Agenda
for
120th PCC Meeting

Date:16/11/2022
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 120th PROTECTION COORDINATION SUB-COMMITTEE MEETING TO BE HELD ON 16.11.2022 AT 10:30 HOURS THROUGH MS TEAMS ONLINE MEETING PLATFORM

PART – A

ITEM NO. A.1: Confirmation of Minutes of 119th Protection Coordination sub-Committee Meeting held on 18th October 2022 through MS Teams online platform.

The minutes of 119th Protection Coordination sub-Committee meeting held on 18.10.2022 was circulated vide letter dated 09.11.2022.

Members may confirm.

PART – B

ITEM NO. B.1: Repeated Disturbance at 220 kV Chatra(JUSNL) S/s

A. Total Power Failure at 220 kV Chatra(JUSNL) S/s on 13.10.2022 at 10:22 Hrs

220 kV Daltonganj-Chatra-2 is LILOed at Latehar, however, 220 kV Latehar-Chatra is not charged yet.

On 13.10.2022 at 10:22 Hrs, 220 kV Daltonganj-Chatra-1 got tripped due to R_N fault subsequently total power failure occurred at Chatra S/s as it was fed radially through only one circuit.

Load Loss: **17 MW**
Outage Duration: 08:54 Hrs

B. Total Power Failure at 220 kV Chatra(JUSNL) S/s on 17.10.2022 at 10:50 Hrs

On 17.10.2022 at 10:50 Hrs, 220 kV Daltonganj-Chatra-1 got tripped due to B_N fault subsequently total power failure occurred at Chatra S/s as it was fed radially through only one circuit.

Load Loss: **17 MW**
Outage Duration: 00:34 Hrs

C. Total Power Failure at 220 kV Chatra(JUSNL) S/s on 19.10.2022 at 15:09 Hrs

On 19.10.2022 at 15:09 Hrs, 220 kV Daltonganj-Chatra-1 got tripped due to Y_N fault. This resulted in total power failure occurred at Chatra S/s as it was fed radially through only one circuit.

Load Loss: **10 MW**
Outage Duration: 00:37 Hrs

Detailed report from ERLDC is attached at **Annexure B.1**.

JUSNL may explain.

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

A. Bus tripping occurred in Eastern Region during October 2022

During October 2022, following incidents of bus bar tripping had been observed in Eastern Region.

Element Name	Tripping Date	Reason	Utility
400 kV Main Bus-1 at Patna	10.10.22 at 15:07 Hrs	LBB of 400 kV Patna-Saharsa-2 operated at Patna	PG ER-1
400 kV Main Bus-1 at Mendhasal	19.10.22 at 16:15 Hrs	During testing of future bay LBB operated.	OPTCL
220 kV Bus-1 at Ramchandrapur	04.10.22 at 21:30 Hrs	Bus bar protection operated	JUSNL
220 kV Bus-2 at Rengali (PH)	07.10.22 at 13:42 Hrs	Bus bar protection operated. Y_ph jumper snapped	OHPC
220 kV Bus-1 at Motipur	19.09.22 at 10:51 Hrs	Bus Bar protection Operated	BSPTCL

Concerned utilities may explain.

ITEM NO. B.3: Repeated Tripping of 132 kV Sonenagar-Nagaruntari

132 kV Sonenagar -Nagaruntari had tripped 13 times in the month of October"22. It has also observed that for each tripping line was restored within a span of one to two hour.

Sr.No	Element Name	Tripping Date	Tripping Time	Reason	Revival Date	Revival Ti
1	132KV-Nagaruntari-SONENAGAR-1	01-11-2022	00:46	Sonenagar end: R-E, Zone - 1, F/C 3.3 kA, 3.7 km. It generally remain idle charged from Sonenagar end.	01-11-2022	02:02
2	132KV-Nagaruntari-SONENAGAR-1	18-10-2022	18:50	Sonenagar: R-N, Ir=2.57 KM, fd=5.245 KM	18-10-2022	22:35
3	132KV-Nagaruntari-SONENAGAR-1	17-10-2022	04:23	Sonenagar: R-E Fault, F/C 2.331 KA, F/D 5.947KM	17-10-2022	05:20
4	132KV-Nagaruntari-SONENAGAR-1	15-10-2022	18:47	Tripped from Sonenagar End only, Sonenagar: R-Ph, Z-4, 2.534 kA,	15-10-2022	19:43
5	132KV-Nagaruntari-SONENAGAR-1	14-10-2022	21:22	Sonenagar: R-N, 2.6kA, -5.3km (backup protection relay), Line was idle charged from Sonenagar end.	14-10-2022	22:10
6	132KV-Nagaruntari-SONENAGAR-1	12-10-2022	21:45	Sonenagar: R-Ph, Z-4,2.687 kA, 25.32 kM. Naruntari: Not Tripped.	12-10-2022	22:33
7	132KV-Nagaruntari-SONENAGAR-1	12-10-2022	05:50	Sonenagar:B-Ph, 2.792 kA, 25.87 kM Nagaruntari: Not Tripped	12-10-2022	06:58
8	132KV-Nagaruntari-SONENAGAR-1	11-10-2022	21:35	Sonenagar End: Z-4, R-ph, 25.3 km, If = 2.693 kA	11-10-2022	23:02
9	132KV-Nagaruntari-SONENAGAR-1	10-10-2022	18:43	SoneNagar - R_N , FC - 0.8 KA	10-10-2022	19:28
10	132KV-Nagaruntari-SONENAGAR-1	08-10-2022	19:50	Sonenagar: Y-E fault, F/C 2.64 KA, F/D 25.2 Km	08-10-2022	21:10
11	132KV-Nagaruntari-SONENAGAR-1	06-10-2022	08:54	Sonenagar: R-E, 2.844KA, Zone-4, 24.23Km	06-10-2022	10:28
12	132KV-Nagaruntari-SONENAGAR-1	04-10-2022	16:14	Sonenagar: R-N, Z-4, 3.725kA, 18.11km	04-10-2022	17:34
13	132KV-Nagaruntari-SONENAGAR-1	03-10-2022	18:23	Sonenagar: RN,	03-10-2022	19:06

JUSNL & BSPTCL may explain.

ITEM NO. B.4: Spurious tripping of ICTs

Please find below details of tripping of ICTs where protection system had mal-operated.

Sr.No	Element Name	Tripping Date	Tripping Time	Reason
1	400KV/220KV 315 MVA ICT 2 AT MENDHASAL	19-10-2022	16:15	During testing of 413 future bay at Mendhasal, LBB got initiated
2	400KV/220KV 315 MVA ICT 1 AT MENDHASAL	19-10-2022	16:15	During testing of 413 future bay at Mendhasal, LBB got initiated
3	400KV/220KV 315 MVA ICT 1 AT KEONJHOR(PG)	15-10-2022	12:35	DC earth fault.
4	400KV/220KV 315 MVA ICT 1 AT JAMSHEDPUR	14-10-2022	05:29	Mal Operation of relay
5	400KV/220KV 315 MVA ICT 1 AT MEERAMUNDALI	04-10-2022	22:21	OTI Operated
6	400KV/220KV 315 MVA ICT 1 AT JAMSHEDPUR	04-10-2022	21:30	Tripped from Ramchandrapur end.
7	400KV/220KV 315 MVA ICT 2 AT JAMSHEDPUR	04-10-2022	21:30	Tripped from Ramchandrapur end.

Concerned utility may explain.

ITEM NO. B.5: Tripping Incidence in month of October-2022

Single line tripping incidents in the month of October-2022 which needs explanation from constituents of either end is attached at **Annexure B.5.**

Concerned utilities may explain.

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 attached at **Annexure C.1.**

Members may update the latest status.

ITEM NO. C.2: DEF protection setting review in Sikkim complex in view of LILO of 400 kV Teesta 3-Kishanganj at Rangpo

After LILO of 400 kV Teesta 3-Kishanganj at Rangpo, review of DEF settings for all lines emanating from Teesta-3, Dikchu, Rangpo was necessitated. In 111th PCC meeting, it was decided that PRDC would carry out the study for DEF relay setting coordination for Sikkim Complex with revised configuration of transmission network.

Subsequently the study was carried out and shared with ERLDC for verification of network configuration and fault level data.

In 117th PCC meeting ERLDC observed that the network configuration and fault level information are in order.

The DEF settings based on the revised study is enclosed at **Annexure C.2.**

In 118th PCC Meeting, PCC advised concerned utilities of Sikkim Complex to implement the revised settings of DEF relay as enumerated in the report at their respective end and confirmation of the same shall be intimated to ERPC/ERLDC.

In 119th PCC Meeting, it was informed that Tashiding had revised the DEF settings at their end.

PCC advised concerned utilities to implement the revised DEF settings at their end at the earliest.

Concerned utilities may update.

ITEM NO. C.3: Status of Implementation of bus bar protection at 220 kV Substations.

The issue was raised in 45th& 46th TCC Meeting wherein concerned utilities replied that the implementation of busbar protection would be done at the earliest.

The status of availability of busbar protection at 220 kV substations of ER utilities as on August-22 is attached at **Annexure C.3.**

In 46th TCC Meeting,
BSPTCL representative updated that out of twelve substations where busbar protection is not available, proposal for ten no of substations has been sent for funding through PSDF.
Busbar protection of Fatuha S/s will be commissioned in August'22. For Biharsharif S/s, there is space constraint and the busbar protection can be implemented after construction of new control room building.
OPTCL representative informed that some of the substations where busbar is not-operational are under SAS project and the commissioning of busbar is covered under the SAS project. For these substations, the tentative timeline for implementation would be one year.

TCC opined that the requirement of having busbar protection in 220 kV substations is mandatory as per CEA grid connectivity standard and advised concerned transmission utilities to take necessary action for operationalizing busbar protection in all the 220 kV substations in their respective jurisdiction.

In 119th PCC Meeting, OPTCL representative informed that bus bar protection of nine(9) substations where it was not operational earlier had been rectified and is in healthy state at present.

PCC advised OPTCL to share status of bus bar protection of all 220 kV substations to ERPC/ERLDC. The updated status received from OPTCL is attached at ***Annexure C.3.1.***

WBSETCL representative informed that bus bar protection at Gokarna and Satgachia S/S is not in service due to pending stability test and it will be put into service by Nov 2022.

JUSNL representative informed that bus bar protection at Chaibasa S/s is not in service at present.

Concerned utilities may update the present status.

ITEM NO. C.4: Review of utilization of PSCT/PDMS by the utilities of ERPC

Under the PSDF funded project "Creation and maintaining a Web based Protection Database and Desktop based Protection setting calculation tool for Eastern Regional Grid" a centrally available web-based protection database was in operation since 2017. As per the DPR of the project, the

project would have five-year support service period after Go-Live of the project. Presently the 5th year support service is going on which will be completed on 31.10.2022. Also, 32 nos. of PSCT licenses were distributed among the ER utilities to carry out protection studies, relay co-ordinations, tripping analysis etc. under the above project.

To decide further course of action regarding protection database, it is necessary to review/discuss the utilization of the protection database as well as PSCT licenses by the utilities of Eastern Region. Utilities may share their experience and give feedback/suggestion on ER Protection database system.

In 119th PCC meeting, Member secretary ERPC stressed upon fact that in spite of training on PSCT and PDMS provided at regular interval, the protection settings/relay data are not being added/updated by most of the utilities in the protection database. He informed that under proposed IEGC regulation 2022, protection database has been mandated to be maintained at RPC level. He requested all the utilities of Eastern Region to take necessary steps in this regard so that whenever there is an addition/change in relay setting/protection settings in their respective system, the same shall be updated in protection database of ERPC(PDMS). This will ensure an up-to-date protection database. He further suggested that a modus operandi may be prepared in consultation with ERLDC & other concerned utilities for timely update of the settings data into the database.

With regard to PSCT license, he requested all the utilities to share their utilization as well as feedback on the software.

PCC advised all utilities to share their experience and provide feedback/suggestion on ER Protection database system as well as PSCT tool to ERPC secretariat within 15 days.

Member Secretary ERPC also suggested that nodal person from each utility may be nominated who will be responsible for protection related matter including the updation of relay setting in protection database. Further for state transmission system, SLDCs shall monitor the timely submission 7 update of protection settings in database.

Members may update.

ITEM NO. C.5: Compliance of 3rd Party Protection Audit Team Observations

3rd party protection audit of various substations in Odisha was carried out from 25.04.2022 to 28.04.2022 by audit team. The observation of audit team is attached at **Annexure C.5.1.**

In 117th PCC meeting, NTPC Darlipalli representative informed that the recommendation regarding overvoltage settings have already been complied with and for power swing blocking setting, the matter has been sent to their corporate wing for their comments.

In 118th PCC Meeting, OPTCL vide email dated submitted their compliance.

3rd party protection audit observations for the substations in Jharkhand has been circulated vide letter dated 19.09.2022. The report is enclosed at **Annexure C.5.2**. PCC advised JUSNL, Powergrid & DVC to go through the observations and take necessary action for compliance.

In 119th PCC Meeting, JUSNL representative informed that approval had been taken from higher authority for compliance of 3rd party protection audit observations for the substations in Jharkhand.

PCC advised Powergrid & DVC to go through the observations and take necessary action for compliance and share updated status of compliance of 3rd party protection audit observations to ERPC.

Concerned utilities may update.

ITEM NO. C.6: Collection of Protection Setting data by PRDC

In 116th PCC meeting, substation visit of following new substations was planned by PRDC team to collect the necessary protection settings data.

SL NO	NEW SUBSTATION	VOLTAGE LEVEL	UTILITY	State
1	SAHARSA	400/220 kV	PMTL	Bihar
2	CHATRA	220 kV	JUSNL	Jharkhand
3	KARAMNASA(NEW)	220 kV	BSPTCL	Bihar
4	JAKKANPORE	400/220 kV	BGCL	Bihar
5	NAUBATPUR	400/220 kV	BGCL	Bihar
6	MOKAMAH	220 kV	BGCL	Bihar
7	NPGCL	400 kV	NTPC	Bihar
8	GOBINDPUR	220 kV	JUSNL	Jharkhand
9	JAINAMORE	220 kV	JUSNL	Jharkhand
10	DHANBAD	220 kV	NKTL	Jharkhand
11	Rongichu	220 kV	MBPCL	Sikkim
12	Jorethang	220 kV	Dans Energy	Sikkim
13	MERAMUNDALI B	400 kV	OPTCL	Odisha

In 117th PCC meeting, PRDC representative updated that substation visit for data collection had been completed for the substations in Bihar & Jharkhand. For rest of the substations, the visit would be planned at the earliest.

In 118th PCC Meeting, PRDC representative informed that the Substation visit in Sikkim would be completed by Oct-22.

PCC advised PRDC to update the already collected protection setting data into the database at the earliest.

In 119th PCC Meeting, PRDC representative informed that the Substation visit in Sikkim would be completed by Oct-22.

PRDC may update.

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पावर सिस्टम ऑपरेशन करपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Government of India Enterprise)
Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.
CIN: U40105DL2009GOI188682
फ़ोन: 033- 24235755, 24174049 फैक्स : 033-24235809/5029 Website:www.erldc.org, Email ID- erldc@posoco.in

दिनांक: **01-11-2022**

Report on the grid event in Eastern Region (पूर्वी क्षेत्र में ग्रिड घटना पर रिपोर्ट)

Summary of the events (घटनाओं का सारांश):

Event 1: At 10:22 Hrs on 13.10.2022, 220 kV Daltonganj-Chatra-1 tripped due to R_N fault. Total power failed at Chatra S/s as it is being fed radially through only one circuit. 220 kV Daltonganj-Chatra-2 is LILOed at Latehar, however, 220 kV Latehar-Chatra is not charged yet. 17 MW load loss reported at Chatra by Jharkhand SLDC.

- **Date / Time of disturbance:** 13-10-2022 at 10:22 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 220/132 kV Chatra
- **Load and Generation loss**.
    - No generation loss was reported during the event.
    - Around 17 MW load loss reported during the event at Chatra by Jharkhand SLDC.

Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- 220 kV Latehar-Chatra (part section of LILO of 220 kV Daltonganj-Chatra-2 at Latehar)

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Daltonganj-Chatra-1

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
10:22	220 kV Daltonagnj-Chatra-1	Daltonganj: R_N, 29.5 km, 3.09 kA, A/r successful	Chatra: R-N, 0.217 kA, 125 km	46 kV dip in R_ph voltage at Daltonganj. Fault clearance time: 100 msec

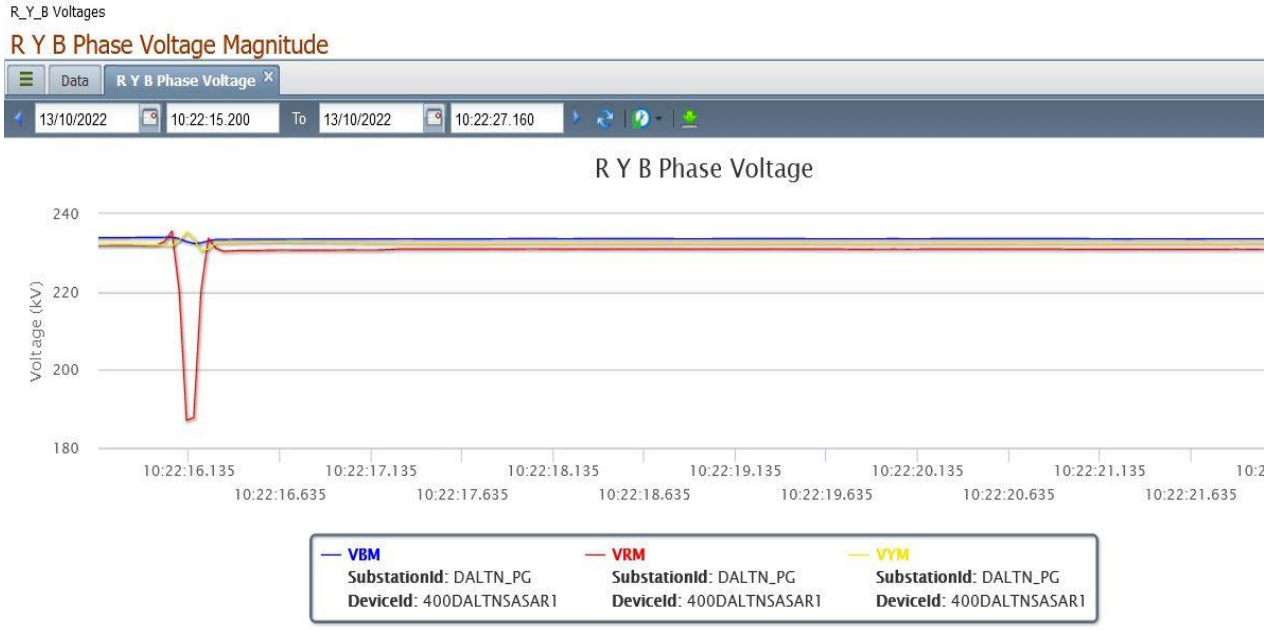


Figure 1: PMU snapshot of 400/220 kV Daltonganj S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Daltonganj-Chatra-1	19:16

Event 2: At 10:50 Hrs on 17.10.2022, 220 kV Daltonganj-Chatra-1 tripped due to B_N fault. Total power failed at Chatra S/s as it is being fed radially through only one circuit. 220 kV Daltonganj-Chatra-2 is LILOed at Latehar, however, 220 kV Latehar-Chatra is not charged yet. 17 MW load loss reported at Chatra by Jharkhand SLDC.

- **Date / Time of disturbance:** 17-10-2022 at 10:50 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 220/132 kV Chatra
- **Load and Generation loss**.
    - No generation loss was reported during the event.
    - Around 17 MW load loss reported during the event at Chatra by Jharkhand SLDC.

Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- 220 kV Latehar-Chatra (part section of LILO of 220 kV Daltonganj-Chatra-2 at Latehar)

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Daltonganj-Chatra-1

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
10:50	220 kV Daltonagnj-Chatra-1	Daltonganj: B_N, 172 km, 1.1 kA, A/r successful	-	21 kV dip in B_ph voltage at Daltonganj. Fault clearance time: 100 msec

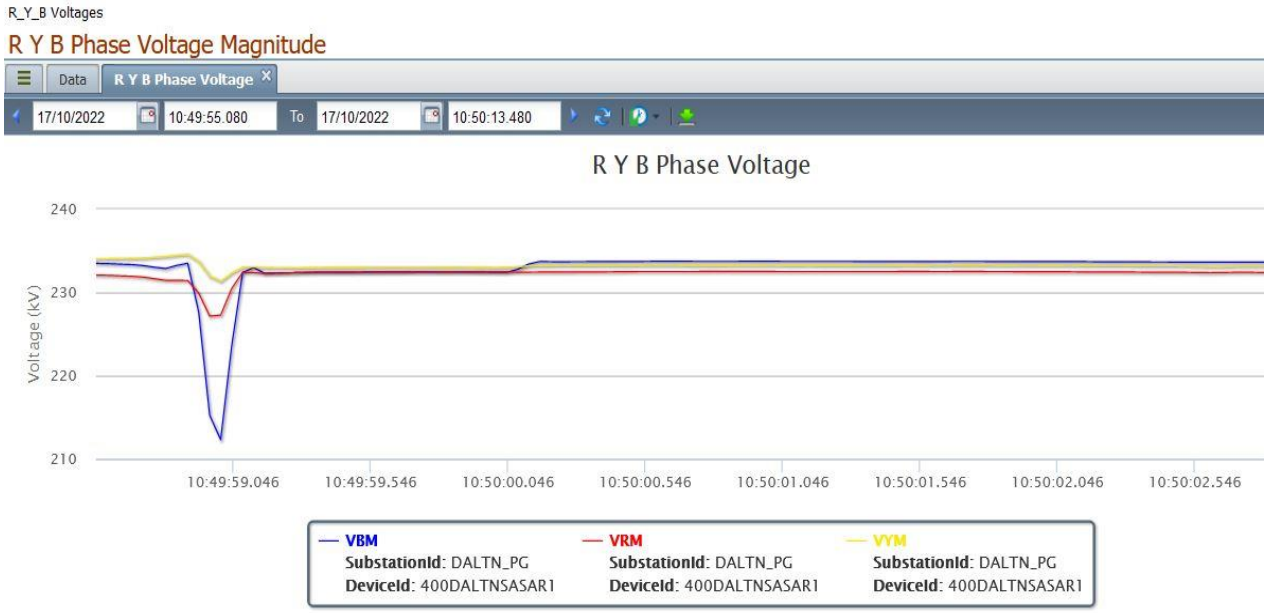


Figure 2: PMU snapshot of 400/220 kV Daltonganj S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Daltonganj-Chatra-1	11:24

Event 3: At 15:09 Hrs on 19.10.2022, 220 kV Daltonganj-Chatra-tripped due to Y_N fault. Total power failed at Chatra S/s as it is being fed radially through only one circuit. 220 kV Daltonganj-Chatra-2 is LILOed at Latehar, however, 220 kV Latehar-Chatra is not charged yet. 10 MW load loss reported at Chatra by Jharkhand SLDC.

- **Date / Time of disturbance:** 19-10-2022 at 15:09 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 220/132 kV Chatra
- **Load and Generation loss**.
    - No generation loss was reported during the event.
    - Around 10 MW load loss reported during the event at Chatra by Jharkhand SLDC.

Important Transmission Line/element if out (महत्वपूर्ण संचरण लाइने जो बंद है):

- 220 kV Latehar-Chatra (part section of LILO of 220 kV Daltonganj-Chatra-2 at Latehar)

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Daltonganj-Chatra-1

Relay indication and PMU observation (रिले संकेत और पीएमयू पर्यवेक्षण):

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
15:09	220 kV Daltonagnj-Chatra-1	Daltonganj: Y_N, Zone-2, 139.5 km, 1.406 kA	Chatra: Didn't trip	33 kV dip in Y_ph voltage at Daltonganj. Fault clearance time: 400 msec

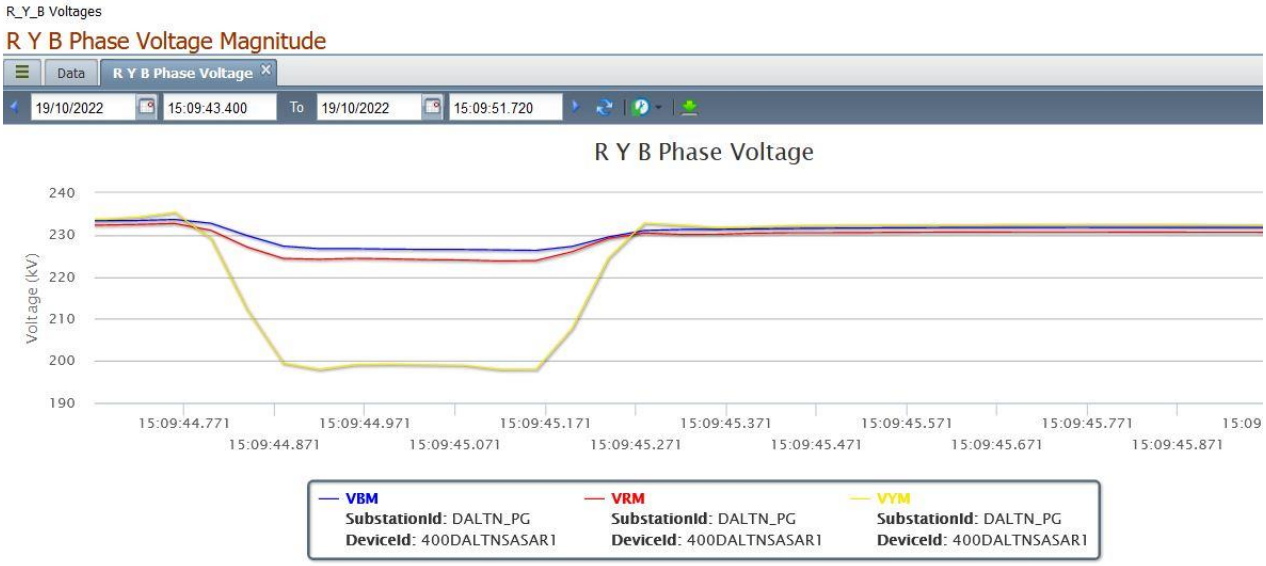


Figure 3: PMU snapshot of 400/220 kV Daltonganj S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Daltonganj-Chatra-1	15:46

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

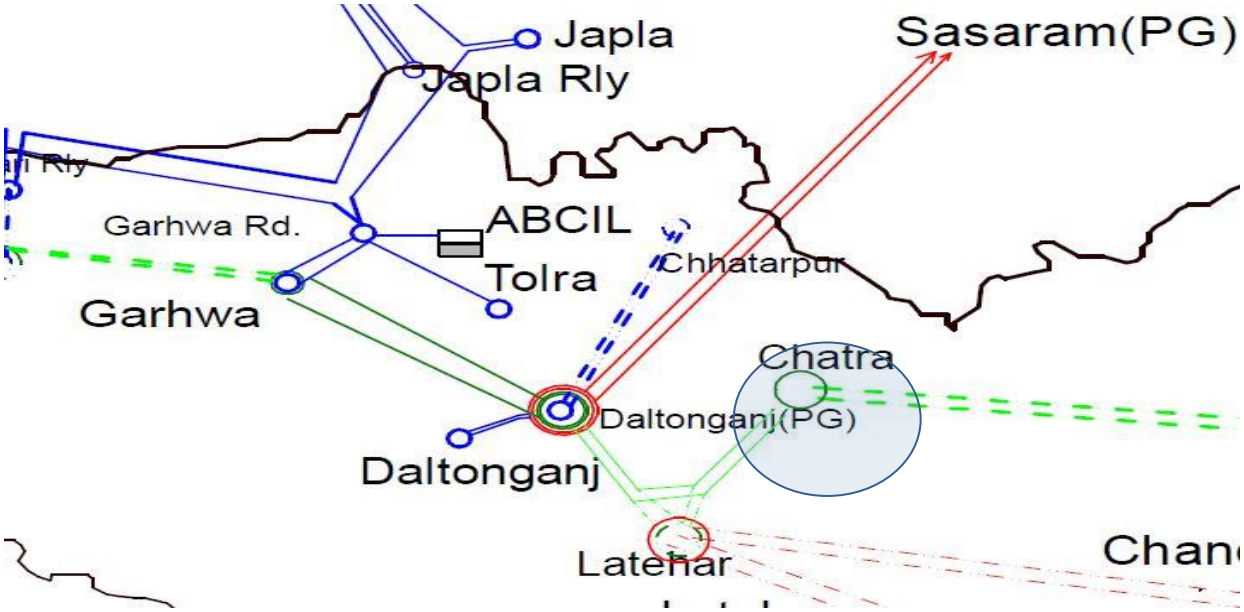


Figure 4: Network across the affected area

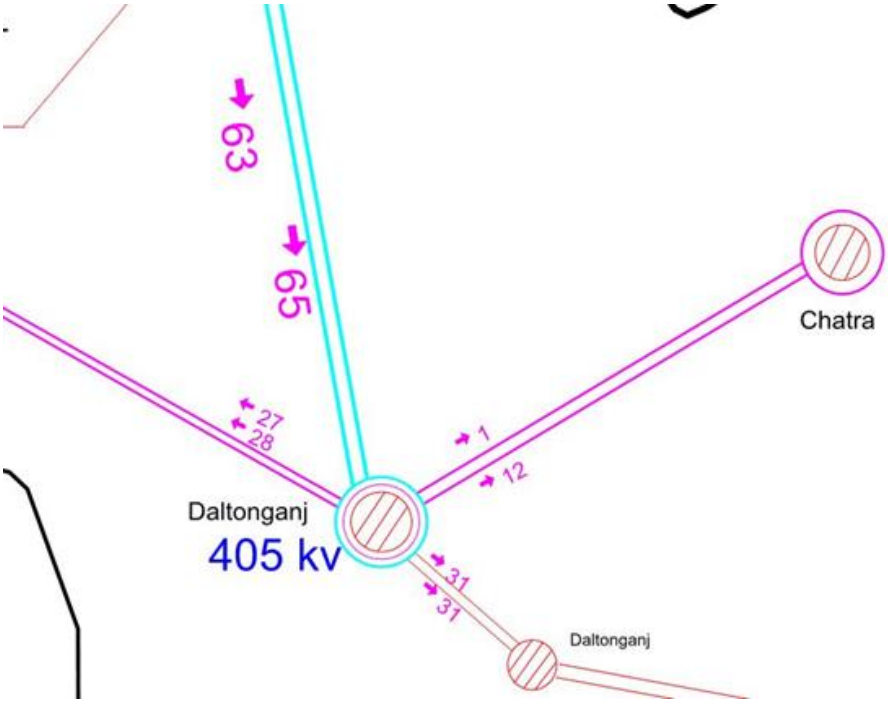


Figure 5: SCADA snapshot of the system

Analysis of the event (घटना का विश्लेषण) & Protection issue (सुरक्षा समस्या):

- In 1st and 2nd event, A/r was successful from Daltonganj only. Issue of Non-A/r at Chatra end has been flagged multiple times. JUSNL may update.
- In 3rd event, fault was cleared from Daltonganj in Zone-2 time, suggesting failure of carrier protection. JUSNL may explain.
- Both LILO portions of 220 kV Daltonganj-Chatra-2 at Latehar has not been charged yet, hence affecting reliability of power supply at Chatra. JUSNL to explain the reason for delay in charging of the line.

Non-compliance observed (विनियमन का गैर-अनुपालन):

Issues	Regulation Non-Compliance	Utility
DR/EL not provided within 24 Hours	1. IEGC 5.2 (r) 2. CEA grid Standard 15.3	**PG ER-1, JUSNL**

Status of Reporting (रिपोर्टिंग की स्थिति):

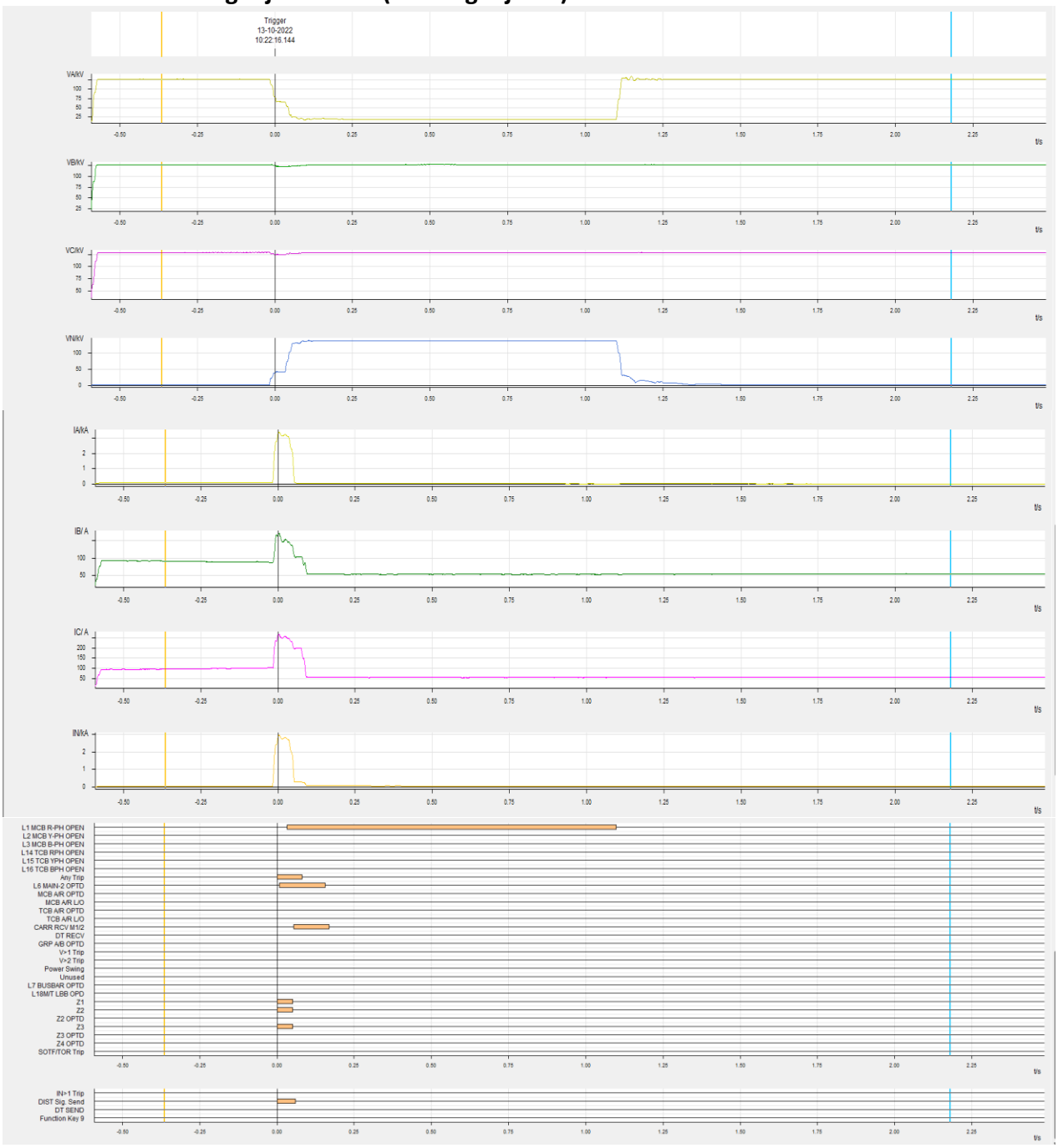
- DR yet to be received from JUSNL

Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event.

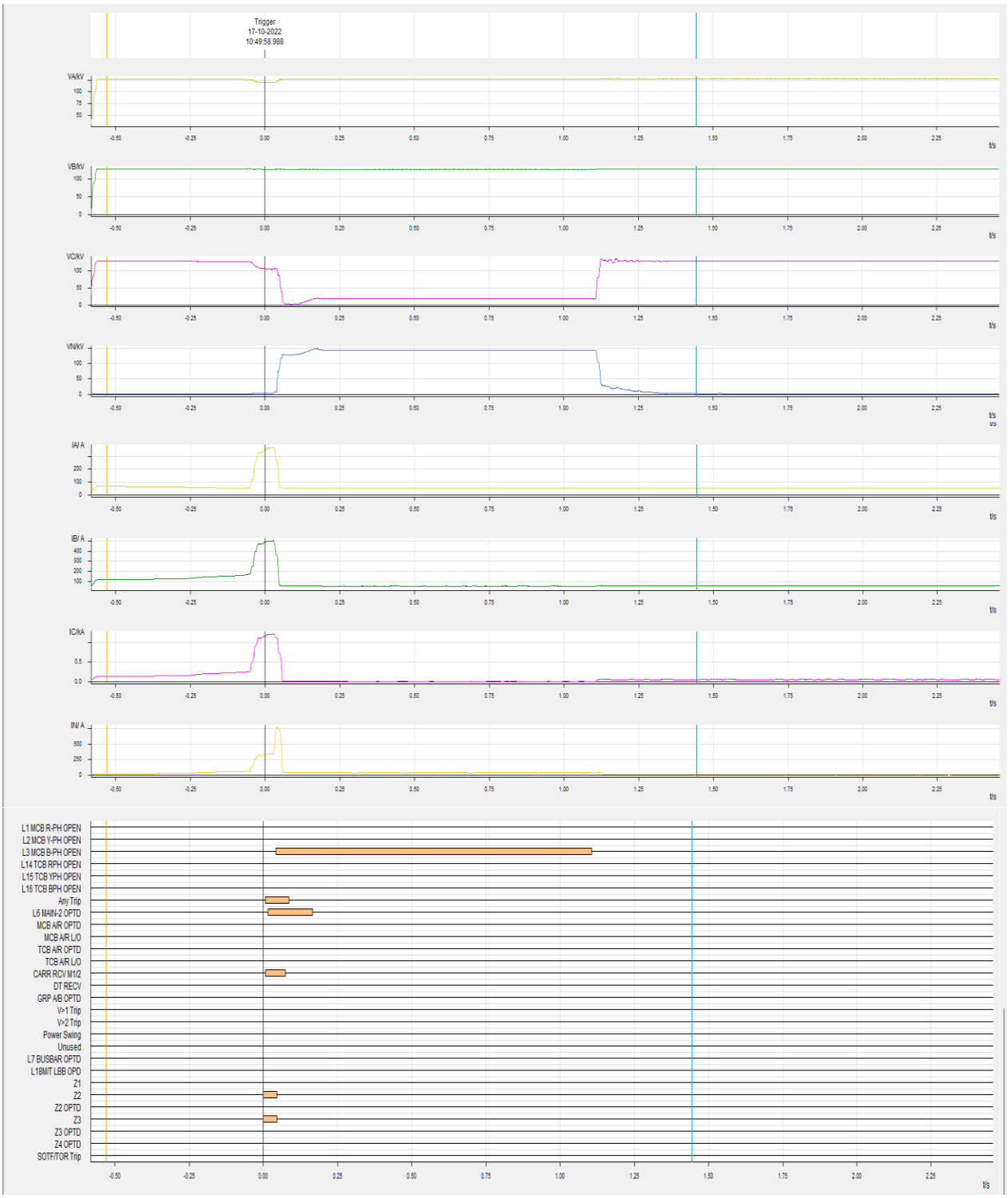
SoE data not recorded at the time of events.

Annexure 2: DR recorded

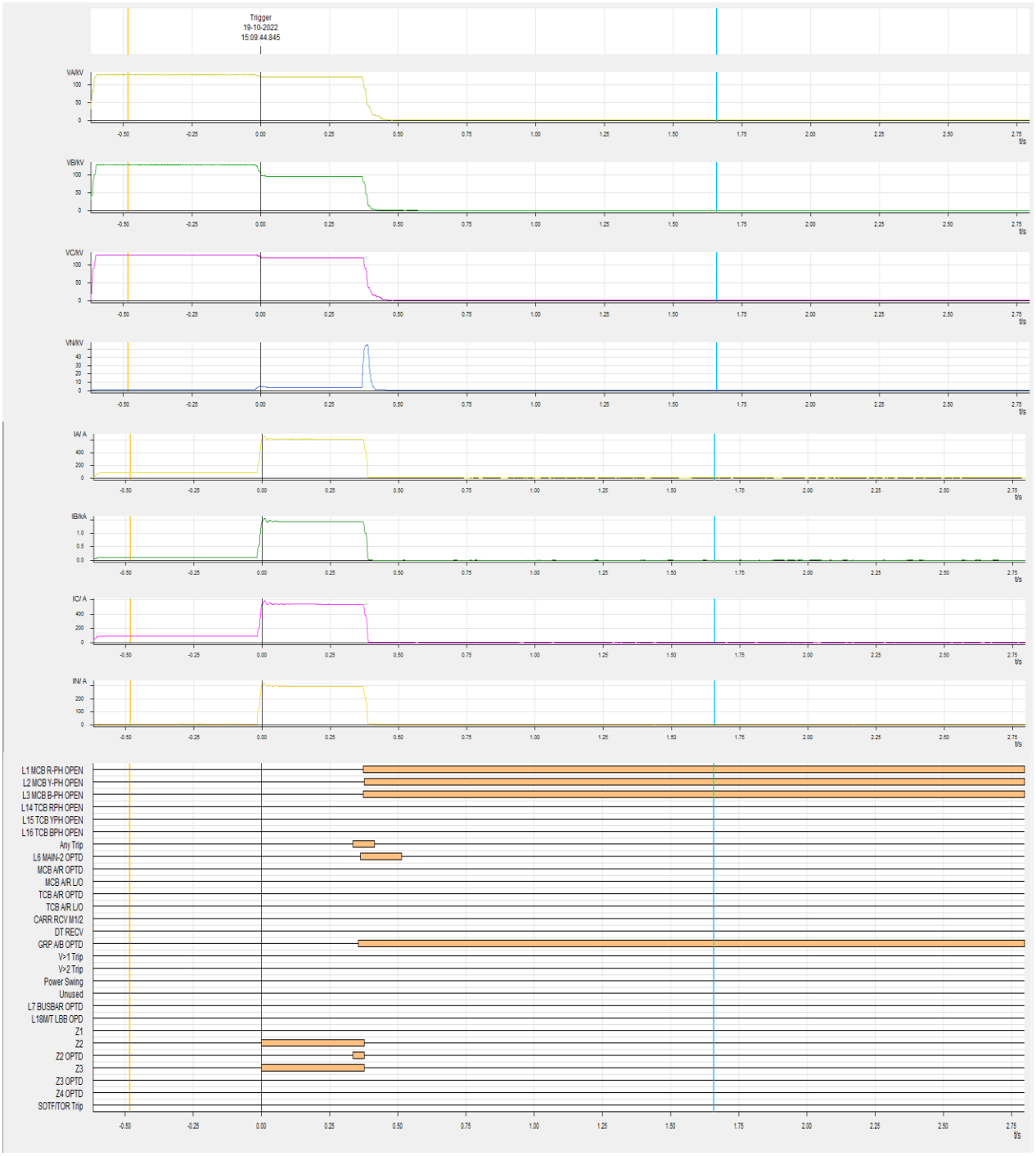
DR of 220 kV Daltonganj-Chatra-1 (Daltonganj end)-Event 1



DR of 220 kV Daltonganj-Chatra-1 (Daltonganj end)-Event 2



DR of 220 kV Daltonganj-Chatra-1 (Daltonganj end)-Event 3



List of important transmission lines in ER which tripped in October-2022

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	DR Configuration Discrepancy	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	UTILITY RESPONSE

1	220 KV RANCHI-CHANDIL-1	01/10/2022	10:54	01/10/2022	12:15	Ranchi: B_N, 32.57 km, 3.8 kA	Chandil: B_N, 53.04 km, 1.89 kA	B-Earth	100	A/r failed after 1 sec from Ranchi.		Yes	Yes	
2	400 KV DURGAPUR-SAGARDIGHI-1	02/10/2022	12:02	02/10/2022	12:26	Durgapur: Y-B, 3.2 km, Iy: 29.67 kA, Ib: 26.09 kA	Sagardighi: Y_B, 108.7 km, Iy: 3.8 kA, Ib: 3.42 kA	Y-B-Earth	100	Phase to phase fault		Yes	Yes	
3	220 KV BUDHIPADAR-KORBA-1	03/10/2022	16:24	04/10/2022	13:18	Budhipadar: R_N, 2.6 km, 22.01 kA, A/r successful		R-Earth	100	R_ph jumper snapped at loc. No. 1		No	NA	
4	220 KV DARBHANGA(DMTCL)-DARBHANGA-1	03/10/2022	22:59	04/10/2022	00:10	DMTCL: R_N, 232 km, 0.986 kA, Zone-3		R-Earth	3000	Back-Up O/c operated at DMTCL. BSPTCL may explain		Yes	No	

5	220 KV DARBHANGA(DMTCL)-DARBHANGA-2	03/10/2022	22:59	04/10/2022	00:10	DMTCL: R_N, Zone-3, 142.7 km, 1.42 kA		R-Earth	3000	Back-Up O/c operated at DMTCL. BSPTCL may explain		Yes	No	
6	400 KV BARH-PATNA-1	04/10/2022	01:00	04/10/2022	01:25	Barh: Y_N, 2.13 km, 23.25 kA	Patna: Y_N, 75 km, 6.3 kA, A/r successful	Y-Earth	100	Three phase tripping at Barh		Yes	Yes	
7	220 KV JODA-RAMCHANDRAPUR-1	04/10/2022	21:30	04/10/2022	23:08	Joda: B_N, 129 km, 0.911 kA	Ramchandrapur: B_N, 7.1 km, 12.75 kA	B-Earth	400	Tripped in Zone-2 time from Joda		Yes	Yes	
8	400 KV PPSP-BIDHANNAGAR-1	05/10/2022	09:05	05/10/2022	09:26	PPSP: R_N, 141.2 km	Bidhannagar: R_N, 42.5 km, 6 kA	R-Earth	100	A/r kept disabled as per OEM advise		No	Yes	

9	400 KV BARIPADA-KEONJHOR-1	05/10/2022	09:57	05/10/2022	11:45	Baripada: DT received	Keonjhor : O/V St. 1	No fault	NA	O/V in B_ph at Keonjhor		Yes	Yes	
10	400 KV BARIPADA-KEONJHOR-1	05/10/2022	12:00	05/10/2022	23:08	Baripada: DT received	Keonjhor : O/V St. 1	No fault	NA	Cable replaced from CVT MB to relay		Yes	Yes	
11	220 KV ROURKELA-TARKERA-2	05/10/2022	12:23	05/10/2022	14:56	Rourkela: B_N, 2.5 km, 14.98 kA	Tarkera: B_N, 10.5 km	B-Earth	100	Other two phase at Rourkela tripped after 1.2 seconds. Three phase tripping at Tarkera		Yes	Yes	

12	220 KV ROURKELA-TARKERA-1	05/10/2022	12:38	05/10/2022	14:58	Rourkela: R_N, 12.4 km, 7.37 kA	Tarkera: R_N, 4.3 kA	R-B-Earth	100	Phase to phase fault at Rourkela. Tarkera end observed single phase fault in R_ph		Yes	Yes	
13	400 KV KAHALGAON-LAKHISARAI-2	05/10/2022	14:43	05/10/2022	19:04	Kahalgaon: Didn't trip		No fault	NA	No fault. PG may explain		No	Yes	
14	220 KV RENGALI (PH)-TSTPP-1	07/10/2022	13:42	08/10/2022	15:55							No	No	
15	220 KV ALIPURDUAR-SALAKATI-1	08/10/2022	14:08	08/10/2022	15:06	Alipurduar: Y_N, 51.28 km, 2.911 kA		Y-Earth				No	NA	

16	400 KV BINAGURI-MALBASE-1	08/10/2022	15:55	08/10/2022	16:37	Binaguri: A/r successful	Malbase: R_B, Ir: 6.176 kA, Ib: 1.122 kA, 39.13 km	R-B-Earth	100			No	NA	
17	220 KV JODA-RAMCHANDRAPUR-1	09/10/2022	13:08	09/10/2022	13:40	Joda: Y_N, 17.37 km, 1.43 kA	Ramchandrapur: Y_N, 123.2 km, 1.35 kA	Y-Earth	400	Both ends saw fault in Zone-2		Yes	Yes	
18	400 KV NEW RANCHI-PATRATU-2	10/10/2022	10:02	10/10/2022	10:47	New Ranchi: B_N, 22.301 km, 5.19 kA	Patratu: B_N, 3.52 kA, A/r successful	B-Earth	100	Three phase tripping at New Ranchi		Yes	Yes	

19	400 KV PATNA-SAHARSA-2	10/10/2022	15:07	10/10/2022	21:41	Patna: B_N, 21.28 km, 12.73 kA	Saharsa: B_N, 218 km, 2 kA	B-Earth	500	Line tripped after 100 msec. However, after 200 msec of tripping, current in B_ph appeared again at patna and LBB operated. PG may explain.		Yes	Yes	
20	765 KV MEDINIPUR-NEW JEERAT-2	10/10/2022	22:51	10/10/2022	23:32	Medinipur: DT received	New Jeerat: Didn't trip	No fault	NA			No	No	
21	400 KV BINAGURI-BONGAIGAON-2	10/10/2022	23:00	10/10/2022	23:51	Binaguri: R_N, 70.1 km, 4.46 kA, A/r successful	Bongaigaon: R_N, 138.47 km, 2.63 kA	R-Earth				No	NA	

22	400 KV JEERAT-BAKRESWAR-1	11/10/2022	11:24	11/10/2022	11:38	Jeerat: B_N, 144.2 km, 3.4 kA	Bakreswar: B_N, 33.6 km, 4.2 kA	B-Earth	100	Single phase tripping at Jeerat. A/r triggerred but breaker didn't close. Later all three phase tripped on PD after 1.5 seconds. A/r successful from Bakreshwar		Yes	No	
23	400 KV MERAMUNDALI-JSPL-1	11/10/2022	11:42	11/10/2022	14:49	Meramundali: B_N, 28.1 km, 9.24 kA	JSPL: B_N, 11 km, 6 kA	B-Earth	100	A/r dead time at Meramundali is set at 300 msec. A/r failed due to persisting fault		Yes	No	

24	400 KV JEERAT-BAKRESWAR-1	11/10/2022	13:08	11/10/2022	13:37	Jeerat: B_N, 158 km, 4 kA	Bakreswar: B_N, 34 km, 5 kA	B-Earth	100	Single phase tripping at Jeerat. A/r triggerred but breaker didn't close. Later all three phase tripped on PD after 1.5 seconds. A/r successful from Bakreshwar		Yes	No	
25	400 KV JHARSUGUDA-RAIGARH-2	11/10/2022	16:16	11/10/2022	17:22	Jharsuguda: R_N, 44 km, 7.9 kA		R-Earth	100	A/r failed after 1 sec		Yes	NA	

26	400 KV PPSP-BIDHANNAGAR-1	11/10/2022	19:49	11/10/2022	20:18	PPSP: R_N, 135 km	Bidhannagar: R_N, 46 km, 5.9 kA	R-Earth	100	A/r kept disabled as per OEM advise		No	Yes	
27	400 KV ALIPURDUAR-JIGMELLING-1	12/10/2022	01:12	12/10/2022	01:55	Alipurduar: DT received	Jigmelling: Didn't trip	No fault	NA			No	NA	
28	400 KV BARIPADA-KHARAGPUR-1	12/10/2022	12:17	12/10/2022	17:56	Baripada: Y_N, Zone-2, 109 km, 3.6 kA	Kharagpur: Y_N, 12.9 km, 3 kA	Y-Earth	100	A/r successful. Tripped again within reclaim time		Yes	Yes	

29	400 KV KISHANGANJ-RANGPO-1	12/10/2022	12:24	12/10/2022	13:19	Kishanganj: B_N, 90 km, 4.5 kA	Rangpo: B_N, 96.42 km, 3.628 kA	B-Earth	100	B-Phase voltage touched around 500 kV after 650 msec and other two phase tripped at Kishanganj and DT sent to remote end		Yes	No	
30	400 KV PPSP-BIDHANNAGAR-2	12/10/2022	16:31	12/10/2022	16:52	PPSP: R_N, 139 km	Bidhannagar: R_N, 48 km, 5.79 kA	R-Earth	100	A/r kept disabled as per OEM advise		No	Yes	
31	400 KV DURGAPUR-JAMSHEDPUR-1	12/10/2022	16:39	12/10/2022	18:14	Durgapur: R_N, 125.2 km, 2.46 kA	Jamshedpur: R_N, 13.57 km, 13.38 kA	R-Earth	100			No	No	

32	220 KV DALTONGANJ-CHATRA-1	13/10/2022	10:22	13/10/2022	19:16	Daltonganj: R_N, 29.5 km, 3.09 kA, A/r successful	Chatra: R_N, 125 km, 0.217 kA	R-Earth	100	A/R successful from Daltonganj end only.		Yes	No	
33	400 KV MEDINIPUR-NEW CHANDITALA-1	13/10/2022	11:52	13/10/2022	13:07	Medinipur: Y_N, 70.97 km, 3.86 kA	New Chandita la: Y_N, 10.2 kA	Y-Earth	100	No A/r attempt from chanditala end.124412		No	Yes	
34	400 KV NEW PPSP-NEW RANCHI-2	13/10/2022	12:44	13/10/2022	13:07		New Ranchi: Didn't trip	No fault	NA			No	NA	
35	400 KV PPSP-BIDHANNAGAR-2	13/10/2022	14:41	13/10/2022	15:05	PPSP: R_N, 142.9 km	Bidhanna gar: R_N, 44.14 km, 6.11 kA	R-Earth	100			No	Yes	

36	220 KV PATNA-KHAGAUL-1	13/10/2022	15:07	13/10/2022	17:09	Patna: B_N, 8.5 km, 11.89 kA		B-Earth	100	3 phase triiping at the instant of fault no auto reclose .		Yes	No	
37	220 KV RAJARHAT-BARASAT-2	13/10/2022	16:08	13/10/2022	16:27		Barasat: R_N, 3 km, 14.65 kA	R-Earth	100	3 phase triiping at the instant of fault no auto reclose .Overvolatge in Y phase observed		No	Yes	

38	220 KV BOLANGIR-KESINGA-1	13/10/2022	20:25	13/10/2022	21:42	Bolangir: Y_N, 81 km, 1.61 kA		Y-Earth	100	3 phase tripping ,Phase to phase fault ane after other .DT received from remote end .		Yes	No	
39	220 KV JODA-JSPL	14/10/2022	11:15	14/10/2022	14:39	Joda: R_N		Y-Earth	350	High resistive tripped after 350 ms in zone-2		No	No	
40	220 KV JSPL-JAMSHEDPUR	14/10/2022	11:15	14/10/2022	12:00		Jamshedpur: R_N, 28.10 km, 3.01 kA					No	No	

41	220 KV TENUGHAT-BIHARSHARIF	14/10/2022	14:14	14/10/2022	14:58	Tenughat: B_N, Zone-1, 63.4 km, 0.176 kA		B-Earth	100	3 phase tripping from Biharshariff no auto reclose.			Yes	
42	220 KV MAITHON-KALYANESHWARI-1	15/10/2022	11:33	15/10/2022	12:31	Maithon: Didn't trip	Kalyaneshwari: Master trip	No fault	NA			NA	No	
43	400 KV DURGAPUR-KAHALGAON-1	15/10/2022	12:23	15/10/2022	14:27	Durgapur: Y_N, 167.27 km, 2.01 kA	Kahalgaon: Y_N, 3.312 kA	Y-Earth	100			No	No	

44	400 KV ARAMBAG-NEW PPSP-2	16/10/2022	12:21	16/10/2022	12:35	Arambag: B_N, 188.2 km, 2.28 kA	New PPSP: B_N, 25 km, 3.87 kA	B-Earth	100	NO Autoreclose		No	No	
45	220 KV BOLANGIR-KESINGA-1	16/10/2022	20:08	17/10/2022	17:47	Bolangir: Y_N, 72.3 km, 2.01 kA, A/r successful	Kesinga: Y_N, 15.5 km, 2.92 kA	Y-Earth	100	A/R successful from bolangir only		No	No	
46	765 KV JHARSUGUDA-RAIPUR-1	16/10/2022	20:16	17/10/2022	21:38	B_ph LA burst at Jharsuguda during charging attempt of Raipur-1		B-Earth	100	3 phase triiping at the instant of fault no auto reclose .		Yes	NA	
47	220 KV DALTONGANJ-CHATRA-1	17/10/2022	10:50	17/10/2022	11:24	Daltonganj: B_N, 172 km, 1.1 kA		B-Earth	100	A/r successful only from daltonganj end.		Yes	No	

48	220 KV NEW PURNEA-MADHEPURA-1	17/10/2022	11:00	17/10/2022	11:56	New Purnea: Y_N, 3.8 km, 10.82 kA	Madhepura: Y_N, 78.8 km, 2.31 kA	Y-Earth	100			Yes	Yes	
49	220 KV MAITHON-KALYANESHWARI-2	17/10/2022	11:49	17/10/2022	13:30	Maithon: Didn't trip	Kalyaneshwari: Master trip	No fault	NA			NA	No	
50	400 KV LAPANGA-OPGC-2	17/10/2022	15:13	17/10/2022	15:41	Lapanga: R_N, 17.9 km, 11.2 kA, A/r successful	OPGC: R_N, 7 km, 15 kA	R-Earth	100	A/r successful only from Lapanga end.		Yes	No	
51	400 KV NEW PURNEA-MUZAFFARPUR-1	18/10/2022	13:07	18/10/2022	15:07	New Purnea: Y_N, 131.2 km, 3.15 kA	Muzaffarpur: Y_N, 122.5 km, 2.817 kA	Y-Earth	100	A/R failed		Yes	Yes	

52	400 KV ROURKELA-CHAIBASA-2	18/10/2022	14:18	18/10/2022	14:50	Rourkela: B_N, Zone-2, 134 km		B-Earth	100	3 phase tripping from rourkella while A/R successful from chaibasa		Yes	Yes	
53	400 KV JAMSHEDPUR-CHAIBASA-2	18/10/2022	14:27	19/10/2022	00:09		Chaibasa: Y_N, 3 km, 14.9 kA	Y-Earth	100			Yes	Yes	
54	220 KV DALTONGANJ-CHATRA-1	19/10/2022	15:09	19/10/2022	15:46	Daltonganj: Y_N, Zone-2, 139.5 km, 1.406 kA		Y-Earth	100	A/R successful from Daltonganj end only.		Yes	No	

55	400 KV MERAMUNDALI-MENDHASAL-1	19/10/2022	16:15	19/10/2022	16:48		LBB initiated during testing of future bay at Mendhasal	No fault	NA	Reason may be explained		No	No	
56	400 KV MERAMUNDALI-MENDHASAL-2	19/10/2022	16:15	19/10/2022	16:48		LBB initiated during testing of future bay at Mendhasal	No fault	NA			No	No	
57	220 KV DARBHANGA (DMTCL)-SAMASTIPUR-1	20/10/2022	05:45	20/10/2022	06:35	Darbhanga: Y_B, 13.53 km, Iy: 4.50 kA, Ib: 4.47 kA	Samastipur: Y_B, 1.4 km, Iy=Ib=4.7 kA	Y-B-Earth	100			Yes	No	

58	400 KV NEW PPSP-NEW RANCHI-1	20/10/2022	15:54	20/10/2022	16:49	New PPSP: DT received	New Ranchi: DT sent during testing of line reactor	No fault	NA			No	No	
59	400 KV NEW PURNEA-BIHARSHARIF-1	21/10/2022	08:48	21/10/2022	10:14	New Purnea: B_N, 81.49 km, 4.4 kA	Biharsharif: B_N, A/r successful	B-Earth	100	At Biharshariff end it seems A/R of TCB operated while MCB did not reclosed .Needs to be checked		Yes	Yes	
60	220 KV SUBHASHGRAM-EMSS-2	21/10/2022	15:27	21/10/2022	17:01	Subhashgram: R_Y, 20.95 km, Ir: 8.03 kA, Iy: 6.87 kA	EMSS: R_Y, 4.3 km	R-Y	100			No	No	

61	400 KV BINAGURI-MALBASE-1	23/10/2022	05:06	23/10/2022	06:24	Binaguri: B_N, Zone-2, 126 km, 2.3 kA		B-Earth	100			No	NA	
62	220 KV PATNA-KHAGAUL-1	23/10/2022	08:29	23/10/2022	10:19	Patna: B_N, 8.49 km, 11.59 kA		B-Earth	100	3 phase trippping from Patna.		Yes	No	
63	400 KV DSTPS-JAMSHEDPUR-1	23/10/2022	09:14	23/10/2022	11:10		Jamshedpur: B_N, 154 km, 1.99 kA	B-Earth	100	A/r successful only from jamshedpur		Yes	No	

64	400 KV DARBHANGA (DMTCL)-MUZAFFARPUR-1	23/10/2022	11:38	23/10/2022	11:47	Darbhanga: B_N, 19.4 km, 8.64 kA	Muzaffarpur: A/r successful	B-Earth	100	3 phase tripping at Darbhanga while at muzafferpur Main tie opened at the instant of fault and after 1 sec MVB A/R successful but TCB did not reclosed and all 3 phase TCB tripped after 2.5 seconds but MCB was closed.		Yes	Yes	
65	220 KV JODA-RAMCHANDRAPUR-1	24/10/2022	09:35	24/10/2022	10:03	Joda: Y_N, 0.5 kA	Ramchandrapur: Y_N, 19.2 km, 0.98 kA	Y-Earth	100	Tripped in directional O/C		Yes	Yes	

66	400 KV ANGUL-BOLANGIR-1	24/10/2022	14:47	24/10/2022	15:41	Angul: B_N, 28.6 km, 7.78 kA	Bolangir: B_N, 173.6 km, 1.21 kA	B-Earth	100	Tripped in reclaim time		Yes	Yes	
67	220 KV ALIPURDUAR-SALAKATI-1	24/10/2022	18:14	24/10/2022	19:17		Salakati: Didn't trip					No	NA	
68	220 KV DARBHANGA (DMTCL)-LAUKAHI-2	26/10/2022	19:32	26/10/2022	21:03		Laukahi: R_N, 23.78 km, 3.422 kA	R-Earth	100	A/R succesfful from DMTCL, Dead time very low of 400 ms may be reveiwed.		Yes	No	
69	400 KV JEERAT-BAKRESHWAR-1	27/10/2022	16:04	28/10/2022	11:44	Jeerat: B_N, 162.7 km, Zone-2, 2.65 kA	Bakreshwar: B_N, 10.6 km, 7.79 kA	B-Earth	100	Tripped in reclaim time		Yes	No	

70	220 KV DARBHANGA (DMTCL)-MOTIPUR-1	27/10/2022	17:14	27/10/2022	19:37	DMTCL: R_N, 5.3 km, 12.59 kA	Motipur: R_N, 102.1 km, 1.39 kA	R-Earth	100	A/R successful from motipur end only		Yes	Yes	
71	220 KV TENUGHAT-BIHARSHARIF-1	30/10/2022	13:03	30/10/2022	13:31	Tenughat: B_N, 56 km, 0.176 kA	Biharsharif: B_N, 108 km, 1.23 kA	B-Earth	100	No A/R at Biharshariff end .		Yes	No	
72	220 KV SUBHASHGRAM-BARUIPUR-1	31/10/2022	12:38	31/10/2022	16:15	Subhashgram: Y-B, 6 km, Iy: 15.48 kA, Ib: 15.31 kA	Baruipur: Y_B, 25.2 km, Iy: 1.6 kA, Ib: 1.62 kA	Y-B-Earth	100			No	No	

ANNEXURE-C.1

Sl No.	Name of the incidence	PCC Recommendation	Latest status
119th PCC Meeting			
1.	Total Power failure at 220 kV CTPS A and CTPS B (DVC) S/s on 24.09.2022 at 10:55 Hrs	PCC observed that the settings adopted by DVC for broken conductor protection is quite conservative and not the usual practice as followed by other utilities. PCC advised DVC to submit the criteria/philosophy behind such setting and further advised to review the setting and the broken conductor protection may be set in alarm mode instead of issuing tripping command. PCC advised DVC to submit all the relevant DR/EL related to the disturbance at the earliest.	
2.	Disturbance at 220 kV Tenughat (TVNL) S/S on 09.09.2022 at 12:55 Hrs	PCC advised JUSNL to rectify all clearance related issues present in 220 kV Tenughat-Govindpur D/C line so that similar type of incidents can be avoided in future. PCC advised JUSNL to share PSL logic of relay to ERPC/ERLDC. It further advised JUSNL to communicate this matter to relay manufacturer for testing and updating firmware in the relay. PCC advised TVNL to review overcurrent settings of unit #2 considering the present transmission network & fault level data at Tenughat. The coordination study may be done considering when one unit in operation & there is a line fault in one of the outgoing feeders (worst case scenario). The revised setting may be implemented at Unit end & the same may be intimated to PCC.	
3.	Repeated Disturbances at 220 kV Ratu(JUSNL) S/s	PCC opined that all utilities may share the best practices adopted in their system to avoid such type of maloperation of Transformers/Reactors so that a common best practice may be compiled and shared for benefit of all.	

4.	Tripping of 220 kV Bus-1 at Ramchandrapur on 28/09/2022 at 15:49 Hrs	PCC suggested that CT connection may be checked for C-phase for all the feeders connected to busbar relay and the reporting of C-phase current of each 220 kV feeder to busbar relay may be checked.	
118th PCC Meeting			
5.	Disturbance at 400 kV Dikchu S/s on 10.08.2022 at 11:57 Hrs	PCC advised Dikchu HEP to expedite the visit of relay engineer and resolve the issue by Sep-22. PCC also raised serious concern about long outage of the main bus-2 of Dikchu HEP and advised DIkchu HEP to continuously take up with the vendor for supply of the breaker at the earliest. Further, Dikchu HEP was advised to submit a firm time-line for restoration of the main bus-2 which would be monitored in PCC meeting.	In 119th PCC Meeting, Dikchu HEP representative informed that breaker will be supplied by end of Nov 2022 and main Bus-2 will be restored by Dec 2022. He further added that relay engineer will visit site within a week to resolve the autorecloser issue.
117th PCC Meeting			
6.	Total Power failure at 220 kV Joda (OPTCL) S/s on 27.07.2022 at 11:30 Hrs	OPTCL representative replied that they would take necessary action for implementing autorecloser without PLCC at TTPS end. Further he informed that OPGW for the above line has been commissioned and after completion of DTPC commissioning work, the A/R scheme with OPGW communication would be implemented subsequently.	OPTCL updated that their team would visit to TTPS S/s within a week. Further they are coordinating with NTPC for early implementation of A/R without PLCC in 220 kV Joda-TTPS line. No update in 119th PCC Meeting.
7.	Tripping of 220 kV TLDP IV-NJP line.	PCC opined that carrier healthiness may be checked between NJP & TLDP by performing end to end testing in the line and therefore advised NHPC & WBSETCL to coordinate with each other to complete the test.	Meeting was held among testing wing, communication wing and O&M of WBSETCL at NJP substation. The minutes of meeting is attached at **Annexure C.1.7.**

Annexure C.1.7

एनएचपीसी लिमिटेड
(भारत सरकार का उद्यम)
NHPC Limited
(A Govt. of India Enterprise)

O&M DIVISION
NHPC OFFICE COMPLEX
SECTOR-33, FARIDABAD
HARYANA- 121003
Ph. 91-129-2250846
FAX:91-129-2272413/1419

एनएचपीसी/ओ&एम/2022/116. दिनांक: 26/10/2022

सदस्य सचिव
पूर्वी क्षेत्रीय विद्युत समिति
14, गोल्फ क्लब रोड,
टोलीगंज
कोलकाता-700032

विषय: ERPC की 117वीं पीसीसी बैठक के एजेंडा बिंदु B10 के संबंध में।

महोदय,

यह ERPC की 117 वीं पीसीसी बैठक के Agenda Point No-B10 के संदर्भ में है जिसमें टीएलडी-IV-एनजेपी लाइन # 1 और लाइन # 2 में auto reclose ऑपरेशन बाधित था। इस संबंध में WBSETCL के समन्वय से टीएलडी-IV-एनजेपी लाइन # 1 और लाइन # 2 कि end to end testing की गई और एनजेपी सब-स्टेशन end में fault की पहचान की गई। WBSETCL की MOM की प्रति आपके संदर्भ हेतु संलग्न है।

यह कृपया आपकी जानकारी के लिए प्रस्तुत है।

धन्यवाद।

भवदीय

सूरज

(सूरज धीमान)
महाप्रबंधक (ओ एंड एम)

MOM between Testing wing and Communication wing & O&M of WBSETCL at NJP 220/132/33 KV Sub Stn. Regarding TLDP IV ckt-1 auto-reclose not working at TLDP IV end.

Member Present

For Communication Wing	For Testing wing	For O&M wing
Mr.Lawang Dorjee Sherpa	Mr.Suman Mazumdar	Mr. Vaskar Chowdhury

It has been observed that auto-reclose was not successful at TLDP IV end for ckt-1 from last few transient tripping. To resolve the defect joint testing has been done by testing & communication wing.

During testing following pints has been noted: -

- When total system is connected, "DT send" pulse generated when only permissive send is given not in continuous manner.
- When relay part is separated then DT pulse generated when only permissive is given not in continuous manner.
- It is observed that permissive command not generated when only "DT send " is given.
- End to end testing has been done with TLDP ckt-1
- The same problem was also observed previously at the time of commissioning for that reason it was not handed over to the then in charge of the communication wing.

Now after discussion with Competent authority of communication wing, it is proposed for replacement of the said PLCCs protection as per spare availability in South Bengal if in good condition.

For Communication Wing	For Testing wing	For O&M wing
	Suman Mazumdar DE(E)	D.E.(E) Incharge NJP 220 KV S/Stn. Belaram, Jalpaiguri

MOM between Testing wing and Communication wing & O&M of WBSETCL at NJP 220/132/33 KV Sub Stn. Regarding TLDP IV ckt-2 auto-reclose not working at TLDP IV end.

Member Present

For Communication Wing	For Testing wing	For O&M wing
Mr.Lawang Dorjee Sherpa	Mr.Suman Majumdar	Mr. Vaskar Chowdhury

It has been observed that auto-reclose was not successful at TLDP IV end for ckt-2 from last few transient tripping. To resolve the defect joint testing has been done by testing & communication wing.

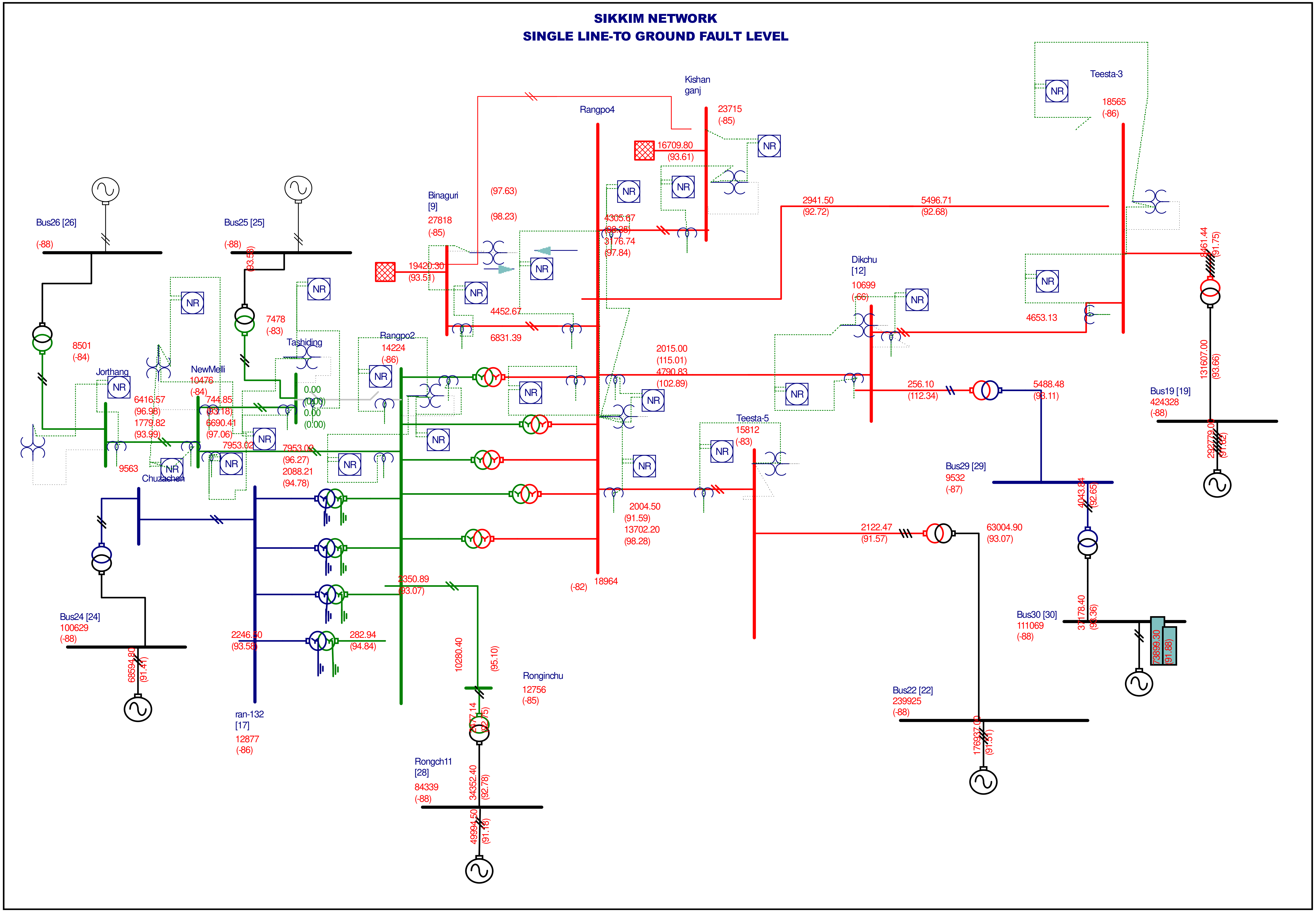
During testing following pints has been noted: -

- It is observed that when permissive command is given the same is not being transmitted on regular basis.
- Appropriate PLCC cards were replaced but same defects remain same.
- No defect has been found in relay panel.

Now after discussion with Competent authority of communication wing, it is proposed for replacement of the said PLCCs protection as per spare availability in South Bengal if in good condition.

For Communication Wing	For Testing wing	For O&M wing
		D.E (E)Incharge NJP 220 KV S/Stn. Balaram, Jalpaiguri

Annexure C.2



SIKKIM NETWORK
SINGLE LINE-TO GROUND FAULT LEVEL
Teesta-3
18565
(-86)
Kishan ganj
23715
(-85)
Rangpo4
16709.80
(93.61)
Binaguri [9]
27818
(-85)
(97.63)
(98.23)
4305.67
3176.74
(97.84)
19420.30
(93.51)
4452.67
6831.39
2941.50
(92.72)
5496.71
(92.68)
Dikchu [12]
10699
4653.13
Bus26 [26]
(-88)
Bus25 [25]
(-88)
7478
(-83)
8501
(-84)
Tashiding
Rangpo2
14224
(-86)
Jorthang
NewMelli
10476
(-84)
6416.57
(96.98)
1779.82
(93.99)
744.85
6690.41
(97.06)
7953.02
(96.27)
2088.21
(94.78)
9563
Chuzachen
2015.00
(115.01)
4790.83
(102.89)
256.10
(112.34)
5488.48
Teesta-5
15812
(-83)
Bus19 [19]
424328
(-88)
Bus29 [29]
9532
(-87)
2004.50
(91.59)
13702.20
(98.28)
2122.47
(91.57)
63004.90
(93.07)
(-82)
18964
2350.89
(93.07)
Bus24 [24]
100629
(-88)
2246.50
282.94
(94.84)
10280.40
(95.10)
Ronginchu
12756
(-85)
Bus30 [30]
111069
(-88)
ran-132 [17]
12877
(-86)
Rongch11 [28]
84339
(-88)
34352.40
(92.78)
Bus22 [22]
239925
(-88)
131607.00
(93.66)

Line	Relay Connected at	CT Ratio in A	Fault Location	Fault Current seen by the Relay	Existing			Proposed			
					Ie> in A (Primary)	TMS	Top in sec	Ie> in A (Primary)	TMS	Top in sec	TMS (correct)
Binaguri-Rangpo	Rangpo end	2000/1	Binaguri	4453	200	0.568	1.241985	400	0.564	1.6	0.56
Binaguri-Rangpo	Binaguri end	2000/1	Rangpo	6831	200	0.638	1.220696	400	0.667	1.6	0.67
Kishangunj-Rangpo	Rangpo end	3000/1	Kishangunj	3177	1200	0.514	3.65964	600	0.387	1.6	0.39
Kishangunj-Rangpo	Kishangunj end	3000/1	Rangpo	4306	400	0.28	0.805367	600	0.459	1.6	0.46
Rangpo- Dikchu	Rangpo end	3000/1	Dikchu	4791	200	0.61	1.302136	600	0.333	1.1	0.33
Rangpo- Dikchu	Dikchu end	3000/1	Rangpo	2015	600	1.5 (DT)	1.5	600	0.21	1.2	0.21
Rangpo- TeesthaV	Rangpo end	2000/1	Teestha V	13702	200	0.6	0.952209	400	0.575	1.1	0.58
Rangpo- TeesthaV	TeesthaV end	2000/1	Rangpo	2005	-	-		400	0.281	1.2	0.28
Rangpo-Teestha III	Rangpo end	3000/1	Teestha III	5497	1200	0.28	1.268379	600	0.356	1.1	0.4
Rangpo-Teestha III	Teestha III end	2000/1	Rangpo	2942	-	-		400	0.349	1.2	0.35
Dikchu-Teestha III	Dickchu end	3000/1	Teestha III	4653	400	1.5 (DT)	1.5	600	0.358	1.2	0.36
Dikchu-Teestha III	Teestha III end	3000/1	Dikchu	5832	-	-		600	0.399	1.2	0.40
Rangpo 220Kv Bus											
Rangpo- Newmelli	Rangpo end	1600/1	Newmelli	7953	320	0.399	0.841655	320	0.427	0.9	0.43
Rangpo- Newmelli	Newmelli end	1600/1	Rangpo	2088	320	0.33	1.208623	320	0.246	0.9	0.25

Tasheding-Newmelli	Tasheding end	800/1	Newmelli	745	160	0.24	1.075464	160	0.223	1	0.22
Tasheding-Newmelli	Newmelli end	1600/1	Tasheding	6690	320	0.314	0.701258	320	0.403	0.9	0.40
Newmelli-Jorethang	Newmelli end	400/1	Jorethang	6417	-	0.473		80	0.589	0.9	0.59
Newmelli-Jorethang	Jorethang end	400/1	Newmelli	1780	300	0.09	0.347553	300	0.155	0.6	0.16
Rangpo - Ronginchu	Rangpo end	1600/1	Ronginchu	10280	208	0.52	0.897307	208	0.522	0.9	0.52
Rangpo - Ronginchu	Ronginchu end	400/1	Rangpo	2351	60	0.5 (DT)	0.5	80	0.500	1	0.50

This is the condition by taking peak generation at all individual substation

Annexure C.3

220kV Bus Bar Protection status at BSPTCL

Sl. no.	Name of the GSS	Status	Remarks
01	Fatuha	GE make Bus Bar Panel available at site. Its commissioning work is pending as one of the relay found defective during panels testing. Relay replacement and further commissioning work to be done by agency.	Continuous follow up from site is needed.
02	Khagaul	Bus Bar Protection Panel not available. One main one transfer bus scheme.	New installation and commissioning is needed.
03	Biharsharif	• Installation and commissioning of new Bus Bar Protection Panel was awarded to M/s GE in 2015, but work remained partially completed and executing agency left midway. • At present 18 no of 220kV bays are available which cannot be integrated in existing Bus Bar Protection Relays. • Also, suitable space is not available in cable trench.	• As per service engineer of m/s GE following modification in old Bus Bar scheme is needed. a) Scheme modification b) Hardware modification c) Software modification d) Firmware modification. • Suitable space in cable trench also needed.
04	Dehri	Bus Bar Panel not available. One main one transfer bus scheme.	New installation and commissioning is needed.
05	Bodhgaya	Bus Bar Panel not available. One main one transfer bus scheme.	New installation and commissioning is needed.
06	Sampatchak	• ABB make Electromechanical type Bus Bar Panel available but not in service due to cases of mal operation. • An estimate for new bus bar scheme prepared and submitted, as per field officials. • Fault Data extraction facility not available in present scheme.	Retrofitting with Numerical type Bus Bar Relay or change of complete Bus Bar Panel is needed for Proper Data Extraction and Fault Analysis
07	Begusarai	ABB make Electromechanical type Bus Bar Panel available but not in service. Fault	Retrofitting with Numerical type Bus Bar Relay or

		Data extraction facility not available in present scheme.	change of complete Bus Bar Panel is needed for Proper Data Extraction and Fault Analysis
08	Bihta new	Alstom make Bus Bar Protection scheme available. Not in service since 28.08.21 due to repeated operation of Y phase Bus Bar Relay. Matter communicated to OEM for rectification of Y phase relay.	Defective relay needs to be replaced to take the Bus Bar Protection system in service
09	Pusauli	ERL make numerical type Bus Bar Protection panel available, but out of service due to mal operation just after commissioning of the GSS.	As it is not working properly since its commissioning in 2015, thorough inspection from OEM is needed.
10	Gopalganj	• As reported, Bus Bar Protection panel was not working properly after its commissioning in 2005. • Easun make **Digital type** Bus Bar Panel available but out of service. Fault Data extraction facility not available.	Retrofitting with Numerical type Bus Bar Relay or change of complete Bus Bar Panel is needed for Proper Data Extraction and Fault Analysis
11	Hajipur	• ABB make **Electromechanical type** Bus Bar panel available but out of service since 03 nos. GSS Bays of BGCL commissioned in same switchyard in 2016. • Fault Data extraction facility not available in present scheme.	Retrofitting with Numerical type Bus Bar Relay or change of complete Bus Bar Panel is needed for Proper Data Extraction and Fault Analysis
12	Darbhanga	• As reported, Bus Bar Protection Panel was not working properly after its commissioning in 2006. • Easun make **Digital type** Bus Bar Panel available but out of service. Fault Data extraction facility not available.	Retrofitting with Numerical type Bus Bar Relay or change of complete Bus Bar Panel is needed for Proper Data Extraction and Fault Analysis
13	Sonenagar NEW	Working	Bus Bar Protection testing done in July 2021 for integration of 220/132 kV 160 MVA ICT.
14	Motipur	Working	
15	Musahari	Working	

16	Khagaria new	Working	Bus Bar Protection testing done on 18/01/22 for integration of 220kV Saharsa New (PGCIL) d/c bays
17	Kisanganj new	Working	Bus Bar Protection testing done on 05/03/22 for integration of 220kV Thakurganj (u/c) d/c bays
18	Madhepura	Not Working	• Existing Bus Bar scheme has 04 nos. of bays. • 06 nos. of bays not integrated. • Electromechanical type Bus Bar scheme, fault Data extraction facility not available.
19	Laukahi	Working	

Present Status of Busbar Protection for 220 KV System of OPTCL					
Name of Substation	**Relay Make**	**Relay Model**	**Numerical/Static**	**Busbar Status**	**Remarks**
400/220/132/33 KV Mendhasal	SIEMENS	7SS5231-5CA01-0AA1/HH	Numerical	Healthy	
220/132/33 KV Atri	ALSTOM	BCU-P40 AGILE,P743; MCU-P40 AGILE,P741	Numerical	Healthy	
220/132/33 KV Chandaka-B	SIEMENS	MICOM P741	Numerical	Healthy	
220/132/33kV Goda	GE	B-90	Numerical	Healthy	
220/132/33 KV Balasore	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
400/220/33 KV New Duburi	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Duburi Old	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Joda	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Kesinga	SCHNEIDER	MCU-MICOM P741;BCU-MICOM P43	Numerical	Healthy	
220/132/33 KV Jayapatna	GE	B90 Multiline	Numerical	Healthy	
220/132/33 KV Bhanjanagar	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Aska New	ALSTOM	MVAJM	Numerical	Healthy	
220/132/33 KV Bargarh New	GE	B90 Multiline	Numerical	Healthy	
220/132/33 KV Nayagarh					Not Available. New Numerical Relay will be commissioned.
220/132/33 KV Samangara	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	01no. Bay Unit (Bus Coupler) is defective. 220kV power supply is not available due to breakdown of D/C Lines during cyclone.
220/132/33 KV Chandaka	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	02nos. Bay Units are defective. M/s SIEMENS is not responding to the call.
220/132/33 KV Cuttack	SIEMENS	SIPROTEC 7SS5251	Numerical	Unhealthy	01no. Bay Unit is defective & sent to SIEMENS Factory for repair.
220/132/33 KV Bidanasi	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	02nos. Bay Units are defective. M/s SIEMENS has been contacted for rectification.
220/132/33 KV Paradeep	ALSTOM	BCU-P40 AGILE,P743; MCU-P40 AGILE,P741	Numerical	Not Commissioned	Will be commissioned during ongoing SAS Project.
220/33 KV Rengali	ER	B3, B24H2	Electromagnetic	Defunct	To be replaced by Numerical Relay
400/220/132/33 KV Meramundali	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	Central Unit & 01no. Bay Unit are defective.M/s SIEMENS has been contacted for rectification.
220/132/33 KV Bhadrak	AREVA	P141	Numerical	Defunct	To be replaced by Numerical Relay.
220/132/33 KV Bolangir New	ABB	REB500	Numerical	Not Commissioned	To be replaced by Numerical Relay of new version.
220/132/33 KV Narendrapur	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	01no. Bay Unit is defective.M/s SIEMENS has been contacted for rectification.

Name of Substation	Relay Make	Relay Model	Numerical/Static	Busbar Status	Remarks
400/220/132/33 KV Lapanga	SIEMENS	SIPROTEC 7SS52	Numerical	Not Commissioned	Will be Commissioned after procurement of CT Primary links for higher CT Ratio.
220/132/33 KV Katapalli	ABB	REB500	Numerical	Not Commissioned	To be replaced by Numerical Relay of new version.
220/132/33 KV Budhipadar	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	03nos. Bay Units are defective.M/s SIEMENS has been contacted for rectification.
220/132 KV Tarkera	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	03nos. Bay Units are defective.M/s SIEMENS has been contacted for rectification.
220/132/33 KV Jayanagar	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	01no. Bay Unit is defective.M/s SIEMENS has been contacted for rectification.
220/132/33 KV Therubali	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	03nos. Bay Units are defective.M/s SIEMENS has been contacted for rectification.
220/33 KV Infocity-2	SIEMENS	SIPROTEC 7SS54	Numerical	Healthy	
220/33 KV Narsinghpur	GE	B90 Multiline	Numerical	Healthy	
220/33 KV Ranki/ Keonjhar	TOSHIBA	GRB200	Numerical	Healthy	
220/33 KV Barkote	ALSTOM	FAC34RF111B	Electromechanical	Not Commissioned	To be replaced by Numerical Relay of new version.
220/33 KV Bonai	GE	B30 Multiline	Numerical	Not Commissioned	To be replaced by Numerical Relay of new version.
220/33 KV Malkangiri	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/33 KV Balimela	ABB	SPAE 010	Static	Defunct	To be replaced by Numerical Relay of new version.
220/33 KV Kashipur	GE	B90 Multiline	Numerical	Unhealthy	Central Unit & 01no. Bay Unit are defective.M/s GE has been contacted for rectification.
220/33 KV Laxmipur	SCHNEIDER	MICOM P741	Numerical	Unhealthy	01no. Communication Cable of Bay Unit is defective.

Present Status of Busbar Protection for 220 KV System (JUSNL)

Name of Substation	Relay Make	Relay Model	Numerical/Static	Busbar Status	Remarks
220/132KV Hatia-II GSS	Siemens	SIPROTEC 7SS525	Numerical	Working	
220/132/33 KV Burmu (Ratu) GSS	ABB	REB670	Numerical	Working	
220/132KV Dumka-II (Madanpur) GSS	Schendier (MiCOM)	MiCOM P743(Bay Unit) MiCOMP741(Central Unit)	Numerical	Working	
220/132/33 KV Godda GSS	ZIV	Central Unit-DBC Bay Unit-DBP	Numerical	Working	
220/132/33 KV Jasidih GSS	ZIV	Central Unit-DBC Bay Unit-DBP	Numerical	Working	
220/132/33 KV Giridih GSS	Siemens	SIPROTEC 7SS85	Numerical	Working	
220/132/33 KV Lalmatia GSS	N/A				Single main bus With transfer bus
220/132 KV Chandil GSS	N/A				Single main bus With transfer bus
220/132KV Ramchanderpur GSS	GE	Multilin B90	Numerical	Working	Spurious operation of busbar protection was observed in recent past. The scheme requires detail checking.
220/132KV Chaibasa-II GSS (Ulijhari)	Schendier (MiCOM)	MiCOM P743(Bay Unit) MiCOM P741(Central Unit)	Numerical	Working	During 3rd party protection audit, busbar protection is found to be not in operation due to issue in peripheral unit.
220/132KV Bhagodih (Garhwa New) GSS	ZIV	Central Unit-DBC Bay Unit-DBP	Numerical	Working	
220/132/33 KV PTPS Switchyard	N/A				All the 220KV Bays will be shifted to 400/220KV PTPS_New GSS
220/132/33 KV Govidpur GSS	ZIV	Central Unit-DBC Bay Unit-DBP	Numerical	Working	
220/132/33 KV Itakhori GSS	ZIV	Central Unit-DBC Bay Unit-DBP	Numerical	Working	

Present Busbar Protection Status of 220 KV System under WBSETCL

Name of Substation	Relay Make	Type	Numerical/Static	Status	Remarks
Alipurduyar 220 KV	Siemens	7SS52	Numerical	Functional	
New Jalpaiguri 220 KV	Abb	RADSS	Static	Functional	
Dalkhola 220 KV	Abb	RADHA	Static	Functional	
Gazole 220 KV	Siemens	7SS85	Numerical	Functional	
Gokarna 400 KV	Abb	REB670	Numerical	Static relay replacing by Numerical	Expected to be put into service with in May-22
Rejinagar 220 KV	Alstom	Micom P741/743	Numerical	Functional	
Sagardighi 220 KV	ZIV	DBC/DBP	Numerical	Functional	
Jeerat 400 KV	Abb	REB670	Numerical	Functional	
Dharampur 220 KV	Alstom	Micom P746	Numerical	Functional	
Krishnanagar 220 KV	Areva	FAC34	Static	Functional	
Kasba 220 KV	Abb	REB670	Numerical	Functional	
KLC 220 KV	Abb	REB670	Numerical	Functional	
NewTown 220 KV	Abb	RADHA	Static	Functional	
Barasat 220 KV	Siemens	7SS85	Numerical	Functional	
Subhasgram 220 KV	Areva	FAC34	Static	Functional	
Laxmikantapur 220 KV	Abb	REB670	Numerical	Functional	
New Haldia 220 KV	Abb	RADHA	Static	Functional	
Domjur 220 KV	Abb	RADHA	Static	Functional	
Foundry Park 220 KV	Siemens	7SS52	Numerical	Functional	
Howrah 220 KV	Areva	FAC34	Static	Functional	
Rishra 220 KV	Abb	RADHA	Static	Functional	
Chanditala 400 KV	Alstom	Micom P741/743	Numerical	Functional	
Midnapore 220 KV	Abb	RADHA	Static	Functional	
Kharagpur 400 KV	Alstom	Micom P741/743	Numerical	Functional	
Vidyasagar Park 220 KV	Alstom	MFAC34	Static	Functional	
Egra 220 KV	Siemens	7SS85	Numerical	Functional	
New Bishnupur 220 KV	Abb	REB670	Numerical	Functional	
Arambag 400 KV	Abb	REB670	Numerical	Work in progress	Expected to be put into service with in April--22
Satgachia 220 KV	Abb	REB670	Numerical	Static relay replacing by Numerical	Expected to be put into service with in May-22
Durgapur 220 KV	Abb	REB670	Numerical	Functional	
Sadaipur 220 KV	Abb	REB670	Numerical	Functional	
Asansol 220 KV	Abb	RADHA	Static	Functional	
Hura 220 KV	Siemens	7SS52	Numerical	Functional	

Annexure C.3.1

Present Status of Busbar Protection for 220 KV System of OPTCLAs on 31.10.2022					
Name of Substation	**Relay Make**	**Relay Model**	**Numerical/Static**	**Busbar Status**	**Remarks**
400/220/132/33 KV Mendhasal	SIEMENS	7SS5231-5CA01-0AA1/HH	Numerical	Healthy	
220/132/33 KV Atri	ALSTOM	BCU-P40 AGILE,P743; MCU-P40 AGILE,P741	Numerical	Healthy	
220/132/33 KV Chandaka-B	SIEMENS	MICOM P741	Numerical	Healthy	
220/132/33kV Goda	GE	B-90	Numerical	Healthy	
220/132/33 KV Balasore	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
400/220/33 KV New Duburi	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Duburi Old	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Joda	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Kesinga	SCHNEIDER	MCU-MICOM P741;BCU-MICOM P43	Numerical	Healthy	
220/132/33 KV Jayapatna	GE	B90 Multiline	Numerical	Healthy	
220/132/33 KV Bhanjanagar	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Aska New	ALSTOM	MVAJM	Numerical	Healthy	
220/132/33 KV Bargarh New	GE	B90 Multiline	Numerical	Healthy	
220/132/33 KV Nayagarh					New Numerical Relay will be commissioned during ongoing SAS Project.

220/132/33 KV Samangara	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	01no. Bay Unit (Bus Coupler) is defective. 220kV power supply is not available due to breakdown of D/C Lines during cyclone.
220/132/33 KV Chandaka	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Cuttack	SIEMENS	SIPROTEC 7SS5251	Numerical	Healthy	
220/132/33 KV Bidanasi	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Paradeep	ALSTOM	BCU-P40 AGILE,P743; MCU-P40 AGILE,P741	Numerical	Not Commissioned	Will be commissioned during ongoing SAS Project.
220/33 KV Rengali	ER	B3, B24H2	Electromagnetic	Defunct	To be replaced by Numerical Relay
400/220/132/33 KV Meramundali	SIEMENS	SIPROTEC 7SS52	Numerical	Unhealthy	Central Unit & 01no. Bay Unit are defective.M/s SIEMENS has been contacted for rectification.
220/132/33 KV Bhadrak	AREVA	P141	Numerical	Defunct	To be replaced by Numerical Relay.
220/132/33 KV Bolangir New	ABB	REB500	Numerical	Not Commissioned	New Numerical Relay will be commissioned during ongoing SAS Project.
220/132/33 KV Narendrapur	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
400/220/132/33 KV Lapanga	SIEMENS	SIPROTEC 7SS52	Numerical	Not Commissioned	Will be Commissioned after procurement of CT Primary links for higher CT Ratio.
220/132/33 KV Katapalli	ABB	REB500	Numerical	Not Commissioned	New Numerical Relay will be commissioned during ongoing SAS Project.

220/132/33 KV Budhipadar	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132 KV Tarkera	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Jayanagar	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/132/33 KV Therubali	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/33 KV Infocity-2	SIEMENS	SIPROTEC 7SS54	Numerical	Healthy	
220/33 KV Narsinghpur	GE	B90 Multiline	Numerical	Healthy	
220/33 KV Ranki/ Keonjhar	TOSHIBA	GRB200	Numerical	Healthy	
220/33 KV Barkote	ALSTOM	FAC34RF111B	Electromechanical	Not Commissioned	To be replaced by Numerical Relay of new version.
220/33 KV Bonai	GE	B30 Multiline	Numerical	Not Commissioned	To be replaced by Numerical Relay of new version.
220/33 KV Malkangiri	SIEMENS	SIPROTEC 7SS52	Numerical	Healthy	
220/33 KV Balimela	ABB	SPAE 010	Static	Defunct	To be replaced by Numerical Relay of new version.
220/33 KV Kashipur	GE	B90 Multiline	Numerical	Unhealthy	Central Unit & 01no. Bay Unit are defective.M/s GE has been contacted for rectification.
220/33 KV Laxmipur	SCHNEIDER	MICOM P741	Numerical	Healthy	

Annexure C.5.1

Protection Audit Recommendations for the Stations audited protection audit team of ERPC				
Sl No.	**Name of Substation**	**Owner**	**Date of Audit**	**Remarks/Recommendation**
1	765/400 kV Sundergarh S/s	Powergrid	25.04.2022	1.Switchyard equipments are in good and healthy condition. Switchyard area as well as overall station is well maintained.
				2.Provision for nameplate with bay/line name may be done in front of SPR(Kiosk) in switchyard for easy identification.
2	400/220/132 kV Lapanga(OPTCL) S/s	OPTCL	26.04.2022	1.Event logger is not available for 220 kV System. The same shall be provided.
				2.Time synchronising equipment is not available for 220 kV system.
				3.Busbar/LBB protection is not available for 220 kV system . The same shall be commissioned at the earliest.
				4.Autorecloser is implemented without PLCC for all the 220 kV feeders. It was informed that OPGW for these lines are under commissioning.
				5.OPGW/DTPC commissioning may be expedited and thereafter carrier based autorecloser as well as intertripping scheme may be implemented for 220 kV lines.
				6.For 220 kV control room housing the relay panels, air conditioning shall be provided for proper functioning of protection system panels & to prevent failure of numerical protection systems.
				7.Zone settings(zone-2, zone-3 & zone-4) in distance protection relay may be reviewed for all the 400 & 220 kV lines in line with the ERPC Protection philosophy.
				8.Group protection for 400 kV Lapanga-Meramundali line may be enabled and two group settings may be kept in the relay. One group considering 400 kV M'mundali-Bolangir in service and another group setting when 400 kV M'mundali-Bolangir is not in service. Group to be selected as per the actual configuration.
				9.Autorecloser in 400 kV Lapanga-Meramundali line is having some issue. The same may be rectified.
				10.Power swing blocking enabled for all zones. It may reviewed and blocking may be done all the zones except zone-1.
				11.Grading in terms of time/voltage setting shall be done in Overvoltage settings of 400 kV lines.
3	220/132 kV Budhipadar(OPTCL) S/s	OPTCL	26.04.2022	1. Time synchronising equipment in substation control room is not working. The same may be rectified & put into service.
				2.Main-I relay of 220 kV Budhipadar-Lapanga-I feeder and main-2 relay of 220 kV Budhipadar-SMC feeder was found to be defective and not in operation. Defective relay shall be changed with spare/new relay immediately.

				3.Main-1 relay of following fedders are of static type. 220 kV Budhipadar-IB TPS line, 220 kV Budhipadar-Tarkera D/c line, 220 kV Budhipadar-Raigarh PG. All Electro Static Relays may be replaced with latest version of Numerical relays for quick and accurate analysis of Trippings.
				4.DC earth leakage were found in both DC-I & II sources. The same may be attended. Continous monitoring of dc earth leakage measurements to be done.
				5.PLCC is not in service for most of the lines. Autorecloser w/o PLCC is implemented for some of the feeders like 220 kV Tarkara D/C, 220 kV Lapanga D/C feeder. For rest of the feeders auto recloser was not in service.
				It was informed that OPGW for these lines are under commissioning. OPGW/DTPC commissioning may be expedited and thereafter carrier based autorecloser as well as intertripping scheme shall be implemented for 220 kV lines.
				6.For 220 kV Budhipadar-Korba-1 &2, the PLCC is not working and found to be out of service since long. Being inter-regional line, matter may be taken up with appropriate authority for restoring the PLCC communication in the line. Alternatively, It is suggested that carrier communication through OPGW network may be planned & implemented.
				7.Zone settings for all 220 kV lines need to be reviewed in line ith ERPC Protection Philosophy & considering the present network configuration at the remote end substations.
				8.Busbar protection is available for a single bus only. For other bus, it is out of service due to defective bay units. It is advised to restore the busbar protection for the second bus at the earliest. Similarily zone-4 settings of feeders corresponding to the bus for which busbar is out of service may be reduced to 250 msec.
				9. Oil leakages was observed in 220/132 kV Auto-I. Action may be taken to address the same.
				10.Vegetation shall be cleared & proper PCC and gravelling should be done in the switchyard.
				General:
				1. Uniform protection philosophy may be adopted across OPTCL network
				2. Protection co-ordination to be done as and when there is change in network configuration or commissioning of new lines
				3. O/V voltage/time gradation to be done for S/s level
				4. Periodic internal review of implemented protection settings
4	220 kV IB TPS	OPGC	27.04.2022	1. Event logger is not available for 220 kV system. The same shall be provided.
				2. Zone-2 tmer setting may be reviewed considering the shortest line at remote end(budhipadar) for all 220 kV lines

				3. Zone-4 reach and time delay may be reviewed for all 220 kV lines
				4. Zone-3 time delay may be reviewed as it is encroaching next voltage level (220 kV Lines)
				5. PLCC not operational for all four 220 kV feeders. It was informed that OPGW/DTPC based communication system will be commissioned in near future.
				6. OPGW/DTPC commissioning may be expedited and thereafter carrier based autorecloser as well as intertripping scheme may be implemented for 220 kV lines.
				7. Busbar relay is of static type. It was informed that renovation & upgradation of 220 kV switchyard is under proposal stage.
5	400 kV OPGC S/s	OPGC	27.04.2022	1. At 400 kV level, it was found the both main-1 & main-2 relays of outgoing transmission lines are of same make & model employing different characteristic. It is recommended that different make & model for main-1 &2 relay is preferable and same may be implemented.
				2. Overvoltage setting for the lines need to be reviewed. Time grading / voltage grading may be done in the overvoltage settings for different lines/for overall substation
				3. DR time window may be increased. DR configuration may be done in line with guidelines approved in ERPC PCC meeting.
				4. Overcurrent protection in 400 kV lines may be disabled.
				5. Provision for sending DT signal to other end during operation of DEF protection may be implemented.
				6. Line length for 400 kV OPGC-Lapanga line may be verfied in consultation with OPTCL.
				7. Zone-2 & Zone-3 settings of all 400 kV lines need to be reviewed and set as per the ERPC Protection philosophy.
				8. Adjacent shortest and longest line length maybe verified and zone settings maybe implemented accordingly
				9. Power swing block enabled for all zones. May be reviewed
6	765 kV Darlipali(NTPC) S/s	NTPC	28.04.2022	1. Time grading to be done in stage-I overvoltage settings for 765 kV Darlipalli-Jharsuguda D/c line.
				2. Power Swing blocking enabled for all zones. May be reviewed.
				3. Relay setting data is not available in Protection database of ERPC. The same may be updated at the earliest.

Annexure C.5.2

Annexure-A				
Protection Audit Recommendations for the Stations audited by protection audit team of ERPC				
Sl No.	**Name of Substation**	**Owner**	**Date of Audit**	**Remarks/Recommendation**
1	400/220 kV Jamshedpur S/s	Powergrid	20.07.2022	1.Time synchronization for some of the relays are not as per the GPS clock. The same may be rectified. 2.Zone-2 timer setting for all 400 kV lines is set to 500 msec. The same may be reviewed in line with ERPC Protection guidelines. 3. TMS value of backup overcurrent IDMT relay is different for three ICTs whereas the pickup value is same for all the ICTs. Similarly TMS of backup earthfault relay for ICT-1 & ICT-2 is different than ICT-3. It is recommended to set TMS value for overcurrent relay as well as backup E/F relays uniform among all three ICTs.
2	400/220 kV Chaibasa S/s	Powergrid	21.07.2022	1.Switchyard equipments are in good and healthy condition. Switchyard area as well as overall station is well maintained. 2.Though Overvoltage stage 1 settings are graded in time or voltage magnitude between the two ckts of Rourkella or Chaibasa or jamshedpur ,they are not so clearly graded as whole(Rourkella 1 and Jamshedpur 1 having identical settings).This part may be reviewed and the shorter line may be made to have higher magnitude or time value relative to the longer lines. No two 400 KV line should have exactly same settings in voltage triggering value or time delay.

3	220/132 kV Chandil(JUSNL) S/s	JUSNL	20.07.2022	**General:**
				1. Uniform protection philosophy shall be adopted across JUSNL network in line with ERPC Protection philosophy.
				2. Protection co-ordination to be done as and when there is change in network configuration or commissioning of new lines.
				3. Review of implemented protection settings need to be carried out periodically for JUSNL system..
				4.Measures shall be taken to ensure healthiness of busbar/LBB protection relay & PLCC system in the substation.
				1. Time synchronising equipment in substation is not available.
				2.For 220 kV Ranchi Feeder, only main-I protection relay is present along with separate back-up overcurrent relay. Main-2 protection relay shall be installed for this line.
				3. Peak load served by the station is 240 MVA,however three out of four 100 MVA 220/132 KV ATR are functional. 4th ATR is out since 30.4.2020 and replacement status is not available.N-1 relibility criteria is being not satisfied during peak condition. Steps may be taken at the earliest to bring 4th ATR into service.
				4.Oil leakage found in ATR-1. However due to high demand, the shutdown is not being allowed and the issue can not be attended. The same may be looked into urgently.
				5.220 kV is having sing main & transfer bus scheme. As intimated by S/s incharge, proposal for bus sectionalizer in 220 kV bus is under consideration.
				6.Busbar/LBB protection is not available.
				7.Zone 4 delay time for all 220 kV lines is 300 ms.it may be made 250 ms as Bus bar protection is not commissioned.
				8.Disturbance recorders shall be configured as per the DR standard guidelines of ERPC.
				9. For Santaldih ckt, zone 2 reach has been setting has been done as 18.97 Ω which seems to be on the higher as it is appearing to be 120% of line length + 50% of Shortest adjacent line. As per ERPC guideline, the same for 220 KV line should be either 120% of line length or (100% of length+ 50% of shortest adjacent line).
				10.For Ramchandrapur line, zone 3 value is 23.87 Ω. However, this value is encroaching the 2x150 MVA 220/132 KV ATR impedance in Ramchandrapur as seen from chandil,so the time delay of zone 3 may be suitably reviewed and coordinated with fault clearing time of the said ATR.
				11.Only one DC battery source is found in service while other is in spare and not in service simultaneously. For 220 KV, Two separate Dc sources are recommended feeding to main 1 and main 2 relays with separate trip coils as per CEA construction standards.
				12.Power swing block is enabled for all the zones in 220 kV lines. It is recommended to block zone 2 and above with unblocking time of 2 seconds
				13.REF protection for ATRs is not available in all but one. For one ATR, though REF protection is avaialble, REF has been kept disabled after it maloperated during through faults. It is advised to implement REF protection for all the transformers.
				14.DC earth leakage was found. Battery connectors were found to have oxidized etching marks. Action may be taken to rectify the above issue.
				15.PLCC channels are not healthy for Ranchi line.For Sanataldih circuit, the autorecloser dead time setting may be checked and set to 1 sec.
				16.Bus CVT is being used for distance protection relay of 220 kV feeders. Provision for line CVT in 220 kV Feeders may be envisaged and implemented.
				17.PCC & Gravelling may be done for complete area of 220 kV Switchyard.
				18.LA counter is missing in ATR-2. The same may be provided.
				19.Zone settings for all 220 kV lines need to be reviewed in line ith ERPC Protection Philosophy & considering the present network configuration at the remote end substations.

4	220 kV Ramchandrapur	JUSNL	21.07.2022	1. Bus 2 PT is not in service. Only bus 1 PT is present and it is being used in distance relay for covering short line section between the 220 KV side 400/220 KV Jamshedpur ICT terminals to 220 KV Ramchandrapur bus .Bus-2 PT may be replaced at the earliest.
				2.Requirement of distance protection on RCP end for the line section of 220 kV RCP-Jamshedpur(PG) may be reviewed. In case distance protection remain in operation, provision for line CVT may be envisaged where distance protection is in service.
				3.Only one DC battery source is found in service while other is in spare and not in service simultaneously. For 220 KV level, Two separate Dc sources are recommended feeding to main 1 and main 2 relays with separate trip coils as per CEA construction standards. Necessary action may be taken to operate two sources in parallel.
				4.DR is not GPS time synchronised. The same may be rectified.
				5. DR time window may be increased. DR configuration may be done in line with guidelines approved in ERPC PCC meeting.
				6.Busbar relay panel is placed in old control room without Air Conditioning.Action may be taken to place the busbar panel in a AC room.
				7.Zone settings for chandil line shall be reviewed in line with ERPC protection philosophy.
				8. Zone-2 & zone-3 reach setting may be reviewed for Chaibasa fedder
				9.Zone-3 setting may be reviewed for 220 kV RCP-Joda feeder.
				10. LBB relays are not for individual bay as a result LBB protection is not functional although busbar protection is in service. As per CEA grid connectivity regulation, LBB is mandatory for 220 kV S/s. Action may be taken to implement the same.
				11.Power swing block is enabled for all the zones in 220 kV lines. It is recommended to block zone 2 and above with unblocking time of 2 seconds
				12.Autoreclose scheme is implemented without PLCC . Dead time is seen to be 1.2 sec ,while recommendation is 1 sec. Reclaim time is 3 seconds while recommendation is 25 seconds.Above settings may be reviewed.
				13.PLCC is healthy only for 220 kV Chaibasa lines. For rest 220 kV feeders, steps may be taken to address the PLCC issue and put into service at the earliest.
				14.N-1 relaibility criteria is not being satisfied for 200/132 kV ATRs in both peak & off-peak period.Out of 3 ATRs available, one is out of service due to bushing failure since long wheras another transformer is being operated in very critical condition having heavy oil leakge. As per the reports submitted in S/s, the parametes w.r.t. transformer oil and bushing is not as per the standard. It is recommended that complete overhauling/replacement of ATR-2 may be done at the earliest. SImilarly action may be taken for bushing replacement for ATR-1 which is out of service since long.
				15.PCC & Gravelling may be done for transformer bays in 220 kV Switchyard.
				16.REF protection is not in service for both the 220/132kV transformers. The same may be implemented.

5	220 kV Chaibasa S/s	JUSNL	21.07.2022	1. Disturbance recorders are not time synchronised.
				2. DR time window may be increased. DR configuration may be done in line with guidelines approved in ERPC PCC meeting.
				3. Zone-2 reach setting & zone-3 timer setting for Ramchandrapur feeder shall be reviewed in line with ERPC protection philosophy.
				4. Overvoltage protection was seen to be enabled with stage 1 at 110%,5 sec delay. The same may be disabled or set to a higher value(greater than 112 %).
				5.For Ramchandrapur feeders, autorecloser is not in service for both the circuits due to issue in BCU panel. The issue may be looked into at the earliest.
				6. Zone-3 & Zone-4 reach setting to be reviewed for 220 kV Chaibasa-Chaibasa(PG) line.
				7. In 150 MVA 220/132 KV ATR, low set current pickup setting in backup O/C relay is 1048 A ,which is 260% of transformer rated current. This current pick up setting may be reviewed.
				8.The bus bar protection relay is not functional due to fibre communication error as shown in relay display. Being a imporatant protection in the substation, immediate measure shall be taken to rectify the issue and bring the busbar relay into service.
				9. Air conditioning is not working in the kiosks housing the relay panel for different bays. AC shall be provided for proper functioning of protection system panels & to prevent failure of numerical protection systems.
				10.It is seen in the switchyard that both bus side isolators of 220 KV Chaibasa Chaibasa ckt 2 and 220 KV Chaibasa Ramchandrapur ckt 1 are in closed condition. This may be immediately changed to a single bus only as whenever there is a bus fault in either of 220 KV bus,both lines will trip during fault clearance. Necessary modification may be made in wiring of bus bar relay and Peripheral units.
				11.DC earth leakage was observed in one of the DC sources. The same may be attended.
6	220 kV Jamshedpur S/s	DVC	22.07.2022	1.PLCC is not working for 220 kV JSD-Jindal line. Therefore autorecloser scheme is kept disabled for the line. PLCC panel is present at Jamshedpur end however there is no information of PLCC at JSPL end. The matter may be taken up with appropriate authority for commissioning PLCC in the line.
				2. Disturbance recorder configuration to be done as per DR standard guidelines by ERPC. CB close status(CB open shall be configured in DR instead of CB Close) to be rectified and DR window size to be increased in DR.
				3. Time synchronising equipment in substation control room is not working. The same may be rectified & put into service.
				4.DC earth leakage were found in both DC-I & II sources. The same may be attended. Continous monitoring of dc earth leakage measurements to be done.
				5.For JSPL circuit, Zone 2 reach is encroaching half of next shortest adjacent line,so time delay is seen to be 500 ms. Alternatively,reach may be reduced from 120% of length to line length plus 50% of SAL ,while time delay can be maintained at 350 msec. To be reviewed.
				6. Zone-2 reach setting for Bokaro line may be reviewed considering the shortest adjacent line as 220 kV BTPS-CTPS.
				7.As informed by S/s Incharge, in the LBB protection there is no provision of sending DT signal to other end of the line. The scheme may be reviewed and transmitting DT signal to other end in LBB protection may be incorporated.