



Minutes
of
85th PCC Meeting

Date: 10.12.2019
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 85TH PROTECTION SUB-COMMITTEE MEETING HELD AT ERPC, KOLKATA ON 19.11.2019 (TUESDAY) AT 11:00 HOURS

List of participants is attached in **Annexure-A**.

PART – A

ITEM NO. A.1: Confirmation of minutes of 84th Protection sub-Committee Meeting held on 23rd October, 2019 at ERPC, Kolkata.

The minutes of 84th Protection Sub-Committee meeting held on 23.10.19 circulated vide letter dated 11.11.2019.

Members may confirm the minutes of 84th PCC meeting.

Deliberation in the meeting

Members confirmed the minutes of 84th PCC meeting.

PART – B

ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN OCTOBER, 2019

ITEM NO. B.1: Tripping of 400 kV Angul – JITPL D/C on 17.10.2019 at 08:11 Hrs.

400 kV Angul – JITPL D/C tripped at 08:11 hrs while availing scheduled Shutdown of 400 kV Angul–JITPL II.

Generation loss of 470 MW occurred of JITPL Unit #2 due to loss of evacuation path.

Generation Loss: 470 MW

Powergrid may explain.

Deliberation in the meeting

JITPL representative was not present in the meeting.

JITPL vide mail dated 18th November 2019 informed that, the “TIE – LBB” protection has operated JITPL and initiated trip command to 400 kV Angul – JITPL D/C. As a result, both the lines got tripped from JIPL. JITPL explained the reason for TIE-LBB operation as follows:

- 1) *The logic for “TIE LBB” protection is,*
 - a) *GRP 86 to be operated*
 - b) *The current of the bus is to be more than 10% of CT ratio for 200 msec, continuously.*
- 2) *Before the line outage, the current in 400 kV Angul – JITPL line I, TIE CT and Line 2 TIE CT was 170 amps respectively. While taking line 2 shutdown, on dated 17/10/2019 at 8.00 AM, the load current shifted from “LINE 2 TIE CT to Line 1 TIE CT” and as a result the current of line 1 TIE CT reached to 318 amps.*

85th PCC Minutes

4) As DC earth fault persisting in the switchyard DC system, it had initiated the LBB operation (line-1) as Unit-1 Generator GRP 86 master trip contact initiate. (Unit-1 already in Shutdown condition).

5) Hence as per logic, both conditions are satisfied and LBB trip command generated.

PCC observed that master trip (86) contact of unit 1 was already under initiated condition even though the unit 1 was under shutdown condition.

PCC decided to discuss the issue in next PCC meeting wherein JITPL should explain the following:

- 1) Reason for initiation of master trip (86) contact of unit 1
- 2) DC earth fault persisting in the switchyard DC system

ITEM NO. B.2: Total power failure at 220/132 kV Sadaipalli S/s on 25.10.2019 at 04:44 Hrs.

At 04:44 Hrs, B phase jumper of Bus II-isolator of 220 KV Sadaipalli – New Bargarh S/C snapped at Sadaipalli end and caught fire.

For safety reason, 220 KV Bolangir (PG)-Sadaipalli was hand-tripped on emergency basis.

Consequently, 220/132 KV Sadaipalli S/s became dead and load loss of 111 MW occurred in downstream areas of Sadaipalli.

Load Loss: 111 MW

OPTCL may explain.

Deliberation in the meeting

OPTCL explained that B phase jumper of Bus II-isolator of 220 KV Sadaipalli – New Bargarh S/C was snapped at Sadaipalli end. New Bargarh end tripped on broken conductor. As the clearance from drop jumper to isolator became less continuous sparking was observed at that point. 220 KV Bolangir (PG)-Sadaipalli was hand-tripped as a result 220/132 KV Sadaipalli S/s became dead. Presentation is enclosed at **Annexure-B2**.

OPTCL added that the defective isolator was replaced with new one after transferring all feeders/TFRs from Bus -2 to Bus-1.

PCC advised OPTCL to carry out the preventive maintenance to avoid such failures of equipment.

ITEM NO. B.3: Multiple tripping at Budipadar S/s on 08.10.2019 at 19:26 Hrs.

At 18:04 hrs, 220 kV Budipadar – Korba – II and 220 kV Budipadar – Raigarh S/C tripped at 18:04 hrs on Y-B fault.

At 18:17 hrs 220 kV Budipadar – Korba – III tripped due to Y-N fault.

At 18:20 hrs. 220 kV Budipadar –Tarkera – II tripped. Fault was cleared within 100 ms.

While charging this line 220 kV Budipadar bus II became dead at 19:26 hrs, tripping all elements connected to bus II i.e. 220 kV Budipadar –Lapanga– D/C, 220 kV Budipadar –IB – II & IV and 220/132 kV ICT at Budipadar.

OPTCL may explain.

Deliberation in the meeting

*OPTCL explained the disturbance with a detailed presentation. The presentation is enclosed at **Annexure-B3**. OPTCL explained that due to heavy rain and lightning multiple faults were occurred in around Budipadar S/s.*

At 18:04 hrs, 220 kV Budipadar – Korba – II and 220 kV Budipadar – Raigarh S/C tripped from Budipadar end on zone 1 and zone 2 from remote end due to Y-B fault in both the lines simultaneously. OPTCL added that both the lines are on same tower so fault due to lightning might be appeared in both lines simultaneously.

At 18:17 hrs 220 kV Budipadar – Korba – III tripped from Budipadar end on zone 1 and zone 2 from remote end due to Y-N fault.

At 18:20 hrs, 220 kV Budipadar –Tarkera – I ripped from Budipadar end on zone 1 and zone 2 from remote end due to R-N fault.

Thereafter, while charging 220 kV Budipadar –Tarkera – I, wave trap of the line got busted and caused a bus fault in Bus II. As a result, busbar protection got operated and tripped all the elements connected to Bus II.

PCC observed that multiple trippings were initiated at Budipadar because of faults close Budipadar substation. PCC advised OPTCL to check the earthing within the substation and tower footage resistance close to Budipadar S/s.

PCC also observed that DR configuration is not proper at Budipadar S/s, PCC advised to rectify the same.

ERLDC informed that analogue data of Budipadar S/s was not available during the disturbance.

OPTCL explained that the relevant modem got busted during the disturbance, the same had been replaced. The data has been restored.

ITEM NO. B.4: Disturbance at Teesta – III Generating Station on 26.10.2019 at 15:43 Hrs.

At 15:43 hrs, Unit #3 and #6 at Teesta III tripped on neutral overcurrent protection and 400 kV Dikchu - Teesta III line, 400 kV Kishanganj - Teesta III tripped on overvoltage protection.

All this led to loss of voltage at 400 kV Teesta III with 400 MW generation loss.

Also, at this moment Dikchu Unit #2 tripped at 48 MW on neutral overcurrent protection on generator transformer.

Generation Loss: 448 MW

TUL, Dikchu and Powergrid may explain.

Deliberation in the meeting

*TUL explained the disturbance with a detailed presentation. The presentation is enclosed at **Annexure-B4**. TUL explained that while synchronising unit 4, the R-ph feedback link of the CB got opened, as a result R-Phase Pole close feedback was not received at bay controller even though physically three poles of the GIS breaker were in closed condition. Pole Discrepancy had operated and issued command to open the CB. Y-Phase & B-Phase GIS breaker pole opened but R-Phase remained in closed position. ESD applied for Unit#4 After opening Field Circuit Breaker of Unit#4, Generator Voltage became zero but due to R-Phase GIS Circuit breaker pole mechanical link*

failure of open/close and the pole remained in closed condition due to which fault current started flowing from 400 KV bus to Unit#4 generator through NGT. Both the lines 400 KV Teesta-III Kishanganj & 400 KV Dikchu , Unit#3 and Unit#6 participated in feeding the fault current.

400 KV Teesta-III Dikchu Line tripped due to line earth fault protection. 400 KV Teesta-III Kishanganj Line tripped due to Over-Voltage Stage-I.

Unit#3 and Unit#6 of TUL and unit 2 of Dikchu tripped on GT neutral Over-current.

PCC observed that Dikchu unit 2 tripped earlier than Unit#3 and Unit#6 of TUL.

PCC advised Dikchu to review the GT neutral Over-current setting.

PCC opined that the unit for which the CB failed to open should be isolated first by opening the bus section before initiating ESD so that this kind of incidences could be avoided.

TUL informed that they have included this procedure in their revised operating procedure.

ITEM NO. B.5: Tripping of 400 kV Binaguri – Rangpo – II and 220 kV Jorethang – New Melli D/C on 26.10.2019 at 07:27 Hrs.

At 07:27 hrs, 400 kV Binaguri – Rangpo – II tripped due to B-N fault.

At same time, 220 kV Jorethang – New Melli D/C tripped from Jorethang end only on DEF protection resulting tripping of running unit #1 due to loss of evacuation path.

Generation Loss: 45 MW

Powergrid and Jorethang may explain.

Deliberation in the meeting

Powergrid informed that there was a high resistance B-N fault in 400 kV Binaguri – Rangpo – II. Initially the fault was detected by DEF then in zone 3 and zone 2 distance protection. The line was tripped from both the ends in zone 2.

PCC opined that since it is a high resistance fault prone area, these faults might not be detected reliably by the distance protection. The differential protection may be implemented for faster fault clearing, if OPGW is available.

It was informed that OPGW laying is in progress.

PCC advised Powergrid to implement differential protection in this line.

Regarding tripping of 220 kV Jorethang – New Melli D/C lines tripped from Jorethang end only on DEF protection, PCC advised Jorethang to review the settings of DEF to avoid such uncoordinated trippings.

ITEM NO. B.6: Tripping of 220 kV FSTPP - Lalmatia S/C & 132 KV KhSTPP-Lalmatia S/C on 22.10.2019 at 11:55 Hrs.

At 11:55 Hrs, 220 KV FSTPP Lalmatia S/C tripped due to B-N Fault. At the same time, 132 KV KhSTPP-Lalmatia S/C also tripped, leading to a load loss of 44 MW.

132 KV KhSTPP - Lalmatia S/C was charged at 12:08 but tripped again while taking charging attempt of 220 KV FSTPP-Lalmatia s/c at 12:20 Hrs.

Delayed fault clearance of 500 ms has been observed in PMU data.

85th PCC Minutes

Time	Name	Relay Indication at End 1	Relay Indication at End 2
11:55	220 KV FSTPP Lalmatia S/C	D/P	O/C, E/F, BU, 86 trip
11:55	132 KV KhSTPP - Lalmatia S/C	Yet to be received	BU, O/C
12:20	220 KV FSTPP Lalmatia S/C	B-N, D/P,	E/P, 54 KM FROM Lalmatia
12:20	132 KV KhSTPP - Lalmatia S/C	Yet to be received	BU, O/C

Load Loss: 44 MW

JUSNL and NTPC may explain.

Deliberation in the meeting

NTPC failed to place the details of relay indications and explain the tripping of 220 KV FSTPP - Lalmatia S/C and 132 KV KhSTPP - Lalmatia S/C line.

PCC advised NTPC to submit the tripping details to ERPC and ERLDC.

Based on PMU plot PCC opined that there was a fault in 220 KV FSTPP-Lalmatia S/C line and the fault was cleared from Farakka but not cleared from Lalmatia. As a result, only other connectivity Lalmatia S/s, 132 KV KhSTPP - Lalmatia S/C line got tripped from KhSTPP on backup overcurrent protection.

ITEM NO. B.7: Disturbance at Talcher HVDC station on 03.10.2019 at 14:05 Hrs.

At 14:05 hrs, HVDC Talcher Kolar pole-I tripped resulting reduction of power flow from 1500 MW to 1000 MW.

At the time of incident there was no generation at GMR. So, 40 MW generation reduction occurred at JITPL.

Pole I was deblocked at 17:45 hrs.

Generation Loss: 40 MW

Powergrid may explain.

Deliberation in the meeting

POWERGRID informed that HVDC Talcher Kolar pole-I got tripped due to maloperation of SF6 pressure switch of B-ph converter transformer. The issue has been resolved after replacing the pressure switch.

ITEM NO. B.8: Tripping Incidences in the month of October, 2019.

Other tripping incidences occurred in the month of October 2019 which needs explanation from constituents of either of the end.

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.

85th PCC Minutes

Deliberation in the meeting

Members explained the tripping incidences. Updated status is enclosed at **Annexure-B8**.

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

Members may update the latest status.

Deliberation in the meeting

Members updated the latest status. Updated status is enclosed at **Annexure-C1**.

ITEM NO. C.2: Schedule of training program to be conducted by PRDC

PRDC, as per the AMC, is going to conduct 2nd training programme on PDMS and PSCT in state utility premises of Eastern Region. The tentative schedule is given below:

Sl no.	State	Location	Date	Training
1.	West Bengal	NJP	04.02.2019-05.02.2019	on PDMS
		Durgapur	07.02.2019-08.02.2019	
2.	Bihar	North Bihar	08.04.2019-09.04.2019	
		South Bihar	11.04.2019-12.04.2019	
3.	Sikkim	-	03.06.2019-04.06.2019	
4.	Odisha	-	08.07.2019-09.07.2019	
5.	Jharkhand	-	05.08.2019-06.08.2019	
6.	For All States	ERPC	02.09.2019-06.09.2019	on PSCT

PRDC informed that the training programme on PDMS has already been completed in West Bengal, Bihar, Sikkim & Odisha as per the schedule.

Members may update.

Deliberation in the meeting

PRDC updated the status as follows:

SL NO.	State	Date	Training
1	West Bengal(Siliguri)	04.02.2019-05.02.2019	On PDMS
	West Bengal(Durgapur)	08.02.2019-09.02.2019	On PDMS
2	Bihar	08.04.2019-09.04.2019	On PDMS
		10.04.2019-11.04.2019	On PSCT

3	Sikkim	11.06.2019- 12.06.2019	Relay Setting analysis and Protection Co- ordination
4	Odisha	22.07.2019- 23.07.2019	On PDMS
5	Jharkhand	25.08.2019- 26.08.2019	On PDMS
6	For all state	In December 2019	On PSCT

ITEM NO. C.3: 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 are available at ERPC website (Observations include PLCC rectification/activation which needs a comprehensive plan).

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

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

BSPTCL may update.

Deliberation in the meeting

Members noted.

ITEM NO. C.4: 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:

85th PCC Minutes

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/P LCC Link available	AR facility functional
13	<u>220KV BUDIPADAR-KORBA-II</u>	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC available	will be activated in consultation with Korba
17	<u>220 KV TSTPP-RENGALI</u>	17.07.16	EARTH FAULT	NTPC	OPTCL		by March 2018
18	<u>220KV BUDIPADAR-RAIGARH</u>	21.07.16	EARTH FAULT	OPTCL	PGCIL	PLCC defective	
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		Voice established. For carrier required shutdown
24	<u>220 KV ROURKELA - TARKERA-II</u>	11.08.16	B-N FAULT	PGCIL	OPTCL	OPGW available	Expected to install protection coupler by Jan 17
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:

- 220kV Rengali(PG)-Rengali S/Y (Proposal for Commn. in OPGW is pending): *PSDF appraisal committee accepted the proposal*
- 220kV Indravati(PG)-Indravati(PH) (Proposal for Commn. in OPGW pending): *PSDF appraisal committee accepted the proposal*
- 132kV Baripada(PG)-Baripada (Tendering in Progress for OPGW): *Contract awarded*
- 132kV Baripada(PG)-Rairangpur (Tendering in Progress for OPGW): *Contract awarded*

BSPTCL:

SI No.	Lines	Status
1	220 kV Purnea(PG)-Madhepura	Protection through PLCC is working properly

2	220 kV Biharsharif-BTPS new	Commissioning of PLCC is under progress.
3	220 kV BTPS new- Begusarai	Commissioning of PLCC is under progress.
4	220 kV Biharshariff-Bodhgaya line LILO at Khizersarai	OPGW is present. Protection is done through DPC.
5	220kV MTPS-Motiari line	OPGW is installed.
6	220KV Madhepura-New Purnea D/C	Protection through PLCC is working properly
7	220KV Muzaffarpur-Hajipur D/C line	Protection through PLCC is working properly
8	220KV Patna-Khagaul-SC	PLCC Panel working properly.
9	220 kV DMTCL(Darbhanga)-Laukhi Circuit-I	PLCC Panel working properly
10	220 kV Tenughat-Biharsharif S/C	PLCC to be commissioned
11	220 kV Gaya-Sonenagar New circuit-I	Communication through OPGW
12	220 kV Pusauli-Dehri S/C	PLCC not working
13	220 kV Begusarai-Purnea(PG) D/C	PLCC working properly
14	220 kV DMTCL-Motipur ckt-II	PLCC to be commissioned.
15	220 kV Dehri- Gaya D/C	PLCC working properly
16	220 kV Kishanganj(PG)-Kishanganj(B)-II	PLCC working properly

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

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

Members may update.

Deliberation in the meeting

Members noted.

ITEM NO. C.5: Any additional agenda.

1. Multiple tripping events in the month of September 2019

1.1. Multiple tripping incident at Ranchi on 02-09-2019 at 04:26 hrs:

At 04:26 hrs on 02-09-2019, following elements tripped at Ranchi S/S

- 220 kV Bus 1 at Ranchi
- 220 kV Ranchi-Chandil S/C
- 220 kV Ranchi-Hatia 1
- 400/220 kV 315 ICT 1

As per PMU data captured at Ranchi, two voltage dip were captured at around 04:26:35.600 hrs and at around 04:26:35.890 hrs. Though first fault was cleared within 100 ms, second fault was cleared after 350 ms. As per DR recorded at Ranchi end of 220 kV Ranchi – Chandil S/C, Y-N fault occurred at 04:26:35.664 hrs which got cleared from both sides within 100 ms. After 250 ms, Y pole breaker at Ranchi end auto-reclosed and tripped again as the fault was persisting at that time. During this time fault was cleared after 300 ms. No zonal protection or TOR operation was recorded in DR.

POWERGRID ER-I may increase the dead time of auto-reclose operation and share the reason for non-operation of any TOR protection at the time of reclose of the breaker. POWERGRID ER-I and JUSNL may share the reason for non-receipt of carrier at Chandil end.

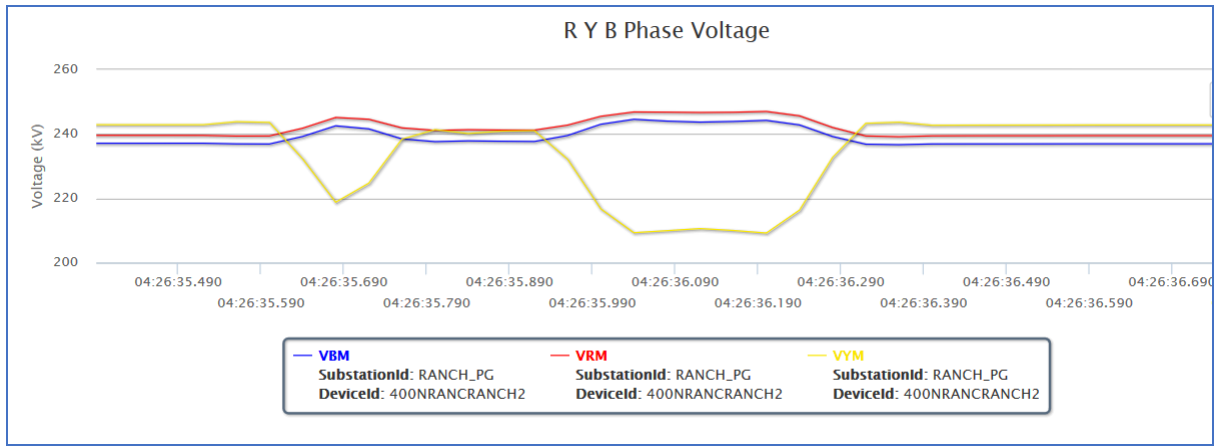


Figure 1: Three phase voltage recorded at Ranchi during the multiple tripping event at Ranchi at 04:26 hrs on 02-09-19

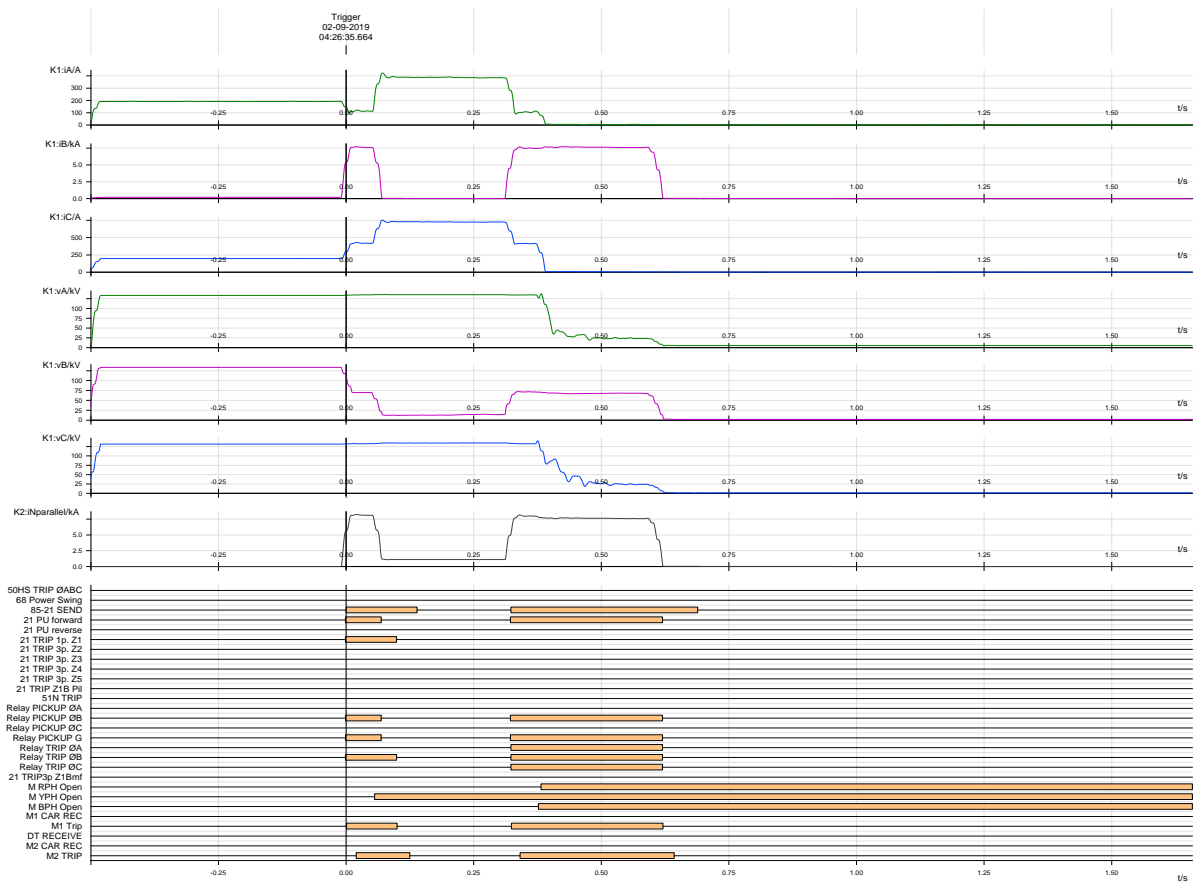


Figure 2: DR recorded at Ranchi end of 220 kV Ranchi – Chandil S/C during the multiple tripping event at Ranchi at 04:26 hrs on 02-09-19

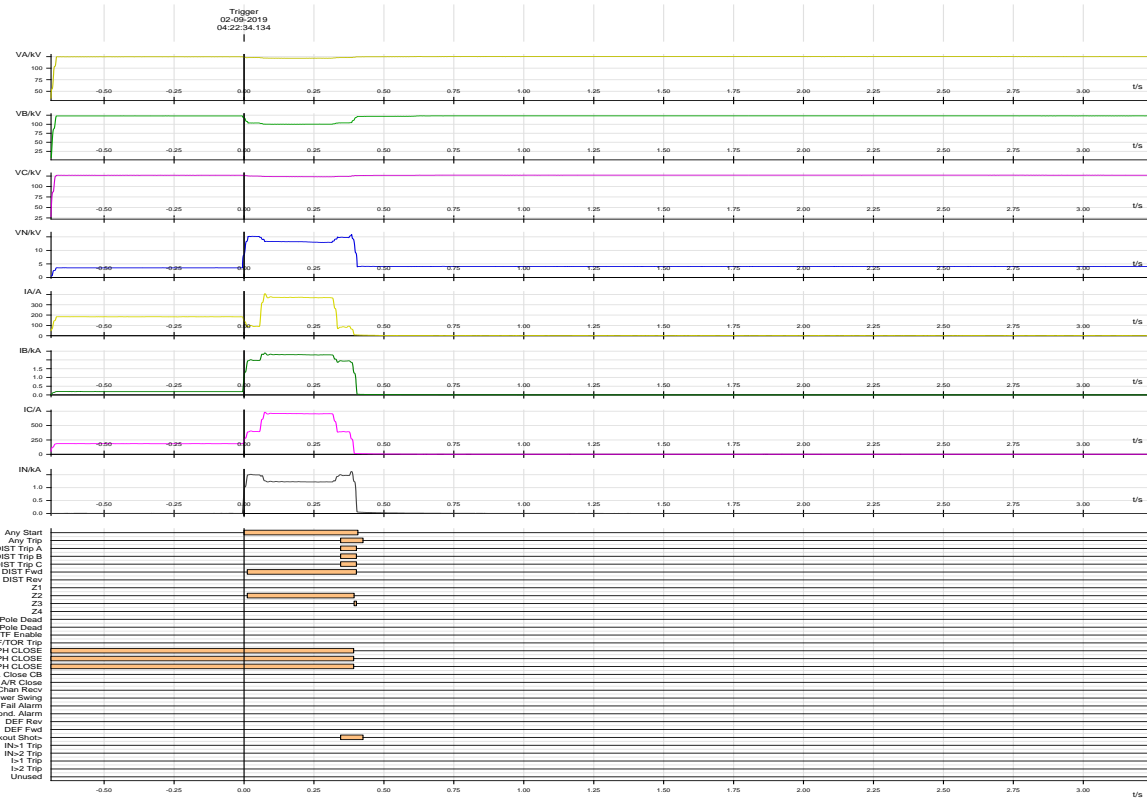


Figure 3: DR recorded at Chandil end of 220 kV Ranchi – Chandil S/C during the multiple tripping event at Ranchi at 04:26 hrs on 02-09-19

Deliberation in the meeting

Powergrid informed that Y-ph breaker restrike was observed after 300 ms. The breaker has been replaced.

1.2. Multiple tripping incident at Indravati on 17-09-2019 at 16:03 hrs:

Following elements tripped on 17-09-19 at 16:03 hrs

- 400 kV Jeypore-Indravati (PG)
- 400 kV Rengali-Indravati (PG) from Rengali end only
- 400 KV Indravati (PG)-Indravati (OHPC) from OHPC end
- 315 MVA 400/220 kV ICT I at Indravati

Following operational and protection issues have been observed which may be explained 400 KV Indravati (PG)-Indravati (OHPC) line is a very short line, implementation of Differential protection may be recommended for such short line.

Fault cleared from Jeypore end after 500 ms in Zone 2. But after 1.1 sec of fault clearing a sudden voltage came in not clear. While in DR its RSM value is 400 kV (Line to Neutral) but in STATCOM TFR file much less value captured. And that's why STATCOM response was limited. Why such sudden voltage appeared may be investigated.

Deliberation in the meeting

OPTCL informed that they are taking approval from their highest authority for implementation of differential protection for this line.

PCC advised Powergrid to analyze the reason for sudden voltage rise.

2. Multiple tripping event at Lakhisarai at 12:22 hrs on 23-10-2019

132 KV Lakhisarai – Lakhisarai – II was under shutdown. As per verbal information from POWERGRID, line isolator was open and earth switch was in charged condition at POWERGRID end. As per DR recorded at Lakhisarai end of 132 kV Lakhisari – Lakhisari - II, both the current and voltage was very low prior to the event. At 12:22:22 hrs, voltage increased from 50 V to 240 V and current increased from 3A to 40 A in all three phases resulting Z-I pick up at Lakhisarai, which in turn activate SOTF as the line was not in service. Neutral current (100 A) was higher than LBB setting at this time. So SOTF along with high neutral current resulted operation of LBB at Lakhisarai 132 kV buses resulting tripping of 132 kV Lakhisarai – Lakhisarai – I, 132 kV Lakhisarai – Jamui D/C and 400/132 kV ICTs at Lakhisarai along with load loss 41 MW (10 MW traction load).

POWERGRID ERTS – I may share the reason of increase in current at the time of the event and the remedial action taken to prevent these types of incidents where one bus tripped along with load loss for a fault in out of service line.

Issue to be clarified by POWERGRID:

1. During shutdown local earthing to bypass CT must have been arranged on both the side of the CT to avoid such appearance of current.
2. Generally current appears due to Zero sequence mutual coupling. Which indicates that there may be some other fault in the system. POWERGRID /BSPTCL may confirm.
3. SOTF setting is $I>3$ was 3 A (sec) then why SOTF operated for only 40 AMP (primary) current.
4. LBB setting was 50 mA (sec), which means 20 Amp in primary. It may be reviewed. Generally it should be kept 200 mA (Sec) i.e 20%.
5. In DR CT ratio needs to be incorporated correctly for proper analysis.

Deliberation in the meeting

Powergrid informed that a circular has been issued to ensure local earthing to bypass CT during shutdown.

Powergrid explained that in case of any zone picked up then SOTF would operate.

Powergrid added that the LBB setting has been revised.

3. Multiple tripping event at Kolaghat Thermal Power Plant at 18:17 hrs on 25-10-2019

On 25-10-19 at 18:17 hrs, 132kV bus at Kolaghat Thermal Power plant tripped due to operation of R-phase Bus differential protection. At same time, 400/220kV ICTs at Kolaghat Thermal Power Plant tripped on R-phase directional overcurrent and only running unit#2 (connected to 220kV bus) tripped due to loss of auxiliary power leading to a generation loss of 180 MW. There is power interruption of 60 MW to local Kolaghat load. As per PMU data recorded at Jeerat, fault was observed in all three phases and fault clearing time is more than 500 ms.

As per detail report received from WB, at 18:17 hrs flashover occurred at 89C R phase isolator of 132 kV ATR #3. It was suspected fault was an arc fault at 89C isolator between breaker and transformer CT. After initiation of the fault, O/C protection of 400 kV side of both 400/220 kV ICTs picked up (500 A pick up) and gave trip pulse to 132 kV Uluberia and Bagnan feeders after 500 ms and 132 kV Tamluk 1 & 2 feeders after 700 ms resulting tripping of all feeders except 132 kV Tamluk #1 feeder. After this 400/220 kV ICT 1 & 2 tripped through 400 kV side backup overcurrent protection (P/U = 500 A, Definite time = 1 sec) and thereafter 220/132 kV ATRs tripped from 220 kV sides through back up O/C protection (directional, P/U = 800A, TMS = 0.2, IEC SI) resulting total power failure at 132 kV side. At 18:18 hrs, unit 2 was hand tripped due to low vacuum initiating form tripping of all CW and ACW pumps.

Following discrepancies may be cleared by WBPDC/ WBSLDC/WBSETCL

85th PCC Minutes

1. Tripping command was initiated first from 400 kV side of 400/220 kV ICTs for the fault in 132 kV side. Reason for non-tripping of any relay at 132 kV level may be explained though Z-IV picked up for 132 kV Tamluk #2, Uluberia and Bagnan feeders and O/C picked up for 220/132 kV ICTs from 220 kV side. This fault should be covered in bus bar differential protection. Due to unavailability of bus bar protection, fault was to be cleared from 400 kV and 220 kV level. **As per clause 45.2.vii of CEA Regulation: Measures relating to Safety and Electric Supply 2010, bus bar protection is to be present at 132 kV level also.**
2. Tripping of 400/220 kV ICTs before 220/132 kV ICTs may be investigated.

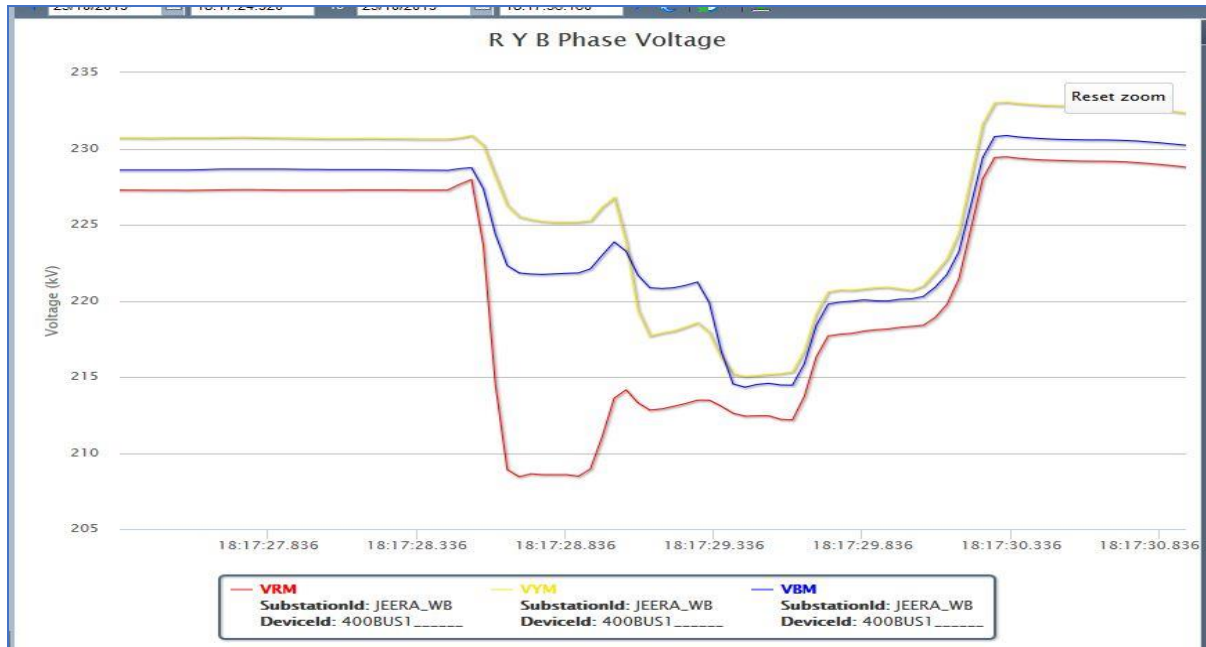


Figure 4: Three phase voltage recorded at Ranchi during the multiple tripping event at Kolaghat Thermal Power Plant at 18:17 hrs on 25-10-2019

Deliberation in the meeting

It was informed that the SPS for load shedding had been operated and tripped the 400/220kV ICTs at Kolaghat.

PCC advised WBSETCL to keep the SPS time setting greater than protection relay time setting to avoid unwanted tripping and should ensure proper relay coordination between 400/220kV ICTs and 220/132kV ATRs.

4. Protection coordination issue of 220 kV Jorethang-New melli line:

On 04/11/19 at 14:18 hrs Successful A/R took place on 400 kV Rangpo-Kishanganj line. At the same time 220 kV Jorethang-New melli tripped on E/F protection from Jorethang end and after another 2.2 sec it tripped from other end. Such overreaching was also taken place in past and PCC advised to revise the setting and do proper coordination. JLHEP via mail confirmed that revised setting is implemented on 07/11/19.

However on 11/11/19 again during successful A/R of 400 kV Rangpo-Kishanganj 220 kV Jorethang-New melli tripped. So Jorethang and POWERGRID are requested to review the setting again and ensure proper coordination.

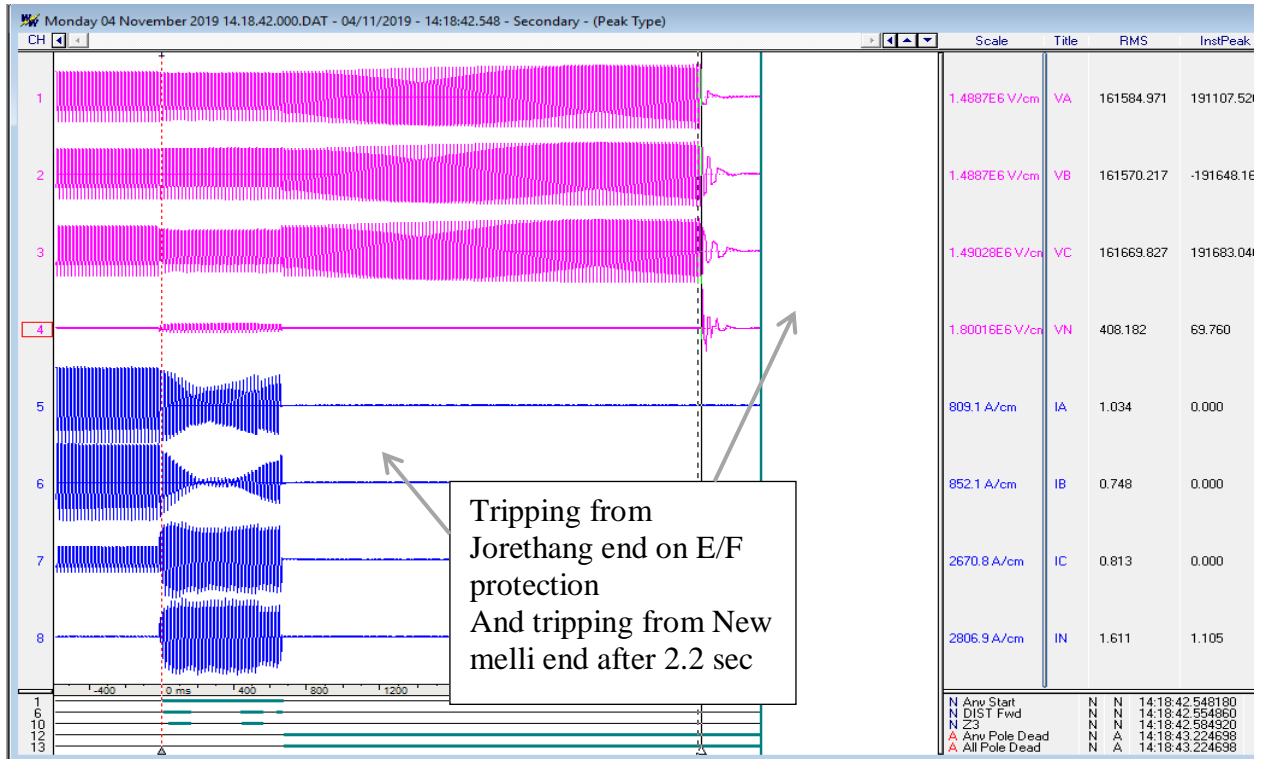


Figure 5 Jorethang end DR on 04/11/19 for 220 kV Jorethang-New melli line

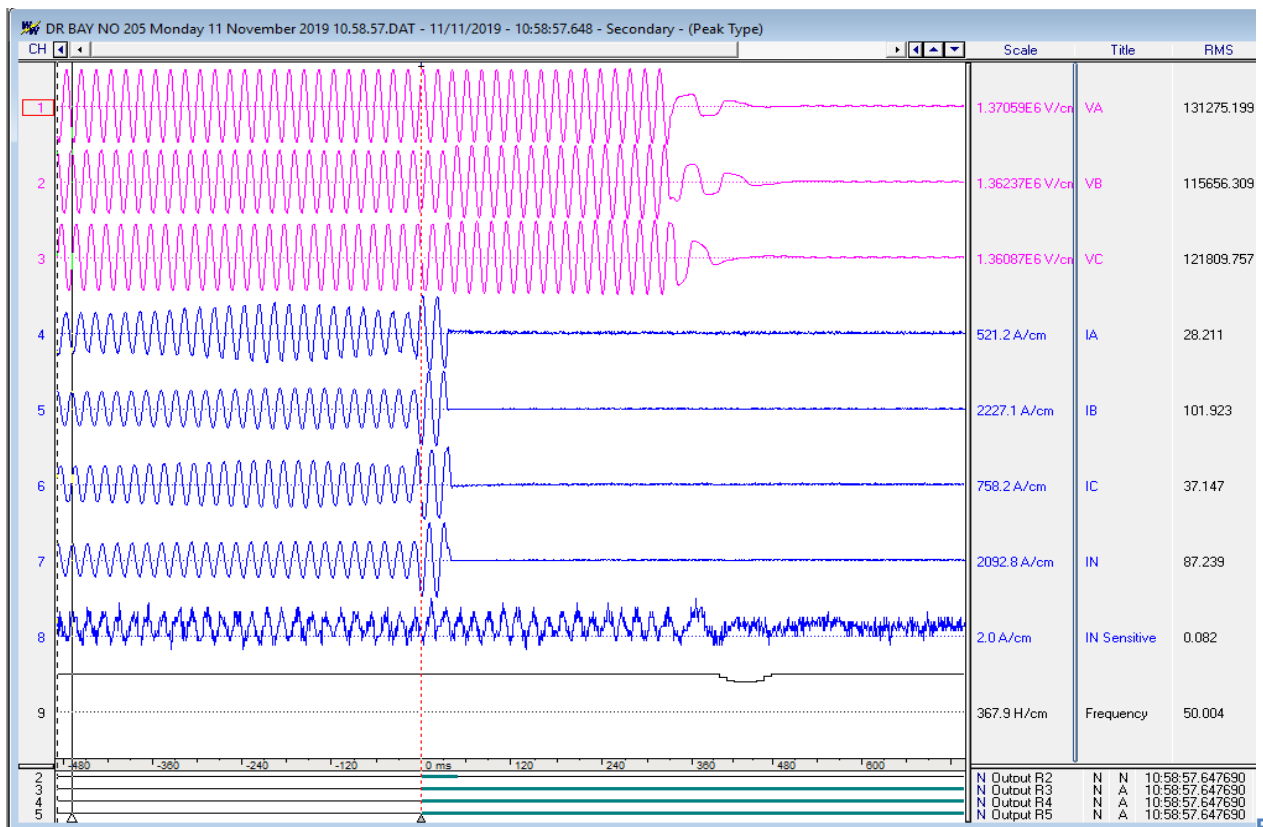


Figure 6 Jorethang end DR on 11/11/19 for 220 kV Jorethang-New melli line

Deliberation in the meeting

Jorethang vide mail informed that they are unable to set the relay settings of DEF of backup protection and shared the settings with ERPC Secretariat. It was decided that the settings would be reviewed in coordination with PRDC.

5. Implementation of Zone 4 reduced time setting at Sipara Substation and enabling of back up protection in 220 kV Patna-Sipara T/C Differential protection

During the third party protection audit at 220/132 kV Sipara S/S on 23-08-19, it has been observed that 220 kV Bus bar protection at Sipara was kept out on some issues. In addition, there was no Zone 2-4 protection on 220 kV Patna-Sipara T/C. So, any fault on 220 kV Sipara bus will be cleared on Back up protection enabled only in the lines. As the 220 kV Patna-Sipara has no backup protection in service which may lead to an outage of 400/220 kV Patna ICTs and can result in cascaded tripping in the system and blackout of large areas.

In view of the above kindly share the following information

Substation	Action Item List
Sipara	Zone 4 protection setting for outgoing lines needs to be reduced with proper zone 4 settings to cover near the entire 220 kV Bus. Time setting to be reduced.
Patna	220 kV Sipara-Patna T/C Zone 2 and Zone 4 enabling (By means of extending 220 kV Bus voltage of Patna S/S for Zone 2-4 in one protection and 220 kV Sipara Bus voltage in other protection for Zone 2-4.

Also, BSPTCL may kindly provide the details for any such bus bar protection outages to their SLDC as well as ERLDC.

Deliberation in the meeting

PCC advised BSPTCL to share the details to ERLDC and ERPC.

6. Discrepancies observed in various auto-reclose events in the month of October 2019

During the various auto reclose events in the month of October 2019, various discrepancies have been observed in DR received. Following table shows the issues observed.

Date	Time	DR description	Issue in the DR	Utilities to update
04-10-2019	05:34	400 kV Subhasgram – HEL - II at Subhasgram end	A/R not successful for tie breaker at Subhasgram end but no fault was captured in DR during reclose of tie breaker	POWERGRID ERTS - II
06-10-2019	01:13	220 Chukha Birpara - I at Chukha	Single phase auto-reclose may be implemented in place of three phase auto-reclose at Chukha end.	Chukha
07-10-2019	17:22	220 kV Chukha Birpara – I at Chukha	From Birpara end, A/R successful but it tripped from Chukha end. Reason may be explained by Chukha. Single phase auto-reclose may be implemented in place of three phase auto-reclose at Chukha end.	Chukha
17-10-2019	15:35	400 kV Rangpo – Kisangani at Rangpo	Digital channels called main CB trip and zonal protection trip are not properly configured.	POWERGRID ERTS - II

18-10-2019	09:38	400 kV Durgapur – Sagardighi – I at Durgapur	CB open R, B & Y may be properly configured. As per these digital channels, three poles opened at Durgapur end. But as per analog channel, A/R operation is successful at Durgapur end.	POWERGRID ERTS - II
14-10-2019	09:54	400 kV Alipurduar – Binaguri – II at Binaguri	Reason for failure of auto-reclose at Tie breaker may be explained	POWERGRID ERTS - II
14-10-2019	04:13	220 kV Chukha – Birpara - I at Birpara end	No D/P picked up (PGCIL may confirm line tripped in D/P or not). CB OPEN R, Y, B was in reset condition even after three phase line tripping at Birpara end	POWERGRID ERTS - II
19-10-2019	17:53	400 kV Binaguri – Bongaigaon – II at Binaguri	Both MCB and TCB open breaker status to be configured	POWERGRID ERTS - II

Deliberation in the meeting

PCC advised respective constituents to take the necessary action to resolve the issues.

7. DR standardization required

In 79th PCC meeting, guidelines for analog and digital channels of DR for line, transformer and B/B protection was decided. For proper analysis of any tripping, it is very important to standardize DR output. During the various auto-reclose and tripping incidents in the month of October 2019, it has been observed DR installed at various S/S is not properly configured. Following table shows the issues observed:

Date	Time	DR description	Issue in the DR	Utilities to update
02-09-2019	02:15	DR for A/R operation at 400 kV Maithon Ranchi at Maithon on 02-09-2019 at 02:15 hrs	Reason of tripping of the line is not clear from DR.	POWERGRID ERTS - II
30-09-2019	14:12	DR for Tripping of 220 kV Maithon – Dhanbad – I on 30/09/19 at 14:12 hrs at Maithon end	R pole breaker operation was not captured during A/R operation	POWERGRID ERTS - II
04-10-2019	12:49	DR for Tripping of 400 kV Alipurduar – Bongaigaon – I at Alipurduar on 04/10/19 at 12:49 hrs	Z-I, Z-II picked up but Z-III did not pick up in DR. DR may be configured as per decision taken in 79th ER PCC meeting	POWERGRID ERTS - II
04-10-2019	18:53	DR for tripping of 400 kV Ranchi – RTPS - III at Ranchi end on 04/10/19 at 18:53 hrs	Digital status of main and tie CB phase may be checked.	POWERGRID ERTS - I

05-10-2019	05:45	DR for auto-reclose of 220 kV Birpara – Alipurduar - II at Birpara end for on 05/10/19 at 05:45 hrs	Digital channels are not properly configured. Picking up of 1 ph., 2 ph., 3 ph. fault, SOTF/TOR trip etc. may be explained. No Zonal protection picked up for A/R operation.	POWERGRID ERTS - II
05-10-2019	05:45	DR for auto-reclose of 220 kV Birpara – Alipurduar - I at Birpara end for on 05/10/19 at 05:44 hrs	Digital channels are not properly configured. Picking up of 1 ph., 2 ph., 3 ph. fault, SOTF/TOR trip, MCB Y phase open etc. may be explained. No Zonal protection picked up for A/R operation	POWERGRID ERTS - II
06-10-2019	13:15	DR for A/R operation at 400 kV Maithon Jamshedpur at Maithon on 06-10-2019 at 13:15 hrs	Reason of tripping, breaker operation of the line is not clear from DR.	POWERGRID ERTS - II
25-10-2019	10:07	DR for tripping of 400 kV Alipurduar – Bongaigaon – II on 25/10/19 at 10:07 hrs	DR may be configured as per decision taken in 79th ER PCC meeting.	POWERGRID ERTS - II
25-10-2019	18:53	DR for tripping of 400 kV Alipurduar – Bongaigaon – I on 25/10/19 at 18:53 hrs		
26-10-2019	07:27	DR for tripping of 400 kV Binaguri - Rangpo - II at Binaguri end on 26/10/19 at 07:27 hrs	Digital status of main CB R phase may be checked	POWERGRID ERTS - II
29-10-2019	00:30	DR for tripping of 400 kV Sagardighi Berhampur - II at Berhampur end on 29/10/19 at 00:30 hrs	R and Y phase CB were in closed position prior to the incident as per DR. Digital channel status may be checked	POWERGRID ERTS - II

Deliberation in the meeting

PCC advised respective constituents to take the necessary action to resolve the issues.

8. The use of DPC with wide band equipment only or DPC with wide band equipment & APC with PLC for carrier protection, if OPGW available ---Bihar

Deliberation in the meeting

PCC opined that DPC with wide band equipment is the matured version of old PLC communication and it is much reliable than the old PLC carrier communication.

PCC advised BSPTCL to implement DPC with wide band equipment, if OPGW link is available. PLC carrier protection is not required wherever DPC with wide band equipment was implemented.

Participants in 85th PROTECTION COORDINATION SUB-COMMITTEE (PCC) Meeting of ERPC

Venue: ERPC Conference Hall, Kolkata

Time: 11:00 hrs

Date: 19.11.2019 (Tuesday)

Sl No	Name	Designation/ Organization	Contact Number	Email	Signature
1	J. Bandyopadhyay	Member Secretary ERPC	9432326351	mserpc-power@gov.in	
2	D. K. Jain	Executive Director, ERLDC	9910344127	dk.jain@posoco.in	
3	J. G. Rao	EE, ERPC	9547891353	ganesh.jada@gov.in	J. G. Rao
4	SURAJIT BANERJEE	GM, ERLDC	9423041823	surajit.banerjee@posoco.in	S. Banerjee
5	Sukdev Bal	CM / POWERGRID	9903180042	sukdevbal@powergrid india.com	Sukdev Bal
6	S. MAITI	S.D.E, DVC	7545867453	sudiptam77m@ gmail.com	S. Maiti
7	S.K. SAHU	DGM / POWERGRID Odisha Project	9078883643	SKsahu@powergrid india.com	S.K. Sahu
8	Rahul Anand	Sr. Manager / NTPC ER-I	9425823430	rahulanand@ntpc. co.in	Rahul Anand
9	S.K. MISHRA	DGM (OS) NTPC, ER-II	7606000912	SKmishra05@ntpc. co.in	S.K. Mishra
10	Sanjit Chakrabarti	PRDC, Kolkata	8337034887	sanjit.g@prdcinb.tech.com	Sanjit Chakrabarti
11	Rupam Das	PRDC, Kolkata	7278885852	rupam.das@prdcinb.tech.com	Rupam Das
12	Rajesh Kumar	TUL, Sikkim	7479044380	radhesh1415@gmail.com	Rajesh Kumar
13	RAJ PROTIM	ERLDC, DM	9903329591	rajprotim@posoco. in	Raj Protim
14	Ranadip Das	ERLDC, DM	8584072081	ranadipdas@posoco.in	Ranadip Das
15	SAIBALGHOSH	ERLDC, DM	8589071070	Saibal@posoco.in	Saibal Ghosh
16	S.P. Datta	AAM, ERPC	94330 67022	spdatta@rediffmail. com	S.P. Datta
17	Rajiv Ranjan	EEE/CRITL	7903059492	rrnjan87@gmail.com	Rajiv Ranjan
18	H.K. SINGH	EEE/telecom	9308940668	hkbs@tel@rediffmail.com	H.K. Singh
19	C. S. Nandi	Manager/CRITL	6202991413	cecritl.jusn@rediffmail.com	C.S. Nandi
20	Charan Das Mishra	Sr. Manager/CRITL	8877128318	cecritl.jusn@rediffmail.com	Charan Das

"Coming together is a beginning, staying together is progress, and working together is success." –Henry Ford

Participants in 85th PROTECTION COORDINATION SUB-COMMITTEE (PCC) Meeting of ERPC

Venue: ERPC Conference Hall, Kolkata

Time: 11:00 hrs

Date: 19.11.2019 (Tuesday)

Sl No	Name	Designation/ Organization	Contact Number	Email	Signature
21	JAYANTA KANJILAL	A.C.E WBSETCL	9434910189	K_JAYANTAL2@ REDIFFMAIL.COM	
22	GOUTAM DUTTA	S.E, SLDC, W.B.	8981288619	g_dutta-0304@rediff- mail.com	 19/11/19
23	SUDIPTA GHOSH	Manager (PS) WBPDCL	8336917005	sghosh04@wbpdcl.co. in	 19.11.19
24	Benedhart Parida	Manager (EL) OPTCL	9438907367	ele.bparida@optcl.co.in	
25	Sarantosh Kumar Das	Consultant SLDC OPTCL	9437000261	S-sarantoshdas@rediffmail.com	
26	PK Mishra	CLD, SLDC, Bber	9438907402	clt_sldc@sldcosissa.org.in	
27	PRASHANT KUMAR DAS	Sr.G.M, SLDC, BBR	9438907408	prashantk_das@yahoo.co.in	
28	HEMANTA KLI GHOSH	L.O-GRIDCO	8917347112	hemanta62@gmail.com	
29	SHRIMOHAN JHA	Consultant- ERPC	6289127726	erpcjha@yashwantrao.com	
30	S.A. Ansari	PLCEL, Pccm	9431820252	shabbirshamudansari@ rediffmail.com	
31	Samai Majhi	Manager (EL.)/ OPTCL	9438907826	ele.samajhi@optcl.co.in	
32					
33					
34					
35					
36					
37					
38					
39					
40					

"Coming together is a beginning, staying together is progress, and working together is success." –Henry Ford

Disturbance occurred on 25.10.19.

Date 25.10.19 , Time- 4.43Hrs

Station: **New Bolangir (Sadaipalli) 220/132/33 KV GSS**

Weather Condition: Light Rain fall

1. 220 KV Bargarh New-Bolangir New tripped at 04.43 Hrs

at New – Bargarh end on Main-1 DP Relay Broken conductor protection.

2. 220 KV Bolangir New- Bolangir PG hand tripped at 04.44 Hrs at Bolangir new end resulted Complete blackout at Bolangir new end.

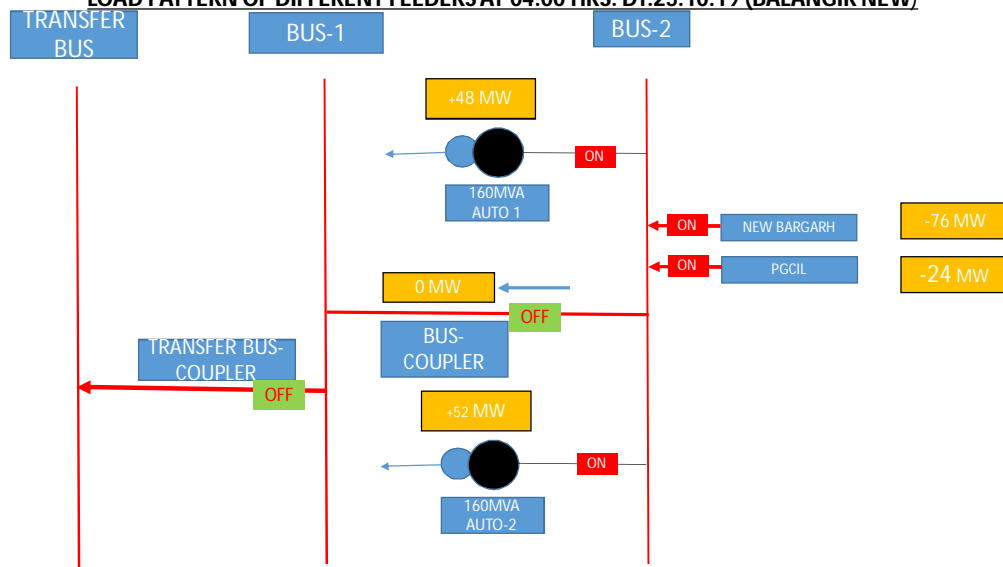
Field observations / Physical findings –

From the switchyard inspection it was found that , the B phase jumper from SI to Main bus -2 of 220kv new Bargarh line detached from the isolator point resulting in continuous sparking due to less clearance . (Explained in subsequent slides with photograph)

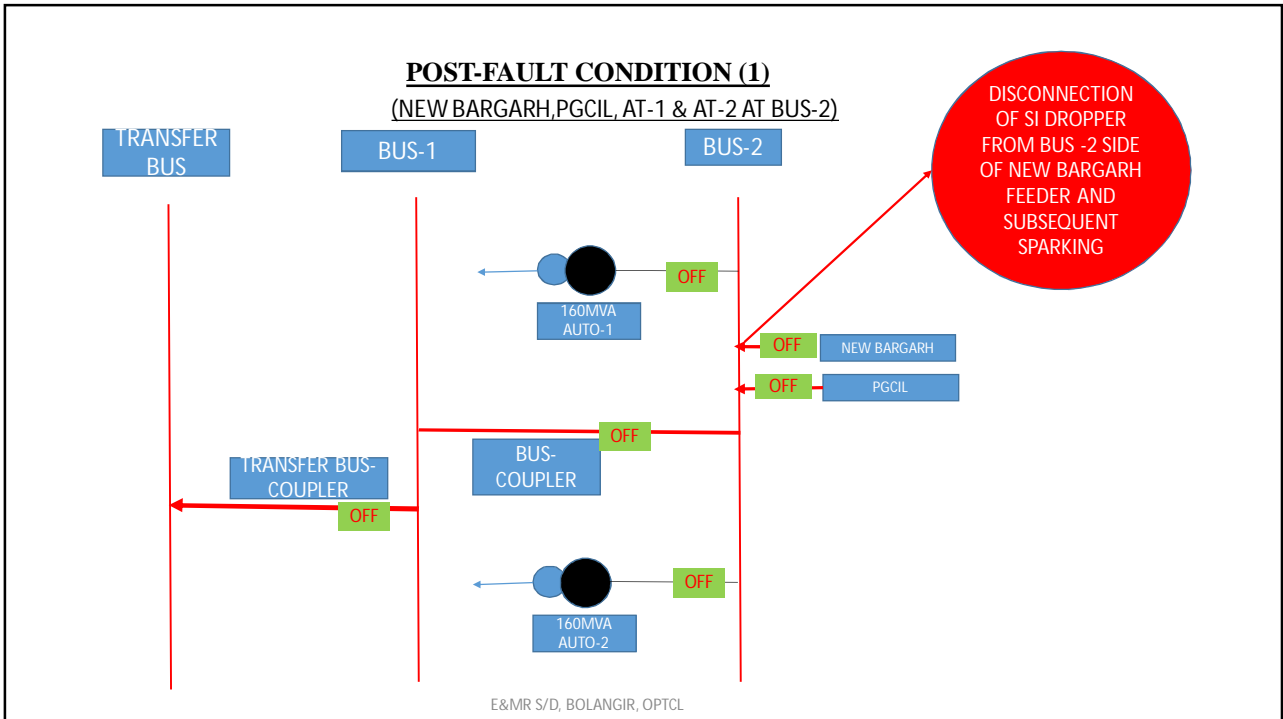
Team E&MR , OPTCL , Bolangir

PRE-FAULT CONDITION (1)

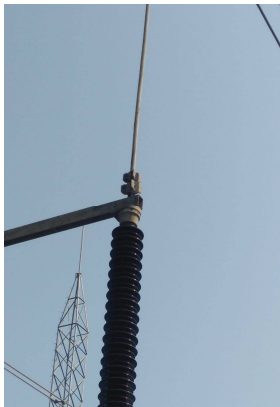
LOAD PATTERN OF DIFFERENT FEEDERS AT 04.00 HRS. DT.25.10.19 (BALANGIR NEW)



E&MR S/D, BOLANGIR, OPTCL



Dislocation photos of B phase SI dropper From Bus -2 of New Bargarh Line



Normal Condition



Dislocated Condition



Dislocation of spindle due to damaged lock



Date & Time of Occurrence:25.10.19, 04:44Hrs (At Sadaipalli GSS)

Details of Occurrence:

Sl.No.	Name of feeder	Relay Indication	
		Sadaipalli End	Remote End
1	220 kV New Bargarh	No Tripping	Main -1 distance Broken conductor protection relay operated.
2	220 kV PGCIL-1	PGCIL Ckt was hand tripped at Balangir new end as fault fire was observed due to dislocation of B phase SI dropper of New Bargarh circuit at Bus – 2 for safety measures.	No tripping.

E&MR S/D, BOLANGIR, OPTCL

Analysis

1. At 04.43 Hrs. Bolangir New- New Bargarh ckt SI Dropper from Main bus -2 detached from isolator due to material failure resulted tripping of said line at New bargarh end on broken conductor protection of distance protection relay o
2. As the clearance from drop jumper to isolator became less continuous sparking was observed at that point.
3. To prevent continuous sparking, 220kv New bolangir-PGCIL line was hand tripped at New balangir end .
4. The New – Bargarh and PGCIL lines were charged at 05:36 Hrs and 06:40 Hrs respectively. Both the lines were transferred to Bus – 1 before charging the lines. So the Grid was under complete blackout from 04:44 to 05:36 Hrs (52 Minutes).

Remedial measures-

The defective isolator was replaced with new one after transferring all feeders/TFRs from Bus -2 to Bus-1 at 5.36Hrs .

Team E&MR , OPTCL , Bolangir

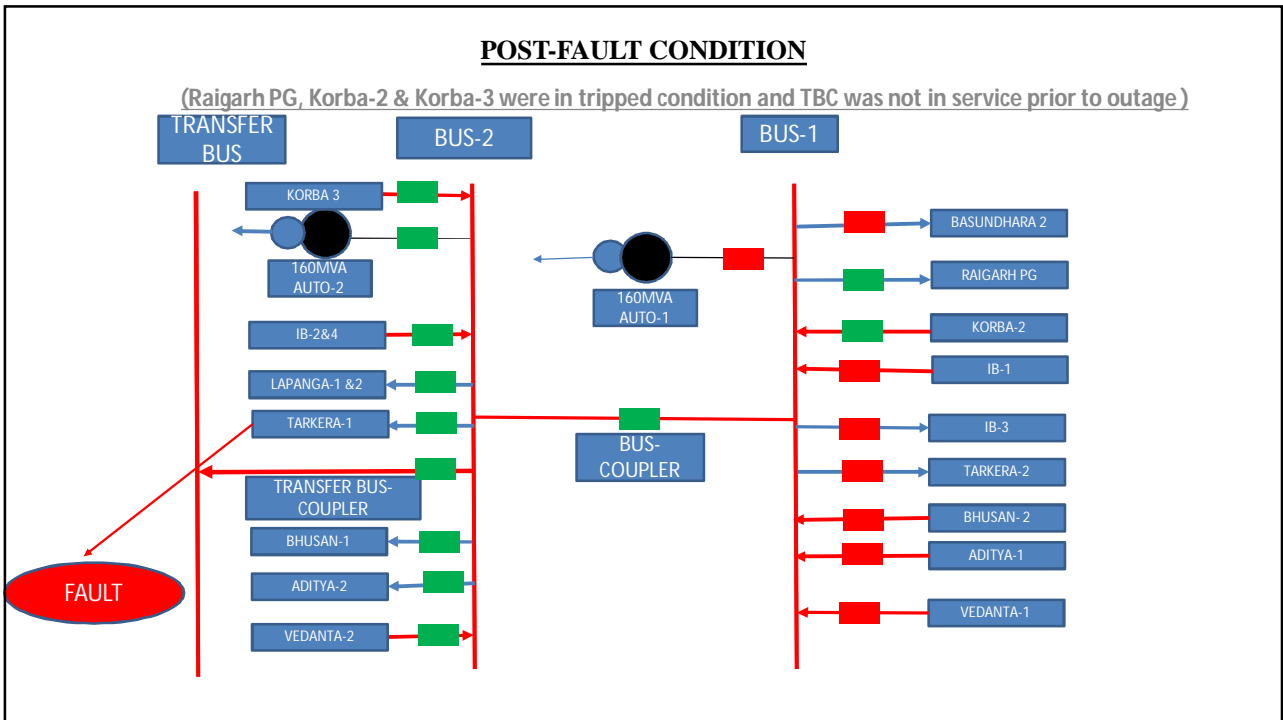
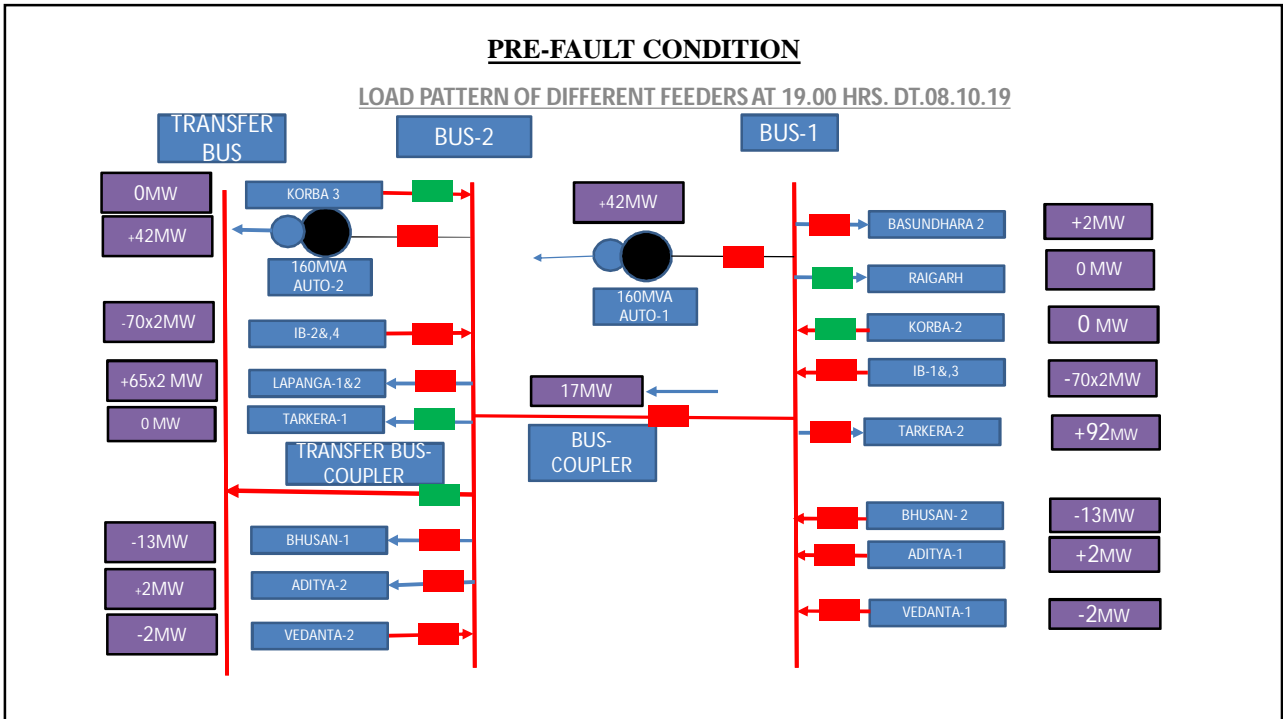
Outage of 220KV Bus-2 System at Budhipadar Grid S/s on Dt.08.10.2019

Outage of 220KV Bus-2 system at Budhipadar Grid S/s on Dt.08.10.2019.

- Date : 08:10.2019 ,Time- 19:26 Hrs.
- Station : 220/132/33KV GSS Budhipadar .
- Weather : Heavy rain with Lightning.
- 220KV Raigarh PG and Korba-2 were in tripped condition from 18.04Hrs.
- 220KV Korba-3 was in tripped condition from 18.17 Hrs.
- At 19:26 hrs while charging, 220 KV Budhipadar-Tarkera Ckt-1 (which had tripped at 18:20 hrs) again tripped on D.P Relay operation along with operation of Bus-Bar relay causing Bus-2 dead.

Field Observation / Physical findings:

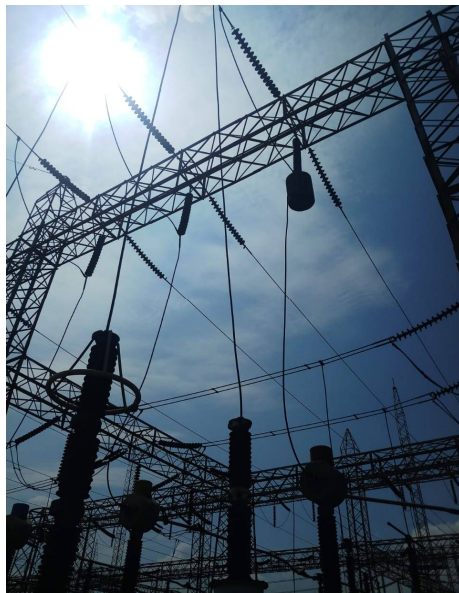
From the switchyard inspection it was found that, the 'R' phase Wave Trap had bursted and snapped along with its jumper and fell on Bus side of R-Phase C.T clamp causing Bus-2 fault resulting in to outage of all the feeders/TFR connected to the Bus-2.(Explained in subsequent slides with photographs).



LOCATION OF FAULT



LOCATION OF WAVE TRAP



Date & Time of Occurrence: 08.10.19, 19.26 Hrs

Sl.No.	Name of feeder	Relay Indication	
		Budhipadar End	Remote(Tarkera) End
1	220 kV Tarkera-1	DP1-ABB-RELZ100 TRZ, TRSOTF, ZM1,ZM2,ZM3. DP2-Siemens-7SA522 Fault Loop=L1-E, IL1= 5.53KA	No Trip
2	220 kV Bus-2 (Auto-2,IB-2&4, Tarkera-1, Lapanga-1 &2, B/C,Bhusan-1, AAL-2,VAL-2)	B/B Relay(Make-Siemens, 7SS52) Trip BBP- L123 Trip Bus2-L1 & 96 Optd.	N A

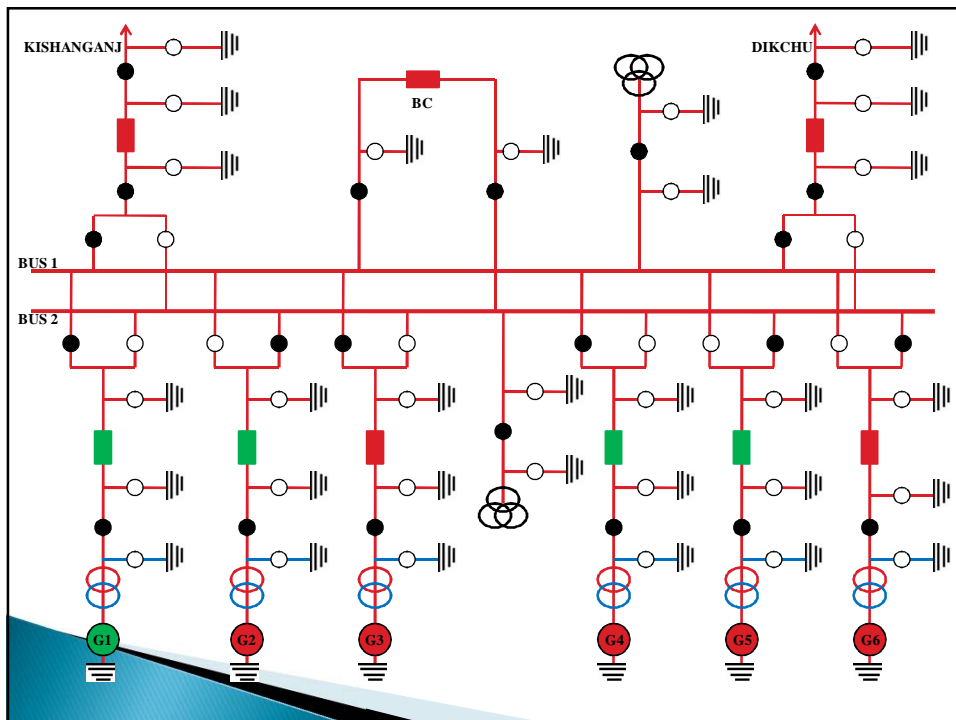
Analysis:-

- Initially at 18.20 hrs 220KV Budhipadar-Tarkera Ckt-1 had tripped (local end : R/E, 0.8 km, 27.86 KA and remote end: R/E, 99 km, 2.02KA) and the fault was cleared with successful operation of the D.P Relay, Zone-1 protection. After getting clearance from both the end, the line was charged from Tarkera end at 19:23 hrs and it stood ok . But, while charging the line at 19:26 Hrs from Budhipadar end, again tripped on D.P Relay operation (R/E, 5. 53 KA, SOTF) along with operation of Bus-Bar Protection Relay. The R-phase Wave Trap (Y.O.M-1997) got damaged on bursting and it was snapped along with its jumper and fell on bus side of R-Phase C.T clamp which resulted in to Bus-2 fault.
- The fault was cleared with operation of Bus-bar protection causing outage of all Feeders & Transformer connected to Bus-2.

REMEDIAL MEASURES:

1. The damaged Wave Trap was dismantled & removed from the ckt. For protection & communication purpose OPGW system will be adopted in the above line.
2. The 220KV Budhipadar-Tarkera Ckt-1 was charged at 15:02 Hrs. on dt. 09.10.2019 after completion of jumppering work and stood ok.

TEESTA-III TRIPPING INCIDENT ON DATED 26.10.2019



PRE-FAULT CONDITION

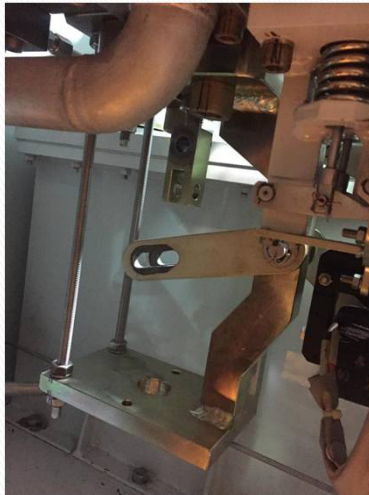
- ▶ 400 KV Teesta-III Kishanganj Line & 400 KV Teesta-III Dikchu Line on Bus-I
- ▶ Unit#1 , Unit#3 and Unit#4 on Bus-I
- ▶ Unit#2 , Unit#5 and Unit#6 on Bus-II
- ▶ 400 KV Bus Coupler is in closed position
- ▶ Unit#3 load was 42 MW and gradually increasing to 200MW
- ▶ Unit#6 load was 44 MW and gradually increasing to 200MW

SEQUENCE OF EVENTS

- ▶ 15:34:17.508 hrs, Unit#4 synchronized and physically three poles of the GIS breaker in closed condition but R-Phase Pole close feedback not received at bay controller.
- ▶ 15:34:19.840 hrs, Unit#4 tripping command initiated due to Phase discrepancy. Y-Phase & B-Phase GIS breaker pole opened but R-Phase remained in closed position. So we tried to open R-Phase Pole manually from breaker panel but failed to open.
- ▶ 15:43:33.779 hrs, **ESD** applied for Unit#4 (Unit#4 Load was 2.34 MW). As per ESD scheme:
 - a) Field CB opened
 - b) Governor Stopped command initiated
 - c) MIV closed command initiated

Contd.

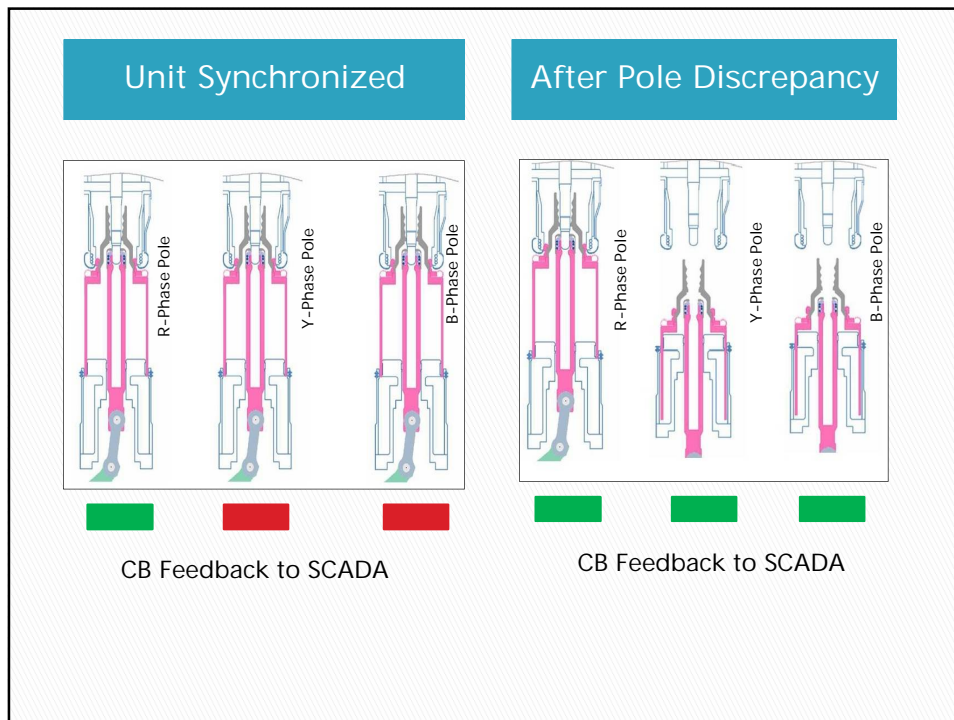
- ▶ After opening Field Circuit Breaker of Unit#4, Generator Voltage became zero but due to R-Phase GIS Circuit breaker pole mechanical link failure of open/close and the pole remained in closed condition due to which fault current started flowing from 400 KV bus to Unit#4 generator. Both the lines 400 KV Teesta-III Kishanganj & 400 KV Dikchu , Unit#3 and Unit#6 participated in feeding the fault current.
- ▶ 15:43:42.400 hrs, Unit#6 tripped due to **51 NT (GT neutral Over-current)**
- ▶ 15:43:42.410 hrs, Unit#3 tripped due to **51 NT (GT neutral Over-current)**
- ▶ 15:43:43.710 hrs, 400 KV Teesta-III Dikchu Line tripped due to **line earth fault protection** (Setting : Ip- 200 amp, IEC normal inverse curve, TMS-0.7).
- ▶ 15:43:47.230 hrs, 400 KV Teesta-III Kishanganj Line tripped due to **Over-Voltage Stage-I** (110%, 4 sec) Voltage: RN- 204.7 KV, YN-255.6 KV, BN-256.55 KV.



DETACHED MECHANICAL LINK



BROKEN COTTER PIN



WHY LBB NOT OPERATED?

- ▶ For LBB Operation following condition should satisfy:
 - CBF (Circuit Breaker Failure)
 - Primary side current >0.1 Amp
 - CB close feedback

RESTORATION

- ▶ 16:00 hrs, 400 KV Bus-Coupler opening code received and bus coupler opened. As Unit#4 was on Bus-I , to isolate Bus-I, Bus-coupler was opened and both lines and other Units shifted to Bus-II.
- ▶ 16:13 hrs, 400 KV Teesta-III Dikchu line charged. After restoration of Line, Unit#1, Unit#2, Unit#3, Unit#5 and Unit#6 synchronized with grid on Bus-II.
- ▶ 17:00 hrs, 400 KV Teesta-III Kishanganj Line Charged on Bus-II.
- ▶ 18:18 hrs, 400 KV Bus Coupler closing code received and bus coupler closed.
- ▶ 18:22 hrs, Unit#4 synchronized with Grid, after rectification of 400 KV GIS Unit#4 R-phase breaker pole on Bus-II.



List of important transmission lines in ER which tripped in October-2019

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	Primary observation/ Remarks	Deliberation in PCC meeting
1	400KV JEYPORE-GAZUWAKA-I	01-10-2019	13:17	01-10-2019	14:00	O/V Stage I operated.		O/V Stage I operated.	No	Yes	STATCOM TFR not received for analysis of High voltage	Static O/V relay has been replaced by numeric relay. STATCOM DR yet to be received. PG to update
2	220 kV Rajarhat-Jeer at	02-10-2019	10:44			B-N fault, If=7.4 KA	B-N fault	B-N fault	Yes	No	Why DT sent to Jeer at for SLG fault which led to tripping of line even after successful AR from one end	PG to update
3	400KV BIHARSARIFF (PG)-VARANASI-II	02-10-2019	13:58	02-10-2019	15:34	Y-N, 246.51 Km, 1.85 KA		Y-N Fault	Yes	No	Dead time at both ends may be co-ordinated	Dead time setting of both ends are same as per configuration
4	220KV PUSAULI-SAHUPURI-SC	02-10-2019	19:02	02-10-2019	20:33	R-N, 72 KM(100%), 1.639 kA AT SASARAM		R-N Fault	No	No	Reason for delayed fault clearance (700 ms approx.) may be explained	Line tripped due to downstream fault. To be coordinated with NRPC.
5	400KV KODERMA-BIHARSARIFF (PG)-I	02-10-2019	21:04	02-10-2019	22:10	B'Srf:Not tripped	A/R Faulty DTT Trip.	Faulty tripping at Koderma	No	--	Reason for tripping at Koderma may be explained	Mal-operation during maintenance work at Koderma
6	400KV BINAGURI-TALA-IV	04-10-2019	14:23			Y_N, 124 KM, 2.830 kA, Z II (Binaguri)		Y-N Fault	Yes	No	Delayed fault clearance from Binaguri end (carrier unhealthy), fault detected in Z-II from Binaguri	To be raised in 5th OCC meeting with Bhutan
7	400KV RANCHI-RAGHUNATHPUR-III	04-10-2019	18:53	04-10-2019	19:16	B_N, 95.46 KM, 3.81 kA, A/r successful	B_N, 77.65 KM, 4.71 kA	B-N fault	Yes	Yes	As per DR recorded at RTPS end, A/R started. But no 3 phase tripping or A/R is not captured in DR; DVC to explain	Rectified
8	220KV MAITHON-DHANBAD-II	05-10-2019	11:02	05-10-2019	11:35	B-N, 38.57 Km , 3.75 KA	B-N, Z1, 13.12 kms, 5.367 KA.	B-N fault	Yes	No	Dead time at both ends may be co-ordinated; No breaker operation is being captured in Maithon end DR	PG to update (as per DR at Maithon end dead time is 1200 ms; Dhanbad end Dead time is 1000 ms)
9	220KV CHANDIL-RANCHI-sc	06-10-2019	1:42	06-10-2019	1:56		R-N fault, Ir= 2.2 KA, 78 Km	R-N Fault	Yes	No	Reason for delayed fault clearance (400 ms approx.) may be explained; At Ranchi end Z-II picked up and line tripped in Z-II timing from Ranchi end	During the tripping time PLCC link was unhealthy. It has been rectified.
10	220KV RENGALI(PH)-TSTPP-SC	06-10-2019	15:46	06-10-2019	16:42		B-n, z2, 22.2 km, 6 kA	B-N fault	No	Yes	Reason for delayed trip (400 ms) may be explained.	PLCC issue; OPTCL/GRIDCO to update
11	400KV LAPANGA-OPGC (B THERMAL)-1	07-10-2019	0:50	08-10-2019	17:57	B-Phase conductor snapped between loc no. 127/3 to 128/0		B-Phase conductor snapped	Yes	No	As per PMU data repeated attempt of auto-reclose has been observed; As per DR recorded at Lapanga, no successive A/R attempt has been observed. OPGC end DR may be sent	OPTCL/GRIDCO to update
12	400KV NEW PPSP-NEW RANCHI-II	07-10-2019	14:40	07-10-2019	15:08	BN , 2.19 kA , 50.1 km ,	B-N, 52 km, 2.17 kA	B-N fault	No	No	Reason for delayed trip (3000 ms approx.) may be explained. Fault is cleared by opening the line ,this means fault was in the line only. DT send to remote end by Ranchi, is DT enabled for DEF.	Delayed fault clearance due to high resistance fault
13	220KV BUDHIPADAR-RAIGARH-SC	07-10-2019	15:14	07-10-2019	16:37	DP, z1, R-n, 0.1 km, 22.62 kA	R-n, 84 km, 2.2 kA	R-N Fault	Yes	No	Reason for delayed trip (500 ms) at Raigarh end may be explained. As per DR at Budipadar end, fault was cleared within 100 ms	--
14	400KV ALIPURDUAR-JIGMELLING-I	08-10-2019	1:19			A/R unsuccessful, B-N fault, 6.88 kA, Z-1, FD=76.4 KM.		B-N fault	Yes	Yes	3 Phase Ar at Jigmeling and Dead time not coordinated	To be raised in 5th OCC meeting with Bhutan
15	400 kV Durgapur-Sagardighi	08-10-2019	09:38			R-N, If=4.4KA	R-N	R-N fault	Yes	No	Why Main CB opened phase while AR was successful via Tie CB	Rectified
16	400KV KhSTPP-BARH-II	08-10-2019	11:52	08-10-2019	13:11	O/V OPERATED MAX 252 KV IN Y PHASE	DT RECEIPT	O/V at Kahalgaon	No	No	Only .cfg file has been uploaded in PDMS at Kahalgaon	To be re-uploaded/resent by NTPC
17	400KV RAJARHAT-JEERAT-SC	08-10-2019	19:25	08-10-2019	19:57	R-N, 5.39kA, 38km FROM RAJARHAT END		R-N fault	Yes	No	Fault clearance time more than 100 ms due to delay of Carrier receive. Reason for TCB lock out may be explained. R pole of MCB remained open for more than 1400 ms (till the end of DR). Reason for R pole stuck at Rajarhat end may be explained.	PG to update
18	400KV NEW PPSP-NEW RANCHI-II	10-10-2019	13:06	10-10-2019	13:33	B-N, 3.59kA, 63.4km	B-N, 5.49kA, 27.2 km	B-N fault	Yes	Yes	Reason for non-attempt of A/R at New Ranchi may be explained. D/P pick up signal in New PPSP end DR may be configured properly. DR may be configured as per decisions taken in 79th ER PCC meeting	PG to update
19	400KV BINAGURI-NEW PURNEA-II	12-10-2019	5:58	12-10-2019	6:26	Maloperation of Tie Bay LBB	Maloperation of Tie Bay LBB at Binaguri	DT Receipt	Yes	No	Reason for LBB operation to be explained by PG	Solved
20	400KV BINAGURI-ALIPURDUAR-II	12-10-2019	5:58	12-10-2019	6:29	Maloperation of Tie Bay LBB	Maloperation of Tie Bay LBB at Binaguri	DT Receipt	Yes	No	Reason for LBB operation to be explained by PG	Solved

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	Primary observation/ Remarks	Deliberation in PCC meeting
21	220KV GAYA-SONENAGAR-I	12-10-2019	8:55	12-10-2019	9:10	A/r successful:B-N,14.7 KA, 4.444 km	z1,64.03 km,B-n,316 A	B-N fault	Yes	Yes	A/R operation started at Sonenagar end; But three poles tripped after 1 second without reclose attempt. BSPTCL to explain	BSPTCL to update
22	220KV CHUKHA-BIRPARA-I	14-10-2019	3:43			R-N, 3.4kA, 41km	Charging attempted at 4:12 hrs but tripped on SOTF (R-Y, Ir-4.6kA, Iy-4.7kA, 42km from Birpara end)	R-N Fault	No	Yes	Single phase A/R may be implemented in place of three phase A/R at Chukha end	To be raised in 5th OCC meeting with Bhutan
23	400KV ALIPURDUAR-BONGAIGAON-II	16-10-2019	17:37	17-10-2019	17:42	R-PHASE CONDUCTOR SNAPPED BETWEEN TOWER NO 260 AND 261		R-PHASE CONDUCTOR SNAPPED	Yes	No	Reason for non-A/R attempt at Alipurduar may be explained	Rectified
24	220KV RENGALI(PH)-TSTPP-SC	17-10-2019	12:35	17-10-2019	13:44	YN, Z-2		Y-N Fault			Reason for delayed trip (500 ms approx.) may be explained.	PLCC issue; OPTCL/GRIDCO to update
25	220KV GAYA-KHIZERSARAI-I	19-10-2019	15:31	19-10-2019	19:13	B-N,56.5 km,3.24 KA		B-N fault	Yes		Reason for delayed trip (500 ms approx.) may be explained.	PLCC issue; BSPTCL to update
26	220KV BOLANGIR(PG)-BOLANGIR(GRIDCO)-II	22-10-2019	14:32	22-10-2019	15:11		Bolangir(GRIDCO): Backup O/C	Backup O/C	No	Yes	Reason for delayed trip (350 ms approx.) may be explained.	PLCC issue; OPTCL/GRIDCO to update
27	220KV PUSAULI-SAHUPURI-SC	27-10-2019	9:02	27-10-2019	9:50	B-N, Z1, 72km, 1.6KA	NA	B-N fault			Reason for delayed fault clearance (700 ms approx.) may be explained	Line tripped due to downstream fault. To be coordinated with NRPC.

ANNEXURE-C1

SI No.	Name of the incidence	PCC Recommendation	Latest status
84th PCC Meeting			
1.	Total power failure at 220 kV Dumka(JUSNL) on 07.09.2019 at 17:32 Hrs	<ul style="list-style-type: none"> • PCC advised JUSNL to check the distance relay settings at Dumka end for 220 kV Dumka- Govindpur idle charged lines and advised to set all the zone timing as instantaneous till the lines are not charged from other end. • PCC also advised to set directional earth fault time setting as instantaneous till the lines are not charged from other end. • PCC advised JUSNL to check the healthiness of the LBB protection at 220kV Dumka S/s. 	<p><i>JUSNL informed that the line charged from both ends.</i></p> <p><i>Issue of communication cable of LBB has been resolved. LBB is working correctly.</i></p>
2.	Disturbance at 220 kV Hatia(JUSNL) S/s on 24.09.2019 at 17:32 Hrs	<ul style="list-style-type: none"> • PCC advised JUSNL to review the relay settings for 220 kV Hatia-Ranchi circuit-III as well as to test the relays. • PCC also advised to set the zone-2 timing instantaneous for the anti theft charge line till the line is not charged from other end and to enable directional earth fault protection at Hatia end for this line. • PCC also advised JUSNL to check and rectify the CT polarity issue for 220 kV Hatia-Ranchi circuit-II. 	<p><i>Zone settings and DEF settings have been revised.</i></p>
3.	Disturbance at Talcher HVDC station on 04.09.19 at 16:59 Hrs.	Powergrid informed that the issue has been referred to M/s Siemens for analysis. PCC noted this and asked powergrid to share the findings.	<p><i>LOA placed. OEM would visit the site in January 2020.</i></p>
83rd PCC Meeting			
4.	Total power failure at 220 kV Dehri S/s on 18.08.2019 at 17:24 Hrs	PCC advised BSPTCL to submit the detailed report along with all the relevant DR & EL within a week for further analysis.	<p><i>BSPTCL submitted the report</i></p>

5.	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.	
6.	Disturbance at 400 kV New Purnea S/s 29.08.2019 at 08:08 Hrs	From the DRs submitted by BSPTCL, it was observed that the sampling frequency was set at 200 Hz which hampers in capturing the correct information. PCC advised BSPTCL to properly configure the DR settings as per the standard approved by PCC.	BSPTCL informed that they will set sampling frequency at 1000 Hz.
7.	Three phase tripping of tie breaker in case transient fault at Binaguri end of 400 kV Binaguri – Bongaigaon – I.	Powergrid informed that the issue would be resolved in next available shutdown.	<i>Powergrid informed that the relay has been replaced.</i>
82nd PCC Meeting			
8.	Total Power failure at 220 kV Jorethang, 220 kV Tashiding & 220 kV New Melli S/s on 14.07.2019 at 10:35 Hrs.	<p>PCC advised DANS Energy to take the following actions to avoid the unwanted tripping of the lines:</p> <ul style="list-style-type: none"> • Since the line length of the transmission lines are less than 20 km, differential protection may be implemented for 220kV Tashiding-New Melli line and Jorethang-New Melli line to improve the reliability. • Distance relay reach settings and selection of primary/secondary in the relay configuration settings to be reviewed at both Tashiding and Jorethang end. • Exact impedance of the line to be measured using off line fault location and the realy settings are to be reviewed accordingly. <p>Distance relays at Tashiding and Jorethang end should be tested to verify the correct operation.</p>	
9.	Disturbance at 220 kV Siliguri S/s on 22.07.19 at 03:57 Hrs.	PCC advised Powergrid to take the following corrective actions:	<i>Powergrid informed that the module for time</i>

		<ul style="list-style-type: none"> • Time synchronization of DRs need to be checked and rectified at Dalkhola end. • As carrier was sent from dalkhola end in zone-2 initiation, Powergrid was advised to check overreach scheme in the relay settings at Dalkhola end and to review the settings. 	<p><i>synchronisation was found corrupt and they have issued the order for procurement for new module. They also informed it will take two months time for new installation.</i></p>
81st PCC Meeting			
10.	Disturbance at 400 kV Dikchu S/s on 30.06.2019 at 09:55 Hrs.	<p>PCC advised Dikchu to review the backup E/F time setting of the ICT and coordinate the setting with with the zone-3 timing of the transmission line.</p> <p>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.</p> <p>PCC advised Chuzachen to review the zone settings for 132 kV Chuzachen-Rangpo line.</p> <p>PCC advised TPTL to do line patrolling for 400 kV Rangpo-Dikchu line to find out the cause of such high resistive fault in the line.</p>	<p><i>As advised by PCC the second stage earth fault settings of ICT have been modified. previously set to 100 ms is now revised to 1.3 sec in co-ordination with zone 3 time settings of transmission line which is set at 1.0 sec.</i></p>
11.	Disturbance at 220 kV Budhipadar(OPTCL) S/s on 12.06.2019 at 00:37 Hrs.	<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 synchronisation</p>	<p><i>OPTCL informed that they will replace the old relays at the earliest.</i></p>
12.	Disturbance at 400 kV Meramundali (OPTCL) S/s on 03.06.2019 at 01:15 Hrs.	<p>For voltage rise issue, PCC advised to check for any CVT related issues in the substation. PCC also advised</p>	<p><i>OPTCL informed that they have issued tender for</i></p>

		to carry out earthing audit of the complete substation.	<i>the earthing audit of the substation.</i>
13.	Disturbance at 220/132 kV Dumka(JUSNL) S/s on 19.06.2019 at 13:02 Hrs.	PCC advised for time synchronization of the DR outputs at both Maithon & Dumka end.	<i>JUSNL informed that there was antenna and cable fault in the time synchronisation module. JUSNL informed that it will be rectified within a month.</i>
76th PCC Meeting			
14.	Disturbance at 400kV Gaya(PG), 220kV Gaya and Bodhgaya on 05-01-19 at 11:20 hrs	PCC advised BSPTCL to review the Khijasarai end relay settings to avoid unwanted tripping at Khijasarai end and submit the relay settings to ERPC for inclusion in PDMS.	<i>BSPTCL informed that they will send the relay settings at the earliest.</i>
72nd PCC Meeting			
15.	HVDC TFR triggering standardization and reporting requirements.	PCC advised POWERGRID to submit TFR triggering criteria and TFR signal list for all HVDC station as well as STATCOMs of Eastern region to ERLDC.	<i>It was informed that required information was received from Talcher HVDC station.</i>
71st PCC Meeting			
16.	Disturbance at 220/132 kV Motipur(BSPTCL) S/s on 15.08.18 at 13:00 hrs.	PCC advised BSPTCL to check the disturbance recorders of all the lines in 220 kV Motipur S/s and communicate the findings to ERPC/ERLDC at the earliest.	<i>BSPTCL informed that OEM found CT core of 220 kV MTPS Circuit saturated. CT has been replaced.</i>
17.	Disturbance at 400 kV Farakka S/s on 19.08.18 at 15:26 hrs.	PCC advised to check the reason for not sending carrier from Farakka to Kahalgaon and non-operation of Autorecloser.	<i>NTPC informed that the carrier healthiness will be checked in December 2019.</i>