



Agenda of 98th PCC Meeting

Date: 13.01.2021
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA OF 98TH PROTECTION SUB-COMMITTEE MEETING TO BE HELD ON 13.01.2021 AT 10:30 HOURS

PART – A

ITEM NO. A.1: Confirmation of minutes of 97th Protection sub-Committee Meeting held on 14th December 2020 through MS Teams.

The minutes of 97th Protection Sub-Committee meeting held on 14.12.2020 circulated vide letter dated 04.01.2021.

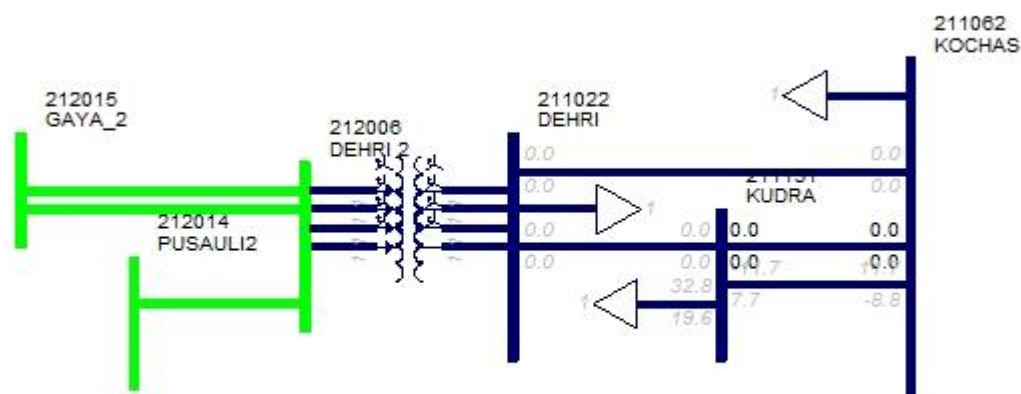
Members may confirm the minutes of 97th PCC meeting.

PART – B

ITEM NO. B.1: 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.

BSPTCL informed that the fault was in 132 kV Dehri-Kochas line.



Load Loss: 184 MW

BSPTCL and Powergrid may explain.

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

ITEM NO. B.2.1: Multiple cases of 315 MVA ICT 2 and 3 trippings at 400/220 kV Bihar Sharif during any close-in fault on 400 kV Transmission lines from Bihar Sharif

On multiple occasions in the last year, 400/220 kV 315 MVA ICTs 2 and 3 of Bihar Sharif got tripped during all the close-in fault on 400 kV Transmission lines from Bihar Sharif. The issue was discussed in the 94th and 95th PCC and BSPTCL was advised to review the ICT backup overcurrent protection relay settings in coordination with Powergrid.

However the issue is still not rectified as observed from the recent event on 01-01-2021 where the ICTs tripped during a fault on 400 kV-Bihar Sharif- Mujaffarpur 2 circuit (LA failure at Bihar Sharif end). The detailed list of past tripping is provided below :

Sr No	Element Name	Tripping Date	Tripping Time	Reason 1	Reason 2	ICT Tripping on External fault
1	400KV-BIHARSARIFF(PG)-MUZAFFARPUR(PG)-2	01-01-2021	17:31	B'SARIFF: R-N,FD 0.02KM,FC 29KA	MZP: R-N,FD 132KM,FC 3.9KA	ICT Tripped due to fault in 400 BSF-MZF-2 although fault cleared within 100 ms still lct tripped .
2	400KV/220KV 315 MVA ICT 2 AT BIHARSARIFF	01-01-2021	17:31	TRIPPED DUE TO DIRECTIONAL O/C		
3	400KV/220KV 315 MVA ICT 3 AT BIHARSARIFF	01-01-2021	17:31	TRIPPED DUE TO DIRECTIONAL O/C.TRIPPED FROM BSEB END ONLY		
4	400KV-BIHARSARIFF(PG)-MUZAFFARPUR(PG)-1	23-09-2020	19:16	BSF: B-N,28.1KA,1.1Km	MFR: B-N,3.9KA, 132Km	ICT Tripped due to fault in 400 BSF-MZF-I although fault cleared within 100 ms still lct tripped .
5	400KV/220KV 315 MVA ICT 2 AT BIHARSARIFF	23-09-2020	19:16	Backup O/C trip		
6	400KV/220KV 315 MVA ICT 3 AT BIHARSARIFF	23-09-2020	18:19	Backup O/C trip		ICT Tripped due to fault in 400 Kv BSF-varanasi-2 although fault cleared within 100 ms still lcttripped .
7	400KV/220KV 315 MVA ICT 2 AT BIHARSARIFF	23-09-2020	18:19	Backup O/C trip		
8	400KV-BIHARSARIFF(PG)-VARANASI-2	23-09-2020	18:19	B_N, 2.8 KM, 27.6 kA		
9	400KV/220KV 315 MVA ICT 3 AT BIHARSARIFF	14-08-2020	20:23	NO TRIP AT PG SIDE	MASTER TRIP RELAY AT BSEB	ICT Tripped due to fault in 220 Kv BSF-Tenughat although fault cleared within 100 ms still

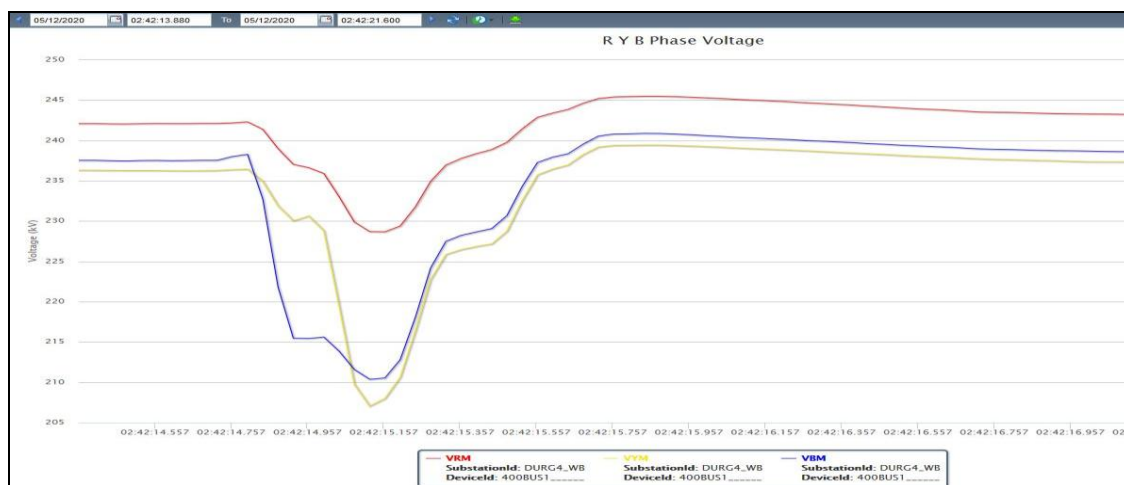
Sr No	Element Name	Tripping Date	Tripping Time	Reason 1	Reason 2	ICT Tripping on External fault
10	400KV/220KV 315 MVA ICT 2 AT BIHARSARIFF	14-08-2020	20:23	inter trip received at HV pg side	MASTER TRIP RELAY AT BSEB	Icttripped .
11	220KV-TENUGHAT-BIHARSARIFF-1	14-08-2020	20:23	Y-N Fault, Zone 2, location - 184.8 KM from TTSP, Ir- 782 A, ly- 1.342 KA, lb- 382 A, Fault Resistance -15.8 ohm	Y-N,o/c e/f 27.15 kA in iY at biharshariff	
12	400KV/220KV 315 MVA ICT 2 AT BIHARSARIFF	19-07-2020	05:47	MASTER TRIP RELAY 86 (INTER TRIP) OPERATED		--
13	220KV/132KV 150 MVA ICT 2 AT BIHARSARIFF	19-07-2020	05:50	master trip relay 86(inter tripping)		
14	400KV/220KV 315 MVA ICT 3 AT BIHARSARIFF	05-06-2020	20:14	Back Up O/C. From BSPTCL end		ICT Tripped due to fault in 400 Kv BSF-varanasi-2 although fault cleared within 100 ms still Icttripped .
15	400KV/220KV 315 MVA ICT 2 AT BIHARSARIFF	05-06-2020	20:14	Back Up O/C		
16	400KV-BIHARSARIFF(PG)-VARANASI-2	05-06-2020	20:14	B_N Fault, 3.64 KM, 23.21 kA (Biharsharif)		
17	400KV/220KV 315 MVA ICT 1 AT BIHARSARIFF	26-06-2020	14:26	Due to intertrip received from BSPTCL end		--
18	400KV/220KV 315 MVA ICT 1 AT BIHARSARIFF	28-06-2020	09:07	DT received at PG end		--

BSPTCL and Powergrid may explain.

ITEM NO.B.2.2: Grid event at 400/220/132 kV Gokarna S/S on 05 – 12 – 2020 at 02:42 hrs

On 05-12-2020 at 02:42 hrs, B phase PT of 220 kV Main Bus-1 at Gokarna got burst resulting in 220 kV Bus 1 fault at Gokarna. As there was no Bus-Bar Protection at 220 kV bus at Gokarna, the fault was cleared by tripping of 220 kV feeders, 315 MVA 400/220 kV ICT, 160 MVA 220/132 kV ICTs & 220KV Bus-Coupler on backup protection/remote end protection as mentioned in below table.

Serial No	Name of Bay	Connected to Bus	Relay indication at Gokarna end	Relay indication at Remote end
1	220KV Sadaipur#1	Bus-1	Y-B-N, Z4	No Trip
2	220KV Sadaipur#2	Bus-2	Y-B-N, Z4	No Trip
3	220KV Rejinagar#1	Bus-1		Tripped with Z2
4	220KV Rejinagar#2	Bus-2	B-N, Z4	
5	220KV Sagardighi#1	Bus-1		Tripped with Z2
6	220KV Sagardighi#2	Bus-2	Y-B-N, Z4	
7	315 MVA 400/220 kV ICT - 1	Bus-1	B/U O/C&E/F(HV)	
8	160 MVA 220/132 kV ICT - 1	Bus-1	B/U O/C&E/F(HV)	
9	160 MVA 220/132 kV ICT - 2	Bus-2	B/U O/C&E/F(LV)	
10	160 MVA 220/132 kV ICT - 3	Bus-1	B/U O/C&E/F(LV)	
11	220KV B/C		O/C&E/F	



As per Durapur PMU, fault was in R, Y and B phase at 02:42 hrs. Around 30 kV dip has been observed in Y and B phase voltage while 12 kV dip in R phase is recorded in the PMU. The fault clearing time was around 800 ms.

Report received from WBSETCL is attached in the **Annexure B2.1**.

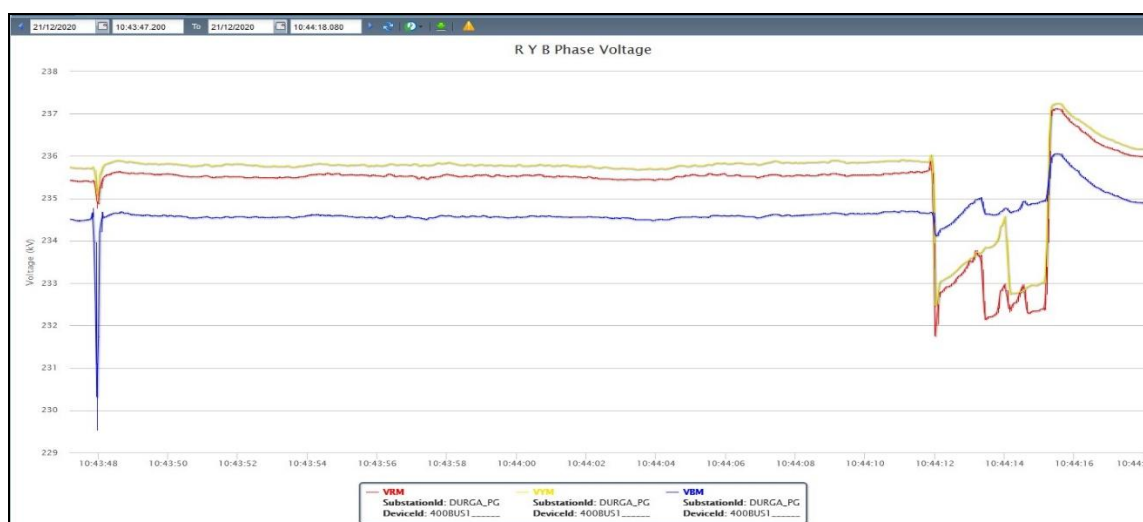
WBSETCL may explain.

ITEM NO. B.2.2 : Grid event at 220/132 kV Waria TPS on 21 – 12 – 2020 at 10:45 hrs

Before the event, 132 kV Waria TPS-Burdwan S/C was diverted through Bus Coupler and 132 kV Waria TPS-Jamuria S/C was under shutdown for CT replacement at Jamuria end.

On 21-12-2020 at 10:45 hrs, there was a fault at 132 kV Waria TPS-Kaliphari S/C due to snapping of R-phase jumpers at few locations. Subsequently total power failure occurred at 132 kV voltage level at Waria TPS as the 86 lockout relay failed to trip the circuit breaker at Waria end.

As per PMU at Durgapur, there was a fault in R, Y and B phases at 10:44 hrs. Around 5 kV dip has been observed in Y and R phase and around 0.5 kV dip has been observed in the B phase at the same time. The fault clearing time was around 3200 ms.



The report received from DVC SLDC is attached in **Annexure B2.2**.

DVC may explain.

ITEM NO. B.3: Islanding schemes of Eastern Region

1) MTPS, Kanti Islanding Scheme:

The islanding scheme was discussed in 68th 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.

PCC advised Bihar to check the availability of UFRs at 132kV lines and also to check the

availability of PLCC system in 220kV Kanti TPS-Gopalganj D/C lines & 132kV lines connected at Gopalganj and submit the details to ERPC and ERLDC immediately.

KBUNL and BSPTCL 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 97th PCC following deliberations were made

SLDC Odisha informed that report related to latest status of IB-TPS Islanding scheme would be provided within a week to ERPC and ERLDC.

OPGC and OPTCL may update.

3) 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 B3.3**

In 97th PCC following deliberations were made:

DVC informed that concerned representative could not attend the meeting due to Covid-19.

PCC advised to discuss the Chandrapura islanding scheme in a separate meeting between DVC, ERPC and ERLDC.

Members may discuss.

ITEM NO. B.4: Total Power Failure at 220 / 132 kV Hatia Substation on 13.11.2020 at 14:36 hrs

On 13th November 2020 at 14:36 hrs, B phase CT at Hatia end of 220 kV Ranchi Hatia – 3 was busted causing bus fault at 220 kV Hatia bus of 220/132 kV Hatia Substation. The following elements got tripped:

- 220 kV Ranchi Hatia – 1 and 2 tripped from Ranchi end
- 220 kV Patraru – Hatia D/C tripped from Patraru end
- 220/132 kV 150 MVA ICT – 3 Hatia also tripped

Thereafter, 220/132 kV ICT – 1 & 2 and 220 kV Ranchi – Hatia – 1 & 2 were hand tripped from Hatia end. As a result total power failure occurred at 220/132 kV Hatia S/S.

In 97th PCC Meeting, PCC observed that the fault in 220kV bus at Hatia was not cleared from 220/132kV ICT 2 and ICT 3, as a result the 132kV lines got tripped.

PCC advised JUSNL to take the following corrective measures:

- a) *The busbar protection of 220kV Hatia should be put in service at the earliest after necessary rectification work.*
- b) *zone 4 time settings must be reduced to 250-300 ms till the bus bar protection is not operational.*
- c) *Primary and backup protection system of 220/132kV ICT 1, 2 and 3 is to be tested and settings needed to be reviewed for proper coordination with transmission line protection. Tripping of circuit breaker should be checked by giving a trip command from the relay.*
- d) *Check the configuration of PLCC signals of 220 kV Hatia – Ranchi circuit 2 and 3 at Hatia end as Powergrid received carrier signal for both circuit 2 and circuit 3 from Hatia end.*
- e) *Verify reason of tripping of 132 kV PTPS – Hatia circuit from Patraru end in zone 1 as it should not detect the fault in zone 1 .*
- f) *Detail of all CTs installed at Hatia along with testing report to be submitted to ERPC and ERLDC.*

JUSNL may update.

ITEM NO. B.5: Tripping of 400 kV Bus bar – 2 at 400/220 kV Jeerat S/S on 12 – 11– 2020 at 12:10 hrs.

400 kV bus bar – 2 at 400/220 kV Jeerat S/S tripped on 12 – 11– 2020 at 12:10 hrs due to Y phase to earth fault resulting in tripping of following elements:

- 400 kV Rajarhat – Jeerat S/C
- 400 kV Jeerat – Bakreswar S/C
- 400/220 kV 315 MVA ICT – 2 & 4 at Jeerat

Around 130 kV dip has been observed at Y phase bus voltage at Jeerat.

In 97th PCC following deliberations were made

WBSETCL informed that 400 kV bus bar – 2 at 400/220 kV Jeerat S/S was tripped due to Y phase to earth fault. Bus bar protection operated and tripped of all connected elements with Bus 2. WBSETCL added that no physical fault was found within the substation and it might be a transient fault.

ERLDC enquired about any load trimming scheme implemented at Jeerat.

PCC advised WBSETCL to share the load trimming scheme to ERPC and ERLDC.

WBSETCL may update.

ITEM NO. B.6: 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 01st 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 97th PCC following deliberations were made

OPTCL updated the following:

- Bus Bar Protection at 220kV level of Meramundali S/s was not in service due to problem in BCU. Defective BCU has been sent to OEM Siemens.*
- Zone 4 time settings of all 220 kV elements have been reduced and the same would be continued till restoration of the Busbar protection at 220 kV Meramundali.*
- It was informed that overcurrent E/F protection at TTPS end of 220 kV Meramundali-TTPS D/C line has pick up the fault.*
- 220 kV Meramundali-Tata Steel D/C line tripped from Tata Steel on backup O/C, E/F protection. Since the line is 3 km long so they are in process of implementing differential protection for this line. The islanding scheme of Tata Steel was successfully operated and survived.*

After detailed deliberation PCC advised the following:

- 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.*
- OPTCL and TTPS to analyze the reason for non-operation of distance protection at TTPS end of 220 kV Meramundali – TTPS D/C line.*

OPTCL may update.

ITEM NO. B.7: Backup Overcurrent Relay coordination of Sikkim Complex

In 97th 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.

Members may discuss

ITEM NO. B.8: Resistive reach setting guidelines and model calculation for distance protection--ERLDC

1. Proposed Criteria for Phase-earth fault:

- a. Calculation of minimum load impedance should be as per Ramkrishna Committee Recommendation:
 - Maximum load current (I_{max}) may be considered as 1.5 times the thermal rating of the line or 1.5 times the associated bay equipment current rating (the minimum of the bay equipment individual rating) whichever is lower.
 - Minimum voltage (V_{min}) to be considered as 0.85pu (85%).
- b. Minimum setting for resistive reach should be such that it must cover fault resistance, arc resistance and the tower footing resistance.
- c. Generally Maximum reach setting should be 80% of the minimum load impedance.
- d. Resistive reach setting < 4.5 times the zone reactive reach setting.

Resistive reach should be the maximum of the value determined by the above three rules.

2. Proposed Criteria for Phase-Phase fault:

- a. Calculation of minimum load impedance as per the same method mentioned above.
- b. Minimum setting for resistive reach should be such that it must cover fault resistance and arc resistance.
- c. Generally, the resistive reach of zone-3 is set less than 80% of minimum load impedance. For power swing consideration, a margin of DR is given. Therefore, it is essential that load should not encroach this DR. In view of this, R3ph – R4ph is set 60% of minimum load impedance. R2ph and R1ph are set 80% of R3ph-R4ph respectively.
- d. Resistive reach setting < 3 times the zone reactive reach setting.

Resistive reach should be the maximum of the value determined by the above three rules.

Another important point is consideration of remote end in feed for zone-2 and 3 reach calculations.

In 96th PCC, Powergrid informed that the specifications in point d) may change with the OEM therefore this condition may not be applicable for all manufacturers.

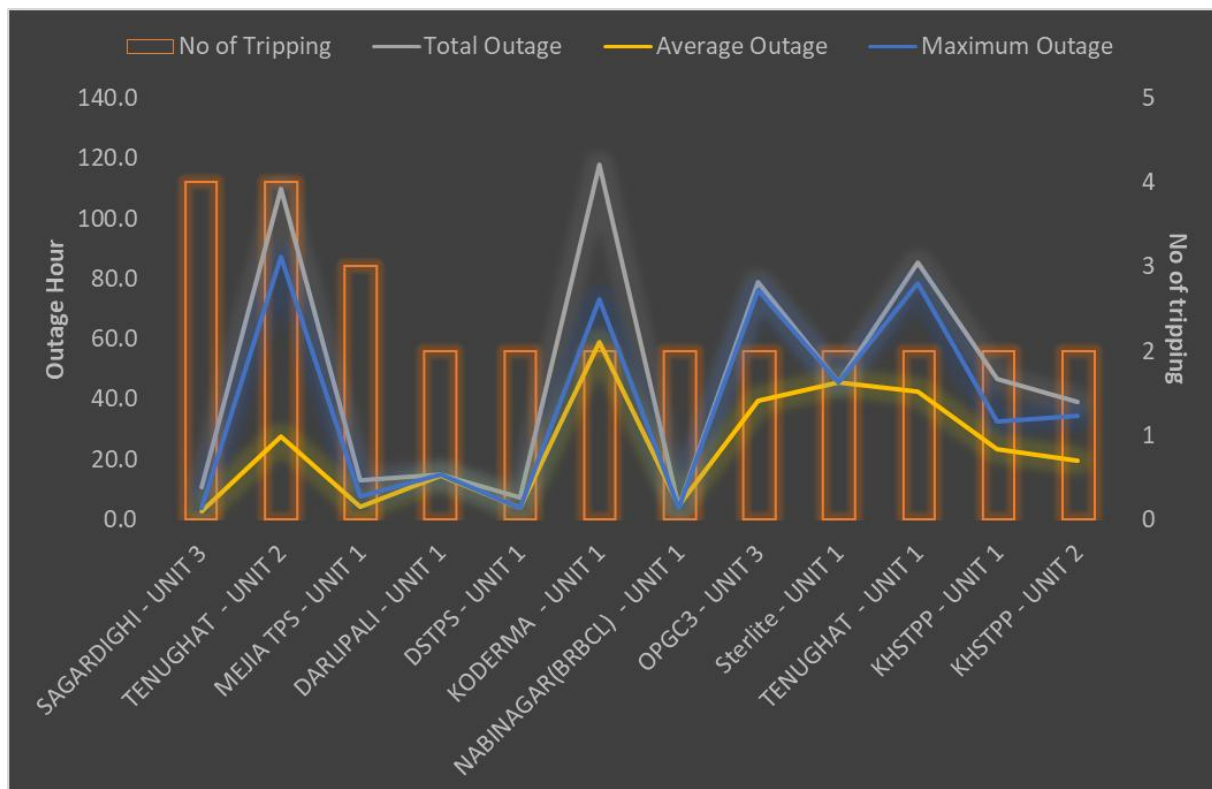
DVC informed that consideration of thermal loading value (75° or 85°) for the settings to be discussed and finalized.

In 97th PCC meeting, PCC advised all the constituents to go through the guidelines and submit their comments to ERPC and ERLDC.

Members may discuss.

ITEM NO. B.9: Repeated tripping of generating units in December 2020

During December 2020, repeated tripping has 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 Dec 2020 is given below

Name of generating units	Reason for tripping	No of tripping	Utility to respond
Sagardighi TPS Unit 3	DC Earth Fault, Flame failure, Drum level low, High turbine shaft vibration	4	WBPDC, WBSLDC
Tenughat TPS unit 2	Boiler leakage problem; turbine problem	4	Jharkhand SLDC, TTPS
Mejia TPS unit 1	Low furnace pressure, Electrical reserve board failure	3	DVC SLDC

WBPDC, Tenughat , Jharkhand SLDC & DVC 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:

New Substation List

Sl No	SS Name	Data Collection	Owner	State
1	Saltlake Stadium		WBSETCL	West Bengal
2	Kashipur		OPTCL	Odisha
3	Betanati		OPTCL	Odisha
4	Aska New		OPTCL	Odisha
5	Udala		OPTCL	Odisha
6	Narshinghpur		OPTCL	Odisha
7	Mancheswar		OPTCL	Odisha
8	North Karanpura		NTPC	Jharkhand

9	Mangdhechu		MHPA	Sikkim
10	TingTing		Sikkim
11	Lethang		Sikkim
12	Rongichu		Sikkim

In view of COVID-19 pandemic the data is being collected through online. All the constituents may note and submit the relevant data to PRDC for maintaining the database.

In 93rd PCC, all the concerned utilities were advised to submit the relevant data to PRDC for maintaining the database.

In 97th PCC , PCC advised all concerned utilities to submit the relevant data to PRDC for maintaining the database.

Members may note and comply.

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, WBPDCCL ,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 erpcprotection@gmail.com.

In 97th PCC , PCC advised all concerned utilities to upload the pending relay settings in PDMS or send the relay settings to erpcprotection@gmail.com.

Members may note and comply.

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

1. Charging of 400 kV New Purnea Farakka S/C and 400 kV New Purnea Gokarna S/C

To avoid tower collapse situation because of encroachment of Ganga river, some portion of 400 kV New Purnea Farakka S/C and 400 kV New Purnea Gokarna S/C were charged as 400 kV Farakka Gokarna S/C since 08th September 2020. Subsequently, the tower near the river collapsed however the above arrangement survived due to the action taken. To restore the original circuit through the ERS tower arrangement, 400 kV Farakka Gokarna S/C was switched off and 400 kV New Purnea Farakka S/C and 400 kV New Purnea-Gokarna S/C were restored on 27th December 2020 and 26th December 2020.

As per information available at ERLDC, protection coordination may be required as per the following table.

Reason	S/S may be affected	Remarks	Utility to respond	Response received
Restorati	New	Protection coordination to	POWERGRI	Protection

on of 400 kV New Purnea Farakka S/C and 400 kV New Purnea Gokarna S/C	Purnea	be done for all newly connected elements as per ERPC's guidelines. Some portion was antitheft charged from New Purnea end. Protection setting may be modified for that portion	D ER- 1	setting has been revised. Revised setting is shared with ERPC.
	Farakka	Protection coordination to be done for all newly connected elements as per ERPC's guidelines. Protection setting may be revised from the setting configured for 400 kV Farakka Gokarna S/C	NTPC Farakka	Protection setting has been revised. Revised setting is shared with ERPC.
	Gokarna	Protection coordination to be done for all newly connected elements as per ERPC's guidelines. Protection setting may be revised from the setting configured for 400 kV Farakka Gokarna S/C	WBSETCL	Protection setting has been revised.
	S/S connected to New Purnea: Biharsharif, Kishanganj, Muzaffarpur, Farakka, Malda, Binaguri	Longest line connected to New Purnea S/S may be changed to 400 kV New Purnea Gokarna. POWERGRID ER-1 may share whether any change in longest or shortest line connected to New Purnea S/S.	POWERGRID ER – 1 & 2, NTPC Farakka	Confirmation of protection coordination has been received from POWERGRID ER – 1 & 2 and NTPC Farakka.
	S/S connected to Farakka: Kahalgaon, Sagardighi, Parulia, Malda, Berhampur, Rajarhat	NTPC Farakka may share whether any change in longest or shortest line connected to Farakka S/S.	NTPC Kahalgaon, WBPDC, POWERGRID ERTS - 2	NTPC Farakka informed there is no change in longest and shortest line due to restoration of this circuit.
	S/S connected to Gokarna: Rajarhat Sagardighi	Longest and shortest line connected to Gokarna S/S may be changed to 400 kV New Purnea Gokarna S/C and 400 kV Gokarna Sagardighi S/C	POWERGRID ERTS – 2, WBPDC	Confirmation of protection coordination has been received from POWERGRID ER – 1 & 2.

WBPDC 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-II intimated that PLCC channel could not be established due to problem found in the co-axial cable and in the signal generator card at Farakka end. Further they have set the zone-2 time settings of the above line at 200 msec from both end with autoreclosure enabled mode to avoid relay racing.

Members may discuss.

2. First time charging of 765 kV Ranchi Medinipur D/C, 765 kV main bus 1 & 2 at Medinipur along with 2 x 330 MVar Bus reactor at Medinipur

As per information received at ERLDC following elements will be charged in near future:

- 765 kV Ranchi Medinipur D/C
 - **Line length 269.04 km; Conductor type: Hexa ACSR Zebra**
 - 3 x 80 MVar line reactor will be charged at Medinipur for each circuit
 - 3 x 80 MVar line reactor are already charged at Ranchi for each circuit
- 765 kV Main Bus 1 & 2 at Medinipur
 - Type of Conductor- QUAD AAC Bull
- 765 kV 3x 110 MVar Bus reactor 1 & 2 at Medinipur

As per information available at ERLDC, protection coordination may be required as per the following table.

Reason	S/S may be affected	Remarks	Utility to respond	Response received
Charging of 765 kV Ranchi Medinipur D/C	Medinipur (New)	Protection coordination to be done for all new connected elements as per ERPC's guidelines	POWERGRID/ PMJTL	Protection coordination has been done as per ERPC's guideline
	Ranchi	Protection relay setting is to be revised from idle charging setting. Protection setting may be configured as per ERPC's guidelines.	POWERGRID ER - 1	
	S/S connected to Ranchi: Dharamjai garh	Protection relay setting may be coordinated as per new charging line.	WRLDC/ POWERGRID	

Protection relay setting at Medinipur and Ranchi for all newly charged elements may be shared with ERLDC and ERPC for updating in ERPC protection database.

Powergrid may update.

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

Report of incidence on 05-12-2020 at Gokarna 220KV Sub-station.

1. **Date & Time of occurrence:** 05-12-2020, 02-42 hr.
2. **Name of Sub-Station:** Gokarna 220KV S/S.WBSETCL
3. **Location & nature of Fault:** 220 KV Main Bus-I, Blue phase PT bursts out.
Defective PT Particulars: Make-CGL ; Type-VEOT, Year- 1997; Sl.No.9880.

List of Lines & Units tripped during the event:

Serial No	Name of Bay	Connected to Bus	Relay indication at Gokarna end	Relay indication at Remote end
1	220KV Sadaipur#1	Bus-I	B-C-N, Z4	No Trip
2	220KV Sadaipur#2	Bus-II	B-C-N, Z4	No Trip
3	220KV Rejinagar#1	Bus-I		Tripped with Z2
4	220KV Rejinagar#2	Bus-II	C-N, Z4	
5	220KV Sagardighi#1	Bus-I		Tripped with Z2
6	220KV Sagardighi#2	Bus-II	B-C-N, Z4	
7	315 MVA TR#1 LV	Bus-I	B/U O/C&E/F(HV)	
8	160 MVA TR#1 HV	Bus-I	B/U O/C&E/F(HV)	
9	160 MVA TR#2 HV	Bus-II	B/U O/C&E/F(LV)	
10	160 MVA TR#3 HV	Bus-I	B/U O/C&E/F(LV)	
11	220KV B/C		O/C&E/F	

4. **Antecedent condition prior to the Event:** Incident report of Site attached herewith.
5. **List of elements (which have influence on the event) which were under outage prior to the event:** Nil
6. **Amount of load and generation loss in MW:** No Load Loss occurred.
7. **Amount of energy unserved in MU to consumer/customer:** Not Applicable.
8. **Catering load from alternate source (if done after the event):** Not Required.
9. **Root cause for tripping of lines (Source of fault if any; Malfunction of protection system if any):** 220KV Main Bus-I, Blue phase PT bursts out. As there is no Bus-Bar Protection at present in 220KV system, the fault was cleared by tripping of 220KV Lines, 315 MVA Transformers, 160 MVA transformers & 220KV Bus-Coupler as mentioned in above shown table.
Protection operation of 220KV lines connected to Bus-2 & 220KV Bus- Coupler are in order. Protection (Zone4) of 220KV Lines connected to Bus-1 didn't pick up at that instant due to failure of Blue phase PT and tripped from far end with Z2 time.
Though 220KV Sadaipur#1 was connected to Bus-1, but it is tripped with Z4, as the same has line CVT.
Protection operation of 315 MVA Transformer, 160 MVA Transformer connected to 220KV Bus-1 is in order except 160 MVA TR#1

160 MVA TR#1 tripped with HV O/C & E/F relay (Aegis) which may mal-operate in reverse direction due to failure of PT. DR couldn't be extracted due to communication problem.

Though 160 MVA Tr#2 was connected to Bus-2, it was tripped due to wrong o/c setting enabled in the differential relay apart from our standard setting.

10. Remedial action taken (if any):

- a) Blue phase PT replaced on the next day.
- b) HV O/C relay(Aegis) of 160 MVA TR#1 has been replaced by P141.
- c) Wrong O/C setting in differential relay of 160 MVA TR#2 has been corrected.
- d) For incorporation of 220 KV Bus Bar, M/S ABB has been engaged.

11. Restoration of elements: Incident report of site attached.

TPF at 132 KV Bus at DTPS at 10:45 HRS on 21-12-2020

At about 10:45 HRS of date 21-12-2020 TPF occurred at 132 kV DTPS, ASP, Jamuria substations.

Bus Arrangement at 132 KV Bus at DTPS prior to the incident: -

ATR #1 , ATR #2 , ATR#3 , L#100 (132 kV DTPS-Jamuria) , L#51(132 kV DTPS-ASP) , L#52(132 kV DTPS-ASP), L#76(132 kV DTPS-Burdwan), ST #1, RT#1, L#92 (DTPS-Shayam Steel) was in service.

L#75(132 kV DTPS-Burdwan) was diverted through Bus Coupler. L#99 (132 kV DTPS-Jamuria) was under shutdown for CT replacement at Jamuria end.

Relay details at DTPS End:-

1. 132 KV DTPS-Kaliphari (L#21):- L#21 (DTPS-Kaliphari) tripped through Zone-1 , Zone-2 , Zone-3, Start A , Start B , O/C & E/F.
2. 132 KV DTPS-Kaliphari (L#20):- Zone-1, Start C but its 86 (L/O) did not operate.
3. ATR #1 - 220 KV & 132 KV side tripped through Device Trip, Ph-A O/C St, Ph-B O/C-St, O/C-trip in LV (132 KV) relay 86AX and 86 L/O.
4. ATR #2 -220 KV & 132 KV side tripped through Device Trip, Ph-A O/C St, Ph-B O/C-St, O/C-trip in LV (132 KV) relay 86AX and 86 L/O.
5. ATR #3 -220 KV & 132 KV side tripped through Device Trip, Ph-A O/C St, Ph-B O/C-St, O/C-trip in LV (132 KV) relay and 86 L/O.
6. L#100 , L#51 , L#52, L#75, L#76, ST#1, RT#1 (132 KV side), L#92 (DTPS-Shayam Steel) were made OFF at 10:50 HRS.

Root cause of the incident:-

Failure of 86 L/O relay to trip circuit breaker of Line #20 (132 kV DTPS-Kaliphari) to clear the fault initiated in between DTPS and Kaliphari line. Later on it has been learnt from Kaliphari end that R-phase jumpers were found snapped at few locations.

Normalization time:-

After physical inspection of ATR #1, ATR #2, ATR#3 220 KV side and 132 KV side MB & TB and all 3 three ATRs bays found OK, normalization process started as follows:

1. ATR #1 220 KV side normalised at 11:04 HRS, 132 KV side normalised at 11:06 HRS.
2. ATR #2 220 KV side normalised at 11:05 HRS, 132 KV side normalised at 11:06 HRS.
3. RT #1 , traction power normalised at 11:07 HRS.
4. L#51 (132 kV DTPS-ASP) power normalised at 11:10 HRS.
5. L#76 (132 kV DTPS-BWN) power normalised at 11:15 HRS.
6. L#75 (132 kV DTPS-BWN) power normalised at 11:16 HRS.
7. L#92 (132 kV DTPS-Shayam Steel) power normalised at 11:17 HRS.
8. ST #1 normalised at 11:18 HRS.
9. DHTC , DCW (33 KV) normalised at 11:19 HRS.
10. L#52(132 kV DTPS-ASP) normalised at 11:20 HRS.
11. ATR #3 220 KV & 132 KV side normalised at 11:30 HRS.
12. Line #100 (132 kV DTPS-Jamuria) power normalised at 11:31 HRS.

13. Line #99 (132 kV DTPS-Jamuria) is under shut down for CT replacement work at Jamuria end.

14. L#20 & L#21 is off and isolated from DTPS end for work in line.

Generation Loss: Nil

Load loss: around 100 MW.

Remedial Action:-

The Central Testing Circle at Maithon is informed about the incident and to take appropriate action in this regard.

Further Message Follows.

Annexure B3.3

Philosophy towards formulation and implementation of Grid Islanding Scheme considering 2 x 250 MW units (U # 7 & 8) of Chandrapura TPS, DVC connected to 220KV Grid System

The present islanding scheme in DVC is under service at Chandrapura TPS considering Unit # 1, 2 & 3 having capacity of 3 x 130MW (namely, CTPS – A plant) along with connected load of CTPS – A itself. However, U # 1 & 2 were put out of bar.

Hence, a new suitable venue in DVC is felt to be identified towards formulation and implementation of a new Grid Islanding scheme. Accordingly, U # 7 & 8 of Chandrapura TPS having capacity of 2 x 250MW (namely, CTPS – B plant) has been considered after much thinking and threadbare discussions. These units are connected to 220KV grid. Single line connection diagram (DVC Grid) is shown in Annexure – I.

The Grid islanding scheme is proposed to be implemented in two stages namely,

stage I : Islanding from grid &

stage II : Load – Generation balance through sequential load shedding

considering the 2 x 250MW generators of CTPS – B plant along with connected loads of CTPS – A (120 MVA), BIADA (73 MVA), Putki (180 MVA), Patherdih (141 MVA) & Nimiaghat (40 MVA).

The feasibility of the scheme at this preliminary stage is elaborated as below:-

1. Minimum generation of a unit to be considered as 170MW.
2. Monitoring of Total Generation in MW to be implemented using feed from Ex-Bus MW transducers available at 220kV Switchyard of CTPS – B.
3. The Grid Islanding relay (R1) to be placed at CTPS – B end considering 220KV Bus voltage & frequency of CTPS – B as reference.

[Note :

- a. The old Islanding panel, placed at CTPS – A, may be used after shifting of the same from CTPS – A to CTPS – B. The OEM of this panel i.e. GE (erstwhile ALSTOM) confirmed that the existing panel could be suitably modified.
- b. Entire scheme design including setting of different relays will be taken care of after freezing of the scheme outline.]
4. After actuation of R1 relay – R2, R3, R4, R5, and R6 Relays which will be connected to IEC-61850 compliant substation bus of CTPS – A (220KV), CTPS – A(132KV), Putki (132KV), Patherdih (132KV) & Nimiaghat (132KV) will get actuated through –
 - a. OPGW network with gateway & SDH (synchronous digital hierarchy) to be used for communication of inter-tripping logic through tele-protection GOOSE messaging after creation of VLAN.
 - b. Media converter (AC/DC operated) for Gateway-SDH link/connectivity to be incorporated, if required (where length between gateway-SDH is greater than 50mtr.).

and give trip command (stage – I tripping) as per following –

Substation Bus (IEC - 61850)	Relay	Trip command to -
CTPS_B	R1	CTPS – Dhanbad line (L # 203, 204) CTPS – BTPS line (L # 205, 206)
CTPS_A (220KV)	R2	CTPS – Kalyaneswari line (L # 201, 202) CTPS – BSL line (L # 253 & 254)
CTPS_A (132KV)	R3	CTPS – Gola (L # 6 & 7) CTPS – Purulia (L # 58 & 59) CTPS – Ramkanali/Jamuria (L # 60, 61) CTPS - Rajabera (L # 62, 63)
Patherdih	R5	Patherdih - MHS line (L # 14 & 15) Patherdih - Sindri line (L # 49 & 50) 132/25KV Transformer (Traction Load)
Nimiaghat	R6	Nimiaghat – Giridih line (L # 86 & 87) 132/25KV Transformer (Traction Load)

All Railway feeders/Traction load connected to the above buses to be disconnected during stage 1 operation to avoid unbalance loading.

5. The islanded connection after stage – I tripping is shown in Annexure – II and connected loads (CD in MVA) will be as below having average value of 416 MVA –

CTPS_A	119.90	MVA
BIADA	73.05	MVA
Putki	180.45	MVA
Patherdih	141.40	MVA
Nimiaghat	40.00	MVA
Total Load	554.80	MVA

75% of load	416.10	MVA
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Apparently there will be no problem in Load – Generation balance in normal condition –

Generation considered: 225 x 2 MW = 450 MW

Average Load connected: 416 MVA or 400 MW

Considering droop of the TG is 5%,

$$(450 - 400) \text{ MW} = 50 \text{ MW corresponds to } \frac{5}{450} \times 50 = 0.56 \%$$

If occurrence freq. is 50 Hz, then it may shoot up to $50 + 50 \times 0.56 \% = 50.28 \text{ Hz}$.

It will be easily taken care of.

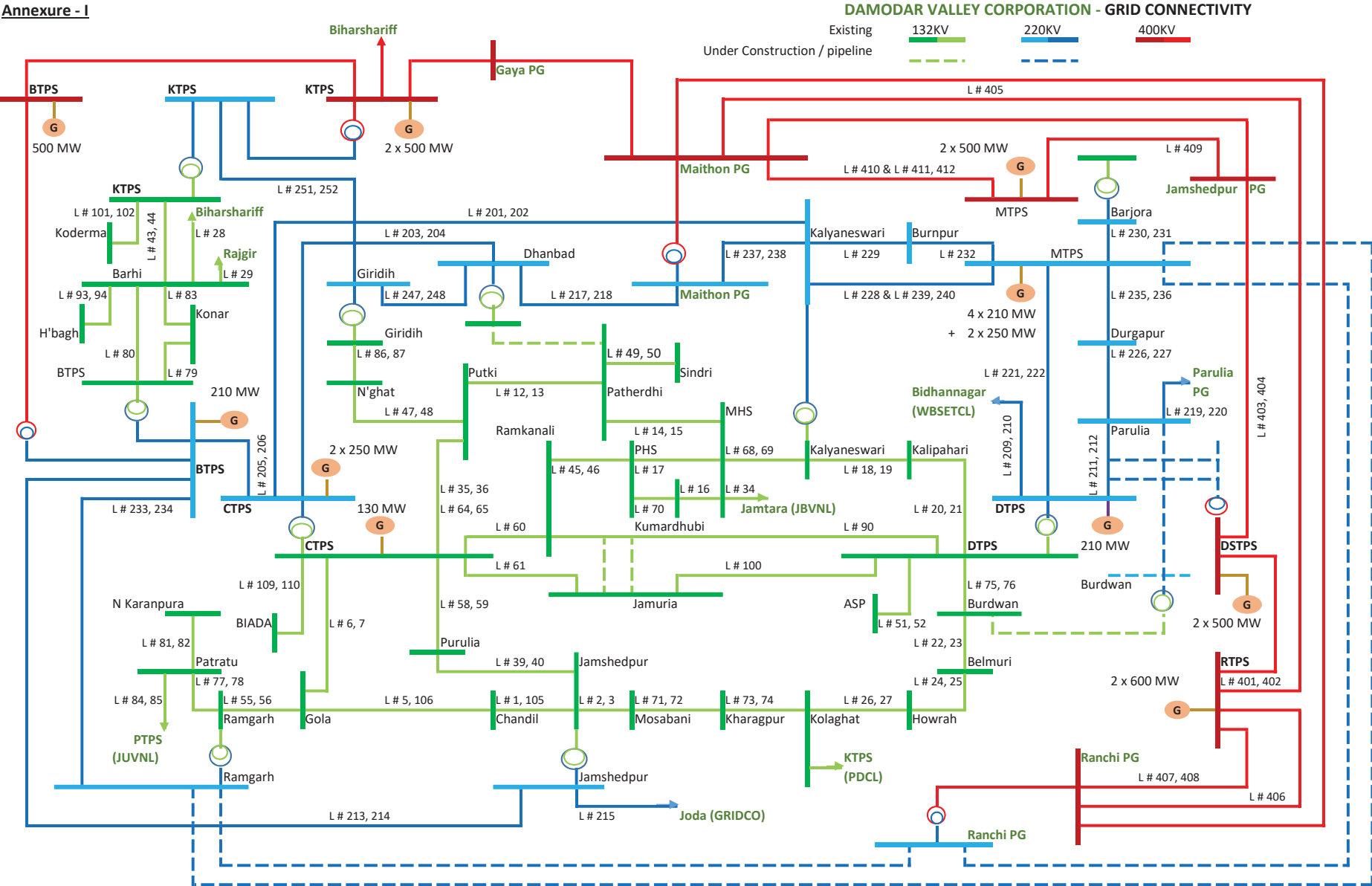
6. However, if

- a. Gen.>>Load demand or freq. would exceed a given set point, then one unit (lowest MW) will get tripped and
- b. Only one unit is in service then

subsequent Load – Generation balancing is to be made by sequential load shedding (stage – II) at different substations as furnished below through protection telemetry (as discussed above) –

Phase - II :: Sequential Load shedding			
1	JBVNL, Ganeshpur	35.00	Putki
	JBVNL, Digwadih	<u>17.00</u>	Patherdih
		<u>52.00</u>	
2	JUVNL, Godhore	35.00	Putki
	JBVNL, Mukunda	<u>15.00</u>	Patherdih
		<u>50.00</u>	
3	JSEB, Dumri Banaso	40.00	Nimiaghat
4	JBVNL, Dugda	25.00	CTPS
5	JSEB, Jainamore	22.00	CTPS

Annexure - I



Islanding Scheme at CTPS

Phase - I :: Tripping for Islanding

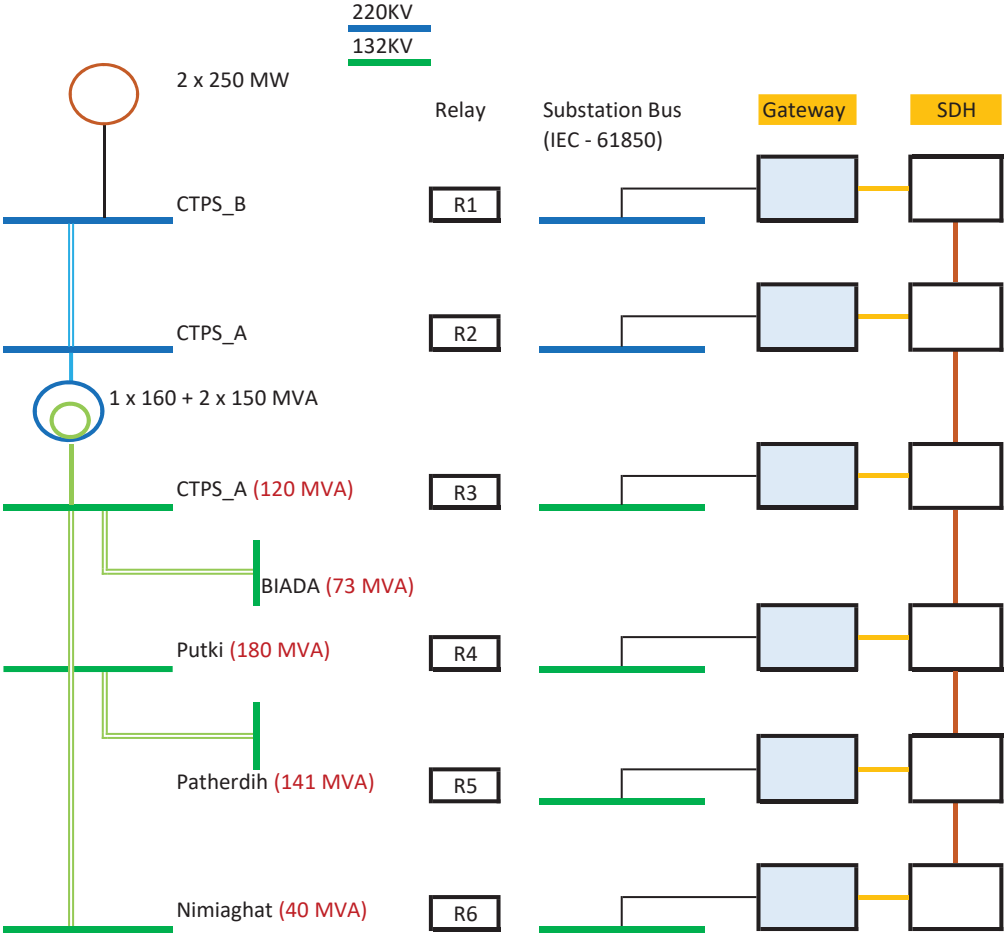
CTPS – Dhanbad line (L # 203, 204)
CTPS – BTPS line (L # 205, 206)

CTPS – Kalyaneswari line (L # 201, 202)
CTPS – BSL line (L # 253 & 254)

CTPS – Gola (L # 6 & 7)
CTPS – Purulia (L # 58 & 59)
CTPS – Ramkanali/Jamuria (L # 60, 61)
CTPS - Rajabera (L # 62, 63)

Patherdih - MHS line (L # 14 & 15)
Patherdih - Sindri line (L # 49 & 50)
132/25KV Transformer (Traction Load)

Nimiaghat – Giridih line (L # 86 & 87)
132/25KV Transformer (Traction Load)



Annexure - II

After Phase - I tripping
Load in MVA

CTPS_A	119.90
BIADA	73.05
Putki	180.45
Patherdih	141.40
Nimiaghat	40.00
Total Load	554.80
75% of load	416.10

Phase - II :: Sequential Load shedding

1	JBVNL, Ganeshpur	35.00	Putki
	JBVNL, Digwadih	17.00	Patherdih
		52.00	
2	JUVNL, Godhore	35.00	Putki
	JBVNL, Mukunda	15.00	Patherdih
		50.00	
3	JSEB,Dumri Banaso	40.00	Nimiaghat
4	JBVNL, Dugda	25.00	CTPS
5	JSEB, Jainamore	22.00	CTPS