



Agenda for **57th PCC meeting**

Date: 25.07.2017
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 56TH PROTECTION SUB-COMMITTEE MEETING TO BE HELD AT ERPC, KOLKATA ON 25.07.2017 (TUESDAY) AT 11:00 HOURS

PART – A

ITEM NO. A.1: Confirmation of minutes of 56th Protection sub-Committee Meeting held on 22nd June, 2017 at ERPC, Kolkata.

The minutes of 56th Protection Sub-Committee meeting held on 22.06.17 circulated vide letter dated 10.07.17.

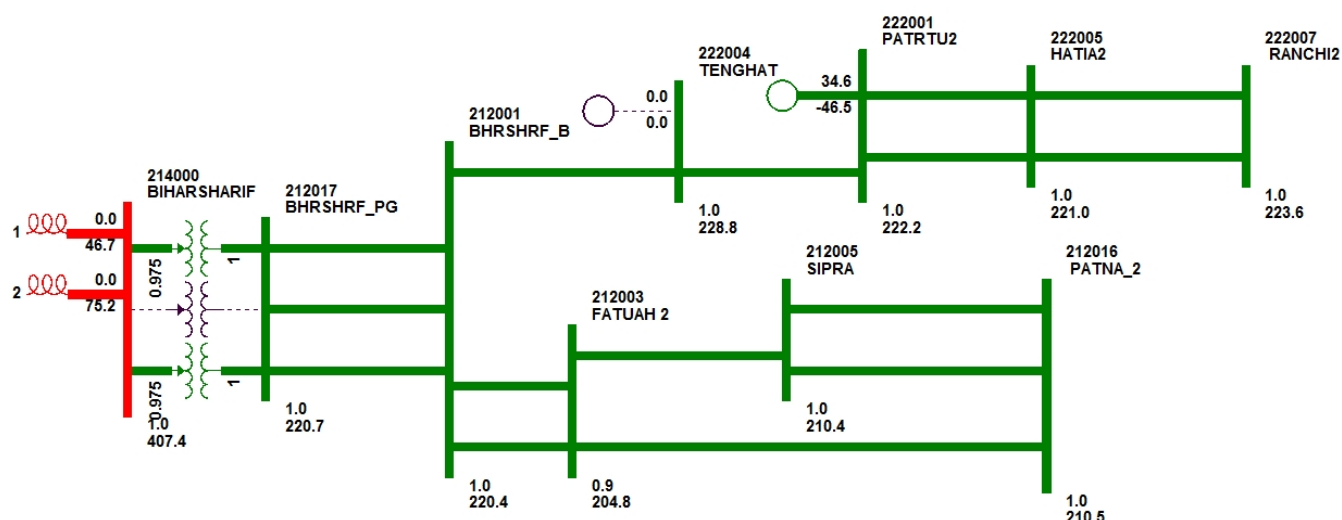
Members may confirm the minutes of 56th PCC meeting.

PART – B

ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN JUNE, 2017

ITEM NO. B.1: Disturbance at 220 kV Hatia, Biharsharif and Fatua S/s on 05-06-17 at 20:27 hrs.

1. Single line diagram: Submitted



2. Detailed analysis of tripping incident: Submitted

400/220 kV ICT – II at Biharshariff was under shut down and there was no generation at Tenughat. Power flow in 220 kV Ranchi – Hatia D/C was more than 200 MW/ckt and 220 kV Tenughat Biharshariff S/C was 56 MW.

At 20:27 hrs 220 kV Ranchi – Hatia D/C tripped due to Y-N fault in Circuit I. Load at Hatia, Patratu and its surrounding area was catered through 220 kV Biharshariff – Tenughat S/C (Which was supplied from 400/220 kV ICT– I & III at Biharshariff) after tripping of 220 kV Ranchi – Hatia D/C. Both ICTs at Biharshariff tripped due to high loading.

220 kV TVNL – Biharshariff S/C tripped only from TVNL end in Y-N, Z-II (F/D 164 km). Prior to tripping of 220 kV TVNL – Biharshariff S/C, current flow (<700A) was less than maximum current carrying capacity (1262 A assuming 45° ambient temperature and 75° maximum temperature).

After tripping of 220 kV TVNL – Biharshariff S/C & 400/220 kV ICTs at Biharshariff, supply to Hatia, Patratu and its surrounding area was lost and load at Biharshariff, Begusarai & Fatuah was fed from 220 kV Darbhanga – Ujiarpur – Begusarai Link and 220 kV Patna – Fatuah S/C. 220 kV Patna – Fatuah S/C tripped on overload and 220 kV Darbhanga – Ujiarpur S/C was manually switched off (Loading was more than 260 MW prior to switching off).

Analysis of PMU plots:

- At 20:27:12.340 hrs and 20:27:13.280 hrs R-N fault has been observed in PMU data.
- In first case, fault clearing time is less than 100 ms
- In second case fault clearing time is 200 ms approx.

Status of Reporting:

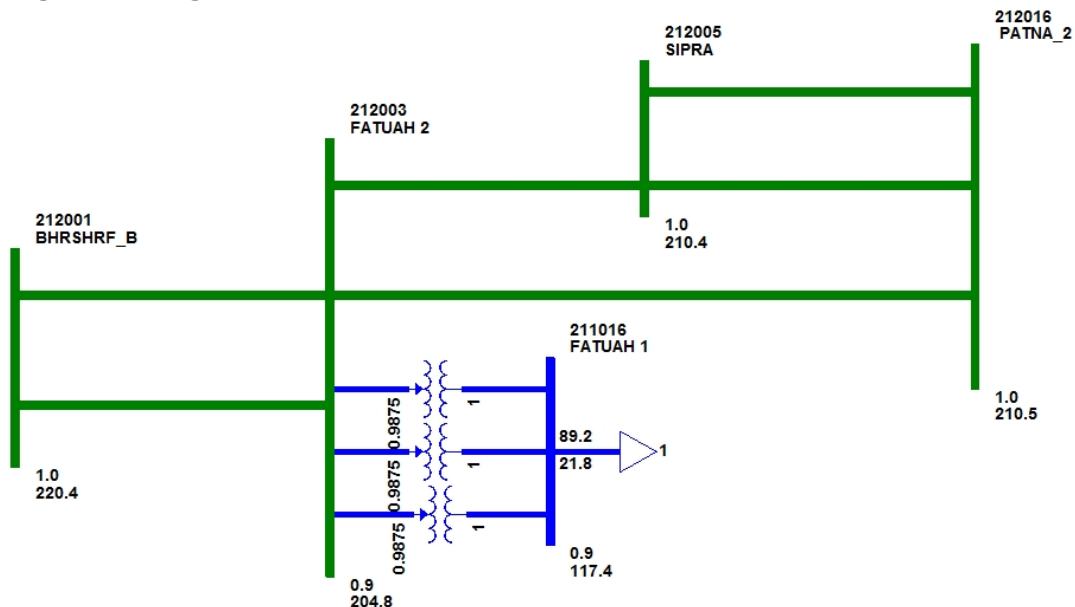
- Detail report along with DR has been received from TVNL on 06-06-17
- DR has been received from BSPTCL for Biharshariff S/s received on 07-06-17
- DR from Powergrid recieved

BSPTCL, JUSNL and Powergrid may explain the following:

- Reason for tripping of both circuit of 220 kV Ranchi – Hatia D/C for fault in Circuit I may be explained.
- Reason for tripping of 220 kV TVNL – Biharshariff S/C from TVNL end in Z-II may be explained
- Status of 220 kV Sipara – Fatuah S/C prior to the incident may be explained.
- In PMU data, two voltage dip in Y phase have been observed. Reason may be explained

ITEM NO. B.2: Disturbance at 220 kV Fatua S/s (BSPTCL) on 15-06-17 at 06:23 hrs.

1. Single line diagram: Submitted



2. Detailed analysis of tripping incident: Submitted

At 06:23 hrs 220 kV Patna - Fatuah S/C line tripped from Patna end on B-N fault in 360 ms, distance to fault from Patna 36.6 km (133%). Thereafter following lines tripped resulting total loss of supply to Fatuah S/S:

- 220 kV Sipara - Fatuah S/C (Y-N, Z-I, 16.5 km from Fatuah, 2.5 kA)
- 220 kV Biharshariff - Fatuah - I (tripped from Fatuah, Non Dir. O/C& E/F. IY-2.53 kA, IB-2.4 kA) DR of 220 KV Fatuha-Biharsharif ckt-I at Fatuha end is not available.
- 220 kV Biharshariff - Fatuah - II tripped from Biharshariff end on Y-B fault (IY-2.75 kA, IB-2.564kA) within 100 ms.

3. **Disturbance record:** Received from Powergrid, BSPTCL

4. **Remedial action taken :** Not Submitted

Analysis of PMU plots:

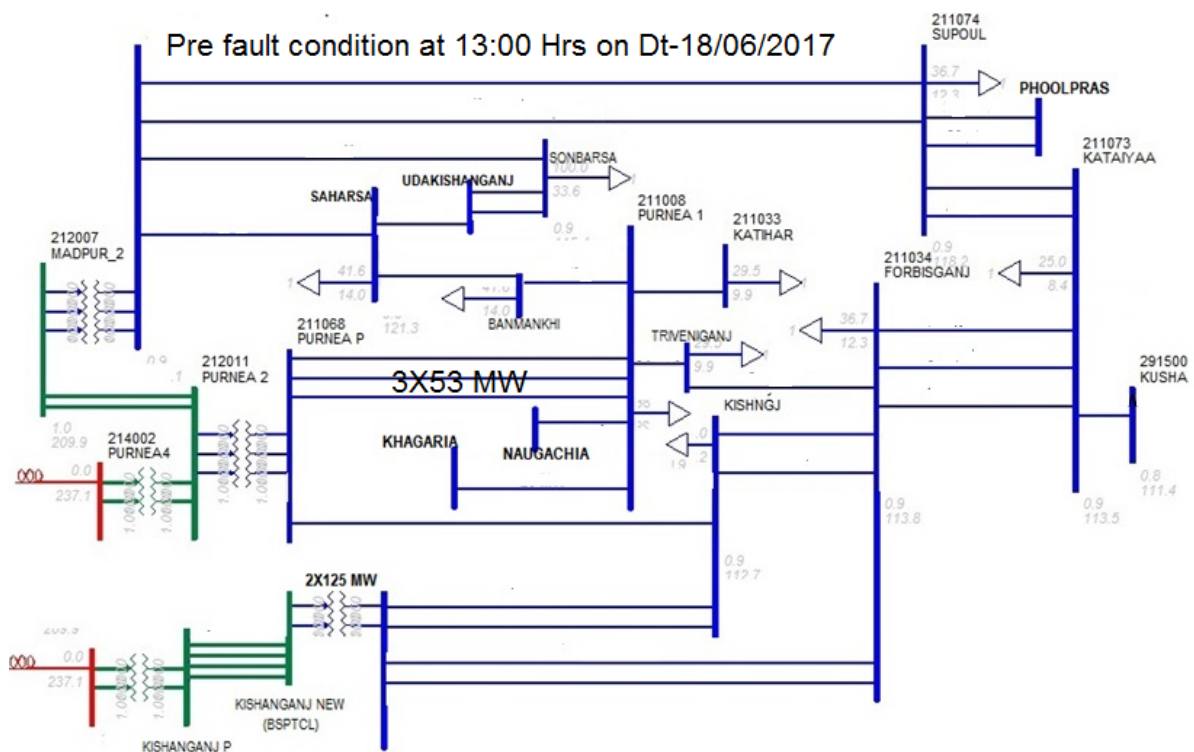
- Fault clearing time 1200 ms (Y-N fault) and 500 ms (B-N fault)

BSPTCL and Powergrid may explain the following:

- Location of fault
- Reason for tripping of 220 kV Biharshariff - Fatuah - I & II

ITEM NO. B.3: Disturbance at 132 kV Purnea S/s (PGCIL) on 18-06-17 at 13:42 hrs.

1. **Single line diagram:** Submitted



2. **Detailed analysis of tripping incident:** Submitted

132 kV Purnea (PG) - Purnea (BSPTCL) - I tripped due to falling of jack bus jumper on Main Bus at Purnea(BSPTCL). At same time 220/132 kV ICT I, II & III at Purnea(PG) & 220KV New Purnea-Purnea D/C line tripped on backup overcurrent.

BSPTCL informed that DC at 132kV Purnea(B) was not available due to operation of DC OV Relay(286 VDC) in DCDB panel.

Relay indications are as follows:

Line Name	Relay Operated	Indications	Remarks
132 KV BSPTCL-1	67C, 86	Over current fault appeared	
160 MVA ICT-1	MICOM P643	O/C Start & Trip A,B,C,N. IA1=3.697 KA, IB1=3.821 KA, IC1=3.866 KA, Va-n=2.669 kV, Vb-n=3.878 kV, Vc-n= 5.189 kV	ICT-1 was tripped on both HV & IV side in intertrip
160 MVA ICT-2	MICOM P643	O/C Start & Trip A,B,C,N. IA1=3.613 KA, IB1=3.763 KA, IC1=3.660 KA, Va-n=3.752 kV, Vb-n=564.2 V, Vc-n= 1.328 kV	ICT-2 was tripped on both HV & IV side in intertrip
160 MVA ICT-3	67A/B/C,86	Instantaneous	ICT-3 was tripped on both HV & IV side in intertrip

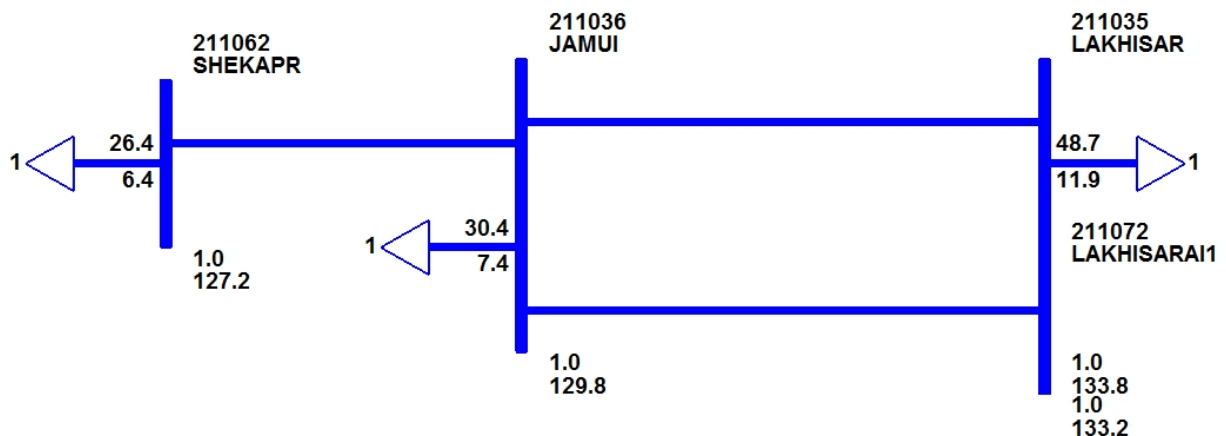
Analysis of PMU plots:

- Fault clearance time is 350 ms

BSPTCL and Powergrid may explain.

ITEM NO. B.4: Disturbance at 132 kV Jamui S/s (BSPTCL) on 04-06-17 at 17:28 hrs.

1. Single line diagram: Submitted



2. Detailed analysis of tripping incident: Submitted

Transient R-N fault occurred at 132/33 kV transformer I & II at Jamui. Both the transformers tripped from HV end on O/C, F/F protection. 132 kV Lakhisarai - Jamui D/C also tripped from Lakhisarai end on Z-III (Jamui was radially connected to Lakhisarai) resulting total power failure at Jamui. Fault distance is 49 km from Lakhisarai. F/C is 1.745kA.

132 KV Jamui-Seikhpur S/C was under shutdown.

The relay Indications are as follows:

Time (Hrs)	Name of the element	Relay at Local end	Relay at remote end
17:28 hrs	20 MVA T1	-	O/C & E/F relay(hv) Ir=84 A, Iy=83 A, Ib=83 A, In=241 A Vab=95 KV, Vbc=134 KV, Vca=101 KV
	20 MVA T2	-	O/C & E/F relay(hv) Ir=71 A, Iy=72 A, Ib=72 A, In=214 A Vab=94.7 KV, Vbc=134 KV, Vcn=100 KV.
	132 KV Lakhisarai (PG)-Jamui ckt-1	Tripped phase-R-N,Zone-3,Fault distance-49.79 k.m,Fault current=1.745 KA	Did not trip

3. Disturbance record: Received DR of 20 MVA T1&T2

4. Remedial action taken : Not Submitted

Analysis of PMU plots:

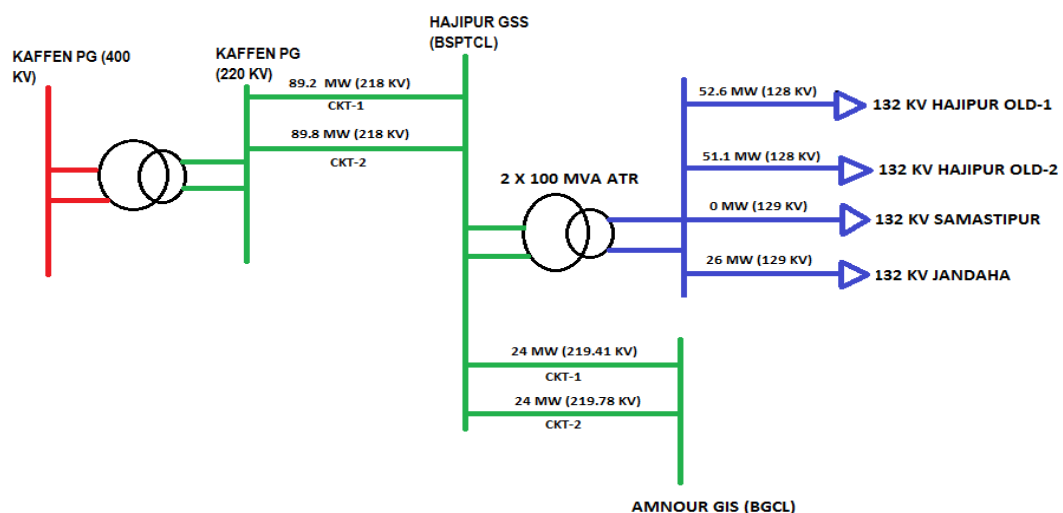
- Fault clearance time is 840 ms

BSPTCL may explain the following:

- Reason for delayed fault clearing from 132kV/33kV Transformers

ITEM NO. B.5: Disturbance at 220 kV Hazipur (BSPTCL) on 11-06-17 at 11:39hrs.

1. Single line diagram: Submitted



2. Detailed analysis of tripping incident: Submitted

At 11:39 hrs, 220 KV HJP-Amnour line- I tripped from Hazipur end on Y-B fault, zone 1, fault distance 12.7 km from Hazipur. At same time, 220 KV Muzaffarpur-Hazipur-D/C tripped from Muzaffarpur (PG) end on zone 2 resulting total power failure at Hazipur. 220 KV HJP-Amnour line- II manually tripped from Hazipur end.

The relay Indications are as follows:

Sl.No.	Name of Bay / Line	Time of tripping	Local End Relay Indications	Remote End Relay Indications
1	220 KV Hajipur-Amnour Ckt-1	11:39hrs	Zone-1	
2	220 KV Hajipur-Amnour Ckt-2	11:39hrs	Manually Tripped	
3	220 KV Hajipur- Kaffen (PG) Ckt-1	11:39hrs	Tripped	Z2 trip B- phase fault Y- phase fault Distance : 69.8Km
4	220 KV Hajipur- Kaffen (PG) Ckt-2	11:39hrs	Tripped	Z2 trip B- phase fault Y- phase fault Distance : 69.8Km

3. Disturbance record: Received Hazipur end DR of 220 KV Hajipur-Amnour Ckt-1

4. Remedial action taken: Tree cutting was done in HJP-Amnour line.

Analysis of PMU plots:

- Fault clearance time is less than 100 ms

Status of Reporting:

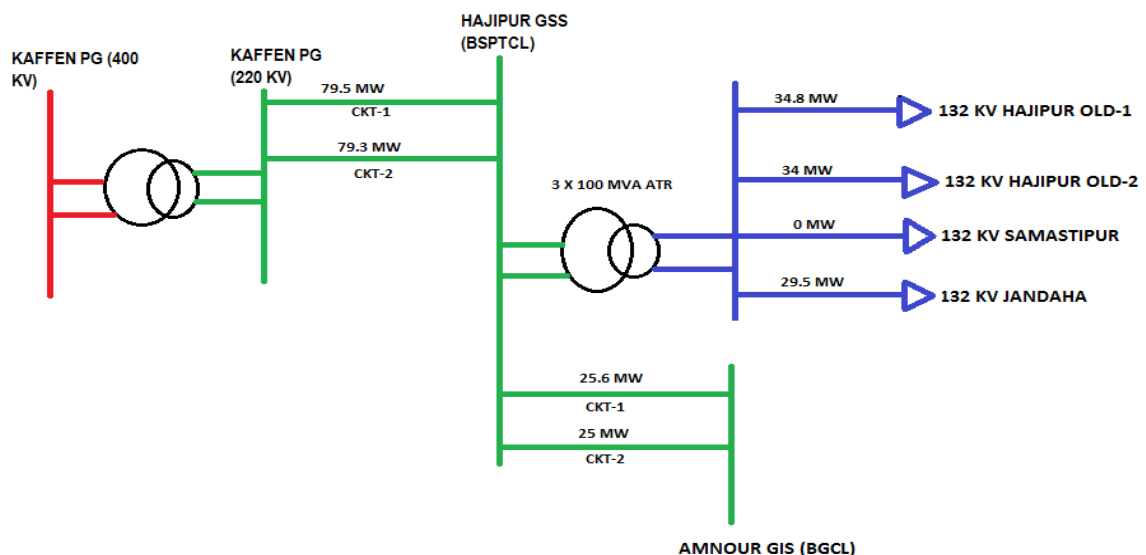
- Detail tripping report from BSPTCL is received

Powergrid and BSPTCL may explain the following:

- Amnour end tripping details of 220 KV Hajipur-Amnour Ckt-1
- Reason for tripping of 220 KV Muzaffarpur-Hazipur-D/C line from Muzaffarpur end on zone 2 as the fault was already cleared within 100 ms (as per PMU data). Powergrid may share the zone 2 time setting at Muzaffarpur end.

ITEM NO. B.6: Tripping of 220 KV Muzaffarpur-Hazipur-D/C line on 19-06-17 at 14:35 hrs.

1. Single line diagram: Submitted



2. Detailed analysis of tripping incident: Submitted

220 KV Kaffen (PG)-Hajipur Ckt-1 and 2 tripped at 14:35 hrs from Kaffen end as the tower no. 8 of 220 KV Kaffen (PG)-Hajipur transmission line collapsed due to heavy storm.

The relay Indications are as follows:

Sl.No.	Name of Bay / Line	Time of tripping	Local End Relay Indications	Remote End Relay Indications
1	220 KV Hajipur- Kaffen (PG) Ckt-1	14:35hrs	N/A	General Trip, RYB fault, SOTF optd.
2	220 KV Hajipur- Kaffen (PG) Ckt-2	14:35hrs	N/A	B phase fault

3. Disturbance record: Received Hazipur end DR of 220 KV Hajipur- Kaffen (PG) Ckt-1

4. Remedial action taken:

- Erection of new tower was done within 6 days and two other nearby damaged towers were repaired properly.
- 220 KV Hajipur- Kaffen (PG) Ckt-1 and 2 normalized on 25/06/2017 at 19:23 hrs and 19:29 hrs respectively.

Analysis of PMU plots:

- Fault clearance time is less than 100 ms

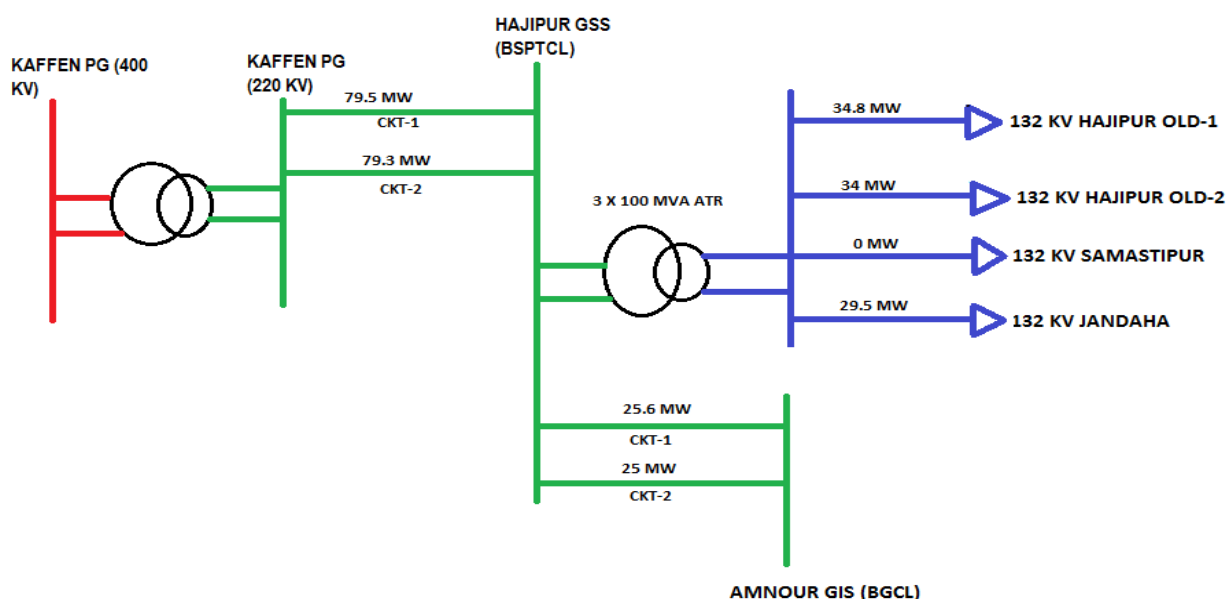
Status of Reporting:

- Detail tripping report from BSPTCL is received

Powergrid and BSPTCL may explain.

ITEM NO. B.7: Disturbance at 220 kV Hazipur (BSPTCL) on 23-06-17 at 19:20hrs.

1. Single line diagram: Submitted



2. Detailed analysis of tripping incident: Submitted

220 KV Muzaffarpur-Hazipur D/C are out due to tower collapse. 132kV Hazipur was supplied through 132 KV Samastipur-Hazipur S/C. Samastipur GSS was feeding 132 KV Begusarai GSS power to 220 KV Hajipur GSS through transfer bus.

At 19:25 hrs, 132 KV Begusarai (L9) – 132 KV Samastipur line tripped at Begusarai GSS end due to drop jumper (from Gantry to Isolator) snapped at 132 KV Samastipur GSS end. As a result Hazipur power was interrupted.

The relay Indications are as follows:

Sl.No.	Name of Bay / Line	Time of tripping	Local End Relay Indications	Remote End Relay Indications
1	132 KV Begusarai – 132 KV Samastipur line	19:25 hrs		General Trip, Zone-3, R, Y phase, Directional Earth Fault, Overcurrent operated. Distance protection operated. 86 AX, 86 B

3. Disturbance record: Not received

4. Remedial action taken: 132 KV Begusarai (L9) – 132 KV Samastipur – 220 KV Hajipur – 132 KV Hajipur normalised at 20: 38 hrs after rectification of snapped drop jumper at Samastipur GSS end.

Analysis of PMU plots:

- Fault clearance time is 600 ms

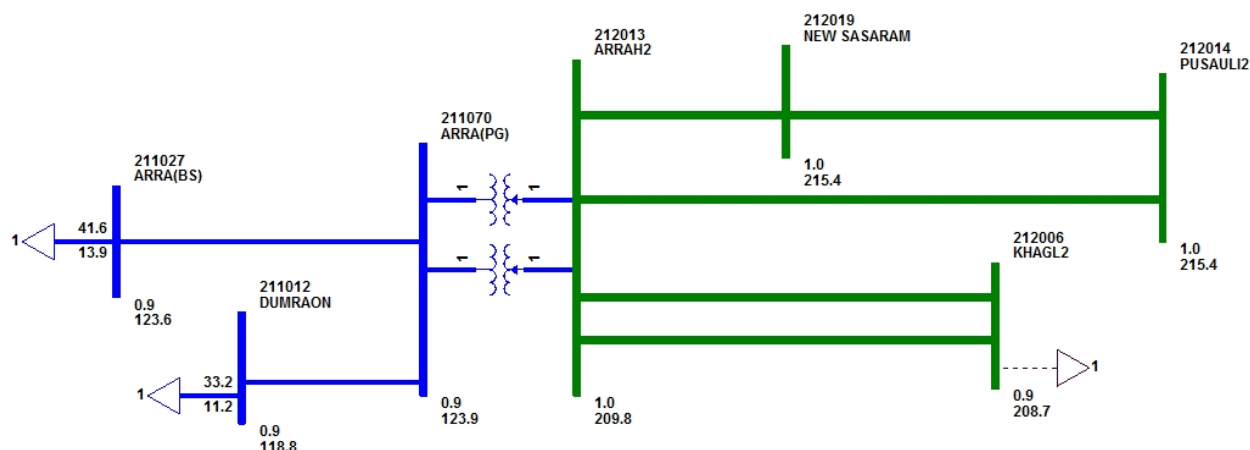
Status of Reporting:

- Detail tripping report from BSPTCL is received

BSPTCL may explain the following:

- Prefault conditions
- Tripping details at Begusarai end

ITEM NO. B.8: Disturbance at 220 kV Khagul S/s (BSPTCL) on 07-06-17 at 11:44 hrs.



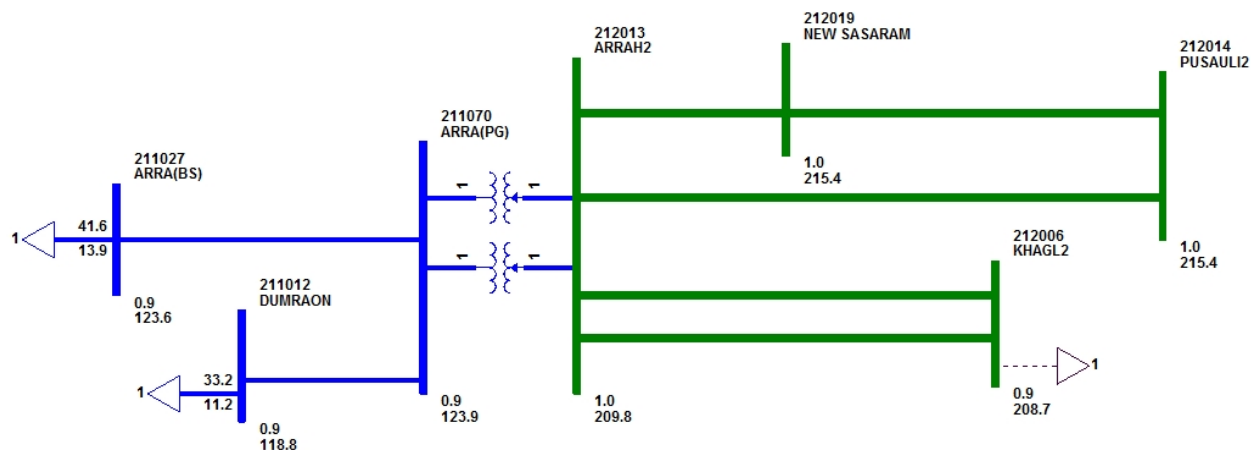
At 11:44 hrs on dated 07.06.17, 220 KV Ara(PG)-Khagaul line-2 tripped from khagaul end on zone 1. At same time 100 MVA Trf-2 was also tripped at Khagaul GSS on overcurrent earth fault.

Relay indications as follows:

Name of Transformer/Line	Relay Operated at Khagaul end	Circuit Breaker Status Khagaul end	Relay Operated at Ara (PG) end	Circuit Breaker Status Ara (PG)end
100 MVA T2	Non-directional O/C & E/F (HV), 86 HV, 86 LV	Open	—	—
220 KV Ara(PG)-Khagaul line-2 (CTR-800/1A)	Distance relay- Zone-1, distance- 2.579 k.m, R-N Phase, Fault Current- Ia-8.72 KA, Ib-20.57 A, Ic- 20.09A	Open	—	CB was already open as line was charged on No load from Khagaul end.

BSPTCL may explain.

ITEM NO. B.9: Disturbance at 132 kV Arrah S/s (BSPTCL) on 18-06-17 at 06:15 hrs and on 24-06-17 at 14:25 hrs



132/33 kV ATR - I & II at Arrah (BSPTCL) tripped due to operation of overflux operation on both the incidences.

BSPTCL may explain.

ITEM NO. B.10: Disturbance at 220 kV Nandokhar S/s (BSPTCL) on 28-06-17 at 15:02 hrs and 15:52 hrs.

220KV Ara-Khagaul D/C were opened due to O/V prior due to disturbance. 220 KV Ara-Nandokhar S/C was opened due to over voltage. Nandokhar was radially connected to Sasaram.

Total power failure at 220kV Nandokhar occurred after tripping of 220 kV Sasaram - Nandokhar S/C due to DT received at Nandokhar end.

Powergrid and BSPTCL may explain.

ITEM NO. B.11: Station blackouts at 220kV MTPS

Station Blackout being faced at MTPS due to tripping of 220KV MTPS-Kaffen Ckt-1 & 2 on various reasons. It may be noted that above lines are connected to the grid, while remaining lines emanating from MTPS remain connected in radial mode. Though 220KV MTPS-Motipur Ckt-1 and 220KV MTPS-Ujjiyarpur Ckt-2 has grid connectivity, but these two lines are also most of the times kept on radial mode by SLDC, Patna due to power flow constraints.

Following three incidents Kaffen Ckt-1 & 2 trippings resulted in Station Blackout at KBUNL. This causes not only heavy loss to KBUNL but heavy stress on machines due to sudden power failure. North Bihar area which is connected with the MTPS with 6 Nos. 220KV & 7 Nos. 132KV lines also goes in dark during above period.

1. TRIPPING OF 220KV MTPS-KAFFEN CKT-1 & 2 FROM KAFFEN END ON 20.06.2017, 08:42 HRS RESULTING IN UNIT-2 TRIPPING AND THUS STATION BLACKOUT.

- KBUNL/MTPS Unit-2 tripped at 08:42:42 hrs of 20/06/2017 on Generator Under Voltage (70%) due to sudden opening of 220KV MTPS-Kaffen Ckt-1 & 2 line from Kaffen end.
- Unit-2 was running at 77MW with GT-2 load around 70MW while other Units of KBUNL were in stopped condition. Kaffen-1 & 2 lines were catering 135MW each(Import).
- R-Y Ph fault occurred in 220KV MTPS-Motipur Line-1(earlier Darbhanga line-1) at 08:41:39 hrs and line tripped on Zone-1, Fault location 2.7KM (Actual fault tower no. 5 from MTPS end due to opening of jumper).
- Kaffen Ckt-1&2 also tripped on same time on Zone-1 from PGCIL Kaffen end though at KBUNL end breaker remain closed. Operator report of PGCIL showing that Kaffen-1 & 2 line tripped on zone-1 and fault cleared within 67mS. At MTPS end Kaffen-1/2 earth fault picked up but current became zero within 40mS, which shows that both Kaffen-1 & 2 line opened instantly on Zone-1 trip. Though it should come under zone-2 with time delay.
- After tripping of Kaffen-1 & 2, total load of 207 MW on Unit-1 (Complete Radial load, since other lines were not connected with grid) caused under voltage tripping of Unit-2.
- This caused total blackout at MTPS and Kaffen line 1 & 2 was restored at 20/06/2017, 09:20:04 hrs.
- Our Unit-2 was restored and synchronized 20.06.2017, 14:18 Hrs. This caused Unit outage from 08:42 to 14:18 hrs.

2. TRIPPING OF 220KV MTPS-KAFFEN CKT-1 & 2 DUE TO PLCC MALFUNCTION ON 07.05.2017, 14:41 HRS RESULTING IN UNIT-1 TRIPPING AND THUS STATION BLACKOUT.

- Message was given by PGCIL on 04/05/2017 for taking PLCC of 220KV MTPS Kaffen Ckt-1 & 2 in service after checking & confirmation by them. It was put into service on 05/05/2017 15:34 hrs. Reading of DT/Inter trip counter was being recorded in each shift.
- 220KV MTPS-Kaffen-1 & 2 lines tripped at 14:01 hrs of 07/05/2016 on Direct Trip received from PLCC Ch-2. PLCC Counter reading of Cmd-1/2/3/4 out of Ch-2(Before/on trip 87/87, 86/87, 101/102 and 93/94 respectively) has recorded increase of DT counter reading by one.
- The Import from above lines before trip was around 135MW on each lines.
- This has caused sudden disturbance of loading of our running Unit-1(while other units were not running), which tripped on Under frequency due to sudden overloading of the Unit after Kaffen-1/2 trip.
- This has resulted in total black out at our station.

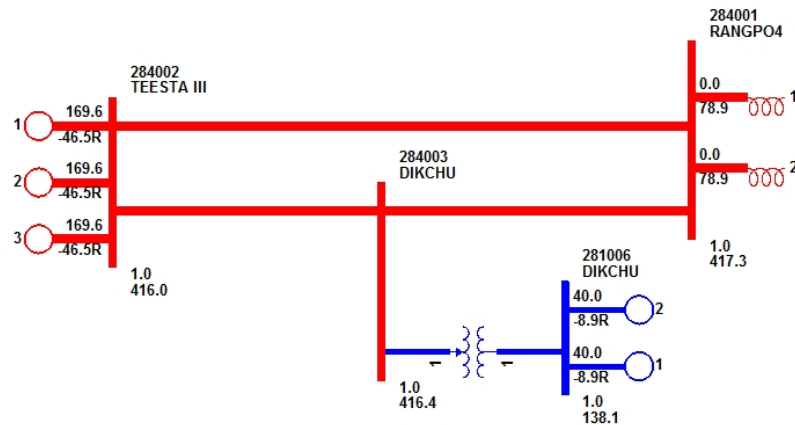
3. TRIPPING OF 220KV MTPS-KAFFEN CKT-1 & 2 DUE TO PLCC MALFUNCTION ON 18.04.2017, 22:55 HRS RESULTING IN STATION BLACKOUT.

- 220KV MTPS-Kaffen-1 & 2 lines tripped at 18.04.2017, 22:55 hrs on Carrier DT Received.
- Our all Units were under stopped condition and this has resulted in Station Blackout.
- PGCIL has checked and rectified the PLCC malfunction.

KBUNL, NTPC may explain.

ITEM NO. B.12: Tripping of 400kV Teesta III – Rangpo line on 06-06-17 at 03:27 hrs.

1. Single line diagram: Not Submitted



2. Detailed analysis of tripping incident: Submitted

At 03:27 hrs 400 kV Teesta III – Rangpo S/C tripped from both ends on Y-B-N fault. At same time, 400 kV Teesta III – Dikchu tripped from both ends due to over voltage which resulted tripping of all running units (#I, #II, #IV, #V & #VI) at Teesta III and Dikchu (unit #I & II) due to loss of evacuation path.

The relay Indications are as follows:

Element Name	Relay Indication at Teesta III	Relay Indication at remote end
400 kV Teesta III – Rangpo S/C	Y-B, Z-I, $I_Y = 5.2$ kA, $I_B = 4.1$ kA. Breaker opened at 03:27:41.293 hrs	Y-B, Z-II, $I_Y = 5.6$ kA, $I_B = 6.5$ kA. Breaker opened at 03:27:41.312 hrs
400 kV Teesta III – Dikchu S/C	$V > 2$, DT sent, Phase voltage < 260 kV. Breaker opened at 03:27:42.995 hrs*	O/V operated, Phase voltage < 330 kV. Breaker opened at 03:27:49.344 hrs**

3. Disturbance record: DR from Teesta III, Dikchu and POWERGRID has been received

4. Remedial action taken : Not Submitted

Analysis of PMU plots:

- Y-B fault has been observed in PMU data.
- Fault clearing time less than 100 ms.

Status of Reporting:

- DR from Teesta III, Dikchu and POWERGRID has been received by 08-06-17

Teesta-III, Dikchu and Powergrid may explain the following:

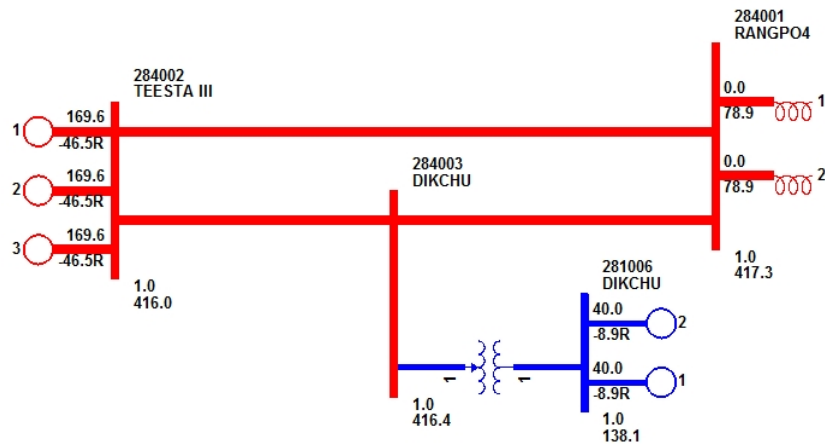
- Operation of $V > 2$ for 400 kV Teesta III – Dikchu S/C at Teesta III may be explained.
- Digital channel for B pole CB of 400 kV Teesta III – Dikchu S/C may be configured in comtrade output from Teesta III end.
- DR of 400 kV Teesta III – Dikchu S/C at Dikchu may be sent in COMTRADE format.

ITEM NO. B.13: Tripping of 400kV Teesta III – Rangpo line on 17-06-17 at 16:14 hrs.

400 kV Teesta III - Rangpo S/C tripped during SPS testing at Teesta III. Unit #1, #2, #4, #5 & #6 at Teesta III & Unit #1 & #2 at Dikchu tripped due to loss of evacuation path. DT was received at Rangpo.

Teesta III and Dikchu may explain.

ITEM NO. B.14: Tripping of 400kV Teesta III – Rangpo S/C line and 400 kV Teesta III – Dikchu S/C on 24-06-17 at 15:49 hrs.



400 kV Teesta III – Dikchu S/C line tripped from Teesta-III end on B-N, zone 2. 400 kV Teesta III – Rangpo S/C tripped from Teesta-III and sent DT to Rangpo end.

Element Name	Observation from DR at Teesta III	Observation from DR at remote end
400 kV Teesta III – Dikchu S/C	Z-II picked up at 15:49:41.225 hrs and carrier sent to remote end. $I_B = 8.5$ kA. No breaker opened. Digital status is available for only R & Y phase breaker.*	No relay picked up. Current in all phases < 200 A (seems erroneous). Only tie breaker status is available in DR. No breaker opened.*
400 kV Teesta III – Rangpo S/C	Breaker opened at 15:49:41.597 hrs on backup O/C. F/C 3.6 kA.*	Breaker opened at 15:49:41.659 hrs after DT receipt. F/C 4.1 kA. No relay picked up.

PMU Observation:

- In Binaguri PMU data, B-N fault (26 kV Voltage dip) observed at 15:49:41.000 hrs.
- Fault clearing time is 600 ms approx. (Cleared after tripping of 400 kV Teesta III – Rangpo S/C).

Status of Reporting:

- DR from Teesta III, Dikchu and POWERGRID has been received by 25-06-17

Teesta-III & Powergrid may explain the following:

- Location of the fault
- Relay indications of Teesta III end of 400 kV Teesta III – Rangpo S/C tripping. Explain the reason for sending DT to Rangpo end.
- DR may be submitted in comtrade format.

ITEM NO. B.15: Disturbance at 220 kV Birpara S/s (PGCIL) on 18-06-17 at 22:37 hrs.

Due to operation of differential protection at Birpara all elements connected to bus I & II along with bus coupler tripped. 132 kV Birpara - Birpara D/C also tripped.

As per SOE, 220kV Birpara-Malbase S/C, 220kV Birpara-Alipurduar - II & 220kV Birpara-Chukha - II along with 220 kV B/C tripped from Birpara at 22:37:34:680 hrs.

Then 220kV Birpara-Alipurduar - I, 220kV Birpara-Binaguri D/C, 220kV Birpara-Chukha - I, 132 kV Birpara - Birpara D/C along with 220/132 kV ATR - I & II tripped from Birpara (PG) within 100 ms.

Powergrid may explain the following:

- Reason & location of fault may be shared
- Reason for operation of differential protection for both buses may be explained
- Reason for tripping of 132 kV Birpara - Birpara D/C may be explained

On 22-05-17 at 16:32 hrs, differential protection at bus - II at Birpara tripped all elements connected to bus II i.e. 220 kV Chukha - Birpara - II, 220 kV Birpara - Malbase S/C, 220 kV Birpara - Alipurduar - II, 220 kV Birpara - Siliguri - I, 220/132 kV ATR at Birpara tripped from Birpara end.

In 56th PCC, Powergrid explained that bus bar protection operated at 220 kV Birpara on bus fault and tripped all the lines.

ERLDC informed that as per PMU data the fault clearing time was 500 ms.

PCC advised Powergrid to verify the tripping and report to ERPC and ERLDC.

Powergrid may update.

ITEM NO. B.16: Disturbance at CTPS A S/s (DVC) on 05-06-17 at 00:05 hrs.

All 132 kV lines connected to CTPS A S/S along with Unit VII & VIII at CTPS B and 220/132 kV ATR - I, II & III (160 x 2 +150) at CTPS A tripped due to CT failure of 132 kV CTPS A-Rajbera-II at CTPS A end followed by a bus fault at 132kV CTPS A S/S.

DVC may explain.

ITEM NO. B.17: Disturbance at RTPS (DVC) on 01-06-17 at 22:00 hrs.

At 22:00 hrs main breakers of all elements connected to 400 kV main bus – I at RTPS tripped due to LBB initiation and subsequent operation for the fault in idle charged portion of 400 kV Ranchi – RTPS – III. As per ERLDC SCADA data, power flow in 400 kV DSTPS – RTPS – I & 400 kV Ranchi – RTPS – I became zero.

DVC may explain.

ITEM NO. B.18: Disturbance at 400 kV Meramundali S/s on 15-06-17 at 15:53 hrs.

Pre-fault conditions:

- 400 kV Meramundali – SEL – II was under shutdown

400 kV Bus configuration of Meramundali S/S:

Bus I	Bus II	Tie-Breaker ON
Vedanta-II(B/D)	Angul-I	401-ON
Mendhsal-I	Duburi-II	402-ON
Angul-II	Vedanta-I	403-ON
Duburi-I	Mendhasal-II(Not in Service)	404-not in service
JSPL-I	KANIHA	405-ON
ICT-I	Future	406- not in service
Future-7	ICT-II	407-OFF
GKEL	JSPL-II	408-ON

Analysis of the incident:

Time	Analysis	PMU observation
15:51	No tripping incident reported. But power flow in 220 kV Meramundali – Old Duburi D/C became zero in SCADA data	No fault observed in PMU data.
15:53	LBB operation at Meramundali bus – I resulted tripping of all connected elements except 400 kV Meramundali – New Duburi – I. But breaker of 400 kV Meramundali – New Duburi – I at New Duburi end tripped due on D/P ($I_Y = 1$ kA, $I_B = 9.5$ kA, 10.6 km from New Duburi). Tripped Elements: 400 kV Meramundali – Angul – II, 400 kV Meramundali – Mendasal – I, 400/ 220 kV ICT-I. Only main breaker opened for JSPL – I feeder (Power flow did not become zero and 400 kV buses at Meramundali was in service as per SCADA data).	In PMU data, voltage dip observed in B phase. Before full recovery of voltage another fault has been observed. Total fault clearing time > 600 ms
16:09	400 kV Meramundali – SEL – I tripped at both ends (At SEL – I: R-N, F/C 2kA, 146 km; At Meramundali: R-N, F/C 11.49 kA, 35.6 km)	Fault clearing time < 100 ms (no A/R observed)
16:14	220 kV bus coupler tripped at Meramundali due to operation of B phase O/C and Y phase E/F. Idle charged part of Old Duburi – II tripped from Meramundali end (B-N, Z-I, 13.23 km from Meramundali F/C 13.23 km)	Voltage-dip in B phase. Fault clearing time < 100 ms
16:18	220 kV Meramundali – Bhanjanagar – II tripped from both ends (Meramundali: R-N, Z-I, 9.6 km, 9kA; Bhanjanagar: R-N, Z-I, 109.89 km)	Voltage-dip in R phase. Fault clearing time < 100 ms
16:37	220 kV Meramundali – BSL – II tripped from Meramundali end on master trip	Y-B fault has been observed in PMU data (<100 ms)

OPTCL may explain.

ITEM NO. B.19: Disturbance at 220 kV Tarkera S/s (OPTCL) on 06-06-17 at 16:30 hrs.

At 16:30 hrs 220 kV Tarkera - Budhipadar D/C tripped due to Y-N fault (Relay Indication at Budhipadar Y-N, Z-I).

At 16:31 hrs 220 kV Tarkera - Rourkela D/C tripped due to Back up O/C & E/F protection at Rourkela.

In Rourkela PMU data, R phase voltage dip observed at 16:30:10 hrs. Fault duration is around 6000 ms Same type of voltage dip has been observed in Ranchi PMU data also. Another voltage dip has been observed at 16:30:80 hrs in R phase. Fault clearing time is 600 ms

OPTCL may explain.

ITEM NO. B.20: Disturbance at 765 kV Dharmajaygarh S/s on 15-06-17 at 14:23 hrs.

At 14:23:12.417, distance protection of Dharamjaigarh-Jabalpur Ckt-3 issued trip command on R-Y fault at both ends. At Dharamjaigarh end, main CB tripped, however, none of the poles of Tie CB tripped, thus all the connected lines tripped on Zone-3 from remote end. LBB did not operate at Dharamjaigarh due to failure in DC supply. Fault was cleared after tripping of 765kV Dharamjaigarh-Ranchi - II after 4 minutes from the fault.

Powergrid may explain.

ITEM NO. B.21: Implementation of on-line tripping incident reporting system in Protection Database Management System.

On-line tripping incident reporting system has been implemented in Protection Database Management System (PDMS). As decided in 53rd & 54th PCC Meetings, details of the tripping incident along with the DR, EL events and other reports can be uploaded through this online portal.

The tripping incident reporting page can be accessed in PDMS through the ERPC protection database website: www.erpc-protectiondb.in:8185. The link is also available in ERPC website on right side bar. Training on PDMS including on-line tripping incident reporting was given to all the constituents from 22.05.17 to 24.05.17. Subsequently, login ID and password for access of PDMS has been issued to the respective members as nominated by the authorities.

ERPC vide letter dated 12th July 2017 informed all the constituents to submit the tripping incident report along with DR (comtrade files), EL and other relevant files through this on-line portal with immediate effect.

Members may note.

ITEM NO. B.22: Tripping of 400kV Farakka-Gokarna line-1 on 05-06-2017 --ERLDC

On 05/06/17 at 12:46 hrs Farakka-Gokarna-1 tripped on R-N fault . Single pole tripping took place from both end . Then the Following incident was observed :

1. A oscillation between line reactor (80 MVAR) and line charging capacitance in the open phase . This is natural phenomena but the major concern in this case is the oscillation is growing in nature and having a frequency very near to 50 HZ .
2. That's why several (nine to be exact) restrike of the fault arc took place and ultimately in High voltage a 3 phase tripping took place from farakka end and DT sent to Gokarno.All this happen during the dead time of A/R .

Now as per our study and investigation based on DR and other information our findings are as follows :

1. Line is made of 400 KV ACSR triple snow bird conductor and line length is around 119 KM . Now MVAR generated by this type of 400 KV line per 100 KM is 67 MVAR , so for 119 km it is coming out 79.73 MVAR .
2. Value of line reactor is 80 MVAR . So, almost 100 % shunt compensation . That's why even after line opening a power frequency oscillation is happening due to resonance (also a 100% compensation is there that's why frequency of oscillation is also around 50 Hz).
3. Now for A/R to be successful "secondary arc extinction" is a necessary and that's why 1 sec dead time is given before charging the phase to nominal voltage .
4. As per various study the deionization time of primary arc or secondary arc extinction time is 425 ms at 400 kv level ,so is we charge the line with in this time chance of restrike of the arc is very much high. In this case though the line open from both end but due to resonance of line reactor and line capacitance a growing oscillation is there and it is reaching 300 KV peak much before normal secondary arc extinction time that's why repeated restrike took place and finally arc extinguishes after several restrike but then due to high voltage line tripped .
5. NGR value of the above line reactor is 414.65 ohm and we have try to reproduce the incident in our PSCAD software and it is found that a value of 600 ohm NGR could reduce the chance of restrike is reduced . Though there will be oscillation but it will be well damped.

Powergrid may explain.

ITEM NO. B.23: Repetitive tripping of 400 kV Biharshariff – Lakhisarai – II at 17:24 hrs and at 18:28 hrs on 30-06-17 due to overvoltage--ERLDC

400 kV Biharshariff – Lakhisarai – II tripped at 17:24 hrs and at 18:28 hrs on 30-06-17 due to overvoltage problem. But no overvoltage has been observed in Biharshariff PMU data.

POWERGRID was requested to provide overvoltage relay setting and voltage measured at both ends at the time of tripping incident via mail dated 03-07-17. POWERGRID may provide overvoltage relay setting and voltage measured at both ends at the time of tripping incident.

Powergrid may explain.

ITEM NO. B.24: Implementation of single phase auto-reclose scheme at PPSP end for the transmission lines connected to Purulia pump storage Plant--ERLDC

PPSP HEP is connected to 400/220/132 kV Bidhannagar S/S via 400 kV D/C lines and to 400/220/132 kV Arambag S/S and 765/400 kV New Ranchi S/S via 400 kV S/C line. It has been observed that these transmission lines tripped several times on transient SLG fault due to non-operation of single phase line auto-reclose facility at PPSP end. Details are given below:

Element Name	Tripping Date	Tripping time	Restoration Date	Restoration Time	Reason	Outage time
400KV BIDHANNAGAR-PPSP-I	11.05.17	16:28	11.05.17	16:47	R-N FAULT	0:19
400KV BIDHANNAGAR-PPSP-II	11.05.17	16:28	11.05.17	16:49	Y-N FAULT	0:21
400KV BIDHANNAGAR-PPSP-I	13.05.17	14:15	13.05.17	15:09	B-N FAULT	0:54
400KV BIDHANNAGAR-PPSP-II	13.05.17	14:15	13.05.17	15:13	B-N FAULT	0:58
400KV PPSP-NEW RANCHI	19.05.17	4:49	19.05.17	5:20	R-N FAULT	0:31
400 KV BIDHANNAGAR - PPSP	26.05.17	14:58	26.05.17	15:13	R-N FAULT	0:15
400KV PPSP-BIDHANNAGAR-II	17.06.17	2:21	17.06.17	2:41	Y-N FAULT	0:20
400KV PPSP-BIDHANNAGAR-I	19.06.17	16:45	19.06.17	17:05	R-N FAULT	0:20
400KV PPSP-BIDHANNAGAR-II	19.06.17	16:46	19.06.17	17:06	B-N FAULT	0:20
400KV PPSP-BIDHANNAGAR-I	19.06.17	21:53	19.06.17	22:19	Y-N FAULT	0:26

In most of the cases, lines were normalized within half an hour. So enabling auto-reclose facility at PPSP end could have reduced the no of line tripping.

It may be mentioned in this connection that single phase A/R facility is already in service at 3 x 170 MW Teesta V and at 6 x 200 MW Teesta III hydro power plant for all 400 kV emanating lines from these stations.

PPSP has been suggested to take necessary action for implementing this feature via letter No. ERLDC/SS/PROTECTION/2017/1622-1625 dated 04/07/2017.

WBSETCL & WBSEDCL may explain.

PART- C:: OTHER ITEMS

FOLLOW-UP OF DECISIONS OF THE PREVIOUS PROTECTION SUB-COMMITTEE MEETING(S)

(The status on the follow up actions is to be furnished by respective constituents)

ITEM NO. C.1: Repeated tripping 400 kV IBEUL Jharsuguda – II

Sl. No	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason
1	18-04-17	16:22	18-04-17	16:22	At location no 2/0 jumper to tower body clearance was found less in R & B phase and Pilot insulator found missing
2	11-05-17	11:08	11-05-17	17:06	DT received from IBEUL end
3	13-05-17	19:12	15-05-17	13:13	Tree infringement found in R phase at Location No. - 18/8 and 18/9 (28 km from Jharsuguda end
4	21-05-17	11:42	22-05-17	14:41	Tree infringement found in R phase at Tower no 137 & 138 in R phase
5	22-05-17	21:13	24-05-17	12:57	Tree infringement in R phase
6	24-05-17	12:57	24-05-17	18:54	R-N FAULT
7	26-05-17	19:50	27-05-17	21:46	Y-N FAULT

In 56th PCC, IBUEL representative was not available in the meeting.

Powergrid informed that proper tree cutting is required to avoid such faults and IBEUL is not taking any corrective action.

IBUEL and Powergrid may update.

ITEM NO. C.2: Disturbance at 400 kV New Dubri S/s on 26-05-17 at 10:20 hrs.

400 kV Meramundali - New Duburi - I & 400/220 kV ICT - I at New Duburi tripped due to operation of LBB protection of bus I at New Duburi.

OPTCL may explain.

In 56th PCC, OPTCL explained the disturbance with a presentation. New Dubri received direct trip command from Meramundali end and main breaker tripped but B-ph of tie breaker got stuck. As a result the LBB protection operated at New Dubri.

PCC felt that there is no fault in the line and LBB should not get activated without any fault current. PCC advised OPTCL to check the LBB settings.

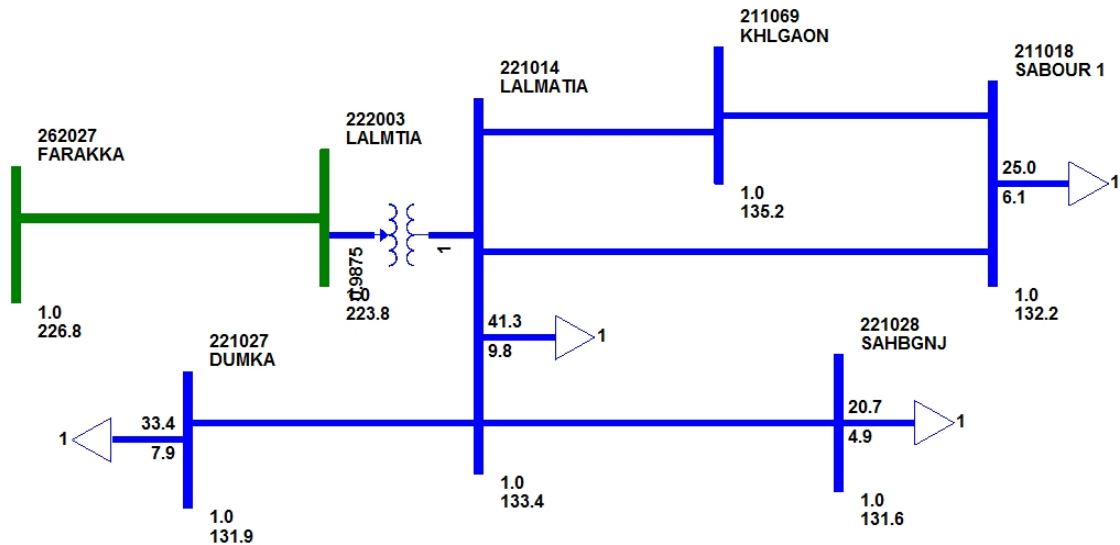
OPTCL may update.

ITEM NO. C.3: Disturbance at 220 kV Lalmatia S/s(JUSNL) on 21-05-17 at 16:39 hrs.

At 16:39 hrs 220 kV Farakka Lalmatia S/C line tripped from Farakka end on O/C E/F protection F/C

4.68 kA in B phase at Farakka.

132 KV Kahalgaon(BSPTCL) - Lalmatia S/C & 132 KV Kahalgaon(NTPC)-Lalmatia S/C were also tripped resulting total loss of power supply at Lalmatia & Sahebgunj. Load at Dumka got survived as it was radially fed from Maithon.



JUSNL and NTPC may explain the following:

- Location of fault
- Tripping of 220 kV Farakka Lalmatia S/C line
- Tripping of 132 KV Kahalgaon(BSPTCL) - Lalmatia S/C & 132 KV Kahalgaon(NTPC)-Lalmatia S/C

In 56th PCC, NTPC informed that 220kV Farakka-Lalmatia line tripped from Farakka end on B-N fault, the fault distance was 59 km. 132 KV Lalmatia- Kahalgaon line didn't trip from Kahalgaon end. However DR recorded in relay of this line indicates that aforesaid line tripped at Lalmatia end.

PCC advised NTPC to collect tripping details of 220kV Farakka-Lalmatia line at Lalmatia end and submit to ERLDC and ERPC.

JUSNL and NTPC may update.

ITEM NO. C.4: Disturbance at 132 kV Chandil and Adityapur S/s (JUSNL) on 13-05-17 at 13:37 hrs.

132 kV Adityapur - Rajkarswan S/C and 132 kV Chandil - Rajkarswan S/C tripped due to Y-B fault resulting total loss of power supply at Rajkarswan.

JUSNL may explain the following:

- Location of fault
- Tripping of 132 kV Adityapur - Rajkarswan S/C and 132 kV Chandil - Rajkarswan S/C

In 56th PCC, JUSNL explained that one line from 132kV Chandil is directly connected to Rajkarswan and other line is connected via Adityapur through 132kV Tie bus.

There was Y-B fault in 132kV Chandil-Rajkaswan line but 132kV Adityapur-Rajkaswan line tripped from Rajkaswan end on over current protection before tripping of 132kV Chandil-Rajkaswan line from Chandil end on zone 1.

PCC felt that Rajkaswan end of 132kV Chandil-Rajkaswan line should also trip in this case. PCC advised to check the relay settings at Rajkaswan end settings of both 132kV Chandil-Rajkaswan

line and 132kV Adityapur-Rajkaswan line.

It was informed that no DR was received from JUSNL. PCC advised JUNL to send the relevant DRs of this disturbance.

JUSNL may update.

ITEM NO. C.5: Repeated pole blocking at HVDC Sasaram

S. No.	Tripping Date	Tripping Time	Brief Reason/Relay Indication	Restoration Date	Restoration Time	Duration
1	29-05-17	00:15	System failure alarm	29-05-17	01:24	1:09:00
2	25-04-17	06:03	Auxiliary supply failure	25-04-17	07:14	1:11:00
3	01-04-17	09:15	Tripped due to Valve cooling system problem	01-04-17	12:56	3:41:00
4	11-04-17	23:32	System failure alarm	12-04-17	00:17	0:45:00
5	30-04-17	03:24	Due to tripping of filters on eastern side	30-04-17	16:13	12:49:00
6	12-01-17	13:36	Blocked due to unbalanced auxiliary system	12-01-17	15:06	1:30:00
7	14-01-17	05:03	Tripped due to system failure alarm	14-01-17	08:57	3:54:00
8	10-01-17	13:23	Filter problem at Sasaram	12-01-17	11:24	46:01:00
9	03-01-17	11:00	To take pole in service in HVDC mode	10-01-17	07:42	164:42:00
10	03-12-16	12:15	Converter control protection operated	03-12-16	13:22	1:07:00
11	06-12-16	19:12	Tripped due to CCP east side M1, M2 major alarm and observed sys fail in East side	06-12-16	20:55	1:43:00
12	19-12-16	12:43	Due to tripping of 400 kv Biharshariff-Sasaram-II	19-12-16	13:35	0:52:00
13	05-11-16	04:51	System fail alarm	05-11-16	06:57	2:06:00
14	22-11-16	12:12	CCP Main-2 major alarm	22-11-16	13:35	1:23:00
15	26-11-16	09:36	CB of filter bank burst	27-11-16	11:31	25:55:00

Detail report is not yet to be received from POWERGRID. Regarding pole block on 25-05-17, there is back up in the station in the following form:

132/33 KV Pusauli	315 MVA ICT-2 tertiary	01 No. DG set of 1500 KVA	Battery available for valve cooling system only. It can provide auxiliary supply for at max 2 minutes.
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Powergrid may explain.

In 56th PCC, Powergrid was advised to submit the details to ERLDC and ERPC.

Powergrid may update.

ITEM NO. C.6: Disturbance at 220 kV Ramchandrapur S/s (JUSNL) on 02-04-17 at 19:01 hrs.

At 19:01 hrs, 132 kV Ramchandrapur – Adityapur D/C along with 220/132 kV ATR II & III and 220 kV B/C at Ramchandrapur tripped due to B-N fault at 132 kV Adityapur – Ramchandrapur – I (B phase insulator string was completely broken). At the same time, 132 kV Adityapur – Chandil S/C, 132 kV Adityapur – Rajkarswan S/C & 132 kV Chandil – Rajkarswan S/C tripped resulting load loss of 250 MW.

In PMU data, delayed fault clearance has been observed.

- As per the relay flags, there was a B-N fault in 132 kV Ramchandrapur – Adityapur line-I at 50% of the line and Ramchandrapur end cleared the fault in zone 1 but Adityapur end failed to clear the fault.
- As a result the fault got feed from 132 kV Ramchandrapur – Adityapur line-II and Ramchandrapur end failed/delayed fault clearing hence the 220/132 kV ATR II & III tripped from 132kV end.
- The other fault feeding lines 132 kV Adityapur – Chandil S/C, 132 kV Adityapur – Rajkarswan S/C & 132 kV Chandil – Rajkarswan S/C also tripped to clear the fault.

The relay Indications at 132kV Ramchandrapur S/s are as follows:

S.No	NAME OF FEEDER	TRIPPING TIME	CLOSING TIME	RELAY [RCP End]	RELAY [Remote End]	REMARK S
1.	132KV Adityapur – Circuit 1	19:02 Hrs.	10:28 Hrs. 03.04.17	B phase fault, power swing, Zone 1, 4.424KM, 5.461KA in B phase		Due to fault in Adityapur circuit-1
2.	132KV Adityapur – Circuit 2	19:02 Hrs.	19:37Hrs.	O/C start I>1 ,O/V start V>1 ,power swing		
3.	220/132KV Transformer No. II	19:02 Hrs.	19:27 Hrs.	O/C in B-phase LV side		
4.	220/132KV Transformer No. III	19:02 Hrs.	19:36 Hrs.	O/C in B-phase LV side		
5.	220KV Bar coupler	19:34 Hrs.	20:42 Hrs.	None directional O/C and E/F ,master trip		
6.	220/132KV Transformer No. II	19:34 Hrs.	19:46 Hrs.	O/C in B-phase LV side		

In 55th PCC, JUSNL explained that

- There was a B-N fault at 132 kV Adityapur – Ramchandrapur line– I and Ramchandrapur end cleared the fault in zone 1 but Adityapur end failed to clear the fault.
- As a result the fault got feed from 132 kV Ramchandrapur – Adityapur line-II and Ramchandrapur end failed/delayed fault clearing hence the 220/132 kV ATR II & III tripped from 132kV end on over current protection.
- 132 kV Adityapur – Chandil S/C line tripped from Chandil on zone 3 and 132 kV Chandil – Rajkarswan S/C line tripped from Chandil end on Over current E/F protection
- 132 kV Adityapur – Rajkarswan S/C was not tripped

PCC felt that the fault should be cleared from 132 kV Adityapur S/s and advised JUSNL to carry out the following:

- Test the protection relays of 132 kV Adityapur – Ramchandrapur line– I at 132 kV Adityapur S/s
- Check the zone 3 time setting of 132 kV Adityapur – Chandil S/C at Chandil end as the line tripped within 350 ms.

JUSNL may update.

ITEM NO. C.7: Disturbance at 400kV Vedanta S/s on 17-03-17 at 10:22 Hrs.

- All the three 400 kV SEL internal smelter feeders tripped on E/F resulting increase in 400 kV SEL – Raigarh S/C flow to 1400 MW.
- Though SPS has been implemented to limit the MW flow through 400 kV SEL – Raigarh S/C to 650 MW, more than 800 MW power was flowing through 400 kV SEL – Raigarh S/C for the duration of 17 minutes as per ERLDC SCADA data.
- Reason for non-operation of SPS of 400 kV SEL-Raigarh should be reviewed.

In 54th PCC, members felt that SPS scheme should operate as and when power flow in any of the 400 kV SEL-Raigarh or 400 kV SEL-Rourkela line is greater than 650 MW as per the designed SPS scheme and generation backing down of Vedanta units should be initiated in this case.

Vedanta informed that as per the present setting the SPS will be initiated if power flow in 400 kV line exceeds 800 MW. After this disturbance, SPS scheme at Vedanta end has been modified from summation logic to Individual line loading logic.

CE, NPC opined that the SPS settings should not be changed without detail discussion in PCC forum.

PCC took serious note of modifying the SPS settings without intimating ERPC /ERLDC and advised OPTCL & Vedanta to submit present SPS details immediately for further discussion in OCC/PCC meetings.

OPTCL may update.

ITEM NO. C.8: Multiple elements tripping at 220/132 kV Lalmatia (JUSNL) S/s on 06-02-17 at 16:40 Hrs.

At 16:40hrs, blasting of 132 kV Y & B phase CTs of 132 kV bus sectionalizer at 220/132kV Lalmatia S/s resulted in following events:

- 132 kV Lalmatia - Kahalgaon and 132 kV Lalmatia - Dumka – II tripped from Lalmatia end on zone IV protection.
- 132 kV Lalmatia -Dumka – I feeder tripped from both end.
- Farakka end of 220 kV Farakka Lalmatia line, remain picked up the fault in zone 1 for 880 ms but no line breaker was tripped.

The relay Indications are as follows:

Time	Name of the element	Relay at Lalmatia	Relay at remote end
16:40 hrs	220 kV Lalmatia - Farakka feeder	Did not trip	R-Y-B phase Z-I started, B phase relay picked at 16:40:28.504 hrs, Y phase relay picked at 16:40:28.664 hrs, R phase relay picked at 16:40:28.905 hrs, F/C 1.5 kA in all three phases. All the relay were in picked condition till the end of time frame captured by NTPC end DR (DR is attached)
	132 kV Lalmatia - KhSTPP feeder	B-N, Z-IV, O/C, IA 0.7kA, IB – 0.9 kA, IC – 3kA, Fault duration 183.8 ms.	Did not trip

132 kV Lalmatia Dumka – I	E/F	D/P
132 kV Lalmatia Dumka – II	E/F, Z-IV	Did not trip
220/132 KV ATR, 132/33 KV ATR – I & II at Lalmatia	E/F protection at Lalmatia	

Analysis of PMU plots:

- At 16:40 hrs, 4 kV voltage dip observed in all three phases.
- Fault clearance time is 700 ms. Though the voltage fully recovered to pre-fault value after 600 ms of the fault.

In 53rd PCC, NTPC informed that 132 kV Y & B phase CTs of 132 kV bus sectionalizer were busted at 220/132kV Lalmatia S/s and Bus bar protection was failed to operate. One 220/132kV ATR at Lalmatia (under NTPC control area) tripped on backup E/F protection other ATR which is under JUSNL control area was failed to clear the fault. As a result, 220kV Lalmatia-Farakka line tripped from Farakka end on directional E/F protection.

JUSNL informed that 132kV Lalmatia-Dumka D/C line and 132kV Lalmatia-Khahalgaon S/C line tripped from Lalmatia end on non directional over current protection. The 220/132kV ATR at Lalmatia under their control area also tripped on over current E/F protection.

PCC observed that 220kV Lalmatia-Farakka line tripped from Farakka end after 6 sec which is not acceptable and tripping of 220/132kV ATRs is not clear.

PCC advised the following:

- NTPC should check the reason for non-operation of busbar protection at 132kV Lalmatia S/s.
- NTPC and JUSNL should jointly test the healthiness of the busbar protection at 132kV Lalmatia S/s
- NTPC and JUSNL should place the details of ATR tripping along the relevant DR.
- JUSNL should disable the non-directional over current protection feature in all 132kV lines and enable directional over current protection with proper relay coordination.

PCC advised JUSNL and NTPC to submit the action taken report to ERPC and ERLDC within a week.

In 54th PCC, NTPC and JUSNL informed that they will test the healthiness of the busbar protection at 132kV Lalmatia S/s in May 2017.

JUSNL informed they have not yet disabled the non-directional over current protection feature in all 132kV lines.

NTPC and JUSNL may update.

ITEM NO. C.9: Third Party Protection Audit

1. Status of 1st 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	27	39.71
Odisha	59	38	64.41
JUSNL	34	16	47.06
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 are available at ERPC website (Observations include PLCC rectification/activation which needs a comprehensive plan).

Members may update.

2. Schedule for 2nd Third Party Protection Audit:

The latest status of 2nd Third Party Protection audit is as follows:

1) Jeerat (PG)	Completed on 15 th July 2015
2) Subashgram (PG)	Completed on 16 th July 2015
3) Kolaghat TPS (WBPDCCL)-	Completed on 7 th August 2015
4) Kharagpur (WBSETCL) 400/220kV -	Completed on 7 th August 2015
5) Bidhannagar (WBSETCL) 400 & 220kV	Completed on 8 th September, 2015
6) Durgapur (PG) 400kV S/s	Completed on 10 th September, 2015
7) DSTPS(DVC) 400/220kV	Completed on 9 th September, 2015
8) Mejia (DVC) TPS 400/220kV	Completed on 11 th September, 2015
9) 400/220/132kV Mendhasal (OPTCL)	Completed on 2 nd November, 2015
10) 400/220kV Talcher STPS (NTPC)	Completed on 3 rd November, 2015
11) 765/400kV Angul (PG)	Completed on 4 th November, 2015
12) 400kV JITPL	Completed on 5 th November, 2015
13) 400kV GMR	Completed on 5 th November, 2015
14) 400kV Malda (PG)	Completed on 23 rd February, 2016
15) 400kV Farakka (NTPC)	Completed on 24 th February, 2016
16) 400kV Behrampur(PG)	Completed on 25 th February, 2016
17) 400kV Sagardighi (WBPDCCL)	Completed on 25 th February, 2016
18) 400kV Bakreswar (WBPDCCL)	Completed on 26 th February, 2016
19) 765kV Gaya(PG)	Completed on 1 st November, 2016
20) 400kV Biharshariff(PG)	Completed on 3 rd November, 2016
21) 220kV Biharshariff(BSPTCL)	Completed on 3 rd November, 2016
22) 400kV Maithon (PG)	Completed on 18 th May, 2017
23) 132kV Gola (DVC)	Completed on 17 th May, 2017
24) 132kV Barhi (DVC)	Completed on 18 th May, 2017
25) 132kV Koderma (DVC)	Completed on 18 th May, 2017
26) 132kV Kumardhubi (DVC)	Completed on 19 th May, 2017
27) 132kV Ramkanali (DVC)	Completed on 19 th May, 2017
28) 220kV Ramchandrapur	Completed on 1 st June, 2017
29) 400kV Jamshedpur (PG)	Completed on 1 st June, 2017
30) 132kV Patherdih (DVC)	Completed on 31 st May, 2017
31) 132kV Kalipahari (DVC)	Completed on 30 th May, 2017
32) 132kV Putki (DVC)	Completed on 31 st May, 2017
33) 132kV ASP (DVC)	Completed on 30 th May, 2017
34) 132kV Mosabani (DVC)	Completed on 2 nd June, 2017
35) 132kV Purulia (DVC)	Completed on 1 st June, 2017

It was informed that the third party protection audit observations are available in the ERPC website in important documents.

PCC advised all the constituents to comply the observations at the earliest.

Members may update.

ITEM NO. C.10: Implementation of Protection Database Management System Project.

ERPC proposal for “Creation & Maintenance of web based protection database management system and desktop based protection calculation tool for Eastern Regional Grid” has been approved by the Ministry of Power for funding from Power System Development Fund (PSDF) vide No-10/1/2014-OM dated 07.03.2016.

In 49th PCC, PRDC informed that data collection for West Bengal is in progress and it will be completed by December, 2016.

In 50th PCC, It was informed that Software Acceptance Tests are in progress.

In 51st PCC, PRDC informed that data collection of Odisha and Jharkhand has been completed. Data collection in West Bengal and Bihar is in progress. Data collection of Eastern Region will be completed by 15th February 2017.

PRDC added that software acceptance trails of PSCT phase-I have been completed and phase-II will be done from 19th to 21st January 2017. Software acceptance trails of web based PDMS system have been completed and observations will be implemented at the earliest.

It was informed that a format for on-line reporting of tripping incidence has been prepared in PDMS and PRDC will present details in next PCC meeting.

In 52nd PCC, PRDC explained the format for on-line reporting of tripping incidence.

PCC suggested PRDC to include details of the elements under shutdown before the disturbance.

In 53rd PCC, PRDC informed that data survey and modeling has been completed and PDMS will be operational by 31st March 2017. The login id will be provided soon.

PRDC presented the format for on-line reporting of tripping incidence.

PCC in principle agreed with the format and advised PRDC to include a summery sheet for the each tripping incidence.

In 54th PCC, PRDC informed that summery sheet for on-line tripping incidence reporting has been prepared. The PDMS is operational and constituents can access the data. Login credentials were given to all the constituents.

It was decided that a separate meeting will be convened in May 2017 to finalize the procedure for on-line reporting and data updation.

In 55th PCC, PRDC informed that collection of relay settings 97 out of 112 substations were completed in Bihar. Rest are in progress.

Pending relay setting file collection of JUSNL substations are in progress. Relay setting file collection of Sikkim substations are pending.

In 56th PCC, PRDC informed that relay setting file collection of BSPTCL and Sikkim substations are in progress.

PRDC may update.

ITEM NO. C.11: Non-commissioning of PLCC / OPGW and non-implementation of carrier aided tripping in 220kV and above lines.

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

List of line where auto reclose facility is not available(Information based on PMU data analysis)							
S. No	Transmission Lines name	Date of Tripping	Reason of Tripping	Owner Detail		Present Status	
				End-1	End-2	OPGW/PLCC Link available	AR facility functional
10	400KV PATNA-BALIA-II	21.06.16	B-N FAULT	PGCIL	PGCIL		
12	400KV PATNA-BALIA-I	21.06.16	R-N FAULT	PGCIL	PGCIL	PLCC available	
13	220KV BUDIPADAR-KORBA-II	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC available	will be activated in consultation with Korba
14	400 KV ARAMBAGH - BIDHANNAGAR	02.07.16	Y-N FAULT	WBSET CL	WBSET CL	PLCC available	AR in service but some problem in y-ph pole
16	400 KV NEW RANCHI - CHANDWA - I	13.07.16	B-N FAULT	PGCIL	PGCIL	PLCC available	
17	220 KV TSTPP-RENGALI	17.07.16	EARTH FAULT	NTPC	OPTCL		
18	220KV BUDIPADAR-RAIGARH	21.07.16	EARTH FAULT	OPTCL	PGCIL	PLCC defective	
19	400 KV KOLAGHAT-KHARAGPUR	03.08.16	Y-N FAULT	WBPDC L	WBSET CL		
20	220 KV FARAKKA-LALMATIA	03.08.16	B-N FAULT .	NTPC	JUNSL	Yes	Old Relay and not functional. 7-8 months required for auto re-close relay procurement.
21	400 KV PURNEA-MUZAFARPUR-I	03.08.16	R-N FAULT	PGCIL	PGCIL	PLCC available	
23	220 KV MUZAFFARPUR - HAZIPUR - II	10.08.16	B-N FAULT	PGCIL	BSPTCL		Voice established. For carrier required shutdown
24	220 KV ROURKELA - TARKERA-II	11.08.16	B-N FAULT	PGCIL	OPTCL	OPGW available	Expected to install protection

							coupler by Jan 17
25	220 KV CHANDIL-SANTALDIH	25.08.16	R-N FAULT	JUSNL	WBPDC L	not available	
26	400 KV MPL-RANCHI-II	02.09.16	R-N FAULT	MPL	PGCIL	PLCC available	
27	220 KV BIHARSARIF-TENUGHAT	07.09.16	B-N FAULT	BSPTC L	TVNL		
29	220 KV RAMCHANDRAPUR - CHANDIL	22.09.16	B-N FAULT	JUSNL	JUNSL		
31	400 KV KOLAGHAT - CHAIBASA	28.09.16	B-N FAULT	WBPDC L	PGCIL	PLCC available	

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.

TCC advised to review the status of above in lower forums report back in next TCC.

Members may update the status.

ITEM NO. C.12: Non-commissioning / non-functional status of bus-bar protection at important 220 kV Sub-stations.

It has been observed that at many 220 kV substations particularly that of STU, bus-bar protection is either not commissioned or non-functional. The non-availability / non-functionality of bus bar protection, results in delayed, multiple and uncoordinated tripping, in the event of a bus fault. This in turn not only results in partial local black out but also jeopardises the security of interconnected national grid as a whole. The matter was also pointed out during the third party protection audit which is being carried out regularly. Constituents are required to meet the audit compliance and commission or made bus –bar protection functional where ever it is not available. A list of such important 220 kV sub-stations as per the first third party audit is placed in the meeting.

In 34th TCC, members updated the status as follows:

Bus Bar Protection not available (reccord as per third party protection audit)

Bihar				
SI No	Name of Substation	Bus protection status	Date of audit	Present Status
1	220 kV Bodhgaya	Not available	28-Dec-12	<i>Single bus and there is no space available for busbar protection</i>
Jharkhand				
1	220 kV Chandil	Not available	29-Jan-13	<i>LBB available</i>
2	220 kV Tenughat	Not available	12-Apr-13	
DVC				
1	220 kV Jamsedpur	Not available	10-Apr-13	<i>Single bus. Bus bar will be commissioned under PSDF.</i>
West Bengal				

1	220 kV Arambah	Not available	24-Jan-13	<i>Available in alarm mode. Planning to replace with numerical relay</i>
2	220 kV Jeerat	Not available	20-Dec-12	<i>Relays have been received at site. Installation is in progress.</i>

TCC further advised all the constituents to give the latest status of Bus Bar protection of other 220KV S/S under respective control area.

TCC advised to review the status of above in lower forums report back in next TCC.

Members may update.

PART- D

Item No D.1 Tripping incidences in the month of June, 2017

Other tripping incidences occurred in the month of June 2017 which needs explanation from constituents of either of the end is given at **Annexure- D1**.

Members may discuss.

Item No D.2 Any other issues.

Annexure-D1

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Auto Recloser status	DR/EL received within 24 Hrs	DR/EL received after 24 Hrs	Remarks
Fault clearing time is violating protection standard (As per PMU data)													
1	220KV JODA-RAMCHANDRAPUR-I	09/06/2017	10:25	09/06/2017	11:37	Did not trip	Y-B, O/C, E/F	Y-B-N FAULT	500 ms approx	No autoreclose operation observed in PMU data	--	No	
2	400KV RANCHI-RAGHUNATHPUR-II	11/06/2017	12:03	11/06/2017	13:06	--	B-N, Z-II, F/C 2.92 KA, 150.76 km from RTPS	B-N FAULT	600 ms approx	No autoreclose operation observed in PMU data	No	No	
3	220KV RENGALI(GRIDCO)-RENGALI(PG)-II	12/06/2017	17:23	13/06/2017	10:14	Y-B FAULT	Yet to be received	Y-B-N FAULT	500 ms approx	--	No	No	
4	220KV FSTPP-LALMATIA-I	16/06/2017	11:35	16/06/2017	12:04	Z1, Y-N Fault from Farraka end	Yet to be received	Y-N FAULT	350 ms	No autoreclose operation observed in PMU data	No	No	
5	400KV RANCHI-SIPAT-II	19/06/2017	17:34	19/06/2017	17:43	Y-N, 2.6kA, 284.5 KM	Yet to be received	Y-N FAULT	300 ms approx	No autoreclose operation observed in PMU data	No	No	
6	400KV RANCHI-RAGHUNATHPUR-III	19/06/2017	21:10	19/06/2017	23:34	Yet to be received	B-N, Z-II	B-N FAULT	600 ms approx	No autoreclose operation observed in PMU data	No	No	Antitheft charged portion from Ranchi tripped
7	400KV DARBHANGA (DMTCL)-MUZAFFARPUR-II	30/06/2017	17:37	30/06/2017	18:25	B-N, Z-II, 52.1 km from DMTCL, Fault clearing time >400 ms	Yet to be received	B-N FAULT	400 ms approx	No autoreclose operation observed in PMU data	Yes	No	
Multiple tripping at same time													
1	220KV MUZAFFARPUR(PG)-MUZAFFARPUR(BSEB)-I	20/06/2017	8:40	20/06/2017	9:20	R-Y-N, IR-2.5KA, IY-1.93KA, Distance: 31.6KM from Muz(PG)	Yet to be received	R-Y FAULT	<100	--	No	No	
2	220KV MUZAFFARPUR(PG)-MUZAFFARPUR(BSEB)-II			20/06/2017	9:22	R-Y-N, IR-2.28KA, IY-4.74KA, Distance: 31KM from Muz(PG)	Yet to be received	R-Y FAULT	<100	--	No	No	
3	220KV CHANDIL-RANCHI-I	20/06/2017	17:12	20/06/2017	17:49	Yet to be received	Y-N , 6.3 KA, 16 KM	Y-N FAULT	<100	--	No	No	
4	400KV RANCHI-SIPAT-II			20/06/2017	20:47	Y-B , 4 KA each , 137 KM	Yet to be received	Y-B-N FAULT	<100	--	No	No	
5	400KV PUSAULI-NABINAGAR-II	22/06/2017	13:53	22/06/2017	15:58	Y-N 2.4 KA at Pusauli	Yet to be received	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
6	400KV PUSAULI-NABINAGAR-I			22/06/2017	15:07	Yet to be received	Yet to be received	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
7	400KV GAYA-KODERMA-I	30/06/2017	20:18	30/06/2017	21:12	Y-N. F/C 2.7 kA, 121 km from Gaya	Yet to be received	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
8	400KV GAYA-KODERMA-II			30/06/2017	21:13	Y-N	Y-N, 2.7 kA, 126.5 km from Gaya	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
Fault Not observed in PMU data													
1	220KV MUZAFFARPUR-HAJIPUR-I	02/06/2017	16:10	02/06/2017	17:25	Yet to be received	CB Auto tripped	SPURIOUS TRIPPING	--	--	No	No	
2	400KV KHARAGPUR-CHAIBASA-II	02/06/2017	21:03	02/06/2017	22:12	DT Received	PRV OPERATED FOR L/R	MALOPERATION OF PRV OF L/R AT CHAIBASA END	--	--	No	--	.evt file received from KGP end

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Auto Recloser status	DR/EL received within 24 Hrs	DR/EL received after 24 Hrs	Remarks
3	400KV KHARAGPUR-CHAIBASA-II	03/06/2017	10:20	03/06/2017	11:03	DT Received	PRV OPERATED FOR L/R	MALOPERATION OF PRV OF L/R AT CHAIBASA END	--	--	No	--	.evt file received from KGP end
4	400KV JAMSHEDPUR-ANDAL-II	04/06/2017	23:12	04/06/2017	23:53	Did not trip	Master trip relay operated	SPURIOUS TRIPPING	--	--	No	No	
5	400KV PPSP-NEW RANCHI S/C	15/06/2017	14:23	15/06/2017	15:17	Yet to be received	Did not trip	SPURIOUS TRIPPING	--	--	--	No	Voltage unbalance has been observed at the time of the disturbance
6	400KV IBEUL-JHARSUGUDA-I	22/06/2017	12:26	22/06/2017	19:27	DT Received	Yet to be received	DT RECEIVED AT IBEUL	--	--	No	No	
No autorecloser operation observed in PMU data													
1	400KV RANCHI-RAGHUNATHPUR-II	01/06/2017	16:14	01/06/2017	18:41	Yet to be received	Yet to be received	R-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
2	400KV FSTPP-GOKARNO-I	05/06/2017	12:44	05/06/2017	14:29	R-N, 3.8 kA, Z-II, A/R started, but three pole opened due to operation of O/V stage - II (R phase vol = 390 kV)	R-N, Z-I, 15.26 km from Gokarno, F/C 5.78 kA, A/R started but three pole opened on DT receipt	R-N FAULT	--	--	Yes	Yes	
3	400KV JEERAT-BAKRESWAR-I	05/06/2017	12:53	05/06/2017	13:09	Y-N, Z-I, 117 km from Jeerat, A/R successful at Jeerat end	Y-N, Z-I, 24 km from BKTTP, A/R blocked at Bakreswar end due to low oil pressure	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	A/R blocked at Bakreswar end due to low oil pressure (Tripped on Pole discrepancy)
4	400KV MEERAMUNDALI-STERLITE-I	06/06/2017	18:57	06/06/2017	19:55	Y-N, 138 km from Meeramandali, 1.82 kA	Y-N, F/C 1.9 kA, Z-I at SEL, A/R not attempted	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	Yes	
5	220KV BIRPARA-MALBASE-I	07/06/2017	18:10	07/06/2017	21:36	DEF	Yet to be received	R-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
6	220KV DARBHANGA (DMTCL)-MOTIPUR-II	08/06/2017	18:12	09/06/2017	19:49	Z-I	Yet to be received	R-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
7	400KV FSTPP-KHSTPP-IV	09/06/2017	12:55	09/06/2017	13:07	Y-N, Z-I, A/R successful at Farakka end	Y-N, Z-I, 23 km from KhSTPP end, F/C - 11 kA	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
8	220KV NEW PURNEA-MADHEPURA-II	09/06/2017	13:20	09/06/2017	13:38	B_N;A/R SUCCESSFUL;15.8 KM	TRIPPED FROM MADHEPURA END;B_N;16.3 KM	B-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
9	400KV RANCHI-RAGHUNATHPUR-II	11/06/2017	16:10	11/06/2017	18:13	--	R-N, Z-I, 25.41 km from RTPS, 10.369 kA	B-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
10	400KV GMR-ANGUL-I	15/06/2017	16:30	15/06/2017	17:01	IR- 9574.5A,IY-1522 A,IB- 1179 A, VR = 42 kV, IO = 13.506 kA, Z-I, 4.4 km from GMR, DT sent	DT received	R-N FAULT	<100	No autoreclose operation observed in PMU data	Yes	No	Z-I operated in all three phases at GMR end resulting A/R block
11	400KV ARAMBAGH-BAKRESWAR-I	19/06/2017	19:52	19/06/2017	20:34	B-N, F/C - 13.5 KA, 25.8 KM from Arambag	B-N, F/C 2.01 KA, 106.7 KM from Bakreswar	B-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
12	400KV MAITHON-MEJIA-I	20/06/2017	4:50	20/06/2017	5:19	R-N, Z-I, 12.8 KA, 17.51 km from Maithon	Did not trip	R-N FAULT	<100	No autoreclose operation observed in PMU data	Yes	No	

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Auto Recloser status	DR/EL received within 24 Hrs	DR/EL received after 24 Hrs	Remarks
13	400KV MAITHON-KhSTPP-I	20/06/2017	7:54	20/06/2017	8:25	R-N, Z-I, 7.8 kA	Did not trip	B-N FAULT	<100	No autoreclose operation observed in PMU data	Yes	No	
14	400KV RENGALI-KEONJHAR-I	20/06/2017	21:55	20/06/2017	22:32	Rengali- Y_N,F.C.5.31 kA , F.D. 58.48 KM	Keonjhar-Y_N, F.C. 2.31 kA, F.D. 42 KM	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	
15	400KV MUZAFFARPUR(PG)- BIHARSARIFF-I	30/06/2017	17:31	30/06/2017	21:29	Yet to be received	Y-N, 2.73 kA, Z-I, 135 km from BSF	Y-N FAULT	<100	No autoreclose operation observed in PMU data	No	No	