



Agenda for 90th PCC Meeting

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

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 90TH PROTECTION SUB-COMMITTEE MEETING TO BE HELD ON 13.05.2020 AT 10:00 HOURS

PART – A

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

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

Members may confirm the minutes of 89th 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.

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.

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.

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	

Load Loss : 50 MW , Gen Loss: 300 MW

JUSNL, TVNL and BSPTCL may explain.

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, Faut 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

220kV Chandil-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,
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Load Loss: 210 MW

JUSNL and WBPDCCL may explain.

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 – Ramchandrapur S/C	O/C and E/F start in all three phases. IR= 0.7kA, IY= 0.6kA, IB= 2.8kA.	IR= 4.7kA, IY= 6.65kA, IB= 0.9 kA, 35 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

Load Loss: 35 MW

JUSNL , WBPDC and Powergrid may explain.

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:

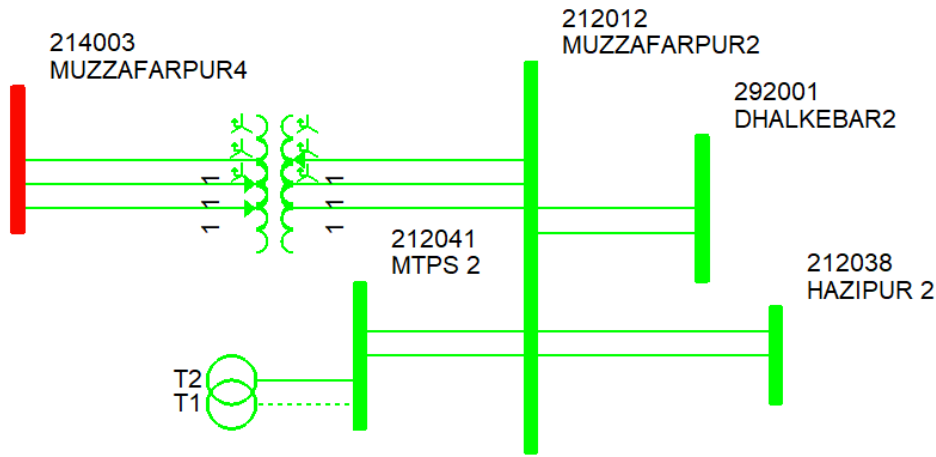
Name	Relay Indication at End 1	Relay Indication at End 2
220 kV Chandil - STPS S/C	IR= 0.2kA, IY= 0.7kA, IB= 0.2kA. Reason for tripping is not recorded in DR or shared in detail report. All three phase breakers opened at 1500 ms after sensing the fault	Did not trip (As per FIR shared during tripping)
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.

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.

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.

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.

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.

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.

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)	

Gen Loss : 200 MW

Powergrid , TUL and Dikchu may explain.

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.

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

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.

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.

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.

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 -Budhipadar 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.

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.

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.

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.

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.

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.

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.

Members may discuss.

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.

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.

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 event also occurred at MPL also in the past where fault in 6.6 kV has resulted in both plant tripping.

Members may discuss.

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.

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	SLG, L-L-G and L-L fault at various	6	BSPTCL

PURNEA-1	location		
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.

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
29-03-2020	19:21	Chandil	--

*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 be 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.

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.

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.

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.

PART- C:: OTHER ITEMS

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

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

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

Members may update the latest status.

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

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

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

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

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

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

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

BSPTCL may update.

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

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

List of line where auto reclose facility is not available(Information based on PMU data analysis)							
S. No	Transmission Lines name	Date of Tripping	Reason of Tripping	Owner Detail		Present Status	
				End-1	End-2	OPGW/W LCC Link available	AR facility functional
13	<u>220KV BUDIPADAR-KORBA-II</u>	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 by 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						

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

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

OPTCL:

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

BSPTCL:

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

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

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

Members may update.

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

List of important transmission lines in ER which tripped in March 2020

Annexure B21

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	400KV-MEERAMUNDALI-MENDHASAL-2	1/3/2020	7:47	1/3/2020	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	YES	--
2	400KV-NEW PPSP-ARAMBAGH-1	2/3/2020	12:52	2/3/2020	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	YES	NO
3	220KV-MAITHON-DUMKA-2	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	220KV-DARBHANGA(DMTCL)-LAUKAHI-1	6/3/2020	4:11	7/3/2020	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	NO
5	400KV-MEERAMUNDALI-MENDHASAL-2	6/3/2020	11:48	6/3/2020	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	YES	--
6	400KV-MEERAMUNDALI-MENDHASAL-2	6/3/2020	13:29	6/3/2020	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	YES	NO
7	400KV-NEW PPSP-NEW RANCHI-2	7/3/2020	10:27	7/3/2020	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	YES
8	400KV-NEW PPSP-NEW RANCHI-1	7/3/2020	17:22	7/3/2020	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	YES
9	220KV-CHANDIL-STPS(WBSEB)-1	7/3/2020	23:46	8/3/2020	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	220KV-DARBHANGA (DMTCL)-MOTIPUR-1	9/3/2020	11:05	9/3/2020	11:43	Drabhanga-ZZ 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

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
11	220KV-DARBHANGA (DMTCL)-MOTIPUR-1	9/3/2020	13:40	9/3/2020	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	DR sent for different timing
12	400KV-MERAMUNDALI-LAPANGA-2	10/3/2020	11:54	11/3/2020	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	220KV-PUSAULI-DEHRI-1	12/3/2020	11:51	12/3/2020	12:28	B-N,10.912 KM,7.121 IN IB	Started phase-bn Tripped phase-R y b Ia-176.3a Ib-91094a Ic--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	220KV-MUZAFFARPUR-HAJIPUR-1	13/3/2020	7:21	14/3/2020	15:42	R-N,FD 6.3KM,FC 12KA@MZP	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	400KV-PUSAULI(PG)-NABINAGAR(BRBCL)-1	13/3/2020	19:26	13/3/2020	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	220KV-DEHRI-GAYA-1	13/3/2020	20:00	13/3/2020	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	220KV-GAYA-SONENAGAR-2	13/3/2020	20:49	13/3/2020	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
18	400KV-MERAMUNDALI-LAPANGA-2	16/3/2020	15:53	16/3/2020	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. Meramundali end may confirm whether DT sent or not	NO	NO
19	765 kV Jharsuguda Raipur - 2	19/3/2020	14:20	19/3/2020	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 breakers at Jharsuguda end without any auto-reclose attempt may be shared.	YES	NO
20	400 kV Angul Jharsuguda 3	19/3/2020	14:32	19/3/2020	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 at Angul end may be shared; Unsuccessful auto reclose operation has been observed at Jharsuguda end	YES	NO
21	220 kV Budhipadar - Korba - 2	19/3/2020	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;	YES	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
22	400KV-JHARSUGUDA(GIS)-OPGC-1	19/3/2020	15:26	19/3/2020	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.	YES	NO
23	400KV-MERAMUNDALI-LAPANGA-1	19/3/2020	16:54	19/3/2020	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	YES	YES
24	220 kV Talcher Meramundali -1	19/3/2020	18:03	20/3/2020	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	YES
25	400 kV Talcher Meramundali - 1	19/3/2020	18:14	20/3/2020	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	NO	YES
26	400KV-MERAMUNDALI-LAPANGA-1	19/3/2020	23:18	20/3/2020	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	YES	YES
27	220KV-MUZAFFARPUR-HAJIPUR-2	20/3/2020	9:35	20/3/2020	10:12	bus bar protection maloperation while testing ict 1	Yet to be received	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
28	220KV-TENUGHAT-BIHARSARIFF-1	20/3/2020	12:22	20/3/2020	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	220KV-DEHRI-GAYA-2	20/3/2020	12:23	20/3/2020	13:17	B-N fault zone -1 29.49km from Dehri end I _c --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.	NO	YES
30	400KV-MEERAMUNDALI-MENDHASAL-2	21/3/2020	13:25	21/3/2020	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

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
31	400KV-DURGAPUR-SAGARDIGHI-1	21/3/2020	18:49	21/3/2020	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	NO
32	400KV-KHSTPP-BANKA (PG)-1	21/3/2020	20:19	22/3/2020	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	400KV-DURGAPUR-SAGARDIGHI-1	22/3/2020	15:48	22/3/2020	16:34	Durgapur End-Z1, YN Dist-23.6 km 25.16	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	400KV-MERAMUNDALI-LAPANGA-1	23/3/2020	13:27	23/3/2020	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	400KV-MERAMUNDALI-LAPANGA-1	24/3/2020	11:53	24/3/2020	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	400KV-KODERMA-BIHARSARIFF(PG)-2	26/3/2020	13:38	26/3/2020	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
37	400KV-NEW CHANDITALA-KHARAGPUR-1	27/3/2020	10:28	27/3/2020	10:49	KGP: B-N,,Z1,6.903km,8.378 kA.	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	400KV-NEW CHANDITALA-KHARAGPUR-1	27/3/2020	12:08	27/3/2020	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

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
39	400KV-MEERAMUNDALI-MENDHASAL-2	31/3/2020	10:22	31/3/2020	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

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, Email ID- 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**

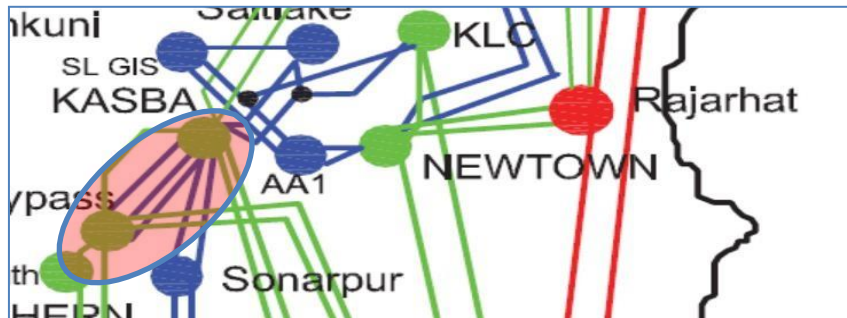


Figure 1: Network across affected area

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.

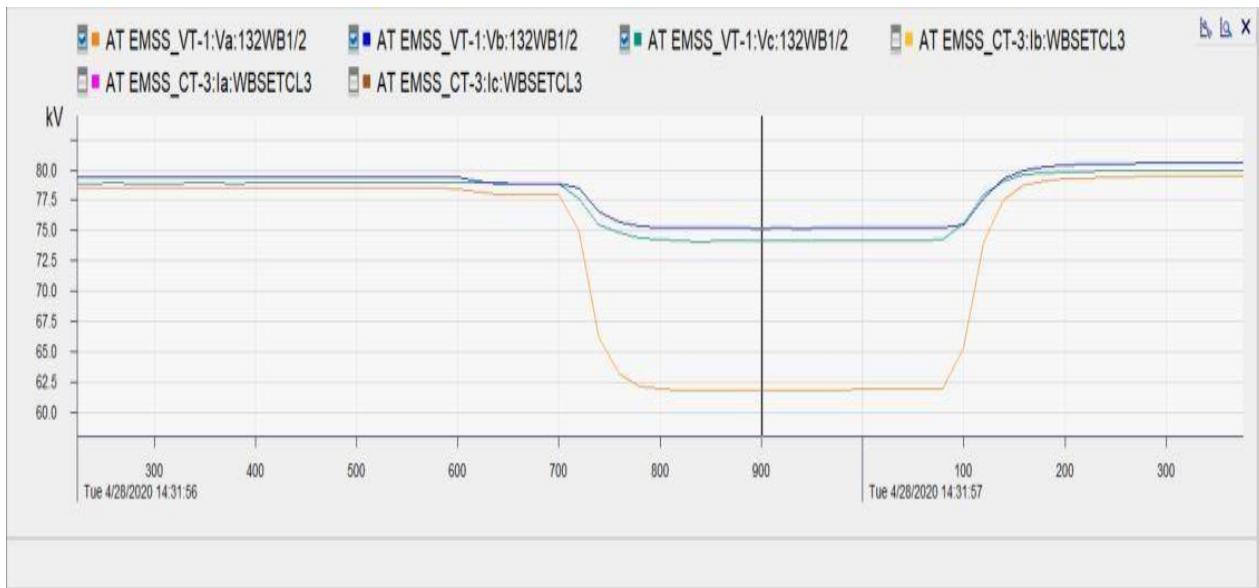


Figure 3: Three phase voltage of line voltage of 132 kV EMSS - Kasba - 1 measured at EMSS PMU (shared by CESC) shows existence of R phase to earth fault at the time of the event

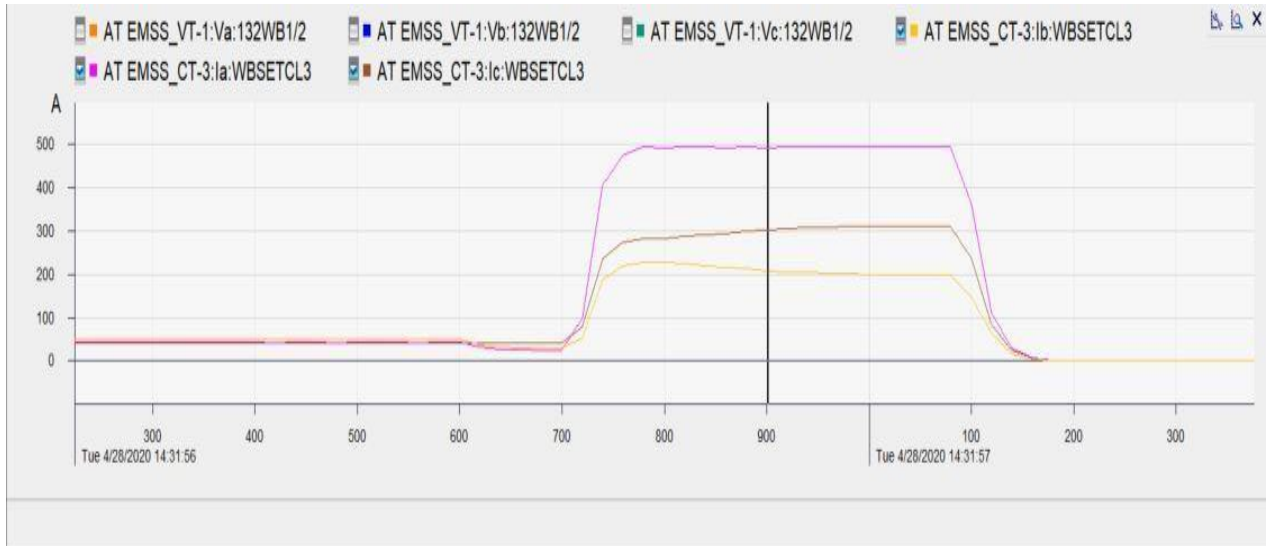


Figure 4: Three phase current of 132 kV EMSS - Kasba - 3 measured at EMSS PMU (shared by CESC) shows around 0.5kA current in R phase was flowing through this circuit before tripping.

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:

SL. No	Name of Bay/Line	Local end relay type/make & indication	Remote end relay type/make & indication
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:

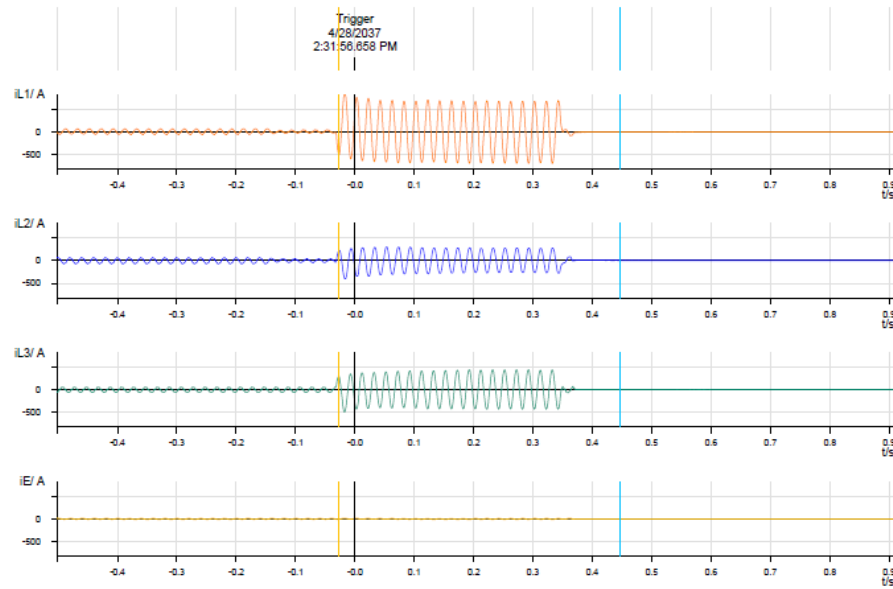
Sl. No	Details	Interrupti on from	Normalized at	Remarks
	No Load shed occurred in CESC System			

Annexure 2: DR received from WBSLDC/CESC

EMSS W3 Folder 7SJ621 V4.7 Var

- 2 -

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



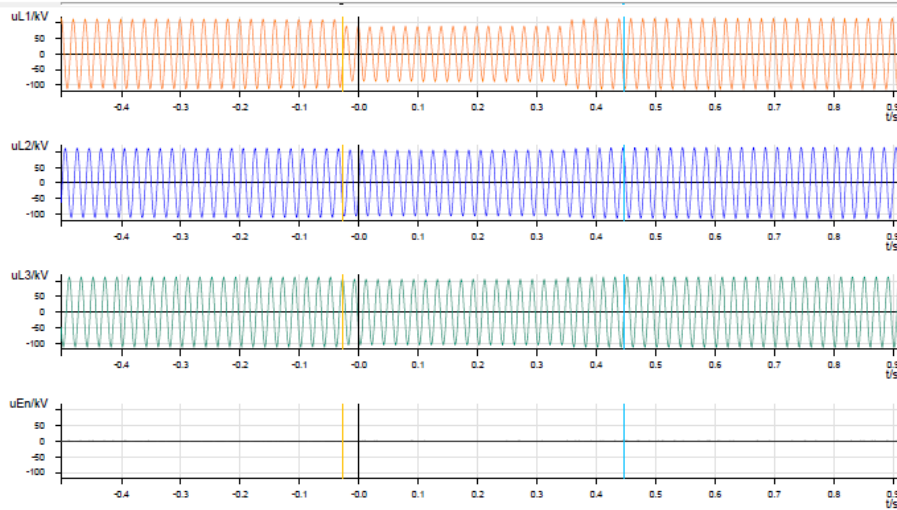
4/30/2020 / 6:00:46 PM
SIGRA 4.59

FR000001.CFG

EMSS W3 Folder 7SJ621 V4.7 Var

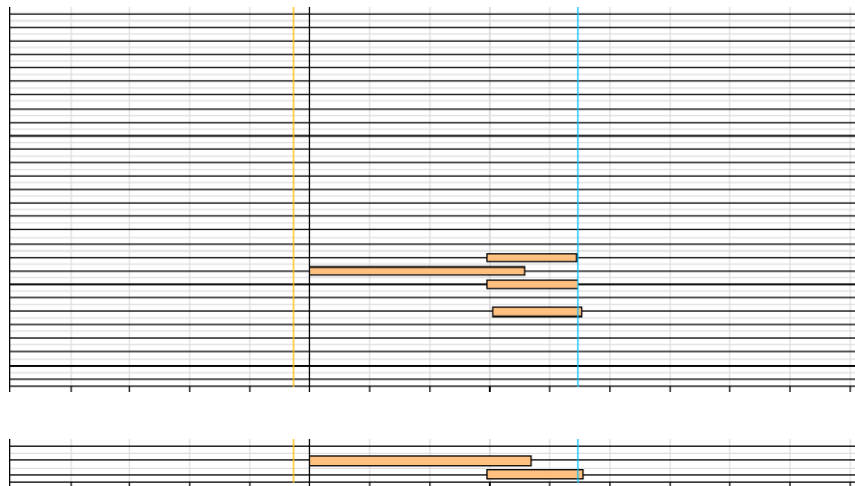
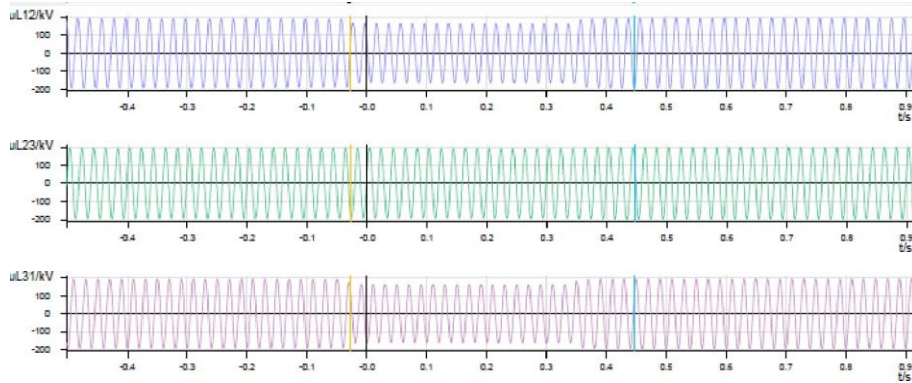
- 3 -

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



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

FR000001.CFG



SI No.	Name of the incidence	PCC Recommendation	Latest status
89th PCC Meeting			
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"> • Submit the last test report of the CT which was failed during the disturbance • Carry out the testing of other CTs at Bidhanagar S/s • Avoid uneven distribution of lines between the Buses • WBSETCL along with SLDC, WB should explore to change the network configuration to reduce the fault current level at Bidhanagar 	
2.	Tripping of 220 kV Muzaffarpur-Hajipur D/C on 09.02.2020 at 12:53 Hrs and Tripping of 220 kV Hajipur-Amnour D/C on 10.02.2020 at 17:32 Hrs.	<p>PCC advised BSTCL to take the following actions:</p> <ul style="list-style-type: none"> • Check the past trippings for successful/unsuccessful operation of LBB and Bus Bar protection • Test LBB protection and Bus bar protection. <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	

88th PCC Meeting

1.	Disturbance at 220 kV Maithon(PG) Substation on 25.01.2020 at 15:14 Hrs.	PCC advised Powergrid to replace the relay with numerical relay.	
2.	Tripping of 220 KV Gaya Sonenagar D/C on 13.01.2020 at 00:40 Hrs.	<p>PCC advised BSTPCL take the following corrective actions:</p> <ul style="list-style-type: none"> • Send the PSL logic and relay setting file to ERPC Secretariat. • DR synchronisation need to be reviewed. 	
3.	Tripping of 400 kV Teesta V – Rangpo D/C on 05.01.2020 at 20:04 Hrs.	<p>PCC advised NHPC to take following corrective actions:</p> <ul style="list-style-type: none"> • Revise their Zone-4 time settings to 500 ms. • 400kV Teesta-V – Rangpo Ckt-I distance protection input 	

		needed to be checked.	
87th PCC Meeting			
1.	Tripping of 220 kV Darbhanga (DMTCL) – Motipur I on 14.12.2019 at 02:50 Hrs.	PCC advised BSPTCL to take following corrective actions: - <ul style="list-style-type: none"> • Digital signals configuration of relays at Motipur end need to be checked. • Over voltage settings of relay at Motipur end need to be reviewed. 	
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 th PCC meeting JUSNL informed that they did not get the reply from SLDC Jharkhand yet	
83rd PCC Meeting			
1.	Total power failure at 220 kV Darbhanga (BSPTCL) S/s on 16.08.2019 at 22:23 Hrs.	PCC observed that DR configuration at DMTCL end is not in order. PCC advised DMTCL to configure the DR settings as per the standard. In 87 th PCC meeting, DMTCL informed that DR would be configured by end of February, 2020.	
81st PCC Meeting			
1.	Disturbance at 400 kV Dikchu S/s on 30.06.2019 at 09:55 Hrs.	The time setting for the DEF relay at Jorethang end was 500 msec. PCC advised Jorethang to review the timer setting of DEF protection at Jorethang end. PCC advised Chuzachen to review the zone settings for 132 kV Chuzachen-Rangpo line. PCC advised TPTL to do line patrolling for 400 kV Rangpo-Dikchu	

		<p>line to find out the cause of such high resistive fault in the line.</p> <p>In 87th 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 89th 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 & 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 3rd TeST meeting, OPTCL informed that they had replaced the old relay at Korba.</p> <p>In 87th PCC meeting, OPTCL informed that DR for Budhipadar – Korba Circuit-I has been configured.</p>	