NO	PG EB-2		
18	765KV-DHARAMJAIGARH-JHARSUGUDA-1	11/06/2020	14:07	DT received at Jharsuguda	R phase CT flashover in Main bay of Jharsuguda-I at Daramjaigarh	B-N FAULT	26/10/1900	Reason for delayed clearance may be explained .No Dr received	JHARSUGUDA	NO	NO	PG EB-3		
19	220KV-TENUGHAT-BIHARSARIFF-1	12/06/2020	13:41	, Ir=884.7 A, Ib=336.5 A, Ic=330.2 A at Tenughat	R-16A	R-N fault .	1500	Reason for slow increase of current in R phase may be explained till 1500 ms after which line tripped , whether it was a high resistive fault?. R phase breaker at Bsf end showing opened status still line current is of increasing trend .Line tripped on which protection not clear PD or what ?	BIHARSHARIFF	YES	YES	BSPTCL , JVUSNL		
20	220KV-RENGALI(PH)-RENGALI-2	12/06/2020	05:36	ON PILOT WIRE PROTECTION RELAY OPERATION. at rengali	no trip at rengali pg end			No fault in PMU .Reson may be explained.	TALCHER	NO	NO	OPTCL.		
21	220KV-RENGALI(PH)-RENGALI-2	13/06/2020	00:10	Master trip relay operated at Rengali PH	Line charged from PG end			No fault in PMU .Reson may be explained.	TALCHER	NO	NO	OPTCL.		
22	220KV-BUDHIPADAR-KORBA-2	14/06/2020	04:09	ZZ,Y-N,204.4Km,1.25KA@Budhipadar		Y-N Fault	400	From Buddipadar line tripped in z-2 .Seems no carrier based protection.				OPTCL.		
23	220KV-KATAPALLI-BOLANGIR(PG)-1	15/06/2020	10:45	BN	BN , 28 KM , 1.5 KA	B-N FAULT	<100	Breaker of all three phase opened from katapalli end within 100 ms of fault whether Carrier based protection is there or not ?,Line voltage becme zero after 1 second of the breaker opening	JEYPORE	YES	NO	OPTCL		
24	400KV-RANCHI-SIPAT-2	15/06/2020	07:56	B-N FD-361.2KM,FC-1.5KA		B-N FAULT	<100	After successful A/R DT received at Ranchi end.Tripping incident after successful A/R not present in DR.	RANCHI	YES	NO	PG EB-1		
25	220KV-MAITHON-OLMKA-1	16/06/2020	12:41	a/r successful at maithon ,L-75 KA B-N,zone 1 34.3 km ,weather bad	zone 1, 3.48 km,R-N,Ir=1.79 ka Ip=190 A,IB=502.7 A	R-N fault .	<100	A/R successful from Maithon end .But at the instant of fault 3 phase tripping at Dumka end .Whether A/R feature is enabled at Dumka end.If so why 3 phase tripping occurred at Dumka 3 phase.Pole opening status is not configured in Dr at Dumak .	MAITHON	YES	YES	JUVNL		
26	400KV-NABINAGAR(NPGC)-PATNA-1	17/06/2020	15:11	Y_N Fault, 9 KA? O/V St II (NPGC)	O/V st II (Patna)	O/V STAGE -2	<100	Initially there was Y -N fault in the line and Y phase breaker opened instantly but after 400 ms of opening of breaker sever high voltage appeared in the opened phase and all 3 phase opened due to DT rrod with O/V stage 2-operation at Patna end .This may please by explained...	PATNA	YES	NO	PG ER-1 , NPGC		
27	220KV-DARBHANGA (DMTCL)-SAMASTIPUR-1	23/06/2020	11:31	R-N,FD 35.2KM,FC 1.839 KA@DARBHANGA		B-N FAULT	<100	Seems Rand Y phase were closed during dead time but when did may got opened not in the DR frame of 1.1 sec .Was A/R successful from DMTCL end .Is there A/R enebled at Samastipur	Muzaffarpur	YES	NO	DMTCL,BSPTCL		
28	220KV-MUZAFFARPUR-DHALKEBAR-1	24/06/2020	18:23	r ph DEF 368 A at Muzaffarpur	in B phase at dhalkebar	R-N fault .	2.5 sec	R phase current was around 500 amps for 2.5 sec after which 3 phase tripping occurred .Directional o/c setting may be shared .Reason for delayed tripping may be shared was it as per DO/C setting ?	Muzaffarpur	YES	NO	PG EB-1		

29	220KV-MUZAFFARPUR-DHALKEBAR-2	24/06/2020	18:23	r ph DEF 365 A at Muzaffarpur	In B phase at dhalkebar	R-N fault .	2.5 sec	R phase current was around 700 amps for 2.5 sec after which 3 phase tripping occurred .Directional o/c setting may be shared .Reason for delayed tripping may be shared was it as per DO/C setting ?	Muzaffarpur	YES	NO	PG-ER-1	
30	220KV-DARBHANGA (DMTCL)-DARBHANGA-2	25/06/2020	21:31	Y/F, B-N, 2KA		B-N FAULT	<100	Pole status not configured in DR . A/R not observed in DR time frame .R&Y phase breaker were closed from DMTCL end till DR frame time . When did the opened whether A/R attempted from DMTCL end and successful or not ?Status of A/R at ikihar end	Muzaffarpur	YES	NO	DMTCL,BSPTCL	
31	400KV-GAYA-NABINAGAR(NPGC)-1	25/06/2020	17:03	B_N		R-N FAULT	<100	Seems A/R was off so 3 phase tripping occurred at the instant of fault .Was A/R under planned S/D .	GAYA	YES	NO	PG ER-1	
32	220KV-BEGUSARAI-NEW PURNEA-1	25/06/2020	17:15	R_N, 1.2 kA (Begusarai)		R-N FAULT	<100	Whether A/R operated or not ?	PURNEA	NO	NO	PG-ER-1&BSPTCL	
33	220KV-KISHANGANJ(PG)-DALKHOLA (PG)-1	25/06/2020	06:21	R-N,3 KM,16.5KA@KISHANGANJ		R-N FAULT	<100	Y and B phase opened after 1.5 seconds at dalkhola end ,whether due to Pole descrepancy ,Seems A/R was not enabled .3 phase tripping occurred from kishanganj at the instant of fault and carrier was sent ,then why delay of 1.5 second at Dalkola end ?Status A/R may be clarified .	KISHANGANJ	YES	YES	PG ER-1&WBSETCL	
34	220KV-KISHANGANJ(PG)-DALKHOLA (PG)-2	25/06/2020	15:37	R_N, 21 KM, 4 kA (Dalkhola)		B-N FAULT	<100	A/R was successful from Kishanganj end but from Dalkhola end 3 phase tripping occurred at the instant of fault ,this may be explained ,whether A/R is disabled at Dalkhola.	KISHANGANJ	YES	YES	WBSETCL	
35	220KV-DARBHANGA(DMTCL)-LAUKAHI-1	25/06/2020	06:32	LAUKAHI: R-N, 21, 2.9KA,20.5KM	DARI: R-N,FD 60KM,FC 1.543KA	R-N FAULT	<100	3 Phase tripping occurred for single phase fault at DMTCL end that means A/R is not enabled ,may explain this .At Laukahi end A/R lockout occurred ,what is the status of A/R at Laukahi may be explained . Pole status is not configured in Dr.	Muzaffarpur	YES	YES	DMTCL,BSPTCL	
36	400KV-MEERAMUNDALI-GMR-1	26/06/2020	18:43	Mera-Only DT received		No fault observed in PMU		Reason of why DT send may be explained .	ANGUL	YES	NO	PG_ER-3	
37	400KV-GAYA-NABINAGAR(NPGC)-1	26/06/2020	10:41	NPGC_21 R-N FC-6.6kA Dist- 20km	Gaya-DT received	R-N FULT.	<100	For single phase fault ,3 phase tripping with DT receipt at Gaya end from NPGC .Whrere A/R was disabled at NTPC .	GAYA	YES	NO	NPGC	
38	220KV-MADHEPURA-NEW PURNEA-1	26/06/2020	08:52	Madhepura-2-LB-ph trip,Dist- 55.6km, Ib-1.596kA	Purnea-A/R succesful	B-N FAULT	<100	why A/R not operated at Madhepura .Status of A/R	PURNEA	YES	NO	BSPTCL	
39	400KV-KHSTPP-LAKHISARAI- 1	26/06/2020	07:17	LAK:Y-N,FD-99.800M,FC 3.128kA,R- SUCCESSFUL AT LAKHISARAI END	KHSTPP: Y-N,FD 65.76M,FC 8.37kA, TRIPPED FROM KHSTPP END	Y-N FAULT	<100	Why A/R not operated from Kahalgaon end .DR time frame does not covers A/R frame .From PMU it seems R and B phase breaker opened after 2 seconds approx ,whether due to PD or something else may be explained .	BIHARSHARIFF	YES	NO	NTPC KAHALGAON	
40	400KV-RANCHI-MAITHON RB-1	27/06/2020	12:45	Y_N, 110 KM, 2.35 kA (Maithon RB)		Y-N FAULT.	<100	A/R successful from Ranchi end only .Why A/R not occurred at MPL end .Secondary arching issue observed even after opening of Y phase breaker ,Y phase voltage went upto more than 600 kv.	RANCHI	YES	NO	MPL-ER-1 PG	
41	220KV-TENUGHAT-BIHARSARIFF-1	27/06/2020	09:55	Z1, Y-N, 1.747KA, 76.25Km	111.9Km, Y-N, 1.4kA	Y-N FAULT	<100	3 Phase tripping occurred for single phase fault at Tenghat end ,Seems A/R not enabled .A/R status and individual pole status not configured in DR.	BIHARSHARIFF	YES	NO	JUVNL	
42	220KV-CHANDIL-RANCHI-1	28/06/2020	18:11	Chandil-Z2 R-N FD-82.38km		R-N FAULT.	350	A/R successful from Ranchi end ,Chandil end tripped in zone -2 seems there is no carrier aided tripping scheme .	RANCHI	YES	NO	PG-ER-1 , JVUNL	
43	220KV-NEW PURNEA-MADHEPURA-2	28/06/2020	04:22	A/R SUCCSSFUL AT NEW PURNEA-R-N 15.4KA,75 kA	71.4 KM,R-N,2.2 KA FROM MADHEPURA	R-N FAULT.	<100	why A/R not operated at Madhepura .Status of A/R	PURNEA	YES	NO	BSPTCL	
44	220KV-DARBHANGA (DMTCL)-MOTIPUR-1	29/06/2020	13:59	R-N,Z-1,I/C 2.36A F/D-35KM FROM MOTIPUR	R-N,Z-1,F/C 1.7kA F/D- 81KM FROM DARBHANGA	B-N FAULT	<100	A/R was enbled still 3 phase tripping occurred at motipur end this may be explained .	Muzaffarpur	NO	YES	BSPTCL	
45	220KV-MADHEPURA-NEW PURNEA-1	30/06/2020	11:29	madhepura: R- N, Z1, 1.47 KA 55.6 Km	A/R SUCCSSFUL 50.3 KM 3.24 KA ZA IN NEW PURNEA	R-N FAULT		why A/R not operated at Madhepura .Status of A/R .Dr time not sufficient for AR observation.	PURNEA	YES	NO	BSPTCL	

Presentation for 92nd PCC meeting

B7. GD at Darbhanga on 10-06-2020

- BSPTCL report
  - At 10:54 Hrs 220 kV Motipur-DMTCL ckt-1 got tripped from both ends.
  - At the same time Darbhanga (BSPTCL)-DMTCL ckt-2 got tripped on Aided D.E.F.
  - Darbhanga (BSPTCL)-DMTCL ckt-1 was intact and not tripped.
  - At the same time 160 MVA ATR-2 got tripped on Earth Fault. DR could not be fetched from Relay resulting tripping of 160 MVA ATR-1 on overload.
  - Simultaneously Darbhanga (BSPTCL)-Mushahari ckt-1 also got tripped from Darbhanga (BSPTCL) end. (DR uploaded)



B7. GD at Darbhanga on 10-06-2020

- Y-Phase PT voltage in Directional Earth Fault Relay of ATR-2 was missing.
- LA test of all bays (220 kv & 132 kv) was done and value of test results for R-Phase HV side of ATR-2 was found abnormal. Instructed for the early replacement.
- It has been observed that when system remains on both buses (MB-1 & MB-2) through bus coupler then current values are unsymmetrical resulting in abnormal neutral current. But when the system is put on the single bus this problem does not exist. We have suggested to put the system on single bus (either MB-1 or MB-2).

B7. GD at Darbhanga on 10-06-2020

- BSPTCL's report
  - Confusion of 220 kV Darbhanga Darbhanga D/C nomenclature has been solved.
    - Presently only for DMTCL- Darbhanga circuit -I bay of musahari circuit -II is being used at 220 kv darbhanga end.
  - On thorough checking after tripping it was found that LBB was operated at 220 / 132 KV Darbhanga GSS (BSPTCL) due to loose connection. the same has been rectified.
  - Breaker timing test at 220/132 KV GSS Darbhanga (BSPTCL) for 220 KV breakers of DMTCL-Darbhanga ckt- I and II , Darbhanga -Mushahri ckt- I and trafo -I&II will be done and report will be submitted

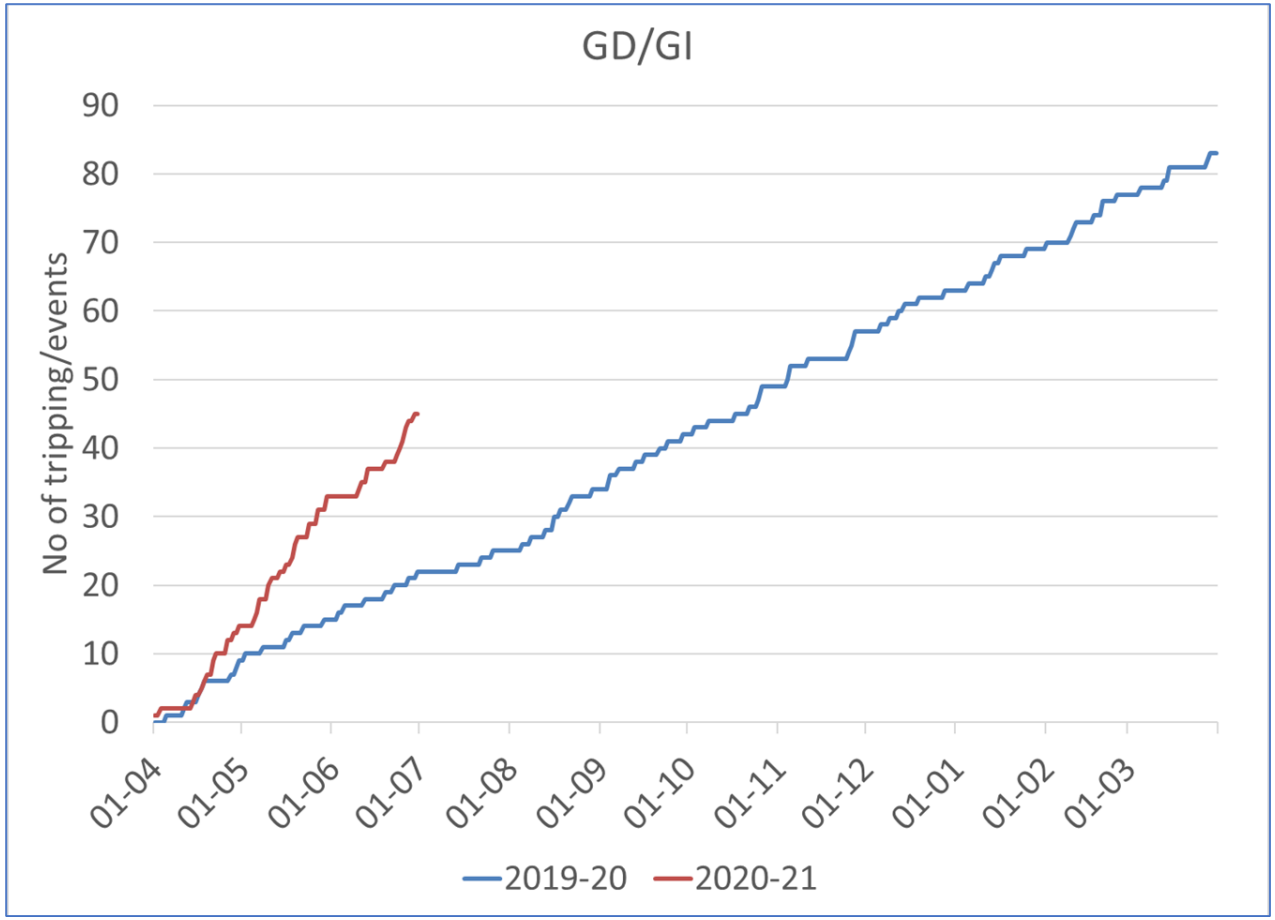
B9 GD at GMR – Meramundali on 26th June 2020

- 400 kV GMR Meramundali S/C tripped due to DT received at Meramundali end.
- GMR's reply:
  - No relay picked up at GMR end
  - Breaker was in closed condition at GMR end
  - All the relays and BCU were in healthy condition without logging any fault report
  - PLCC at both the ends were made reset , circuit was checked thoroughly at GMR end. But nothing abnormalities were observed.

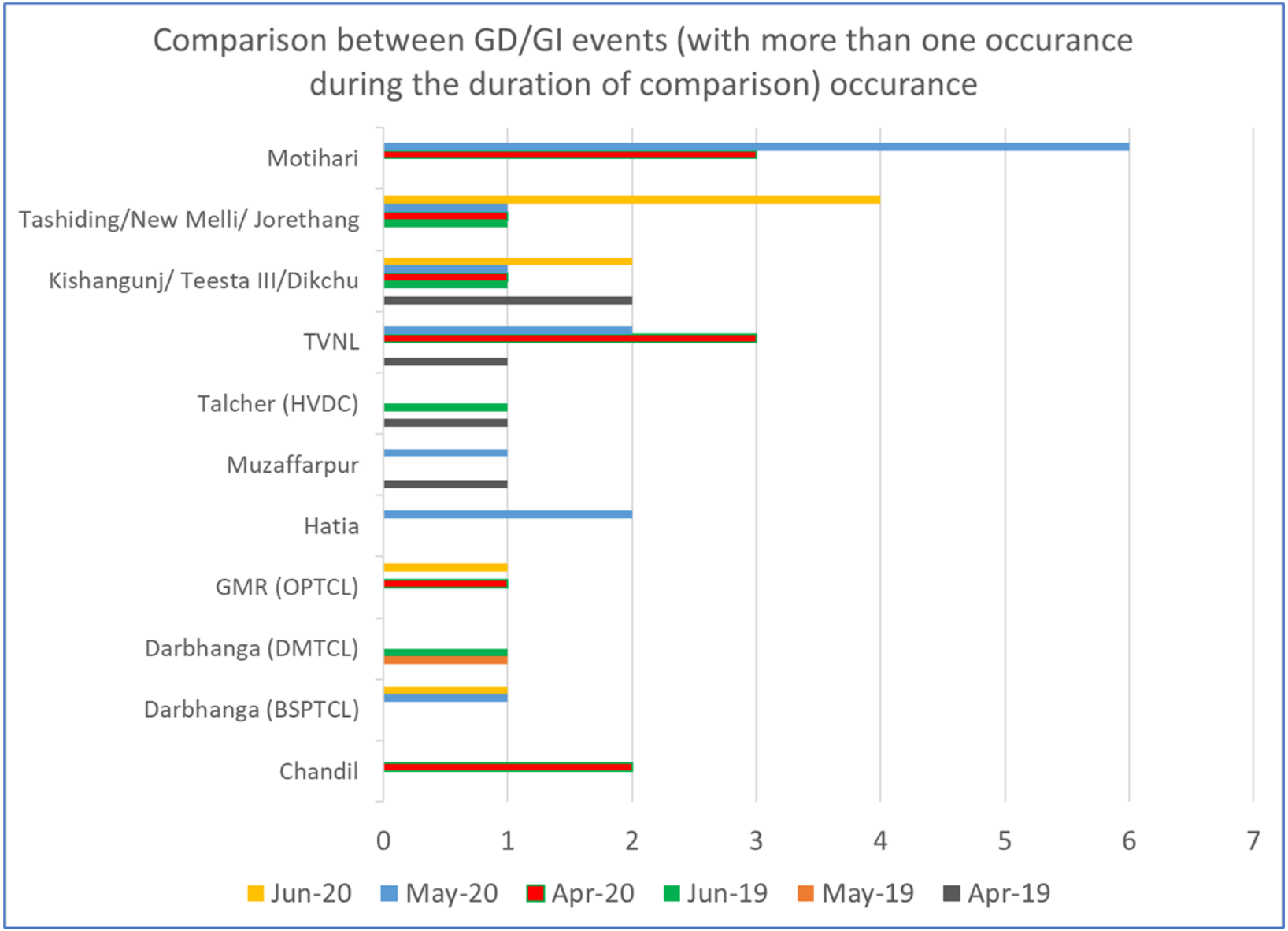
B9 GD at GMR – Meramundali on 26th June 2020

- Remedial action taken by GMR:
  - Wiring was checked properly and found no abnormalities
  - PLCC cards were cleaned
  - Simulation of DT signal was done with breaker tripping
  - SMP was incorporated for cleaning of PLCC cards and checking of PLCC signal during opportunity shutdown

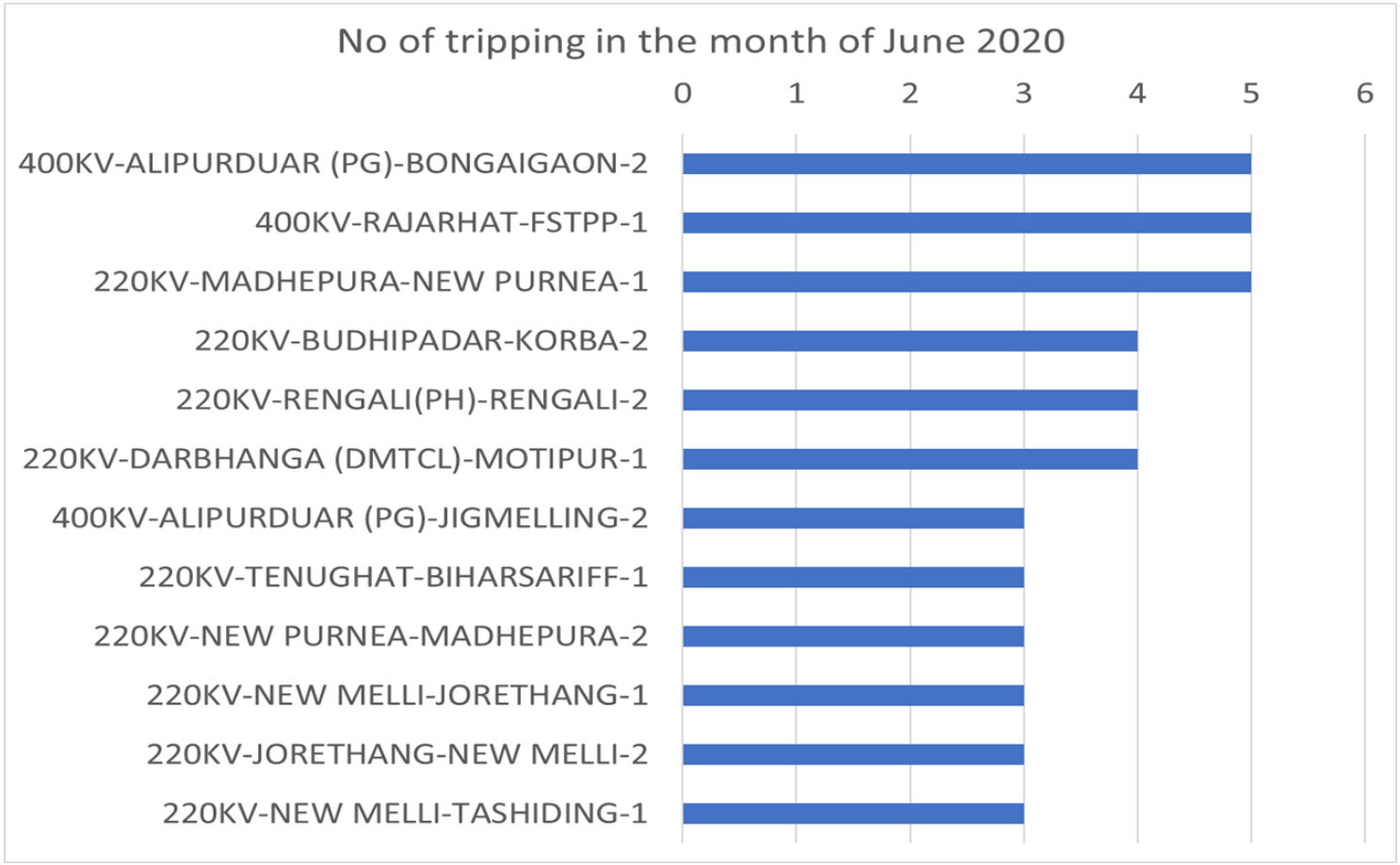
B17 Growing no of GD/GI in Eastern Region in 2020-21



B17 Repeated GD/GI at same place



B17 Repeated tripping of same transmission elements

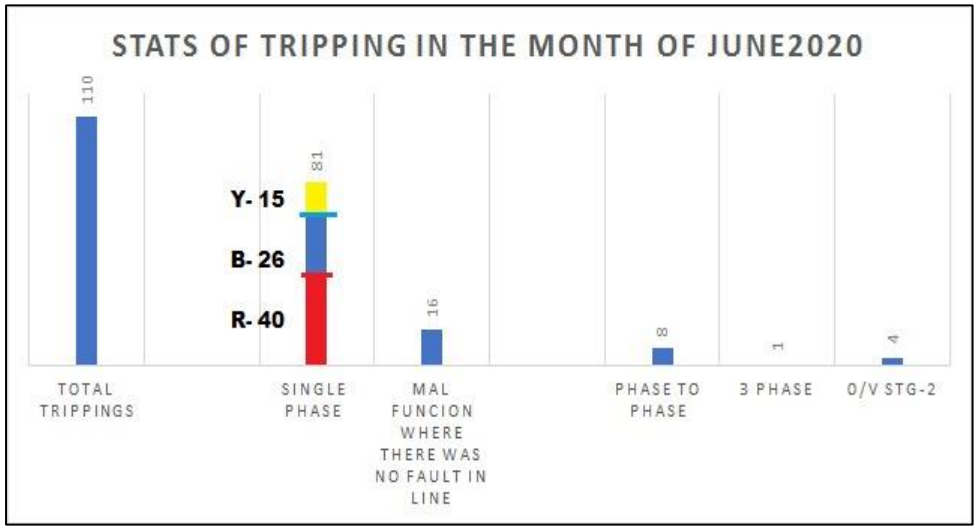


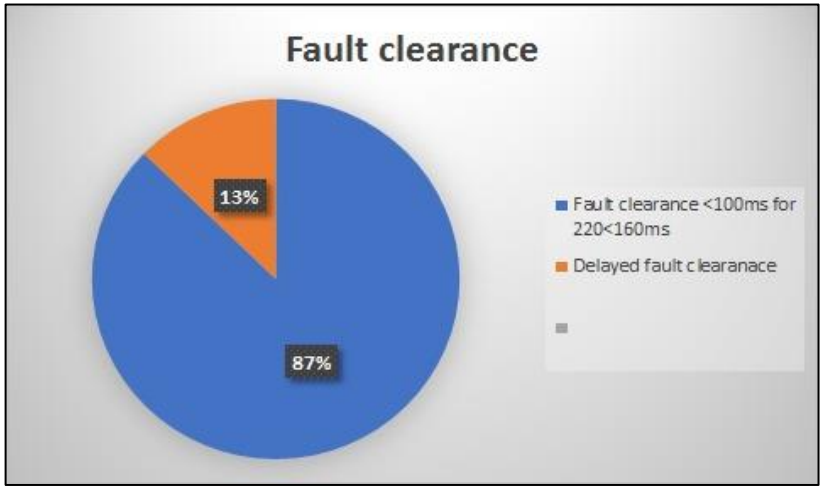
In case of majority tripping, fault found in nearby location.

B17 Repeated tripping incidents of transmission lines due to same reason during June2020

Repeated tripping incidents due to same reason		
Name of the line	**Reason**	**No of tripping**
400KV-ALIPURDUAR (PG)-BONGAIGAON-2	R phase to earth fault with location 40 - 65 km from Bongaigaon end. 3 tripping incidents with fault distance at 60 - 65 km from Bongaigaon end.	5
400KV-RAJARHAT-FSTPP-1	R phase to earth fault or R & B phase fault at location of 17-23 km from Rajarhat. Line is anti theft charged from Rajarhat end up to 210 km from Rajarhat on 20th June 2020	4
220KV-MADHEPURA-NEW PURNEA-1	B phase to earth fault at 55 - 58 km from Madhepura	3
220KV-MADHEPURA-NEW PURNEA-1 & 2	LBB operation at New Purnea	2
220KV-RENGALI(PH)-RENGALI-2	Two incidents due to differential protection operation at PG end. Line did not trip from other end. During other two incidents, line tripped from Rengali (PH) end only on operation of master trip relay or pilot wire protection relay.	4
220KV-DARBHANGA (DMTCL)-MOTIPUR-1	B phase to earth fault at 81 - 83 km from Darbhanga	3
220KV- JORETHANG - NEW MELLI- D/C and 220 KV NEW MELLI - TASHIDING S/C	During all 3 events, thre was a high resistance fault and then it got converted to Y and B phase fault at 220 kV New Melli - Tashding. Directional E/F relay of Jorethang end of 220 kV Jorethang - New Melli D/C detected the fault and tripped. Generation loss occured at Jorethang and Tashiding	3

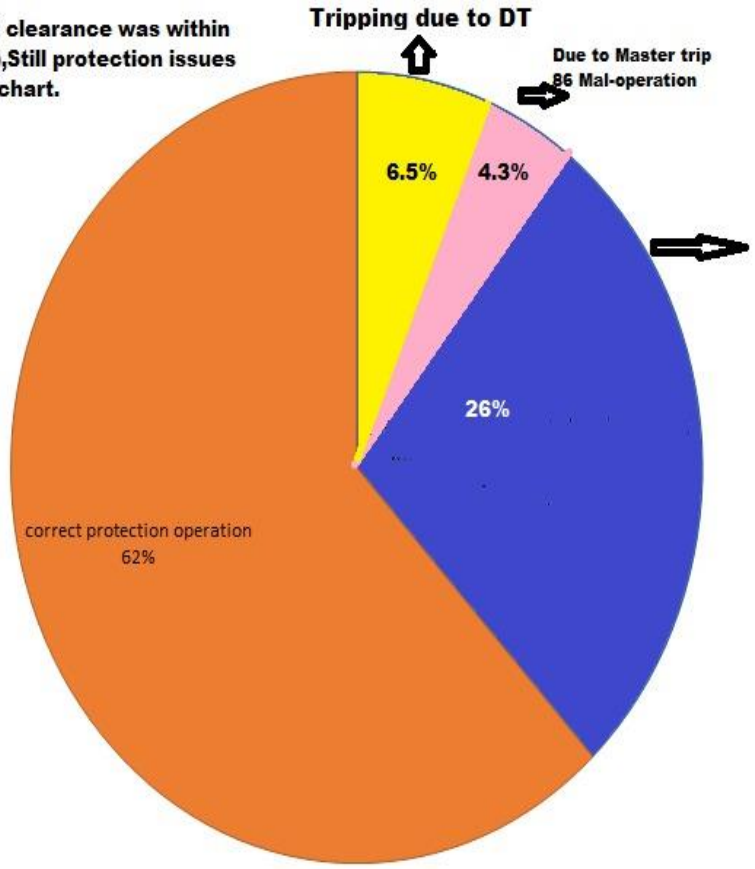
PROTECTION PERFORMANCE FOR SINGLE LINE TRIPPING





Protection Performance

For the cases Where Faul;t clearance was within 100 ms and 160ms(220 Kv),Still protection issues found as mentioned in the chart.



3 Phase tripping due to Non operation of Auto reclose in a event of 1 phase fault.Mostly at 220 KV level.So this can be improved by A/R enabling.

LIST OF LINES WITH A/R ISSUES

S.NO	LINE NAME	TRIP DATE	TRIP TIME	Relay Indication LOCAL END	Fault Clearance time in msec	Remarks	Utility Response
1	220KV-RENGALI(PH)-TSTPP-1	02-06-2020	15:32	ZONE-1 R,B FD-16.9KM FC- 6.2 KM	160	No A/R operation.As all 3 phase breaker opened after 160 ms .	A/R was out of service ,due to mal-operation of pilot wire.
2	220KV-BUDHIPADAR-KORBA-2	02-06-2020	11:25	Y-N Z1 , FD= 147.0 Kms, d[%]=81.2%, IL2= 1.17 KA	900	.Breaker opening status not showing.. pole opening status is not showing.	Line has tripped in Zone-2 at Budhipadar
3	220KV-MADHEPURA-NEW PURNEA-1	02-06-2020	13:51	Madhepura :B-N, Z1, 58.1km,1.19KA	100	As per DR R &Y phase did not opened at purnea end .No A/R operation observed .Independent pole status not configured inDR.Status of A/r at madhepura.	
4	220KV-TENUGHAT-BIHARSARIFF-1	02-06-2020	06:11	BIHARSARIF: B-N, 96KM, 1.5KA	<100	Why 3 phase tripping occurred in case of single phase fault ,Was A/R disabed .R phase breaker status showing as opened prior to fault .Satatus of A/R at Tenughat	
5	220KV-BUDHIPADAR-KORBA-2	08-06-2020	13:51	Budhipadar:b-n, 121 km,1.28ka	160	z-2&z-3 started at Budhipadar end .Current became zero after 160 ms , .SEEMS BUS VOLTAGE IS TAKEN AS I/P for line . pole opening status is not showing in DR.Stats of A//R ?	Bus PT taken, A/R shortly to be implemented, DR setting to be done
6	220KV-BUDHIPADAR-KORBA-2	09-06-2020	18:47	R_N, 24.45 kA (Budhipadar)	<100	Single phase fault , No A/R operation.	A/R shortly to be implemented after shutdown permission availed from Korba side
7	220KV-TTPS-TSTPP-1	09-06-2020	15:29	B_N, 5.6 kA, 24 KM (TTPS)	<100	Breaker status may be configured in DR. What votage linput has been selected line or Bus as ,Line voltage of R and Y phase are showing healthy voltages .	
8	220KV-DARBHANGA (DMTCL)-MOTIPUR-1	10-06-2020	10:54	Darbhanga-Z1, B-N FD-38.7km FC-2.95	<100	No A/r is observed whether A/R operated or not as Time frame is not suffivient in DR for A/R observation .	
9	220KV-BARIPADA-BALASORE-2	11-06-2020	00:55	Y -N, 35.54 KM,3.597 KA,Z1 FROM BARIPADA	<100	DR not received from any end .	Auto Reclose scheme is not implemented in Tr. Lines.
10	220KV-TENUGHAT-BIHARSARIFF-1	12-06-2020	13:46	Ia=484.7 A, Ib=336.5 A, Ic= 320.2 A at Tenughat	1500	Reason for slow increase of current in R phase may be explained till 1500 ms after which line tripped . DR time of main 1 and main 2 is time synched at tenughat end . R phase breaker at Bsf end showing opened status still line current is of increasing trend .Line tripped on which protection not clear PD or what ?	

11	220KV-BUDHIPADAR-KORBA-2	14-06-2020	04:09	Z2,Y-N,204.4Km,1.25KA@Budhipadar	400	From Buddipadar line tripped in z-2 .Seems no carrier based protection .	Carrier not available now
12	220KV-KATAPALLI-BOLANGIR(PG)-1	15-06-2020	10:45	BN	<100	Breaker of all three phase opened from katapalli end within 100 Ms of fault whether Carrier based protection is there or not ? Line voltage beacme zero after 1 second of the breaker opening .	A/R is disabled at OPTCLl end .A/R attempted from pg end but failed as tree enchrochment fault was there .A/R disabled at Pg end also.
13	220KV-IBTPS-BUDHIPADAR-4	16-06-2020	14:12	z1 b-n,16.85 KA 5.1 km from budipadar ,cloudy and lightning reported	<100	NO A/R operation observed.	A/R shortly to be implemented
14	220KV-GAYA-KHIZERSARAI-2	16-06-2020	18:05	MAIN 2: 1.553 KA,R-N, FROM GAYA;RAIN REPORTED	<100	NO A/R operation observed.	
15	220KV-DARBHANGA (DMTCL)-SAMASTIPUR-1	23-06-2020	11:32	B-N,FD 35.2KM,FC 1.839 KA@DARBHANGA	<100	Seems Rand Y phase were closed during dead time but when did they got opened not in the DR frame of 1.1 sec .Was A/R succesful from DMTCL end .Is there A/R enebled at Samastipur	
16	220KV-FSTPP-LALMATIA-1	23-06-2020	11:00	TRIPPED FROM FSTPP END	<100		
17	220KV-DARBHANGA (DMTCL)-DARBHANGA-2	25-06-2020	21:31	E/F, B-N, 2KA	<100	Pole status not configured in DR .A/R not observed in DR time frame ,R&Y phase breaker were closed from DMTCL end till DR frame time .When did the opened whether A/R attempted from DMTCL end and successful or not ?Status of A/R at Bihar end	
18	220KV-BEGUSARAI-NEW PURNEA-1	25-06-2020	17:15	R_N, 1.2 kA (Begusarai)	<100	Whther A/R operated or not ?	
19	220KV-KISHANGANJ(PG)-DALKHOLA (PG)-1	25-06-2020	06:21	R-N,3 KM,14.5KA@KISHANGANJ	<100	Y and B phase opened after 1.5 seconds at dalkhola end ,whether due to Pole descrepancy ,Seems A/R was not enabled .3 phase tripping occurred from kishanganj at the instant of fault and carrier was sent ,then why delay of 1.5 second at Dalkola end ?Status A/R may be clarified .	AR issue in Kishenganj end is being reviewed. OEM has also been referred.
20	220KV-KISHANGANJ(PG)-DALKHOLA (PG)-2	25-06-2020	15:37	B_N, 21 KM, 4 kA (Dalkhola)	<100	A/R was successful from Kishanganj end but from Dalkhola end 3 phase tripping occurred at the instant of fault ,this may be explained ,whether A/R is disabled at Dalkhola.	

21	220KV-DARBHANGA(DMTCL)-LAUKAHI-1	25-06-2020	06:32	LAUKAHI: R-N, Z1, 2.9KA,20.5KM	<100	3 Phase tripping occurred for single phase fault at DMTCL end that means A/R is not enebled ,may explain this .At Laukahi end A/R lockout occurred ,what is the status of A/R at Laukahi may be explained . Pole status is not configured in Dr.	
22	220KV-MADHEPURA-NEW PURNEA-1	26-06-2020	08:55	Madhepura-Z-1,B-ph trip,Dist-55.6km, Ib-1.596kA	<100	why A/R not operated at Madhepura .Status of A/R	
23	220KV-TENUGHAT-BIHARSARIFF-1	27-06-2020	09:55	Z1, Y-N, 1.747KA, 76.25Km	<100	3 Phase tripping occurred for single phase fault at Tenghat end ,Seems A/R not enabled .A/R status and Individual pole status not configured in DR.	
24	220KV-CHANDIL-RANCHI-1	28-06-2020	18:11	Chandil-Z2 R-N FD-82.38km	350	A/R successful from Ranchi end ,Chandil end tripped in zone -2 seems there is no carrier aided tripping scheme .	Carrier was sent from ranchi end as per DR JUSNL may confirm.
25	220KV-NEW PURNEA-MADHEPURA-2	28-06-2020	04:23	A/R SUCCESSFUL AT NEW PURNEA R-N 15 KM 6.75 KA	<100	why A/R not operated at Madhepura .Status of A/R	
26	220KV-BARIPADA-BALASORE-2	29-06-2020	11:54	Balasore : YN , Z1 , 49.71 km , 2.625 kA	<100		The Line tripped due to R phase conductor snapping..Auto Reclose scheme is not implemented in 220kV Tr. Lines
27	220KV-DARBHANGA (DMTCL)-MOTIPUR-1	29-06-2020	13:50	B-N,Z-1,F/C-2.3KA F/D-35KM FROM MOTIPUR	<100	A/R was enbled still 3 phase tripping occurred at motipur end this may be explained .	
28	220KV-MADHEPURA-NEW PURNEA-1	30-06-2020	11:20	madhepura: B-N, Z1, 1.47 KA 55.6 Km.		why A/R not operated at Madhepura .Status of A/R .Dr time not sufficient for AR observation.	

B18 Repetitive LBB operation at New Purnea S/S in the month of June 2020

- BSPTCL's reply:
  - The Relay setting of the Bay is ok. Breaker timer test of the Bay breaker yielded a satisfactory result
  - *Nut-bolt arrangement of Y phase CT connection in LBB relay TB of 220 KV Madhepura-I circuit was found loose and couldn't be tightened due to some copper deposit developed in the nut, probably due to sparking.*
  - *The Nut-bolt of the LBB relay was changed on date - 13/6/2020 and the bay charged successfully at 15:47 Hrs. Since then, no any maloperation of LBB relay observed in Madhepura-I circuit at PGCIL Purnea.*
  - it has been observed that during tripping auto reclosing is initiated through the relay but the closing of breaker does not happen.

Multiple Tripping's due to Over-voltage stage-II operation with issue of Secondary arcing and LC Resonance

During the month of June few tripping incidents were reported due to Over voltage Stage-II operation. After analysis with DR, it was observed it occurred due to Secondary arcing issue and LC resonance with the compensated lines where line reactors are installed. These incidents are vulnerable to grid operation as well as life of the equipment. List of lines are mentioned below.

Name of Line	Tripping Date /Time	Utility to Respond
400 kV PATNA- NPGC-1	17/06/2020 , 15:14 Hrs	POWERGRID ERTS-1 , NPGC
400 kV ALIPURDWAR-BINAGURI-2	10/06/2020 , 13:11 Hrs	POWERGRID ERTS-2
400 kV KAHALGAON-MAITHON -2 400 KV MPL-RANCHI-I	05/06/2020 , 16:08 Hrs 27/06/2020, 12:49 Hrs	POWERGRID ERTS-2,NTPC KAHALGAON POWERGRID ERTS-I , MPL

ISSUES WITH SHUNT COMPENSATED LINES

- Secondary arcing
- LC Resonance causing O/V in opened phase during A/R
- LC resonance after 3 pole opening or Ringdown

SECONDAR arcing :

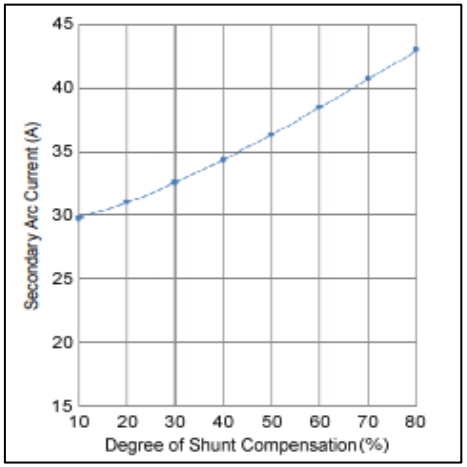
- In a three-phase line, there is electromagnetic and electrostatic coupling between the phase conductors. A single-phase-to-ground fault results in the formation of a primary arc between the faulted phase and ground. The line protection system isolates the faulted phase from the power system , thereby extinguishing the primary arc; the other two healthy phases remain in service.

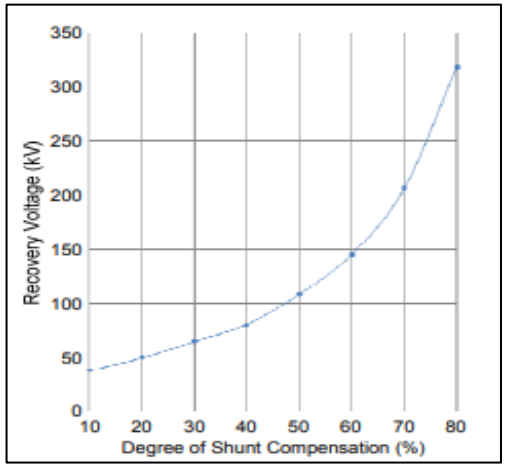
- During the dead time capacitive and inductive coupling between the conductor of the open phase and the un-faulted phase conductors induces a voltage in the open phase conductor. Because the air is already ionized from the primary arc, the induced voltage can create a secondary arc and sustain it for a given time after the phase opening.

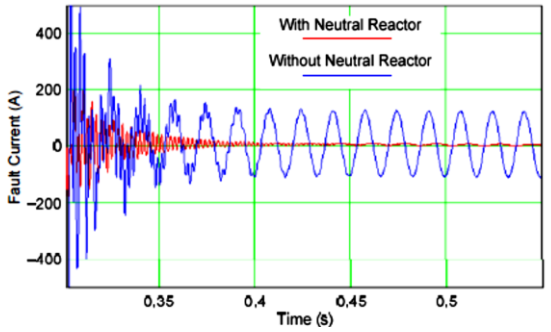
- The secondary arc current depends mainly on the line voltage and length, the fault current and also depends on fault location, load current, line transposition, and reactors connected to the faulted phase. This current should self-extinguish within 500 milliseconds, if the arc current is no greater than 40 A in lines with shunt reactor compensation and no greater than 20 A in uncompensated lines .

- If reclosing occurs before the secondary arc is extinguished, it is no different than reclosing back into a permanent fault.

Impact of compensation: For a 400 Kv line secondary arc self-extinguishes within 500 ms if arc current is less than 40 A ,in lines with shunt compensation but this arc current increases more than 40 amps as the degree of shunt compensation increase and then this arc do not get self-extinguished. Similarly recovery voltage also keeps on increasing.







Remedial Measure :

To extinguish the secondary arc (neutralize the secondary arcing current), a fourth reactor, the neutral reactor, is installed between the phase reactor neutral point and ground of proper rating .

Purpose is that the interphase inductive current supplied from the shunt reactor configuration should have the same magnitude as the capacitive current but with opposite polarity .

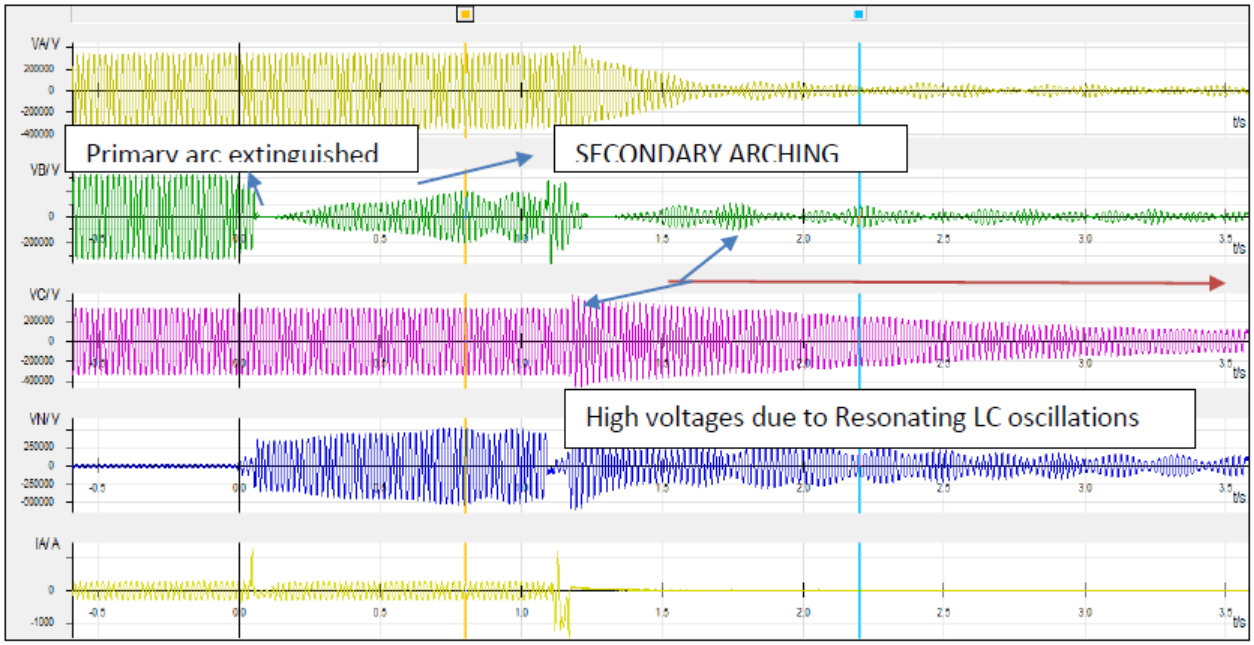
If the reactor neutral point is directly grounded, the wye-connected reactor group has identical positive-, negative-, and zero-sequence impedances. Effectively, the mutual inductive susceptance between the phases does not exist, and there is no neutralization of capacitive current .

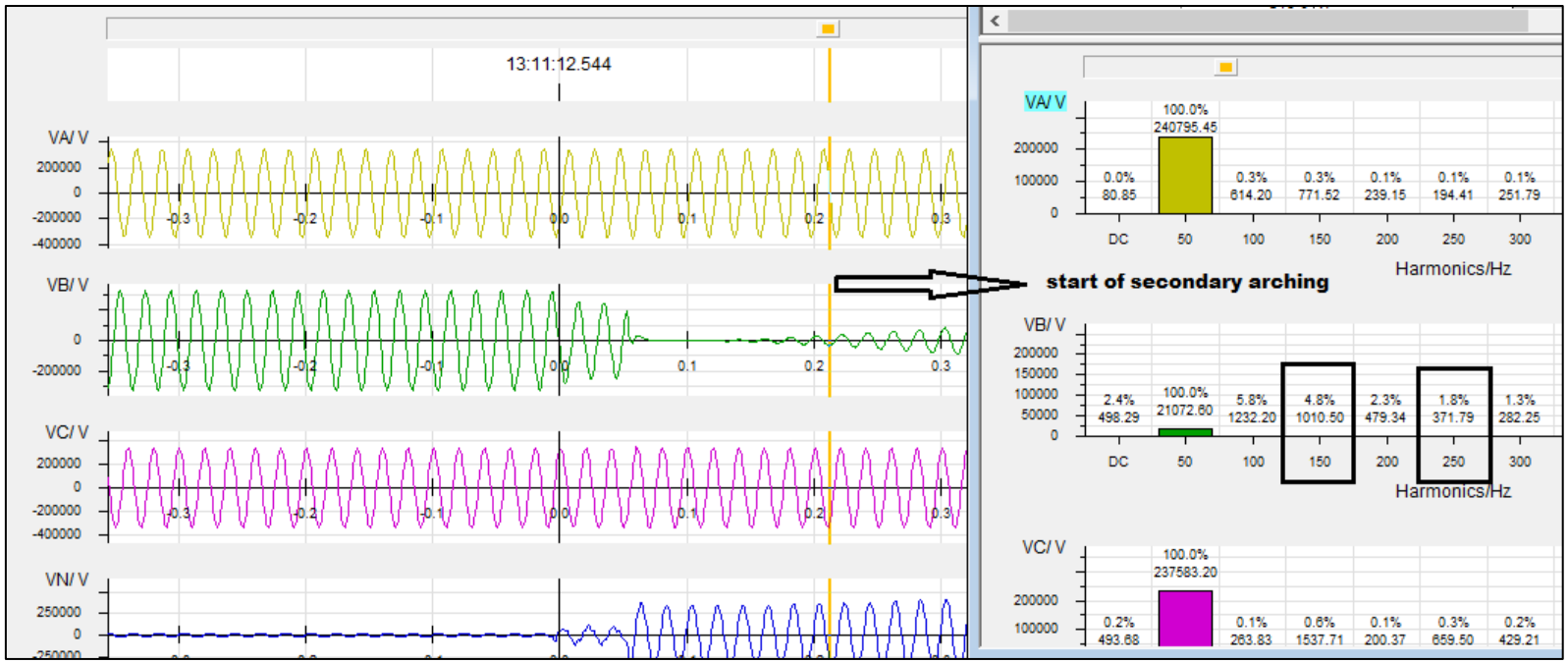
TRIPPING OF 400KV-BINAGURI-ALIPURDUAR (PG)-2 AT 13:11 HRS ON 10/06/2020:

There was Y-N fault in the line and As the Y phase breaker opened primary arc was extinguished during breaker opening but secondary arcing started as can be seen in below figure and due to which B phase line voltage can be seen it persisted with growing magnitude up to the dead time till auto reclose was attempted and it got failed .

It is hard to say that it failed either due to secondary arcing or there was actual fault ,as at the instant of auto reclose with persisting secondary arcing and growing voltage if we close the breaker it is same as closing to a permanent fault.

Here in the above mentioned case also Line is 100% compensated thus secondary arch current will be more than 50 amps and chances are there that it will persist for large time if not suppressed .



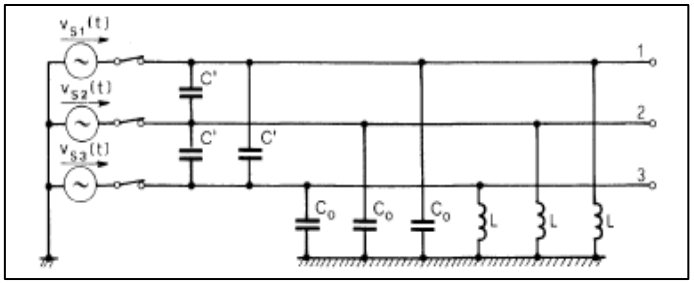

13:11:12.544
VA/ V
VB/ V
VC/ V
VN/ V
start of secondary arching
Harmonics/Hz
DC
50
100
150
200
250
300

Resonance Overvoltage :

- Shunt reactors increase the open-phase recovery voltage considerably because of unequal compensation of the positive and zero-sequence line capacitances.

- As reactors are in parallel with conductor capacitance to ground (L and C0 in Fig.), the equivalent phase--to-ground-reactance at power frequency is inductive and very high when the shunt compensation is large (above about 65%).

- In open--phase condition, therefore, a series resonance may occur with the coupling capacitances to the energized phases, and large overvoltages may stress the open phases and associated open circuit breakers at their terminals.



$$f_0 = \frac{1}{2\pi\sqrt{L(C_0+2C')}} = f\sqrt{\frac{1+3m}{1+2m}}\,K$$

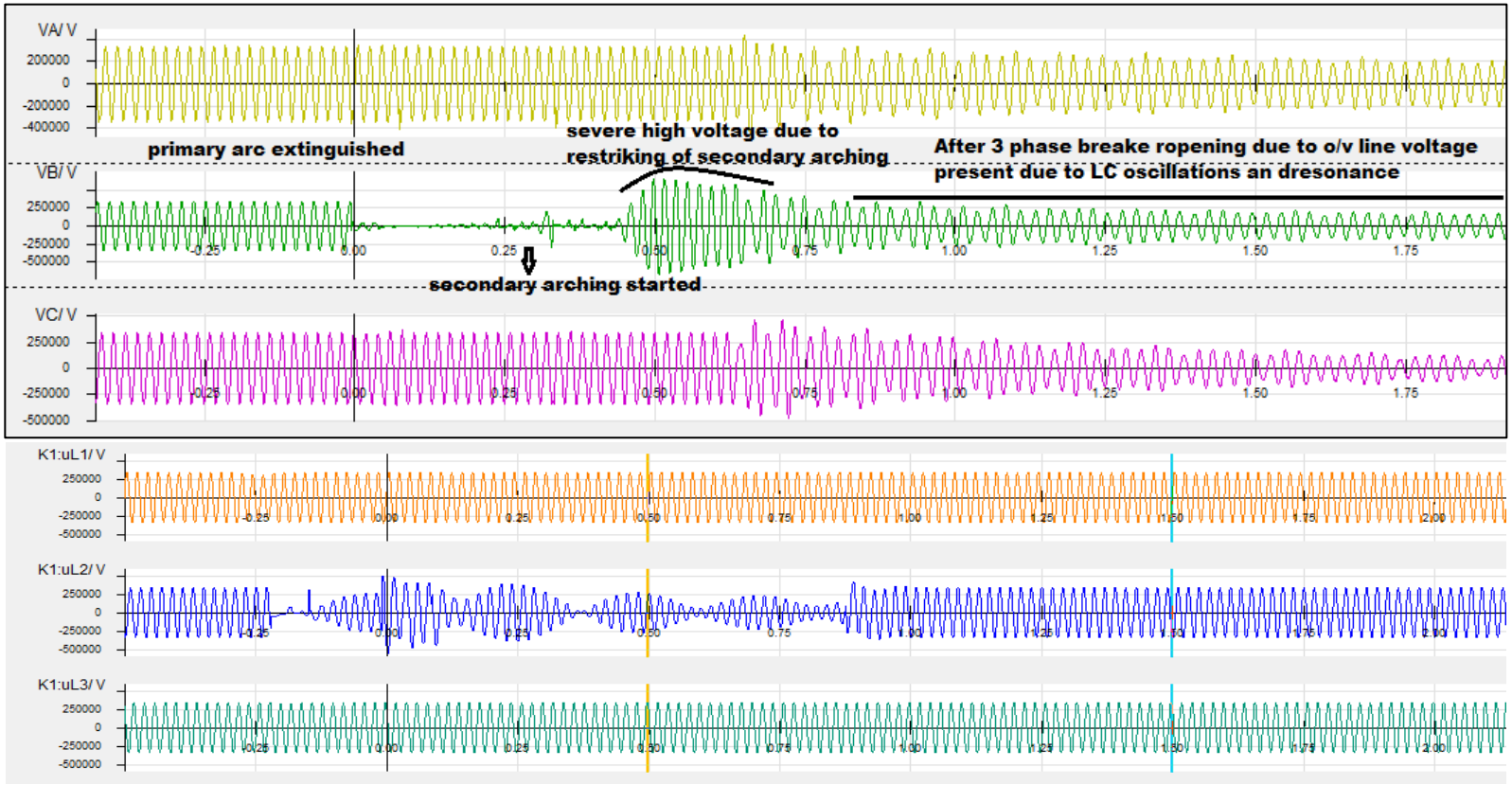
m=C'/Co

In general the voltage of the open phase to ground is the sum of two sine functions, of frequencies fo and f.
When $K = (1 + 2m)/(1 + 3m)$, $f_0 = f$ and the circuit is resonant at power frequency ,the voltage of the open phase becomes virtually infinite.

Remedial measure: De-tuning of resonance circuit by bypassing reactor.

TRIPPING OF 400 KV NPGC-PATNA –I AT 15:14 HRS ON 17/06/2020 DUE TO OV-STAGE II :

Initially there was Y -N fault in the line and Y phase breaker opened instantly but after 400 ms of opening of breaker sever high voltage appeared in the opened phase and all 3 phase opened due to DT receipt with O/V stage 2-operation at Patna end **.**
After 3 pole opening even line voltage in all 3 phase persisted for 5 seconds.



Mpl-ranchi
27/06 case

Reactor Ring down or Lc oscillation voltage after 3 pole opening :

Plot of the line voltages for a fault on the power system, we can see, once the line is isolated, the voltages on the unfaulted phases begin to oscillate and ring down.

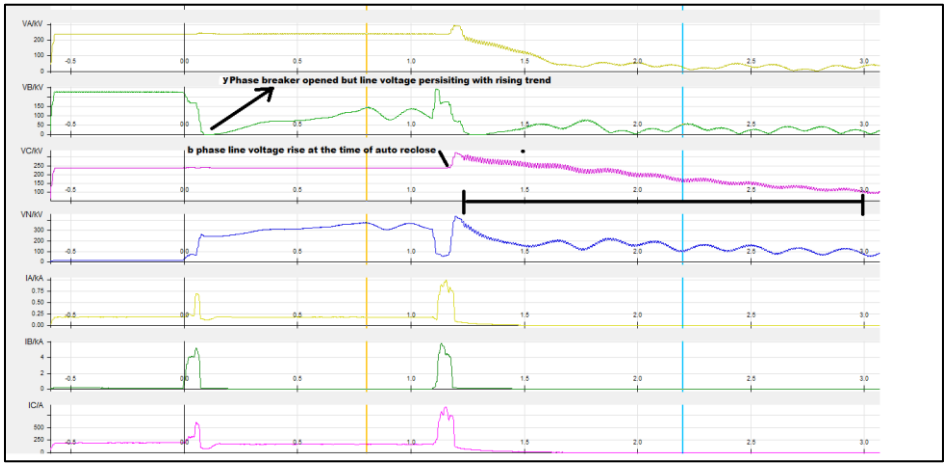
the energy trapped in the shunt reactor and capacitor results in a voltage that has a frequency of oscillation as mentioned below .

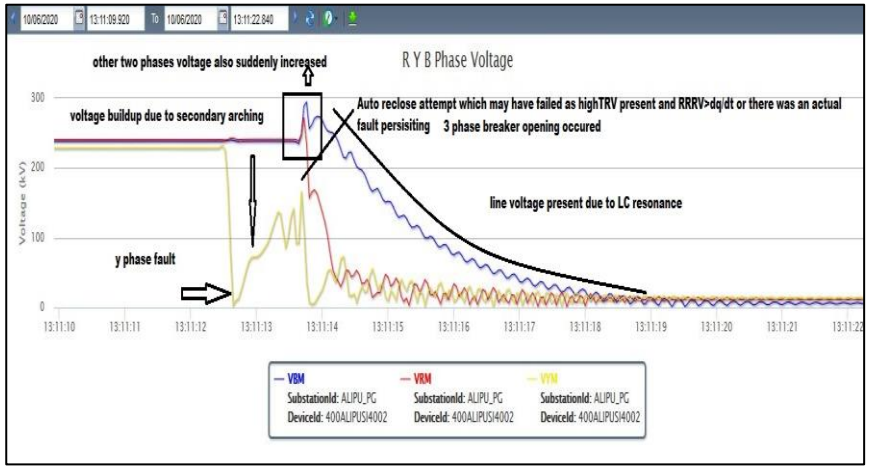
Ac waveform of instantaneous values showing resonating voltage oscillations due to interaction of Line reactor 80 MVAR at APD end and line charging mvar also 80 Mvar ACSR Quad moose 120Km line .This is causing oscillation frequency of 50Hz.K is degree of compensation.

$$f = k(\frac{xc}{xl})^{1/2}$$

Oscillations are due to exchange of energy between reactor and line capacitance.

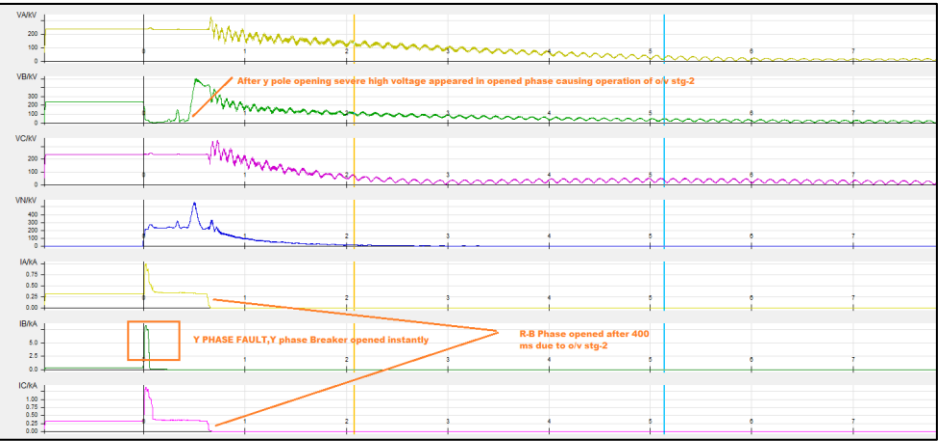
This was observed in all the cases with Line reactor attached in report .

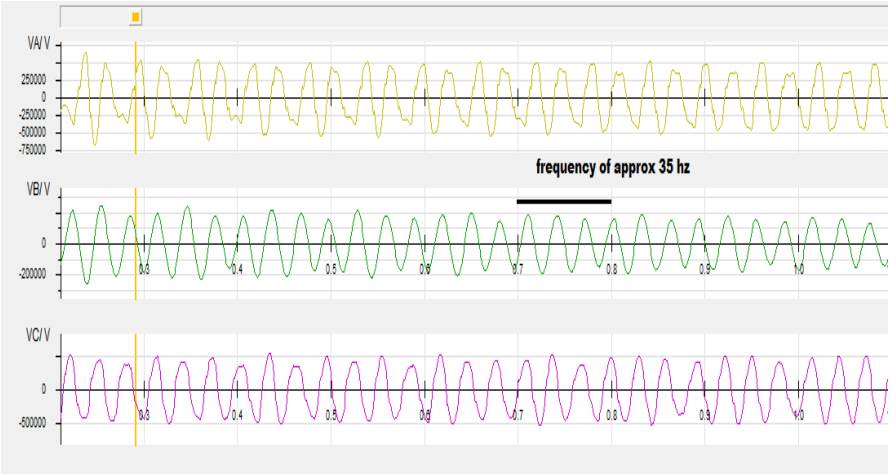




NPGC CASE:

With such amount of voltage LC oscillations also started with frequency of 45 Hz approx. As line is compensated more than 85 % ,Line length is 140Km (90 Mvar) , quad moose with 80 Mvar L/R at Patna end .Thus oscillation frequency of LC resonance is coming around 45 Hz which is observed in Dr plot also





LC oscillations Ringdown khatpp-maithon line: At maithon end even after breaker opening line voltage was there for few seconds due to LC oscillations due to 50 Mavr line reactor at maithon end .Line is 172 km twin moose line so charging mvar will be 172*0.55 =94 mvar and .Degree of compensation with 50 Mvar reactor at maithon end comes to 50/94=54%.Hence LC oscillation frequency will be **35 Hz** .

Utilities are requested to submit the details of NGR and whether NGR was in service during tripping.

Severe Over voltages are causing line tripping and can potentially damage equipment's, whether any equipment was damaged during tripping.

Utilities are requested to submit their analysis and observations regarding this.

LC resonance phenomenon due to which high line voltage is appearing even after 3 phase breaker opening may cause problems which requires detailed study and measures to mitigate the same ,Tripping of Line reactors scheme may be implemented after proper study **.**

Members may discuss

ANNEXURE-C1

Sl No.	Name of the incidence	PCC Recommendation	Latest status
91st PCC Meeting			
1.	Tripping of all 220 k V lines from 220 k V NJP Substation on 27.05.2020 at 0:56 hrs	PCC advised Powergrid to share the report with ERPC and ERLDC.	On 24 June 2020, PGCIL has share reports to WBSETCL,ERLDC and ERPC.
2.	Nomination of nodal persons for communication related to tripping of grid elements	PCC advised all the utilities including SLDCs to nominate at least two nodal persons within a week for tripping analysis.	All utilities have been intimated for the nomination. Status of Nomination is attaced in annexure C1.2
3.	Multiple tripping incident at Jeeratat 18:08 hrs on 27-05-2020	PCC advised WBSETCL to submit a report to ERPC and ERLDC.	On 21st July 2020, report and data have been received from WB
90th PCC Meeting			
1.	Tripping of both running units at 220 k V TTPS on 15.03.2020 at 16:12 hrs.	PCC advised JUSNL to take the following measures to avoid the unwanted tripping of transmission lines: • Check any fault was appeared in downstream network of Patratu PTPS S/s • Send the relevant DR of zone 4 tripping of 220 kV TTPS – PTPS S/C line at PTPS end • Check the zone 4 reach and time settings of 220 kV TTPS – PTPS S/C line at PTPS end as the line should not trip within 100 ms. • Test the protection relays of 132kV and 220 kV system at PTPS including 220/132kV ATRs	JUSNL updated following points – a) No fault found at downstream network of PTPS according to grid official. Relevant DR was already submitted. b) Z4 reach and time delay of 220 kV PTPS – TTPS was reviewed and found as per ERPC Philosophy. c) Line patrolling and Tree cutting have been done (report enclosed). d) Relay setting was already submitted by mail on 13.05.2020.

2.	Black out at 220 k V Tenughat Substation on 14.04.2020 at 12:47 hrs	After detailed deliberation. PCC opined that tripping of 220 kV TTPS – PTPS S/C line not clear, PCC advised JUSNL to collect the details and submit to ERPC and ERLDC. PCC advised BSPTCL, JUSNL and TVNL to take following corrective measures to avoid frequent tripping of the lines: • 220 kV TenughatBiharshariff S/C tripped 7 times in the months of March and April, 2020. 220 KV TTPS PTPS line also tripped several times in March and April 2020. JUSNL and BSPTCL were advised to carry out the line patrolling and ensure healthiness of these line. • TVNL was advised to review the O/C, E/F protection settings of 220 kV TenughatBiharshariff S/C , O/C , E/F protection settings of PTPS unit so that high resistance faults could be identified reliably.	JUSNL updated following points – a) No fault found at downstream network of PTPS according to grid official. Relevant DR was already submitted. b) Z4 reach and time delay of 220 kV PTPS – TTPS was reviewed and found as per ERPC Philosophy. c) Line patrolling and Tree cutting have been done (report enclosed). **d)** Relay setting was already submitted by mail on 13.05.2020
3.	Total Power failure at 220 k V TTPS on 22.04.2020 at 20:12 hrs	PCC advised JUSNL to submit the relay settings of 220 kV PTPS-TTPS line at PTPS end to ERPC and ERLDC	JUSNL updated following points – a) No fault found at downstream network of PTPS according to grid official. Relevant DR was already submitted. b) Z4 reach and time delay of 220 kV PTPS – TTPS was reviewed and found as per ERPC Philosophy. c) Line patrolling and Tree cutting have been done (report enclosed). **d)** Relay setting was already submitted by mail on 13.05.2020
4.	Disturbance at 220 k V Tenughat Substation on 28.04.2020 at 06:29 hrs.	PCC advised TVNL to replace the EM type Busbar protection with numerical relay.	

5.	Disturbance at 220 k V Chandil Substation on 29.03.2020 at 19:21 hrs.	PCC observed the following discrepancies and advised JUSNL and WBPDCL to take appropriate action: • 220kVChandil-Ramchandrapur S/C line got tripped within 100 ms. (Relay fault pickup details are not available due to incorrect DR configuration) JUSNL may check timing of distance protection at Ramchandrapur. • Disturbance recorders of all the substations of JUSNL involved in this disturbance are to be configured as per the ERPC guidelines. • STPS end DR of 220kV Chandil-STPS line is to be configured as per the ERPC guidelines • Protection system of 220/132kV ATRs to be tested and the settings are to be coordinated with 220kV and 132 kV protection relays. • Busbar protection for all 220kV substations are to be installed to minimize the fault clearing time. • As 220kV Chandil S/s has single bus and transfer scheme, option for sectionalizer may be explored. • Healthiness of carrier signal of 220kV Chandil-STPS line is to be checked. • STPS end DR of 220kV Chandil-STPS line is to be configured as per the ERPC guidelines	JUSNL updated following points: a) Timing of distance protection at Ramchandrapur end was reviewed and found as per ERPC Philosophy. b) Old electromechanical relays are to replaced under PSDF upgradation (In progress). c) Proposal for bus sectionaliser has been sent by Chandil. d) Current PLCC healthiness status report is enclosed. e) Z4 reach and time delay of 220 kV Chandil – STPS line at Chandil end was reviewed and found as per ERPC Philosophy.
6.	Total Power failure at 220 k V Chandil Substation on 15.04.2020 at 17:20 hrs	PCC observed the following discrepancies and advised JUSNL to take appropriate action: • Disturbance recorders of all the substations involved in this disturbance are to be configured as	JUSNL updated following points: a) Timing of distance protection at Ramchandrapur end was reviewed and found as per ERPC Philosophy.

		per the ERPC guidelines. • CB of 220kV STPS-Chandil line at Chandil end is to be tested • Protection system of 220/132kV ATRs to be tested and the settings are to be coordinated with 220kV and 132 kV protection relays. • Busbar protection for all 220kV substations are to be installed to minimize the fault clearing time.	b) Old electromechanical relays are to replaced under PSDF upgradation (In progress). c) Proposal for bus sectionaliser has been sent by Chandil. d) Current PLCC healthiness status report is enclosed. e) Z4 reach and time delay of 220 kV Chandil – STPS line at Chandil end was reviewed and found as per ERPC Philosophy.
7.	Total Power failure at 220 k V Chandil Substation on 30.04.2020 at 19:37 hrs	PCC observed the following discrepancies and advised JUSNL to take appropriate action: • Disturbance recorders of all the substations involved in this disturbance are to be configured as per the ERPC guidelines. • The reach and time settings of distance protection of 220kV STPS-Chandil line at Chandil end are to be reviewed. • Protection system of 220/132kV ATRs to be tested and the settings are to be coordinated with 220kV and 132 kV protection relays.	JUSNL updated following points: a) Timing of distance protection at Ramchandrapur end was reviewed and found as per ERPC Philosophy. b) Old electromechanical relays are to replaced under PSDF upgradation (In progress). c) Proposal for bus sectionaliser has been sent by Chandil. d) Current PLCC healthiness status report is enclosed. e) Z4 reach and time delay of 220 kV Chandil – STPS line at Chandil end was reviewed and found as per ERPC Philosophy.
8.	Total Power failure at 400 k V Teesta III and Dikchu Substations on 15.03.2020 at 16:12 hrs	PCC advised Powergrid to explore implementation of line differential protection for 400 kV Teesta III – Kishangunj S/C, 400 kV Rangpo – Kishangunj S/C and 400 kV Teesta III – Dikchu – Rangpo section to	A sperate meeting to discuss the Sikkim Hydro complex to resolve the issues will be called by ERPC.

		avoid uncoordinated trippings. This would identify the high resistive faults reliably and clear the faults immediately. PCC advised Dikchu to review earth fault settings at 400 k V side of 400/132 kV ICT of Dikchu HEP as tripping of this ICT is not desirable. PCC already advised same in earlier PCC Meetings.	ICT Backup Earth fault setting has already been revised by Dikchu
9.	Tripping of 400 k V Teesta III – Dikchu S/C from both ends on 21.04.2020 at 11:00 hrs	PCC advised Dikchu to review the relay settings. PCC advised TUL to maintain the spare reserves.	Relay block logic has been modified for Main2 relay for DIkchu-Rangpo ckt at Dikchu end. A sperate meeting to discuss the Sikkim Hydro complex to resolve the issues will be called by ERPC. CEA Spare Equipment guidelines has beenshared by ERLDC to all utilities to ensure all spare in adequate quantum is available.
10.	Black out of 132 k V Chujachen Hydro Power Substation on 01.04.2020	PCC advised DANS Energy to send relay settings , SLD and line parameters at Tashiding and Jorethang to ERPC and ERLDC.	The Setting of Jorethang and Tashiding has been reviewed by respective utilities in coordination with PRDC.
11.	Tripping of Unit 1 of JITPL on 05.03.2020 at 19:27 hrs	PCC advised JITPL take following corrective actions: • Reduce zone 4 time setting of transmission lines to 0.5 second. • Bay CT could be taken in reactor differential protection. • As a temporary measure, set reactor bays backup impedance tripping time to 200-300 milisecond instead of 0 second to avoid maloperation.	JITPL : At presently Rector Bay -1 &2 Back up Impedance Tripping time set at relay 100 milli sec . For Appropriate differential Scheme adaptation in both reactors bay we are called consultant(TCE), OEM (Siemens) and Relay testing Engineer ,it is in process of P.O placed . After completion, it will be shared with ERPC and ERLDC

			separately in future.
12.	Tripping of both units of JITPL on 21.04.2020 at 18:29 hrs	PCC advised JITPL to take following action: 1) Tripping of both units at JITPL for bus bar protection operation of any bus may be reviewed. 2) Units shall be connected to grid through remaining healthy bus	As per BHEL tripping scheme any one of the bus trip both generators will be tripped. During Visiting of Consultant (TCE), OEM(SIEMNS), Relay Testing Engineer the bus bar tripping scheme will be reviewed . After completion, it will be shared with ERPC and ERLDC separately in future.
13.	Multiple tripping incident at Melli at 18:29 hrs on 13-03-2020	PCC advised Powergrid and sikkim to take necessary action and submit details to ERPC and ERLDC	Sikkim SLDC has been advised to coordinate with sharing of information with ERLDC and ERPC.
14.	Islanding of CESC system at 14:31 hrs on 28-04-2020	PCC advised WBSETCL and CESC to coordinate the protection settings and islanding scheme settings to minimize separation of CESC system.	The Issues has been resolved by WEBSETCL and CESC in coordination with each other. The 33 kV line protection have been reviewed and corrected by WBSETCL.
89th PCC Meeting			
1.	Disturbance at 220 kV Bidhannagar Substation on 01.02.2020 at 21:05 Hrs.	PCC suggested WBSETCL to take the following remedial measures: • Submit the last test report of the CT which was failed during the disturbance • Carry out the testing of other CTs at Bidhanagar S/s • Avoid uneven distribution of lines between the Buses • WBSETCL along with SLDC, WB should explore to change the network configuration to reduce the fault current level at Bidhanagar	

2.	Tripping of 220 kV Muzaffarpur-Hajipur D/C on 09.02.2020 at 12:53 Hrs and Tripping of 220 kV Hajipur-Amnour D/C on 10.02.2020 at 17:32 Hrs.	PCC advised BSPTCL to take the following actions: • Check the past trippings for successful/unsuccessful operation of LBB and Bus Bar protection • Test LBB protection and Bus bar protection. PCC also advised SLDC Bihar and Powergrid to check reason for voltage unbalance at Muzaffarpur Substation.	
3.	Disturbance at Muzaffarpur Substation on 20.02.2020 at 12:29 Hrs.	PCC advised BSPTCL to resolve the O&M issues with Powergrid at the earliest.	Agreement on Maintenance has been signed between PGCIL and BSPTCL as informed by BSPTCL.
4.	Multiple tripping incident at RTPS at 01:55 hrs on 08-02-2020	PCC advised DVC to change GPS time synchronization.	Time synchronization as checked with Maithon and found ok.
5.	Multiple tripping incident at NBU at 22:01 hrs on 29-02-2020	PCC advised WBSETCL to send detailed report to ERPC.	Details and DR/EL have been received from WBSETCL
6.	Sharing DR/EL for any tripping incident within 24 hrs of the incident and detailed report of any grid disturbance/grid incident/grid event within seven days	PCC advised SLDCs, generating stations and transmission utilities involved to send detailed report along with DR/EL to ERPC and ERLDC	All utilities were informed and they have started submitting the same in line with PCC discussion

88th PCC Meeting			
1.	Disturbance at 220 kV Maithon(PG) Substation on 25.01.2020 at 15:14 Hrs.	PCC advised Powergrid to replace the relay with numerical relay.	
2.	Tripping of 220 KV Gaya SonenagarD/Con 13.01.2020 at 00:40 Hrs.	PCC advised BSTPCL take the following corrective actions: • Send the PSL logic and relay setting file to ERPC Secretariat. • DR synchronisation need to be reviewed.	PSL logic was also checked by BSPTCL and was shared with ERPC. There is no GPS available at the Sonenagar end and is being done manually.
3.	Tripping of 400 kV Teesta V – Rangpo D/Con 05.01.2020 at 20:04 Hrs.	PCC advised NHPC to take following corrective actions: • Revise their Zone-4 time settings to 500 ms. • 400kV Teesta-V – Rangpo Ckt-I distance protection input needed to be checked.	
87thPCC Meeting			
1.	Tripping of 220 KV Darbhanga (DMTCL) – Motipur I on 14.12.2019 at 02:50 Hrs.	PCC advised BSPTCL to take following corrective actions: - • Digital signals configuration of relays at Motipur end need to be checked. • Over voltage settings of relay at Motipur end need to be reviewed.	BSPTCL has configured the DR as per ERPC guidelines. Over voltage setting has been revised and now it has been coordinated.
2.	Tripping of 132 kV Dumka – Lalmatia D/C on 09.12.2019 at 11:35 hrs	PCC advised JUSNL to collect DRs and discuss above issue with the SLDC and send the details to ERPC/ERLDC. PCC advised NTPC to share the DR at Lalmatia end. In 88th PCC meeting JUSNL	

		informedthat they did not got the reply from SLDC Jharkhand yet	
83rd PCC Meeting			
1.	Total power failure at 220 kV Darbhanga (BSPTCL) S/s on 16.08.2019 at 22:23 Hrs.	PCC observed that DR configuration at DMTCL end is not in order. PCC advised DMTCL to configure the DR settings as per the standard. In 87thPCC meeting, DMTCL informed that DR would be configured by end of February, 2020.	DMTCL has configured the DR as per ERPC guidelines
81st PCC Meeting			
1.	Disturbance at 400 kV Dikchu S/s on 30.06.2019 at 09:55 Hrs.	The time setting for the DEF relay at Jorethang end was 500 msec. PCC advised Jorethang to review the timer setting of DEF protection at Jorethang end. PCC advised Chuzachen to review the zone settings for 132 kV Chuzachen-Rangpo line. PCC advised TPTL to do line patrolling for 400 kV Rangpo-Dikchu line to find out the cause of such high resistive fault in the line. In 87thPCC meeting, Chuzachen informed that they have asked for information related to Rangpo end from Powergrid and Sikkim. Further, Chuzachen informed that they would send the zone setting file to ERPC/ERLDC at the earliest. In 89th PCC Chuzachen was advised to review the zone 3 settings for 132 kV Chuzachen-Rangpo line as it is very high	DEF Setting have been reviewed by Jorethang to coordinate for resistive faults in coordination with PRDCand ERPC Chuzachen has also reviewed their setting to ensure timely fault clearance.
2.	Disturbance at 220 kV Budhipadar(OPTCL) S/s on 12.06.2019 at 00:37 Hrs.	PCC advised OPTCL to properly configure the DRs for 220 kV Budhipadar – Korba D/C & 220 kV Budhipadar-Raigarh circuit at Budhipadar end and for 220 kV Budhipadar – Lapanga - II at	

		Lapanga end as per the DR standard finalised in 79th PCC Meeting. PCC also advised OPTCL to check the time synchronization. In 3rdTeST meeting, OPTCL informed that they had replaced the old relay at Korba. In 87th PCC meeting, OPTCL informed that DR for Budhipadar – Korba Circuit-I has been configured.	

Annexure C1.2 Status of nomination received from the entities for the communication of tripping related information

Entity	Nomination for communication for tripping related information
NTPC Kahalgaon	Yet to be received
NTPC Talcher	Yet to be received
NTPC Darlipalli	Yet to be received
Adhunik	Yet to be received
GMR	Yet to be received
KBUNL	Yet to be received
Teesta V	Yet to be received
Rangit	Yet to be received
DVC SLDC	Yet to be received
WB SLDC	Yet to be received