



Minutes  
for  
**90<sup>th</sup> PCC Meeting**

**Date: 13.05.2020**  
**Eastern Regional Power Committee**  
**14, Golf Club Road, Tollygunge**  
**Kolkata: 700 033**

# EASTERN REGIONAL POWER COMMITTEE

## AGENDA FOR 90<sup>TH</sup> PROTECTION SUB-COMMITTEE MEETING TO BE HELD ON 13.05.2020 AT 10:00 HOURS

Meeting was conducted through CISCO WEBEX Online platform . Participant list is enclosed at Annexure – A.

### PART – A

#### ITEM NO. A.1: Confirmation of minutes of 89<sup>th</sup> Protection sub-Committee Meeting held on 13<sup>th</sup> March, 2020 at ERPC, Kolkata.

The minutes of 89<sup>th</sup> Protection Sub-Committee meeting held on 13.03.2020 circulated vide letter dated 24.03.2020.

Members may confirm the minutes of 89<sup>th</sup> PCC meeting.

#### Deliberation in meeting

*Members confirmed the minutes of 89<sup>th</sup> PCC meeting.*

### PART – B

#### ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN MARCH 2020 AND APRIL 2020.

#### ITEM NO. B.1: Tripping of both running units at 220 k V TTPS on 15.03.2020 at 16:12 hrs.

At 16:12 hrs 220 kV Tenughat – Biharsharif S/C and 220 kV Patratu – Tenughat S/C tripped on earth fault protection resulting in tripping of both running units at Tenughat due to loss of evacuation path.

220 kV TTPS – Biharshariff was restored at 16:47 hrs and 220 kV PTPS –TTPS was restored at 19:48 hrs.

Jharkhand SLDC/JUSNL is advised to share the reason for tripping of 220 kV PTPS – TTPS S/C at PTPS end to ERLDC/ERPC. Also, the reason for non-triggering of any DR at PTPS end needs to be Name Relay Indication at End 1 Relay Indication at End 2 220 kV TTPS – PTPS S/C Did not trip Relay indication yet to be received; Detail report for this GD event at JUSNL system is yet to be received from Jharkhand SLDC

#### Relay Indications:

Name	Relay Indication at End 1	Relay Indication at End 2
220 kV TTPS – PTPS S/C	Did not trip	Relay indication yet to be received; As per information received DR was not triggered during this event
220 kV TTPS – Biharshariff S/C	Did not trip	Back up over current relay, current in all three phases was around 800 A before tripping

BSPTCL is requested to review O/C protection setting at Biharshariff end.

Generation Loss: 300 MW

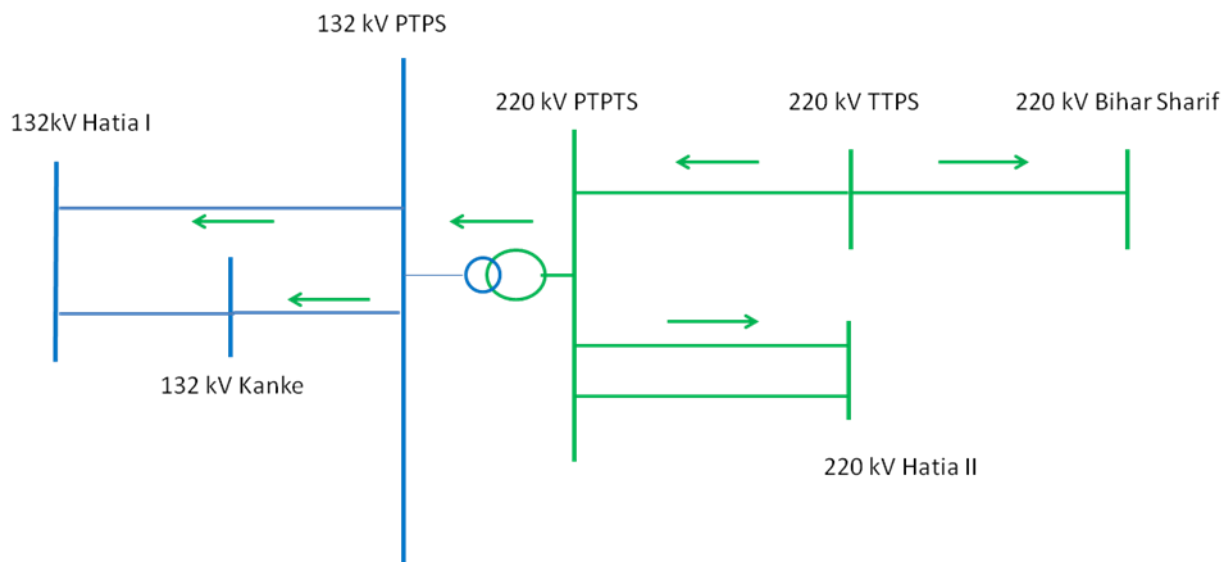
JUSNL ,TVNL and BSPTCL may explain.

### **Deliberation in meeting**

JUSNL explained that there was no physical fault in 220kV and 132 kV system at PTPS but voltage dip was observed for 300 ms at PTPS S/s. JUSNL informed that 220 kV TTPS – PTPS S/C line tripped from PTPS end on zone 4 within 100 ms. JUSNL added that as per DR bus voltage became almost zero and relay sensed as zone 4 fault.

ERLDC informed that after tripping of 220 kV TTPS – PTPS S/C line, 220 kV TTPS – Biharshariff S/C line got tripped from Biharshariff end on backup overcurrent protection. ERLDC observed that Biharshariff end has conservative setting.

BSPTCL informed that the backup overcurrent settings has been revised from 600 A to 900 A after disturbance.



After detailed analysis PCC opined that there might be a fault in downstream network of Patratu PTPS S/s and the fault was not cleared by 132kV Protection system at Patratu PTPS.

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

### **ITEM NO. B.2: Black out at 220 k V Tenughat Substation on 14.04.2020 at 12:47 hrs.**

220 KV Tenughat (TTPS) Biharshariff S/C tripped on 12:32 hrs. due to B phase to earth fault. At 12:46 hrs, 220 kV Tenughat (TTPS) – Patratu (PTPS) S/C tripped on earth fault from PTPS end resulting in tripping of both running units at TTPS due to loss of the only available evacuation path. With this 220 kV Tenughat substation got black out.

### **Generation Loss : 299 MW**

JUSNL ,TVNL and BSPTCL may explain.

## Deliberation in meeting

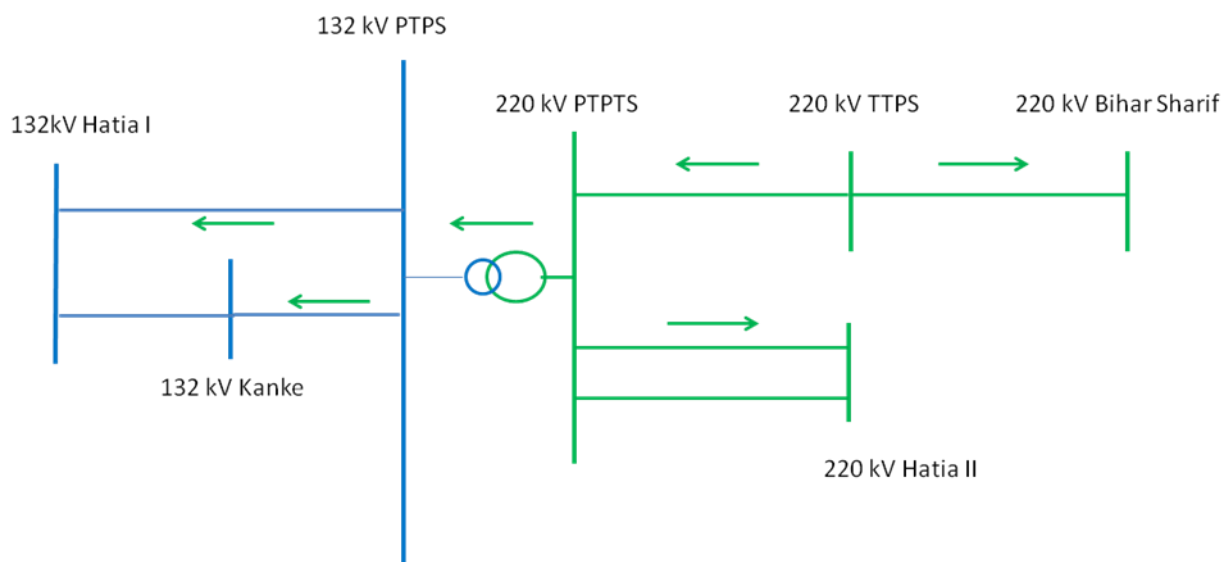
BSPTCL informed that at 12:32 hrs, there was a high resistive B-N fault in 220 kV TTPS – Biharshariff S/C line at 58 km from Biharshariff end. Biharshariff end cleared the fault in zone 1 distance protection and TVNL end got tripped on directional E/F protection. Delayed tripping was observed at TVNL end due to high pickup value of E/F protection settings.

JUSNL informed that at 12:46 hrs, 220 kV TTPS – PTPS S/C tripped from PTPS end on Earth Fault protection. JUSNL failed submit the DR for the tripping. There was no tripping from TTPS end.

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 Tenughat Biharshariff 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 Tenughat Biharshariff S/C , O/C , E/F protection settings of PTPS unit so that high resistance faults could be identified reliably.



### **ITEM NO. B.3: Total Power failure at 220 k V TTPS on 22.04.2020 at 20:12 hrs**

At 20:12 hrs. 220 kV Tenughat (TTPS) – Patratu (PTPS) S/C tripped from PTPS end detecting a B phase to earth fault in zone 1. At same time, 220 kV TTPS – Biharshariff S/C tripped from Biharshariff end in 350 ms on zone – 2 distance protection. Due to tripping of both circuits, both the running units at TTPS tripped due to loss of evacuation path and total power failure occurred at TTPS

As per three phase voltage recorded at Ranchi PMU , fault clearing time was less than 100 ms

As per Biharshariff end PMU data , fault clearing time is around 350 ms

220 kV TTPS – Biharshariff was restored at 21:32 hrs. 220 kV PTPS –TTPS was restored at 22:32 hrs. Tenughat unit # 1 was revived at 06:14 hrs. on 23-04-2020 • Tenughat unit #2 was revived at 01:22 hrs. on 26-04-2020

Reason and location of fault on 220 kV TTPS-PTPS circuit to be shared by JUSNL

Reason for non-picking of any DEF protection in DR may be shared as earth fault relay picked up

at TTPS end

**Relay Indications:**

Name	Relay Indication at End 1	Relay Indication at End 2
220 kV TTPS – Biharshariff S/C	B-N, zone-4 and earth fault start, IB = 1.5 kA, and line did not trip from TTPS end	B-N, F/C 1.5 kA, zone -2 trip, 165 km from Biharshariff
220 kV TTPS – PTPS S/C	B-N; earth fault start, It did not trip from TTPS end	B-N, zone – 1, F/C 2.7 kA, 28 km from PTPS
Tenughat Unit1	Yet to be received	
Tenughat Unit2	Yet to be received	

Load Loss: 50 MW , Gen Loss : 313 MW

JUSNL ,TVNL and BSPTCL may explain.

**Deliberation in meeting**

*TVNL explained that no physical fault was observed at Tenughat substation. TVNL further added that no equipment was damaged.*

*After detailed analysis, PCC opined that that there might be a fault at TTPS S/s and the fault got cleared from remote ends.PCC advised TVNL to verify and submit the details.*

*TVNL informed that complete switchyard has been examined, nothing found, it might be a transient fault.*

*PCC advised JUSNL to submit the relay settings of 220 kV PTPS-TTPS line at PTPS end to ERPC and ERLDC.*

**ITEM NO. B.4: Disturbance at 220 k V Tenughat Substation on 28.04.2020 at 06:29 hrs.**

At 06:12 hrs auxiliary transformer of unit 1 at TTPS at tripped due to mal operation of differential relay resulted tripping of Tenughat Unit 1. At 06:29 hrs, all feeders connected to Bus 2 including Tenughat Unit #2, 220 kV TTPS – Patratu (PTPS) S/C, Station Transformer 2 at TTPS and 220 KV Bus coupler beaker at TTPS tripped due to operation LBB operation at TTPS. However, Tenughat station supply remains intact through 220 kV TTPS – Biharshariff S/C which was connected to 220 kV Bus-1 at TTPS.

220 kV PTPS –TTPS was restored at 09:09 hrs. Tenughat unit # 1 was revived at 10:45 hrs. Tenughat unit #2 was revived at 20:38 hrs.

Reason for operation of 96 relay of bus 2 and CT supervision relay of zone 2 at TTPS may be shared with remedial action taken. Remedial action taken after mal-operation of differential relay of auxiliary transformer unit 1 at TTPS may be shared.

TVNL may share the upgradation plan of shifting from Electromagnetic Bus bar differential to Numerical protection. Further, TVNL may kindly share any additional electromagnetic protection at its switchyard and plan for their replacement

**Relay Indications:**

Name	Relay Indication at End 1	Relay Indication at End 2
220 kV TTPS – PTPS S/C	96 relay of bus 2 and CT supervision relay of zone 2	Yet to be received
Tenughat Unit1	Auxiliary transformer tripped	

Tenughat Unit2	96 relay of bus 2 and CT supervision relay of zone 2
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**Load Loss : 50 MW , Gen Loss: 300 MW**

JUSNL, TVNL and BSPTCL may explain.

**Deliberation in meeting**

*TVNL explained that no physical fault was observed at Tenughat substation. The disturbance was due to maloperation of differential relay of 220kV Bus 2. TVNL added that the relay is EM type.*

*PCC advised TVNL to replace the EM type Busbar protection with numerical relay.*

**ITEM NO. B.5: Disturbance at 220 k V Chandil Substation on 29.03.2020 at 19:21 hrs.**

At 19:21 hrs, R phase CT of 220 kV STPS bay of 220/132 kV Chandil s/s burst resulting tripping of all 220 kV feeders connected to Chandil S/S.

220 kV Ramchandrapur – Chandil S/C was restored at 19:45 hrs.

220 kV Ranchi – Chandil S/C was restored at 19:50 hrs.

220 kV STPS – Chandil S/C was restored at 20:40 hrs.

As per PMU and DR data, fault was cleared after 1.2 sec.

Make, year of installation, year of manufacturing and last inspection report of failed CT may be shared with ERPC/ERLDC by the utility as discussed in 89th ER PCC meeting.

JUSNL/WBPDCL may explain reason for not receipt of carrier signal at STPS end in spite of sensing the fault in zone 1 at Chandil end

JUSNL may share the status of installation of bus bar protection at Chandil.

No SOE has been recorded in ERLDC SCADA data at the time of event. JUSNL, PGCIL ERTS – I, WBPDCL are requested to check this issue

**Relay Indications:**

Name	Relay Indication at End 1	Relay Indication at End 2
220 kV Chandil -STPS S/C	1 st fault: R phase to earth fault, Zone I, IR = 50.3 kA (measurement error suspected), Y & B phase current almost zero, Fault clearing time is around 250 ms 2 nd fault (450 ms after 1st fault): Y phase to earth fault, Zone 1, IY = 3 kA, R & B current almost 0, fault clearing time is around 600 ms	R phase to earth fault, zone 2, 110 km from STPS, IR-1.464 kA, IY- 40.71 A, IB40.64 A, A/R lock out. Three phase trip
220 kV Chandil– Ranchi S/C	R – B to earth fault, Zone – 4 trip, Fault duration: 433 ms, IR-2.2 kA, IY- 0.5 kA, IB- 0.9kA, Fault location: 0km, Breaker close signal was not reset in DR,	R phase to earth fault, Zone 2, 78 km from Ranchi, IR-2.2 kA, IY- 0.5 kA, IB- 0.9kA. Three Phase trip
220kVChandil-Ramchandrapur S/C	R-Y-B, Zone -4, Fault location: 0km, IR-4.7 kA, IY- 0.7 kA, IB- 0.95kA, Fault duration: 86.6 ms	R-B phase to earth fault, Zone -2,; 35km, IR-4.7 kA, IY- 0.7 kA, IB- 0.9kA,

## Load Loss: 210 MW

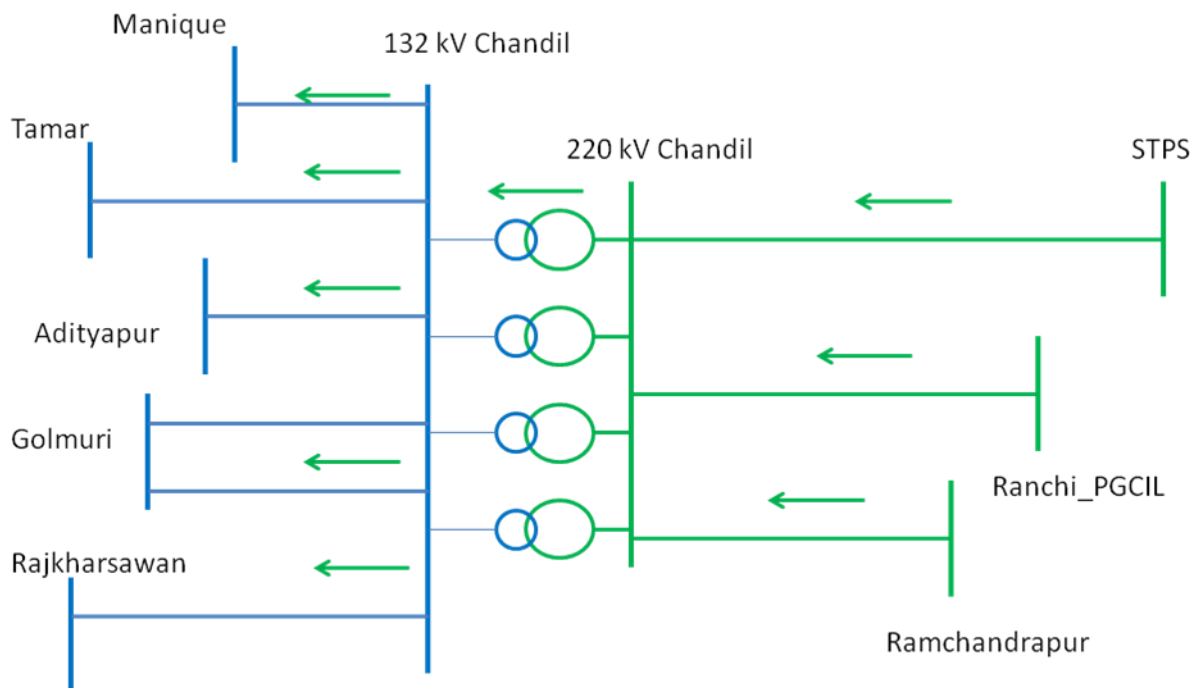
JUSNL and WBPDCCL may explain.

### Deliberation in the meeting

JUSNL explained the disturbance with a presentation. The presentation is enclosed at Annexure-B5.

JUSNL explained that at 19:21 hrs, R-N fault occurred at 220kV bus of 220/132kV Chandil S/s due to failure of R phase CT of 220 kV STPS bay. Busbar protection for 220kV system at Chandil S/s was not available as a result, all the 220kV lines tripped from remote end. Thereafter, second fault (Y-N fault) was appeared at 220/132kV Chandil S/s after 0.5 sec. Both the faults finally got cleared from 132kV line protection system at Adityapur and Rajkaswan.

JUSNL informed that 220/132kV ATRs also tripped but failed to submit the relay indications and DR. JUSNL added that old EM type relays are in service for 220/132kV ATRs.



After detailed analysis by the PCC forum, the following points were observed:

- At 19:21 hrs, R-N fault occurred at 220kV bus of 220/132kV Chandil S/s due to failure of R phase CT of 220 kV STPS bay
- 220 kV Chandil -STPS S/C line tripped from STPS end within 350 ms on zone 2
- 220 kV Chandil- Ranchi S/C line tripped from Ranchi end within 350 ms on zone 2
- 220kV Chandil-Ramchandrapur S/C line got tripped within 100 ms. (Relay fault pickup details are not available due to incorrect DR configuration).
- For all the above lines Chandil end relay observed the fault in zone 4.
- 132kV Chandil-Adityapur and 132kV Chandil-Rajkaswan line protection relays (back over current E/F protection) identified the fault
- In the mean time after 0.5 sec, Y-N fault appeared at 220/132kV Chandil S/s
- Both the faults finally got cleared from 132kV line protection system at Adityapur and Rajkaswan after 1.1 sec
- Details of other 132kV source, 132kV Chandil-Golmuri line is not available.
- It was observed that 220/132kV ATRs failed to clear the fault in time as a result 132kV lines got tripped.

- Total fault clearing time is around 1.2 seconds as per PMU data.

PCC observed the following discrepancies and advised JUSNL and WBPDCCL to take appropriate action:

- 220kV Chandil-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

**ITEM NO. B.6: Total Power failure at 220 k V Chandil Substation on 15.04.2020 at 17:20 hrs.**

At 17:20 hrs., 220 kV Santaldih TPS (STPS) – Chandil S/C, 220 kV Ranchi – Chandil S/C and 220 kV Ramchandrapur – Chandil S/C tripped. At same time, flashover at LT side of one 100 MVA, 220/132 kV ICT was observed and all four 132 kV feeders connected to Chandil were hand tripped resulting total power failure at Chandil end

220 kV STPS – Chandil S/C was restored at 18:00 hrs. . 220 kV Ranchi – Chandil S/C was restored at 18:08 hrs. 220 kV Ramchandrapur – Chandil S/C was restored at 18:25 hrs.

Reason and location of fault and how fault was cleared may be shared by JUSNL. Ranchi, and Ramchandrapur end relay indication and DR/EL (if triggered) may be shared by PGCIL ERTS - 1/JUSNL.

Santaldih TPS and Chandil end DR is to be time synchronized and all DRs recorded at Chandil end and DR recorded for Chandil feeder at STPS end may be configured as ER PCCs recommendation

JUSNL is requested share the remedial action taken based on observations shared by ERLDC.

Reason for opening of B phase CB at Chandil end of 220 kV STPS end feeder at 2500 ms (R and Y phase breaker opened at 500 ms after sensing the fault) after sensing the fault may be shared.

**Relay Indications:**

Name	Relay Indication at End 1	Relay Indication at End 2
220 kV Chandil - STPS S/C	R, Y and B phase short circuit fault, zone – 4, 0.1 km from Chandil in reverse direction, IR= 1.5kA, IY= 1.6kA, IB= 1.8kA. B pole opened after 2 seconds from opening of R and Y phase breaker.	Y phase power swing block (PSB IN), Auto reclose lock out shot (As per details shared by Chandil end). In STPS end DR, reason of tripping is not recorded.
220 kV Chandil – Ranchi S/C	B phase O/C and E/F start. IR= 0.2kA, IY= 0.3kA, IB= 0.9kA. Reason for tripping is not recorded in DR or shared in relay details. As per DR, all three phase breakers opened at around 500 ms after sensing the fault	Did not trip (As per details shared by Chandil end). But line voltage recorded in Chandil end DR became zero at around 1 seconds after sensing the fault at Chandil end, which indicates tripping from Ranchi end in zone-3
220 kV Chandil	O/C and E/F start in all three phases.	IR= 4.7kA, IY= 6.65kA, IB= 0.9 kA, 35



– Ramchandrapur S/C	IR= 0.7kA, IY= 0.6kA, IB= 2.8kA.	km from Ramchandrapur (as shared by Chandil end). line voltage recorded in Chandil end DR became zero at around 1 seconds after sensing the fault at Chandil end, which indicates tripping from Ramchandrapur end in zone-3
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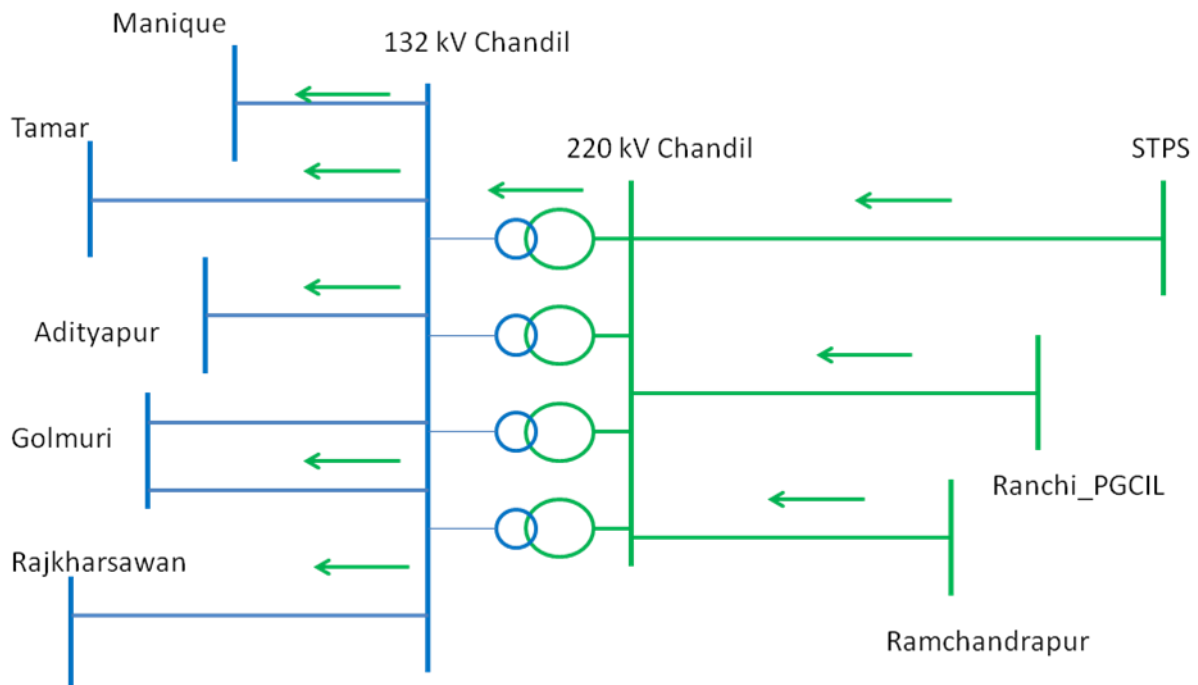
**Load Loss: 35 MW**

JUSNL , WBPDC and Powergrid may explain.

**Deliberation in the meeting**

JUSNL explained the disturbance with a presentation. The presentation is enclosed at Annexure-B6.

JUSNL explained that at 17:20 hrs, B-N fault occurred at 220/132kV Chandil S/s (details of exact location of the fault were not available). Busbar protection for 220kV system at Chandil S/s was not available as a result, all the 220kV lines tripped on line protection. Protection system of 220/132kV ATRs failed to clear the fault as a result the fault got cleared from 132kV line protection system at Adityapur, Golmuri and Rajkaswan.



After detailed analysis by the PCC forum, the following points were observed:

- At 17:20 hrs, B-N fault occurred at 132kV bus of 220/132kV Chandil S/s, later the fault got converted into three-phase fault
- Since the fault was in 132kV system, there was no pickup by the remote end distance protection of 220kV lines. Only over current E/F pickup was observed at Ranchi end. Chandil end distance protection identified the fault in zone 4 for all 220kV lines and issued trip command to respective line breakers after 0.5 sec.
- CBs of Ramchandrapur and Ranchi 220kV lines got tripped but B-ph pole of 220kV STPS line CB failed to open.

- Thereafter, STPS end over current E/F protection identified the fault and got tripped from STPS end after 2 sec. Since the fault was in 132kV system the fault current observed at STPS end was less which resulted into longer time for clearing the fault.
- In the mean time, 132kV Chandil-Adityapur line, 132kV Chandil-Rajkaswan line and 132kV Chandil-Golmuri line got tripped by backup overcurrent E/F protection after 1.5 sec.
- It was observed that 220/132kV ATRs failed to clear the fault in time as a result 132kV lines got tripped.
- Total fault clearing time was around 4 sec

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.
- 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.

**ITEM NO. B.7: Total Power failure at 220 k V Chandil Substation on 30.04.2020 at 19:37 hrs**

At 19:37 hrs, all 220 kV lines and 220/132 kV ATRs tripped at Chandil due to burst 100 MVA 220/132 kV ICT - 3 at Chandil and total power failure occurred at Chandil and its nearby areas. Initially power was extended to affected area from Manique (DVC) by 21:18 hrs.

Power was extended to affected area from 132 kV Manique (DVC) by 21:18 hrs.

220 kV Ramchandrapur – Chandil S/C was restored at 23:01 hrs.

220 kV Ranchi – Chandil S/C was restored at 00:53 hrs. on next day i.e. 01-05-2020

220 kV STPS – Chandil S/C was restored at 01:02 hrs. on next day i.e. 01-05-2020

JUSNL may share the status of installation of bus bar protection at Chandil

Zone -4 setting of 220 kV Lines also need to be reviewed in coordination with 220/132 kV ICTs backup overcurrent protection setting

Reason for delayed fault clearance may be shared by JUSNL.

**Relay Indications:**

Name	Relay Indication at End 1	Relay Indication at End 2
220 kV Chandil - STPS S/C	IR= 0.2kA, IY= 0.7kA, IB= 0.2kA. Reason for tripping is not recorded in DR or shared in detail report. All three phase breakers opened at 1500 ms after sensing the fault	Did not trip (As per FIR shared during tripping)
220 kV Chandil – Ranchi S/C	R and Y phase O/C and E/F start. IR= 0.6kA, IY= 1.3kA, IB= 0.3kA. Reason for tripping is not recorded in DR or shared in relay details. As per DR, all three phase breakers opened at around 500 ms after sensing the fault	Did not trip (As per FIR shared during tripping)
220 kV Chandil – Ramchandrapur S/C	R and Y phase O/C and E/F start in all three phases. IR= 0.8kA, IY= 2.9 kA, IB= 0.4 kA. Reason for tripping is not recorded in DR. As per DR, all three phase breakers opened at around 500 ms after sensing the fault.	Did not trip (As per FIR shared during tripping)

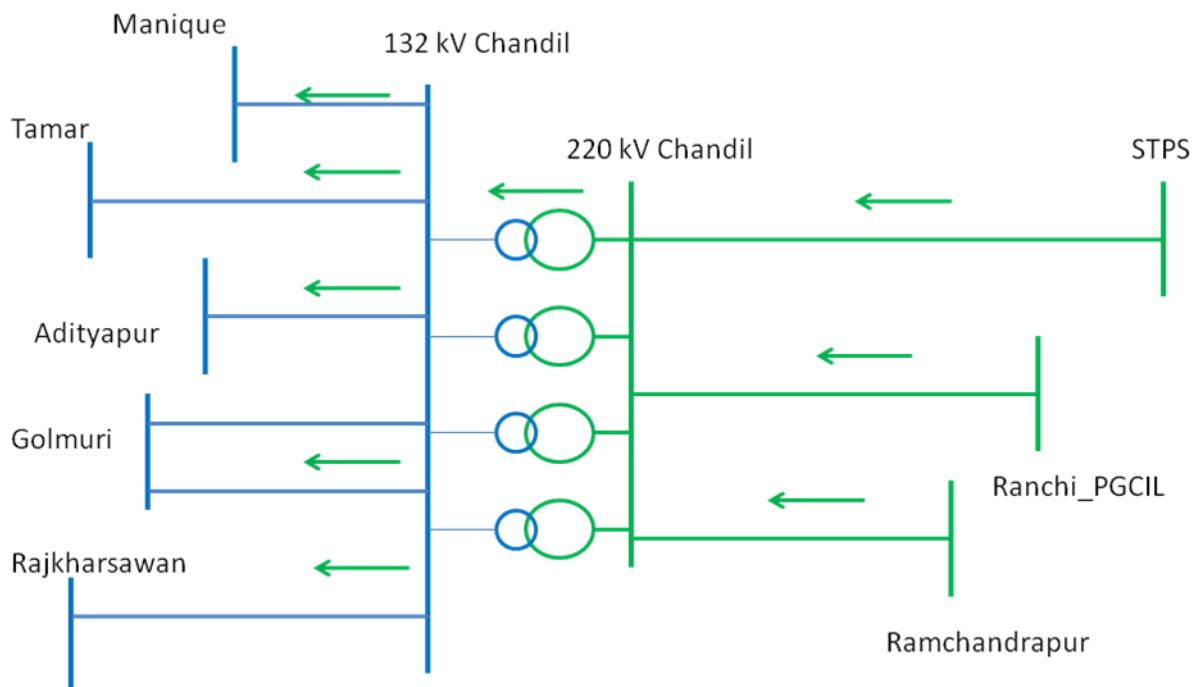
**Load Loss : 145 MW**

**JUSNL , WBPDC and Powergrid may explain.**

**Deliberation in the meeting**

JUSNL explained the disturbance with a presentation. The presentation is enclosed at Annexure-B7.

JUSNL explained that at 19:37 hrs, 100 MVA 220/132 kV ICT - 3 at Chandil got burst due to LV side Y-ph bushing failure. JUSNL informed that differential protection of the ICT 3 operated and issued trip command. Since Busbar protection for 220kV system at Chandil S/s was not available as a result, all the 220kV lines tripped on line protection. The fault got cleared from 132kV line protection system at Adityapur, Golmuri and Rajkaswan.



After detailed analysis by the PCC forum, the following points were observed:

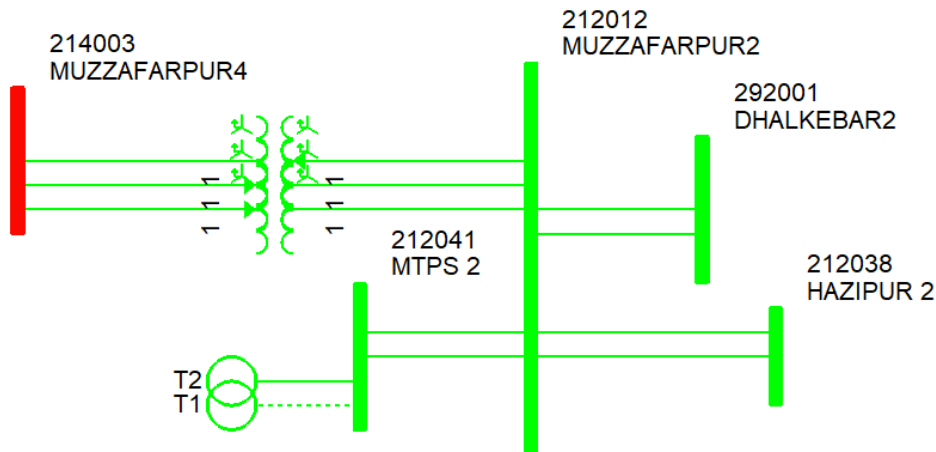
- At 19:37 hrs, Y-N fault occurred at 132kV side of 100 MVA, 220/132kV ICT-3 at Chandil S/s.
- Since the fault was in 132kV system, there was no pickup by the remote end distance protection of 220kV lines. Chandil end distance protection identified the fault in zone 4 for 220kV Ranchi and Ramchandrapur lines and issued trip command to respective line breakers after 0.5 sec.
- Chandil end of 220kV STPS line failed to identify the fault in zone 4 initially and able to identified the fault in zone 4 after tripping of 220kV Ranchi and Ramchandrapur lines. 220kV Chnadil-STPS got tripped after 1.5 sec from the fault initiation.
- In the mean time, 132kV Chandil-Adityapur line, 132kV Chandil-Rajkaswan line and 132kV Chandil-Golmuri line got tripped by backup overcurrent E/F protection after 2 sec.
- It was observed that 220/132kV ATRs failed to clear the fault in time as a result 132kV lines got tripped.
- Total fault clearing time was around 2000 ms.

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.

**ITEM NO. B.8: Disturbance at 220 k V Muzaffarpur Substation on 28.03.2020 at 18:49 hrs.**

At 18:49 hrs, 220 KV Muzaffarpur bus 1 tripped on LBB maloperation associated with 400/220 KV ICT 1 CB. Due to this, 220 KV Muzaffarpur Hajipur 1, 220 KV Muzaffarpur KBUNL 2, 220 KV Muzaffarpur Dhalkebar - 1, 400/220 KV ICT 1 and 2 at Muzaffarpur tripped.



No Gen Loss and load loss

Powergrid and BSPTCL may explain.

**Deliberation in meeting**

*Powergrid explained that due to malfunction of master trip relay at Muzaffarpur bus 1 tripped on LBB. Powergrid further added that faulty relay was replaced with new relay.*

**ITEM NO. B.9: Total Power failure at 400 / 132 k V Motihari Substation on 19.04.2020 at 20:54 hrs.**

400/132 kV Motihari was connected to rest of the grid via 400 kV Barh – Motihari – 2 (Others lines are under breakdown due to tower-collapse) and radial load of 132 KV Betiya, 132 KV Motihari (Bihar) and 132 KV Raxaul was supplied through 400/132 kV ICT – 2 at Motihari. At 20:54 hrs. 400 kV Barh – Motihari – 2 got tripped due to Y phase to earth fault resulting in total power failure at 400/132 kV Motihari along with 132 kV Motihari, 132 kV Betiya and 132 kV Raxaul and other surrounding areas.

Load Loss: 140 MW

DMTCL, NTPC and BSPTCL may explain.

**Deliberation in meeting**

*DMTCL explained that fault was repeatedly occurring at two particular locations which are under the jurisdiction of Powergrid. The issue was informed to Powergrid to take corrective action.*

*Powergrid informed that OPGW stringing is in progress and the faults were appearing due to less clearance. Powergrid added that the OPGW tightening had been done to improve the clearance.*

**ITEM NO. B.10: Total Power failure at 400 / 132 k V Motihari Substation on 26.04.2020 at 08:42 hrs.**

400/132 kV Motihari was connected to rest of the grid via 400 kV Barh – Motihari – 2 (Others lines are under breakdown due to tower-collapse) and radial load of 132 KV Betiya, 132 KV

Motihari (Bihar) and 132 KV Raxaul was supplied through 400/132 kV ICT – 2 at Motihari. During the event, 400 kV Barh – Motihari – 2 got tripped due to Y phase to earth fault resulting in total power failure at 400/132 kV Motihari along with 132 kV Motihari, 132 kV Betiya and 132 kV Raxaul and other surrounding areas.

After the first event, 400 kV Barh-Motihari – 2 was charged at 9:24 hrs. followed by restoration of all loads by 9:45 hrs. After the second event, Power was extended to Betia at 11:15 hrs from Gopalgunj and then power was further extended to Raxaul. Power to Motihari (Bihar) was extended from Motipur at 11:35 hrs. 400 kV Barh-Motihari – 2 was charged at 19:34 hrs and power was extended from Betia, Raxaul and Motipur from Motihari (DMTCL) by 20:02 hrs.

**Relay Indications:**

Time	Name	Relay Indication at End 1	Relay Indication at End 2
08: 42 hrs	400 kV Barh – Motihari – 2	Y-N,79 KM from Barh, FC 4.5kA	Y-N,122 km from Motihari,F/C 0.5 kA
11:10 hrs.	400 kV Barh – Motihari – 2	Y-N, F/C 8.7 kA, Zone - 1	Y-N, 203 km from Motihari,F/C-0.27kA

Load Loss: 80 MW

DMTCL ,NTPC and BSPTCL may explain.

**Deliberation in meeting**

*The issue was discussed in item B.9.*

**ITEM NO. B.11: Total Power failure at 400 / 132 k V Motihari Substation on 26.04.2020 at 11:10 hrs.**

400/132 kV Motihari was connected to rest of the grid via 400 kV Barh – Motihari – 2 (Others lines are under breakdown due to tower-collapse) and radial load of 132 KV Betiya, 132 KV Motihari (Bihar) and 132 KV Raxaul was supplied through 400/132 kV ICT – 2 at Motihari. During the event, 400 kV Barh – Motihari – 2 got tripped due to Y phase to earth fault resulting in total power failure at 400/132 kV Motihari along with 132 kV Motihari, 132 kV Betiya and 132 kV Raxaul and other surrounding areas.

Load Loss: 80 MW

DMTCL , NTPC and BSPTCL may explain.

**Deliberation in meeting**

*The issue was discussed in item B.9.*

**ITEM NO. B.12: Disturbance at Parulia Substation on 17.04.2020 at 10:50 hrs.**

At 10:49 hrs. 220 kV Waria – Parulia – 1 tripped on B phase to earth fault. At the same time all connected 220 kV lines tripped from Parulia end due to operation of bus bar protection. Around 30 kV dip has been observed in B phase voltage at Durgapur PMU data at the time of the disturbance. No auto-reclose operation has been captured in PMU data.

Load Loss: 25 MW

DVC may explain.

**Deliberation in meeting**

DVC explained that due to maloperation of CT switching relay Aux contact, the busbar protection at 220kV Purulia S/s operated. The busbar protection is old EM relay.

DVC added that protection scheme at Parulia substation would be replaced by numerical relays by Oct 2020.

ERLDC informed that SOE at Parulia S/s was not available to ERLDC. ERLDC requested SLDC to check working condition of SOE.

**ITEM NO. B.13: Total Power failure at 400 k V Teesta III and Dikchu Substations on 15.03.2020 at 16:12 hrs**

At 13:52 hrs 400 kV Teesta III - Kishangunj S/C, 400 kV Teesta III - Dikchu S/C and 400 kV Dikchu - Rangpo S/C tripped resulting total power failure at Teesta III and Dikchu. DT received at Teesta III from remote ends for both feeders. E/F protection picked up at Dikchu end.

400kV Teesta III – Kishanganj S/C restored at 14:31 hrs. 400 kV Teesta III – Dikchu S/C was restored at 18:06 hrs. 400 kV Rangpo – Dikchu S/C was restored at 17:27 hrs

High resistance fault followed by delayed clearing of fault had been observed in the past for 400 kV Rangpo – Dikchu S/C and 400 kV Rangpo – Kishangunj S/C. Considering importance of reliability of 400 kV Teesta III – Kishangunj S/C and 400 kV Teesta III – Dikchu – Rangpo section, option for implementation of differential protection may be explored on these circuit including 400 kV Rangpo-Kishanganj circuit. Similar type of events has occurred on 12th April 2019, 16th April 2019 and 30th June 2019 followed by loss of hydro generation.

Tripping of 400/132 kV ICT at Dikchu HEP from 400 kV side before tripping of any circuit may be explained. Reviewing of E/F setting of this ICT was recommended by ER PCC

**Relay Indications:**

Name	Relay Indication at End 1	Relay Indication at End 2
400 kV Teesta III - Kishangunj S/C	DT received, O/C and E/F picked up for cable section but did not trip	E/F trip; IR 0.33 kA, IY 0.35 kA, IB 1.33 kA and IN = 0.6 kA
400 kV Teesta III - Dikchu S/C	DT received, O/C and E/F picked up for cable section but did not trip	E/F picked up
400 kV Dikchu - Rangpo S/C	E/F trip	DT received
Unit 6 at Teesta III	GT neutral O/C	
400/132 kV ICT at Dikchu	HV side: Differential protection; LV side: inter-trip (verbally informed)	

Gen Loss : 200 MW

Powergrid , TUL and Dikchu may explain.

**Deliberation in meeting**

Dikchu explained that there was a high resistive B-N fault occurred in 400kV Teesta III – Dikchu S/C line close to Dikchu end. The fault was picked up by O/C, E/F protection at Dikchu and Teesta III end cable protection. In the mean time, 400kV Dikchu-Rangpo S/C line got tripped from Dikchu end on O/C, E/F protection and 400 kV Teesta III - Kishangunj S/C line tripped from Kishanganj end.

PCC observed that uncoordinated trippings were occurred due to improper relay coordination of O/C, E/F protection among Kishanganj, Teesta III, Rangpo and Dikchu.

After detailed discussion, it was opined that it is difficult to coordinate the backup O/C, E/F protection settings for wide variation in hydro generation levels in Sikkim area.

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 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.

**ITEM NO. B.14: Tripping of 400 k V Teesta III – Dikchu S/C from both ends on 21.04.2020 at 11:00 hrs**

At 09:30 hrs, 400 kV Teesta III – Dikchu S/C tripped from both ends. Due to problem in relay line could not be charged from Dikchu end and line was idle charged from Teesta III end .At 11:00 hrs, 400 kV Teesta III – Kishangunj S/C tripped from Teesta III end on operation of over voltage stage I protection and from Kishangunj end due to DT receipt.

400kV Teesta III – Kishanganj S/C restored at 12:39 hrs. 400 kV Teesta III – Dikchu S/C was restored at 13:34 hrs. after manually resetting of overvoltage relay at Dikchu end.

Remedial action taken after non-opening of R pole of unit #3 breaker at Teesta III may be shared. Similar type of incident occurred on 25th November 2019, when breaker got stuck and bus I at Teesta III end during synchronization of unit 5 of Teesta III resulting in loss of generation of around 300 MW.

At same time one R phase to earth fault has been observed at Kishangunj PMU data. POWERGRID ERTS - I is requested to check whether any auto-reclose operation took place for transient R phase to earth fault at same time near Kishangunj. DR from Kishangunj end recorded during DR may be shared.

**Relay Indications:**

Time	Name	Relay Indication at End 1	Relay Indication at End 2
09:30 Hrs	400 kV Teesta III - Dikchu S/C	Yet to be received	DT received
11:00 Hrs.	400 kV Teesta III - Kishangunj S/C	O/V stage 1 operated	DT received

No Load and Gen. Loss

Powergrid , TUL and Dikchu may explain.

**Deliberation in meeting**

TUL explained that R pole of unit #3 breaker was maloperated as lock mechanism worn out as a result LBB operated and tripped 400 kV Teesta III - Dikchu S/C from Teesta III end. DT was sent to Dikchu end.

It was further added that as temporary measure washer was installed to avoid slipping of lock mechanism. Thereafter CB is working satisfactorily.

During charging of the line Dikchu end CB failed to hold due to pickup by overvoltage relay.

PCC advised Dikchu to review the relay settings.

PCC advised TUL to maintain the spare reserves.

**ITEM NO. B.15: Black out of 132 k V Chujachen Hydro Power Substation on 01.04.2020.**

At 18:23 hrs, 220 kV Rangpo - New Melli - S/C got tripped due to R and Y phase to earth fault in the circuit near to Rangpo end. In addition to this, 132 kV Rangpo Gangtok D/C also got tripped simultaneously with this fault. As Gangtok load was radially supplied from Rangpo through 132 kV Rangpo-Gangtok D/C so with their tripping, total power failure occurred at Gangtok city. At same time, 220 kV Rangpo – Tashiding S/C also got tripped only from Tashiding end sensing the same R and Y phase to earth fault in zone – 1 resulting total power failure at Tashiding – Jorethang – New Melli section and tripping of running unit at Tashiding due to loss of evacuation path. After these, at 18:28 hrs. 132 kV Rangpo Chujachen – D/C tripped from both ends on Y and B phase to earth fault. The fault was in circuit 1 based on which Chujachen has issued trip command in zone 1 and send DT to remote end. However, at the same time due to receipt of Direct trip from remote end, circuit 2 got tripped from Rangpo end. This led to black out of 132 kV Chujachen Hydro Power substation.

Load Loss: 28 MW Gen Loss: 35 MW

Powergrid, DANS Energy, Chujachen and Sikkim may explain.

### **Deliberation in meeting**

*Powergrid explained that at 18:23 hrs, 220 kV Rangpo - New Melli - S/C got tripped due to R and Y phase to earth fault in the circuit near to Rangpo end. 132 kV Rangpo Gangtok D/C also got tripped from Rangpo due to maloperation of relay. Powergrid added that the relay had been replaced after the disturbance.*

*During the disturbance, 220 kV Rangpo – Tashiding S/C also got tripped only from Tashiding end sensing the same R and Y phase to earth fault in zone – 1.*

*It was informed that the issue of unwanted tripping of 220 kV Rangpo – Tashiding S/C was discussed in earlier PCC meetings and DANS ENERGY was advised to review the settings.*

*PCC advised DANS Energy to send relay settings, SLD and line parameters at Tashiding and Jorethang to ERPC and ERLDC.*

*At 18:28 hrs, 132 kV Rangpo Chujachen – D/C tripped from both ends on Y and B phase to earth fault. The fault was in circuit 1 based on which Chujachen has issued trip command in zone 1 and send DT to remote end. However, at the same time due to receipt of Direct trip from remote end, circuit 2 got tripped from Rangpo end.*

*PCC observed that sending DT for circuit 1 is receiving as circuit 2 at Rangpo end.*

*Powergrid informed that this was due incorrect PSL logic at Rangpo end, the same has been corrected and working satisfactorily.*

### **ITEM NO. B.16: Tripping of Unit 1 of JITPL on 05.03.2020 at 19:27 hrs.**

At 19:27Hrs, 400kV JITPL-Angul D/C tripped on B-N fault. At the time of the event, inclement weather was reported. JITPL Unit#1 was generating around 560MW, which got tripped due to no evacuation path.

In Angul PMU data, B phase to earth fault has been observed. Fault clearing time was 600 ms. Make, year of installation, year of manufacturing and last inspection report of failed CT may be shared by JITPL

As per DR shared for 400 kV JITPL – Angul – 2 at JITPL end, auto reclose operation took place within 300 ms after detecting the fault in zone 1. Reason for auto reclose may be explained by JITPL. It has been observed even after detecting the fault in zone – 1, JITPL end breakers took around 200 ms to clear the fault (two instances found). Reason for delayed clearance of zone 1 faults may be explained by JITPL

As per DR recorded at JITPL end, only B phase breaker opened at JITPL. JITPL to share status of other breaker poles operation



### Relay Indications:

Name	Relay Indication at End 1	Relay Indication at End 2
400 kV Angul – JITPL - I	B-N, reverse directional picked up,	B-N, 64.638Km, 6.03KA
400 kV Angul – JITPL - II	B-N, Z-I	B-N, 72Km, 4.16 kA

Gen Loss: 560 MW

Powergrid Orrisa and JITPL may explain.

### Deliberation in meeting

*JITPL explained that on JITPL-ANGUL Line-2 Bph Fault Occurred due to CT failure. Autoreclose operation initiated for line 2. Line-2 Distance Really given definite trip(3 phase trip ) command Jitpl end Breakers(407&408 CB) . But fault current still persist through 409 CB . It initiate to Dia-2 Tie LBB Operation(200milli Sec) and open to 409 CB.*

*Line-1 Tripped by Angul end on distance relay Zone-2 protection ( Trip delay time 300milli sec).During this period JITPL end Line distance Relay reverse zone picked up( Zone-4 Trip delay 1.2sec).*

*In order to reduce the fault clearing time during CT failures of reactor bays, reactor bays backup impedance tripping time was reduced to 0 seconds from 1.2 seconds as remedial measure.*

*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.*

### **ITEM NO. B.17: Tripping of both units of JITPL on 21.04.2020 at 18:29 hrs**

At 18:26 hrs. successful auto-reclose of 400 kV JITPL – Angul – 2 occurred at JITPL end for transient R phase to earth fault. At 18:29 hrs. both running units at JITPL tripped because of operation of bus bar protection of bus 2 at JITPL due to CT failure.

Fault clearing time is less than 100 ms

Due to loss of around 750 MW generation at JITPL, frequency dropped to 49.95 Hz from 50.04 Hz resulting in around 0.09 Hz frequency change. Both units at JITPL were revived at 05:22 hrs. and 09:09 hrs. on 22nd April 2020

Make, year of installation, year of manufacturing and last inspection report of failed CT may be shared by JITPL

Reason for tripping of both units due to operation of bus bar protection of bus bar – 2 at JITPL may be shared

### Relay Indications:

Name	Relay Indication at JITPL end
400 kV Bus 2 at JITPL	Yet to be received
Unit 1 at JITPL	Yet to be received
Unit 2 at JITPL	Yet to be received

Gen Loss: 749 MW

Powergrid Orrisa and JITPL may explain.

## Deliberation in meeting

JITPL explained that on 400kV JITPL-Angul Line-2 single phase Earth fault occurred. Line CB 407B & Tie CB 408-52 R-Phase pole were opened by distance protection relay followed by auto reclose command executed by Line BCU to close Rph Pole Line-CB 407-52 & Tie CB 408-52. It further added that at 18.30hrs Bus bar-2 operated and opened to all Bus-2 Circuit breaker .It concluded that Bus bar-2 tripping was also initiated to trip of Unit-1 and Unit -2 Generator as per OEM (BHEL) Scheme.

JITPL informed that repeated failure of Siemens make SF<sub>6</sub> CT (model no SAS420). Since 2013, they have observed 14 no of failures. JITPL added that they are replacing the CTs one by one.

After detailed deliberation, 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

### **ITEM NO. B.18: Disturbance at 220 k V Budhipadar Substation on 13.03.2020 at 03:26 hrs.**

At 03:21 Hrs., 220 kV Budhipadar – Raigarh S/C tripped hrs. due to snapping of R phase wave trap jumper of this line. At 03:26 hrs., 220 kV Korba East -Buddhipadar 2 and 3 also tripped on R phase to earth fault and Y phase to earth fault respectively. However, after 300 ms, 220 kV bus coupler breaker along with 220 kV Budhipadar Bus 2 and all connected elements got tripped at 220/132 kV Budhipadar S/S on bus bar protection relay operation.

DR/EL for this event has been submitted so far by OPTCL due to which detailed analysis of event could not be completed within time by ERLDC.

### **Relay Indications:**

Time	Name	Relay Indication at End 1	Relay Indication at End 2
03:21 Hrs	220 kV Budhipadar – Raigarh S/C	R phase to earth fault, F/D = -0.2 km, F/C 23.5 kA	R phase to Earth fault, F/C 7.28 kA, 32 km from Raigarh
03:26 Hrs.	220 kV B/C at Budhipadar S/S	B/B Zone 2 protection operated at Budhipadar	
	220 kV Budhipadar – Korba 2	R phase to E/F, Zone 1 trip, Fault location: 1.5 km, IR=19/51 kA B/B Zone 2 protection operated at Budhipadar	Ckt 2: R-N, Z-II, 139 km
	220 kV Budhipadar – Korba 3	Y phase to Earth Fault, Zone 1 trip, Fault location :2.459 kA, IY=17.8 kA.	Idle charge from Budhipadar only so no tripping.
	220 kV Budhipadar – IBTPS 2 &4	B/B Zone 2 protection operated at Budhipadar	Yet to be received
	160 MVA 220/132 kV ICT - 2 at Budhipadar	B/B Zone 2 protection operated at Budhipadar	Yet to be received
	220 kV Budhipadar – Tarkhera 1	B/B Zone 2 protection operated at Budhipadar	Yet to be received

	220 kV Budhipadar – Lapanga 1	B/B Zone 2 protection operated at Budhipadar	Yet to be received
	220 kV Budhipadar – Bhusan 1	B/B Zone 2 protection operated at Budhipadar	Yet to be received
	220 kV Budhipadar – AAL – 2	B/B Zone 2 protection operated at Budhipadar	Yet to be received
	220 kV Budhipadar – VAL – 2	B/B Zone 2 protection operated at Budhipadar	Yet to be received

No load and Gen loss

OPTCL , Powergrid Orrisa and OPGC may explain.

### **Deliberation in meeting**

*OPTCL explained that at 03.26Hrs. the 220KV Korba-2 breaker failed to trip even though the relay operated resulting in to Bus-bar operation for 220KV Bus-2. During checking it was found that the TC2 coil of breaker was found faulty. Secondly, the LBB relay was also found faulty. Finally. the fault was cleared with operation of Bus-bar protection causing outage of all Feeders & Transformer connected to Bus-2.*

*OPTCL added that the defective trip coils were replaced in the breaker and the operation was checked and found to be in order. The defect in the LBB relay was also rectified and the circuit was checked and tested & found to be in order.*

*OPTCL was advised to check the autoreclose operation in consultation with remote end and review the DR configuration at Korba end.*

### **ITEM NO. B.19: Disturbance at 220 k V Balimela Substation on 03.04.2020 at 03:19 hrs.**

At 03:19 hrs. all running units and connected 220 kV feeders at Balimela HEP tripped on operation of bus bar protection of 220 kV bus 2 at Balimela (only bus 2 was in service at the time of disturbance) due to bursting of B phase bus CT (SLD attached in annexure 1) at Balimela end of 220 kV Balimela – Jayanagar – 1. On inspection, SF6 circuit breaker, post insulator, line isolator (both 3P and 4P) and line CT of 220 kV Balimela – Jayanagar – 1 at Balimela end were also found in damaged condition.

Gen loss: 245 MW

OPTCL may explain.

### **Deliberation in meeting**

*OHPC explained that busbar protection operated due to B-N fault at 220kV Balimela S/s and tripped all the elements connected to Bus 2. This was due to busting of B phase bus CT.*

### **ITEM NO. B.20: Tripping of Unit 3 of 400 k V GMR substation on 18.04.2020 at 19:34 hrs.**

GMR unit # 3 was connected to rest of the grid via 400 kV Meramundali – GMR S/C. At 19:34 hrs, 400 kV GMR – Meramundali S/C tripped on B phase to earth fault (fault location at 4 km from Meramundali) resulting tripping of this unit.

Gen loss : 249 MW

OPTCL and GMR may explain.

### **Deliberation in meeting**

*OPTCL explained that Auto-reclose was not ready at Meramundali end due to unavailability of breaker status due to cable fault. The same was rectified.*

### **ITEM NO. B.21: Tripping Incidences in month of March 2020**

Other tripping incidences occurred in the month of March 2020 which needs explanation from constituents of either of the end is given in **Annexure-B21**.

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

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

Members may discuss.

### **Deliberation in meeting**

*PCC advised all constituents to share details with ERPC and ERLDC. Updated status is enclosed at Annexure-B21.*

### **ITEM NO. B.22: List of DR discrepancies in the month of March 2020.**

The list of all DR discrepancies in month of March 2020 which needs explanation from constituents of either of end is given at **Annexure – B22** respectively.

Members may discuss.

### **Deliberation in meeting**

*PCC advised all constituents to refer the annexure and share the details with ERPC and ERLDC.*

### **ITEM NO. B.23: Multiple tripping incidents in the month of March 2020**

#### **23.1 Multiple tripping incident at Melli at 18:29 hrs on 13-03-2020**

At 18:29Hrs on 13th March 2020, 132 kV Rangpo-Melli S/C and 132 kV Siliguri-Melli S/C tripped resulting in total power failure at 132 kV Melli S/S along with load loss of 26 MW in the surrounding areas. As per PMU data recorded at Rangpo S/S (shown in **Error! Reference source not found.**), there was a fault in R and Y phase, which was cleared in zone 1 from

one end and zone 2 from another end. Fault clearing time is around 500 ms. **Error! Reference source not found.** shows the power flow through 132 kV Melli – Rangpo S/C and 132 kV Melli – Siliguri S/C and voltage at 132 kV bus at Melli S/S. 132kV Siliguri-Melli S/C was charged at 19:44hrs and 132kV Rangpo-Melli S/C was charged at 19:46hrs.

POWERGRID ERTS – II/Sikkim SLDC may explain the reason for delayed clearance of fault and tripping of both circuits at same time along with DR/EL.

**Members may discuss.**

**Deliberation in meeting**

*PCC advised powergrid and sikkim to take necessary action and submit details to ERPC and ERLDC.*

**23.2 Repeated tripping of 400 kV Patna Kishanganj D/C on 13th March 2020**

On 13th March 2020, 400 kV Patna Kishanganj D/C tripped repeatedly on fault as shown in table 1. 400 kV Patna Kishanganj D/C plays important role to evacuate hydro power from Sikkim and Bhutan. Hence, tripping of these lines affects reliability of Eastern Regional network. It is also observed that, for Single-Line-To-Ground (SLG) fault, Auto Reclose (A/R) did not operate at Patna end.

Sl. No	Name of the element	Tripping Time	Restoration Time	End 1 relay indication	End 2 relay indication	Remarks
1	400 KV Patna-Kishanganj 2	19:35	20:16	Y phase to earth fault, F/C 3.69 kA, 122.7 km from Patna	Y phase to earth fault, F/C 2.2 kA, 119 km from Kishanganj	Auto reclose operation successful from Kishanganj only.
2	400 KV Patna-Kishanganj 1	19:41	20:11	B phase to earth fault, F/C 1.94 kA, 206.7 km from Patna	B phase to earth fault, F/C 2.2 kA, 208 km from Kishanganj	Four Auto reclose operation attempts from Kishanganj end between 19:37-19:42 Hrs. Auto reclose operation successful from Kishanganj only. Dead time is set as 2 seconds.
3	400 KV Patna-Kishanganj 1	22:25	00:13 (14-03-2020)	B phase to earth fault, F/C 3.18 kA, 121 km from Patna	B phase to earth fault, F/C 2.2 kA, 198 km from Kishanganj	Auto reclose operation successful from Kishanganj only. Dead time is set as 2 seconds.
4	400 KV Patna-Kishanganj 2	22:37	22:42	Y phase to earth fault, Zone -1, 3.42 kA	Y phase to earth fault, F/C 1.99 kA, 145 km from Kishanganj	Auto reclose operation successful from Kishanganj end only. All three phase breakers of 400 KV Patna-Kishanganj 1 also got opened from Kishanganj
5	400 KV Patna-Kishanganj 2	22:42:50	00:13 (14-03-2020)	Y phase to earth fault, Zone -1, 3.35 kA	Y phase to earth fault, F/C 1.91 kA, 145 km	Auto reclose operation successful from Kishanganj only. Line tripped again within reclaim time.

6	400 KV Patna-Kishanganj 1	03:36 (14-03-2020)	18:54 (14-03-2020)	B phase to earth fault, F/C 3.2 kA, 128 km from Patna	B phase to earth fault, F/C 2.2 kA, 146 km from Kishanganj	Auto reclose operation successful from Kishanganj only. Dead time is set as 2 seconds.
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**Members may discuss.**

**Deliberation in meeting**

*PCC advised concerned constituents to take necessary action and submit details to ERPC and ERLDC*

**23.3 Repeated tripping of transmission lines due to same reason/fault at nearby areas.**

ERLDC has observed that five transmission lines having voltage level 220 kV and above have tripped more than two times in the month of March 2020 (table 1). After analysis of the reason (DR/EL/Site Report), it has been observed 400 kV Meramundali – Mendasal – 2, 400 kV Kharagpur – New Chanditala – 1, 400 kV Meramundali – Lapanga – 1 and 400 kV Patna – Kishanganj – D/C tripped more than one time with same relay indication. Reason for tripping of these lines are summarized in following table:

Name of the line	Reason	No of tripping	Utility to respond
400 kV Meramundali - Mendasal -2	DT receipt/Master trip at Meramundali	6	OPTCL
	R phase to earth fault at 33 - 39 km from Meramundali	4	
	R phase to earth fault at 36- 43 km from Mendasal	2	
400 kV Meramundali - Lapanga - 1	Y phase to earth fault with fault location at 124-135 km from Meramundali	3	OPTCL
400 kV New Chanditala - Kharagpur 1	B phase to earth fault with fault location at 5-8 km from Kharagpur	4	WBSETCL

Repeated tripping of these lines due to same fault or same reason may endanger the reliability of Eastern Region. Further it has been observed fault location is reported in nearby areas in case of some tripping incidents. OPTCL/WBSETCL are requested to share root cause of these tripping incidents along with remedial action taken to solve this problem.

**Members may discuss.**

**Deliberation in meeting**

*PCC advised concerned constituents to take necessary action and submit details to ERPC and ERLDC.*

**23.4 Persisting issue of 400 kV Barh Gorakhpur D/C**

During the 89th ER PCC meeting, POWERGRID ERTS – 1 was advised to share the reason for repeated tripping of 400 kV Barh – Gorakhpur D/C on DT receipt at Barh or Gorakhpur end. In the month March 2020, 400 kV Barh – Gorakhpur – 1 tripped again at 14:40 hrs on 30th March

2020 due to spurious DT received at Gorakhpur end. In view of the above, POWERGRID ERTS-I and NTPC Barh are advised to maintain the healthiness of PLCC panel and reduce the no of tripping on DT receipt

**Members may discuss.**

**Deliberation in meeting**

*PCC advised concerned constituents to take necessary action and submit details to ERPC and ERLDC*

**ITEM NO. B.24: Multiple tripping incidents in the month of April 2020**

**24.1 Tripping of both units at Tenughat (TTPS) at 07:35 hrs on 05-04-2020**

At 07:35 hrs, both the units at TTPS tripped due to flame failure though both 220 kV Biharshariff and PTPS feeders were in service. It was reported by TTPS that heavy jerk in AC control supply (110V) due to flashing in 6.6 kV breaker of SP pump A of ash handling plant. Due to jerk and fluctuation in supply voltage of flame scanner panel, both the units at TTPS tripped resulting around 300 MW generation loss. Both the units were revived at 10:21 and 10:10 hrs. on same day.

Given this event, TTPS may kindly share the following

1. Reason for the flashover
2. Whether the auxiliary of both units are being fed from the same source or have they bifurcated to avoid tripping of both units
3. Remedial action taken
4. Lesson learned from this event to avoid such an event in the future.

It may be noted that similar kind of tripping also occurred at MPL also in the past where fault in 6.6 kV has resulted in both plant tripping.

**Members may discuss.**

**Deliberation in meeting**

- ▶ *TVNL informed that Flashing in breaker of HP Ash Pump motor A occurred due to fault in breaker operating mechanism.*
- ▶ *Auxiliary of both units are from two different sources.*
- ▶ *110 V AC power to Flame scanner Panel of both units U#1 and U#2 has been provided through UPS of U#1 and U#2 respectively.*

**24.2 Islanding of CESC system at 14:31 hrs on 28-04-2020**

Prior to the event, CESC system was radially connected with rest of the grid via 132 kV Kasba (WBSETCL) – EMSS T/C. At 14:31 hrs, 132 kV Kasba (WBSETCL) – EMSS T/C tripped only from EMSS end resulting in islanding of CESC system along with generation units #1, unit #2 and unit #3 at Budge Budge generating station. No load or generation loss was reported at the time of the event. R phase to earth fault was observed in Subhasgram PMU data and fault clearing time was around 300 ms. Detailed analysis is attached in **Annexure B24.2**

Reason and location of fault along with reason for delayed fault clearing may be shared. As per WBSLDC/CESC report, around 1.1 kA current in R phase for 300 ms. was flowing from EMSS to

WBSECL system before islanding. No fault or tripping was reported in WBSETCL system at the time of fault. As per DR/PMU plot shared by CESC, around 0.5 kA current in R phase was flowing through 132 kV EMSS – Kasba – 3. CESC/WBSLDC are advised to share DR/PMU plots of 132 kV EMSS – Kasba – 1 and 2 also (WB SLDC/ CESC to update)

No SOE and analog SCADA data are recorded during this event. WB SLDC is advised to check this issue. (WB SLDC update)

**Relay Indications:**

Name	Relay Indication at End 1	Relay Indication at End 2
132 kV Kasba (WBSETCL) – EMSS T/C	Did not trip	R phase, Directional O/C trip.

WBSETCL and CESC may explain.

**Deliberation in meeting**

*WBSETCL explained that there was a fault in 33kV system connected to Sonarpur 132kV S/S. The 33kV system protection failed to clear the fault. The fault was R-Y phase to phase fault producing a fault current of around 12kA (30 times the p.s. value of 400A of O/C relay). IDMT relay with TMS of 0.15 tripped at 132kV Sonarour end in 360 ms.*

*In the mean time CESC system got islanded within 300 ms as per the scheme.*

*WBSETCL added that normally, 33kV lines have a second stage O/C setting with DT characteristics to trip within 50ms. By mistake, the protection was not enabled for this line. After wards, setting of that line as well as most of 33kV lines have been checked and set right.*

*PCC advised WBSETCL and CESC to coordinate the protection settings and islanding scheme settings to minimize separation of CESC system.*

**24.3 Repeated tripping of transmission lines due to same reason/fault at nearby areas.**

There are eleven transmission lines having voltage level 220 kV and above and which tripped more than two times in the month of April 2020. After analysis the reason, it has been observed most of them tripped more than one time with same relay indication. Summary of tripping incidents is given in following table:

Name of the line	Reason	No of tripping	Name of Utility
220KV-BEGUSARAI-NEW PURNEA-1	SLG, L-L-G and L-L fault at various location	6	BSPTCL
220KV-BEGUSARAI-NEW PURNEA-2	SLG, L-L-G and L-L fault at various location	6	BSPTCL
220KV-CHANDIL-STPS(WBPDCL)-1	GD at Chandil	2	WBPDCL/ JUSNL
220KV-TENUGHAT-BIHARSARIFF-1	B phase to earth fault at various location (2 incidents led to GD at TTPS)	4	BSPTCL/ JUSNL
400KV-JEERAT-BAKRESWAR-1	R phase to earth fault due to R phase to ground fault at 39 - 46 km from Bakreswar	3	WBSETCL



220KV-JODA-RAMCHANDRAPUR-1	Y phase to earth fault at various location	3	DVC/OPTCL
220KV-BUDHIPADAR-KORBA-2	R phase to earth fault at 1-8 km from Budhipadar	3	WRTS-1/OPTCL
220KV-BIRPARA-MALBASE-1	Bus bar protection operated at Malbase	2	ERST-2/Bhutan
400KV-NEW PURNEA-GOKARNA-1	B phase to earth fault at 20 km from Purnea	2	PGCIL ERTS-2
400KV-ALIPURDUAR (PG)-BINAGURI-3	B phase to earth fault at various location	3	PGCIL ERTS-2

Repeated tripping of these lines due to same fault or same reason may endanger the reliability of Eastern Region. Further it has been observed fault location is reported in nearby areas in case of some tripping incidents. Utilities are requested to share root cause of these tripping incidents along with remedial action taken to solve this problem. It has been observed 220 kV Tenughat Biharshariff S/C tripped several times in the month of March and April 2020.

**Members may discuss.**

**Deliberation in meeting**

*PCC advised all the concerned utilities to take necessary action to avoid repeated trippings.*

**ITEM NO. B.25: 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**

As per IEGC section 5.2 (r), all the users, STU/SLDC and CTU are to send information including DR/EL output to RLDC within 24 hours from the tripping incident. But in case of some tripping incidents, DR/EL and detailed tripping report are yet to be received even after the end of the month. All the users, STU/SLDC and CTU are suggested to upload DR output in comtrade format of both main 1 and main 2 protection (if available) and event logger output in PDF format in PDMS. In case of technical constraints related to uploading of DR/EL in PDMS, DR/EL may be sent to erldcprotection@posoco.in and erpcprotection@gmail.com. Both the end substations of all transmission lines having voltage level of 220 kV and above are advised to share tripping details as per format attached in annexure within 24 hrs from the occurrence of the tripping. All the SLDCs and generating stations may send detailed report along with root cause analysis and remedial action taken to ERLDC/ERPC within seven days of any grid disturbance/grid incident/grid event within their control area.

Following table shows the events where DR/EL and detail report are yet to be received for GD/GI events in the months of March and 2020.

Date	Time	S/S involved	DR/EL/Report yet to be received from*
05-03-2020	19:27	JITPL	DR and Detail report yet to be received from JITPL (DR received in PDF format)
13-03-2020	03:26	Budhipadar	--
15-03-2020	13:52	Teesta III & Dikchu	--
15-03-2020	16:12	TVNL	DR not generated at PTPS end (as reported) Detail report yet to be received from Jharkhand SLDC
28-03-2020	18:49	Muzaffarpur	Detail report and DR/EL yet to be received from PGCIL ERTS I
29-03-	19:21	Chandil	--

2020			
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\*As on 22nd April 2020

Date	Time	S/S involved	DR/EL/Report yet to be received from*
01-04-2020	18:23	Tashiding, New Melli, Jorethang,	Detail report along with DR/EL recorded at Gangtok are yet to be received from Sikkim SLDC/POWERGRID
03-04-2020	03:19	Balimela	DR/EL yet to be received from OHPC/OPTCL
14-04-2020	12:47	Tenughat	Biharshariff end DR/EL yet to be received from BSPTCL, PTPS end DR/EL yet to be received from JUSNL
15-04-2020	17:20	Chandil	STPS, Ramchandrapur and Ranchi end DR/EL yet to be received
17-04-2020	10:50	Parulia	DR/EL are yet to be received from DVC and POWERGRID ERTS - II (for Parulia PG)
18-04-2020	19:34	GMR	DR recorded at GMR is yet to be received
19-04-2020	20:54	Motihari	Detail report is yet to be received from Bihar SLDC
21-04-2020	11:00	Teesta III	DR/EL yet to be received from Kishangunj end
21-04-2020	18:29	JITPL	DR/EL yet to be received form JITPL
22-04-2020	20:12	Tenughat	Detail report and DR/EL yet to be received from Bihar SLDC/BSPTCL
26-04-2020	08:42	Motihari	Detail report yet to be received from Bihar SLDC
26-04-2020	11:10	Motihari	Detail report yet to be received from Bihar SLDC
28-04-2020	06:29	Tenughat	Detail report yet to be received from TTPS and Jharkhand SLDC
30-04-2020	19:37	Chandil	--

\*As on 03rd May 2020

While submitting detail report of any GD/GI or any grid event, following information/items are to submitted also:

1. Submission of Action Taken Report or Target date for Action (if remedial action is to be taken) whichever is applicable
2. Submission of Main I & Main II Protection of both ends
3. Submission of Make, Date of Commissioning, Date of Installation and latest test report of each equipment in case of GD/GI/grid event occurred due to any equipment failure
4. Recent single line diagram of any S/S

**Members may discuss.**

### **Deliberation in meeting**

*PCC advised all the concerned utilities to upload the relevant details in PDMS online portal within the stipulated time as per the regulation.*

### **ITEM NO. B.26: Tripping of transmission lines and ICTs due to CT/CVT failure and tower collapse.**

Due to CT/CVT failure and tower collapse, around 15 tripping incidents of transmission lines and ICTs were reported in the months March and April 2020. Details of all tripping incidents are given in All the utilities are requested to take preventive action so that no of tripping indents may be reduced.

SR.NO	LINE NAME	OWNER	TRIPPING DATE	TIME	REASON
1	132 KV NBU-RAMMAM	WBSETCL	01-03-2020	22:01	B PHASE CT BLAST
2	132 KV ARRAH - JAGDISHPUR II	BSPTCL	01-03-2020	23:52	B PHASE CVT BURST
3	400 KV JITPL - ANGIL II	JITPL	05-03-2020	19:27	CT FAILURE OF TIE BAY
4	220KV-BUDHIPADAR-RAIGARH-1	POWERGRID/ OPTCL	13-03-2020	03:20	.R-ph WT droper jumper broken
5	765KV-RAIPUR PS (DURG)-JHARSUGUDA-2	POWERGRID	16-03-2020	10:11	Jharsuguda:While charging from Jharsuguda end Y ph LA failed at Jharsuguda and line tripped on SOTF.
6	400KV-MERAMUNDALI-NEW DUBRI-D/C	OPTCL	20-03-2020	18:07	3 NOS. OF D/C TOWER COLLAPSED AT LOC NO 17 , 18 AND 19 AT APPROX 10 KM FROM MEERAMUNDALI.
7	315 MVA 400/220 kv ICT II at Jeypore	POWERGRID	29-03-2020	15:37	PRD operated,Rupture of R phase diaphragm in OLTC chamber
8	220 KV SANTALDIH-CHANDIL	WBSETCL/ JVUNL	29-03-2020	19:21	R PHASE CT BLASTE
9	220 kV Howrah - KTPP D/C	WBSETCL	01-04-2020	15:53	Tower collapse at loc no 66 due to soil erosion
10	220 KV BAIMELA - JAYNAGAR	OPTCL	03-04-2020	03:19	B-PHASE CT BLAST
11	220KV-TTPS-TSTPP-1	OPTCL	14-04-2020	10:54	Common D/C tower collapse reported at loc. No.71.
12	220KV TTPS-Rengali (Gridco)	OPTCL	14-04-2020	10:54	Common D/C tower collapse reported at loc. No.71.
13	400KV-GMR-ANGUL-1	GMR	18-04-2020	19:35	R PHASE LA BLAST
14	765 KV NEW RANCHI - DHARAMJAYGARH-I	POWERGRID	21-04-2020	02:45	Tower collapse at loc no : 92 (A+3) and at loc 91 (A+0) & 90 (A+3) partially damaged.
15	400 KV BUS-2 AND BOTH UNIT	JITPL	21-04-2020	18:29	GT SIDE MAIN CB CT FAILURE
16	TOTAL POWER FAILURE AT CHANDIL	JUSNL	30-04-2020	19:37	BURSTING OF LT SIDE OF Y PHASE BUSHING OF 100 MVA 220/132 KV ICT – 3 AT CHANDIL

**Members may discuss.**

**Deliberation in meeting**

*PCC advised all the concerned utilities to take necessary action to avoid repeated trippings.*

**ITEM NO. B.27: Submission of detailed tripping information on Transmission Element Tripping**

A format for submission of detailed information on Transmission element tripping has been prepared for analysis and record keeping. The format includes the details to ensure the better record keeping in view of various requirement in line with IEGC and CEA Regulations. The format is provided in Excel form for ease of data update by the transmission owners/licensee.

Members may discuss.

**Deliberation in meeting**

*PCC advised all constituents to submit detailed tripping information on transmission element tripping in line with IEGC and CEA Regulations.*

**ITEM NO. B.28: Submission of Follow Up on the Issues Raised by ERLDC in their detailing GD/GI report to utilities**

ERLDC through its various detailed report of GD/GI has asked on the various issues and discrepancies observed during any event. It has been observed that follow up action are quite delayed or not being submitted properly by the utilities. All utilities are advised to submit the action taken on the Issues discussed in the last PCC at the beginning of the PCC meeting for ensuring that such tripping will not reoccur.

Members may discuss.

**Deliberation in meeting**

*PCC advised all constituents to update follow up actions.*

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

Members may update the latest status.

**Deliberation in meeting**

*All constituents updated status as mentioned in Annexure-C1.*

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

The compliance status of 1<sup>st</sup> Third Party Protection Audit observations is as follows:

Name of Constituents	Total Observations	Complied	% of Compliance
<b>Powergrid</b>	54	46	85.19
<b>NTPC</b>	16	14	87.50
<b>NHPC</b>	1	1	100.00
<b>DVC</b>	40	26	65.00
<b>WB</b>	68	49	72.06
<b>Odisha</b>	59	42	71.19
<b>JUSNL</b>	34	25	73.53
<b>BSPTCL</b>	16	5	31.25
<b>IPP (GMR, Sterlite and MPL)</b>	5	5	100.00

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

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

In 77<sup>th</sup> PCC, BSPTCL has submitted the updated status.

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

BSPTCL may update.

In 89<sup>th</sup> PCC, PCC advised ERPC and ERLDC to plan Audit at nearest substation by end of March 2020.

### **Deliberation in meeting**

Members noted.

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

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

<b>List of line where auto reclose facility is not available(Information based on PMU data analysis)</b>							
S. No	Transmission Lines name	Date of Tripping	Reason of Tripping	Owner Detail		Present Status	
				End-1	End-2	OPGW/P LCC Link available	AR facility functional
13	220KV BUDIPADAR-KORBA-II	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC not available	will be activated in consultation with Korba

17	<u>220 KV TSTPP-RENGALI</u>	17.07.16	EARTH FAULT	NTPC	OPTCL	OPGW replaced PLCC.	by March 2018
18	<u>220KV BUDIPADAR-RAIGARH</u>	21.07.16	EARTH FAULT	OPTCL	PGCIL	PLCC defective.	To be commissioned be Chhatisgarh.
20	<u>220 KV FARAKKA-LALMATIA</u>	03.08.16	B-N FAULT .	NTPC	JUNSL	Yes	Old Relay and not functional. 7-8 months required for auto re-close relay procurement.
23	<u>220 KV MUZAFFARPUR - HAZIPUR - II</u>	10.08.16	B-N FAULT	PGCIL	BSPTCL	PLCC commissioned.	Voice established. For carrier required shutdown
24	<u>220 KV ROURKELA - TARKERA-II</u>	11.08.16	B-N FAULT	PGCIL	OPTCL	OPGW available	DTPC installed. A/R to be commissioned.
27	<u>220 KV BIHARSARIF-TENUGHAT</u>	07.09.16	B-N FAULT	BSPTCL	TVNL		
33	220KV Jamshedpur-Jindal-SC						

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

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

**OPTCL:**

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

**BSPTCL:**

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

<b>14</b>	<i>220 kV DMTCL-Motipur ckt-II</i>	<i>PLCC to be commissioned.</i>
<b>15</b>	<i>220 kV Dehri- Gaya D/C</i>	<i>PLCC working properly</i>
<b>16</b>	<i>220 kV Kishanganj(PG)-Kishanganj(B)-II</i>	<i>PLCC working properly</i>

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

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

Members may update.

**Deliberation in meeting**

*PCC advised all constituents to take appropriate action to rectify PLCC and autoreclose issues. .*

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

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## Annexure A

Sl.No	Participant name	Organization	Contact No	Email ID
1	Gagan kumar	Bihar SLDC	7992486100	gagankmishra@gmail.com
2	Samten	BPC (Bhutan)	97517280264	samten@bpc.bt
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5	Sucharit Mondal	CESC	7595956952	sucharit.mondal@rpsg.in
6	Santosh Godhekar	DANS ENERGY	7797357880	santosh.ghodekar@dansenergy.com
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14	Saibal Ghosh	ERLDC	8584072079	saibal@posoco.in
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19	Alok Pratap Singh	ERLDC	9007285390	apsingh@posoco.in
20	D.K.Jain	ERLDC		dk.jain@posoco.in
21	Amaresh Mallick	ERLDC		amareshmallick@posoco.in
22	J.G.RAO	ERPC	9547891353	ganeshjada@gmail.com
23	Pradeep Kumar Mohanty	GMR kamalanga Energy Ltd. Odisha	7894450332	pradeep.mohanty@gmrgroup.in
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27	Shivshankar Prasad Singh	JUSNL	9304226255	esetcirclehzb@gmail.com
28	Arun Kumar	JUSNL	9431707314	tcjsr_jusnl@rediffmail.com
29	Dharm Das Murmu	JUSNL	8877128318	cecritl.jusnl@rediffmail.com
30	Arunava Das	Maithon Power Limited	7797305405	arunava@tatapower.com
31	Asim Kumar Nayak	Maithon Power Limited	9204958570	nayakak@tatapower.com
32	Rahul anand	NTPC-Patna	9425823430	rahulanand@ntpc.co.in
33	Vivek Pushpakar	NTPC Barh	9473199217	vivekpushpakar@ntpc.co.in
34	Dhananjay	NTPC Kahalgaon	9425823537	dhananjaykumar@ntpc.co.in
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36	K C Agarwal	NTPC Talcher	9437027760	kcagrawala@ntpc.co.in
37	Uma kanta Mishra	OPTCL	9438907493	ele.umishra@optcl.co.in
38	M Z Huda	OPTCL	9438907491	mzhuda@optcl.co.in
39	Ankur Kumar	Powergrid ER-1	9431815656	ankur@powergridindia.com
40	Sudeep Kumar	Powergrid ER-1	9431820338	sudeepkumar@powergridindia.com
41	Ankur Kumar	Powergrid ER-1	9431815656	ankur@powergridindia.com
42	Barnab Banerjee	Powergrid ER-2	8918785206	barnab@powergridindia.com
43	Ch Mohan Rao	Powergrid Orrisa	9437962193	mohan.rao@powergridindia.com
44	Sukdev Bal	Powergrid ER-2	9903180042	sukdevbal@powergridindia.com
45	Vivek Karthikeyan	Sterlite Power	8966903034	vivek.karthikeyan@sterlite.com
46	Sanjeev Kumar	Tashiding HEP	9557790804	sanjeev@dansenergy.com
47	Deepak Kumar Singh	Tashiding HEP	7797305405	sanjeev@dansenergy.com
48	B. Devendra kumar	Teesta -3 1200mw HEP	8116623069	devendra.b@teestaurja.com



49	Sumanta Padhi	Teesta -3 1200mw HEP	9816661260	devendra.b@teestaurja.com
50	Swapn Bhowmik	TPTL	9958008265	swapan.b@tvptl.com
51	Pallavi Kansal	TPTL	9898596883	pallavi.k@tvptl.com
52	Ashish Kumar Sharma	TVNL	9031049922	ashishtvnl@gmail.com
53	J. K. Sinha	TVNL	9031049934	jksinha_lalpania@yahoo.co.in
54	Ayyappa	TPTL	8967441535	ayyappa.y@tvptl.com
55	GOUTAM DUTTA	WB SLDC	9434910266	g_dutta0304@rediffmail.com
56	RAJAT KR KOLEY	WBPDC	9474860642	rk.koley@wbpdcl.co.in
57	Jayanta Kanjilal	WBSETCL	9434910189	cectdwbsetcl@gmail.com
58	Tushar Ranjan	Jharkhand SLDC	9326374226	sldcranchi@gmail.com



Annexure B5

**Disturbance at 220 kV Chandil GSS  
on 29.03.2020 at 19:21 hrs.**

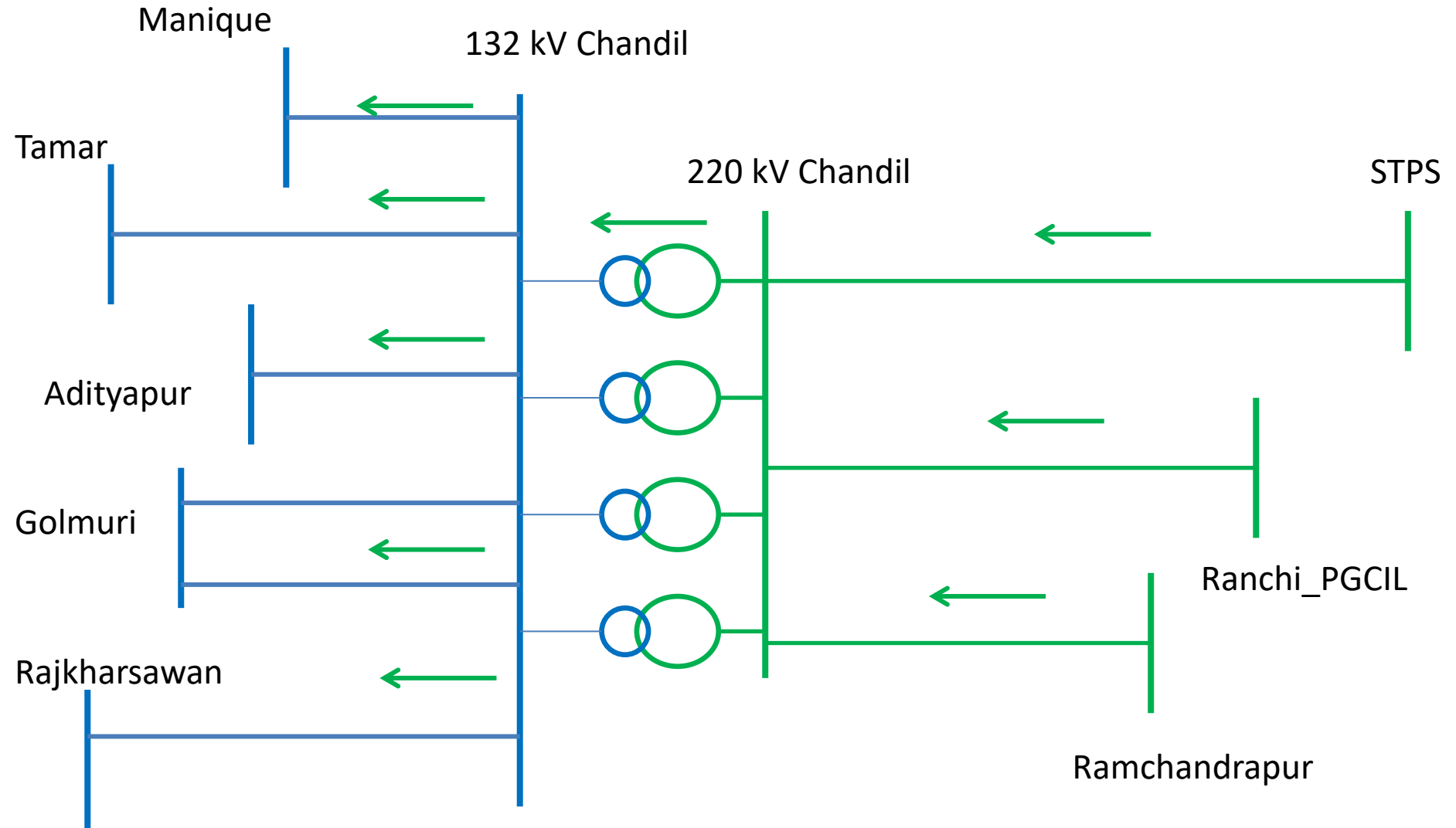
# Disturbance at Chandil GSS

- **Overview of Incident :-**

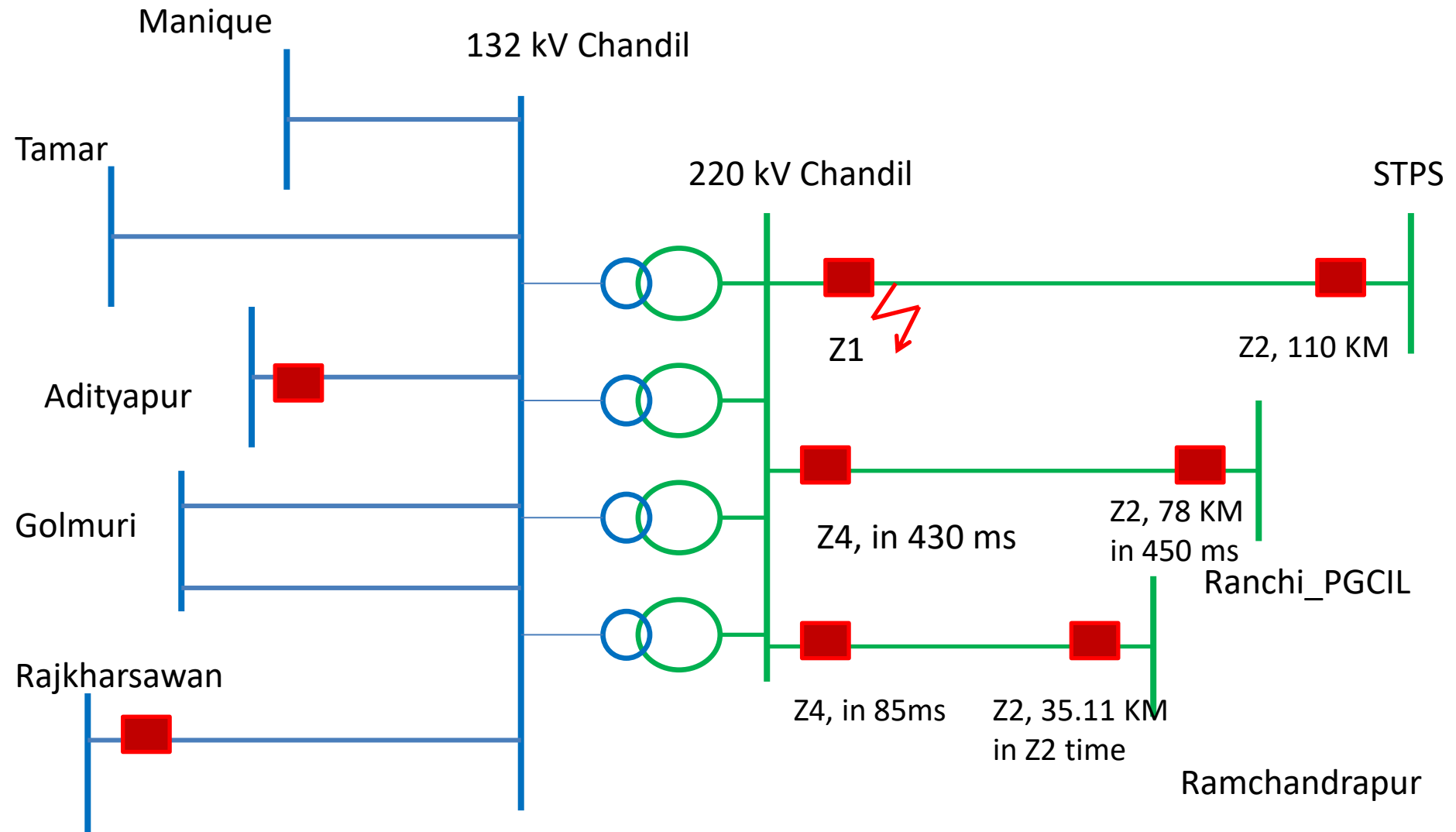
At 19:21 hrs, R phase CT of 220 kV STPS bay of 220/132 kV Chandil s/s got burst which has created bus fault and eventually resulted into tripping of all 220 kV feeders connected to Chandil S/S.

Load loss: 210 MW

# ➤ Pre-fault conditions :-



## ➤ Post-fault conditions :-



# No tripping observed in 132 kV ADP & 132 kV RKSAN at Chandil however both the circuit isolated around 1s assumed fault was cleared by remote end relays.

## • Relay Indications at Chandil :-

1. 220 kV STPS :- Zone – 1, R & Y Phase Distance, A/R Block, A/R Lockout, General alarm CB fail, Sys freq – 50.00 Hz, Fault Duration – 606.6 msec, RTT – 20.09 ms, IA – 0.00 kA, IB – 0.00 A, IC – 0.00 A, VAN - 0.00 kV, VBN - 0.00 kV, VCN – 0.00 kV
2. 220 kV Ranchi PGCIL :- Active Group – 1, Start Phase – ACN, Start Elements – Distance, O/C start I>2, E/F Start IN 1 2, Tripped element – no, System Frequency - 50.00 Hz Fault Duration – 433 ms Relay Trip Time - 0.000 s Fault Location -0.000 m IA - 2.01 kA , IB – 418.0 A , IC – 617.9 A, VAN – 28.5 kV, VBN - 113.8 kV, VCN - 158.9 kV Fault Resistance : 10.72 Ohm, Fault in Zone - Zone 4

### **3. 220 kV Ramchandrapur :-**

Active Group – 1, Start Phase – ABCN, Start Elements – Distance, O/C start I>2, E/F Start IN 1 2, Tripped element – no, System Frequency - 50.00 Hz Fault Duration - 86.66ms Relay Trip Time - 0.000 s Fault Location -0.000 m IA - 4.713kA , IB - 632.1 A , IC - 877.6 A, VAN - 4.494kV, VBN - 128.8kV, VCN - 137.1kV Fault Resistance : 158.4mOhm, Fault in Zone : Zone 4

### **4. 220 kV RCP – Chandil at RCP :-**

Active Group – 1, Start Phase – ACN, Start Elements – Distance, O/C start I>1 2 3, E/F Start IN 1 2, Tripped element – no, System Frequency - 50.00 Hz Fault Duration - 86.66ms Relay Trip Time - 0.000 s Fault Location – 345.11 km IA - 4.717kA , IB - 632.1 A , IC - 877.6 A, VAN - 4.494kV, VBN - 128.8kV, VCN - 137.1kV Fault Resistance : 158.4mOhm, Fault in Zone : Zone 4

- **Tripping Analysis :-**

- ❖ R phase CT of 220 kV Chandil – STPS S/C got burst at Chandil end at 19:21:18 hrs. which has resulted in bus fault at Chandil GSS.

- STPS end of this circuit sensed the fault in Z2 and cleared fault in Z2 time (around 450 ms).

- Chandil end Relay has sensed the fault in Z1 (later Z1 reset and Z4 picked up) and tripping command of only R phase breaker was given as per Z1 scheme. It is observed from voltage data of DR that fault was severe as line voltage has dropped to almost zero kV due to which relay may sense such close in fault in Z1 and Z4.

- Another Y phase earth fault has been observed around 470 ms after the first R phase to ground fault at Chandil end. Chandil end has seen this fault in Z1 and Chandil end breaker took 600 ms to clear the fault.



## • **Tripping Analysis :-**

❖ 220 kV Chandil – Ranchi (PGCIL) circuit tripped in Z4 (around 430 ms) from Chandil end and Ranchi end tripped in Z2 (around 450 ms).

❖ 220 kV Chandil – Ramchandrapur tripped in Z4 instantaneously (around 85 ms) from Chandil end whereas Ramchandrapur end tripped in Z2 around 500 ms.

## • **Tripping Analysis :-**

❖ As per DR observation none of the ICTs and 132 kV feeder tripped at Chandil as the feeding of fault observed through 132 Adityapur and 132 Rajkharsawan circuit around 1s and isolated these circuit after 1s, fault assumed to be cleared from remote end (Remote end DR not available).

## • **Tripping Analysis :-**

❖ As per Grid Official of Chandil GSS after bursting of R phase CT, jumper approached in vicinity of Y phase CT which led to second Y phase to ground fault in 220 kV Chandil – STPS circuit at Chandil end and persists for 600 ms after first R phase to ground fault and it was cleared after tripping of 132 kV Adityapur and 132 kV Rajkharsawan feeders from remote end.

## • Remedial Measures :-

- Chandil end feeders DR to be time synchronised and all DRs digital channel of Chandil end relays to be configured as per ERPC recommendation.
- Zone 4 time delay at Chandil end for all the feeders is to be reviewed.
- The breaker of STPS feeder is checked on 16.03.2020 (report attached).
- Under PSDF upgradation work old relays are being to be replaced.

## MOM

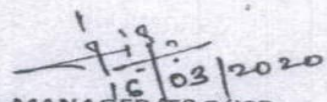
A MOM IS HELD ON DATED 16/03/2020 IN 220/132 KV TSD CHANDIL-1 HAVING A REFERENCE OF LETTER NO. 10 GM(CRITL /OPERATION EFFICENCY), DATED 13-03-2020.

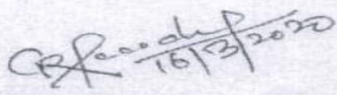
CIRCUIT BREAKER TIMER TEST OF 220 KV BREAKER OF STPS FEEDER (MAKE CGL, SRNO. 42525C) HAS BEEN PERFORMED AND THE RESULTS ARE SHOWN BELOW (TC-1 CIRCUIT):-

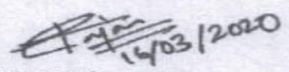
<u>OPERATION</u>	<u>R- PHASE</u>	<u>Y-PHASE</u>	<u>B- PHASE</u>
C-O	28.1 msec	28.3 msec	28.0 msec
TRIP	23.3 msec	23.6 msec	23.1 msec

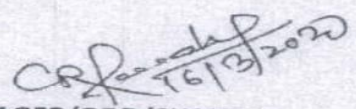
### OBSERVATIONS:-

- (1) NO DELAY IN B-PHASE HAS BEEN OBSERVED DURING THE TEST.
- (2) BREAKER PRESSURE ISSUE IS NOT OBSERVED DURING THE EVENT.

  
JR. MANAGER/T&C/JSR

  
MANAGER/TSD/CHANDIL

  
MANAGER/T&C/JSR

  
SENIOR MANAGER/GOD/CHANDIL

  
9/15/2020

**Thank You**



Annexure B6

# **Disturbance at 220 kV Chandil GSS on 15.04.2020 at 17:20 hrs.**

# Disturbance at Chandil GSS

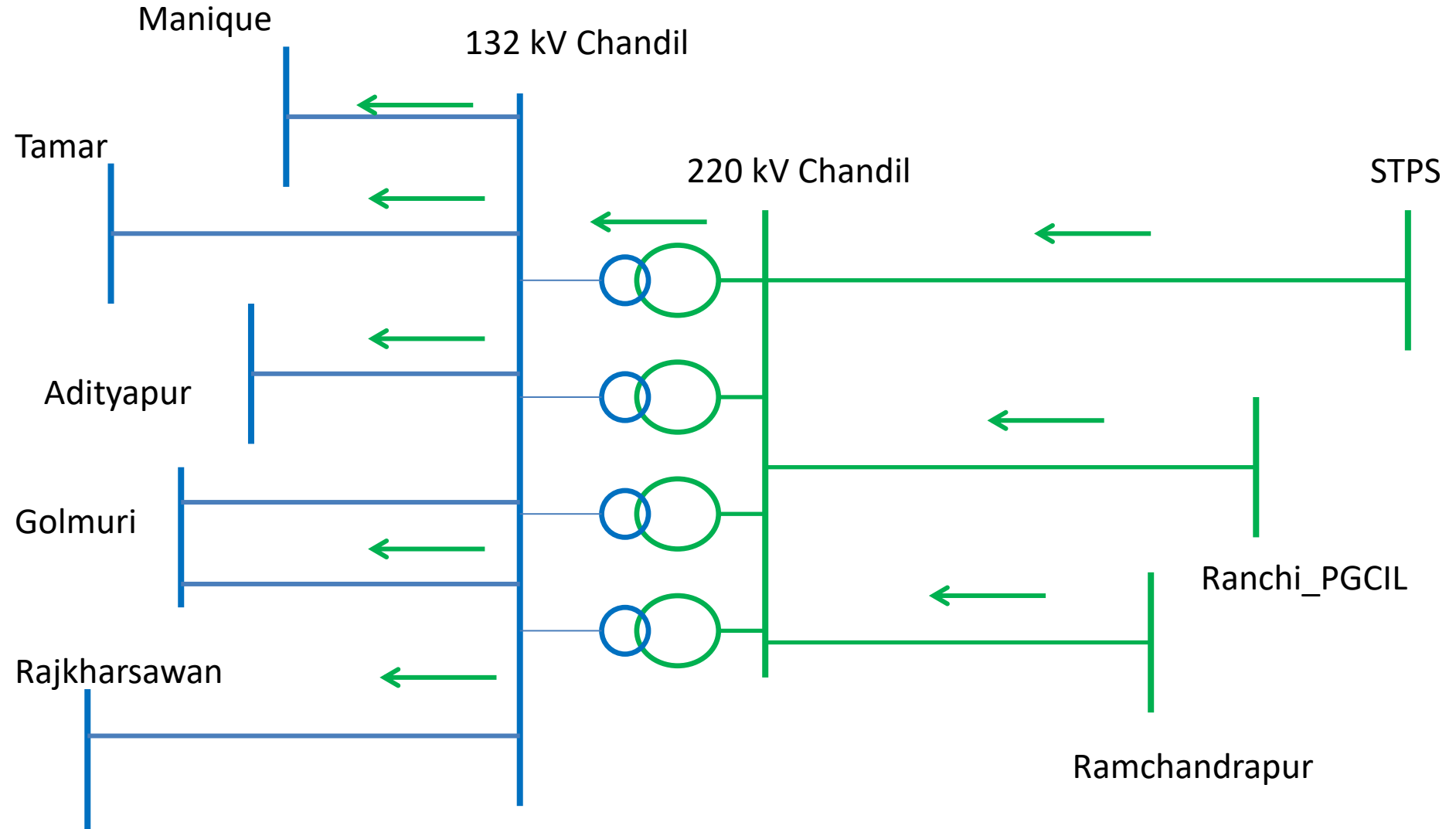
- **Overview of Incident :-**

- At 17:20 hrs., 220 kV Santaldih TPS (STPS) – Chandil S/C, 220 kV Ranchi – Chandil S/C and 220 kV Ramchandrapur – Chandil S/C got tripped. At the same time, flashover was observed at LV side of one of the 100 MVA, 220/132 kV ICT at Chandil S/s and all four 132 kV feeders connected to Chandil were hand tripped by the operator resulting in total power failure at 220/132 kV Chandil S/s and connected radial loads.
- Heavy storm and thunderstorm were reported at Chandil S/S at the time of the event.

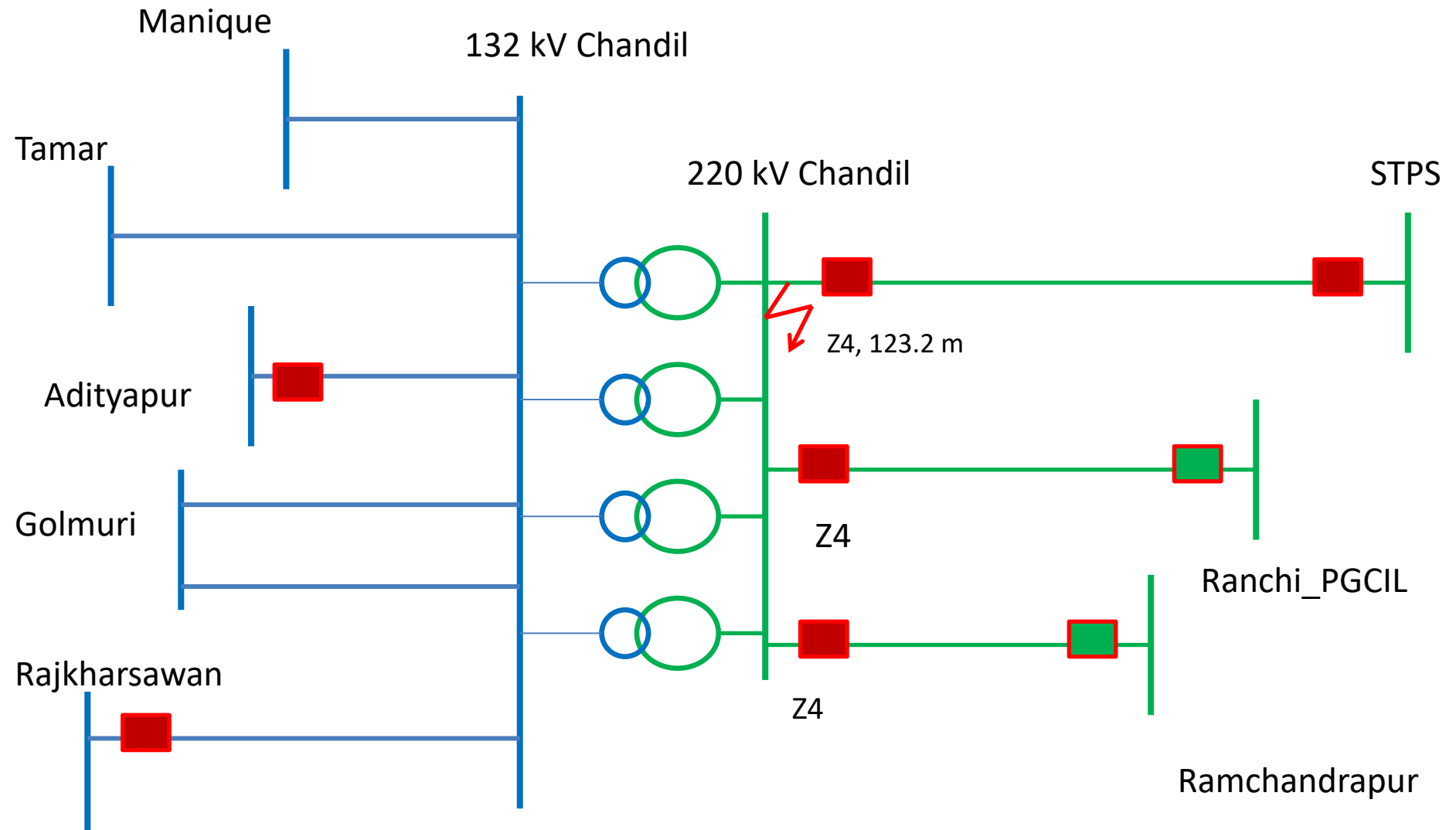
Load loss: 35 MW



# ➤ Pre-fault conditions :-



# ➤ Fault conditions :-



- **Relay Indications at Chandil :-**

1. **220 kV STPS** :- Active Group – 1, Start Phase –ABCN, Trip Phase – ABC, Start Elements – Distance, O/C start I>1 2, E/F Start IN 1 2, Breaker fail -1, System Frequency - 49.99 Hz Fault Duration – 3.734 s, Relay Trip Time - 2.119 s Fault Location – 123.2 km IA – 195.8 A , IB – 601.6 A , IC – 1.242 kA, VAN – 112.7 kV, VBN – 137.4 kV, VCN - 57.83 kV, Fault Resistance : 89.86 mOhm, Fault in Zone - Zone 4.
2. **220 kV Ranchi PGCIL** :- Active Group – 1, Start Phase – C, O/C start I>2, E/F Start IN 1 2, Tripped element – no, System Frequency - 49.99 Hz Fault Duration – 466.40 ms Relay Trip Time - 0.000 s, IA – 429.7 A , IB – 461.2 A , IC – 1.313 A, VAN – 105.8 kV, VBN – 147.4 kV, VCN - 55.92 kV, Fault in Zone - None.

### **3. 220 kV Ramchandrapur :-**

Active Group – 1, Start Phase –ABC, O/C start I>2,  
E/F Start IN 1 2, Tripped element – no, Fault  
Duration – 461.8 ms, Relay Trip Time - 0.000 s,  
Fault Location -0.000 m IA – 689.8 A , IB – 655.4  
A, IC – 2.940 kA, VAN – 119.7 kV, VBN – 133.0 kV,  
VCN – 54.42, Fault in Zone : None

### **4. 220 kV RCP – Chandil at RCP :-**

There was no tripping at Ramchandrapur end as  
informed by Grid official of Ramchandrapur.

- **Tripping Analysis :-**

❖ **220 kV Chandil – STPS S/C :-** From the DR of 220 kV Chandil – STPS S/C at Chandil end, it is observed that it has sensed the fault in Zone 4 (Pick up in 1.1 s) and issued trip command after 1500 ms. With this, its R and Y poles of the breaker had tripped however, Fault current persisted in B phase breaker pole which after around 2 seconds became zero. The DR do not have digital input for Zone 4 tripping and only pickup has been provided however based on time setting it is assumed that it is zone 4 tripping.

As per details shared by Chandil end, Y phase power swing block (PSB IN) and auto reclose lock out picked up at STPS end for this circuit. Although line voltage became zero at Chandil end DR after 1 second of the fault which indicate that the STPS has either tripped in zone 3 or Directional earth fault.

- **Tripping Analysis :-**

- ❖ **220 kV Chandil – Ranchi (PGCIL) and 220 kV Chandil – Ramchandrapur :-** As per DR and EL of 220 kV Ranchi and Ramchandrapur O/C and E/F relay picked up for both the feeders and all three phase breakers of both feeders at Chandil end tripped at around 500 ms after the sensing the fault. As informed by Ranchi (PGCIL) and Ramchandrapur, there was no tripping from their end, hence it is assumed that fault was cleared by Back up protection. The Back up relay indication of these feeders are yet to be received from Chandil.

It is observed from DR that after sensing the fault line voltages of both the RCP and PGCIL feeders became zero after 1000 ms at Chandil end due to presence of line voltage of 220 kV Chandil – STPS feeders for around 1s which might got tripped in zone 3 or Directional earth fault after 1s from STPS end (as the tripping not recorded in STPS data).

## • **Tripping Analysis :-**

❖ **132 kV Adityapur and 132 kV Rajkharsawan feeders :- Both these feeders sensed fault instantaneously in Z4, later reset and again picked up Z4 around 1s and cleared fault in 500 ms. Both the feeders assumed to be tripped in Z4 as DR do not have Z4 tripping. After 1.2s of fault, line voltage of both the feeders become almost Zero assumed to be remote end fault clear (as the remote end tripping data yet to be received).**

## • **Tripping Analysis :-**

❖ **132 kV Golmuri d/c feeders might be the source of fault ( of 220 kV Chandil – STPS trough ICTs (as tripping details of Golmuri yet to be received) as 220 kV Ranchi (PGCIL) and 220 kV Ramchandrapur isolated around 500 ms after fault and 132 kV Adityapur and Rajkharsawan feeders isolated in around 1.5 s as per DR details. The fault might have got cleared after tripping of 132 kV Golmuri d/c feeders.**



- **Remedial Measures:-**

- Chandil end feeders DR to be time synchronised and all DRs digital channel of Chandil end relays to be configured as per ERPC recommendation.
- Reason for tripping of 220 kV Ranchi (PGCIL), 220 KV Ramchandrapur and 220 kV STPS feeders at chandil end is not recorded which is to be checked.
- The breaker of STPS is checked on 16.03.2020 (report attached).
- Under PSDF upgradation work old relays are being to be replaced.

## MOM

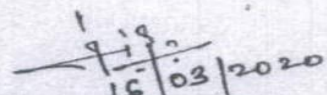
A MOM IS HELD ON DATED 16/03/2020 IN 220/132 KV TSD CHANDIL-1 HAVING A REFERENCE OF LETTER NO. 10 GM(CRITL /OPERATION EFFICENCY), DATED 13-03-2020.

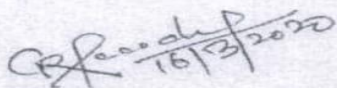
CIRCUIT BREAKER TIMER TEST OF 220 KV BREAKER OF STPS FEEDER (MAKE CGL, SRNO. 42525C) HAS BEEN PERFORMED AND THE RESULTS ARE SHOWN BELOW (TC-1 CIRCUIT):-

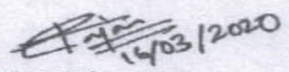
<u>OPERATION</u>	<u>R- PHASE</u>	<u>Y-PHASE</u>	<u>B- PHASE</u>
C-O	28.1 msec	28.3 msec	28.0 msec
TRIP	23.3 msec	23.6 msec	23.1 msec

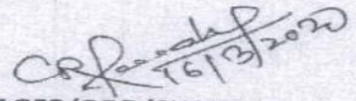
### OBSERVATIONS:-

- (1) NO DELAY IN B-PHASE HAS BEEN OBSERVED DURING THE TEST.
- (2) BREAKER PRESSURE ISSUE IS NOT OBSERVED DURING THE EVENT.

  
JR. MANAGER/T&C/JSR

  
MANAGER/TSD/CHANDIL

  
MANAGER/T&C/JSR

  
SENIOR MANAGER/GOD/CHANDIL

  
9/15/2020

**Thank You**



**Disturbance at 220 kV Chandil GSS  
on 30.04.2020 at 19:37 hrs.**

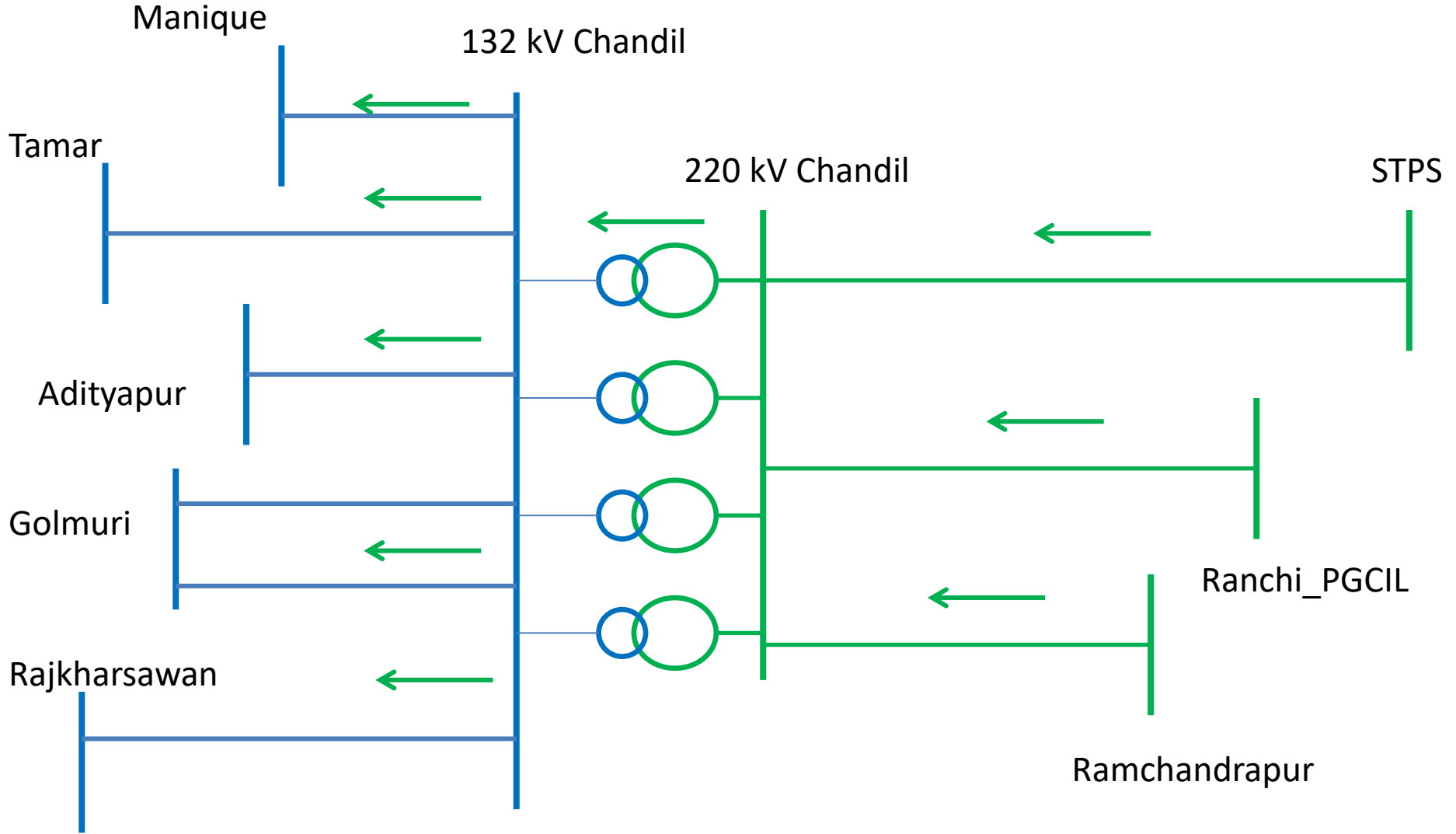
# Disturbance at Chandil GSS

- **Overview of Incident :-**

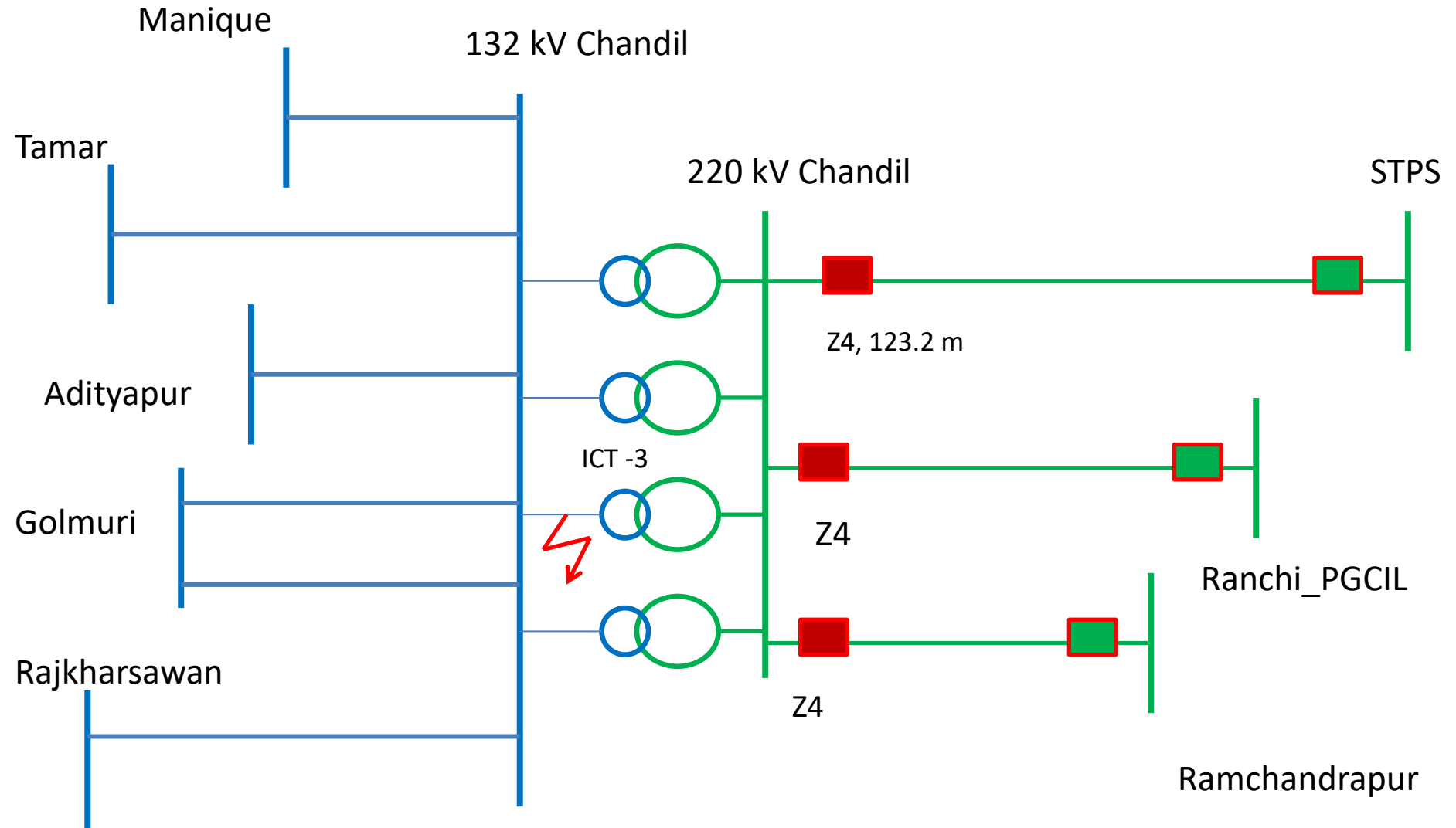
- At 19:37 hrs, all 220 kV lines (only from Chandil S/S) and 220/132 kV ATRs tripped at Chandil due to bursting of LV side of Y phase bushing of 100 MVA 220/132 kV ICT - 3 (Make: Westing house Canada, manufactured at 1964 and installed in 1975) at Chandil. This has resulted in total power failure 220/132 kV Chandil and its nearby areas (Golmuri and Rajkharswan).

Load loss: 145 MW

# ➤ Pre-fault conditions :-



# ➤ Fault conditions :-



- **Relay Indications at Chandil :-**

- 1. 100 MVA ICT – 3 :- Differential relay and E/F operated. Differential relay and E/F indication not retrieved as the relay is Electromechanical type.**
- 2. 220 kV STPS :- Active Group – 1, Start Phase –ABC, Breaker fail, Breaker fail -1, System Frequency - 49.98 Hz Fault Duration – 1.554 s, Relay Trip Time - 11.46 ks, IA – 00.0 A , IB – 00.0 A , IC – 00.0 A , VAN – 00.0 kV, VBN – 00.0 kV, VCN - 00.0 kV**
- 3. 220 kV Ranchi PGCIL :- Active Group – 1, Start Phase – AB, O/C start I>2, E/F Start IN 1 2, System Frequency - 50.04, Fault Duration-433.1ms, Relay trip time-0.000 sec, IA-606.6A, IB-1.296KA, IC-325.5A, VAN-143.3KV, VBN-57.09KV, VCN-112.7KV, Master trip relay 86, Contact multifor trip relay-86**



### **3. 220 kV Ramchandrapur :-**

Active Group-1, Started phase-AB, O/C Start-I> 2, E/F Start IN 1 2, System Frequency-50.02 Hz, FaultDuration-411.5ms, Relay trip time-0.000 sec, IA-816.7A, IB-2.906KA, IC-466.4A, VAN-128.6KV, VBN-44.54KV, VCN-125.6KV.

### **4. 220 kV RCP – Chandil at RCP :-**

There was no tripping at Ramchandrapur end as informed by Grid official of Ramchandrapur.

- **Tripping Analysis :-**

- Y phase LT bushing of ICT – 3 failed at Chandil GSS, leads operation of Differential and Back up relay which are failed to clear the fault. This leads bus fault subsequently all the 220 kV feeders tripped at Chandil end.
- **O/C and E/F relay has picked up for 220 kV Ranchi and Ramchandrapur feeders at Chandil substation and all their breakers got tripped at around 500 ms after the sensing the fault. While the 220 kV STPS feeder at Chandil end got tripped at 1500 ms after sensing the fault.**

## • **Tripping Analysis :-**

- All three 220 kV feeders did not trip from remote end. However, line voltage of all the three circuits became zero in DR at around 2000 ms after sensing the fault at Chandil end indicating substation became dead. As per PMU data fault clearing time is 2000 ms. The 220 kV sources have tripped in 1500 ms but the fault was persist for next 500 ms this could be due to feeding from 132 kV Adityapur and Rajkharsawan feeders as fault persisted for around 2s as per EL observation. After isolation of 132kV feeders from remote end fault might got cleared.

- **Remedial Measures :-**

- Z4 setting of 220 kV lines to be reviewed in coordination with 220/132 kV ICTs back up O/C protection setting.
- Chandil end feeders DR to be time synchronised and all DRs digital channel of Chandil end relays to be configured as per ERPC recommendation.
- Under PSDF upgradation work old relays are being to be replaced.

**Thank You**

**Annexure B21 List of important transmission lines in ER which tripped in March-2020 and discrepancies have been observed**

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication end 1	Relay Indication end 2	Reason	Fault Clearance time in msec	Remarks	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END
1	<a href="#">400KV-MEERAMUNDALI-MENDHASAL-2</a>	3/1/2020	7:47	3/1/2020	9:02	Meramundali: DT Receipt	Did not trip	DT Received at Meramundali	Fault was not observed in PMU data	DT receipt signal is not configured in Meramundali end DR, DR may be configured as per ER PCC's recommendation Reason for DT receipt may be shared	<a href="#">YES</a>	NO
2	<a href="#">400KV-NEW PPSP-ARAMBAGH-1</a>	3/2/2020	12:52	3/2/2020	13:11	ZONE 1, DISTANCE= 132.8 KM, FAULT CURRENT=2.6 KA	ZONE 1, DISTANCE= 67 KM, FAULT CURRENT= 3.51 KA	B phase to Earth Fault	< 100 msec	Reason for non A/R attempt at Arambag end may be shared. Line successfully auto-reclosed at New PPSP end	<a href="#">YES</a>	NO
3	<a href="#">220KV-MAITHON-DUMKA-2</a>	3/3/2020	1:54	3/3/2020	2:37	R-N Ir 3.45 kA Loc 62 kM@Maithon	Zone- 01, R-ph, fault location:- 10.80 km @Dumka	R phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation may be shared.	NO	NO
4	<a href="#">220KV-DARBHANGA(DMTCL)-LAUKAHI-1</a>	3/6/2020	4:11	3/7/2020	19:17	OVERVOLTAGE	Yet to be received	R phase to Earth Fault	6000 msec	Reason for delayed fault clearing may be shared. As per PMU data high resistant R phase to earth fault has been observed	NO	<a href="#">YES</a>
5	<a href="#">400KV-MEERAMUNDALI-MENDHASAL-2</a>	3/6/2020	11:48	3/6/2020	12:23	Tripped from Meramundali end only. DT received	Did not trip	DT Received at Meramundali	Fault was not observed in PMU data	DT receipt signal is not configured in Meramundali end DR, DR may be configured as per ER PCC's recommendation Reason for DT receipt may be shared	<a href="#">YES</a>	NO
6	<a href="#">400KV-MEERAMUNDALI-MENDHASAL-2</a>	3/6/2020	13:29	3/6/2020	14:03	DT received at Meramundali	Yet to be received	DT Received at Meramundali	Fault was not observed in PMU data	DT receipt signal is not configured in Meramundali end DR, DR may be configured as per ER PCC's recommendation Reason for DT receipt may be shared	<a href="#">YES</a>	NO
7	<a href="#">400KV-NEW PPSP-NEW RANCHI-2</a>	3/7/2020	10:27	3/7/2020	10:42	Yet to be received	NRNC: DT Received	DT Received at New Ranchi	Fault was not observed in PMU data	Reason for DT receipt may be shared. New PPSP may confirm whether they send DT signal	NO	<a href="#">YES</a>
8	<a href="#">400KV-NEW PPSP-NEW RANCHI-1</a>	3/7/2020	17:22	3/7/2020	18:04	NPPSP: DT SENT	NRANCHI: DT RECEIPT	DT Received at New Ranchi	Fault was not observed in PMU data	Reason for sending DT signal from New PPSP end may be shared	NO	<a href="#">YES</a>

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication end 1	Relay Indication end 2	Reason	Fault Clearance time in msec	Remarks	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END
9	<a href="#">220KV-CHANDIL-STPS(WBSEB)-1</a>	3/7/2020	23:46	3/8/2020	0:06	z-1 86 km,1.93 kA B-N at Chandil	AT STPS: B-N,Z-1,22.1 KM,5.6KA	B phase to Earth Fault	1360 msec	Breaker operation status may be configured in DR at Chandil end. Reason for non opening of B phase breaker at Chandil end for 1.4 seconds approx. may be explained. Reason for opening of R & Y phase breaker at Chandil end 400 ms after the tripping may be explained. Both Chandil and STPS end need to be time synchronized.	YES	YES
10	<a href="#">220KV-DARBHANGA (DMTCL)-MOTIPUR-1</a>	3/9/2020	11:05	3/9/2020	11:43	Drabhanga-Z2 E/F, Dist-86.2 km DT send	B-N, 1.8 kA, z-1	B phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation may be shared.	NO	YES
11	<a href="#">220KV-DARBHANGA (DMTCL)-MOTIPUR-1</a>	3/9/2020	13:40	3/9/2020	20:56	Yet to be received	B-N,59 KM,Z2@MOTIPUR	B phase to Earth Fault	Fault was not observed in PMU data	Reason for non auto-reclose operation may be shared.	NO	<a href="#">DR sent for different timing</a>
12	<a href="#">400KV-MERAMUNDALI-LAPANGA-2</a>	3/10/2020	11:54	3/11/2020	17:49	Y-N,Z1,FD 91.3 KM,FC 4.95 KA	Y-N, Z-1, 2.6 kA	Y phase to Earth Fault	<100 ms	Reason for non auto-reclose operation at Meramundali may be shared.	YES	YES
13	<a href="#">220KV-PUSAULI-DEHRI-1</a>	3/12/2020	11:51	3/12/2020	12:28	B-N,10.912 KM,7.121 IN IB	Started phase-bn Tripped phase-R y b la-176.3a lb-91094a lc--2.029ka Van-126kv Vbn-134.6kv Vcn-85.70 kv Fault location-49.58km zone -1 at Dehri	B phase to Earth Fault	< 100 msec	Auto reclose operation did not took place at both ends. Reason may be shared. CB operation may be configured correctly in Gaya end DR. Time synchronization may be done at Dehri end	YES	YES
14	<a href="#">220KV-MUZAFFARPUR-HAJIPUR-1</a>	3/13/2020	7:21	3/14/2020	15:42	R-N,FD 6.3KM,FC 12KA@MZF	R-N,1.89KA,FD 71.8 KM@HAJIPUR	R phase to Earth Fault	< 100 msec	Auto reclose operation did not took place at both ends. Reason may be shared. Naming of digital channels may be configured correctly at Muzaffarpur end	YES	NO
15	<a href="#">400KV-PUSAULI(PG)-NABINAGAR(BRBCL)-1</a>	3/13/2020	19:26	3/13/2020	20:22	PLI: R-N, 81Km, 4.9KA	Yet to be received	R phase to Earth Fault	< 100 msec	At Pusauli, all three pole of tie CB tripped instantaneously and Y & B pole of main CB tripped after 1600 msec without auto reclose attempt. Nabinagar end DR may be shared	YES	NO
16	<a href="#">220KV-DEHRI-GAYA-1</a>	3/13/2020	20:00	3/13/2020	20:29	B-N, Z-1, 3 kA	Gaya-B-N, 63.9Km, 2.3KA	B phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation at Dehri end may be shared. Dehri end DR is not time synchronized.	YES	YES
17	<a href="#">220KV-GAYA-SONENAGAR-2</a>	3/13/2020	20:49	3/13/2020	21:07	Gaya: R-N, 21.8KM, 7.2KA, Auto reclose successful	R-N, 1,2 kA, z-1	R phase to Earth Fault	< 100 msec	Reason for opening healthy phase breakers at Sonenagar end without any auto-reclose attempt may be shared. Dead time at Sonenagar end may be reviewed	YES	YES

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication end 1	Relay Indication end 2	Reason	Fault Clearance time in msec	Remarks	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END
18	<a href="#">400KV-MERAMUNDALI-LAPANGA-2</a>	3/16/2020	15:53	3/16/2020	21:37	Did not trip	DT received	DT received at Lapanga.	Fault was not observed in PMU data	Reason for DT receipt at Lapanga end may be shared.	NO	NO
19	<a href="#">765 kv Jharsuguda Raipur - 2</a>	3/19/2020	14:20	3/19/2020	18:02	Y-N, 89.95 Kms Fault Current:7.116 Ka	Y-n, 202.5 Kms Fault Current:5.6 kA	Y phase to Earth Fault	< 100 msec	Reason for opening healthy phase of tie CB at Jharsuguda end without any auto-reclose attempt may be shared.	<a href="#">YES</a>	NO
20	<a href="#">400 kV Angul Jharsuguda 3</a>	3/19/2020	14:32	3/19/2020	15:21	Y-N, Z-2, 3.2 kA	Zone-1 Y-N fault ly-8.92kA Fault Location- 65.1km at Jharsuguda	Y phase to Earth Fault	< 100 msec	Reason for Auto reclose lock out (No AR operation) at Angul end may be shared; Unsuccessful auto reclose operation has been observed at Jharsuguda end	<a href="#">YES</a>	<a href="#">YES</a>
21	<a href="#">220 kv Budhipadar - Korba - 2</a>	3/19/2020	15:20			Z1,FD 1.3 KM,24.05 KA,R-N	Yet to be received	R phase to Earth Fault	< 100 msec	Reason for non-auto reclose operation at Budhipadar end may be shared. DR may be configured at Budhipadar end as per PCC's recommendation and post fault time window may be increased;	<a href="#">YES</a>	NO
22	<a href="#">400KV-JHARSUGUDA(GIS)-OPGC-1</a>	3/19/2020	15:26	3/19/2020	16:07	jharsguda:r-n,11.5 KA,FAULT 29.6 KM,A/R SUCCESSFUL	TRIPPED FROM OPGC END ONLY:R-N,21 KM	R phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation at OPGC may be shared.	<a href="#">YES</a>	NO
23	<a href="#">400KV-MERAMUNDALI-LAPANGA-1</a>	3/19/2020	16:54	3/19/2020	20:11	135 KM,Y-N,3.07 KA AT MEERAMANDALI	83.6 KM ;Y-N;Z1 AT LAPANGA	Y phase to Earth Fault	< 100 msec	Dead time of tie breaker was less than main breaker at Lapanga end; auto reclose of main breaker occurred even after unsuccessful auto-reclose of tie breaker and opening of healthy poles of main breaker. Reason may be shared. Reason for non-auto reclose operation at Meramundali end may be shared. DR at Meramundali end may be configured as per ER PCC's recommendation	<a href="#">YES</a>	<a href="#">YES</a>
24	<a href="#">220 kv Talcher Meramundali -1</a>	3/19/2020	18:03	3/20/2020	9:42	Yet to be received	Z1,R-N,7.68 KM,11.55 KA AT MEERAMANDALI	R phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation may be shared. DR at Meramundali end may be configured as per ER PCC's recommendation	NO	<a href="#">YES</a>
25	<a href="#">400 kv Talcher Meramundali - 1</a>	3/19/2020	18:14	3/20/2020	9:45	Yet to be received	Z1,R-N,9.5KA,34.4 KM AT MEERAMANDALI	R phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation may be shared. DR at Meramundali end may be configured as per ER PCC's recommendation	<a href="#">DR file size is 0 KB</a>	<a href="#">YES</a>
26	<a href="#">400KV-MERAMUNDALI-LAPANGA-1</a>	3/19/2020	23:18	3/20/2020	13:39	Meramundali: RN 68.5 KM, 7.1 KA	Lapanga: Z1 RN DIST- 135.2km IR- 2.798 kA	R phase to Earth Fault	< 100 msec	Dead time of tie breaker was less than main breaker at Lapanga end; auto reclose of main breaker occurred even after unsuccessful auto-reclose of tie breaker and opening of healthy poles of main breaker. Reason may be shared. Reason for non-auto reclose operation at Meramundali end may be shared. DR at Meramundali end may be configured as per ER PCC's recommendation	<a href="#">YES</a>	<a href="#">YES</a>
27	<a href="#">220KV-MUZAFFARPUR-HAJIPUR-2</a>	3/20/2020	9:35	3/20/2020	10:12	bus bar protection maloperation while testing ict 1	Tripped from Hazipur end only	Maloperation of Bus Bar protection.	Fault was not observed in PMU data	Reason for bus bar operation may be shared. Same incident has been observed on 28th March 2020	NO	NO



S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication end 1	Relay Indication end 2	Reason	Fault Clearance time in msec	Remarks	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END
28	<a href="#">220KV-TENUGHAT-BIHARSARIFF-1</a>	3/20/2020	12:22	3/20/2020	12:57	B-N, Z-1, 3.14 kA 59.34 km	E/F, Zone 1, distance 146.2 KM, fault resistance 28.88 Ohm.	B phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation may be shared.	NO	NO
29	<a href="#">220KV-DEHRI-GAYA-2</a>	3/20/2020	12:23	3/20/2020	13:17	B-N fault zone -1 29.49km from Dehri end Ic--2.685 kA	fault current 2.35 kA, B-N fault 64.9 km from Gaya	B phase to Earth Fault	< 100 msec	Reason for non auto-reclose operation at both ends may be shared. Dehri end DR is not time synchronized. CB operation may be configured correctly in Gaya end DR.	YES	YES
30	<a href="#">400KV-MERAMUNDALI-MENDHASAL-2</a>	3/21/2020	13:25	3/21/2020	13:45	Master Trip	Yet to be received	Master Trip	Fault was not observed in PMU data	Reason for master trip operation at Meramundali end may be shared	NO	NO
31	<a href="#">400KV-DURGAPUR-SAGARDIGHI-1</a>	3/21/2020	18:49	3/21/2020	20:09	DGP: R-N, 3.983KA, 107.09KM	SDG:R-N, 2.9Km, 26.29KA	R phase to Earth Fault	1000 msec	As per PMU at Durgapur (PG), Three phase A/R successful at 18:49:30 hrs and then Three phase tripped at 18:50:40 hrs.	NO	Yes
32	<a href="#">400KV-KHSTPP-BANKA (PG)-1</a>	3/21/2020	20:19	3/22/2020	10:05	KHSTPP: R-N, Z1, 4.5km from KhSTPP, 30.89kA	BANKA: R-N, 7KA, 48KM	R phase to Earth Fault	< 100 msec	R phase Main CB multiple times open and closed at Banka. Three phase tripped instantaneously. Auto reclose attempt was not observed in DR shared by NTPC and PG. Reason may be shared. KhSTPP end DR may be configured as per PCC's recommendation.	YES	YES
33	<a href="#">400KV-DURGAPUR-SAGARDIGHI-1</a>	3/22/2020	15:48	3/22/2020	16:34	Durgapur End-Z1, YN Dist-23.6 km 25.16 kA	Sagardighi End-YN, z1, Dist. 95.8km 3.87 kA	Y phase to Earth Fault	< 100 msec	Reason for non auto reclose operation may be shared	NO	NO
34	<a href="#">400KV-MERAMUNDALI-LAPANGA-1</a>	3/23/2020	13:27	3/23/2020	18:24	Y-N, 3.22KA, 129.1KM	Y-N, 3.6 kA, Z-1	Y phase to Earth Fault	< 100 msec	Dead time of tie breaker was less than main breaker at Lapanga end; auto reclose of main breaker occurred even after unsuccessful auto-reclose of tie breaker and opening of healthy poles of main breaker. Reason may be shared. Reason for non-auto reclose operation at Meramundali end may be shared. DR at Meramundali end may be configured as per ER PCC's recommendation	YES	YES
35	<a href="#">400KV-MERAMUNDALI-LAPANGA-1</a>	3/24/2020	11:53	3/24/2020	17:45	Meramundali: 124 km fc ly 3.21 kA lb 3.86 kA Y-B	Lapanga: Z1, Y-N, 89 km	Y phase to Earth Fault	< 100 msec	Dead time of tie breaker was less than main breaker at Lapanga end; auto reclose of main breaker occurred even after unsuccessful auto-reclose of tie breaker and opening of healthy poles of main breaker. Reason may be shared. Reason for non-auto reclose operation at Meramundali end may be shared. DR at Meramundali end may be configured as per ER PCC's recommendation	YES	YES
36	<a href="#">400KV-KODERMA-BIHARSARIFF(PG)-2</a>	3/26/2020	13:38	3/26/2020	14:39	R- N fault, 68.7 km from BS 2.07 kA	auto reclose unsuccessful at koderma end	R phase to Earth Fault	< 100 msec	Reason for no A/R operation at Koderma may be shared	YES	only cfg file

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication end 1	Relay Indication end 2	Reason	Fault Clearance time in msec	Remarks	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END
37	<a href="#">400KV-NEW CHANDITALA-KHARAGPUR-1</a>	3/27/2020	10:28	3/27/2020	10:49	KGP: B-N,,Z1,6.903km,8.378kA.	N CHANDITALA: B-N,,z1,108.9km,2.596kA	B phase to Earth Fault	< 100 msec	Reason for opening of healthy breakers without reclose attempt at Kharagpur end may be shared	YES	YES
38	<a href="#">400KV-NEW CHANDITALA-KHARAGPUR-1</a>	3/27/2020	12:08	3/27/2020	16:44	KGP: B-PH,Z1,7.802KM,FC 7.94KA	NCHD:B-PH,FD 107.6KM FC 2.74KA	B phase to Earth Fault	< 100 msec	Reason for opening of healthy breakers without reclose attempt at Kharagpur end may be shared	YES	YES
39	<a href="#">400KV-MEERAMUNDALI-MENDHASAL-2</a>	3/31/2020	10:22	3/31/2020	11:18	DT received at Meramundali	Yet to be received	DT Received at Meramundali	Fault was not observed in PMU data	DT receipt signal is not configured in Meramundali end DR, DR may be configured as per ER PCC's recommendation Reason for DT receipt may be shared	NO	NO

List of important transmission lines in ER which tripped in April-2020

4/1/2020

S.N	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	Utility to update
1	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/1/2020	13:51	4/1/2020	14:35	TIRUPP: R-N, 1L, 39.4 KM FC 1.38A	M-M-R-N, 2L, 33.97 KM FC 1.04A	B PHASE TO EARTH FAULT	1000 msec	Delayed fault clearance time. As per PMU data high voltage B phase to earth fault has been observed.	YES	NO	NTPC & OPTCL to update
2	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/1/2020	23:47	4/2/2020	0:45	DT, R, 8 ph		B PHASE TO EARTH FAULT	6000 msec	Delayed fault clearance time. As per PMU data high voltage B phase to earth fault has been observed.	YES	YES	DT operated
3	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/2/2020	11:45	4/2/2020	12:22	R-N,F,D 12.6M FC 1.17KAB/PA/NA	R-N,F,D 7.79M FC 1.63 IAG/TTPS	B PHASE TO EARTH FAULT	<100 msec	No A/R operation from both end.	YES	YES	ESPTCL and JSDNL to update
4	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/2/2020	12:45	4/2/2020	13:28	DT, R, 8 ph		B PHASE TO EARTH FAULT	210 msec	Distance Protection Pickup/Trip is not configured in JSD and DR. Directional O/C operated. JSDN may share the DR.	YES	NO	OPTCL and JSDNL to update
5	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/2/2020	14:38	4/2/2020	16:18	Baripada: R-N,2L,F,D 37.13 KA,FC 1.45KA	BARASORE:R-N,2L,FC 1.24KA	B PHASE TO EARTH FAULT	<100 msec	No A/R operation from both end. At Baripada DR O/C lock up before both (Maybe A/R was kept off) as per DR.	YES	NO	PG O&SHA and OPTCL to update
6	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/6/2020	11:41	4/7/2020	17:55	1 N		B PHASE TO EARTH FAULT	<100 msec	Tripping attempted at 12:49 hrs but failed.	YES	YES	PG O&SHA to update
7	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/6/2020	13:27	4/6/2020	14:31	TIRUPP: R-N, 1L, 39.4 KM FC 1.38A		B PHASE TO EARTH FAULT	<100 msec	No A/R Operation	YES	YES	No A/R - 2 faults within BA.
8	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/7/2020	11:09	4/7/2020	23:21	R-N, 2L, F + 21.57 KA, 1.2 km FROM BUDHAPADAK	R-N, 2L, F + 1.08 KA, 162 km FROM KOREA	B PHASE TO EARTH FAULT	<100 msec	No A/R Operation	NO	NO	OPTCL and CPSC/SGRE to update
9	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/8/2020	10:59	4/8/2020	11:53	DT received at lambhadpur. Line tripped from lambhadpur only.		DT received at lambhadpur	---	No fault observed in PMU	YES	NO	PG O&SHA & OPTCL to update
10	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/8/2020	12:10	4/8/2020	12:34	R, N, Fault, 1.664 KA, 78.15 KM (Durgam)	R, N, Fault	B PHASE TO EARTH FAULT	<100 msec	No A/R Operation. B Phase CB status is open in digital channel prior to the fault.	NO	YES	ESPTCL and JSDNL to update
11	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/8/2020	17:57	4/8/2020	18:31	Y-N, 1L, 110.79KM, 1.38KA	KCF Y-N, 68.40M, 3.08KA	B PHASE TO EARTH FAULT	<100 msec	No A/R Operation	YES	YES	OPTCL and JSDNL to update
12	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/8/2020	19:37	4/8/2020	20:14	2L, 1 N, 3.99KA, 91.68M	2, 1, 1 N	B PHASE TO EARTH FAULT	<100 msec	No A/R Operation from Balasore.	NO	YES	line surclosed from Amabag end after tripping by ph to earth fault. A/R failed from BKTPS end.
13	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/9/2020	17:20	4/9/2020	17:47	R, N, Fault, 75.16 km 3.08 KA	Tala end Y-N, 87.8 km, 1.38KA	B PHASE TO EARTH FAULT	<100 msec	Straylight. The CB AR attempted despite of Main CB AR failure. A/R Operation	YES	YES	The fault was permanent in nature. Main CB 3-phase tripped after about 12 sec but the CB re-closed after 2 sec as per normal A/R operation. The primary circuit malfunctioned. Note: The AR relay recently replaced with numerical relay (MCCDM P442). The problem recited.
14	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/9/2020	18:28	4/9/2020	19:29	APD: R-N 2.833A		B PHASE TO EARTH FAULT	<100 msec	No A/R operation from Alipurduar.	YES	NO	There was two tripping as follows: (1) 18:28:48:314 & (2) 18:28:52.827. First tripping successfully auto-reclosed and second tripping within reclose time leaving 3-phase tripping.
15	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/9/2020	22:00	4/9/2020	22:28	BIPHAR: 2L, R-N, 1.99KA, 55.87KM		B PHASE TO EARTH FAULT	<100 msec	Straylight. No A/R operation.	YES	YES	A/R successful at Bihara and however not successful at Chokha end.
16	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/10/2020	13:21	4/10/2020	14:11	Y,N,F,D 37.80 KM FC 1.45KAB/PA/NA	Y,N,F,D 24.875KM FC 1.19KAB/PA/NA	B PHASE TO EARTH FAULT	<100 msec	The CB AR attempted despite of unsuccessful AR of Main CB at Indrapati and Baripada.	NO, YES, YES	NO	AR successful from both end. Tripped in reclaim time. DR updated from Baripada and was of previous tripping.
17	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/12/2020	11:37	4/12/2020	12:07	R,N,F,D 31.73KM FC 1.19KAB/PA/NA	R,N,F,D 24.875KM FC 1.19KAB/PA/NA	B PHASE TO EARTH FAULT	<100 msec	Phase: Main CB A/R successful. The CB healthy phases tripped after 415 msec.	NO	YES	PREVIOUSLY DWELL TIME FOR A/R INITIATION (COMMAND) FROM RELAY WAS 100MS FOR THE BAY-NOW DWELL TIME FOR THE BAY HAS BEEN INCREASED TO 150MS.
18	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/12/2020	12:40	4/12/2020	19:45	R,N,F,D 21.24 KM FC 1.38KAB/PA/NA		B PHASE TO EARTH FAULT	<100 msec	Phase: Main CB A/R successful. The CB healthy phases tripped after 415 msec.	NO	YES	PREVIOUSLY DWELL TIME FOR A/R INITIATION (COMMAND) FROM RELAY WAS 100MS FOR THE BAY-NOW DWELL TIME FOR THE BAY HAS BEEN INCREASED TO 150MS.
19	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/15/2020	2:45	4/15/2020	3:48	MUZAFFARPUR: Y-N, 2L, 79m, 1.38KA		B PHASE TO EARTH FAULT	<100 msec	No A/R operation	NO	NO	ESPTCL to update
20	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/15/2020	2:48	4/15/2020	4:29	MUZAFFARPUR: R-N, 20KA, 0.16km		B PHASE TO EARTH FAULT	<100 msec	Muzaffarpur: No A/R operation. AR LVD instantaneously. A/R operation status is showing even A/R not operated.	YES	NO	PLCC issue resolved
21	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/15/2020	3:55	4/15/2020	10:27	TRIPPED FROM MOTOR END		B PHASE TO EARTH FAULT as per PMU	<100 msec	No A/R operation from Midpur as line tripped from Midpur end only.	NO	NO	ESPTCL to update
22	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/16/2020	0:22	4/16/2020	1:30	AT ANGLA: R-N, 26.84 KM, 3.18KA	AT JAM: R-N, 8.52 KM, 3.18KA	B PHASE TO EARTH FAULT	<100 msec	A/R successful from Jamnaga end as per PMU. Three phase tripping from Angul end as per DR.	YES	NO	PG O&SHA to update
23	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/17/2020	11:30	4/17/2020	17:52	Balihanagar - R-N, 20E 1, 28.13 KM, FAULT CURRENT 11.04 KA	BRP: 8KV, 8KV, 8KV, 8KV, 8KV	B PHASE TO EARTH FAULT	<100 msec	No A/R operation.	NO	YES	did not autoreclose as AR is disabled from both ends. AR in respect of all lines emanating from PPSP is disabled since commissioning as per recommendation of OEM of Generator/Motor unit as gathered from erstwhile In-charge of PPSP, WBSEDL.
24	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/17/2020	17:57	4/17/2020	18:39	R-N, 3.62 KA, FD 42.37 KM from Chokha	R-N, 1.37 KA, FD 106.2 KM from Bhoukha	B PHASE TO EARTH FAULT	<100 msec	No A/R operation at chokha. Healthy phases did not trip after dead time at Chokha.	YES	YES	A/R in main bay did not attempt due to BCU hangup at the time of fault in tie bay because of Corrosion switching device in tie bay. Issue A/R did not attempt. Both resolved.
25	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/18/2020	10:17	4/18/2020	10:38	BD: 2L Y,N,120M, F,C 3 KA	PPSP: 2L, Y,N,66 KM	B PHASE TO EARTH FAULT	<100 msec	No A/R operation as per PMU	NO	NO	did not autoreclose as AR is disabled from both ends.
26	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/19/2020	03:51	4/20/2020	0:41	2L, R-N, FD 62 KM BIPANAKA		B PHASE TO EARTH FAULT	<100 msec	No A/R operation as per PMU	NO	NO	NTPC & OPTCL to update
27	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/20/2020	0:51	4/20/2020	0:57	R,N, Dist 37.62 KM FC 4.87 KA at Mathura		B PHASE TO EARTH FAULT	<100 msec	No A/R operation at both end. Center unhealthy has been observed in Mathura DR.	YES	YES	PG E&D: PCCZ center failed. It was showing in the DR. PCCZ maintained by JSDNL. JSDNL to update
28	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/20/2020	0:04	4/20/2020	1:10	Purmas: 2L R-N 22.8 km 1.7 KA		B PHASE TO EARTH FAULT	<100 msec	A/R unsuccessful during the CB AR at New Purmas although there was no fault persisting during A/R.	YES	YES	BCU issue which was solved in consultation with BSM.
29	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/20/2020	0:25	4/20/2020	1:31	Purmas: 2L R-N 20.5 km 1.7 KA		B PHASE TO EARTH FAULT	<100 msec	A/R unsuccessful during the CB AR at New Purmas although there was no fault persisting during A/R.	YES	YES	BCU issue which was solved in consultation with BSM.
30	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/20/2020	0:35	4/20/2020	1:50	Purmas: 2L R-N 20.4 km 1.2 KA		B PHASE TO EARTH FAULT	<100 msec	A/R unsuccessful during the CB AR at New Purmas although there was no fault persisting during A/R.	YES	YES	BCU issue which was solved in consultation with BSM.
31	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/20/2020	14:01	4/20/2020	18:40	MIRMO: R-N, 2L, 133.04 KA	KAJANGA: 2L, B-N, 130.7M FC 1.65KA	B PHASE TO EARTH FAULT	<100 msec	No A/R operation from Lajpaga.	YES	YES	OPTCL to update
32	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/21/2020	2:43	4/21/2020	3:08	Indication: ZONE 1 Faulty. PM Fault. Fault Distance: 72.96 KM FC 3.785 A at Raghunathpur	A/R successful from Ranchi	B PHASE TO EARTH FAULT	<100 msec	No A/R operation from Raghunathpur.	YES	YES	There was logic problem in Ranchi 1 Line in AR software problem. CAP file in AR way rectified. Problem resolved.
33	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/21/2020	2:56	4/21/2020	3:39	Fault current: 387.6 KA, 187.0 KA, 451.0 KA, Zone 1 B. Dhupur		B PHASE TO EARTH FAULT	<100 msec	2L and No A/R from Saradighat. 24 but tripped instantaneously from Chokha.	YES	YES	JSDNL and WBSPCL to update
34	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/21/2020	6:00	4/21/2020	6:28	MUZAFFARPUR: R-N, 30.562 KM 8.12KA	BP: R-N, 2.01 KA	B PHASE TO EARTH FAULT	500 msec	A/R successful from Muzaffarpur end. Tripped in 22 from New Purmas end. No operation from Muzaffarpur end.	YES	YES	PCCZ checked and found OK when line went under breakdown. The counter had increased at Muzaffarpur end but did not increase at New Purmas.
35	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/21/2020	10:31	4/21/2020	21:10	Y,N,2L, 81.11% DISTANCE 1.7 KA FROM MATHURA	11.58 KA Y,N,6.8 KA FROM MATHURA	B PHASE TO EARTH FAULT	<100 msec	No A/R operation as per PMU	NO	NO	ESPTCL to update
36	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/24/2020	11:38	4/24/2020	13:11	R, N, 1.53 KM, 7.025 KA (Bengaluru)	R, N, 0.78 KM, 7.72 KA (Bengaluru)	B PHASE TO EARTH FAULT	<100 msec	No A/R operation as per PMU	NO	NO	PG O&SHA and OPTCL to update
37	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/24/2020	14:55	4/24/2020	18:15	INDIAN, 2L, R-N, 10.66KM, 11.37KA		B PHASE TO EARTH FAULT	<100 msec	No A/R operation as per PMU	NO	NO	NTPC & OPTCL to update
38	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/24/2020	21:00	4/24/2020	23:10	41 R-N, 8.24 km 14.8 KA from Rudhapatar	from Surber: 2, 2, 8 PHASE, LOC: 179 TM CURRENT. AT PHASE: 1.007KA, Y PHASE: 0.84MP, B PHASE: 0.516MP	B PHASE TO EARTH FAULT	<100 msec	No A/R operation as per PMU	YES	NO	OPTCL and CPSC/SGRE to update
39	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/25/2020	2:49	4/25/2020	3:08	Tripped from substation and no SOT showing in the protection relay at GSS		Tripped from substation and no SOT	---	No fault observed in PMU	NO	NO	PG O&SHA and OPTCL to update
40	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/25/2020	8:02	4/25/2020	8:28	Substation and SOT. ZONE 1 IN 1.15 KA, 3.43 KA. CARRIER RECEIVE FROM KISHANGANGA. DR/CP/DT/CT/OP PCC UP	21 KM FROM KISHANGANGA. 1.10 KA, 3.43 KA, 3.43 KA	B PHASE TO EARTH FAULT	<100 msec	No A/R operation from Kishanganag.	YES	YES	Proven using direction in Zone 1 at Kishanganag end in main 1 relay. As there is no blocking in Zone 1, the trip occurred.
41	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/25/2020	15:31	4/25/2020	16:07	Y,N, ZONE 1, FC: 2.95KA, DIST 109.8KM.		B PHASE TO EARTH FAULT	<100 msec	Durgapur: Main CB AR successful. The CB AR not attempted. Sagelight: No A/R operation.	YES	NO	DR RANM relay: 128 phases for replacement to MCGE. Same will be replaced after Lock Down (Covid-19)
42	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/25/2020	22:59	4/25/2020	23:30	R, N, 6.9 KM, 4.6 KA, A/R successful from Barh	R, N, 4.24 KM, 8.112 KA	B PHASE TO EARTH FAULT	<100 msec	No A/R operation from Barh.	YES	NO	NTPC to update
43	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/26/2020	2:39	4/26/2020	3:45	2L, R-N, 19.02 KM, 5.86 KA	2L, R-N, 1.936 KA, 51.18 KM	B PHASE TO EARTH FAULT	<100 msec	No A/R operation as per PMU	NO	NO	PG O&SHA and OPTCL to update
44	<a href="#">TIRUVI MERRAMUNDEL (TIRUPP. VIKRAMANANDU) - TIRUPP.</a>	4/26/2020	8:42	4/26/2020	9:24	MOTHPUR: Y,N,122KM FC 0.5 KA	BARH: Y,N,D,939M FC 0.5 KA	B PHASE TO EARTH FAULT	<100 msec	MotHPur: Main CB AR successful and Three phase to CB tripped after 100 msec of fault.	YES	YES	The breaker AR Blocked by starting signal supervision. This is Fault clearly phase breaker opened but relay get initiation consecutively. So relay give the definite trip to the CB. This problem faced some time only.

45	<a href="#">DMTCL: R-N/S-4K/L12XM</a>	4/26/2020	13:09	4/26/2020	13:38	DMTCL: R-N/S-4K/L12XM		PHASE TO EARTH FAULT	<100 msec	No All operation as per PMU	NO	NO	DMTCL: PCCC Issue - (Issue of BSPTCL)
46	<a href="#">DMTCL: R-N/S-4K/L12XM</a>	4/27/2020	2:40	4/27/2020	19:48	Southgate R/N, L-36N, 22,25A		PHASE TO EARTH FAULT	<100 msec	No All operation	YES	NO	DMTCL and CPSCU/PMU to update
47	<a href="#">DMTCL: R-N/S-4K/L12XM</a>	4/27/2020	16:04	4/27/2020	16:46	R/N: 441 KA, 76.69 km 12 from Bopura end	11.58 km from chakha end	PHASE TO EARTH FAULT	<100 msec	Bopura PMU: Fault was in R phase only but both R and S phase trip.	YES	NO	All Successful - Tripped in reclaim time.

Sr No	Date	Time	Name	end	issue	Reported in sinle line list?
1	3/1/2020	7:47	400 kv Meramundali Mendasal - 2	Meramundali	DR may be configured as per PCC's recommendation; time window may be increased; reason of tripping is not recorded in DR output. Same observation for successful auto reclose operation of this line from Meramundali end at 13:27 hrs on 2nd March 2020 and tripping of this line at Meramundali end at 11:48 hrs and 13:29 hrs on 06th March 2020, 13:17 hrs on 09th March 2020, 13:01 hrs on 10th March 2020	Yes
2	3/4/2020	13:38	220 kv New Purnea - Begusarai - 1	New Purnea	Breaker operation status may be configured in DR. DR time window may be increased and DR may be configured as per ER PCC's recommendation.	No
3	3/5/2020	21:21	220 kv Budhipadar Raigarh - 1	Budhipadar	DR may be configured as per PCC's recommendation; time window may be increased; Reason for non-auto reclose operation may be shared. Same observation for the tripping at Budhipadar end at 03:20 hrs on 13th March 2020	No
4	3/6/2020	20:43	220 kv Tenughat Biharshariff S/C	Biharshariff	Digital status at Breaker operation not correctly configured; R phase breaker was open condition in DR prior to the event.	No
5	3/7/2020	23:45	220 kv STPS - Chandil S/C	Chandil	Breaker operation status may be configured in DR. Reason for non opening of B phase breaker for 1.4 seconds approx may be explained. Reason for opening of R & Y phase breaker 400 ms after the tripping may be explained, DR not time synchronized	Yes
6	3/10/2020	11:54	400 kv Meramundali - Lapanga DC	Meramundali	DR may be configured as per PCC's recommendation, No Auto-reclose operation also not observed. Unsuccessful auto reclose operation has been observed in case of Lapanga end. Same observation for the tripping at 16:59 hrs and 23:18 hrs on 19th March 2020, 13:27 hrs on 23rd March 2020, 11:53 hrs on 24th March 2020	Yes
7	3/12/2020	11:51	220 kv Gaya Dehri 1	Gaya	CB operation may be configured correctly in DR, Auto-reclose was not attempted at Gaya end. Same observation for the tripping at Gaya end at 12:23 hrs on 20th March 2020	Yes
8	3/12/2020	11:51	220 kv Sasaram Dehri 1	Dehri	Auto reclose not attempted at Dehri end, DR not time synchronized, Same observation for the tripping at Dehri end at 20:00 hrs on 13th March 2020 and 12:23 hrs on 20th March 2020	Yes
9	3/13/2020	7:21	220 kv Muzaffarpur Hazipur - 1	Muzaffarpur	Naming of digital channels may be configured correctly. Reason for non-auto reclose attempt may be shared.	Yes
10	3/13/2020	19:26	400 kv Sasaram Nabinagar - 1	Sasaram	all three pole of tie CB tripped instantaneously and Y & B pole of main CB tripped after 1600 msec without auto reclose attempt. Reason may be shared	Yes
11	3/13/2020	20:49	220 kv Gaya Sonenagar - 1	Sonenagar	Reason for opening healthy phase breakers at Sonenagar end without any auto-reclose attempt may be shared. Dead time of auto-reclose may be reviewed. . Auto reclose was successful from Gaya end.	Yes
12	3/19/2020	14:20	765 kv Jharsuguda Raipur - 2	Jharsuguda	Reason for opening healthy phase breakers at Jharsuguda end without any auto-reclose attempt may be shared.	Yes
13	3/19/2020	14:32	400 kv Angul Jharsuguda 3	Angul	Reason for Auto reclose lock out at Angul end may be shared; unsuccessful Auto reclose operation at Jharsuguda end	Yes
14	3/19/2020	15:21	220 kv Budhipadar - Korba - 2	Budhipadar	DR may be configured as per PCC's recommendation; time window may be increased; Reason for non-auto reclose operation may be shared.	Yes
15	3/19/2020	16:59	400 kv Meramundali - Lapanga	Lapanga	Dead time of tie breaker is less than main breaker, auto reclose of main breaker occurred even after unsuccessful auto-reclose of tie breaker and opening of healthy poles of main breaker. Same observation found in case of 23:18 hrs on 19th March 2020, 13:27 hrs on 23rd March 2020, 11:53 hrs on 24th March 2020	Yes
16	3/19/2020	18:02	220 kv Talcher Meramundali -1	Meramundali	DR may be configured as per PCC's recommendation; time window may be increased. No Auto - reclose operation also observed.	Yes
17	3/19/2020	18:07	400 kv Meramundali New Duburi D/C	Meramundali	DR may be configured as per PCC's recommendation; time window may be increased. No Auto - reclose operation also observed.	No
18	3/19/2020	18:14	400 kv Talcher Meramundali - 1	Meramundali	DR may be configured as per PCC's recommendation; time window may be increased. No Auto - reclose operation also observed.	Yes
19	3/21/2020	20:19	400 kv Kahalgaon Banka 1	Banka	Reason for non-auto-reclose attempt at Banka end may be shared	Yes
20	3/21/2020	20:19	400 kv Kahalgaon Banka 1	Kahalgaon	Reason for non-auto-reclose attempt at Kahalgaon end may be shared. DR may be configured as per PCC's recommendation	Yes
21	3/26/2020	13:38	400 kv Koderma Biharshariff - 2	Koderma	Auto reclose started; but three poles opened, DR not time synchronized	Yes
22	3/27/2020	10:28	400 kv Kharagpur New Chanditala S/C	Kharagpur	Auto reclose started; but three poles opened, DR not time synchronized, Same observation has been found during the tripping at 12:08 hrs on 27th March 2020	Yes
23	3/29/2020	15:15	220 kv STPS - JK Nagar S/C	STPS	DR may be configured as per PCC's recommendation	No

Annexure B22

# पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड

(भारत सरकार का उद्यम)

## POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



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

CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website: [www.erldc.org](http://www.erldc.org), Email ID- [erldc@posoco.in](mailto:erldc@posoco.in)

Annexure B24.2

**Incident No. 28-04-2020/1**

**Dtd: 02-05-2020**

### **Report on the incident in Eastern Region involving WBSETCL system**

- 1) **Date / Time of disturbance:** 28-04-2020 at 14:31 hrs.
- 2) **Systems/ Subsystems affected:** 220/132/33 KV Eastern Metropolitan Substation (EMSS)
- 3) **Antecedent condition:** Prior to the event, CESC system was radially connected with rest of the grid via 132 kV Kasba (WBSETCL) – EMSS T/C.
- 4) **Load and Generation loss:** No load or generation loss was reported at the time of the event.
- 5) **Major elements tripped:**
  - 132 kV Kasba (WBSETCL) – EMSS T/C
- 6) **Network across affected area**

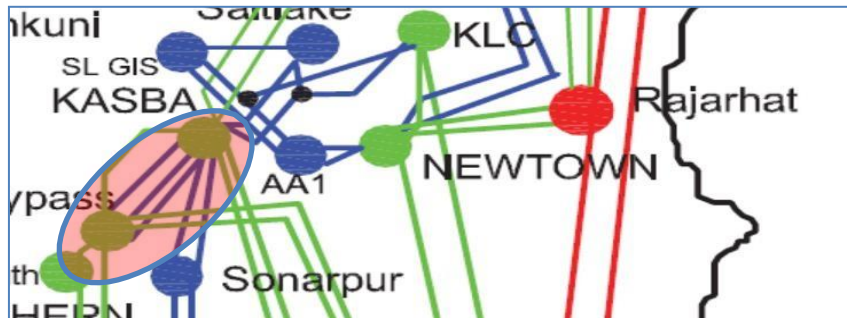


Figure 1: Network across affected area

### **7) Detailed Analysis and relay indication:**

- Prior to the event, CESC system was radially connected with rest of the grid via 132 kV Kasba (WBSETCL) – EMSS T/C.
- CESC system is having islanding scheme which operate if any of the 132 kV Kasba-EMSS T/C observed an overcurrent above 500 Amp for 300 ms (Definite time). This results in simultaneous tripping of these circuits and islanding of CESC system from the grid with its internal generation and load.
- At 14:31 hrs, 132 kV Kasba (WBSETCL) – EMSS T/C tripped only from EMSS end on Directional Overcurrent protection as per design in the 300 ms after observing R phase overcurrent due to some fault resulting in islanding of CESC system along with generation units #1, unit #2 and unit #3 at Budge Budge generating station. No load or generation loss was reported at the time of the event.
- Based on the PMU data recorded in Subhasgram PMU data (Refer Fig 2), R phase to earth fault is observed and fault clearing time was around 300 ms. CESC intimated that, the fault current was

around 500 Amp in ckt 3, 400 Amp in ckt 2 and 200 Amp in ckt 1 and thus totaling 1.1 kA. During this event due to which circuit 3 initiated the islanding sequence.

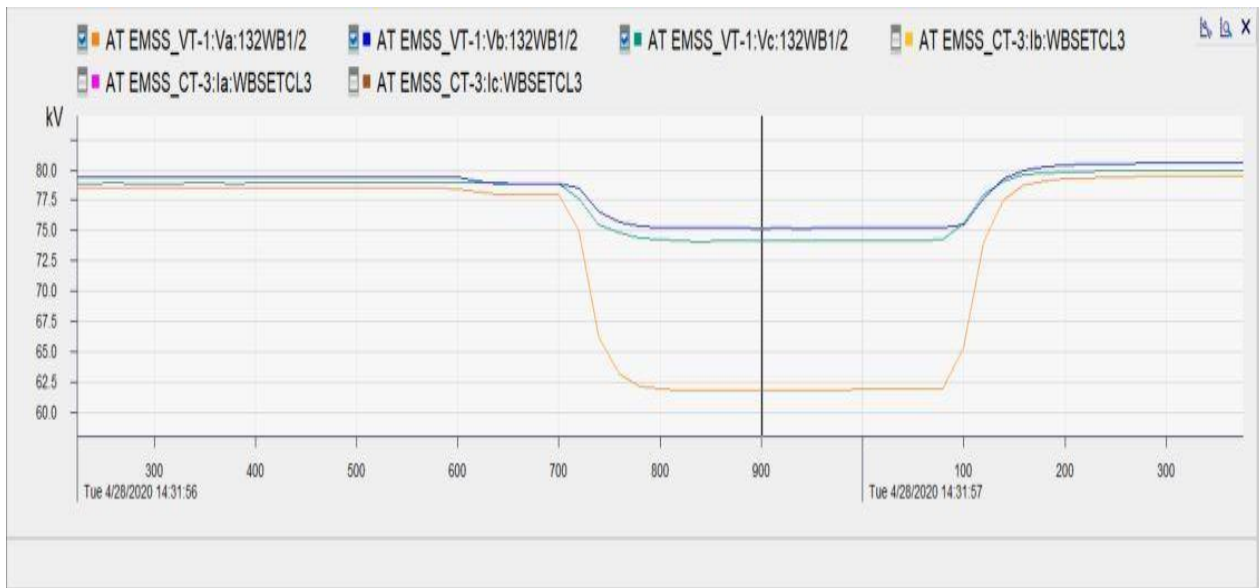
- WBSETCL has not reported any fault in their system for the R phase voltage dip observed during the period. It has informed that no 132 kV and above line/element tripping has occurred in their system except a 33 kV feeder from Sonarpur substation. The details of 33 kV element tripping has not been shared so far.

**Table 1: Relay Indication**

Name	Relay Indication at End 1	Relay Indication at End 2
132 kV Kasba (WBSETCL) – EMSS T/C	Did not trip	R phase, Directional O/C trip.



**Figure 2: Three phase voltage recorded at Subhasgram PMU at the time of the disturbance shows delayed clearance of R phase to earth fault. Fault clearing time is around 300 ms.**



**Figure 3: Three phase voltage of line voltage of 132 kV EMSS - Kasba - 1 measured at EMSS PMU (shared by CESC) shows existence of R phase to earth fault at the time of the event**

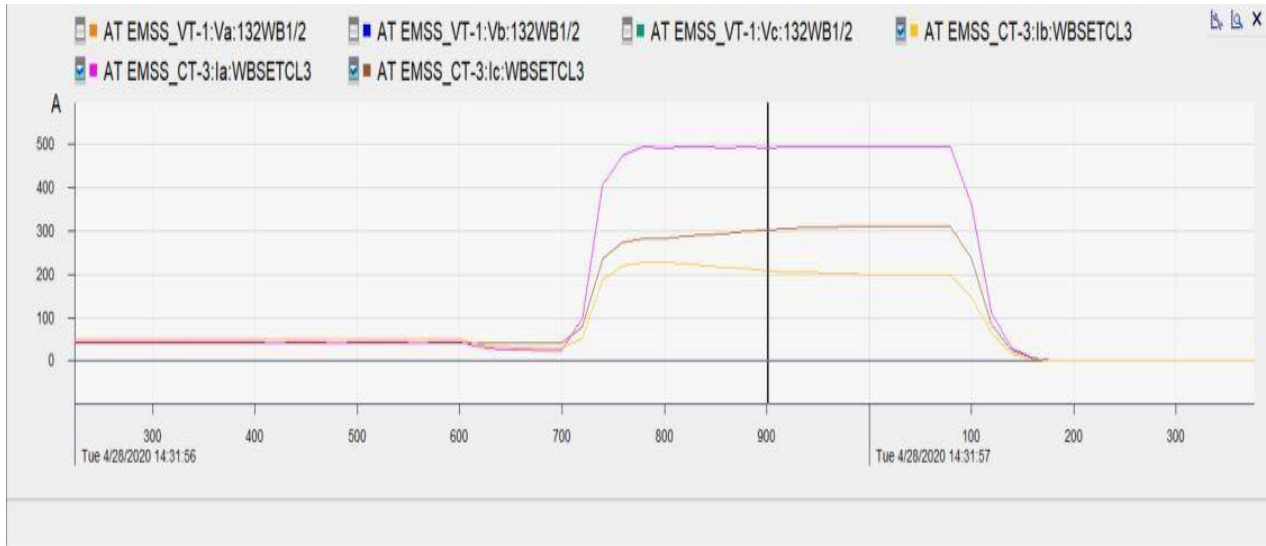


Figure 4: Three phase current of 132 kV EMSS - Kasba - 3 measured at EMSS PMU (shared by CESC) shows around 0.5kA current in R phase was flowing through this circuit before tripping.

#### 8) Restoration:

- At 14:59 hrs, 132 kV Kasba (WBSETCL) – EMSS T/C was charged successfully to synchronize CESC system with rest of the Indian grid.

#### 9) Noncompliance and discrepancies observed:

- Based on the submitted details by CESC it is found that the operation of CESC Islanding scheme is as per the design.
- Based on the submitted detail, the reason behind the fault location which was sensed by 132 kV Kasba-EMSS T/C could not be ascertained. The Fault if would have been on these circuit then that should have been detected tripping should occur from both ends however no tripping was observed from WBSETCL end. Reason and location of fault along with reason for delayed fault clearing may be analysed in detail by WBSETCL. **(WB SLDC/ CESC to update)**
- No SOE and analog SCADA data are recorded during this event. WB SLDC is advised to check this issue. **(WB SLDC update)**

#### 10) Status of Reporting:

Detailed report is received from WBSLDC/CESC along with DR for 132 kV Kasba (WBSETCL) – EMSS – 3.



**Annexure 1: Report received from WBSLDC/CESC**  
**FORMAT FOR REPORTING SYSTEM**  
**DISTURBANCES**  
(Detailed report)

**OCCURRENCE REPORT**

**(1). Date & Time of Occurrence:**

28/04/2020 at 14:31 hrs.

**(2). Name of the Stn. / Generating Station:**

220/132/33 KV Eastern Metropolitan Substation (EMSS)

**(3). Details of Occurrence:**

At **14:31 hrs.** at EMSS: 132 KV F. WBSEB 1, 132 KV F. WBSEB 2 and 132 KV F. WBSEB 3 (fed from WBSETCL Kasba Substation) tripped, causing islanding of CESC System (along with embedded generation of BBGS U1,2,3) from the Grid. No tripping occurred at WBSETCL Kasba Substation and the circuits remained in charged condition. No load shed occurred in CESC system. At **14:59 hrs.** CESC system was again synchronised at Kasba point of supply by switching ON 132 KV F. WBSEB 1, 132 KV F. WBSEB 2 and 132 KV F. WBSEB 3 at EMSS.

**(4). At the time of occurrence the disposition of feeders was as bellow:**

**EMSS**

<u>Main-1 Bus</u>	<u>Main-2 Bus</u>	<u>Reserve Bus</u>
160 MVA T3	160 MVA T1	132 KV F.WBSEB 1
160 MVA T4	160 MVA T2	132 KV F.WBSEB 2
132 KV F.JAD	160 MVA T5	132 KV F.WBSEB 3
132 KV F.30 MVAR	132 KV F.PCSS	132 KV F.EM SOUTH I/C
CAP BANK (OFF)	132 KV F. Pr. ST	1
	132 KV F.PARK LN	132 KV F.EM SOUTH I/C
	132 KV F.50 MVAR	2
	CAP BANK (OFF)	132 KV F.ECAL 2

**(5). Relay Indication for Faulted Line/Transformer/Bus:**

<b>SL. No</b>	<b>Name of Bay/Line</b>	<b>Local end relay type/make &amp; indication</b>	<b>Remote end relay type/make &amp; indication</b>
1	132 KV Kasba -CESC ckt.1	-	-

2	132 KV Kasba -CESC ckt.2	-	-
3	132 KV Kasba-CESC ckt.3	Relay Type: 7SJ 62 Splitting logic: Directional O/C (R phase) & U/V	-

**(6). Location & Nature of the Fault:**

It was found from PMU that fault current was around 1.1 KA on R-Phase which was fed from CESC system to Grid for more than 300 ms resulting in splitting of CESC System from Grid.

**(7). PLCC counter Reading:**

	Local End		Remote End	
	Before	After	Before	After

**(8). Analysis:**

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**(9). Restoration:**

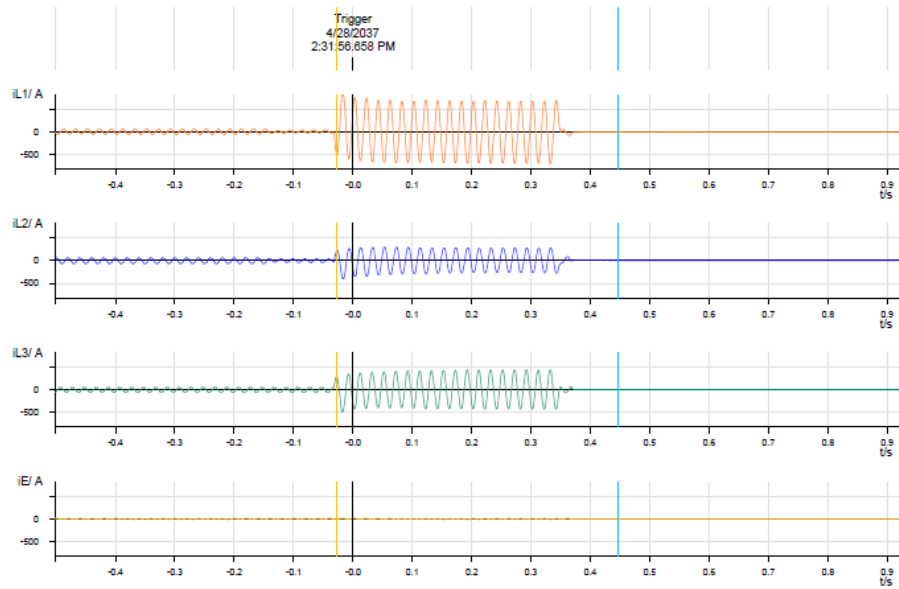
Sl. No	Details	Interrupti on from	Normalized at	Remarks
	No Load shed occurred in CESC System			

# Annexure 2: DR received from WBSLDC/CESC

EMSS W3 Folder 7SJ621 V4.7 Var

- 2 -

4/28/2037 / 2:31:56.658 PM



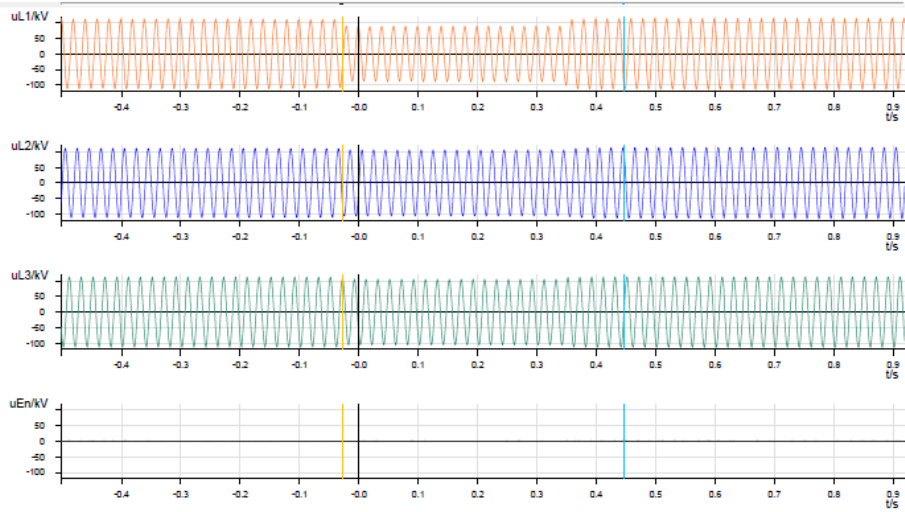
4/30/2020 / 6:00:46 PM  
SIGRA 4.59

FR000001.CFG

EMSS W3 Folder 7SJ621 V4.7 Var

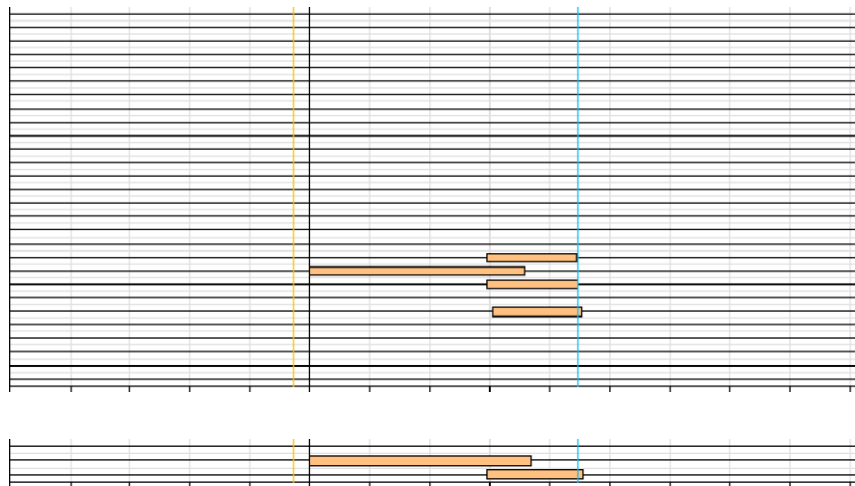
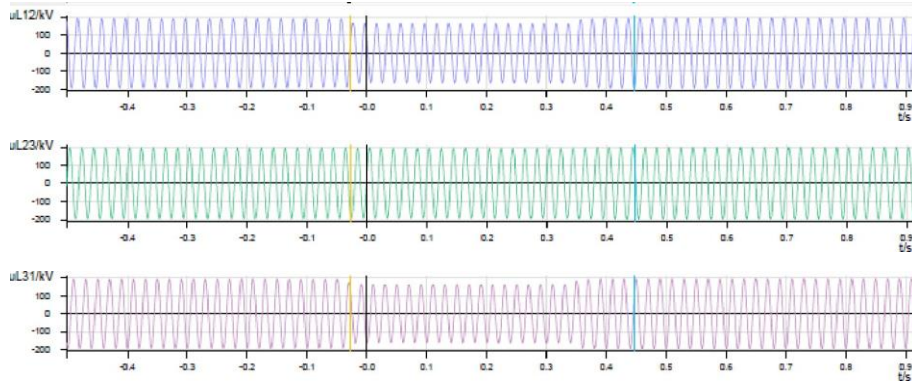
- 3 -

4/28/2037 / 2:31:56.658 PM



4/30/2020 / 6:00:46 PM  
SIGRA 4.59

FR000001.CFG



Annexure B27 Individual Element Tripping Report by Utilities/ISTS/ISGS/IPP to ERLDC under IEGC section 5.2(r), 5.9.5, 5.9.6 (a), (b) & (c)			
Name of the element	400 kV S/S A - S/S B 1		
Reporting Substation	S/S A		
Date of Tripping	Time of tripping	Date of Restoration	Time of Restoration
12/1/2019	21:30	12/1/2019	22:30
<b>Antecedent Conditions</b>			
Element Loading in MW	Other Element Outage from Reporting Substation	Any protection System was out of service	Weather Condition
400 MW (Export)	None	None	Rain and Lightening
<b>Disturbance Recorder Analysis</b>			
Tripping time in ms			
Relay flag from Main 1			
Relay flag from Main 2			
Additional Relay from any Other protection			
Fault location (in km)			
Fault clearing time			
<b>Voltage and Current Details</b>			
	R Phase	Y Phase	B Phase
Fault current in kA			
Pre Fault Voltage in kV			
During Fault Voltage in kV			
Post Fault Voltage in kV			
<b>Circuit Breaker Counter</b>			
LA Counter			
<b>PLCC Counter</b>			
	Pre Event	Post Event	
TX1			
RX1			
TX2			
RX2			
DT1			
DT2			
<b>Root cause of the tripping (May be selected from drop down list)</b>			
	High Resistive Fault	(Other May sepcify Here )	
<b>Additional detail for Root Cause</b>			
Fault was due to bamboo tree at location XXX			
<b>Auto-reclose operation occurred for SLG fault</b>			
	Yes		
<b>In case of No A/R Operation , Reason to be mentioned</b>			
		In case of Unsuccessful A/R , Reason to be mentioned	
<b>Any other Fault in Reclaim Time</b>			
		Any other Fault within Dead time	
<b>Equipment Damage Detail</b>			
Name of Equipment	Other Specify Here		
Make of Equipment			
Manufacturing Year			
Installation Year			
Last Testing done			
<b>Whether Replaced or Not</b>			
<b>Remedial Action Taken</b>			
<b>Additional Information if any</b>			
<b>Contact Details of Analysis Person</b>			

Sl No.	Name of the incidence	PCC Recommendation	Latest status
<b>89<sup>th</sup> PCC Meeting</b>			
1.	Disturbance at 220 kV Bidhannagar Substation on 01.02.2020 at 21:05 Hrs.	<p>PCC suggested WBSETCL to take the following remedial measures:</p> <ul style="list-style-type: none"> <li>• Submit the last test report of the CT which was failed during the disturbance</li> <li>• Carry out the testing of other CTs at Bidhanagar S/s</li> <li>• Avoid uneven distribution of lines between the Buses</li> <li>• WBSETCL along with SLDC, WB should explore to change the network configuration to reduce the fault current level at Bidhanagar</li> </ul>	
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.	<p>PCC advised BSTCL to take the following actions:</p> <ul style="list-style-type: none"> <li>• Check the past trippings for successful/unsuccessful operation of LBB and Bus Bar protection</li> <li>• Test LBB protection and Bus bar protection.</li> </ul> <p>PCC also advised SLDC Bihar and Powergrid to check reason for voltage unbalance at Muzaffarpur Substation.</p>	
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.	

4.	Multiple tripping incident at RTPS at 01:55 hrs on 08-02-2020	PCC advised DVC to change GPS time synchronization.	
5.	Multiple tripping incident at NBU at 22:01 hrs on 29-02-2020	PCC advised WBSETCL to send detailed report to ERPC.	
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	
<b>88th PCC Meeting</b>			
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 Sonenagar D/C on 13.01.2020 at 00:40 Hrs.	PCC advised BSTPCL take the following corrective actions: <ul style="list-style-type: none"> <li>• Send the PSL logic and relay setting file to ERPC Secretariat.</li> <li>• DR synchronisation need to be reviewed.</li> </ul>	
3.	Tripping of 400 kV Teesta V – Rangpo D/C on 05.01.2020 at 20:04 Hrs.	PCC advised NHPC to take following corrective actions: <ul style="list-style-type: none"> <li>• Revise their Zone-4 time settings to 500 ms.</li> <li>• 400kV Teesta-V – Rangpo Ckt-I distance protection input</li> </ul>	

		needed to be checked.	
<b>87<sup>th</sup> PCC Meeting</b>			
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: - <ul style="list-style-type: none"> <li>• Digital signals configuration of relays at Motipur end need to be checked.</li> <li>• Over voltage settings of relay at Motipur end need to be reviewed.</li> </ul>	
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 88 <sup>th</sup> PCC meeting JUSNL informed that they did not get the reply from SLDC Jharkhand yet	
<b>83<sup>rd</sup> PCC Meeting</b>			
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 87 <sup>th</sup> PCC meeting, DMTCL informed that DR would be configured by end of February, 2020.	
<b>81<sup>st</sup> PCC Meeting</b>			
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	



		<p>line to find out the cause of such high resistive fault in the line.</p> <p>In 87<sup>th</sup> PCC meeting, Chuzachen informed that they have asked for information related to Rangpo end from Powergrid and Sikkim.</p> <p>Further, Chuzachen informed that they would send the zone setting file to ERPC/ERLDC at the earliest.</p> <p>In 89<sup>th</sup> PCC Chuzachen was advised to review the zone 3 settings for 132 kV Chuzachen-Rangpo line as it is very high</p>	
2.	<p>Disturbance at 220 kV Budhipadar(OPTCL) S/s on 12.06.2019 at 00:37 Hrs.</p>	<p>PCC advised OPTCL to properly configure the DRs for 220 kV Budhipadar – Korba D/C &amp; 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.</p> <p>PCC also advised OPTCL to check the time synchronization.</p> <p>In 3<sup>rd</sup> TeST meeting, OPTCL informed that they had replaced the old relay at Korba.</p> <p>In 87<sup>th</sup> PCC meeting, OPTCL informed that DR for Budhipadar – Korba Circuit-I has been configured.</p>	