



Agenda  
for  
**100<sup>th</sup> PCC Meeting**

**Date: 12.03.2021**  
**Eastern Regional Power Committee**  
**14, Golf Club Road, Tollygunge**  
**Kolkata: 700 033**

# EASTERN REGIONAL POWER COMMITTEE

## **AGENDA FOR 100<sup>TH</sup> PROTECTION SUB-COMMITTEE MEETING TO BE HELD ON 12.03.2021 AT 10:30 HOURS**

### **PART – A**

#### **ITEM NO. A.1: Confirmation of minutes of 99<sup>th</sup> Protection sub-Committee Meeting held on 12<sup>th</sup> February 2021 through MS Teams.**

The minutes of 99<sup>th</sup> Protection Sub-Committee meeting held on 12.02.2021 circulated vide letter dated 26.02.2021.

**Members may confirm the minutes of 99<sup>th</sup> PCC meeting.**

### **PART – B**

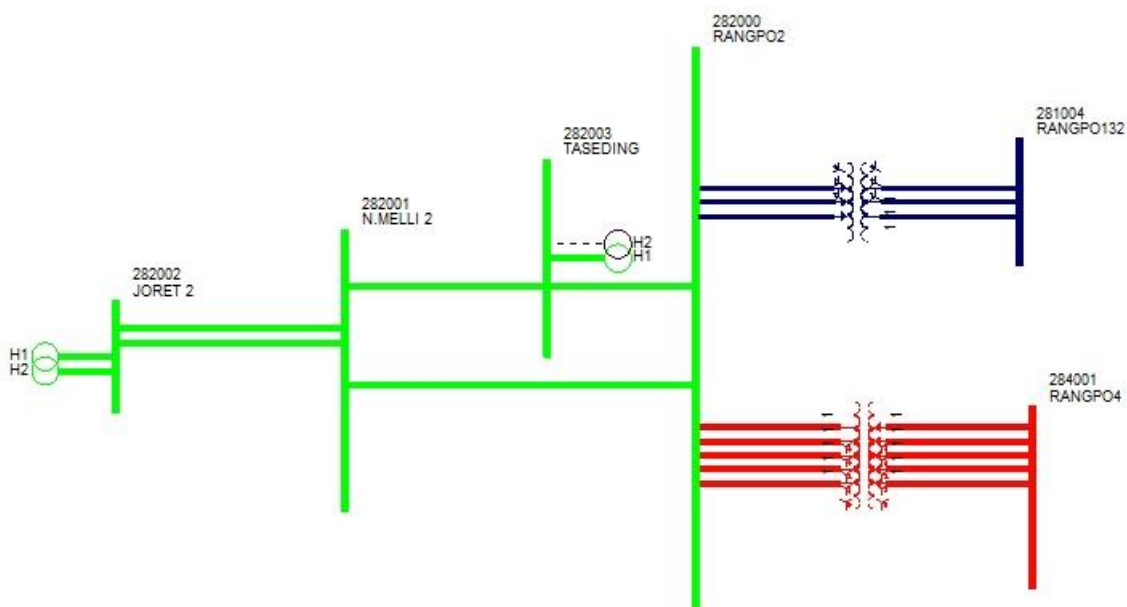
#### **ITEM NO. B.1: Total Power Failure at 220 kV Tashiding HEP**

##### **A. On 15-02-2021 at 14:30 hrs.**

On 15-02-2021, 220 kV THEP-New Melli S/C was under shutdown and unit-1 of Tashiding HEP was under annual overhauling. Tashiding was connected to rest of the grid via 220 kV THEP – Rangpo S/C.

At 14:30 hrs, 220 kV THEP- Rangpo S/C tripped on B-phase to earth fault resulting in total power failure at THEP.

Relay indication has not been captured in both main 1 and main 2 DR recorded at Tashiding end.



**Relay Indications :**

Name	End 1	End 2	PMU Observation
220 kV THEP – Rangpo S/C	Tripped	B-N, Zone – 2, 31 km from Rangpo, F/C 1.7 KA	Around 5 kV gradual dip has been observed in B-phase voltage at Rangpo PMU data. The fault clearing time was around 1600 ms.

Gen. Loss : 34 MW

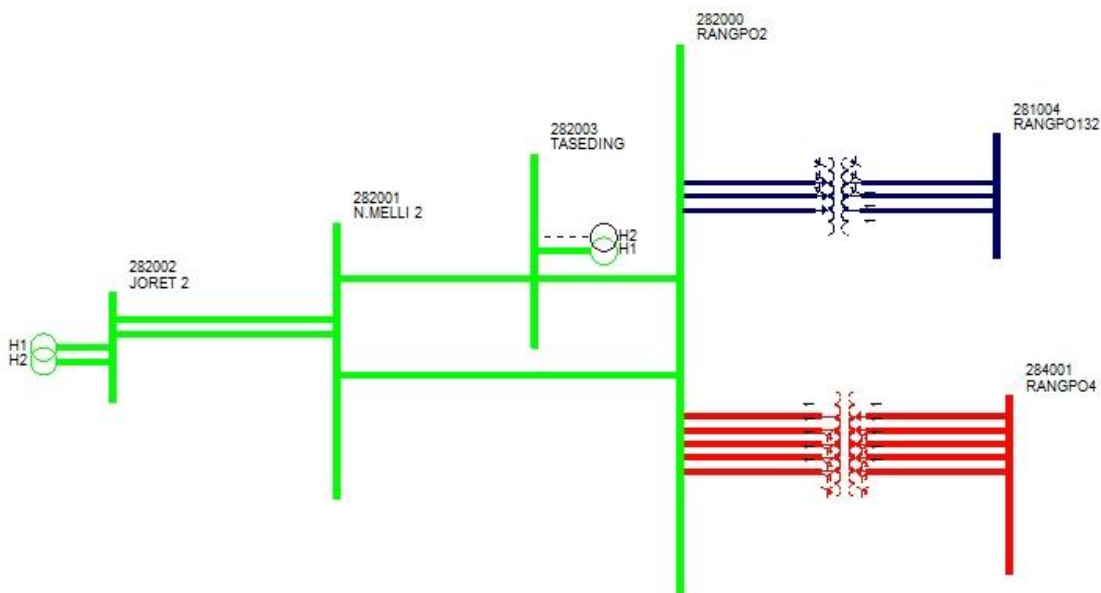
Outage Duration: 1 hr 06 min

**Tashiding HEP & Powergrid may explain.**

**B. On 17-02-2021 at 19:56 hrs.**

On 17-02-2021 at 19:56 hrs, 220 kV THEP – New Melli S/C and 220 kV THEP – Rangpo S/C tripped on R and B phase fault resulting in total generation loss and blackout at 220kV THEP .

Successful auto reclose operation on R phase to earth fault has been observed from DR rerecorded at New Melli end.



**Relay Indications :**

Name	End 1	End 2	PMU Observation
220 kV THEP – New Melli S/C	Zone – 4, DT sent, 8 km (reverse direction)	R-B, F/C 4.5 kA, 18 km from New Melli.	Around 60 kV dip has been observed in R and B phase voltage at Rangpo PMU data. The fault clearing time was less than 100 ms
220 kV THEP- Rangpo S/C	B-N, Zone – 1, 33 km IR = 2.25 kA, IB = 2.7 kA	R-B, Zone – 2, F/C 4.3 kA, 75 km from Rangpo	

Gen. Loss : 48 MW

Outage Duration: 51 min

A report from ERLDC in this regard is enclosed at **Annexure B.1**

**Tashiding HEP & Powergrid may explain.**

**ITEM NO. B.2: Major grid events other than GD/GI**

**ITEM NO.B.2.1 : Disturbance at 220/132 kV Chandrapura A TPS on 10-02-2021 at 08:09 hrs**

On 10-02-2021 at 08:09 hrs, 220/132 kV ICT 1, 2 & 3 and 132 kV Chandrapura-A TPS tripped resulting in power failure at 132 kV level.

Flash report received from DVC SLDC is attached in the **Annexure B 2.1.**

**DVC may explain.**

**ITEM NO.B.2.2 : Tripping of 400 kV Bus - 1 and 2 at 400/220 kV Jeerat S/s on 17-02-2021 at 13:52 hrs**

On 17-02-2021, 400 kV Jeerat-Bakreswar was under shutdown. At 13:52 hrs both 400 kV bus 1 and 2 at Jeerat tripped.

Report received from WBSETCL is enclosed at Annexure B2.2.

**WBSETCL may explain.**

**ITEM NO.B.2.3.: Tripping of 400 kV Bus-2 at 400/220 kV Baripada S/s on 23-02-2021 at 15:39 hrs**

On 23-02-2021 at 13:52 hrs, 400 kV Bus-2 at 400/220 kV Baripada S/s tripped due to mal-operation of Gas density monitor (GDM) relay. 125MVAR bus reactor-1 got tripped during this bus tripping as its tie CB was out for annual maintenance planning of 400/220 kV ICT.

400 kV Bus-2 was later charged at 16:32 hrs and 125 MVAR B/R - 1 charged at 16:35 hrs.

The report received from POWERGRID Odisha is attached in the Annexure B 2.3.

**POWERGRID Odisha may explain.**

**ITEM NO.B.2.4 : Disturbance at Meramundali on 21-02-2021 at 07:23 hrs**

On 21-02-2021 at 07:23 hrs, 315 MVA 400/220 kV ICT 2 at Meramundali caught fire after bursting of 220 KV B-phase bushing at 400/220 kV ICT 2 at Meramundali. At the same time, 220 KV Meramundali – Talcher STPP - 2 tripped from Talcher STPP end only.

**OPTCL & Talcher STPP may explain.**

**ITEM NO.B.2.5.: Tripping of 220 kV Bus-2 at 220/132 kV Budipadar S/S on 27-02-2021 at 17:27 hrs**

On 27-02-2021 at 17:27 hrs 220 kV Bus-2 at 220/132 kV Budipadar S/s got tripped due to mal-operation of LBB relay resulting in tripping of following elements connected with the 220 kV bus-2:

- 220 kV bus coupler at Budipadar
- 220 kV Budipadar IBTPS – 2 & 4
- 220 kV BudipadarBasundharaCkt 2
- 220 kV Budipadar VAL 2
- 220 kV Budipadar AAL 2
- 220 kV BudipadarTarkera 1
- 220 kV BudipadarBhusan 1

Bus bar tripping has earlier been occurred at Budipadar S/S on 16<sup>th</sup> July 2020, 13<sup>th</sup> March 2020, 08<sup>th</sup> October 2019 also.

**OPTCL may explain.**

**ITEM NO. B.3: Repeated tripping of transmission lines connected to 400/220 kV Meramundali S/S**

In February 2021, repeated tripping incidents occurred at transmission lines connected to 400/220 kV Meramundali S/S.

Details of tripping incidents are given in the report attached in **Annexure B.3.**

During few incidents, discrepancy in protection system has been observed which are mentioned in below.

Sr. No	Line Name	Trip Date	Trip time	Reason	Discrepancies observed
1	400 kV Meramundali - Bolangir-1	04-02-2021	01:29	B phase to earth fault	Fault was in B phase and B pole breaker tripped but during dead time high voltage in B phase observed at Bolangir due to secondary arcing which lead to O/V stg-2 operation and line tripping.
2	400 kV Meramundali - TSTPP-2	05-02-2021	15:07	B phase to earth fault	B phase fault but all three phase voltage increased to a very high value upto 900 kV at the instant of fault .A/R was unsuccessful .
3	400 kV New Duburi-Meramundali -1	06-02-2021	12:24	NoFault	There was no fault in line. Tripped during A/R of Meramundali - Mendhasal -2.
4	400 kV Meramundali - Mendasal-2	24-02-2021	13:17	R phase to earth fault	At the instance of charging, tripped after 300 ms delay .SOTF function needs to be checked.
5	400 kV Meramundali - Lapanga-1	27-02-2021	17:26	Y and B phase fault	TCB at Lapanga end opened instantly but MCB opened after 200 ms delay which caused fault feeding till 250 ms, although fault was in z-1 .
6	220 kV TSTPP-Meramundali -2	28-02-2021	12:02	R phase to earth fault	From DR it is clear that auto reclose was successful but after 800 ms of successful A/R, line tripped but no fault was noticed .

- OPTCL may share the root cause analysis of the discrepancies mentioned in above table.
- Problem of high voltage at Meramundali during faults has been already pointed out in 98<sup>th</sup> and 99<sup>th</sup> PCC meeting. Same has been observed in February also. OPTCL may share plan of action in order to early prevention of this problem.
- DR submitted from Meramundali end is of very less time frame and is not as per ERPC guideline.

**OPTCL may explain.**

#### **ITEM NO. B.4: Repeated pole block of HVDC Talcher Kolar**

In 2020-21, repeated incidents of pole block of HVDC Talcher Kolar have been observed. Details of all incidents shown in following table:

<b>Element Name</b>	<b>Tripping Date</b>	<b>Tripping Time</b>	<b>Reason 1</b>	<b>Revival Date</b>	<b>Revival Time</b>
HVDC Talcher Kolar pole - 2	16-07-2020	01:58	Tripping of 400kV Bus at Kolar	16-07-2020	03:36
HVDC Talcher Kolar pole - 1	16-07-2020	01:58	Tripping of 400kV Bus at Kolar	16-07-2020	04:48
HVDC Talcher Kolar pole - 1	19-09-2020	05:02	Problem in smoothing reactor at Talcher end	19-09-2020	19:04
HVDC Talcher Kolar pole - 1	23-10-2020	21:33	Hand tripped due to fire at smoothing reactor at Talcher	01-11-2020	08:15
HVDC Talcher Kolar pole - 1	15-12-2020	16:33	Persistent DC line Fault, 49.7 Km from Talcher	15-12-2020	17:23
HVDC Talcher Kolar pole - 1	20-12-2020	21:24	Inlet temperature high in the valve cooling system	21-12-2020	07:44
HVDC Talcher Kolar pole - 1	26-02-2021	14:20	Hand tripped due to fire at smoothing reactor at Talcher		
HVDC Talcher Kolar pole - 2	26-02-2021	13:10	Hand tripped due to fire at smoothing reactor at Talcher	26-02-2021	14:20

HVDC Talcher Kolar is an important inter-regional link between ER and SR. Reliability of this link is very important with respect to power transmission to Southern Region.

Powergrid Odisha may share

- root cause for repeated fire incident at smoothing reactor at Talcher end.
- action taken in order to reduce the no of pole block of this HVDC link.

**Powergrid may explain.**

#### **ITEM NO. B.5: Islanding schemes of Eastern Region**

## 1) Chandrapura Islanding Scheme:

The islanding scheme in DVC is under Chandrapura TPS considering unit 1, 2 and 3 having capacity of 3x130 MW (Namely CTPS-A plant) along with connected load of CTPS-A itself. However unit 1 and 2 were decommissioned.

In the OCC meeting, DVC informed that they are planning implement the islanding scheme with the new units (unit 7 and 8) of Chandrapura TPS having capacity of 2 x 250 MW (namely CTPS-B plant).

The detailed plan of islanding scheme is given at **Annexure B5**.

*In 98<sup>th</sup> PCC, DVC explained the Chandrapura islanding scheme in detail with a presentation.*

*The scheme as explained by DVC in brief as follows:*

- *The proposed islanding scheme would be implemented considering 2X 250 MW Generators of CTPS-B generating station along with loads of CTPS-A(120 MVA), Putki (180 MVA), Patherdih (141 MVA) and Nimiaghat (40 MVA).*
- *The islanding relay is to be placed at CTPS-B station with voltage & frequency of 220 kV CTPS-B as reference.*
- *On actuation of islanding relay at 220 kV CTPS-B, the trip commands will be extended further to 220 kV CTPS-A, 132 kV CTPS-A, 132 kV Putki, 132 kV Patherdih, and 132 kV Nimiaghata using OPGW communication network.*

*They informed that the timeline for implementation of the islanding scheme would be 18 months from the date of finalization of the scheme.*

*They added that OPGW network is already present in order to extend trip signal of islanding relay to the related substations.*

On a query from PCC regarding healthiness of the breakers at substations associated with this islanding scheme, they informed that circuit breakers are comparatively new in these substations and the breakers are being checked and maintained regularly during annual maintenance program.

During discussion, the frequency settings for islanding operation could not be discussed as representative from CTPS generating station was not present in the meeting.

ERLDC stated that DVC can conduct a dynamic study instead of steady state analysis which might help in finalizing the islanding frequency.

In 99<sup>th</sup> PCC, ERLDC presented the dynamic study report on CTPS islanding scheme. The report is attached at Annexure B5.1.

The study has been carried out for four different cases based on different scenarios of Generation and Demand. ERLDC informed that stability of islanding schemes was confirmed in each cases. However, over-frequency (upto 53.6 Hz) condition is being observed for cases having minimum demand condition.

They further informed that the over-frequency settings for units at CTPS-B is 52 Hz with 100 sec delay.

PCC opined that over frequency setting of the units need to be discussed/reviewed.

PCC advised ERLDC to share the study report with DVC Planning team and decided to conduct a separate meeting to finalize the scheme.

**DVC may update.**

## **2) IB-TPS Islanding Scheme:**

The islanding scheme was discussed in special meeting held on 12-12-2018

After detailed discussion the following were decided:

- The alarm for islanding scheme shall be initiated at 49.2 Hz at both Budhipadar and IB TPS to alert the operators
- Islanding of one unit (210 MW) of IBTPS with the selected loads of 149 MW connected through 132 kV level at Budhipadar substation will be initiated at 47.8 Hz of grid frequency with 250msec time delay.
- The islanding relay Micom P341 at Budhipadar will give trip command to all 220KV feeders connected to Bus-I and Bus II along with Bus coupler except Auto transformer- I & II and selected islanding IB TPS ckts either (IB -1 & 3) or (IB-2 & 4).
- Give trip command to circuit breakers of 132kV Budhipadar-Lapanga S/c line, 132kV Budhipadar-Jharsuguda D/C line and 132kV Budhipadar-Rajgangpur S/C lines at Budhipadar end.
- It will send carrier command to both Kalunga and Tarkera end to trip 132kV Kalunga-Tarkera S/c line from both the ends to make radial load at Kalunga.
- It will send carrier signal to IB TPS to start ramping and adjust IB TPS (one unit) generation to match the load.

Regarding implementation, OPTCL and OPGC informed the following:

- The islanding relay Micom P341 is already installed at bus coupler panel of 220kV Budhipadar S/s
- OPGW is available for 220 kV lines
- Installation of OPGW is in progress for 132kV lines  
Logic for generation control of islanding after receiving the command from Budhipadar is to be implemented at IB TPS.

In 98<sup>th</sup> PCC, OPGC informed that as per their recent communication with the OEM i.e. BHEL, high speed governing system is required for operating the unit in islanding mode of operation. As IB-TPS units are around more than 35 years old and having low speed governing system at present, it would be difficult to implement islanding scheme at IB-TPS.

PCC advised OPGC to place final observations from OEM regarding implementation of islanding scheme at IBTPS units in the PCC meeting.

**OPGC and OPTCL may update**

## **3) MTPS, Kanti Islanding Scheme:**

The islanding scheme was discussed in 68<sup>th</sup> PCC Meeting held on 18-06-2018.

After detailed deliberation, PCC in principle agreed with the following islanding scheme at Kanti TPS:

- Stage II units (2x195 MW) of Kanti TPS will be islanded with station load of 40 MW and



radial load of 150 MW (approx.) of 220kV Kanti TPS-Gopalganj D/C line.

· Once the grid frequency falls to 48.2 Hz, the PLC at Kanti TPS would initiate the islanding process after 500 ms time delay.

In 97th PCC following deliberations were made

KBUNL informed that the islanding scheme would be implemented with Stage II units (2x195 MW) of Kanti TPS. The relevant data related to Stage II units (2x195 MW) of Kanti TPS were already shared to ERLDC. KBUNL added that at present MTPS is having two bus system and they are implementing bus sectionalizer in both the 220 kV buses to isolate the Stage II units (2x195 MW) and 220kV Kanti TPS-Gopalganj D/C lines from rest of the grid.

KBUNL explained that the construction work of relevant bays of bus sectionalizer is pending due to some contractual issues. The work has been awarded to a new contractor and it is expected to be completed by end of 2021.

KBUNL further informed that all the hardware related to islanding schemes have been procured and the islanding scheme is expected to be implemented by December 2021.

PCC opined that implementation of MTPS, Kanti Islanding Scheme is very important for restoration of Bihar system during major grid disturbances. PCC advised KBUNL to expedite the work and implement the islanding scheme by June 2021.

In 98th PCC Meeting, BSPTCL informed that details of the availability of PLCC for the lines associated with KBUNL islanding scheme had already been shared. PCC advised BSPTCL to ensure the healthiness of the PLCC in all the 220kV and 132kV lines connected to the Gopalganj Sub-station within the timeframe of implementation of Islanding scheme at KBUNL.

In 99<sup>th</sup> PCC, NTPC informed that the out of five no. of bays, work for two no. of bay has been completed. They added that remaining work would be completed by June'2021.

PCC advised BSPTCL & NTPC to complete pending works, if any, related to implementation of KBUNL islanding scheme other than the construction work at KBUNL switchyard, before June'2021 so that the scheme can be implemented at the earliest.

PCC also advised ERLDC to share the detailed action plans and requirements for implementation of the islanding scheme to NTPC & BSPTCL so that the same can be implemented by them within June' 2021.

**KBUNL and BSPTCL may update.**

#### **4) Review of FSTPS Islanding Scheme**

In 175<sup>th</sup> OCC Meeting, JUSNL informed that 220 kV Lalmatia-Godda line has been charged and the islanding scheme will be reviewed based on this change in network configuration.

OCC advised JUSNL to submit the load details and change in network configuration after commissioning of 220 kV Lalmatia-Godda line to ERLDC at the earliest.

In 99<sup>th</sup> PCC, it was informed that JUSNL has submitted load details related to Farakka islanding scheme.

PCC advised ERLDC to study and submit revised scheme based on the revised network configuration and load details and advised JUSNL to coordinate with ERLDC in order to finalize the scheme.

**JUSNL, NTPC & ERLDC may update.**

## **ITEM NO. B.6: Islanding Schemes for major cities of Eastern Region**

A special Meeting on reviewing of Islanding Schemes was held on 28<sup>th</sup> Dec 2020 chaired by Hon'ble Minister of state (IC) for Power and New & Renewable Energy.

In this regard a letter from NPC division has been received to discuss the following action points.

- a) Islanding schemes must be designed for all major cities and if there is need to establish power plant in / around such city, the proposal may be submitted to Ministry.
- b) All strategic and essential loads need to be considered for Islanding Scheme and Ministry of Defence may also be consulted for finalizing strategic loads.
- c) Generators which are spatially nearby the strategic and essential load shall be given priority in designing islanding scheme.
- d) All concerned utilities to ensure functionality of AUFLS and df/dt relays at all points of time.

99<sup>th</sup> PCC advised all SLDCs as well as ERLDC to plan for islanding schemes in line with the action points received from NPC division of CEA and submit the proposal in PCC for discussion.

**Members may update.**

## **ITEM NO. B.7: Total Power Failure at 400 kV Motihari Substation on 21.01.2021 at 11:20 hrs**

400 kV Motihari-Gorakhpur D/C and 400 kV Motihari Barh-1 were out of service due to tower collapse. Motihari was connected to rest of the grid through 400 kV Barh Motihari - 2. On 21-01-2021 at 11:20 hrs, a transient Y-phase to earth fault occurred at 400 kV Barh-Motihari - 2. Successful auto reclose operation was occurred at Motihari end.

In 99<sup>th</sup> PCC, NTPC informed that there was a transient Y-phase to earth fault in 400 kV Barh-Motihari line. The auto reclosure was successful for tie bay at Barh end. However, B-pole breaker of main bay did not reclose during the autorecloser operation. They informed that after opening of the B-phase breaker the compressor air pressure went low due to which autoreclosure got blocked in BCU.

DMTCL informed that autoreclosure was successful from DMTCL end.

Regarding DT send from Barh end, NTPC informed that 50N1 protection of line reactor got picked up during the disturbance and tripped the line reactor after a delay of 1.2 sec. The master trip relay of the line also got operated which send DT signal to Barh end. They added that operation of master trip relay for the line is being investigated.

After detailed deliberation, PCC observed that the as the line reactor is switchable, the protection of line reactor should not trip the master trip relay of the line. PCC advised NTPC to check and review the scheme/relay configuration for the line reactor of 400 kV Barh-Motihari-2 line.

**NTPC may update.**

## **ITEM NO. B.8: Repeated tripping of Circuits from NTPC Barh and Associated protection Issues**

In January 2021, repeated tripping has been observed for the lines emanating from 400 kV NTPC Barh generating station. During the analysis of the tripping incidents, discrepancies in Auto – reclose operation, protection system operation and extension of the direct trip signal have been observed and the same has been shown in the next table.

In 99<sup>th</sup> PCC following deliberations were made –

For the event under sl no.1, NTPC informed that 400 kV Barh – Gorakhpur-1 tripped from Barh end due to DT receipt from Gorakhpur end.

Powergrid informed that Gorakhpur end tripped due to DT receipt from Barh end.

PCC advised Powergrid to submit DR files of Gorakhpur end for the above line so that tripping can be analysed.

For the event under sl no.2, NTPC informed that relay at their end sensed Y-phase to ground fault in 400 k V Patna – Barh-1 and auto-reclose was successful.

Powergrid informed that both main and backup protection relay for 400 k V Patna – Barh-1 line at Patna end sensed phase to phase fault and tripped in zone-1 of distance protection. Powergrid informed that the autoreclosure for this line was being successful in earlier cases. PCC advised to check the autoreclosure scheme at their end.

For the event under sl no. 3,4 & 5, after detailed deliberation PCC advised to NTPC following:

- Regarding rise in voltage in healthy phases at Patna end, PCC advised to check for CVT earthing issue for the 400 kV Barh-Patna lines.
- Regarding autoreclosure issue under sl no. 3, PCC advised NTPC to do the thorough checking of the A/R scheme, relay configuration & settings and resolve the A/R issue at the earliest.
- During DR analysis, it was observed that there was a delay of more than 100 msec for carrier received at Barh end for 400 kV Barh-Patna lines. PCC advised NTPC & Powergrid to resolve the carrier delay issue at the earliest.
- PCC advised NTPC to submit a detailed report with respect to the above disturbances and action taken thereof to ERLDC/ERPC secretariat at the earliest.

NTPC vide mail dated 26th Feb 2021 updated as follows:

1. M/s Powergrid, Patna has been informed for resolution of carrier signal delay.
2. CVT secondary earthing has been checked at protection panel of Barh -Patna lines. For further detailed checking, shutdown is planned on 02 March 2021. The tripping after auto-reclose is due to TOR(Trip on Re-close) as in DR channel it is configured as SOTF/TOR trip.
3. The AR of both the main and tie breakers will be checked thoroughly during line shutdown.
4. The protection settings and schemes of transmission lines at Barh have been sent to our Engineering team for review and is under process.

**NTPC & Powergrid may further update.**

**ITEM NO. B.9: Disturbance at 220 k V Hatia Substation on 29.01.2021 at 10:44 hrs**

220 kV Ranchi - Hatia - 3 was being shifted from 220 kV bus-1 to 220 kV bus-2 at Hatia. During changeover, sparking was observed in 220 kV bus-2 isolator at Hatia of Ranchi-3 feeder. Bus bar

protection was not in service at Hatia at 220 kV voltage level. All 220 kV feeders tripped from remote ends.

In 99<sup>th</sup> PCC meeting, during analysis the following discrepancies were observed:

- i. Non-operation of back up overcurrent protection for 220/132 kV ICTs at Hatia.
- ii. Non -operation of backup overcurrent protection at 132 kV level for Hatia-II & Hatia-I S/s.
- iii. Tripping of 132 kV Hatia I-Kanke from Kanke end on zone-3 of distance protection.
- iv. Tripping of 132 kV Hatia I-PTPS from PTPS end on zone-1 of distance protection.

After detailed deliberation, PCC advised followings to JUSNL:

- To review the backup overcurrent settings of 220/132 kV ICTs at 132 kV Hatia-II S/s immediately.
- To review and submit the line backup overcurrent protection settings for 132 kV Hatia 1-132 kV Hatia II circuits.
- To review the zone settings at 132 kV Kanke end as the line should not have tripped in zone-3 from Kanke end.
- To check healthiness of the relay at PTPS end for 132 kV Hatia-I-PTPS line.
- To configure the disturbance recorders as per the standard finalized in 79<sup>th</sup> PCC Meeting.

**JUSNL may update.**

**ITEM NO. B.10: Grid event at 220/132 kV Lalmatia S/s on 11-01-2021 at 11:57 hrs.**

On 11-01-2021 at 11:57 hrs, 132 KV KhSTPP - Lalmatia S/C, 132 KV Kahalgaon (Bihar)-Lalmatia S/C, 132 KV Lalmatia – Sahebgunj S/C tripped on R phase to earth fault. As a result, 40 MW load loss occurred. Power was supplied to Sahebgunj and Rajmahal areas through transfer bus at Lalmatia via 132 kV Kahalgaon – Lalmatia – Sahebgunj link. There was no power failure at 220 kV voltage level at Lalmatia.

In 99<sup>th</sup> PCC, JUSNL informed that both 132 kV Kahalgaon (Bihar)-Lalmatia line and KHSTPP-Lalmatia line are in the same tower. There was an R-phase to ground fault in 132 kV Kahalgaon (Bihar)-Lalmatia line and the line tripped from both the end in zone-1 protection. They added that 132 kV KSTPP-Lalmatia from Lalmatia end and 132 KV Lalmatia-Sahebgunj line from Sahebgunj end also tripped during this disturbance.

JUSNL could not explain the tripping of 132 kV Lalmatia-Sahebgunj line from Sahebgunj end as the line was being radially fed from Lalmatia S/s. PCC advised JUSNL to submit the DR of Sahebgunj end and also to review the protection settings at Sahebgunj end.

On a query from BSPTCL, JUSNL informed that dedicated bay along with protection system for 132 kV Lalmatia-Sahebgunj line at separate transfer bus of Lalmatia S/s have been commissioned and put into operation. PCC advised JUSNL to submit Substation SLD along with relay settings to ERPC for updation of the same in protection database.

PCC advised BSPTCL to set the relay settings at Kahalgaon(BSPTCL) end considering the line length of 132 kV Kahalgaon – Lalmatia section only.

Regarding frequent tripping of the 132 kV Kahalgaon (Bihar)-Lalmatia line and 132 kV KHSTPP-Lalmatia line, PCC advised JUSNL and BSPTCL to do a joint patrolling of the line and submit a report to PCC.

**JUSNL and BSPTCL may update**

**ITEM NO. B.11: Total Power Failure at 220 /132 k V Dehri Substation on 21.12.2020 at 06:21 hrs**

On 21-12-2020 at 06:21 hrs, 220 KV Dehri - Gaya D/C and 220 kV Pusauli - Dehri S/C tripped from Gaya and Pusauli end respectively resulting in total power failure at Dehri end. Existence of Y phase to earth fault has been captured by PMU data as well as DR recorded at Gaya end. The fault clearing time as per Gaya PMU is around 800 ms.

In 98<sup>th</sup> PCC meeting,

BSPTCL was advised to review the settings of main protection of the 132 kV Dehri-Kochas S/C line and back up protection of all the 220/132 kV ICTs at Dehri immediately.

PCC further advised as follows:

- BSPTCL to review all the relay settings at 132 kV Dehri S/s where new relays have been installed and in case of any change in the settings, the same should be shared with ERPLDC/ERPC for updation in the protection database.
- Powergrid to review zone-3 settings of 220 kV Gaya-Dehri line and 220 kV Pushauli-Dehri line. The same should be coordinated with back up overcurrent protection of 220/132 kV ICTs at Dehri.
- BSPTCL to check the PT connections to the main relay as well as back up protection relay at Dehri end.

In 99<sup>th</sup> PCC , BSPTCL informed that the settings for new relays have already been shared. They also informed that the PT connections for main as well as backup protection relay were checked and found in order.

Regarding review of ICT overcurrent protection at Dehri end and zone-3 settings at powergrid end, PCC advised BSPTCL to coordinate with Powergrid and revise the settings at the earliest.

**BSPTCL and Powergrid may update.**

**ITEM NO. B.12: Disturbance at 220 kV Meramundali Substation on 01.10.2020 at 04:07 hrs**

On 30th September 2020 at 22:36 hrs, 220 kV Meramundali – NALCO - 1 was tripped on overcurrent protection. The line was charged at 00:05 hrs on 01<sup>st</sup> October 2020. At 01:35 hrs, sparking was noticed on this circuit at Meramundali end switchyard due to which GRIDCO SLDC advised NALCO to reduce the loading of the circuit.

At 04:07 hrs, line side pipe at Meramundali end of the above-mentioned circuit got broken and fell on the ground along with the breaker jumper causing line fault at Meramundali S/s. Bus jumper of 220 kV bus 1 at Meramundali also got damaged at several places which led to bus fault at 220 kV bus 1 at Meramundali. All the elements connected with 220 kV bus 1 along with the bus coupler tripped at Meramundali.

In 97<sup>th</sup> PCC following deliberations were made

- OPTCL to analyze the reason for rise in healthy phase voltage at Meramundali S/s during single phase to ground fault and send a report to ERPC and ERLDC.
- OPTCL to send latest status of OPGW work and implementation of carrier protection in 220 kV lines to ERPC and ERLDC.

In 98<sup>th</sup> PCC, SLDC Odisha informed that thorough checking of all earthing points are being carried at out at Meramundali S/s.

They further informed that the status of OPGW work and implementation of carrier protection in 220 kV lines would be submitted within a week.

In 99<sup>th</sup> PCC, SLDC Odisha informed that status of OPGW work and implementation of carrier protection in 220 kV lines would be submitted within two weeks.

They further informed that OPTCL has taken up the issue of rise in healthy phase voltage at Meramundali S/s with CPRI. PCC advised to share the progress in this matter to PCC.

**OPTCL may update.**

**ITEM NO. B.13: Backup Overcurrent Relay coordination of Sikkim Complex**

In 97<sup>th</sup> PCC following deliberations were made,

It was informed that IDMT characteristics were implemented at Jorethang and Tashiding.

It was informed that ERPC would share the revised settings as per the study carried out by PRDC to all concerned utilities.

In 99<sup>th</sup> PCC, PCC advised PRDC to re-send the revised settings to all concerned utilities. It further advised all concerned utilities to go through revised settings and provide their observations within one week.

**Members may update.**

**ITEM NO. B.14: Resistive reach setting guidelines and model calculation for distance protection--ERLDC**

In 98<sup>th</sup> PCC, ERLDC informed that thermal loading value would be considered based on the design loading value of the individual line. The design loading value (75° or 85°) has been decided during the design phase of the line as per CEA planning criteria.

PRDC informed that in case of short lines, with the proposed guidelines related to resistive reach settings the relay may not be able to clear high resistive fault.

Powergrid informed that they would submit their views with respect to point d) after due consultation from their end.

PCC viewed that these are general guidelines and modification can be done in resistive reach settings as per OEM specifications to solve the issue of clearing highly resistive faults.

In 99<sup>th</sup> PCC, after detailed deliberation, PCC advised Powergrid, DVC &CESC to give their comments to finalize the guidelines.

*The guidelines for resistive reach settings have been finalized based on the comments received from the utilities. It is enclosed at Annexure B.14.*

**Members may note.**

**ITEM NO. B.15: Protection setting related agenda-ERLDC**

**B.15.1: Overcurrent Protection and Thermal overload protection for Power Transformer in the Eastern Region to ensure optimum utilization as per relevant CEA standards**

All transformers are to be utilized as per their characteristics and design for normal as well as emergency limits defined in the CEA Transmission Planning Criteria. The relevant clause from the CEA Transmission Planning Criteria is provided below:

Quote:

**5. Permissible normal and emergency limits:**

**5.1.** Normal thermal ratings and normal voltage limits represent equipment limits that can be sustained on continuous basis. Emergency thermal ratings and emergency voltage limits represent equipment limits that can be tolerated for a relatively short time which may be one hour to two hours depending on design of the equipment.

**5.2.(c)** The loading limit for an inter-connecting transformer (ICT) shall be its name plate rating. However, during planning, a margin as specified in Paragraph: 13.2 and 13.3 shall be kept in the above lines/transformers loading limits (margin of 10% in the thermal loading limits of lines and transformers).

**5.2.(d)** The emergency thermal limits for the purpose of planning shall be 110% of the normal thermal limits.

**Unquote:**

The protection shall be set considering the normal as well emergency limit as per CEA planning criteria. This is to ensure to utilize the short term capacity of power transformer to avoid unnecessary tripping above name plate rating and provide operator with sufficient time to take action in case of overloading is observed during N-1 contingency of parallel transformer. Thus, the overcurrent and thermal overload protection shall be set as per the IEC and IEEE standard according to which the vendor has specified the design. These standards have defined the overloading limits and their time cycle to which utility should adhere.

During the shutdown of 315 MVA 400/220 kV ICT – 3 at Malda, POWERGRID informed that the overcurrent setting of 315 MVA 400/220 kV ICT – 5 can be set with a maximum time delay of 8 seconds due to limitation in the relay. Because of this limitation, the overcurrent setting of 315 MVA 400/220 kV ICT – 5 was set to 125% current setting with a time delay of 8 seconds. POWERGRID may share the reason for non-ability for the IDMT setting.

*In case of any conservative setting which will limit the 100 % normal and 110 % emergency rating of power transformer has been kept, such limitation on protection setting may immediately be provided by Concerned Transmission/Generation utility to ERLDC/ERPC and respective SLDC as these directly affect the long term as well as operational planning including calculation of ATC/TTC limits in line with CERC regulation.*

**Members may discuss.**

**B.15.2: Transformer overcurrent earth fault setting guidelines**

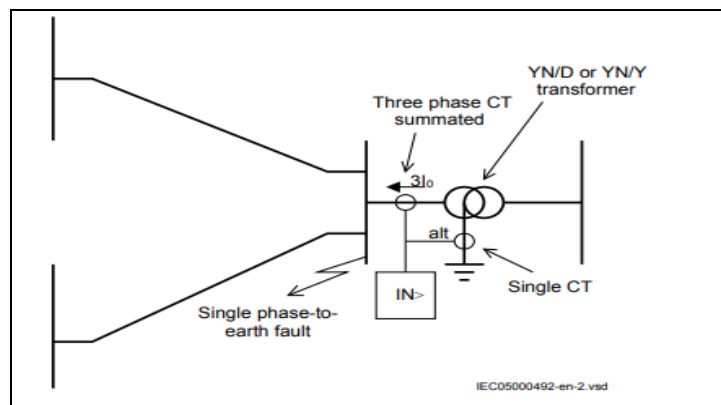
In the recent past few uncoordinated tripping of Transformers have been observed where conservative earth fault overcurrent setting is found to be the main reason. One such event is described below.

<b>Name of the event with date and time</b>	<b>PCC in which event was discussed</b>	<b>Observed issue /non-coordinated tripping</b>
Disturbance at 220 kV Darbhanga S/S on 19-09-2020 at 16:37 hrs	95 <sup>th</sup> PCC	400/220 kV ICT at DMTCL Darbhanga tripped in 67N protection, for a line fault at the remote end in 220 kV DMTCL-Darbhanga (BSPTCL). The setting of 67N stage two was 750 Amp. However, the fault current contribution via the ICT neutral was more than 1.5 kA. This shows that there is a lack of coordination.

As presently there are no setting guidelines in the protection philosophy of ERPC on this aspect, there is a need for introducing a general guideline to help utilities avoiding any conservative setting and uncoordinated tripping. One such general guideline for the earth fault overcurrent setting is provided below for discussion.

### A. Earth fault overcurrent Stage 1 setting:

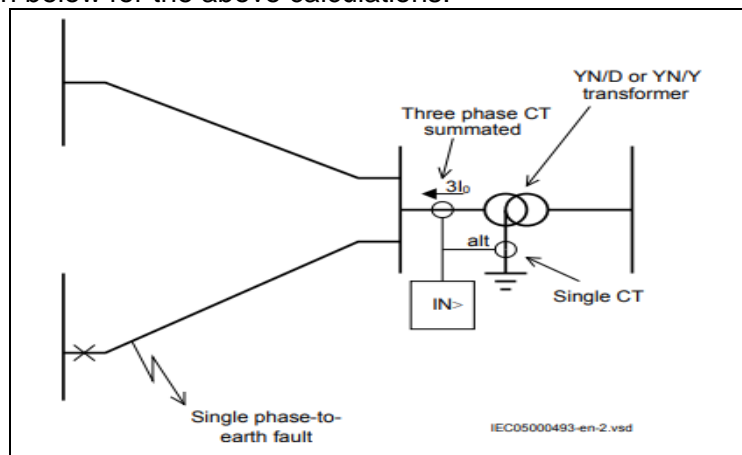
The primary requirement for the stage 1 setting should be to detect earth faults at the local bus bar, where the transformer winding is connected. Therefore, a fault calculation should be made as per figure 1. This calculation provides the current fed to the protection i.e.  $3I_{0\text{fault1}}$ . To assure that step 1 calculation to have selectivity for other earth-fault protection in the network, a short delay may be selected. Normally, a delay in the range of 0.3 – 0.4 s is appropriate under such conditions.



**Figure 1: Step 1 fault calculation 1**

Further to ensure selectivity to delayed line faults clearance at the local bus (typically distance protection operation in zone 2 in 0.5 sec), the current setting must be set high enough so that these faults do not result in unwanted step 1 trip of transformer on earth fault stage 1 setting.

Therefore, a fault calculation as shown in figure 2 is also required to be done. If the fault is located at the borderline between the instantaneous and delayed operation of the line protection (such as Distance protection or line residual overcurrent protection), the above calculation gives the current fed to the protection i.e.  $3I_{0\text{fault2}}$  the setting of step 1 can be chosen within the interval shown relation given below for the above calculations.



**Figure 2: Step 1 fault calculation 1**

$$3I_{0\text{fault2}} \cdot \text{lowmar} < I_{\text{step1}} < 3I_{0\text{fault1}} \cdot \text{highmar}$$

Where **lowmar** is a margin to assure selectivity (typical 1.2) and **highmar** is a margin to assure fast fault clearance of busbar fault (typical 1.2)



## **B. Earth fault overcurrent Stage 2 setting:**

The setting of the sensitive step-2 is dependent on the chosen time delay therefore often a relatively long definite time delay or inverse time delay is selected. For this, a very low current setting (Minimum setting possible) can be selected as it is required to detect earth faults in the transformer winding, close to the neutral point. However, zero-sequence currents that can occur during normal operation of the power system are also required to be considered while selecting this current value for pickup.

**Members may discuss.**

### **B.15.3: Zone-2 and Zone-3 setting when the remote end substation is having non-homogenous conductor type:**

For zone-2 and zone-3 settings, there is a need for reviewing the adjacent shortest and longest line details for the remote end protection coordination activities as discussed in the previous PCC forum and adopted procedure.

However, if the remote end substation is having non-homogenous conductor types for some lines and if only the line length is considered then the complete coverage of all the transmission lines for zone 2 as well as zone 3 coordination activities may be missed. So, it may be advised that instead of the physical length of the conductor, the impedance value of the lines to be considered at substations where the connected feeders have multiple conductor types.

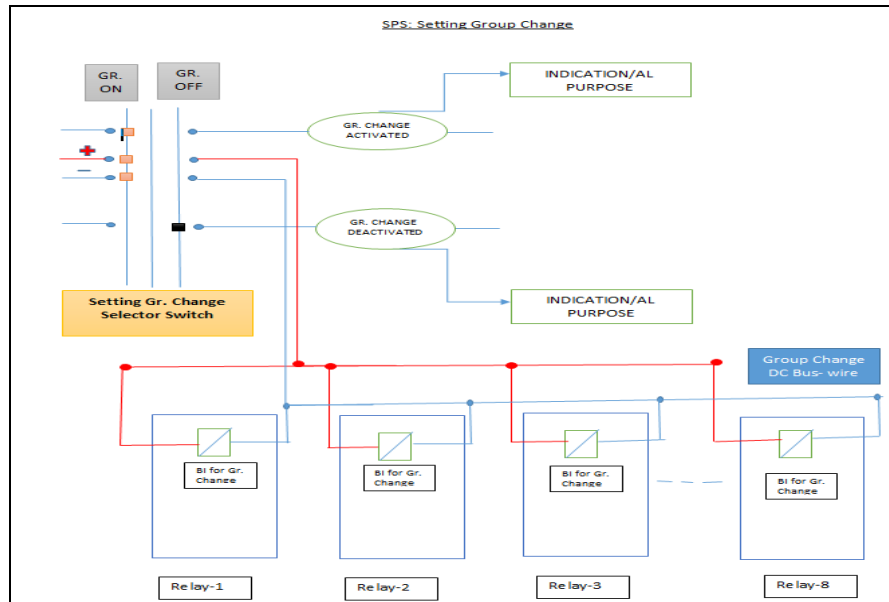
**Members may discuss.**

### **B.15.4: Keeping two sets of protection setting at Substation where bus splitting arrangement is there and at all substations connected to that substation.**

In the 93<sup>rd</sup> PCC meeting, during discussions on operationalizing split bus arrangement at Biharshariff and for any double bus shutdown from one and a half breaker scheme substation, it was proposed to keep two sets of protection settings in all connected substation given the change of longest/shortest line length as per the outage situation and operational philosophy.

In this regards, expert opinions were collected from eastern regional constituents and their response is provided below:

- **Odisha:** There is nothing wrong in adopting multiple setting groups in protection IEDs. But this should be handled by expert personnel and group setting should be checked frequently. This reduces a lot of time of relay setting for network change. Only Siemens relay requires Laptop to change the group setting while in almost other relays it is possible by manual group setting in very little time. If CMOS battery of the IED fails, the group setting may revert back to default setting in case of DC fail. In OPTCL, we are using at some places and very careful monitoring is needed while handling the IEDs by expert person only. Risk is high for higher voltage level.
- **CESC:** There is nothing wrong in adopting multiple setting groups in Numerical Relays. But it is better to avoid manual group setting change using HMI or Laptop. My suggestion is that it is better to use digital I/P for this purpose. Some schematic is attached herewith for your reference.



**Members may discuss.**

**B.15.5: Double-ended fault calculation using IEEE C37.114 guideline for lines with multiple owners**

In today's complex power system with multiple asset owners, it is extremely important to determine fault location with high accuracy to avoid any difference in opinion among utilities at the remote ends of the line. In view of this, it is proposed that for lines where multiple owners are involved in those cases "double-ended fault location" may be adopted. IEEE standard "IEEE Std C37.114™-2014" in this regard may be referred for better understanding and adopting the best international practice.

Recently such calculation has been done for 400 kV Motihari-Barh 2 circuit and results were found to be quite useful to avoid any difference in views of remote end utilities.

**Members may discuss.**

**ITEM NO. B.16: Submission of TFR of HVDC/STATCOM/TCSC for any AC system fault in the elements of the AC substation where HVDC/STATCOM/TCSC is connected--ERLDC**

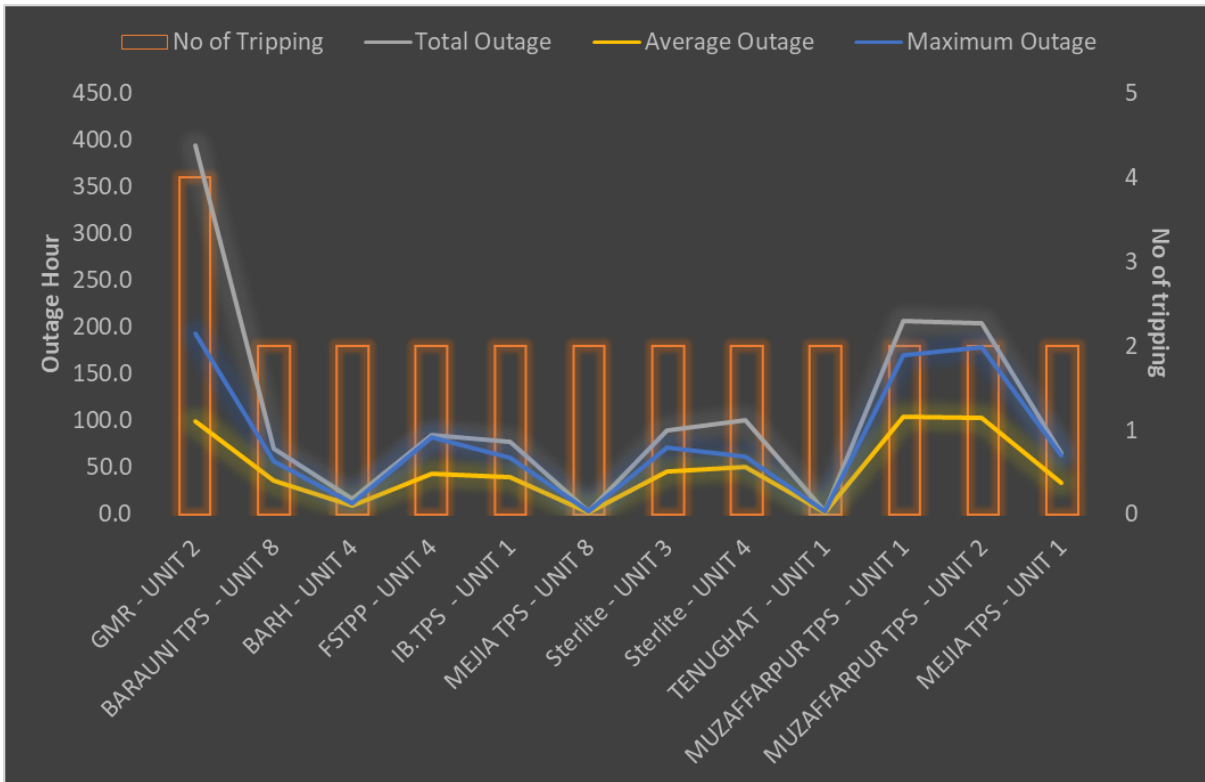
Complete analysis of any AC system fault in the vicinity of FACTS devices requires analysis of the response of the FACTS devices. So, all the utility may submit the TFR of HVDC/STATCOM/TCSC for any AC fault in the elements connected to the substation where the FACTS are installed.

In 72<sup>nd</sup> PCC it was decided that the triggering criteria of TFR need to be submitted by all the FACTS asset owners, however only Talcher HVDC has submitted the same. So, others may submit the same on an urgent basis. This may kindly be taken as a standard practice of sharing the dynamic response of such devices to ERLDC to analyze their performance and support provided to the system.

**Powergrid may update.**

**ITEM NO. B.17: Repeated tripping of generating units in February 2021**

During February 2021, repeated tripping have been observed for a few generating units. A list of such generating units along with the number of tripping and outage duration is shown in the below figure.



Reasons for tripping for units with multiple tripping events in February 2021 is given below:

Name of generating units	Reason for tripping	No of tripping	Utility to respond
GMR TPS Unit 2	Generator Seal oil problem, Primary air fan blade problem	4	GKEL

**GKEL may explain.**

## **PART- C:: OTHER ITEMS**

### **ITEM NO. C.1: Collection of substation data by PRDC**

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

<b>Sl No</b>	<b>SS Name</b>	<b>Data Collection</b>	<b>Owner</b>	<b>State</b>
1	Bagmundi		WBSETCL	West Bengal
2	Dinahata		WBSETCL	West Bengal
3	Goghat		WBSETCL	West Bengal
4	Saltlake Stadium		WBSETCL	West Bengal
5	Mathabhanga		WBSETCL	West Bengal
6	Kashipur		OPTCL	Odisha
7	Betanati		OPTCL	Odisha
8	Aska New		OPTCL	Odisha
9	Udala		OPTCL	Odisha
10	Narashinghpur		OPTCL	Odisha
11	IBTPS		OPGC	Odisha
12	Mancheswar		OPTCL	Odisha
13	North Karanpura		NTPC	Jharkhand
14	TingTing		....	Sikkim
15	Lethang		....	Sikkim
16	Rongichu		.....	Sikkim

*In 99<sup>th</sup> PCC Meeting, it was informed that PRDC personnel would visit physically to new substations mentioned in the list in order to collect substation/relay data for protection database.*

*PCC advised all concerned utilities to facilitate the visit by PRDC personnel for collection of substation/relay data.*

**Members may update.**

### **ITEM NO. C.2: Submission of protection settings in PDMS**

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

Relay settings had been received from CESC, Haldia Energy Limited and for few Substations from Powergrid ER-1. OPTCL, WBSETCL, JUSNL, BSPTCL, WBPDC, Powergrid ER-II, NTPC and other constituents are required to submit relay settings at earliest.

Concerned utilities are advised to upload the relay settings in PDMS or send the relay settings to [ercprotection@gmail.com](mailto:ercprotection@gmail.com).

In 99<sup>th</sup> PCC, PCC advised all concerned utilities to upload the pending relay settings in PDMS or send the relay settings to [ercprotection@gmail.com](mailto:ercprotection@gmail.com).

**Members may update.**

**ITEM NO. C.3: Protection coordination of the new transmission elements to be charged in Eastern Region**

**ITEM NO. C.3.1: LILO of 220 kV Gaya Sonenagar D/C at Chandauti S/S and Charging of 132 kV voltage level at Chandauti**

As per information received at ERLDC, 220 kV Gaya Sonenagar D/C will be LILOed at Chandauti S/S.

Name	Conductor type	Length
220 kV Gaya Chandauti D/C	Single ACSR Zebra	18 km
220 kV Sonenagar Chandauti D/C	Single ACSR Zebra	76 km

Protection coordination may be required as per the following table.

Reason	S/S may be affected	Remarks	Utility to respond	Response received
LILO of 220 kV Gaya Sonenagar D/C at Chandauti S/S	Chandauti	Protection coordination to be done for all newly connected elements as per ERPC's guidelines	PMTL/ POWERGRID	Protection coordination has been done as per ERPC's guideline
	Gaya	Protection setting may be revised for 220 kV Gaya – Chandauti D/C (Earlier it was 220 kV Gaya Sonenagar D/C). Longest line connected to Gaya S/S (Earlier it was 220 kV Gaya Sonenagar D/C as per details available at ERLDC) may get changed.	POWERGRID ER - 1	<b>Yet to be received</b>
	Sonenagar	Protection setting may be revised for 220 kV Sonenagar – Chandauti D/C (Earlier it was 220 kV Gaya Sonenagar D/C).	BSPTCL	<b>Yet to be received</b>
	<b>S/S connected to Gaya:</b> Bodgaya, Dehri, Khijesarai	Longest line connected to Gaya S/S (Earlier it was 220 kV Gaya Sonenagar D/C as per details available at ERLDC) may get changed.	BSPTCL	<b>Yet to be received</b>

**Following Details to be shared:**

- POWERGRID ERTS – 1 & BSPTCL may share whether revision of any existing protection setting at above mentioned S/S is required or not. In case of any revision, the revised setting may be shared with ERPC and ERLDC.
- The protection setting at Chandauti may be shared with ERPC and ERLDC.
- Status of carrier protection and PLCC channel in 220 kV Gaya, Chandauti and Sonenagar section may be shared.

Along with above mentioned elements, 132 kV bus and 200 MVA 220/132 kV ICT 1 & 3 at Chandauti will be charged.

PMTL is requested to share protection relay setting of ICT and bus bar protection (In case bus bar protection is not available same may be mentioned).

**Powergrid & BSPTCL may update.**

**ITEM NO. C.3.2: Charging of 220/132 100 MVA ICT - 4 at Rangpo Sub-station**

As per the scheme agreed in ER Standing Committee, 220/132 100 MVA ICT - 4 is to be charged at Rangpo S/S. Protection coordination may be required as per the following table.

Reason	S/S may be affected	Remarks	Utility to respond	Response received
Charging of 220/132 100 MVA ICT - 4 at Rangpo Sub-station	Rangpo	Protection coordination to be done for all newly connected elements as per ERPC's guidelines	POWERGRID ER-2	Protection coordination would be done as per ERPC's guideline
	<b>S/S connected to Rangpo:</b> New Melli & Tashiding (at 220 kV level) Gangtok & Chujachen (at 132 kV level)	Protection coordination to be checked for change in impedance due to charging of new ICT	POWERGRID ER – 2, Tashiding HEP and Chujachen HEP	<b>Yet to be received</b>

**Following may be shared:**

- Concerned utilities may share whether revision of any existing protection setting is required or not. In case of any revision, the revised setting may be shared with ERPC and ERLDC.
- POWERGRID ER-2 may share the protection setting at Rangpo for newly charged ICT.

This agenda was placed in 99<sup>th</sup> PCC meeting however, the response from POWERGRID ER-2, Tashiding and Chujachen HEP is yet to be received.

**Powergrid, Tashiding HEP & Chuzachen HEP may update.**

**ITEM NO. C.3.3: Charging of 220 kV Rangpo – Ronginchu D/C**

As per information received at ERLDC, 220 kV bus extension at Rangpo named as bus section 1A & 1B along with bus sectionalizer breaker will be charged along 220 kV Rangpo – Ronginchu D/C.

**Details of transmission lines to be charged are as follows:**

Name	Conductor type	Length
220 kV Rangpo – Ronginchu D/C	Single ACSR Zebra	7.26 km

Protection coordination may be required before charging at both ends as per following table.

Reason	S/S may be affected	Remarks	Utility to respond	Response received
Charging of 220 kV Rangpo – Ronginchu D/C and bus extension	Rangpo	Newly charged bus extension is covered under bus bar protection	POWERGRID ER- 2/ MBPCL	Yet to be received
	<b>S/S connected to Rangpo:</b> New Melli & Tashiding	Shortest line connected to Rangpo S/S may be checked and protection coordination may be done for feeders connected to Rangpo S/S in case of change in shortest line connected to Rangpo S/S.	POWERGRID ER- 2, Tashiding HEP	

**Following may be shared:**

- Protective relay setting (both main 1 and main 2) at Rangpo and Ronginchu end for 220 kV Rangpo Ronginchu D/C
- Protective relay setting (both main 1 and main 2) for 220 kV bus at Ronginchu end
- Confirmation of that 220 kV Ronginchu feeders are included in 220 kV bus bar protection at Rangpo
- In case of change in any existing protection relay setting at New Melli and Tashiding, same may be shared with ERPC and ERLDC for update in protection database.

**Till the synchronizing of generating units at Ronginchu, week infeed protection (echo and trip) may be enabled at Ronginchu end.**

**Members may discuss.**

**ITEM NO. C.3.4: LILO of 220 kV Waria TPS-Parulia (DVC) D/C at Durgapur STPS**

As per information received at ERLDC, 220 kV Waria TPS - Parulia (DVC) D/C will be LILoed at 400/220 kV Durgapur STPS. Details of the modified line after LILo are as follows:

Name	Conductor type	Length
220 kV Waria TPS- Durgapur STPS D/C	Single AAAC Zebra	11.14 km
220 kV Parulia (DVC)- Durgapur STPS D/C	Single AAAC Zebra	17.34 km

Protection coordination may be required as per the following table.

Reason	S/S may be affected	Remarks	Utility to respond	Response received
LILo of 220 kV Waria TPS - Parulia (DVC) D/C at Durgapur STPS	Durgapur STPS	Protection coordination to be done for all newly connected elements as per ERPC's guidelines	DVC	Protection coordination has been done as per ERPC's guideline
	Waria TPS	Protection setting may be revised for 220 kV Waria TPS - Durgapur STPS D/C (Earlier it was 220 kV Waria TPS - Parulia (DVC) D/C).	DVC	<b>Yet to be received</b>
	Parulia (DVC)	Protection setting may be revised for 220 kV Parulia (DVC)- Durgapur STPS D/C (Earlier it was 220 kV Waria TPS - Parulia (DVC) D/C).	DVC	<b>Yet to be received</b>
	<b>S/S connected to Parulia (DVC):</b> Tamlā, Muchipara, Parulia (PG)	Longest/shortest line connected to Parulia(DVC) (Earlier longest line connected to Parulia (DVC) was 220 kV Waria - Parulia D/C as per ERLDC database) S/S may get changed.	DVC, POWERGRID ER-2	<b>Yet to be received</b>
	<b>S/S connected to Waria TPS:</b> Mejia, Bidhannagar	Longest/shortest line connected to Waria TPS S/S may get changed.	DVC, WBSETCL	<b>Yet to be received</b>

**Following Details to be shared:**

- Status of carrier protection and PLCC channel of 220 kV Waria TPS – Durgapur STPS and 220 kV Parulia (DVC)-Durgapur STPS section may be shared.
- In case of revision of existing protection setting at S/S connected to Parulia (DVC) and Waria TPS, revised protective relay setting may be shared.

- Protective relay setting of all newly charged (or to be charged) elements may be shared as per the following table.

<b>Element Name</b>	<b>S/S Name</b>	<b>Utility to respond</b>	<b>Received for S/S</b>
220 kV Waria TPS Durgapur STPS D/C	Waria and Durgapur STPS	DVC	
220 kV Parulia (DVC) Durgapur STPS D/C	Parulia (DVC) and Durgapur STPS	DVC	
Bus bar protection of 220 kV bus 1 & 2	Durgapur STPS	DVC	
400/220 kV ICT at Durgapur STPS	Durgapur STPS	DVC	

**DVC may update.**

**ITEM NO. C.3.5: Charging of 23.5/765 kV GT-2 at 765 kV Daripalli S/s.**

As per information received at ERLDC, 23.5/765 kV GT – 2 will be charged at Daripalli generating stations.

- POWERGRID Odisha may check whether any change in protection relay setting is required at Jharsuguda due to reduction in impedance for charging of GT – 2.
- NTPC may share protection relay setting of GT – 2 at Daripalli for update in ERPC protection database.

**NTPC & Powergrid may update.**

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