Agenda
for
94th PCC Meeting

Date: 28.09.2020
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 94TH PROTECTION SUB-COMMITTEE MEETING TO BE HELD ON 28.09.2020 AT 10:30 HOURS

PART – A

ITEM NO. A.1: Confirmation of minutes of 93rd Protection sub-Committee Meeting held on 17th Aug 2020 at ERPC, Kolkata.

The minutes of 93rd Protection Sub-Committee meeting held on 17.08.2020 circulated vide letter dated 09.09.2020.

Members may confirm the minutes of 93rd PCC meeting.

PART – B

ITEM NO. B.1: Disturbance at 400/132 kV Motihari Substation on 12.08.2020 at 23:45 hrs

400/132 kV Motihari substation is connected to the rest of the grid via 400 kV Barh – Motihari – 2 (Other 400 kV lines are under breakdown due to tower-collapse in DMTCL Motihari section). It is feeding the radial loads of 132 KV Bettiah, and 132 KV Raxaul through 400/132 kV ICT – 1 at Motihari.

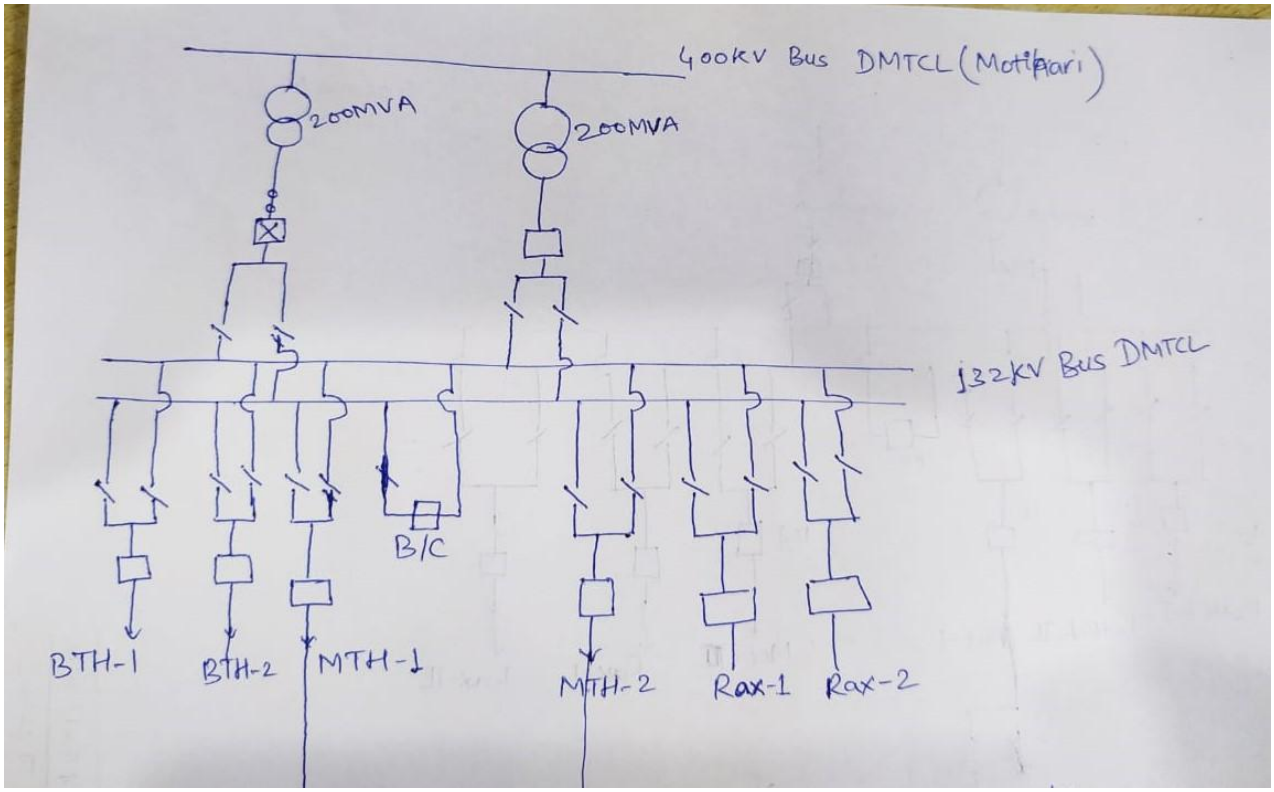
132 kV Motihari (BSPTCL) is presently not being supplied from Motihari DMTCL due to the non-availability of 400/132 kV ICT 2 due to the bushing issue and is being fed through 220 kV Motipur via 400/132 kV Darbhanga (DMTCL) substation. On an interim basis, 132 kV Dhaka substation load was being fed through 400/132 Motihari substation through 132 kV Motihari-Motihari (BSPTCL) 1 circuit via 132 kV transfer bus bay at Motihari (BSPTCL) and connecting 132 kV Motihari(BSPTCL)-Dhaka(BSPTCL) ckt. Loading limit restriction was imposed on this interim connection as 40 MW and based on which directional overcurrent setting was implemented at 132 kV Motihari (DMTCL) to avoid any overloading of 400/132 kV ICT 1.

At 02:19 hrs 400/132 kV ICT - 1 at Motihari got tripped due to operation of LBB Protection from 132 kV side. Being the single source of supply, the tripping of 400/132 kV ICT 1 has led to the loss of supply to 132 kV Bettiah and Raxaul and connected rest of the 132 kV radial system.

Relay Indications :

Element Name	End1 Relay Indication	End 2 Relay Indication	PMU Observation
400/132 kV ICT - 1	Did not trip	LBB Protection	No short circuit fault has been observed in PMU voltage recorded at Barh.
132 kV Motihari-Bettiah 1	LBB Protection	-	
132 kV Motihari-Bettiah 2	LBB Protection	-	
132 kV Motihari-Raxaul 1	LBB Protection	-	
132 kV Motihari-Raxaul 2	LBB Protection	-	
132 kV Motihari-Motihari 1 (Feeding Dhaka 132 kV via	Direction O/C operated as load increased beyond 40	-	

transfer bus at 132 kV Motihari BSPTCL)	MW based current setting , Breaker not tripped, LBB operated.		



Load Loss : 180 MW

BSPTCL and DMTCL may explain.

ITEM NO. B.2: Disturbance at 400 kV Motihari Substation on 22.08.2020 at 16:46 hrs

At 16:46 hrs 400 kV Barh – Motihari – 2 tripped due to Y to B phase short circuit fault. Other 400kV lines connected to Motihari(DMTCL) are under breakdown since August 2019. The tripping led to loss of supply to 400kV Motihari (DMTCL), Betiah/Raxaul/Motihari (Bihar), being the only source of supply.

No SOE has been recorded in ERLDC SCADA data at the time of the event. NTPC Barh, BSPTCL and DMTCL are requested to check this issue.

Relay Indications :

Element Name	Barh End	Motihari End	PMU observation
400 kV Barh Motihari - 2	Y-B, Zone – 1, F/C: 17.89 kA, 10.5 km, from Barh	DT received	Around 80 kV dip has been observed in Y and B phase voltage at the time of the event. Fault clearing time was less than 100 ms.

Load Loss : 117 MW

NTPC Barh, BSPTCL and DMTCL may explain.

ITEM NO. B.3: Total power failure at 400 kV Muzaffarpur and 220 kV Darbhanga Substation on 20.07.2020 at 07:06 hrs

At 07:06 hrs. B phase to earth fault occurred at 400 kV Muzaffarpur-Gorakhpur – 2. B pole of tie breaker at Muzaffarpur end got did not open. Due to delay in LBB operation, fault was getting fed and to clear the fault, 400 kV Muzaffarpur-Gorakhpur – 1, 400 kV Muzaffarpur-New Purnea-2, 400 kV Muzaffarpur-Biharshariff D/C and 220 kV Muzaffarpur – Hajipur D/C tripped. Fault clearing time was around 500 ms. Tripping of 220 kV Muzaffarpur – Hajipur D/C resulted total power failure at Hajipur and chapra.

At 07:08 hrs, 220 kV Darbhanga (DMTCL) – Darbhanga D/C, 220 kV Darbhanga (DMTCL) – Motipur D/C, 220 kV Darbhanga (DMTCL) – Laukahi - 1, 220 kV Darbhanga (DMTCL) – Samastipur S/C tripped due to overvoltage problem resulting total power failure at Darbhanga and its nearby areas.

In 93rd PCC, it was observed that distance protection at Dharbanga(DMTCL) of 400 kV Muzaffarpur-Dharbanga(DMTCL) line has not seen the fault either in zone 3 or zone 2. PCC advised DMTCL to review the zone settings at Dharbanga (DMTCL).

DMTCL may update.

ITEM NO. B.4: Disturbance at 220 kV Darbhanga Substation on 22.07.2020 at 12:15 hrs

220 kV Darbhanga (BSPTCL) to Mushahari – 2 was idle charged from Mushahari end. At 12:15 hrs 220 kV Darbhanga (DMTCL) – Darbhanga (BSPTCL) D/C tripped from DMTCL end only. At same time 220 kV Darbhanga (BSPTCL) to Mushahari – 1 also tripped. Later it was reported that Y – Phase Bushing to Gantry tower conductor of 220 kV Darbhanga (DMTCL) – Darbhanga (BSPTCL) – 2 was melted and fault occurred.

Detail report for any event occurred at Bihar STU network is yet to be received from Bihar SLDC in spite of repeated reminders.

Relay Indications:

Element Name	End 1	End 2	PMU observation
220 kV Darbhanga (DMTCL)-Darbhanga (Bihar)-2	Yet to be received	Did not trip	Around 15 kV dip has been observed in B and Y phase voltage at Muzaffarpur PMU. Initially there was a B phase to earth fault. Around 1000 ms later, another Y phase to earth fault occurred. Fault clearing time was 1300 ms for B phase to earth fault and 300 ms for Y phase to earth fault.
220 kV Darbhanga (DMTCL)-Darbhanga (Bihar)-1	Yet to be received	Did not trip	
220 kV Darbhanga (Bihar) – Mushahari - 1	Yet to be received	Yet to be received	

Load Loss : 250 MW

In 93rd PCC, BSPTCL explained that there was a transient fault in 220 kV Darbhanga (BSPTCL)-Mushahari – 1. Due to problem in trip circuit of Circuit Breaker at Darbhanga (BSPTCL) end, the line did not trip from Darbhanga (BSPTCL) end. Thereafter, 220 kV Darbhanga (DMTCL) – Darbhanga (BSPTCL) D/C tripped from DMTCL end on zone 3.

ERLDC informed that as per the DR plot of Darbhanga (DMTCL) of 220 kV Darbhanga (DMTCL) – Darbhanga (BSPTCL) line-I, the fault was Y-N fault whereas DRs of other lines were showing B-N fault. ERLDC added that BSPTCL is not submitting the DRs in time.

PCC advised BSPTCL to take following actions:

- *Check the phase sequence of 220 kV Darbhanga (DMTCL) – Darbhanga (BSPTCL) D/C lines.*
- *Check the Circuit breaker of 220 kV Darbhanga (BSPTCL) - Mushahari – 1 at 220 kV Darbhanga (BSPTCL) and identify the root cause of non-operation of the CB.*
- *Submit the DRs and tripping report within stipulated time.*

BSPTCL may update.

ITEM NO. B.5: 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.

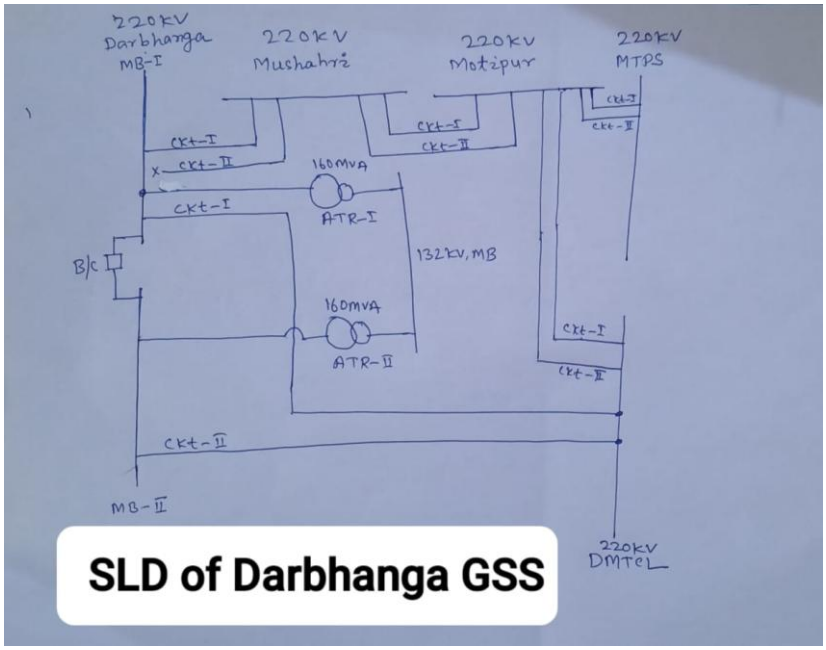
Load Loss: 135 MW

In 92nd PCC, 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.

In 93rd PCC, BSPTCL updated the status of corrective actions as follows:

- *Test the breakers at 220/132 kV GSS Darbhanga (BSPTCL) –-Testing would be done within a week*
- *Test the healthiness of LBB protection at Darbhanga (BSPTCL) ---Tested and found loose connection with the auxiliary relay. The same has been rectified.*
- *Find out the reason for occurrence of unsymmetrical current at Darbhanga (BSPTCL) and resolve the issue. ---Not yet resolved. BSPTCL agreed to resolve at the earliest.*

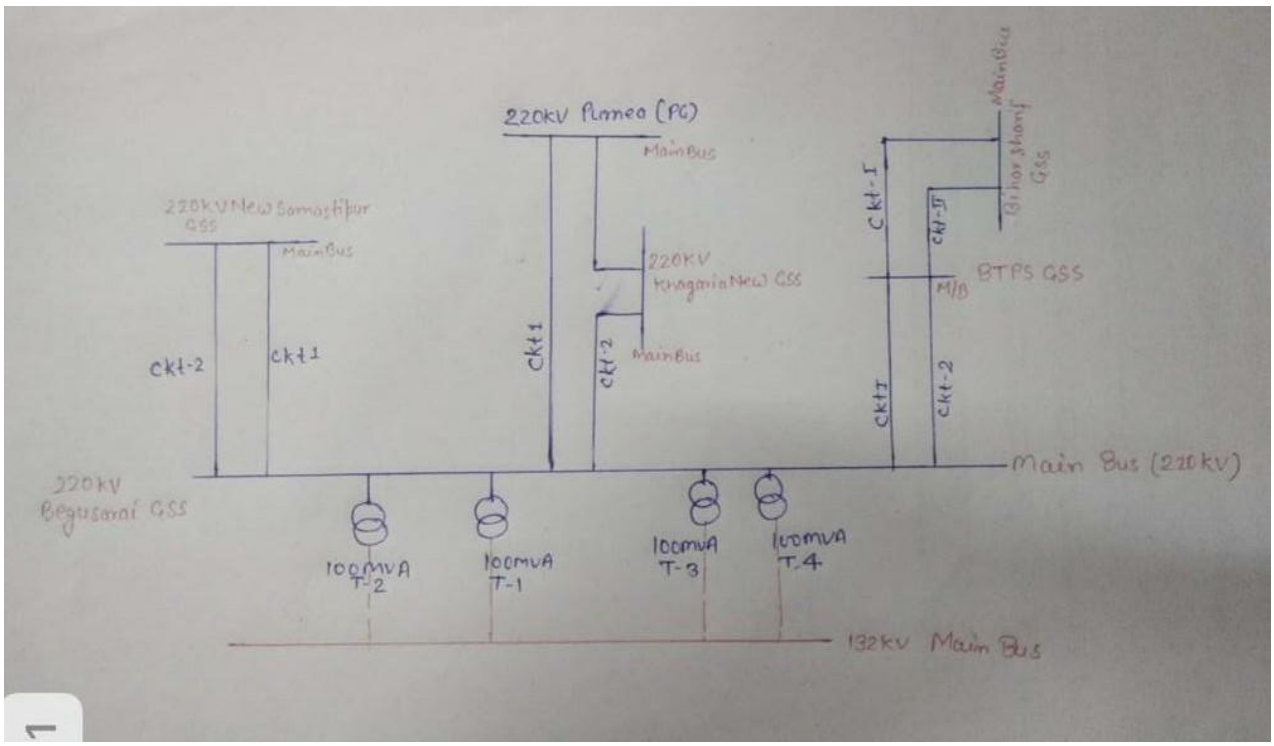
ERLDC informed that unsymmetrical current may be due to wave trap.

PCC advised BSPTCL to interact with ERLDC for any guidance on this issue.

BSPTCL may update.

ITEM NO. B.6: Disturbance at 220 kV Begusarai , 220 kV Khagaria and 220 kV Barauni Substation on 03.08.2020 at 11:05 hrs

On 03-08-20 at 10:15 Hrs 220 kV New Purnea-Begusarai-1 tripped on B phase to earth fault. Consequently 220 KV MTPS-Samastipur D/C kept open to reduce overloading of 220 KV Muzaffarpur(PG)-MTPS D/C. 220kV Samatipur-DMTCL Darbhanga line was out due to flood.



At 11:01 hrs 220 kV Biharshariff-Barauni D/C tripped from Biharshariff end on B-Phase to earth fault with delayed fault clearance observed in PMU. At the same time 220 KV Barauni-Begusari-1 tripped in zone-2 from Barauni end.

At 11:05hrs, 220 KV Begusarai-Khagaria and New Purnea –Khagaria ckt 2 tripped on B phase to earth fault. For 220 KV Begusarai-Khagaria line fault distance was 48.26 km from Begusarai.

At 11:05 hrs. Running unit of Barauni (unit no. 8) generating 180 MW get islanded with Begusarai load and Samastipur load. Due to LGBR unbalance unit-8 of Barauni tripped on under frequency and complete blackout in 220 k V Barauni, 220 KV Begusarai & 220 KV Khagaria took

place. Load loss of 232 MW in Rosra, Kucheswar, Dalsingsarai, Manjhaul, Samastipur, Khagaria areas took place.

Load Loss : 232 MW , Gen . Loss :180 MW

BSPTCL may explain.

ITEM NO. B.7: Disturbance at 220 kV Begusarai , 220 kV Khagaria and 220 k V Barauni Substation on 09.08.2020 at 07:41 hrs

At 7:41 hrs R ph CT blast at Begusarai end of 220 KV BTPS Begusarai ckt 2. Subsequently, all connected 220 KV ckts and 220/132 KV ICTs at Begusarai tripped either on busbar/LBB protection or from remote ends on zone 2.

At the same time, running unit 8 at 220 KV Barauni TPS with 220 MW generation tripped on overcurrent. 220 kV BTPS –Hajipur 1 was under breakdown due to tower collapse and 220 KV BTPS Hajipur ckt 2 also tripped at the same time on possibly overreach.

As a result ,there was total voltage loss at 220 KV Begusarai s/s and load loss 175 MW took place in Dalsinghsarai , BTPS(132Kv),Manjhaul, Ballia, Khagaria andBegusarai area.220 KV BTPS remained connected with 220 KV Biharshariff via 220 KV double ckts.

Load Loss : 175 MW , Gen Loss :220 MW

BSPTCL may explain.

ITEM NO. B.8: Disturbance at 220 k V Hajipur Substation on 04.08.2020 at 19:33 hrs

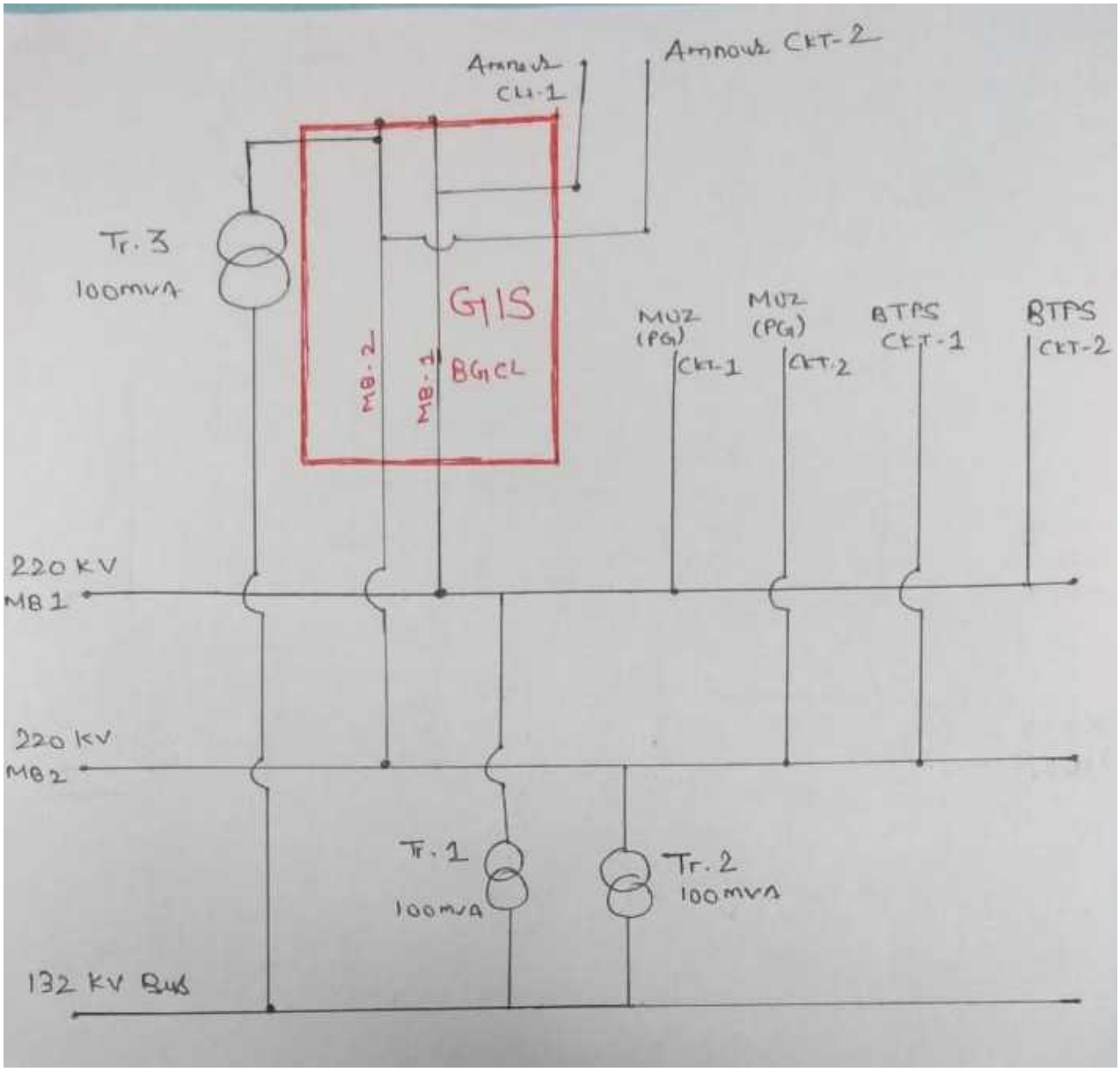
220 KV Barauni-Hajipur-1 was under breakdown and ckt-2 was not in service prior to the event. At 19:33 hrs, while taking charging attempt of 220 KV Barauni-Hajipur 2, 220 KV Muzaffarpur-Hajipur D/C tripped leading to a load loss of 313 MW in Hajipur, Chhapra, Amnour.Initially the 220 kV Barauni-Hazipur 1 which was under outage and was being charged from Hazipur end at 19:33 Hrs.

From DR of 400 kV Muzaffarpur-Hazipur circuits, it is observed that the circuit developed a fault in B phase which persisted for more than 700 ms. After this, the fault got isolated as per the DR file as well as PMU data. The DR for this circuit has not been shared by BSPTCL.

Immediately after 300 ms of this fault, Y-B phase fault appeared in 220 kV Muzaffarpur-Hazipur D/C which was picked in zone 1 and lines got tripped immediately. The exact fault location and whether it was related to 220 kV Barauni-Hazipur 1 tripping is not known as no details from BSPTCL.

As 220 kV Mujaffarpur-Hazipur D/C were the only supply source for 220/132 kV Hazipur, Chapra and Amnour substations, the radial system got blacked out causing loss of 313 MW of load.

- The sequence of events for tripping at Hajipur end has not been recorded at ERLDC SCADA data.
- The reason for tripping from Muzaffarpur end may be shared by POWERGRID ERTS-1.
- It has been observed Auto-reclose attempt was not taken at Hajipur end for a single phase to earth zone 1 fault. Carrier protection was unhealthy prior to the tripping. BSPTCL may explain.
- The reason for the tripping of both 220 kV Muzaffarpur Hajipur D/C may be shared by BSPTCL.



Relay Indications:

Element Name	End 1	End 2	PMU observation
220 kV Hazipur-Barauni 1	No Details	No Details	Around 15 kV dip has been observed in B phase voltage at Muzaffarpur. The fault clearing time was around 300 ms. Around 200 ms after the clearing of this fault, another Y and B phase fault has been captured. The voltage dip was around 10 kV in both Y and B phases. The fault clearing time was less than 100 ms indicating zone 1 tripping time.
220 KV Muzaffarpur-Hajipur – D/C	Yet to be received	B-N, Zone – 1, F/C 2.3 kA, 3 phase trip, Auto-reclose attempt was not taken (circuit ID is not mentioned)	

Load Loss: 313 MW

BSPTCL and Powergrid may explain.

ITEM NO. B.9: Disturbance at 220 k V Biharsharif Substation on 14.08.2020 at 20:23 hrs

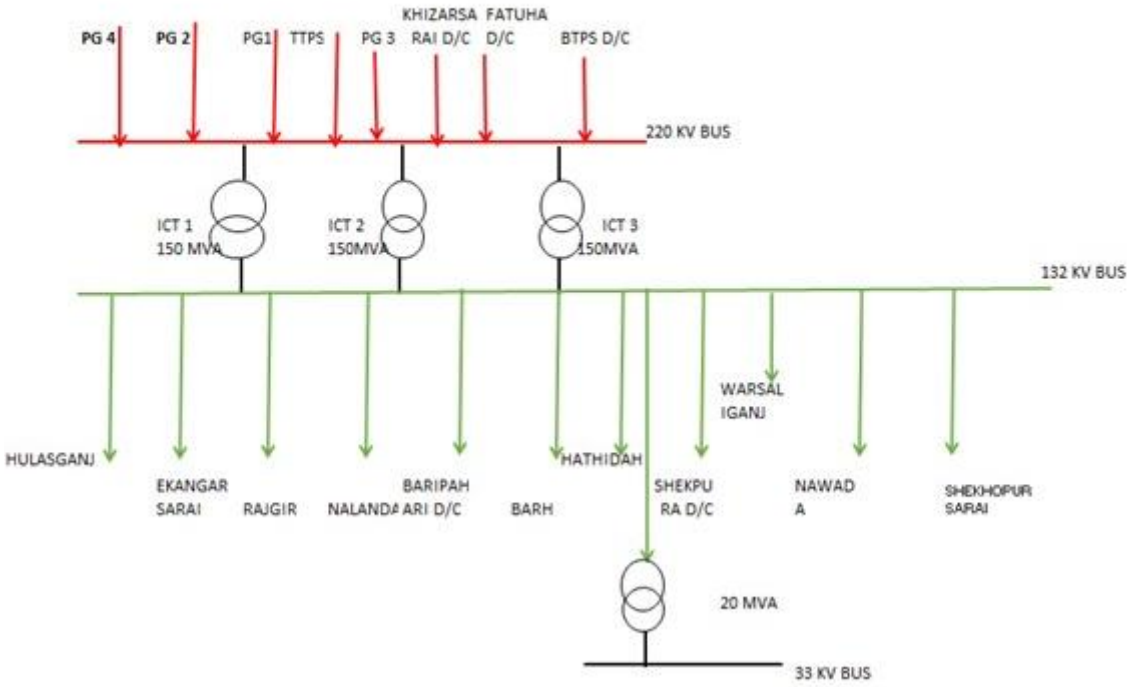
At 20:23 hrs 220 kV Tenughat Bihar Sharif S/C tripped due to Y phase to earth fault. At same time, 400/220 kV ICT 2 and 3 at Bihar Sharif, 220/132 kV ICT 1, 2 and 3 at Bihar Sharif, 132 KV Bihar sharif –Sheikhupura S/C also tripped. During line patrolling, it was found that Y phase Conductor of 220 kV Bihar sharif – TTPS S/C snapped at location No. 496-497 and fell on 132 kV Bihar sharif – Sheikhupura D/C at tower loc no. 10 from Bihar Sharif.

Status of PLCC on 220 kV Bihar Sharif-Tenughat line on both ends as the Tenughat is clearing the fault in zone 2 due to this which exceeds the CEA Standard 2010 for 220 kV lines.

BSPTCL may share on which protection, 220 kV Bihar sharif – TTPS S/C tripped at Bihar Sharif end.

BSPTCL may share the reason for the tripping of 400/220 and 220/132 kV ICTs at Bihar Sharif. Lack of protection coordination has been observed during the event at 400/220 kV Bihar Sharif (PGCIl) and 220/132 kV Bihar Sharif (BSPTCL) during this event. The status of the entire protection system at 220/132 kV Bihar Sharif substation may kindly be shared by BSPTCL as non-operation of 132 kv line protection is of serious concern.

SLD OF BIHARSHARIF GSS



Relay Indications:

Time	Element Name	End 1	End 2	PMU Observation
20:23 hrs	220 kV Bihar Sharif Tenughat S/C	Y-N, O/C & E/F picked up, no distance protection picked up at Bihar Sharif DR. IY-27 kA	Y-N, Zone – 2, F/C 1 kA, 182 km from TTPS	Around 70 kV dip in Y phase voltage has been observed at the time of fault at 220 kV Bihar

		VYN-62 kV		Sharif S/C. During the fault of 132 KV Bihar sharif – Sheikhupura D/C within 100 ms, voltage started to decrease in R and B phase also. When the fault of 220 kV Tenughat Bihar Sharif S/C got cleared from Bihar Sharif end within 100 ms, the voltage dip in Y phase became equal to R and B phase dip (around 10 kV) due to the 3 phase fault at 132 KV Bihar sharif – Sheikhupura D/C. The total fault clearing time was around 400 ms.
20:23 hrs	400/220 kV ICT 2 & 3 at Bihar Sharif	ICT – 3 did not trip at HV side. ICT – 2 tripped form HV SIDE due to inter trip receipt from LV side.	Master trip relay operated at LV side (BSPTCL end)	
20:23 hrs	132 KV Bihar sharif – Sheikhupura 1	B-N, Zone – 1, Fault distance 2.12 km, IR 9.5 kA, IY – 8.9 kA, IB-9.7 kA	Radial Feed	
20:23 hrs	132 KV Bihar sharif – Sheikhupura 2	R-Y-B-N, Zone – 1, IR 8.9 kA, IY 10.1 kA, IB 10.4 kA	Radial Feed	
20:23 hrs	220/132 kV ICT 1, 2 & 3 at Bihar Sharif	ICT 1 and 2 tripped from both sides due to master trip operation. ICT 3 tripped from LV side due to Directional overcurrent and earth fault relay. IR-1.1 kA, IY-1.14 kA, IB-1.14 kA		

Load Loss : 332 MW

BSPTCL may explain.

ITEM NO. B.10: Total Power failure at 220/132 kV Chaibasa Substation on 06.05.2020 at 01:19 hrs.

In 92nd PCC, JUSNL was advised 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

In 94th PCC, JUSNL informed that they had taken shutdown twice to test CB of Chaibasa (JUSNL) end of 220 KV Chaibasa- Ramchandrapur circuit 1, however due to poor weather conditions they were not able to test the CB. JUSNL added that circuit breaker is in service.

JUSNL further added that DC and respective CT, PT connections were checked and were found in order.

PCC advised JUSNL to carry out the preliminary testing of the circuit breaker operation by issuing trip command immediately. Then detailed testing of CB could be done after taking shutdown. PCC also advised JUSNL to test the backup protection of 220/132 kV ATRs and send a detailed report to ERPC and ERLDC.

JUSNL may update.

ITEM NO. B.11: Total Power failure at 220/132 kV Hatia Substation on 14.05.2020 at 15:33 hrs

In 92nd PCC, 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.

In 94th PCC, JUSNL informed that pickup to drop off ratio was changed to 0.99 and earthing at 220 kV Hatia II and Patratu S/s was checked and found in order. JUSNL added that the autorecloser relay is healthy and it is in service.

PCC advised JUSNL to send the results of test done for earthing at 220 kV Hatia II and Patratu S/S to ERPC and ERLDC. PCC advised JUSNL to test PLCC as the auto-recloser would not work if carrier is not healthy.

JUSNL had sent the result of test done for earthing at 220 kV Hatia II and Patratu S/S to ERPC and ERLDC which is attached at **Annexure B11**.

JUSNL may update.

ITEM NO. B.12: Disturbance at 400 k V Arambag S/S on 10.07.2020 at 08:45 hrs.

At 08:45 hrs, 400 kV Arambag – New Chanditala S/C, 400 kV Arambag – Bakreswar S/C, 400 kV Arambag Kolaghat S/C and 400/220 kV ICT – 1, 2, 3 and 4 at Arambag tripped. At same time, all 220 KV lines connected to Arambag s/s and some 132 kV lines also tripped during this event. Flash over was reported at B phase pole of 220 kV side breaker of 315 MVA 400/220 kV ICT – 4 at Arambag.

Flash over at B phase pole of 220 kV side breaker of 315 MVA 400/220 kV ICT – 4 at Arambag resulted B phase to earth fault at 220 kV bus at Arambag. Fault was sensed by Directional E/F protection from 400 kV ICT – 4. Remote ends of 220 kV feeders sensed the fault in Zone – 2. Due to delay in clearance of fault, 220 kV Arambag – Midnapore D/C, 220 kV Arambag – New Bishnupur D/C, 220 kV Arambag – Domjur – 1 and 220 kV Arambag Howrah S/C tripped from remote end in Zone -2. 220 kV Arambag – Rishra S/C tripped from Arambag end Zone -2. Reason for tripping of 220 kV Arambag – Rishra S/C from Arambag end may be investigated by WEBSETCL as fault was in reverse direction. Remote ends of 400 kV Arambag – New Chanditala S/C, 400 kV Arambag – Bakreswar S/C, 400 kV Arambag Kolaghat S/C sensed the fault and tripped in zone – 3 after non-clearance of fault in zone -3 timing. For 400 kV Arambag – New Chanditala S/C and 400 kV Arambag Kolaghat S/C, direct trip signal was received at Arambag end and Arambag end breakers got opened. Criteria for sending DT signal to remote ends may be reviewed by WBPDCL and WBSETCL. 132 kV Arambag Tarakeswar D/C, 132 kV Arambag – Raina D/C, 132 kV Arambag – Brisingha 2 tripped from remote end in back up E/F protection. • 400/220 kV ICT 1, 2, 3 and 4 at Arambag tripped in directional E/F from 400 kV side

(ICT - 4 tripped from 220 kV side also). Fault clearing time was around 1100 ms.
Delayed fault clearance has been observed. Due to fault clearing time of around 1100 ms, 400, 220 and 132 kV feeders tripped from remote ends in Zone -2, Zone -3, back up E/F protection. WBSETCL may investigate and share the reason for delayed clearance of this fault. It has been learnt 220 kV bus bar protection was not in service at Arambag end. Reason for tripping of 220 kV Arambag – Rishara S/C from Arambag end may be shared by WBSETCL.

Relay Indications:

Element Name	End 1	End 2	PMU observation
400 kV Arambag – New Chanditala S/C	DT received	B-N, Zone – 3, 133 km, F/C 3.2 kA	Around 140 kV dip has been observed in B phase at Arambag PMU. Current in 400 kV Arambag – New PPSP – 1 and Arambag – Bakreswar S/C increased to 1.4 kA during the event. As per PMU data, fault clearing time was around 1100 ms.
400 kV Arambag – Bakreswar S/C	Did not trip	B-N, Zone – 3, 300 km	
400 kV Arambag Kolaghat S/C	DT received	B-N, Zone – 3, 180 km, F/C 2 kA	
400/220 kV ICT – 1, 2, 3 and 4 at Arambag	ICT 1, 2, 3: Directional E/F from HV side ICT 4: Directional E/F from HV and LV side		
220 kV Arambag – Midnapore D/C	Did not trip	Zone – 2 protection	
220 kV Arambag – New Bishnupur D/C,	Did not trip	Zone – 2 protection	
220 kV Arambag – Domjur – 1,	Did not trip	Zone – 2 protection	
220 kV Arambag Howrah S/C	Did not trip	Zone – 2 protection	
220 kV Arambag – Rishra S/C	Zone – 2	Did not trip	
132 kV Arambag Tarakeswar D/C	Did not trip	Back up E/F	
132 kV Arambag – Raina D/C	Did not trip	Back up E/F	
132 kV Arambag – Brisingha 2	Did not trip	Back up E/F	

Load Loss : 61 MW

In 94th PCC, WBSETCL explained that there was fault at 220kV bus due to Flash over at B phase pole of 220 kV side breaker of 315 MVA 400/220 kV ICT – 4 at Arambag. Busbar protection was not available for 220kV bus at Arambag. As a result, the fault got cleared from 400kV, 220kV and 132kV side on backup protection with the following relay indications:

- *400/220 kV ICT – 1, 2, 3 at Arambag tripped from backup directional overcurrent E/F protection from HV side but 400/220 kV ICT – 4 was tripped from both LV and HV side on directional overcurrent E/F protection. WBSETCL explained that LV side of ICT-4 was wrongly picked up the fault due to lose neutral wire connection in the PT junction box*
- *400 kV Arambag – New Chanditala S/C, 400 kV Arambag – Bakreswar S/C, 400 kV Arambag-Kolaghat S/C lines tripped from remote on zone 3*
- *220 kV Arambag – Midnapore D/C, 220 kV Arambag – New Bishnupur D/C, 220 kV Arambag – Domjur – 1, 220 kV Arambag Howrah S/C lines tripped from remote end on zone 2*
- *220 kV Arambag – Rishra S/C line tripped from Arambag end on zone 2 instead of Rishra end due to lose neutral wire connection in the PT junction box therefore Arambag end distance protection has seen the fault in forward direction instead of reverse direction*
- *132 kV Arambag-Tarakeswar D/C, 132 kV Arambag – Raina D/C, 132 kV Arambag – Brisingha 2 tripped on backup earth fault protection*

WBSETCL informed that 400kV New PPSP line picked up the fault in zone 3 after tripping of

other 400kV lines.

WBETCL added that lose neutral wire connection in the PT junction box was rectified after the disturbance.

PCC observed that 220/132kV Transformers backup protection should operate to clear the fault and 132kV lines should not be tripped in this case.

WBSETCL explained that 220/132kV Transformers II and III tripped from 132kV on earth fault protection and earth fault protection of other 220/132kV Transformers was not enabled.

PCC advised WBSETCL to take following corrective actions:

- *Busbar protection at 220kV Arambag is to be bring into service*
- *220/132kV Transformers backup protection should be made available and coordinate the protection settings with 220kV and 132kV backup protection settings to avoid unwanted tripping of transmission lines.*
- *Review the settings of 315 MVA 400/220 kV ICTs backup protection to coordinate with backup protection of 400kV transmission lines considering different generation levels*
- *PCC opined that DT should not be sent to other end for a tripping related to distance protection. Criteria for sending DT signal to remote ends for all tripping may be reviewed by WBPDCL and WBSETCL.*

WBSETCL may update.

ITEM NO. B.13: Disturbance at 220 kV Bokaro Substation on 16.08.2020 at 01:52 hrs

At 01:52 Hrs, 220/132 kV Bokaro B S/S became dead after tripping of all connected 220 kV lines and 400/220 kV ICTs. Y phase CT burst was reported of 220 KV Bokaro B-Jamshedpur 2 at Jamshedpur end.

Load Loss : 297 MW

DVC may explain.

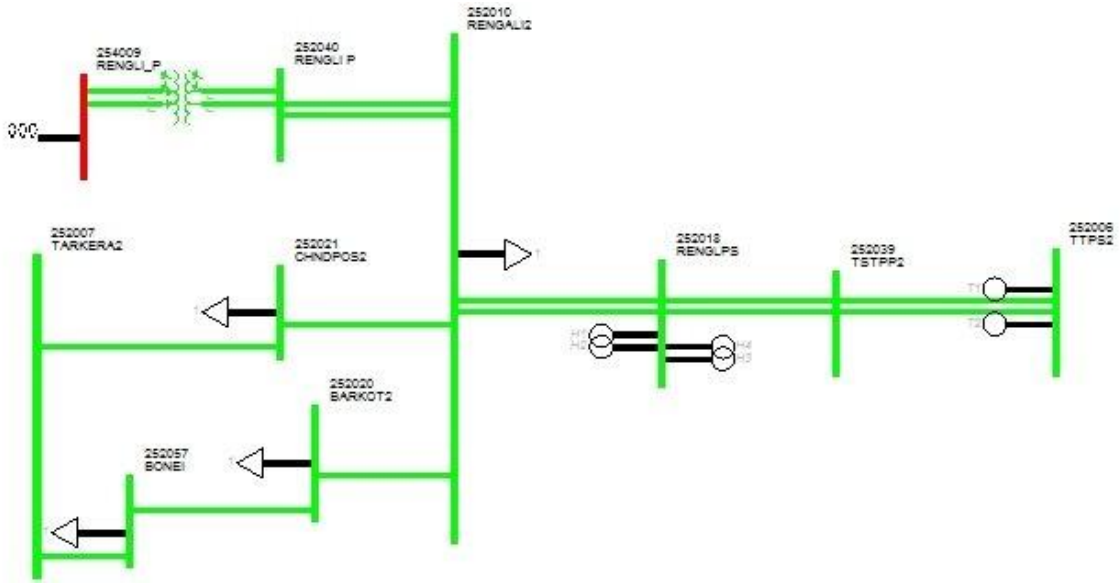
ITEM NO. B.14: Disturbance at 220 kV Rengali Substation on 03.08.2020 at 17:35 hrs

220 kV Rengali Power house (PH) – TTPS S/C was under outage since 19:17 hrs on 2nd August 2020.

The following elements tripped:

- At 16:17 hrs, 220 kV Rengali Switchyard (OPTCL)- Tarkera S/C tripped due to B phase to earth fault.
- At 16:58 hrs 220 kV Rengali Switchyard (OPTCL) - Barkote S/C tripped due to R and Y phase fault.
- At 17:17 hrs 220 kV Rengali Switchyard (OPTCL) - Rengali (PG) - 2 tripped due to Y and B phase fault.
- At 17:35 hrs 220 kV Rengali Switchyard (OPTCL) - Rengali (PG) - 1 tripped due to B phase fault. At same time, 220 kV TSTPP – Rengali PH S/C tripped from TSTPP end resulting in complete power failure at 220kV Rengali Switchyard (OPTCL) and at 220kV Rengali PH.
- All running units at Rengali PH tripped due to loss of evacuation path.

Reason of tripping of 220 kV Rengali Switchyard (OPTCL) - Rengali (PG) - 1 and 220 kV TSTPP – Rengali PH S/C tripped from TSTPP end at same time may be explained by concerned utilities.



Gen Loss :150 MW

OPTCL and Powergrid may explain.

ITEM NO. B.15: Tripping of unit 2 of 400 kV GMR Generating Station on 19.08.2020 at 22:04 hrs

GMR unit # 3 was connected to 400/220 kV Meramundali S/S of OPTCL STU network through 400 kV GMR – Meramundali S/C. GMR unit#1 and 2 were connected to ISTS network through 400 kV Angul-GMR D/C.

At 21:51 hrs, 400 kV GMR-Meramundali S/C tripped only from GMR end after receipt of direct trip signal (DT) from remote end. GMR unit # 3 got islanded and remained in house load operation before tripping at 22:04 hrs. 6.6 kV switchgear of unit # 2 and unit # 3 was in coupled condition. This resulted in high circulating current in the unit auxiliary transformer of unit # 2 and tripped tripping of transformer followed by tripping of unit # 2. Around 300 MW generation loss has been observed. Frequency dropped from 50 Hz to 49.97 Hz.

Connecting one 350 MW generating unit with only one 400 kV transmission line may affect the reliability of the generating station. GRIDCO SLDC/OPTCL are requested to check this issue. GMR informed that 6.6 kV switchgear of unit # 2 (connected to ISTS) and unit # 3 (connected to Odisha state network) was in coupled condition during the event. Similar event occurred on 26th June 2020. 400 kV GMR Meramundali S/C tripped only from Meramundali end due to receipt of DT signal from remote end. **PCC advised to GMR to check the PLCC to find out the root cause of sending the DT signal.** GMR may share their analysis. (**GMR/GRIDCO SLDC to update**) Reason for DT received at GMR end may be shared by GRIDCO SLDC/OPTCL/GMR. Meramundali end may confirm whether DT was sent or not.

Reason for tripping of GMR unit # 3 at 22:04 hrs may be shared by GMR/GRIDCO SLDC

Relay Indications:

Time	Element Name	End 1	End 2	PMU Observation
21:51 hrs	400 kV GMR – Meramundali S/C	DT received at Meramundali	Did not trip	No fault has been observed at three phase bus voltage and Three phase line current of 400 kV GMR Meramundali S/C captured by PMU at Meramundali. At same time GMR unit # 3 went in house load operation. As a result, frequency dropped from 50 Hz to 49.96 Hz.

22:04 hrs	GMR unit #2 and #3	Yet to be received	Yet to be received	Frequency dropped from 50 Hz to 49.97 Hz.

Gen. Loss: 611 MW

GMR, OPTCL, GRIDCO SLDC may explain.

ITEM NO. B.16: Disturbance at 220 kV Joda Substation on 04.07.2020 at 13:19 hrs

At 12:47 hrs 220 kV Joda – TTPS - 1 tripped on Y and B phase to earth fault. Fault clearing time was less than 100 ms. At 13:00 hrs it was charged from Joda end successfully. But while charging this circuit from TTPS end at 13:01 hrs, it tripped on B phase to earth fault from TTPS end. In PMU data at Jamshedpur end, no fault has been observed. Line was in charged condition at TTPS end at the time of the tripping. At 13:06 hrs 220 kV Joda – TTPS – 2 tripped from both ends on R phase to earth fault. Fault clearing time was less than 100 ms. As per DR recorded at Joda end , around 511 kV phase to neutral Voltage has been observed In R phase at Joda. Around 1.4 kA current has been observed in R phase. At 13:19 hrs 220 kV Joda – Ramchandrapur end tripped from both ends on Y phase to earth fault. It tripped from Joda end in zone – 1. In Ramchandrapur end back up O/C protection operated to trip the line. As per PMU data, fault duration was around 500 ms. As per DR recorded at Ramchandrapur end, Zone – 3 relay sensed the fault. But before tripping in Zone – 3, it tripped in back up O/C protection. As per SCADA data recorded at ERLDC, prior to the tripping, power flow of 220 kV Ramchandrapur – Joda S/C was around 150 MW. At same time, power flow through 220 kV Jamshedpur – JSPL – Joda was 18 MW. After the tripping of 220 kV Ramchandrapur – Joda S/C, 220 kV Jamshedpur – JSPL – Joda S/C tripped on O/C protection from Jamshedpur end. As per relay current data, three phase current was around 0.45 – 0.48 kA (Equivalent to 170-180 MW)

Similar type of event occurred at 11:57 hrs on 23rd June 2020. 220 kV Ramchandrapur – Joda S/C and 220 kV Jamshedpur (DVC) – Jindal S/C tripped on overload after tripping of 220 kV Joda – TTPS D/C at 11:41 hrs on B phase to earth fault. During this event three faults have been observed in the span of 30 min duration. As a result, all the four lines connected to Joda tripped. OPTCL is requested to maintain healthiness of the lines to reduce the repeated faults in same lines.

JUSNL may share the reason for operation of back up overcurrent protection at Ramchandrapur end within 500 ms. It has operated before operation of zone – 3 protection. Reach of distance protection at Ramchandrapur end may also be reviewed. Reason for non-picking of zone – 2 distance protection at Ramchandrapur end may be shared. Reason for tripping of 220 kV TTPS – Joda end at TTPS end at 13:01 hrs may be shared by OPTCL. Whether it was remained charged from Joda end during the event, may also be shared by OPTCL. Reason for high voltage in R phase at Joda end DR output recorded at the time of tripping of 220 kV Joda – TTPS – 2 may be investigated by OPTCL. DR for 220 kV Joda – TTPS – 2 at Joda end may be standardized as per PCC's recommendation.

Relay Indications :

Time	**Element Name**	**End 1**	**End 2**	**PMU observation**
12:47 Hrs.	220 kV Joda – TTPS - 1	Y-B, Zone -1, 98 km from Joda, IR = 0.23 kA; IY = 1.89 kA; IB = 2.1 kA, IN = 0.007 kA	R-Y-B, Zone -1, 55 km from TTPS, IR = 2.39 kA; IY = 4.36 kA; IB =4.02 kA	Around 2 – 3 kV dip has been observed in Y and B phase voltage captured by PMU at Jamshedpur. Fault clearing

				time was less than 100 ms.
13:01 Hrs.	220 kV Joda – TTPS - 1	Did not trip (Line was being charged again)	B-N, Zone -1, 74 km from TTPS, IR = 0.060 kA; IY = 0.050 kA; IB = 1.8 kA,	No fault has been observed in PMU data recorded at Jamshedpur
13:06 Hrs.	220 kV Joda – TTPS - 2	B/U relay operated. IR = 0.98 kA; IY = 0.3 kA; IB = 0.3 kA,	R-N, Zone -1, 81 km from TTPS, IR = 1.8 kA; IY = 0.3 kA; IB = 0.3 kA. VRN = 511 kV	Around 2 kV dip has been observed in R phase voltage captured by PMU at Jamshedpur. Fault clearing time was less than 100 ms.
13:19 Hrs	220 kV Joda - Ramchandrapur S/C	Y-N, Zone -1, 38 km from Joda, IR = 0.59 kA; IY = 0.95 kA; IB = 0.43 kA, IN =1.6 kA	B/U O/C. IR = 0.91 kA; IY = 1.77 kA; IB = 0.4 kA,	Around 4 kV dip has been observed in Y phase voltage captured by PMU at Jamshedpur. Fault clearing time was less than 450 ms. Voltage got improved by around 1 kV after tripping of 220 kV Joda - Ramchandrapur S/C from Joda end in Zone -1.
13:19 Hrs	220 kV JodaJSPL Jamshedpur S/C	Did not trip at JSPL and Joda end	Directional O/C, IR = 0.47 kA; IY = 0.48 kA; IB = 0.45 kA, IN =0.010 kA	

Load Loss: 110 MW

OPTCL , JUSNL and DVC may explain.

In 94th PCC, ERLDC explained that at 12:47 hrs, 220 kV Joda – TTPS - 1 tripped on YB-N fault on zone 1 from both the ends.

At 13:01 hrs, 220 kV Joda – TTPS – 1 was charged from TTPS end and the line got tripped from TTPS end on B-N, zone 1 as the fault was persisting. OPTCL confirmed that the line was opened from Joda end during this tripping.

At 13:06 hrs, another fault, R-N fault occurred in 220 kV Joda – TTPS – 2 and the line was tripped from TTPS end on zone 1 and Joda end tripped on backup overcurrent protection. OPTCL explained that there was a problem in PT circuit of the distance relay therefore the distance relay was not operated.

ERLDC informed that in the DR of TTPS end DT has been sent to Joda end, even though Joda end tripped on backup over current protection.

OPTCL informed that DT was not received at Joda end.

At 13:19 hrs another fault, Y-N fault with high arc resistance appeared in 220 kV Joda - Ramchandrapur S/C, Joda end cleared the fault in zone 1 and Ramchadrapur end tripped on backup overcurrent protection.

JUSNL informed that zone 3 pickup was observed at Ramchadrapur end but line tripped on backup overcurrent protection within 450 ms.

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 after the disturbance.

ERLDC informed that DR configuration at Joda end is needed to be reviewed.

PCC advised OPTCL to take the following corrective actions:

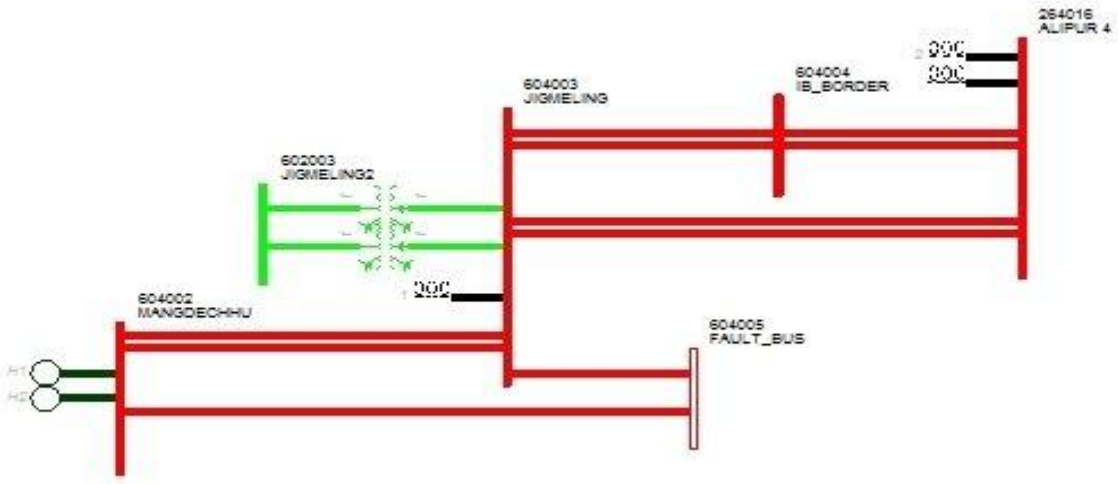
- *Carry out line patrolling of 220 kV Joda – TTPS – D/C line*
- *DR at Joda end is to be standardized as per the ERPC guidelines*
- *Reason for sending DT to Joda end during the tripping of 220 kV Joda – TTPS – line 1 for R-N fault*

PCC advised JUSNL to coordinate the backup overcurrent setting of 220 kV Joda - Ramchandrapur S/C at Ramchandrapur with zone 3 distance protection. JUSNL was also advised to configure the DR as per the ERPC guidelines.

Members may update.

ITEM NO. B.17: Disturbance at 400 kV Alipurduar Substation on 31.08.2020 at 22:33 hrs

At 22:27 HRs, 400 KV Jigmeling-Mangdechu-2 tripped on B phase to earth fault. At 22:33 hrs, while taking charging attempt of 400 KV Jigmeling-Mangdechu-2, 400 KV Alipurduar-Jigmeling D/C tripped on zone-2 in Y to B phase short circuit fault. At the same time, all the running units of Mangdechu and 400 KV Mangdechu-Jigmeling-1 tripped.



Gen Loss : 520 MW

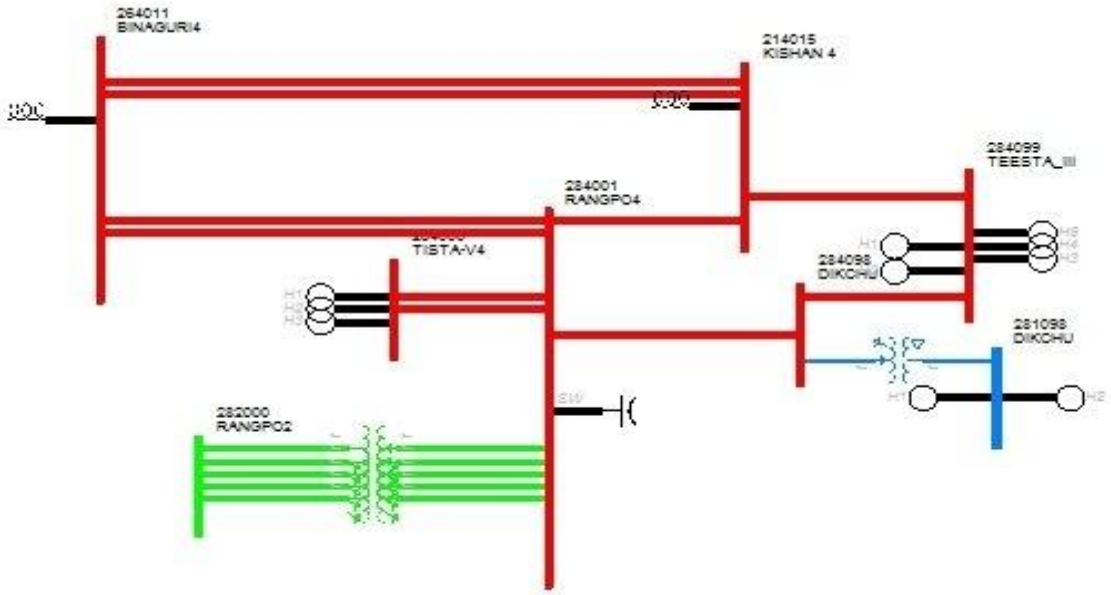
Powergrid may explain.

ITEM NO. B.18: Tripping of both units of 400 kV Dikchu Generating Stations on 01.08.2020 at 11:47 hrs

400/132 kV Dikchu Hydroelectric Plant is connected to the rest of the grid through 400 kV Teesta III – Dikchu S/C and 400 kV Dikchu – Rangpo S/C. Tie bay of 400/132 kV ICT and 400 kV bus 2 at Dikchu was out of service. Both the running units at Dikchu HEP were connected to bus 1 only at Dikchu via 400/132 kV ICT. Tripping of 400 kV Rangpo – Dikchu S/C (only outgoing feeder

connected to 400 kV bus 1 at Dikchu), would result in tripping of any running unit at Dikchu HEP due to opening of both main and tie CB of this line at Dikchu, resulting in complete isolation of Bus-1.

At 11:47 hrs, 400 kV Dikchu Rangpo S/C tripped from both ends due to B phase to earth fault resulting in tripping of both the running units at Dikchu. At same time Dikchu end breaker of 400 kV Teesta III – Dikchu S/C tripped after receiving SOTF trip signal from Main-2 relay (ABB REL 670). Consequently, 400kV Bus-2 of Dikchu also became dead. Reason of tripping of 220 kV TSTPP – Rengali PH S/C may be explained by concerned utility.



Gen. Loss : 100 MW

DANS Energy and Powergrid may explain .

ITEM NO. B.19: Tripping of both units at Jorethang on 04.07.2020 at 14:24 hrs

At 14:24 hrs 400 kV Rangpo – Kishangunj S/C tripped from both ends. Directional Earth fault protection operated at Rangpo and DT was received at Kishangunj. At same time, 220 kV JLHEP – New Melli D/C and 220 kV Tashiding Rangpo S/C tripped on earth fault protection at Jorethang and Tashiding end respectively. As a result both the running units at Jorethang tripped due to loss of evacuation path.

At around 14:24:21.100 hrs one high resistance B phase fault occurred at 400 kV Rangpo Kishangunj S/C. This fault was sensed by B phase directional Over Current relay at Rangpo end of 220 kV Rangpo – Tashiding S/C and Earth Fault relay at Jorethang end of 220 kV Jorethang – New Melli D/C. round 15 kV dip has been observed at around 14:24: 21.100 hrs. in B phase at Rangpo PMU. At around 14:24:21:900 hrs 220 kV Tashiding – Rangpo S/C tripped from Tashiding end on B phase directional O/C and 220 kV Jorethang – New Melli D/C tripped form Jorethang end on E/F protection. After tripping 220 kV JLHEP – New Melli D/C and 220 kV Tashiding New Melli S/C, it increased to 1 kA before tripping. At 14:24:22.302 hrs, 400 kV Rangpo – Kishangunj S/C tripped from Rangpo end due to operation of Directional Earth fault protection. Though B phase current at Rangpo end was 5.3 kA, no significant amount dip in B phase voltage (Phase voltage was 223 kV prior to the tripping) has not been observed in DR recorded at Rangpo end. Start time of DEF at Rangpo end of 400 kV Rangpo – Kishangunj S/C is not recorded in DR. POWERGRID ERTS – II is requested to event logger output recorded at Rangpo end. 400 kV Rangpo Kishangunj S/C tripped from Kishangunj end after DT receipt at Kishangunj end. As per PMU data, B phase current at Kishangunj end decreased at starting of the fault. After tripping of 220 kV JLHEP – New Melli D/C and 220 kV Tashiding New Melli S/C, it increased to 1 kA before tripping. After tripping of 400 kV Rangpo Kishangunj S/C, SPS signal was sent to hydro generating stations in Sikkim areas. Jorethang HEP, Tashiding HEP and

Chujachen HEP have confirmed the recipt of SPS signal. As SPS was disabled at generating stations, no unit tripped due to receipt of SPS signal. As pe information received from POWERGRID ERTS – II, SPS for 400kV Rangpo-Kishanganj line (installed at Rangpo) has been disabled at 10:00 Hrs of 05th July 2020 after the incident.

400 kV Rangpo Kishangunj S/C tripped on 27th June 2020 due to B phase to earth fault. TVPTL is requested to maintain the healthiness of 400 kV Rangpo – Kishangunj S/C.

Reason for tripping of 220 kV Jorethang – New Melli D/C and 220 kV Tashiding – Rangpo S/C before tripping of 400 kV Rangpo – Kishangunj S/C may be shared. POWERGRID ERTS – II may share the time when DEF relay picked up at Rangpo end.

Relay Indications :

Time	**Line name**	**End 1**	**End 2**	**PMU observation**
14:24 Hrs	220 kV Jorethang - New Melli -1	DEF, IR = 0.08 kA; IY = 0.08 kA; IB = 0.22 kA, IN = 0.169 kA Fault clearing time: 800 ms	Did not trip	Around 15 kV dip has been observed at around 14:24: 21.100 hrs. in B phase at Rangpo PMU. Initially current of 400 kV Kishangunj – Rangpo S/C reduced in B phase at Rangpo end. But after tripping 220 kV JLHEP – New Melli D/C and 220 kV Tashiding New Melli S/C, it increased to 1 kA before tripping
14:24 Hrs	220 kV Jorethang - New Melli -2	DEF, IR = 0.08 kA; IY = 0.08 kA; IB = 0.22 kA, IN = 0.173 kA Fault clearing time: 800 ms	Did not trip	
14:24 Hrs	220 kV Tashiding - Rangpo S/C	DEF, IR = 0.17 kA; IY = 0.17 kA; IB = 0.37 kA, IN = 0.25 kA Fault clearing time: 800 ms	Did not trip	
14:24 Hrs	400 kV Rangpo – Kishangunj S/C	DEF, IR = 0.66 kA; IY = 0.48 kA; IB = 5.3 kA, IN = 5.1 kA VCN = 223 kV	DT received at Kishangunj end	
14:24 Hrs	Unit 1 and 2 at JLHEP	Due to loss of evacuation Path		

Gen Loss : 180 MW

In 94th PCC, Powergrid explained that high resistance B phase fault occurred at 400 kV Rangpo-Kishangunj S/C line and the fault was cleared from Rangpo end on DEF. Kishanganj end tripped after receiving DT from Rangpo end. Powergrid added that because of high arc resistance, the fault was not picked up by distance protection.

ERLDC informed that 220 kV Tashiding - Rangpo S/C line tripped from Tashiding on backup over current protection within 800 ms. 220 kV JLHEP – New Melli D/C tripped on DEF within 800 ms.

PCC concluded that the lines were tripped before tripping of 400kV lines due to DT time setting of 800 ms.

PCC opined that there is a need of relay coordination of DEF protection between the 220kV lines in the Sikkim. PCC decided to review the settings of DEF at 220kV lines.

PCC advised TPTL to carry out the line patrolling of 400 kV Rangpo-Kishangunj S/C line to

minimize occurrence of faults.

In 92nd PCC, 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.

DANS Energy , Dikchu , Jorethang and Powergrid may update.

ITEM NO. B.20: Disturbance at 400 kV Teesta III and Dikchu S/S on 16.07.2020 at 16:27 hrs

400 KV Teesta III-Kishanganj S/C was taken under shutdown on emergency basis at 15:49 hrs for gas density monitor replacement work at Kishangunj end. To ensure maximum power evacuation, 400 kV buses at Rangpo were split. Teesta III and Dikchu were connected to 400 kV bus 1 at Rangpo through 400 kV Dikchu – Rangpo S/C their generation was evacuated through 400 kV Rangpo Kishangunj S/C. All other elements at Rangpo S/S were connected to 400 kV bus 2. Generation at Teesta V, Jorethang, Tashiding, Chujachen HEP was being evacuated through 400 kV Rangpo – Binaguri D/C. At 16:27 hrs, 400 KV Teesta III – Dikchu S/C, 400 KV Rangpo-Dikchu S/C, 400 KV Rangpo-Kishanganj S/C tripped resulting total power failure at Teesta III and Dikchu HEP.

It is suspected there was a high resistance B phase to earth fault. The location of the fault is yet to be known. Teesta III end of 400 kV Teesta III – Dikchu S/C, Dikchu end of 400 kV Dikchu – Rangpo S/C and Rangpo end of 400 kV Rangpo Kishangunj S/C sensed the fault in Directional Earth Fault zone and tripped the lines. Though the other end of the above-mentioned lines tripped due to DT receipt, E/F relay also picked up at Dikchu end of 400 kV Teesta III – Dikchu S/C, Rangpo end of 400 kV Dikchu – Rangpo S/C also. Based on the direction earth fault pickup, it is suspected that fault was on 400 kV Rangpo-Kishanganj circuit however the delay in clearance of fault has been sensed by other circuits in upstream which also gave direction earth fault trip from the respective source ends. After tripping of 400 kV Teesta III – Dikchu S/C, Dikchu – Rangpo S/C and 400 kV Rangpo Kishangunj S/C, all the running units at Teesta III and Dikchu got tripped due to loss of evacuation path. In this case, as the 400 kV Teesta 3-DIkchu-Rangpo-Kishnganj system was in Radial mode with Teesta 3 as source and Kishanganj as sink due to the outage of Teesta 3-Kishangnaj Circuit. The correct operation of DEF on suspected 400 kV Rangpo-Kishanganj circuit should have ensured the isolation of fault however even though due to radial nature the generation would have been lost irrespective of other line tripping on not.
It is suspected the same fault was sensed by Rangpo, Dikchu and Teesta III end. Location and reason of fault may be shared. Delayed clearing of the fault has been observed during this event. The fault indicates the very need to coordinate the directional earth fault protection at all substations. The fault level calculation and setting criteria for DEF used should be uniform for all power plants and stations in Sikkim Complex to ensure there is no such tripping. This will ensure that the line on which fault is there will be tripping first.

Relay Indications:

Line name	End 1	End 2	PMU observation
400 KV Teesta III – Dikchu S/C	Directional O/C and E/F trip, IR = 1.7kA, IY = 1.4 kA, IB = 3.5 kA, IN = 2.7 kA	DT received; E/F relay picked up, IR = 1.7kA, IY = 1.4 kA, IB = 3.5 kA, IN = 2.7 kA	High Resistance B phase to earth fault has been observed in PMU data. Fault clearing time was around 1600 ms.

			Frequency dropped from 49.99 Hz to 49.86 Hz at nadir point in 16 seconds Later it stabilized at 49.91 Hz
400 KV Rangpo-Dikchu S/C	E/F start, DT received, IR = 1.7kA, IY = 1.5 kA, IB = 3.6 kA, IN = 2.7 kA	E/F start, IR = 1.7kA, IY = 1.6 kA, IB = 3.4 kA, IN = 2.3 kA	
400 KV Rangpo-Kishanganj S/C	Dir. E/F trip, IR = 1.6kA, IY = 1.3 kA, IB = 3.5 kA, IN = 2.8 kA	DT received.	

Gen Loss: 1390 MW

In 94th PCC, Powergrid explained that there was a high resistance B phase to earth fault in 400 kV Rangpo-Kishangunj S/C. Rangpo end identified the fault on DEF and sent DT to Kishanganj end.

It was informed that 400 KV Teesta III – Dikchu S/C tripped from Teesta III end on DEF, DT with 1.5 sec and 400 KV Rangpo-Dikchu S/C tripped from Dikchu end on DEF, DT with 1.5 sec.

PCC observed that 400 KV Teesta III – Dikchu S/C and 400 KV Rangpo-Dikchu S/C lines tripped before tripping of 400 kV Rangpo-Kishangunj S/C line.

PCC opined that proper coordination of backup protection of these 400kV lines is required keeping IDMT characteristics.

PCC advised Powergrid and TPTL to carry out the line patrolling of 400 kV Rangpo-Kishangunj S/C line including the common section of 400 KV Rangpo-Dikchu S/C to minimize occurrence of faults.

DANS Energy , Teesta , Dikchu and Powergrid may update.

ITEM NO. B.21: SPS for taking care of N-2 Contingency of 400 kV outgoing lines form Sikkim Complex--ERLDC

As per the decision taken in 161 OCC meeting no SPS is required when all the four 400 kV evacuating lines are in service. However, based on the study following proposal are made for the consideration of the forum:

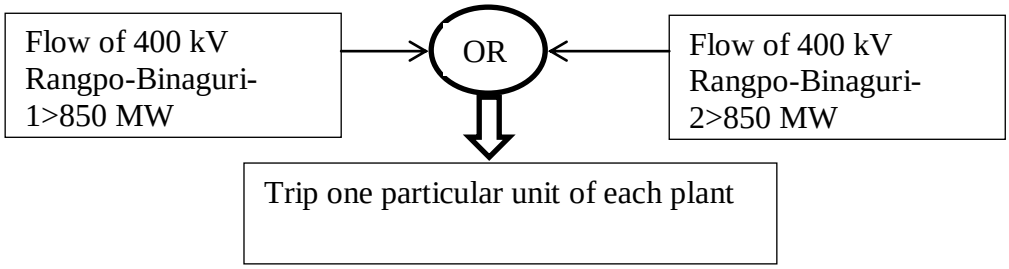
1. When all 4 lines are in service only N-1 contingency of 400 kV Rangpo-Dikchu is critical due to cable portion of Teesta III- Kishenganj section. That part is taken care of by Teesta III local SPS.
2. When all 4 lines in service, following N-2 contingencies are critical
   a. 400 kV Rangpo-Kishanganj & 400 kV Teesta-III-Kishenganj
   b. 400 kV Rangpo-Kishanganj& 400 kV Rangpo-Binaguri one ckt
   c. 400 kV Teesta-III-Kishanganj& 400 kV Rangpo-Binaguri one ckt

From the past experience and due to sharing some common corridor N-2 contingency of 400 kV Rangpo-Kishanganj& 400 kV Teesta-III-Kishanganj is a credible contingency. In 168th OCC meeting ERLDC informed that the SPS is required till completion of reconductoring work of 400kV Rangpo-Binaguri D/C lines for safe evacuation of hydro generation in Sikkim during any contingency.

In 169th OCC, it was decided to discuss the issue along with the protection coordination issues in Sikkim in a separate meeting with the concerned utilities.

Following SPS logic may be implemented for ensuring reliability during the above mentioned three critical N-2 contingency:

SPS:



In 94th PCC, ERLDC explained that flow of 400 kV Rangpo-Binaguri-1 and II is to be measured and if the power flow greater than 850 MW in any one line then SPS signal would be generated and issue trip command to one unit of each plant i.e. Teesta III, Dikchu, Jorethang and Tashiding HEP.

ERLDC informed that trip logic to be connected to the unit which is running at low load. If one unit is already out then tripping of other unit at the particular station is not required.

PCC agreed to implement the SPS at 400kV Rangpo S/s to avoid cascade tripping of the lines and advised Powergrid & ERLDC to discuss mutually for finalization of the SPS settings and implementation of SPS scheme.

Members may update.

ITEM NO. B.22: Tripping of both units at BRBCL on 07.07.2020 at 23:58 hrs.

BRBCL, a 4 x 250 MW thermal power plant is connected to rest of the grid via 400 kV BRBCL – Sasaram D/C. 400 kV BRBCL – Sasaram – 1 was charged from Sasaram end. During synchronizing this line from BRBCL end, 400 kV bus 1 at Sasaram got tripped resulting in tripping of 400 kV BRBCL – Sasaram – 2, 765/400 kV ICT at Sasaram. Unit 2 and 3 were in running condition at BRBCL prior to the event. Both the units tripped due to loss of evacuation path.

400 kV BRBCL – Sasaram – 1 was charged from Sasaram end. Before its synchronization from BRBCL end, one R phase to earth fault occurred in this circuit. Sasaram end relay detected the fault in zone – 1 and tripped this circuit from Sasaram end to isolate the fault. Sasaram end Main 1 relay of 400 kV BRBCL – Sasaram – 2 sensed the fault in Zone – 4. Around 1.5kA current was recorded in R phase. Other phase currents were low. But Sasaram end Main 2 relay of 400 kV BRBCL – Sasaram – 2 sensed the fault in Zone – 1. Around 11kA current was recorded in Y phase . It is suspected main 2 relay sensed the fault in Zone – 1 in Y phase and tripped the line. Carrier was sent to BRBCL end also. • In PMU data, existence of R phase to earth fault has been observed at the time of the event. BRBCL end of 400 kV BRBCL – Sasaram – 2 and main 1 relay at Sasaram end of 400 kV BRBCL – Sasaram – 2 sensed the fault in Y phase. POWERGRID ERTS – 1 may investigate the reason for recording of such a high fault current in Y phase by main 2 relay at Sasaram end. At same time, LBB operated for 400 kV BRBCL – 2 bay at Sasaram end . As per DR, around 16 kA current has been observed in Y phase. Reason for such a high current in Y phase in LBB DR may be investigated by POWERGRID ERTS – 1. No fault was observed in Y phase voltage at PMU data at the time of the event. Reason for LBB operation may also be shared. As per PMU and DR data, fault was cleared within 100 ms. It is suspected due to LBB operation 400 kV BRBCL – 2 bay at Sasaram end, 765/400 kV ICT – 1 and 400 kV bus 1 at Sasaram tripped.

Reason for LBB operation of 400 kV BRBCL – 2 bay at Sasaram end may be shared. Reason for tripping of 765/400 kV ICT – 1 at Sasaram, 400 kV Sasaram – BRBCL - 2 and 400 kV Sasaram bus 1 may be also be shared. Reason for recording of such a high fault current in Y phase by

main 2 relay at Sasaram end may be investigated by POWERGRID ERTS – 1.

Relay Indications:

Time	Element Name	End 1	End 2	PMU observation
23:58 Hrs.	400 kV BRBCL – Sasaram – 1	Line was not charged	R-N, Zone – 1, IR=13.6kA, IY=0.2kA, IB=2.9kA,	Around 100 kV voltage dip has been observed in R phase voltage measured by Sasaram PMU. At same time around 40 kV rise in Y phase and around 30 kV dip in B phase has been observed in Sasaram PMU data. Fault in R phase was cleared within 100 ms. But around 250 ms was taken to clear the voltage dip in B phase.
23:58 Hrs.	400 kV BRBCL – Sasaram – 2	R-N, 123 km from BRBCL, F/C 2 kA	R-N, Zone – 4, IR=1.5kA, IY=0.3kA, IB=0.6kA,	
23:58 Hrs.	765/400 kV ICT – at Sasaram	Did not trip from 765 kV side	Yet to be received	
23:58 Hrs.	400 kV bus 1 at Sasaram	Yet to be received		
23:58 Hrs.	Unit 2 and 3 at BRBCL	Loss of evacuation path		

Gen. Loss : 425 MW

In 94th PCC, Powergrid explained that there was a R-N fault in 400 KV BRBCL – Sasaram – 1 close to Sasaram, the line was tripped within 100 ms but main 2 of 400 KV BRBCL – Sasaram – 2 at Sasaram end also seen the Y-N fault in zone 1 instead of zone 2, R-N fault due to faulty CT circuit cable. LBB relay is also getting feed from same faulty CT circuit cable therefore LBB also operated and tripped all the elements connected to 400kV Bus –I.

ERLDC requested Powergrid to share a report on this incident along with the scheme for the benefit of others.

Powergrid may update.

ITEM NO. B.23: Tripping Incidences in month of August 2020

Other tripping incidences occurred in the month of August 2020 which needs explanation from constituents of either of the end is given in **Annexure-B23.**

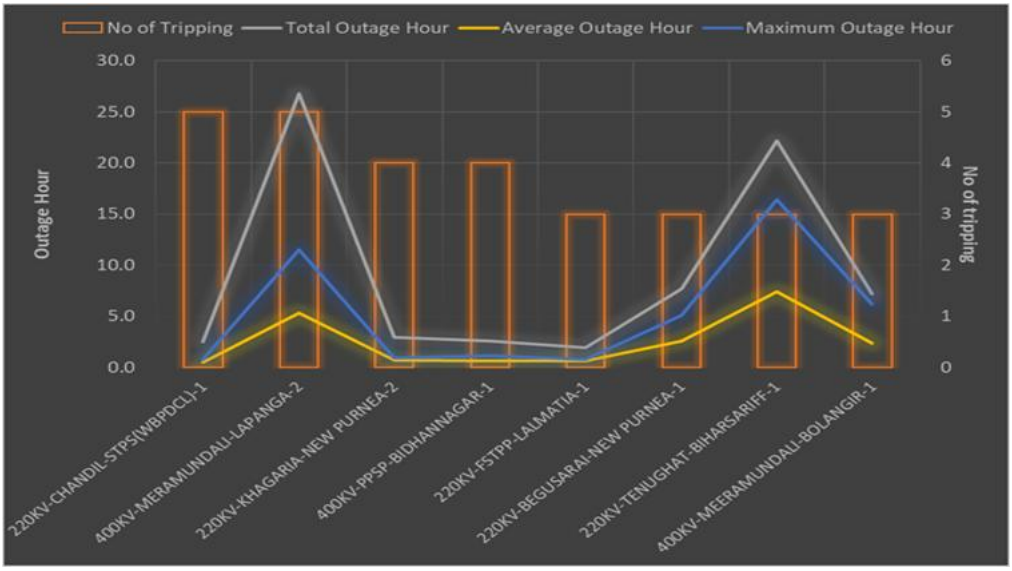
In 36th TCC, all the constituents were advised to use the PDMS on-line portal for uploading the single line tripping details along with DR (comtrade files), EL and other relevant files for all trippings of August 2017 onwards. Otherwise, it will be considered as violation of compliance of clause 5.2(r)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

ITEM NO. B.24: Repeated tripping of transmission lines in August 2020

During August 2020, repeated tripping has been observed in few of the transmission lines. List of these transmission lines along with number of tripping and outage duration are shown below:



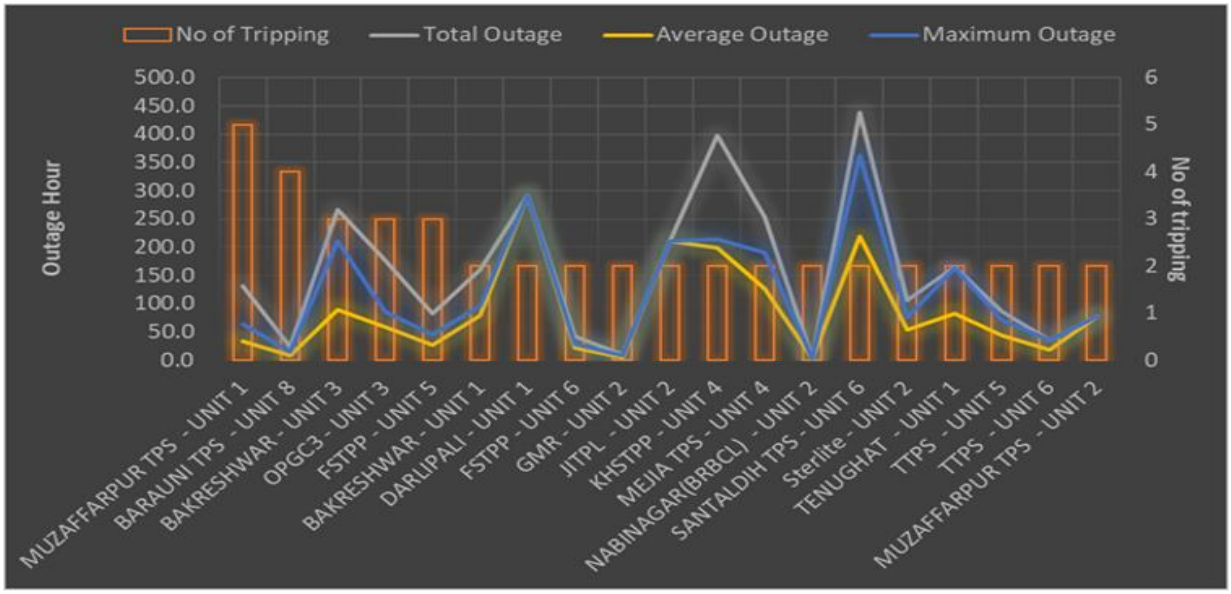
It has been observed that few transmission lines have tripped repeatedly on the same reason. Transmission utilities are advised to share the remedial action taken to reduce the number of such tripping of these transmission lines (list given below).

Name of the line	Reason	No of tripping	Utility to respond
220KV-CHANDIL-STPS(WBPDCL)-1	Short circuit faults at 50-60 km from STPS (3 tripping), Short circuit faults at 25 km from STPS (1 tripping), during testing related activity	5	JUSNL/ Jharkhand SLDC & WBSETCL/WBSLDC
400KV-MERAMUNDALI-LAPANGA-2	Short circuit faults at various locations	5	OPTCL/ GRIDCO SLDC
220KV-KHAGARIA-NEW PURNEA-2	Short circuit faults at various locations	4	BSPTCL/Bihar SLDC
400KV-PPSP-BIDHANNAGAR-1	Short circuit faults at various locations	4	WBSETCL/WBSLDC
220KV-FSTPP-LALMATIA-1	B phase to earth fault at 60 km from Farakka	3	JUSNL/ Jharkhand SLDC & NTPC Farakka
220KV-BEGUSARAI-NEW PURNEA-1	R phase to earth fault at 70 km from New Purnea	3	BSPTCL/Bihar SLDC
220KV-TENUGHAT-BIHARSARIFF-1	R phase to earth fault at 45-50 km from Tenughat	3	JUSNL/ Jharkhand SLDC & BSPTCL/Bihar SLDC
400KV-MEERAMUNDALI-BOLANGIR-1	R phase to earth fault at 130-140 km from Bolangir	3	OPTCL/ GRIDCO SLDC & POWERGRID

Bihar SLDC/BSPTCL, Jharkhand SLDC/JUSNL, WB SLDC/WBSETCL, GRIDCO SLDC/OPTCL, NTPC Farakka and POWERGRID may share the reason for repeated tripping of transmission lines along with remedial action taken to reduce the no of tripping instances. Utilities are advised to maintain healthiness of the transmission lines.

ITEM NO. B.25: Repeated tripping of generating units in August 2020

During August 2020, repeated tripping has been observed for few generating units. List of such generating units along with number of tripping and outage duration is shown in below plot.



In 170th OCC meeting, it has been decided that generating stations will share detail report to ERPC and ERLDC while restoration of their units after forced outage (unit tripping) along with the following details:

- Root cause of the tripping
- Outage duration
- Remedial action taken after the tripping
- DR/EL output in case of tripping of unit due to electrical fault

Regional generating units (ISGS and IPPs) and SLDCs/State generating stations are advised to share detailed report as mentioned above.

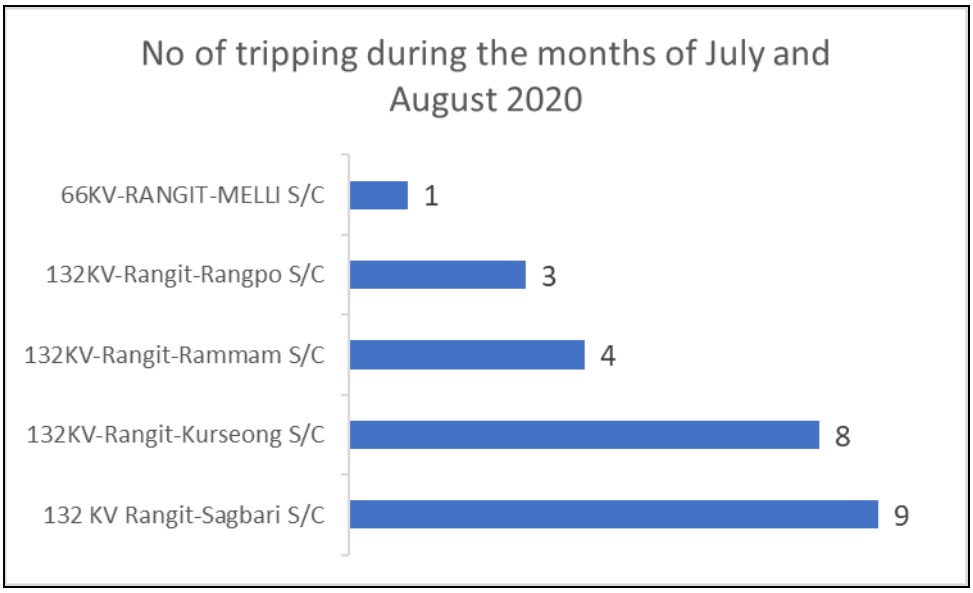
It has been observed that few generating units tripped repeatedly due to same reason. Generating stations may be asked to share the remedial action taken to reduce the no of tripping of these units (list given below).

Name of the line	Reason	No of tripping	Utility to respond
MUZAFFARPUR TPS - UNIT 1	Boiler tube leakage, High drum level, High furnace pressure, ID fan problem and others	5	Bihar SLDC/ KBUNL
OPGC3 - UNIT 3	Ash evacuation problem, Master Fuel trip, Unit bus PT flashover	3	GRIDCO SLDC/ OPGC
FSTPP - UNIT 5	Feed water problem, Drum level low	3	NTPC
DARLIPALI - UNIT 1	Boiler tube leakage	2	NTPC
JITPL - UNIT 2	Bottom Ash Scrapper Problem	2	JITPL
KHSTPP - UNIT 4	Breach in Ash pond dyke	2	NTPC

NTPC, JITPL, Bihar SLDC/KBUNL GRIDCO SLDC/OPGC may share the reason for repeated tripping of these generating units along with remedial action taken to reduce the no of tripping instances.

ITEM NO. B.26: Repeated tripping of transmission lines connected to Rangit Hydro Electric Plant

During the months of July and August 2020, occurrence of repeated tripping has been taken place for the transmission lines connected to Rangit Hydro Electric Plant due to short circuit faults at various locations. No of tripping incidents for each line is shown below:



During fault, all the running units contribute fault currents. Repeated occurrence of faults may result in damage of the generating units.

Utilities are requested to maintain healthiness of these transmission lines.

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.

ITEM NO. C.2: Online training program conducting by PRDC

PRDC is conducting the training on PDMS and protection study using PSCT in different states through online. The training has been completed in West Bengal and Jharkhand. The schedule of the training is given below:

Sl No.	Date	State	Topic
1	29.06.2020	Westbengal	PDMS
2	30.06.2020	Westbengal	Protection Study
3	20.07.2020	Jharkhand	PDMS

4	21.07.2020	Jharkhand	Protection Study
5	03.09.2020	Odisha	PDMS
6	04.09.2020	Odisha	Protection Study
7	21.09.2020	Bihar	PDMS
8	22.09.2020	Bihar	Protection Study

Concerned utility may note and attend the program.

Members may note.

ITEM NO. C.3: Collection of substation data by PRDC

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

New Substation List

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

In view of COVID-19 pandemic the data is being collected through online. All the constituents may note and submit the relevant data to PRDC for maintaining the database.

In 93th PCC, all the concerned utilities were advised to submit the relevant data to PRDC for maintaining the database.

Members may note.

ITEM NO. C.4: Submission of protection settings in PDMS

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

All the utilities are advised to upload the relay settings in PDMS or send the relay settings to erpcprotection@gmail.com.

Members may note and comply.

ITEM NO. C.5: Protection coordination of the new transmission elements charged in JUSNL system during the month of August 2020

JUSNL informed following transmission elements are charged during the month of August 2020:

Sl no.	Transmission Element	Time of charging	Date of Charging
1	132 KV D/C Sahebganj-Karamtola T/L	13:35 Hrs	01.07.2020
2	220 KV Dumka-Jasidih Ckt-I T/L	13:07 Hrs	07.08.2020
3	220 KV Dumka-Jasidih Ckt-II T/L	13:32 Hrs	07.08.2020
4	220 KV Jasidih BUS-II	14:38 Hrs	09.08.2020
5	150 MVA ICT-I at Jasidih GSS	16:25 Hrs	09.08.2020
6	220 KV Dumka-Godda Ckt-I T/L	14:14 Hrs	10.08.2020
7	220 KV Dumka-Godda Ckt-II T/L	14:25 Hrs	10.08.2020
8	220 KV Giridih-Jasidih Ckt-II T/L	15:53 Hrs	13.08.2020
9	220 KV Giridih-Jasidih Ckt-I T/L	11:42 Hrs	14.08.2020
10	220 KV Giridih BUS-I	15:53 Hrs	13.08.2020
11	220 KV Giridih BUS-II	12:42 Hrs	14.08.2020
12	150 MVA ICT-I at Giridih GSS	12:46 Hrs	13.08.2020
13	132 KV Giridih BUS-I	13:04 Hrs	14.08.2020
14	50 MVA T/F at Giridih GSS	14:43 Hrs	14.08.2020
15	132 KV Giridih -Jamua Ckt-I	15:12 Hrs	14.08.2020
16	132 KV Giridih -Jamua Ckt-II	15:32 Hrs	15.08.2020
17	50 MVA T/F-I atJamua GSS	18:50 Hrs	14.08.2020
18	133 KV Giridih -Sariya Ckt-I	18:40 Hrs	15.08.2020
19	134 KV Giridih -Sariya Ckt-II	17:20 Hrs	15.08.2020
20	132 KV Main BUS AT Sariya GSS	23:06 Hrs	14.08.2020
21	50 MVA Trf. No-01 at Sariya GSS	18:13 Hrs	15.08.2020
22	33 KV Main Bus at Sariya GSS	23:37 Hrs	16.08.2020
23	220 KV Daltonganj(PG)-Garhwa New(JUSNL) Ckt-I	17:03 Hrs	16.08.2020
24	220 KV Daltonganj(PG)-Garhwa New(JUSNL) Ckt-II	17:31 Hrs	16.08.2020
25	220 KV Garhwa New(JUSNL) BUS-I	18:34Hrs	16.08.2020
26	150 MVA ICT-I at Garhwa New (JUSNL)	18:35 Hrs	16.08.2020
27	220 KV Garhwa New(JUSNL) BUS-II	12:06 Hrs	19.08.2020
28	132 KV Garhwa(New) BUS-I	14:28 Hrs	19.08.2020
29	132 KV Garhwa(New)-Garhwa ckt-I	14:30 Hrs	19.08.2020
30	132 KV Garhwa(New)-Garhwa ckt-II	14:31 Hrs	19.08.2020
31	150 MVA ICT-II at Giridih GSS	07:45 Hrs	31.08.2020
32	132 KV S/C Hatia I-Tamar T/L	12:48 Hrs	02.09.2020

JUSNL is requested to confirm the following:

1. Protection setting of new charged elements has been configured as per ERPC's guidelines. Auto-reclose has been enabled (wherever applicable) along with along with removal of any instantaneous setting as kept for first charging for zone 2/zone 3/zone 4.
    - Lines with no auto-reclose facility may be shared.
2. Protection coordination has been done for all new charged elements (at both ends in case of transmission lines). It may be checked that due to the charging of new elements, longest and shortest transmission lines of all remotely connected substations are changed or not. In case of any remote substation belongs to other transmission utility, parameter of new charged elements may be shared to them with copy to ERPC and ERLDC.
3. Protection setting of new charged elements (at both ends in case of transmission lines) has been uploaded in PDMS along with updated SLD of substations. Relay setting may be shared in pdf format.
4. Disturbance recorder of new charged elements (at both ends in case of transmission lines) has been configured as per PCC's guidelines.
5. Bus bar differential protection is in service of all new charged bus. In case of non-availability of bus bar protection, Zone 4 timing may be changed to 250 ms and all carrier protection for connected transmission lines should be in healthy condition.
6. The healthiness of carrier protection of new charged elements may be confirmed.

ITEM NO. C.6: Protection coordination for the upcoming 400 kV Sagardighi-Gokarno D/C (WBSETCL)

As per information received, 400 kV Sagardighi-Gokarno D/C is planned to be charged in near future. Protection coordination is to be done at both Sagardighi and Gokarno end for this upcoming circuit. Details for 400 kV Sagardighi-Gokarno D/C shared by SLDC is as

- Conductor type : Quad Moose
- Tower : Double circuit
- Line Length : 41.2 km

Requirement of Protection coordination By Gokarno End (WBSETCL, SLDC WB) with remote end utilities (PGCIL ERTS 1 & PGCIL ERTS 2):

- The two existing circuits are 400 kV Gokarno-New Purnea (S/C, Triple snowbird 250 km) and Gokarno-Rajarhat (S/C, Triple snowbird, 227 km). Thus the above line commissioning will cause a change in short line length for these circuits from remote ends (PGCIL ERTS 1 and PGCIL ERTS 2).
- In addition, the line will result in change in system confirmation causing a long line followed by short lines so the remote end has to coordinate the Zone 2 setting as well as time delays so that there is not uncoordinated tripping.

Requirement of Protection Coordination by Sagardighi end (WBPDCL, WB SLDC) with Remote end utilities (PGCIL ERTS 2, NTPC Farakka, WBSETCL) :

- The Existing shortest line at Sagardighi is 400 kV Sagardighi-Behrampur (HTLS, 30 km) and the longest one is 400 kV Sagardighi-Subhasgram (247 km, Twin moose). The new circuit is Quad moose D/C line with 41.2 km length. Utilities may check the need for protection coordination with upcoming new lines. It is expected that already due to short lines at Sagardighi (30 km) remote end have coordinated time delays for their zone 2 protection setting to avoid unwanted tripping. WBPDCL may provide requisite information to remote ends for coordination required with these lines.

West Bengal SLDC may also confirm that the for the circuits the dia are completed for Main bay as well as tie bay at Sagardighi end (One and half breaker scheme). In addition, WBSLDC/WBPDCL/WBSETCL is requested to confirm following prior to the charging of this line.

1. Protection setting of new charged elements has been configured as per ERPC's guidelines.
2. Protection setting has been uploaded in PDMS. Relay setting has been shared in pdf format with ERPC/ERLDC.
3. Disturbance recorder installed at Sagardighi and Gokarna end has been configured as per PCC's guidelines.
4. Healthiness of carrier protection of this element may be confirmed.
5. The substation event logger have all related information

Members may note.

ITEM NO. C.7: Any additional agenda – with permission of the Chair.

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Annexure B11

Name of GSS	Transforme Earthing (in Ohm)	Status of Bus- Coupler Healthy/Unhealthy
220/132 KV GSS HATIA-II	**Transformer-I** HV-Neutral Earth:-**0.51** LV-Neutral Earth:-**0.40** Transformer Body Earth:-**0.32**	1 220K Voltage Level:- Healthy 2. 132KV Voltage Level:- Healthy
	Transformer-II HV-Neutral Earth:-**0.63** LV- Neutral Earth:-**0.42** Transformer Body Earth:-**0.12**	
	Transformer-III HV-Neutral Earth:-**1.7** LV- Neutral Earth:-**1.7** Transformer Body Earth:-**0.48**	
	220 KV LINE feeder Earthing (in Ohm)	
	PGCIL ,CKT-1 :-**0.45** PGCIL,CKT-2 :-**0.39** PGCIL,CKT-3 :-**0.38**	
	PTPS, CKT- 1 :- **0.39**	
	PTPS,CKT-2 :-**0.38**	

Annexure B23 List of important transmission lines in ER which tripped in AUGUST-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 CONFIGURATION DESCREPANCY	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	Utility to update	Utility Response
1	400KV-RANGPO-DIKCHU-1	01-08-2020	11:46	,B-N,zone 2, 30.81 km (32 km line length),7.68 kA at rangpo	b-n,e/f at dikchu	MAL-OPERATION	200	Issue of SOTF setting at Dikchu end and other issues and recommended settings already intimated	RANGPO		YES	YES	Dikchu	
2	220KV-TENUGHAT-BIHARSARIFF-1	01-08-2020	13:15	R-N,Z1 AT BSEB	Ir=2.651kA, Iy=418.8A, Ic =180.8A, fault location 44.89 km, zone 1 at Jharkhand	R-N FAULT	<160	NO A/R	BIHARSHARIFF		YES	YES		
3	400KV-MERAMUNDALI-LAPANGA-2	01-08-2020	11:57	meramundli-DP,zone-1,B-N fault,1.409km,4.4 KA	Lapanga-DP zone-1,B-N fault,12km,2.733KA	B-N FAULT	<100	MCB AND TCB A/R are not time delayed and 3 phase voltage went upto 600 Kv after 3 pole opening due to reactor ringdown.	MERAMUNDALI	Meeramundali end mcb ,tcb status needs to be configured .	YES	YES	OPTCL	
4	400KV-TEESTA-III-DIKCHU-1	01-08-2020	11:47	b-n,5.185 kA,def pick up bt not tripped with dikchu	dikchu end breaker open	B-N FAULT	200	Issue of SOTF setting at Dikchu end and other issues and recommended settings already intimated	RANGPO		YES	YES	Dikchu	
5	220KV-TTPS-TSTPP-1	02-08-2020	19:58	TSTPS_B-PHASE DISTANCE-4.7 KM FAULT CURRENT-12.03 KA		B-N FAULT	<100	B-N fault no A/ R.	TALCHER	DR CHANNELS NOT CONFIGURED PROPERLY	NO	YES		
6	220KV-RENGALI-TTPS-1	02-08-2020	19:17	TTPS end, Zone -1, B-phase (4.366 kA) at a distance 40.8 km	B-ph conductor snapped at loc. 122	Y-B FAULT	<100	Y-B FAULT	TALCHER	DR CHANNELS NOT CONFIGURED PROPERLY	NO	YES		
7	220KV-RENGALI(PH)-TSTPP-1	02-08-2020	19:17	TSTPP: B-N,FD	RENGALI:B-N,Z1,FD 5.84KM,FC 2.05KA	B-N FAULT	<100	Y-B FAULT	TALCHER	DR CHANNELS NOT CONFIGURED PROPERLY	NO	NO		
8	400KV-ALIPURDUAR (PG)-BONGAIGAON-2	02-08-2020	11:07	APD:Y-N,FD 60.5KM,FC 4.07KA	BONGAIGAON: Z2, Y-N, 1.73KA, 85KM	Y-N FAULT	<100	Tripped in reclaim time	BINAGURI	DR , CB status not configured .	YES	NO		
9	400KV-NEW PPSP-NEW RANCHI-1	02-08-2020	11:59	NPPSP:B-N,Z1,FC 5.74KA,FD 23.8	N RANCHI: B-N,FC 4.720KA,FD 108.35KM	B-N FAULT	<100	Issue of secondary arcing as weel as reactor ringdown also observed after 3 pole opening.Dt received from PPSP this may plz be explained.	RANCHI		NO	YES	PG ER-1	
10	220KV-BUDHIPADAR-KORBA-3	02-08-2020	02:09	Budhipadar: Y Ph, Z-I, 1.75 Km, 22.77 KA		Y-N FAULT	<160	NO A/R	BUDHIPADAR		YES	NO		
11	220KV-BUDHIPADAR-KORBA-2	02-08-2020	02:02	Budhipadar: Y Ph, Z-I, -1 Km, 21.92 KA		Y-N FAULT	<160	NO A/R	BUDHIPADAR		YES	NO		
12	220KV-JODA-RAMCHANDRAPUR-1	03-08-2020	14:30	R-N fault,zone-1, FC-2.11 KA,FD-58.8 KM from joda end	R-phase,Z-1,97.97 km,r-2.169KA,B-65.21A,Y-191.5A	R-N FAULT	<160		JAMSHEDPUR		NO	NO		
13	220KV-BEGUSARAI-NEW PURNEA-1	03-08-2020	22:20	NPurnea : R-N,72.7KM,FC 2.44KA	Dir. O/C, E/F, (67/67N optd),86B, Ia=1.14kA,Ib=184A, Ic=197.1A,In=1.244kA	R-N FAULT	600		PURNEA		NO	NO		
14	220KV-KHAGARIA-NEW PURNEA-1	03-08-2020	20:07	R-N FAULT,41.4KM,4.11KA FROM PURNEA END	no trip at new purnea	R-N FAULT	200		PURNEA		NO	NO		
15	400KV-BINAGURI-ALIPURDUAR (PG)-1	03-08-2020	13:16	Y-N 8.2 KA AT APD DRY	Y-N.112.5 KM,4.297 KA Z1	Y-N FAULT	<100	Issue of secondary arcing as weel as reactor ringdown also observed after 3 pole opening.This secondar arcing may also have caused failed A/R	BINAGURI		YES	YES		
16	220KV-RENGALI(PH)-TSTPP-1	03-08-2020	17:35	B-PHASE,ZONE-1,DISTANCE-9.4 KM,FAULT CURRENT: 8.8 KA at Talcher	not available details at odisha	B-N FAULT	<100	NO A/R	TALCHER		NO	YES		
17	220KV-RENGALI(GRIDCO)-RENGALI(PG)-2	03-08-2020	18:38	pilot protection due to reverse tripping of 220 kV barkot rengali feeder(which tripped at 16:58 hrs);(10 kA in barkot - rengali feeder at rengali end)	no trip at pg end	NO FAULT	NA				NO	NO		
18	220KV-RENGALI(PG)-RENGALI(GRIDCO)-1	03-08-2020	17:35	pilot protection	no trip at pg side	B-N FAULT	520		TALCHER		NO	NO		
19	220KV-RENGALI(GRIDCO)-RENGALI(PG)-2	03-08-2020	17:19	pilot protection	no trip at pg side	NO FAULT	NA		TALCHER		NO	NO		
20	220KV-FSTPP-LALMATIA-1	03-08-2020	12:15	no trip at lalmatia	b-n,z1,63 km ,2 kA at fstpp	B-N FAULT	<100		FARAKKA		NO	NO		
21	220KV-TENUGHAT-BIHARSARIFF-1	03-08-2020	10:22	R-N,O/C START,83.21 ms,49.91 KM,IR=2.165 KA,Z1 FROM TENUGHAT weather normal	R-N Z1 fault duration - 41.60msec Relay trip time-891.9sec Fault location-130.7km Ir- 1.101kA Iy-99.33A Ib-99.03A	R-N FAULT	<100	NO A/R	BIHARSHARIFF	MCB status in DR not proper at BSF end .CB status at Tenughat not configured properly.	YES	YES	BSPTCL,JUSNL	
22	220KV-BEGUSARAI-NEW PURNEA-1	03-08-2020	10:15	B-N,2.21 KA,75.6 KM FROM NEW PURNEA	86A,21M1XR 21M1XY 21M1XB, Ia=174mA,Ib=180mA,Ic=1.169A. from begusarai	B-N FAULT	350		PURNEA		NO	NO		
23	220KV-BARIPADA-BALASORE-2	03-08-2020	09:59	R-N,62.27 KM,1.075 KA,(72 KM LIENGTH) FROM BARIPADA	R-N,2.94 kA,22.96 KM FROM BALASORE weather normal	R-N FAULT	<160		BARIPADA		NO	NO		
24	220KV-MUZAFFARPUR-HAJIPUR-1	04-08-2020	19:33	R_N Fault, 109 kA (Hajipur)		R-N FAULT	<160	ALL 3 PHASE CURRENT WERE HIGH FOR 600 MS ,WHY LBB INITIATED AT HAZIPUR END ?	MUZZferpur		YES	NO	BSPTCL	
25	220KV-MUZAFFARPUR-HAJIPUR-2	04-08-2020	19:33	R_N Fault, 109 kA (Hajipur)		R-N FAULT	<160	ALL 3 PHASE CURRENT WERE HIGH FOR 600 MS ,WHY LBB INITIATED AT HAZIPUR END ?	MUZZferpur		YES	NO	BSPTCL	
26	400KV-ALIPURDUAR (PG)-BINAGURI-3	04-08-2020	11:09	B_N, 117.7 KM, 1.6 kA	B_N, 29.36 KM, 0.7 kA	B-N FAULT	<100		BINAGURI		YES	NO		
27	400KV-NEW PURNEA-MUZAFFARPUR-2	04-08-2020	18:33	N. Purnea: B-N, 2.37KA, 220Km	Muzaffarpur: B-N, 2.6KA, 110.6Km	B-N FAULT	500	PURNEA END OPENED IN Z-2 TIME ,SEEMS SOME ISSUE IN POTT SCHEME	PURNEA		YES	YES	PG ER-1	
28	220KV-FSTPP-LALMATIA-1	04-08-2020	16:42	DT received at FSTPP	Overcurrent in Y, B ph	Y-B FAULT	1500		FARAKKA		NO	NO		
29	220KV-KHAGARIA-NEW PURNEA-2	04-08-2020	16:05	Y_B_N, Iy: 1.14 kA, Ib: 1.30 kA, 84.71 KM		Y-B FAULT	<160		PURNEA		NO	NO		
30	220KV-MALDA(PG)-GAZOLE-1	04-08-2020	15:41	220 KV Bus I tripped at Malda		B-N FAULT	<100		MALDA		YES	NO		
31	400KV-PPSP-BIDHANNAGAR-1	04-08-2020	15:29	Z1, R-N, 153.3Km	Z1, R-N, 42.8Km	R-N FAULT	<100		DURGAPUR		NO	NO		
32	400KV-BINAGURI-KISHANGANJ-1	04-08-2020	14:47	R_N, 98.5 KM, 5.57 kA (Kishanganj)		R-N FAULT	<100		BINAGURI		YES	YES		
33	400KV-BAHARAMPUR-SAGARDIGHI-2	04-08-2020	14:08	B_N, 3.93 kA, 26 KM (Baharampur)	B_N, 2.717 KM, 17.38 kA (Sagardighi)	B-N FAULT	<100	Tripped in reclaim time	BAHARAMPUR	CB status not showing correct value may please be checked at behrampur end .	YES	NO		
34	220KV-BUDHIPADAR-KORBA-3	04-08-2020	12:05	Tripped during switching off of PLCC while shifting to TBC bay for replacement of R-ph supervision relay.		NO FAULT	NA	NO A/R	BUDIPADAR		NO	NO		
35	400KV-BINAGURI-ALIPURDUAR (PG)-1	04-08-2020	13:07	Y_N, 82.54 KM, 4.863 kA, DT received (Binaguri)	Y_N, 8 kA, 24.4 KM	Y-N FAULT	<100	Issue of secondary arcing as weel as reactor ringdown also observed after 3 pole opening.This secondar arcing may also have caused failed A/R	BINAGURI		YES	YES		
36	220KV-KHAGARIA-NEW PURNEA-2	04-08-2020	09:45	N.Purnea: Z1, B-N, 2.29KA, 7.1Km	Khagaria: Z1, B-N, 880A, 42.07Km	B-N FAULT	<160	NO A/R	PURNEA		NO	NO		
37	220KV-SUBHASGRAM(PG)-NEW TOWN-1	04-08-2020	00:19	SUBHASGRAM: B-N,FD 9.035KM,FC 5.692KA	NEW TOWN: B-N,FD8.472KM,FC 1.87KA	B-N FAULT	<160	Reason may be explained and ,what was the Fault ?			YES	YES		
38	220KV-SUBHASGRAM(PG)-BANTALA-1	04-08-2020	00:19	Bantala : 86 Master trip A/R lockout	No tripping at Subhasgram end	B-N FAULT	<160	Reason may be explained and ,what was the Fault ?						
39	220KV-SUBHASGRAM(PG)-CESC(EMSS)-1	04-08-2020	00:19	WB(CESC): Line Differential Relay (B-ph)	S'gram: Line Differential Relay (R-YB-ph),FC IR 9.53KA,IY 1.08KA,IB 6.46KA,FD 10.8KM	B-N FAULT	<160	Reason may be explained and ,what was the Fault ?			YES	YES		
40	400KV-BINAGURI-TALA-2	05-08-2020	23:53	Y-N fault, F/C = 2.481 KA, F/D = 140.3 km AT BINAGURI		Y-N FAULT	<100	Issue of secondary arcing as well as reactor ringdown also observed after 3 pole opening.	BINAGURI		YES	NO		
41	220KV-ALIPURDUAR (PG)-BIRPARA-2	05-08-2020	12:25	BRP: R-n, 48 km, 1.2 kA	ALPDR: R-n, 8.3 km, 6 kA	R-N FAULT	350	Fault in Z-2 of Birpara end .No carrier aided tripping so no A/R from Birpara end but A/R successful from Apd end .This may plz be explained whether carrier aided tripping is there or not ?	ALIPURDWAR		YES	YES	WBSETCL	
42	400KV-PPSP-BIDHANNAGAR-1	05-08-2020	11:56	Zone-1, R-ph, 6.704ka, 42.27KM, PPSP end: Zone-1, R-phae, 135.7KM		R-N FAULT	<100	NO A/R AT PPSP END	DURGAPUR		NO	NO		
43	400KV-PPSP-BIDHANNAGAR-1	05-08-2020	11:17	DGP end: Zone-1, R-ph, 6.74ka, 42.15KM, present voltage 409KV		R-N FAULT	<100	NO A/R AT PPSP END	DURGAPUR		NO	NO		
44	400KV-RANCHI-SIPAT-2	07-08-2020	20:11	Z1, R-N FD-7.282km FC-26.77kA		R-B FAULT	<100	Reactor ringdown observed after 3 pole opening.high line voltage observed .	RANCHI		YES	NO		

45	220KV-KHAGARIA-NEW PURNEA-2	07-08-2020	09:54	Khag-Y-Phase, B-Phase, Z-1 , Ia:80.11A Ib:1.367kA Ic:1.465kA FD: 72.79km		Y-B FAULT	<100		PURNEA		NO	NO		
46	400KV-MERAMUNDALI-LAPANGA-2	08-08-2020	10:13	MEERAMUNDALI: Z2, R-N, 2.52KA, 184KM	LAPANGA: Z1, R-N, 20KA, 3.5KM	R-N FAULT	<100	MCB AND TCB A/R are not time delayed and 3 phase voltage went upto 600 Kv after 3 pole opening due to reactor ringdown.	MERAMUNDALI		YES	YES	OPTCL	
47	220KV-DEHRI-GAYA-2	08-08-2020	14:24	GAYA: B-N, 65KM, 2.75KA, A/R SUCCESSFUL	DEHRI: B-N, 2.2KA, 31KM	B-N FAULT	<100		GAYA		NO	YES		
48	220KV-MAITHON-DHANBAD-1	08-08-2020	14:06	TRIPPED FRO MAITHON END	MAITHON :B-N,FD 42.2KM,FC 4.29KA	B-N FAULT	350	Fault in zone-2 from Maithon end so 3 phase tripping seems no carrier aided tripping .A/R was successful from Dhanbad end .	MAITHON		YES	NO	DVC	
49	220KV-CHANDIL-STPS(WBPDCL)-1	08-08-2020	12:40	STPS: Z1, B-N, 4KA, 25KM	CHANDIL:B-N, 95.5KM, 1.2KA	B-N FAULT	1100	B phase current was high till 1.5 seconds at chandil end .B phase fault then Y phase fault observed at chandil end .Earth fault and overcurrent tripping observed .When B phase DP sensed the fault ,B phase why breaker did not tripped ?What protection operated .Reason for delayed tripping may please be explained .	RANCHI		YES	YES	JUSNL	
50	400KV-KODERMA-BIHARSARIFF(PG)-1	08-08-2020	09:36	DT received at Koderma	DT received at BSF	NO FAULT	NA	Reason of DT may be explained ?	BIHARSHARIFF		NO	YES		
51	400KV-TSTPP-ROURKELA-1	09-08-2020	10:09	DT RECEIPT;DP Z1 R-N 75.7 KM,5.23 KA	Z1,R-N,90.91 KM,4.12 Ka at rourkella	R-N FAULT	<100		TALCHER		YES	NO		
52	220KV-BEGUSARAI-NEW PURNEA-1	09-08-2020	07:41	,R-n1.17 kA,220.1 km from n purnea	master trip at begusarai	R-N FAULT	350	Z-4 operated at Begusarai , opened within 100 ms so Z-4 setting may please be checked ?	PURNEA		NO	YES	BSPTCL	
53	220KV-KATAPALLI-BOLANGIR(PG)-1	10-08-2020	15:32	BOLANGIR: Y-B, IY-2.85KA, IB-3KA, 37.5KM	KATAPALLI: Y-B, Z1, 66KM, IY-3.14KA, IB-2.9KA	Y-B FAULT	<100		BOLANGIR		YES	NO		
54	400KV-BINAGURI-TALA-2	11-08-2020	18:56	56 km ,R-B,ir-7.88 kA; ib-7.4 KA z1 AT BINAGURI	r-b 86.9 km tala ir-3.3 KA ib=2.2 KA	R-B FAULT	<100	After 3 pole opening ,line voltage was there due to reactor ringdown	BINAGURI		YES	NO		
55	220KV-FSTPP-LALMATIA-1	11-08-2020	10:43	z1 B-n,62 km at fstpp	NO TRIP AT LALMATIA END	B-N FAULT	<100		FARAKKA		NO	NO		
56	400KV-FSTPP-KHSTPP-4	12-08-2020	19:45	DT received, Tripped from FSTPP end only		NO FAULT	NA	Reason of DT may be explained ?	FARAKKA		YES	NO	NTPC FSTPP	
57	400KV-BAHARAMPUR-SAGARDIGHI-2	12-08-2020	16:47	DT received		NO FAULT	NA	Reason of DT may be explained ?	FARAKKA		YES	NO	PG ER-2 , WBSETCL	
58	400KV-BAHARAMPUR-SAGARDIGHI-1	12-08-2020	16:47	DT received		NO FAULT	NA	Reason of DT may be explained ?	FARAKKA		YES	NO	PG ER-2 , WBSETCL	
59	765KV-NEW RANCHI-DHARAMJAIGARH-2	12-08-2020	15:36	Tripped from Dharamjaigarh only		NO FAULT	NA	Reason of DT may be explained ?	RANCHI		YES	NO	PG-ER-1 , WR	
60	220KV-JODA-RAMCHANDRAPUR-1	13-08-2020	13:35	RChandrapur-EF, Y-N FD-NA FC-Ib-1.347kA Ia-451.6A Ic-274A	Joda-Y-N FC-307.55A FD-100.8km	Y-N FAULT	800		JAMSHEDPUR		NO	NO		
61	220KV-HAZIPUR-MUZAFFARPUR-1	13-08-2020	00:21	Z-1, R-N fault, FD 7.18KM,FC 10.77KA@MZF	Z1 Trip R Phase fault Fault Duration : 66.69ms Fault Distance : 52.69 KM ,FC1.7KA	R-N FAULT	<100		MUZZferpur		NO	NO		
62	220KV-TENUGHAT-BIHARSARIFF-1	14-08-2020	20:23	Y-N Fault, Zone 2, location - 184.8 KM from TTSP, Ir- 782 A, Iy- 1.342 KA, Ib- 382 A, Fault Resistance -15.8 ohm	Y-N,o/c e/f 27.15 kA in iY at biharsharif	Y-N FAULT	350	Tenughat tripped after Zone 2 time and Y-n fault while at Biharshariff end R-Y-B-G fault so tripped in 100 ms .No carrier aided tripping .What was the nature of fault and type may please be intimated .	BIHARSHARIFF		YES	YES	BSPTCL, JUSNL	
63	220KV-DARBHANGA (DMTCL)-MOTIPUR-2	14-08-2020	14:22	DMTCL: B-N, 4.14KA, 32Km	Motipur: B-N, 1.529KA, 78.75Km	B-N FAULT	<100	A/r successful from DMTCL end but unsuccessful from motipur end .			YES	YES	BSPTCL	
64	220KV-DARBHANGA (DMTCL)-MOTIPUR-1	14-08-2020	12:28	DMTCL: B-N, 60.1Km, 2.05KA	Did not trip at BSEB end	B-N FAULT	<100	A/r successful from Motipur end but no A/R at DMTCL end .Reason may be explained from DMTCL.		CB STATUS IS NOT PROPER.	YES	YES	DMTCL	
65	220KV-DALTONGUNJ-GARWAH (NEW)-2	16-08-2020	18:14	DALTONGUNJ: Z2, Y-B, 82KM, IY-1.3KA, IB-1.3KA		Y-B FAULT	<100	During Pre fault also Y &B phase 170 degree displaced .	SASARAM		YES	YES	JUSNL	
66	400KV-BARIPADA-KHARAGPUR-1	16-08-2020	13:54	KHG: Y-B-N,Z1,FD 51KM,FC IY 2.4KA,IB 1.3KA	BARIPADA: Z1, Y-B, FD-41KM, IY-2KA, IB-3KA	Y-B FAULT	<100		BARIPADA		NO	NO		
67	220KV-MAITHON-KALYANESHWARI-2	17-08-2020	20:19	Maithon R-N, FC 10.7 ka, Dist 4.9 km	Kalvanashwari Zone 1	R-N FAULT	<100	Only R phase breaker opened then no A/R observed at maithon end and after 1.5 seconds all 3 poles opened .Whether PD operated ? Why A/R not operated.	MAITHON		YES	NO	DVC,PG-ER-2	
68	400KV-MEERAMUNDALI-MENDHASAL-1	17-08-2020	04:28	Stub protection operated at Mendhasal	No fault observed as per PMU signature	NO FAULT	NA	Why stub operated ?	MEERAMUNDALI		YES	NO	OPTCL	
69	400KV-NEW CHANDITALA-KHARAGPUR-1	18-08-2020	08:41	N.Chanditala end: Yph, Z1,14.17km, Fault current=3.681kA. AR LO	KGP end: Yph, Z1, 114.8km. Fault current=3.172kA. AR LO	Y-N FAULT	<100		BARIPADA		NO	NO		
70	400KV-JHARSUGUDA-RAIGARH-3	19-08-2020	14:22	R-B fault, Z-1, IR- 6.7 KA, IB-3.04 KA, 64.12 km from Jharsuguda	R-N fault, Z-1, IR- 8.42 KA, 25.81km from Raigarh	R-B FAULT	<100	Insulator decapping.	JHARSUGUDA		NO	NO		
71	400KV-MEERAMUNDALI-GMR-1	19-08-2020	21:51	Spurious DT received from Meeramundali		NO FAULT	NA				NO	NO		
72	220KV-BOLANGIR(PG)-SADEIPALI-1	19-08-2020	18:29	Tripped from only OPTCL end at the time of successful A/r of 400 kV Jeypore - bolangir		NO FAULT	<100	Tripped enchroching the nexty level fault of jeypore - bolangir.	BARIPADA		NO	NO	OPTCL	
73	220KV-BOLANGIR(PG)-BOLANGIR(GRIDCO)-2	19-08-2020	18:29	Tripped from only OPTCL end at the time of successful A/r of 400 kV Jeypore - bolangir		NO FAULT	<100	Tripped enchroching the nexty level fault of jeypore - bolangir.	BARIPADA		NO	NO	OPTCL	
74	220KV-BOLANGIR(PG)-BOLANGIR(GRIDCO)-2	19-08-2020	15:40	B-N, Z-3, 1.22 KA ,110.3 Km FROM BOLANGIR GRIDCO		B-N FAULT	<100		BARIPADA		NO	NO		
75	400KV-MERAMUNDALI-LAPANGA-2	19-08-2020	14:27	R-N, Z-1, 2.33 KA, 177KM FROM MERAMUNDALI	R-N, Z-1, 18.1 KA, 4.1 KM FROM MERAMUNDAL	R-N FAULT	<100		MERAMUNDALI		YES	NO		
76	400KV-KOLAGHAT-KHARAGPUR-2	19-08-2020	08:19	B-N, Z-1, 18.18 km from Kolaghat, 7.38 KA		B-N FAULT	<100		KHARAGPUR		NO	NO		
77	220KV-NEW PURNEA-MADHEPURA-2	20-08-2020	08:48	NPRN: B-N, 13.7Km, 3.78KA	B-N, carrier send, Z1 trip, FC :1.82 kA, FD : 75.2 km	B-N FAULT	<100	A/R not observed in DR frame.	PURNEA		YES	YES		
78	400KV-PPSP-BIDHANNAGAR-1	20-08-2020	02:49	PPSP: B-N, 190 km, 2 ka	BIDHANNAGAR: 86a, b-n, zone 1, 8.2 km.	B-N FAULT	<100		DURGAPUR		NO	NO		
79	400KV-RENGALI-KEONJHOR(PG)-1	21-08-2020	19:15	Rengali : Z1,RY-ph, 56 km, Ir -7.6 KA, Iy -7 KA	Keonjhar : Z1,RY-ph, 40.1 km, Ir- 2.9 KA, Iy -2.5 KA	R-Y FAULT	<100		RENGALI		NO	NO		
80	220KV-JSPL-JAMSHEDPUR(DVC)-1	21-08-2020	20:10	fault location 120 km from JSPL end, Z-2, R-N, 1.26 KA,	Dist prot optd,86 optd,PD optd,R-phase trip,Zone #1 trip,186R,186RT,Fault Distance 27.879Km from jamshedpur	R-N FAULT	<160		JAMSHEDPUR		NO	NO		
81	220KV-RENGALI-TTPS-1	21-08-2020	19:15	STUB Protection (Y-ph) at Rengali		NO FAULT	NA		RENGALI		NO	NO		
82	220KV-GAYA-SONENAGAR-1	21-08-2020	17:50	TRIPPED FROM ONLY SON NAGAR		NO FAULT	NA		GAYA		NO	NO		
83	220KV-TENUGHAT-PATRATU-1	21-08-2020	07:55	TRIPPED FROM ONLY TENUGHAT		NO FAULT	NA	No fault observed .Y pole breaker opened first and earth fault started then after 700 ms all 3 poles opened .Reason may be explained ?	BIHARSHARIFF		YES	NO	BSPTCL , JUSNL	
84	400KV-NEW PURNEA-BIHARSARIFF(PG)-1	22-08-2020	16:34	N'Purnea: B Phase E/F, 190.5 km, 2.2 kA	Bihar-Sharif : B-N Fault, 23.4 km, 11.15 kA	B-N FAULT	<100	Reactor ringdown observed after 3 pole opening high line voltage observed .	BIHARSHARIFF		YES	YES		

85	400KV-MOTIHARI-BARH-2	22-08-2020	16:46	Barh: Y-B Phase to Phase Fault, FD: 10.5 km, IY:17.89 kA, IB: 17.79 kA	Motihari: DT received.	Y-B FAULT	<100	DT received at Motihari	BARH		YES	NO		
86	220KV-CHANDIL-STPS(WBPDCL)-1	22-08-2020	13:05	STPS : R phase , Zone 1, FD 52.3 km, FC: 1.704 kA	Chandil: R phase E/F, zone 1, If: 1.921kA, FD: 59.7 km, A/R successful. Line remianed charged.	R-N FAULT	<100	A/R successful from Chandil end	RANCHI		NO	NO		
87	400KV-BARIPADA-KHARAGPUR-1	22-08-2020	12:32	Baripada: R-N, 44.83Km, 3.86KA	KGP: Z1, R-N, 60.15Km, 3.14KA	R-N FAULT	<100	Tripped in reclaim time	BARIPADA		NO	NO		
88	400KV-KHARAGPUR-KOLAGHAT-1	22-08-2020	11:42	KGP: Z1, B-N, 44.33Km, 5.733KA	KTPP: Z1, B-N, 27.34Km, 4.151KA	B-N FAULT	<100		KHARAGPUR		NO	NO		
89	400KV-RANCHI-RAGHUNATHPUR-3	23-08-2020	16:51	Ranchi-Z1 B-N FC-16.782kA FD-6.44km		B-N FAULT	<100	A/R unsuccessful,Secondary arcing observed in faulted phase.	RANCHI		YES	NO	PG-ER-1 , DVC	
90	220KV-MAITHON-DUMKA-2	23-08-2020	15:45	MAITHON-Z1 R-N FC-3.47kA FD-68.7 km	DUMKA-FC-Ir:- 2.85kA, FD- 11.6km	R-N FAULT	<100	3 Phase tripping occurred at maithon end at the instant of fault for 1 phase fault , No Auto reclose observed ..	MAITHON		YES	NO	PG-ER-2,JUSNL	
91	400KV-KOLAGHAT-KHARAGPUR-2	23-08-2020	12:25	KGP end - Z1, Y -N, FC-3.918 kA FD-60.93 km	KTPP end -Z1, Y -N, FC-5.97 kA FD-29.46 km	Y-N FAULT	<100		KHARAGPUR		NO	NO		
92	400KV-DSTPS(ANDAL)-RAGHUNATHPUR-1	24-08-2020	19:15	Y-N FAULT		Y-N FAULT	<100	B-EARTH FAULT FIRST AFTER 200 MS OF THAT AGAIN y PHASE FAULT	RANCHI		YES	YES		
93	400KV-MEERAMUNDALI-BOLANGIR-1	24-08-2020	18:13	Y phase LA blast,Y-E, IY=25.23KA, Dist=18.2 KM	Y-E, zone-2 , 1.4 kM and 216.1	Y-N FAULT	500	SEVERE HIGH VOLTAGE UPTO 1200 KV OBSERVED IN ALL 3 PHASES	BOLANGIR		YES	NO	OPTCL	
94	220KV-KHAGARIA-NEW PURNEA-1	24-08-2020	03:46	N. Purnea: R-N, 65.9Km, 2.78KA, A/R successful	Khagaria: R-N, Z-1, Dist Prot M1 M2 optd,IR: 1.61kA IY: 0.09kA IB: 0.26kA	R-N FAULT	<100		PURNEA		NO	NO		
95	400KV-MERAMUNDALI-LAPANGA-1	25-08-2020	17:23	B-N,5.28 KA,110.1 km from Meeramandali;b ph voltage not being found at meeramandali	lapanga end no trip	B-N FAULT	<100	A/R unsuccessful from Meramundali end and all 3 pole opened from merramundali end but was closed from lapnga end ? Lapnga end dr may be shared	MEERAMUNDALI	Only CFG file updated no Dat file	YES	NO	OPTCL	
96	400KV-ALIPURDUAR (PG)-BONGAIGAON-1	25-08-2020	21:16	Alipurduar: R-B, 10.8 kM , Ir 12.6 ka, Ib 12.9 kA	Bongaigaon: 56 kM R-B Z1	R-B FAULT	<100		ALIPURDWAR		YES	NO		
97	400KV-PPSP-NEW RANCHI-1	25-08-2020	17:09	dt received at new ranchi	master trip relay operated,dt sent at Nppsp end	NO FAULT	NA	Oscillating line voltage present after 3 pole opening	RANCHI		YES	NO		
98	220KV-KHAGARIA-NEW PURNEA-2	25-08-2020	13:59	a/r successful from purnea end;R-N,75.8 km,2.27 kA from new purnea;weather normal	z1 26 km,R-N, 1.3 KA at khagaria	R-N FAULT	<100		PURNEA		NO	NO		
99	220KV-CHUKHA-BIRPARA-2	26-08-2020	18:33	Yet to berecived	R-Y,zone-2,70KM, IR=1.65KA, IY=.879 A	R-Y FAULT	<100	MULTIPLE FAULTS	BIRPARA		NO	YES		
100	220KV-CHUKHA-BIRPARA-1	26-08-2020	18:33	Yet received		Y-N FAULT	<100	MULTIPLE FAULTS	BIRPARA		NO	YES		
101	220KV-BIRPARA-MALBASE-1	26-08-2020	08:54	DEF, B-N FAULT,287 AMP RESIDUAL CURRENT		DEF	6000		BIRPARA		NO	NO		
102	220KV-DALTONGUNJ-GARWAH (NEW)-2	27-08-2020	15:17	R-Y fault, 80.89 km ,ir=1.485 ka,iy=1.448 kA z2from Daltonguni (pg)	Ir-1.27 KA Iy-1.30 KA Ib 14.97 KA z1 5.69 km from garwah	R-Y FAULT	<100		PUSAUI		NO	NO		
103	765KV-JHARSUGUDA-RAIPUR PS (DURG)-1	28-08-2020	09:13	DT received at Jharsuguda		NO FAULT	NA		JHARSUGUDA		NO	NO		
104	220KV-CHANDIL-STPS(WBPDCL)-1	28-08-2020	11:05	STPS: Z1, B-N, 60.19Km, 2.115KA	Chandil: Z1, R-B	B-N FAULT	<160		RANCHI		NO	NO		
105	400 Kv Meeramundali - Lapanga -I	28-08-2020	12:10	B_N, 3.04 KM, 22.6 kA (L	B_N, 191.7 KM, 2.63 kA	B-N FAULT	<100		MERAMUNDALI		YES	YES		
106	400KV-MEERAMUNDALI-BOLANGIR-1	28-08-2020	09:54	Bolangir: Z1, R-N, 134.4Km, 1.36KA	Meeramundali: R_N, 130.1 KM, 3.35 kA	R-N FAULT	<100	A/R not observed in DR frame.	BOLANGIR	Meramundali DR time is very short for all events this may please be rectified as per ERPC philosophy	YES	NO	OPTCL	
107	220KV-BOLANGIR(PG)-SADEIPALI-2	28-08-2020	09:54	Tripped from overcurrent from Sadeipalli end		NO FAULT	NA	O/C operated overreaching the fault of 400 kv meramundali bolangir .	BOLANGIR		NO	NO	OPTCL	
108	400KV-DSTPS(ANDAL)-RAGHUNATHPUR-1	29-08-2020	17:50	DSTPP-DT send	RNP-Received	NO FAULT	NA		RANCHI		NO	YES		
109	400KV-MEERAMUNDALI-BOLANGIR-1	29-08-2020	09:58	MM-R-N FD 126.2km FC-3.48kA	Bolangir-Z1 FD-142.45km FC-1.40kA	R-N FAULT	<100	A/R successful tripped in reclaim time .	MERAMUNDALI	Meramundali DR time is very short for all events this may please be rectified as per ERPC philosophy	YES	NO		
110	220KV-ALIPURDUAR (PG)-SALAKATI-2	30-08-2020	23:52	Z1, R-B fault, F/D-60.0Km from APD, F/C-2.767KA		R-B FAULT	<100		BINAGURI		YES	NO		
111	220KV-ALIPURDUAR (PG)-SALAKATI-1	30-08-2020	23:52	Z1, R-B fault, F/D-61.5Km from APD, F/C-2.728KA	R-B fault, Z-1 37.3 Km from Salakathi, 4.1 KA	R-B FAULT	<100		BINAGURI		YES	NO		
112	220KV-SUBHASGRAM(PG)-SUBHASGRAM(WB)-2	30-08-2020	17:21	Y_B, Iy: 18:53 kA, Ib: 18.50 kA, 0.6 KM (Subhasgram PG)		Y-B FAULT	<100	LA FAILED	SUBHASGRAM		YES	NO		
113	400KV-BINAGURI-ALIPURDUAR (PG)-2	30-08-2020	13:33	Y_N, 43.4 KM, 8.348 kA		Y-N FAULT	<100	High secondar arcing observed and A/R failed ,Reactor ringdown observed after 3 pole opening also 3 phase line voltage persisited .	BINAGURI		YES	YES		
114	220KV-CHANDIL-STPS(WBPDCL)-1	30-08-2020	14:35	Line charged through TBC tripped during testing in Main bay		NO FAULT	NA		RANCHI		NO	NO		
115	220KV-CHANDIL-RANCHI-1	30-08-2020	14:35	Tripped along with Chandil-Santaldih line		NO FAULT	NA		RANCHI		NO	NO		
116	400KV-MERAMUNDALI-LAPANGA-2	30-08-2020	10:15	Lapanga: Z1, Y-N, 142.5Km, 1.797KA		Y-N FAULT	<100	Secondary arcing observed in dead time as with implementation of additional 80 mvar L/r line became overcompensated . MCB &TCB A/R priorty scheme problem , Reactor ringdown also observed.	MEERAMUNDALI		NO	NO	OPTCL	
117	400KV-KHARAGPUR-KOLAGHAT-1	30-08-2020	12:12	KGP: B_N, 34.33 KM, 5.801 kA	KTPP: B_N, 29.82, 4.808 kA	B-N FAULT	<100		BARIPADA		NO	NO		
118	400KV-ALIPURDUAR (PG)-PUNASANGCHUN-1	30-08-2020	05:04	z1,15.6 km,B-N,12.28 kA at apd	no trip at bhutan	B-N FAULT	<100	Seems from Jigmellin all 3 phase breaker closed after 1.5 seconds	ALIPURDWAR		YES	NO	BHUTAN	
119	220KV-ALIPURDUAR (PG)-SALAKATI-2	30-08-2020	02:59	Y-N fault, 10.1km from APD, 8.896KA, zone1	Y-N,Z2,96.7 KM,AT SALAKATI	Y-N FAULT	<100		ALIPURDWAR		NO	NO		
120	400KV-RAJARHAT-FSTPP-1	31-08-2020	04:20	Y-B,Z1,A/R LOCKOUT AT FSTPP	A/R SUCCESSFUL AT RAJARHAT;Y-N,152 KM FROM RAJARHAT,2.387	Y-N FAULT	<100	A/R successfult at Rajarhat end only.Carrier was sent from Rajarhat still no A/r was observed from Farakka end .Last month tripping same problem was observed from Farakka end as A/R was disabled then it was enabled .What is the problem ?Secondary arcing also observed .	FARAKKA		YES	NO	NTPC FSTPP	
121	132KV-RANGIT-KURSEONG-1	31-08-2020	04:15	B-N,2.365 KA,17.66 KM FROM RANGIT	47.96 KM FROM KURSEONG,1.346 Ka ,B-N	B-N FAULT	<160		RANGPO		NO	NO		

122	132KV-RANGPO-GANGTOK-1	31-08-2020	03:08	A/R SUCCESSFUL AT GANGTOK	2.588 KA,R-B,IT-6.628 KA,IB=8.597 KA FROM RANGPO	R-B FAULT	<160		RANGPO		YES	YES		
123	132KV-RANGPO-MELLI-1	31-08-2020	03:08	Z1,RYB,2.58 KM FROM RANGPO,IT=1.5 KA,IY=1.83 ka,IB-1.63 KA AT RANGPO		R-Y-B	<160		RANGPO		YES	YES		
124	132KV-MELLI-SILIGURI-1	31-08-2020	03:08	67.5 km,R-N,1.61 KA from siliguri		R-N FAULT	<160		RANGPO		NO	NO		
125	132KV-RANGIT-RANGPO-1	31-08-2020	03:08	NO TRIP AT RANGPO	BACK UP EARTH FAULT AT RANGIT	R-N FAULT	<160		RANGPO		NO	YES		
126	132KV-CHUZACHEN-RANGPO-2	31-08-2020	02:58	y-b,z1,3.49 km,iy=3.9 KA,ib=3.7 at rangpo KA	Started phase RYB N Fault Zone - Z1 Fault Distance - 17.4 KM Fault Duration - 54.98 ms Ir - 258.6 A IY - 939.4 A IB - 1.393 kA at chuzachen	Y-B FAULT	<160		RANGPO		YES	YES		
127	132KV-CHUZACHEN-RANGPO-1	31-08-2020	02:58	r-y,z1,3.36 km,ir=6.4 kA,iy=3.9 kA at Rangpo	Started phase RYBN Fault Zone - Z1 Fault Distance - 12.43 KM Fault Duration - 54.98 ms IR - 1.842 kA IY- 972.4 A IB - 580 A at cgujachen	R-Y FAULT	<160		RANGPO		YES	YES		
128	400KV-ALIPURDUAR (PG)-JIGMELLING-1	31-08-2020	22:33	Y_B_N, IY 1.76 KA, IB 2.23 KA, Z2		Y-B FAULT	500	SOTF and protection issues found at jigmelling end .Fault was in jigmelling mangdechu section .Fault cleared in zone-2 from alipurdwar end .	ALIPURDWAR		YES	NO	BHUTAN	
129	400KV-ALIPURDUAR (PG)-JIGMELLING-2	31-08-2020	22:33	Y_B_N, IY 1.76 KA, IB 2.23 KA, Z2		Y-B FAULT	500	SOTF and protection issues found at jigmelling end .Fault was in jigmelling mangdechu section .Fault cleared in zone-2 from alipurdwar end .	ALIPURDWAR		YES	NO	BHUTAN	
130	400KV-MERAMUNDALI-LAPANGA-2	31-08-2020	10:49	MMDL: Y-N, Z1, Iy=7.95 KA,61.6 KM	Lapanga: Y-N, Z1, 137.3 KM,IY=2.86 KA	Y-N FAULT	100	Secondary arcing observed in dead time as with imglementation of additional 80 mvar L/r line became overcompensated . MCB &TCB A/R priorty scheme problem , Reactor ringdown also observed.	MERAMUNDALI		YES	YES	OPTCL	
131	220KV-CHANDIL-STPS(WBPDCL)-1	31-08-2020	12:52	SD-Z1 R-N, FC-2.1 KA FD-64.5 km,		R-N FAULT			RANCHI					

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.	