Agenda
for
137th PCC Meeting

Date:30.07.2024
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 137th PROTECTION COORDINATION SUB-COMMITTEE MEETING TO BE HELD ON 30.07.2024 AT 10:30 HRS THROUGH MS TEAMS

PART – A

ITEM NO. A.1: Confirmation of Minutes of 136th Protection Coordination sub-Committee Meeting held on 19th June 2024 through MS Teams.

The minutes of 136th Protection Coordination sub-Committee meeting held on 19.06.2024 was circulated vide letter dated 19.07.2024.

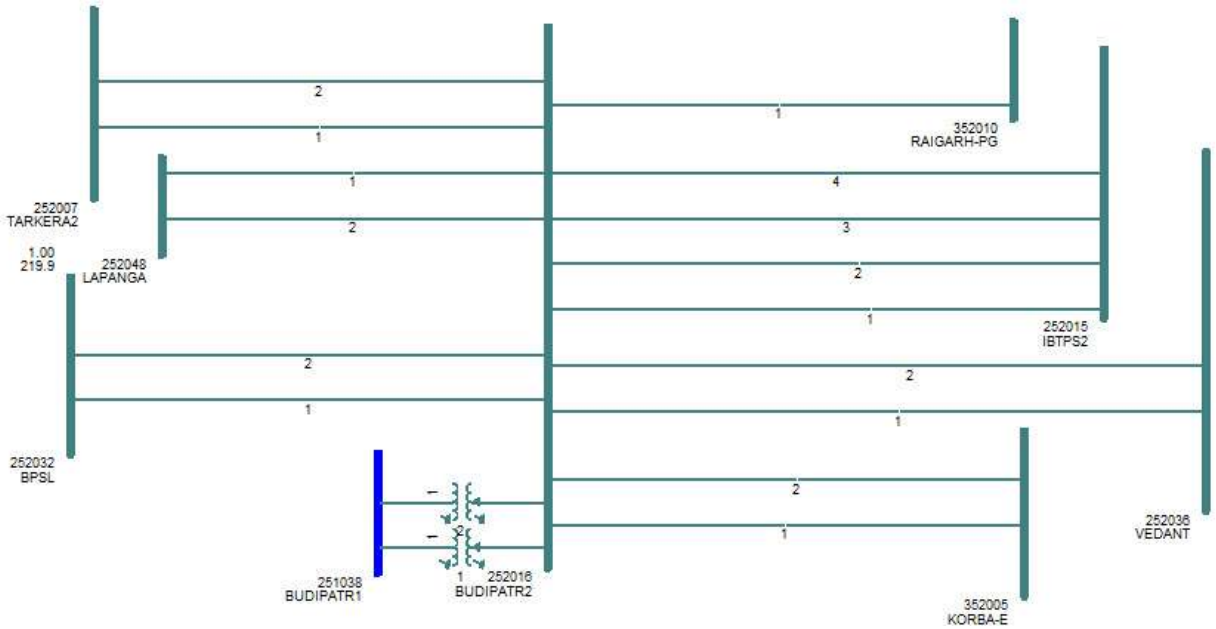
Members may confirm the minutes of the Meeting.

PART – B

ITEM NO. B.1: Repeated disturbance at 220 kV Budhipadar(OPTCL) S/s and 220 kV Ib-TPS (OPGC) S/s on 05.06.2024 at 04:11 Hrs and on 13.06.2024 at 19:11 Hrs

- **Disturbance at 220 kV Budhipadar(OPTCL) S/s and 220 kV Ib-TPS (OPGC) S/s on 05.06.2024 at 04:11 Hrs**

On 05.06.2024 at 04:11 Hrs, R-ph CT of 220kV IBTPS-Budhipadar circuit 3 got burst at Budhipadar end and all emanating lines from Budhipadar got tripped. Further, both units of IB TPS got tripped due to loss of evacuation path. Power was restored via charging of 220kV Budhipadar-Lapanga circuit 2 at 04:54 Hrs.



Detailed report from ERLDC is attached at **Annexure B.1.1.**

Gen. Loss: 350 MW
Outage Duration: 00:43 Hrs

OPTCL & OPGC may explain.

- **Disturbance at 220 kV Budhipadar(OPTCL) S/s and 220 kV Ib-TPS (OPGC) S/s on 13.06.2024 at 19:11 Hrs**

On 13.06.2024 at 19:11 hrs, 220 kV Bus-2 at Budhipadar got tripped due to operation of bus bar protection after failure of R phase CB of 220 kV Budhipadar-Raigarh-1 at Budhipadar. All associated feeders connected to Bus-2 got tripped. At the same time tripping of both running units at IB TPS occurred.

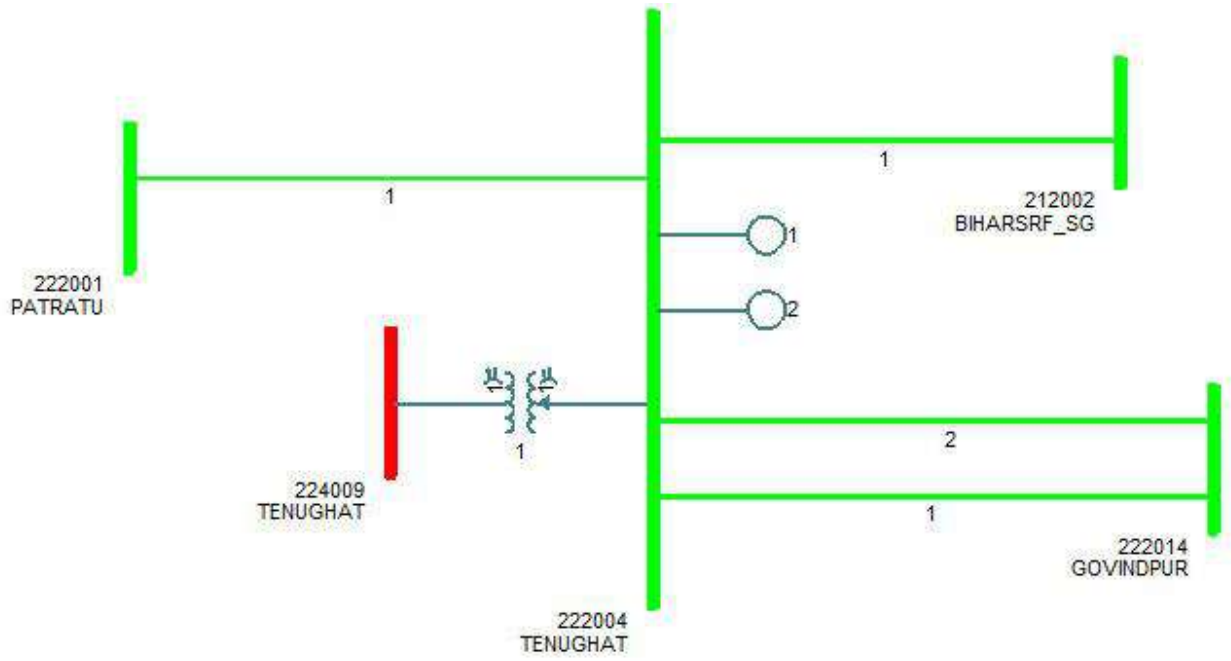
Detailed report from ERLDC is attached at **Annexure B.1.2.**

Gen. Loss: 320 MW
Outage Duration: 01:35 Hrs

OPTCL & OPGC may explain.

ITEM NO. B.2: Disturbance at 220 kV Tenughat (TVNL) S/s and 220 kV Govindpur (JUSNL) S/s on 13.06.2024 at 16:55 Hrs

On 13.06.2024 at 16:55 hrs, 220kV Dumka-Govindpur D/C tripped on R phase fault. 220 kV Tenughat-Biharsharif was already under breakdown consequently, Tenughat unit -2 tripped due to loss of evacuation path as unit -1 was under forced shutdown.



Detailed report from ERLDC is attached at **Annexure B.2.**

Load Loss: 140 MW, Gen. Loss: 142 MW
Outage Duration: 00:13 Hrs

JUSNL & TVNL may explain.

ITEM NO. B.3: Disturbance at 220 kV Baruipur (WBSETCL) S/s on 14.06.2024 at 14:35 Hrs

On 14.06.2024 at 14:35 Hrs, 220 kV Newtown-Subhasgram (PG)- Baruipur tripped due to fault in R phase, 220 kV Baruipur-Subhasgram (WB) was already in opened condition to control loading of ICTs at Subhasgram (PG) which led to a load loss at Baruipur S/s (Renia, Behala, Sirakol & Baruipur Area). Power to the downstream network was made available through 132 kV Lakhikantapur- Sirakol at 14:41 Hrs. 220 kV Bus was charged at 14:48 Hrs through 220 kV Baruipur- Subhasgram (WB).

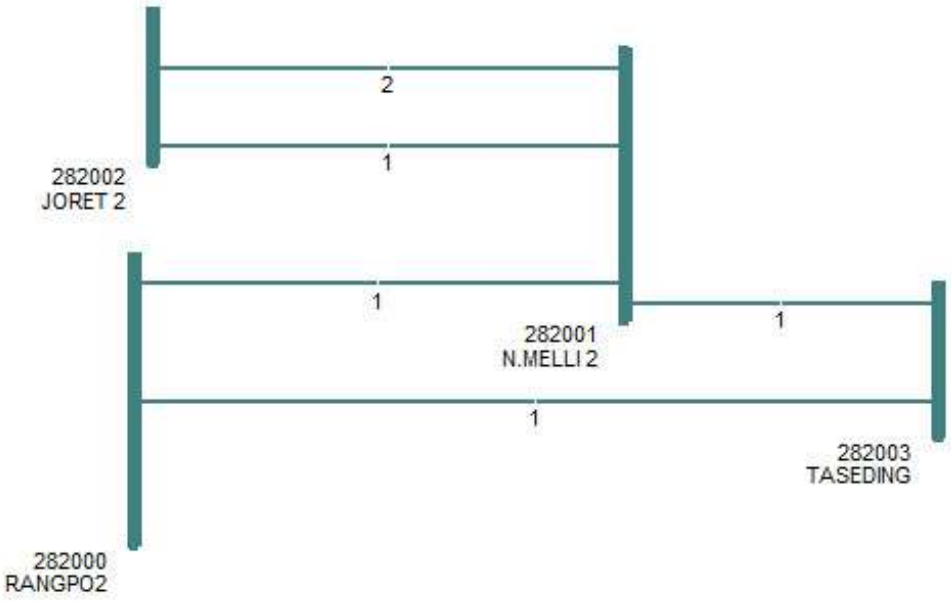
Detailed report from ERLDC is attached at **Annexure B.3.**

Load Loss: 138 MW
Outage Duration: 00:06 Hrs

WBSETCL may explain.

ITEM NO. B.4: Disturbance at 220 kV New Meli (PG) S/s, 220 kV Jorethang HEP and 220 kV Tashiding HEP on 19.06.2024 at 06:38 Hrs

On 19.06.2024 at 06:38 hrs, 220 kV Rangpo- New Melli-1 got tripped due to Y phase to B phase fault. As 220 kV Rangpo- New Melli-2 was under planned shutdown since 21/05/2024, tripping of Tashiding unit 1 & unit 2 and Jorethang unit 1 & unit 2 occurred due to loss of evacuation path.



Detailed report from ERLDC is attached at **Annexure B.4.**

Gen. Loss: 200 MW
Outage Duration: 03:18 Hrs

Powergrid, Jorethang HEP & Tashiding HEP may explain.

ITEM NO. B.5: Disturbance at 400 kV Meeramundali B (OPTCL) S/ s and 400 kV GMR S/s on 20.06.2024 at 19:18 Hrs

On 20.06.2024 at 19:18 Hrs, 400kV-GMR-Meeramundali-B got tripped due to R phase fault which led to tripping of GMR Unit 3 due to loss of evacuation path as GMR Unit 3 is connected to Meramundali-B bus only through single line due to Bus Split at 400kV-GMR S/S.

Detailed report from ERLDC is attached at **Annexure B.5.**

Gen. Loss: 252 MW
Outage Duration: 01:57 Hrs

OPTCL & GMR may explain.

ITEM NO. B.6: Major grid events other than GD/GI

a. Bus tripping occurred in Eastern Region during June'24

Element Name	Tripping Date	Reason	Utility
400kV MAIN BUS - 2 AT IBEUL	08.06.2024 at 06:46 Hrs	Fault in Station Transformer-1	IBEUL

IBEUL may explain.

b. Repeated tripping of transmission lines during the month of June'24

S.No.	Name of the Element	No. of times Tripped	Remarks	Utility
1	132kV-RIHAND-GARWAH-1	7	Fault in B phase in 4 instances.	JUSNL
2	220kV-JODA-RAMCHANDRAPUR-1	6	3 Times A/R was successful from Joda end while line tripped from Ramchandrapur.	OPTCL/JUSNL
3	132kV-BARIPADA(PG)-JALESWAR-1	5	Tripped every time on Y phase fault	OPTCL / PG Odisha
5	132kV-BARIPADA(PG)-BHOGARAI-1	4	Fault in R phase in 3 instances.	OPTCL / PG Odisha
6	400kV-KHSTPP-BARH-1	4	Tripped every time without fault on DT received at Barh end.	NTPC / PG - ER-1

Concerned utilities may explain.

ITEM NO. B.7: Mock Testing of SPS

As per IEGC 2023 Clause 16.2, Mock Testing of all operational SPS has to be done at least once a year for reviewing SPS parameter and functions.

List of all operational SPS in Eastern region and the proposed month of testing are proposed below:

Sl. No.	SPS Details	SPS implemented at	Proposed test month
1	SPS for HVDC Talcher-Kolar at Talcher end (PGCIL and NTPC)	NTPC, Talcher	Operated on 04.06.2024

2	HVDC Bheramara SPS for Secure Power Transfer to Bangladesh (Bangaldesh)	Baharampur(PG)	To be coordinated with NLDC
3	SPS at Sterlite Power (Sterlite)	Sterlite	Modified SPS is under implementation by Sterlite
4	SPS for 220 kV EMSS-Shubhasgram D/C (CESC)	EMSS (CESC)	Aug'24
5	SPS for generation Runback at JITPL	JITPL	Aug'24
6	SPS for 5*400/220 kV ICTs at Subhashgram	Subhasgram(PG)	Sep'24
7	SPS for evacuation of IBEUL generation	IBEUL	Aug'24
8	SPS at Rajarhat (PG) for 2x500MVA ICTs	Rajarhat (PG)	Sep'24

Members may discuss.

ITEM NO. B.8: SPS Scheme for 220 k V Maithon Dumka D/C

A meeting was held on 18/07/2024 through online mode with members from SLDC & STU of Jharkhand, TVNL, ERLDC and ERPC for designing a SPS scheme for 220 kV Maithon-Dumka D/C, following action plan was decided:

a) ERLDC suggested total 160 MW load relief be provided in 2 stages - Initial load relief of 80 MW in case of loading of any line of 220kV Maithon Dumka D/C goes beyond thermal limit and further 80 MW relief if loading of any line is still above the thermal capacity.
b) ERLDC will share the logic of SPS operation and Jharkhand will share the identified load details for SPS operation along with confirmation for the amount of load relief.

ERLDC and Jharkhand may update.

ITEM NO. B.9: Uniform setting for AUFLS relays

On 15th May 2023, frequency of ER dropped to 49.399 Hz due to sudden generation loss of around 7000 MW, triggering the criteria for operation of UFLS stage 1. However, it was observed that the load relief in Eastern region was not adequate. UFLS being a defense mechanism of last resort, its operation should be accurate and adequate load relief should happen in such case.
This was discussed in 127th PCC meeting held on 22.06.2023 and it was decided that no time delay should be present in any UFR relay time settings. Further, PCC advised that wherever static relays are present, the same shall be replaced with numerical relay for better performance.

Concerned utilities may update.

ITEM NO. B.10: Submission of protection performance indices on monthly basis by users to RPC and RLDC for 220 kV and above lines

As per IEGC 2023 Clause 15(6), 15(7) all users shall submit protection performance indices of previous month to ERPC and ERLDC along with reasons for performance indices less than unity of individual element wise protection system to the respective RPC and action plan for corrective measures.

In 136th PCC Meeting, ERPC representative informed that for month of May 2024, protection performance indices had been received from WBSETCL. He further enquired reason behind non-submission of protection performance indices from other utilities.

DVC representative submitted that tripping details are regularly submitted to their SLDC. PCC advised DVC SLDC to look into the matter and furnish the protection performance indices to ERLDC/ERPC in every month.

NTPC representative informed that as it is new practice so it is taking time to implement however details will be shared soon.

DVC representative suggested that a provision for submission of Protection Performance indices may be designed in PDMS portal so that separate submission of the indices will not be required. ERPC Secretariat intimated that the above suggestion will be discussed with M/s PRDC for necessary action.

PCC advised all utilities to submit protection performance indices of previous month to ERPC and ERLDC along with reasons for performance indices less than unity of individual element wise protection system to the respective RPC and action plan for corrective measures.

For the month of June'24, NTPC (North Karanpura, KHSTPP, NPGC, BRBCL, Barh ,Farkka), PG Odisha, BSPTCL & JLHEP had submitted the same, which is attached as **Annexure B.10.**

Concerned utilities may update.

ITEM NO. B.11: Single Line Tripping Incidences in month of June 2024

Single line tripping incidents in the month of June 2024 which needs explanation from constituents of either end is attached at **Annexure B.11.**

Members may discuss.

PART- C: OTHER ITEMS

ITEM NO. C.1: Protection Philosophy of Eastern Region

In 129th PCC Meeting, ERPC Secretariat pointed out the relevant clauses of IEGC 2023 regarding Protection code which will be in force w.e.f. 01.10.2023. He intimated that the existing protection philosophy of ER is not comprehensive and have not been reviewed since long. In compliance to the IEGC regulation and to form a comprehensive protection philosophy, it was suggested to form a committee of protection experts from state transmission utilities, Powergrid, NTPC/NHPC, IPPs as well as representative from SLDCs, ERLDC & ERPC secretariat to review the existing protection philosophy of ERPC and suggest necessary changes to be incorporated in the philosophy.

PCC agreed for the formation of committee as mentioned above and requested concerned utilities to nominate member from their respective organization.

Subsequently ERPC Secretariat vide email dated 26th Feb 2024 had shared draft protection philosophy to committee members which is attached**.** However, no comments have been received till date.

In 134th PCC Meeting, ERPC Secretariat informed that in compliance to the IEGC 2023, protection protocol for Eastern Region had been prepared.

NHPC representative submitted following observations:

i. For 220 kV D/C lines, the zone-2 reach setting may be defined similar to the 400 kV Lines.
ii. Zone-4 setting where busbar protection is not available may be set to 160 msec.

iii. Overvoltage setting may be kept at the 220 kV lines at generating station end where line is having cable section. The settings will be coordinated with unit overvoltage setting.
iv. Cases for which direct trip inter tripping command will be sent to remote end may be specified.

After discussion, PCC agreed for inclusion of point i, iii, and iv in the protection protocol.

PCC further advised all other utilities to go through the protocol and submit their observation at the earliest so that it can be finalized in next PCC Meeting.

In 135th PCC Meeting, Powergrid ER-II representative informed that he has few observations related to protection philosophy which will be shared by 24th May 2024.

PCC further advised all other utilities to go through the protocol and submit their observation by 28th May 2024 so that it can be finalized at earliest.

In 136th PCC Meeting, It was informed to the forum that comments had been received from MPL and Powergrid.

PCC advised ERPC secretariat to conduct a special meeting by 26/06/2024 for finalizing the protection philosophy. Subsequently a meeting was held on 26th June 2024 in which comments received from MPL, Powergrid, NHPC and DVC were thoroughly discussed, and protection philosophy was finalized.

Members may discuss.

ITEM NO. C.2: Internal Protection Audit Plan of Sub stations for the Year 2024-25

The Clause (5) of Regulation 15 of IEGC Regulations, 2023 envisages as below:

Quote
(1) *All users shall conduct internal audit of their protection systems annually, and any shortcomings identified shall be rectified and informed to their respective RPC. The audit report along with action plan for rectification of deficiencies detected, if any, shall be shared with respective RPC for users connected at 220 kV and above (132 kV and above in NER). .....*

(5) Annual audit plan for the next financial year shall be submitted by the users to their respective RPC by 31st October. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC."

Unquote

All utilities are requested to submit the annual audit plan for the substations 220kV and above voltage level for FY 2024-25 to ERPC by 31.10.2023. Annual audit plans for internal audit of their protection systems and third-party protection audit shall be furnished separately.

In 131st PCC Meeting, PCC advised all utilities to submit annual audit plan for the substations 220kV and above voltage level for FY 2024-25 to ERPC at earliest.

The audit plan was received from NHPC & JUSNL.

In 133rd PCC Meeting, It was informed that audit plan had been received from WBSETCL, NHPC and JUSNL.

OPTCL representative informed that detailed protection audit plan will be submitted soon.
BSPTCL representative informed that during winter maintenance activities, protection audit of substations was done however it had not been done as per prescribed format. He further informed that detailed protection audit plan will be submitted soon.

PCC advised Powergrid, NTPC, DVC and IPPs to share their protection audit plan at the earliest.

In 134th PCC Meeting, ERPC representative informed that till date audit plan had been received from WBSETCL, NHPC, JUSNL, BSPTCL and PG Odisha.

PCC advised Powergrid (ER 1 and ER 2), NTPC, DVC and IPPs to share their protection audit plan at the earliest.

WBPDCL representative enquired about the format to carry out protection audit. PCC decided that the prescribed format given in IEGC 2023 will be used to carry out protection audits. The format is also enclosed at **Annexure C.2.**

DVC and CESC have also submitted the protection audit plan to ERPC.

In 135th PCC Meeting, Member Secretary, ERPC advised remaining utilities to share protection audit plan to ERPC within two weeks.

Member Secretary, ERPC suggested that nodal officer from each utility shall be nominated so that protection audit plan other related matter can effectively be monitored.

Powergrid ER-1 representative informed that at present, audit for one substation is done on monthly basis and detailed plan will be shared within a week.
NTPC representative informed that as per present procedure, audit for each substation is done on two yearly basis. ERPC representative replied that as per IEGC 2023, internal audit of each substation needs to be done on yearly basis therefore audit for each of their generating station may be planned accordingly and the plan may be shared within a week.

In 136th PCC Meeting, ERPC representative informed that internal protection audit plan has been received from Powergrid ER-1.

On enquiry from PCC, NTPC representative replied that internal protection audit plan will be shared soon to ERPC/ERLDC.

PCC advised utilities like NTPC, Powergrid ER-2 and other generators to share internal protection audit plan to ERPC/ERLDC at earliest. It further advised to nominate nodal officer from each utility so that protection audit plan other related matter can effectively be monitored.

Concerned Utilities are requested to submit the audit plan at the earliest.

ITEM NO. C.3: Follow-up of Decisions of the Previous Protection Sub-Committee Meeting(s)

The decisions of previous PCC meetings are attached at **Annexure C.3.**

Members may discuss.

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ग्रिड-इंडिया GRID-INDIA ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre
कार्यालय : 14, गोल्फ क्लब रोड, टालिगंज, कोलकाता - 700033
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पूर्वी क्षेत्र के 220/132 केवी बुढ़ीपदार, आईबी टीपीएस उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event at 220kV Budhipadar, IB TPS (OPTCL) Station of Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date(दिनांक):01-07-2024

1. **Event Summary (घटना का सारांश):**

At 04:11 Hrs on 05.06.2024, R_ph CT of 220 kV Budhipadar-IB TPS-3 burst at Budhipadar. This led to a bus fault at Budhipadar, delayed clearing of which led to total power interruption at Budhipadar. Both units of IB TPS also tripped due to loss of evacuation path, leading to generation loss of 350MW. Power was restored via charging of 220kV Budipadar-Lapanga ckt#2 at 04:45 Hrs.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 04:11 hrs of 05.06.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** Odisha
5. **Report received from Utility on:** Not received yet
6. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				Odisha	Odisha
Pre-Event (घटना पूर्व)	49.84 Hz	30020 MW	25838MW	3383 MW	5862 MW
Post Event (घटना के बाद)	49.84 Hz	29670 MW	25898MW	3033 MW	5862 MW

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है)	NIL
Weather Condition (मौसम स्थिति)	Normal weather

7. Load and Generation loss (लोड और जेनरेशन हानि): Generation loss: 350 MW; Load loss: NIL.

8. Duration of interruption (रुकावट की अवधि**): 00:43 Hrs**

9. Network across the affected area (प्रभावित क्षेत्र का नक्शा)

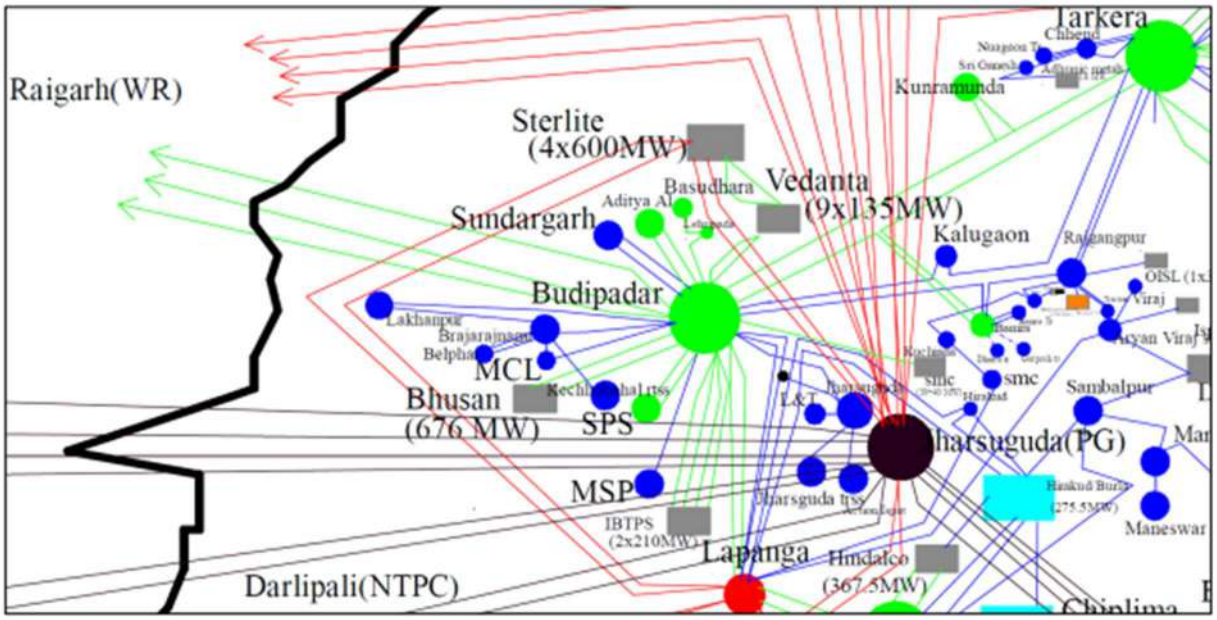


Figure 1: Network across the affected area

10. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): R_ph CT of 220 kV Budhipadar-IB TPS-3 failed at Budhipadar.

11. Major Elements Tripped (प्रमुख ट्रिपिंग):

क्र०सं०	नाम	Trip time (hh:mm:ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	220kV Budipadar-IB TPS-3	04:11:36	Budhipadar: R_N, Zone-1	IB TPS: DT received	20:24 (on 06.06.2024)
2	220kV Budipadar-IB TPS-1		Budhipadar: Y_N, Zone-2, 7 km, 2.5 kA	IB TPS: Y_B, Zone-2, Iy: 1.25 kA, Ib: .99 kA	05:10
3	220kV Budipadar-IB TPS-2		Budhipadar: Y_B, Zone-4	IB TPS: Didn't trip	06:06
4	220kV Budipadar-IB TPS-4		Budhipadar: Y_B, Zone-4	IB TPS: DT received	06:07
5	220kV Budipadar-Raigarh-1		Budhipadar: Y_B, FC - 3.2KA , Zone-4	-	08:21
6	220kV Budipadar-Korba-1		Budhipadar: Y_B, Zone-4 FC – Iy-1.5 KA , I b- 1.4 KA		09:01

7	220kV Budipadar-Korba-2		Budhipadar: Y_B, Zone-4 FC – Iy-1.6 KA , I b- 1.2 KA		18:20
8	220kV Budipadar-Bamra		Budhipadar: R_Y_B, Zone-4		10:08
9	220kV Budipadar-Adityapur-1&2		R_N fault		05:20
10	220kV Budipadar Lapanga-1		Budhipadar: R_Y_B, FC – Ir- 4.1 kA , iy- 4.3 KA , ib – 4.8 kA Zone-4		04:54
11	220kV Budipadar Lapanga-2		Budhipadar: R_Y_B, FC – Ir- 4.1 kA , iy- 4.3 KA , ib – 4.4 kA Zone-4		05:06
12	220kV Budipadar-Vedanta-1,2		Budhipadar: R_Y_B, Zone-4		09:50/05:19
13	220kV Budipadar-BPSL-1,2		Budhipadar: R_Y_B, Zone-4		05:17/09:22

12. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):

R_ph CT of 220 kV Budhipadar-IB TPS#3 burst at Budhipadar. Sequence of events is tabulated as below:

Timestamp	Event	Remarks
04:11:34.900	R_ph CT of 220 kV Budhipadar-IBTPS-3 burst at Budhipadar. Voltage dip observed in R & B ph. Three phase tripping occurred at Budhipadar and DT received at IB TPS. As per PMU data, 220 kV Budhipadar-AAL D/c tripped from Budhipadar immediately.	Reason for tripping of 220 kV Budhipadar-AAL D/c may be explained. Reason for DT receipt at IB TPS may also be checked.
04:11:35.900	Three phase A/r attempt taken at Budhipadar for IBTPS-3. This fault evolved into a bus fault	Reason for three phase A/r attempt may be explained.
04:11:36.150	220 kV Budhipadar-BPSL D/c tripped from Budhipadar end in Zone-4	Time delay for Zone-4 is not kept uniform at Budhipadar. Reason for DT receipt in 220 kV Budhipadar-IB TPS #4 may be checked.
04:11:36.240	220 kV Budhipadar-IB TPS-2,4; 220 kV Budhipadar-Korba-1, 220 kV Budhipadar-Lapanga D/c tripped in Zone-4 from Budhipadar. DT received at IB TPS for Ckt.4. Ckt.2 didn't trip at IB TPS.	
04:11:36.400	220 kV Budhipadar-IBTPS#1 tripped from Budhipadar in Zone-4 and tripped from IB TPS end in Zone-2 (after 400 msec).	
04:11:36.520	220 kV Budhipadar-Raigarh-1 tripped in Zone-4 from Budhipadar	
04:11:36.640	220 kV Budhipadar-Concast; 220 kV Budhipadar-Korba-2 tripped in Zone-4 from Budhipadar	
-	Timestamp of opening of Vedanta D/c, Bus coupler, ICTs couldn't be ascertained due to non-availability of PMU, DR data.	-

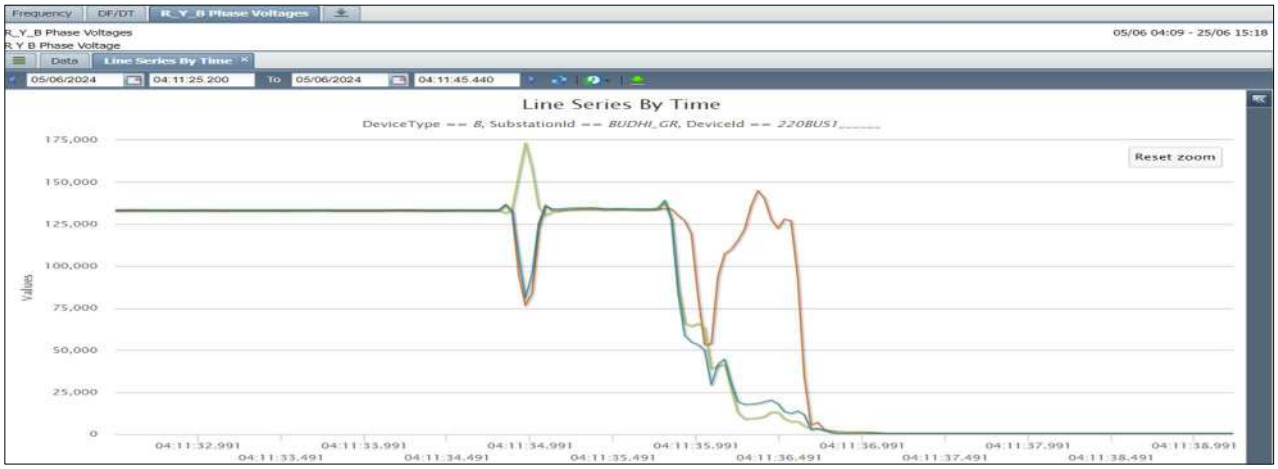


Figure 3: PMU voltage snapshot of 220 kV Bus-1 at Budhipadar

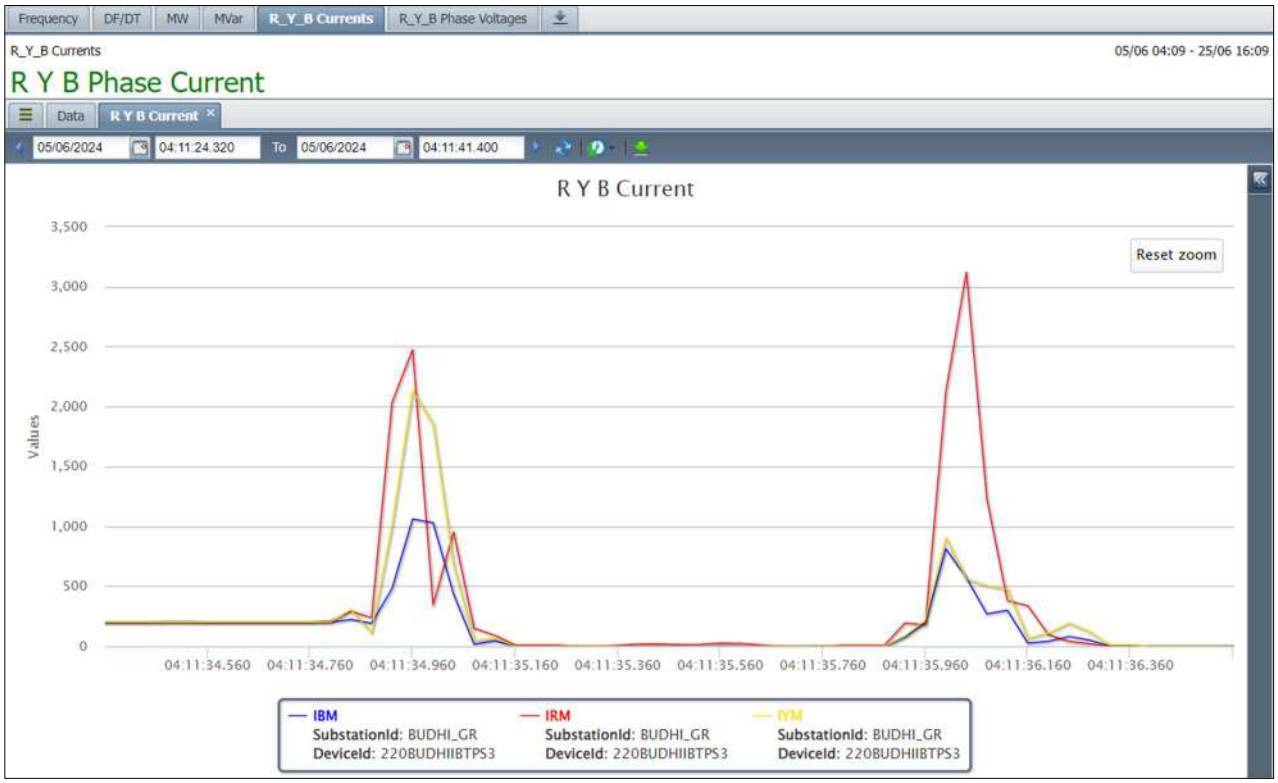


Figure 4: PMU Current snapshot of 220 kV Budhipadar-IB TPS#3

13. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- Three phase A/R of 220 kV Budhipadar-IB TPS#3 has been enabled at Budhipadar. Same may be reviewed.
- 220 kV Budhipadar-AAL D/c tripped immediately from Budhipadar during first fault. Reason for the same may be explained by OPTCL.

- Due to non-availability of Bus bar protection, all feeders with sources on remote end tripped in Zone-4. Different time delay for Zone-4 is set for different feeders at Budhipadar. As reported, Bus bar protection has been commissioned now. Zone-4 delay may be reviewed for all feeders.
- Timestamp of tripping of 220 kV Budhipadar-Vedanta D/c. 220 kV Bus coupler, 220/132 kV ICTs at Budhipadar is not available due to paucity of data. OPTCL may update the tripping time of these elements.
- Detail of islanding of CPPs may be shared.
- DR length for some of the DRs at Budhipadar and IB TPS is very less, and pre-fault data is not recorded. All DRs are not time synchronized. OPTCL and IB TPS may look into it.

14. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- DR length may be increased to 3 seconds with pre-fault recording time of 0.5 seconds.
- Other highlighted issues in the previous paragraph may be investigated and necessary remedial measures may be taken at the earliest.

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

S.No.	Issues	Regulation Non-Compliance	Utilities
2.	**DR/EL not provided within 24 Hours**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**OPTCL, IB TPS**

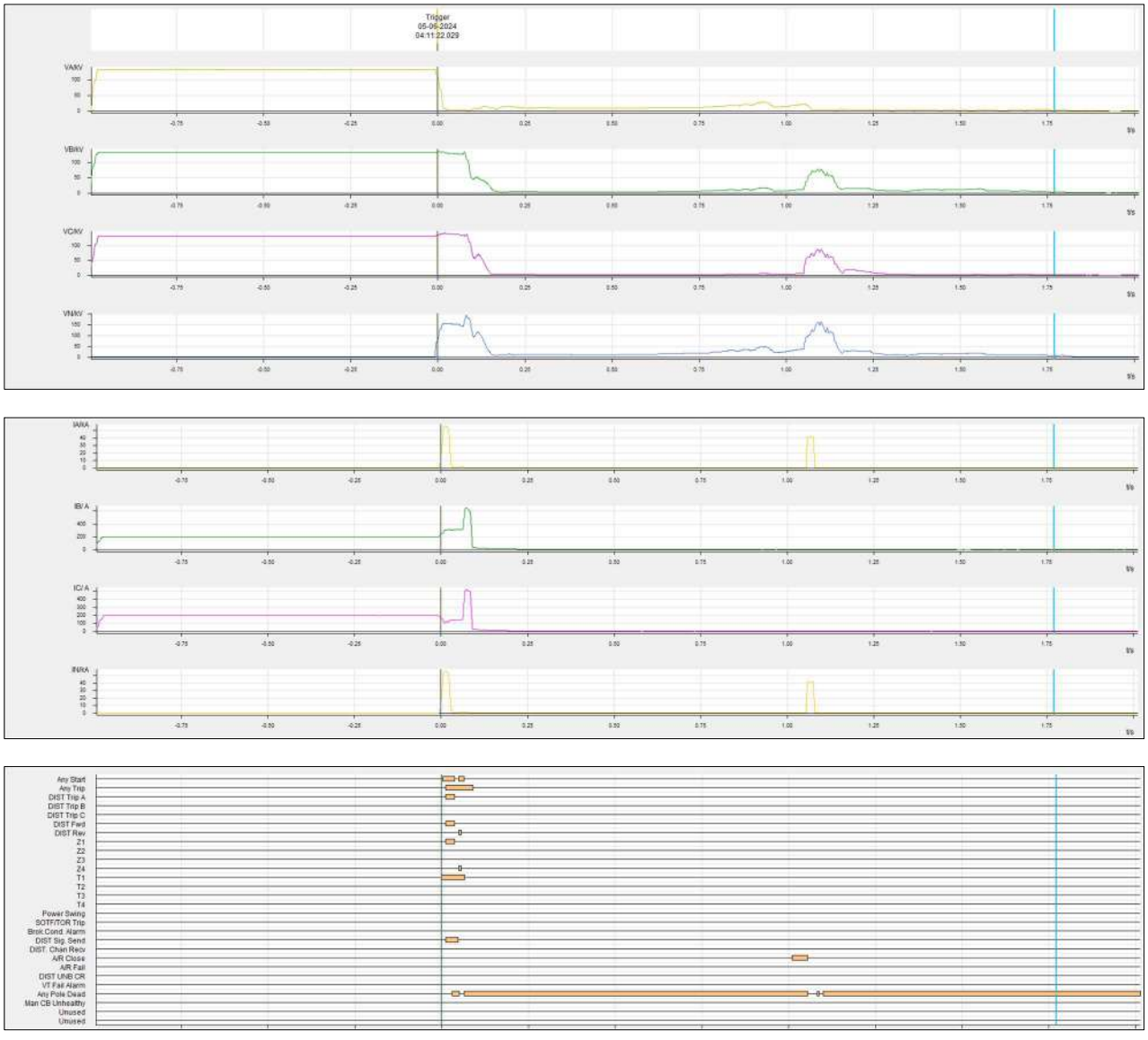
16. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

Annexure 1: (Sequence of Events-As per ERLDC SCADA)

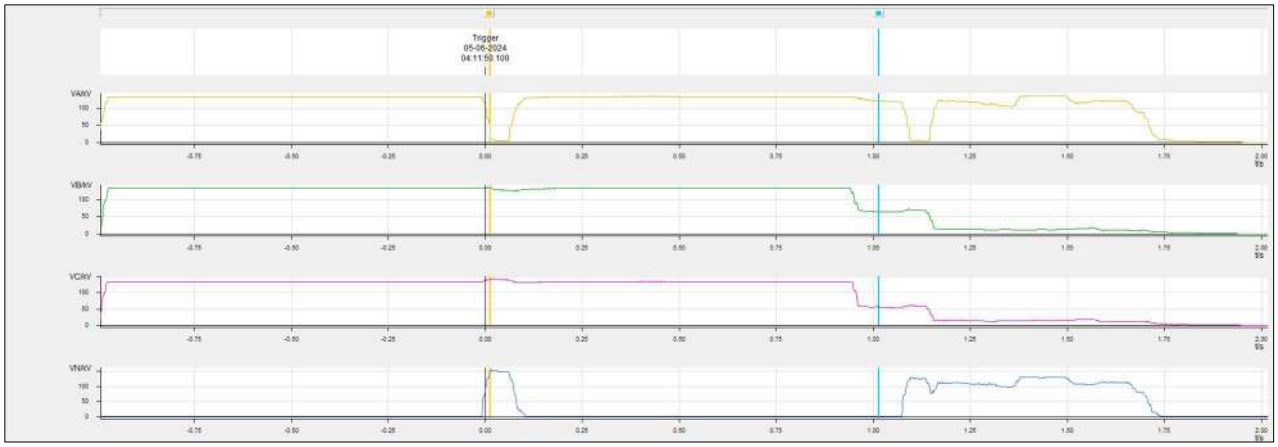
SOE data not available in ERLDC Scada.

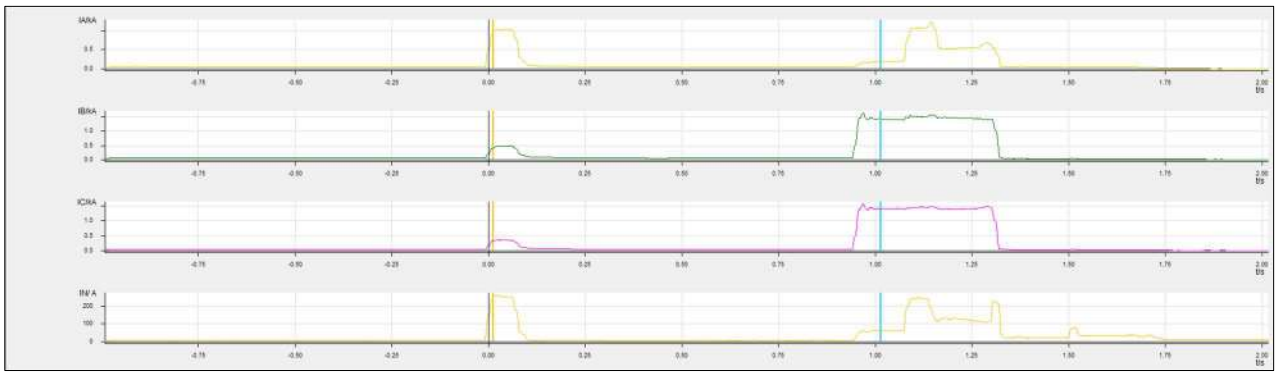
Annexure 2: DR

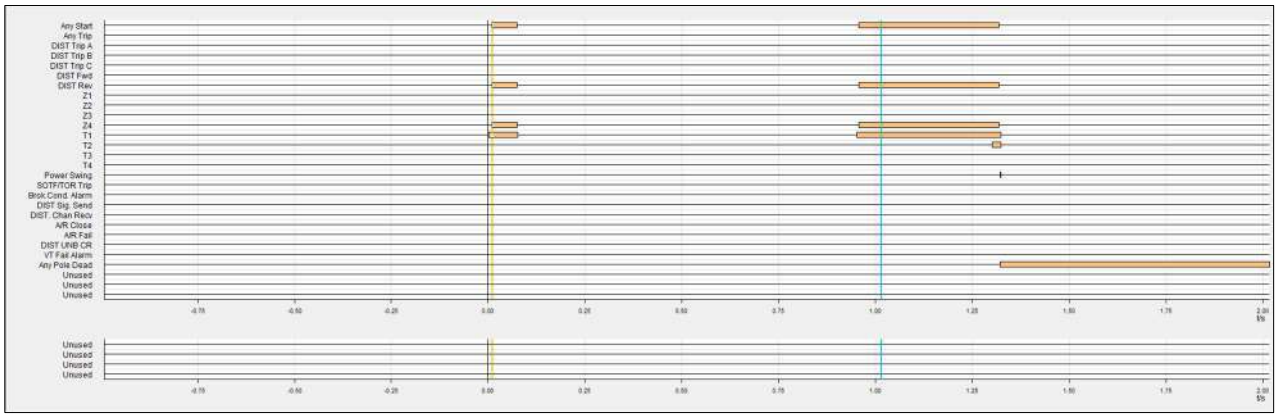
DR of 220 kV Budhipadar-IB TPS#3 (Budhipadar)



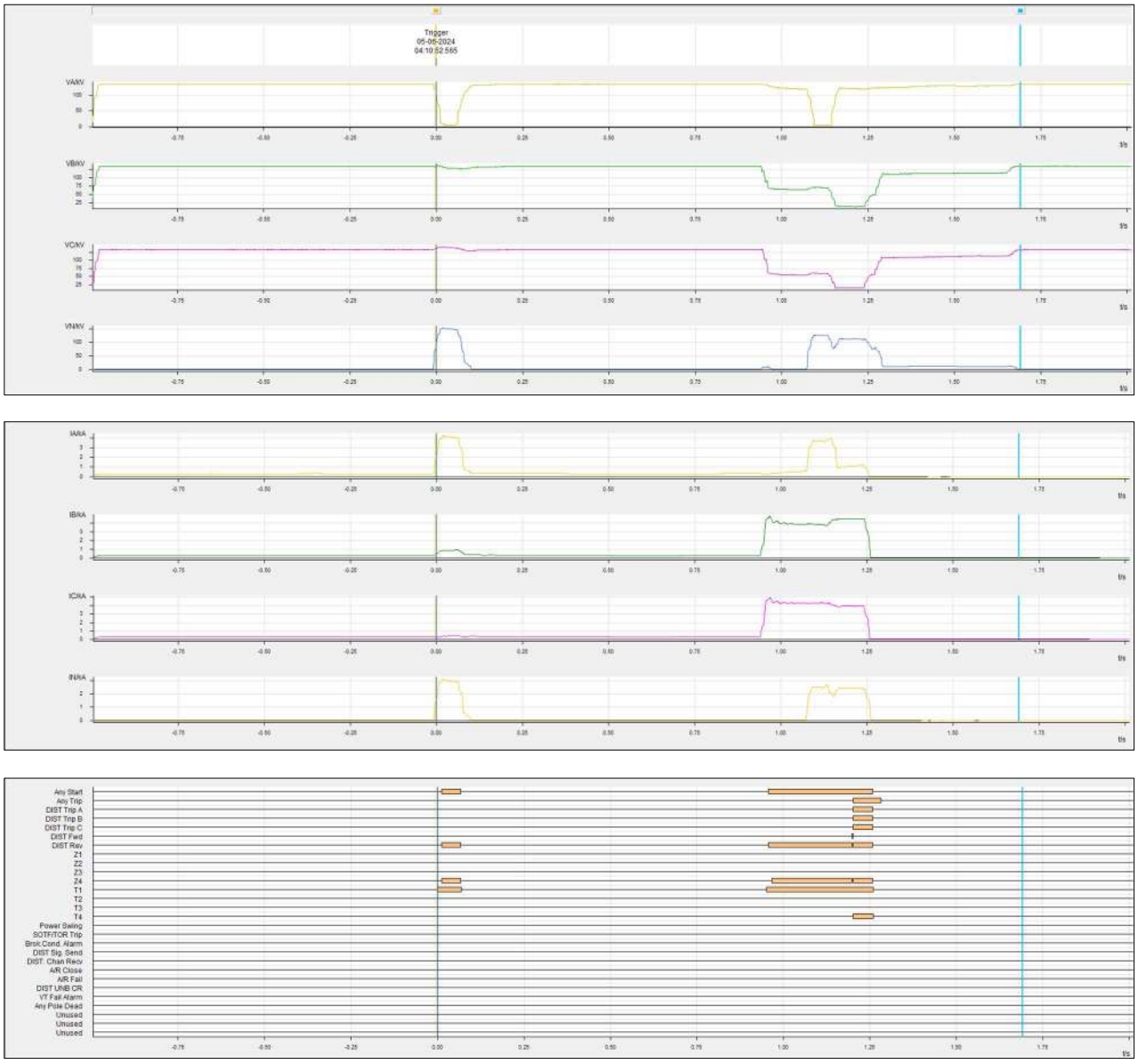
DR of 220 kV Budhipadar-Korba #1 (Budhipadar)



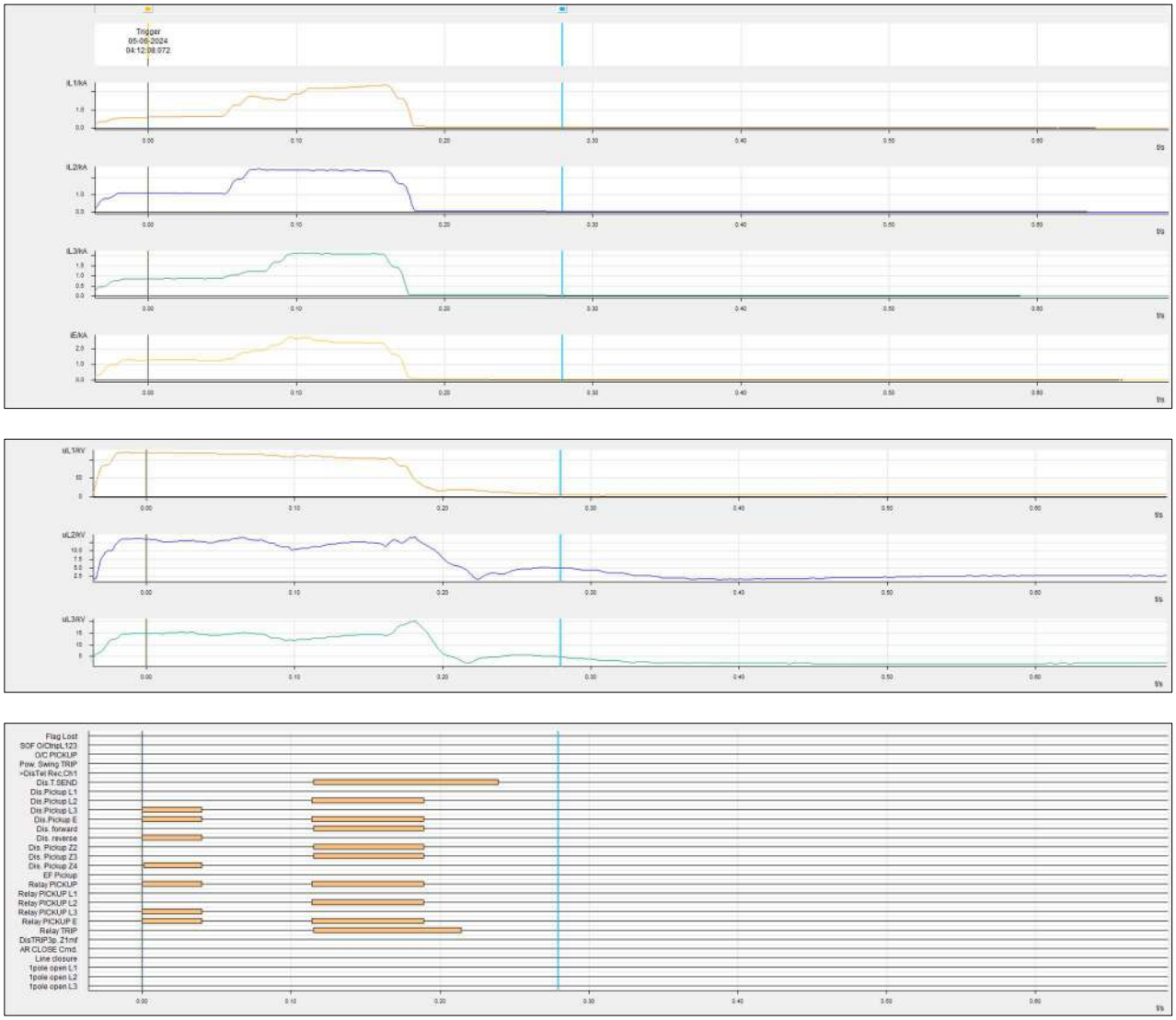




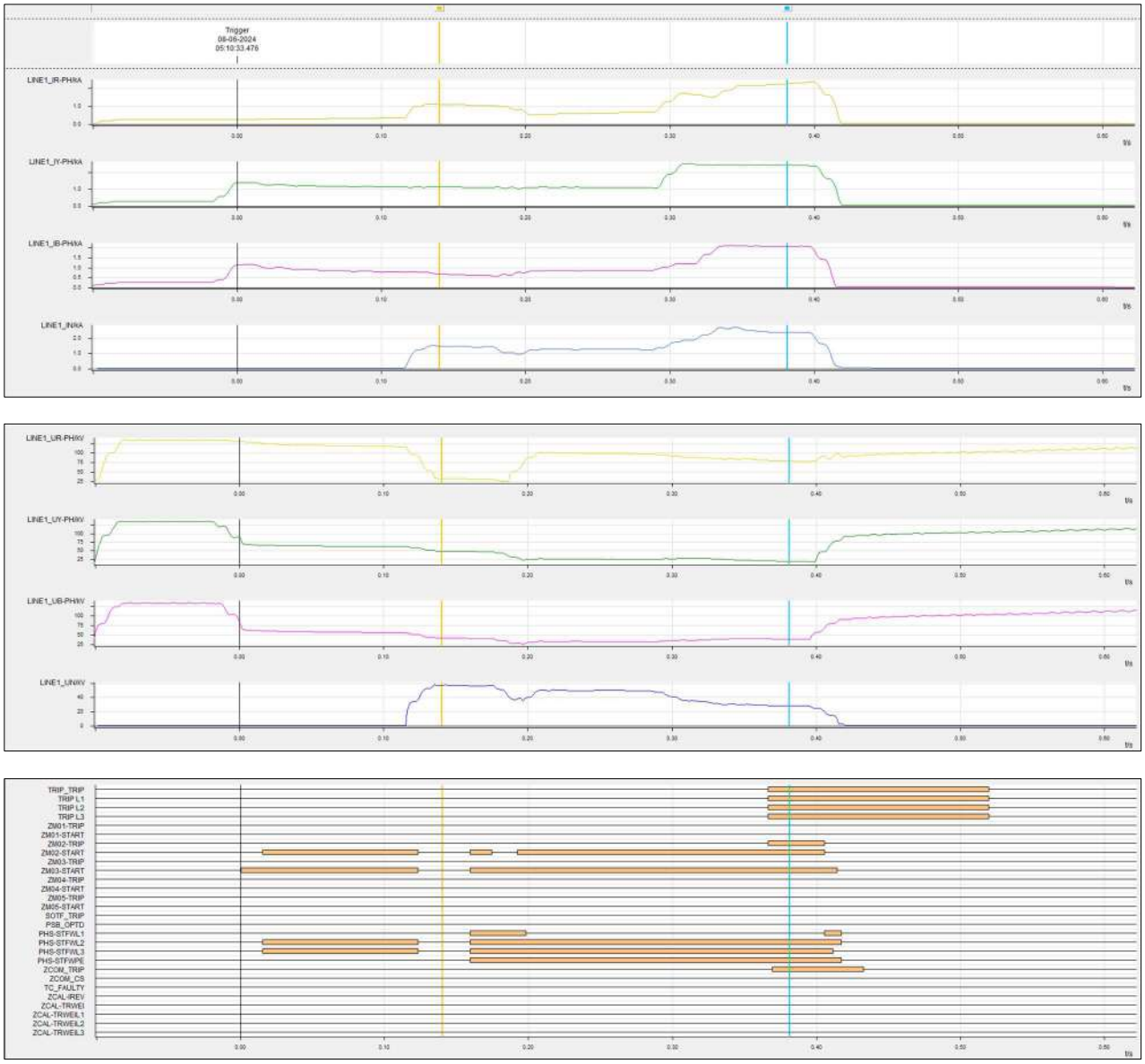
DR of 220 kV Budhipadar-Lapanga #1 (Budhipadar)



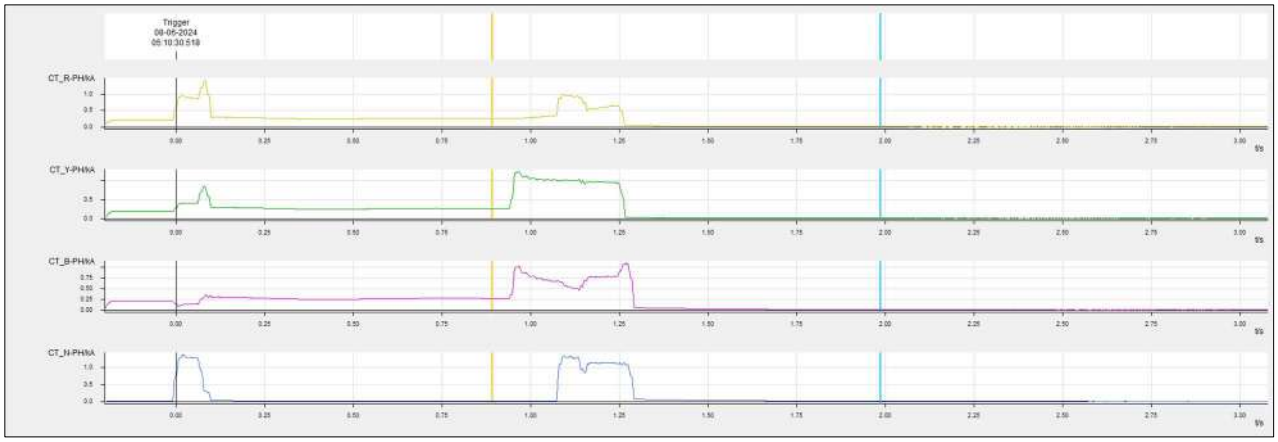
DR of 220 kV Budhipadar-IB TPS#1 (Budhipadar)

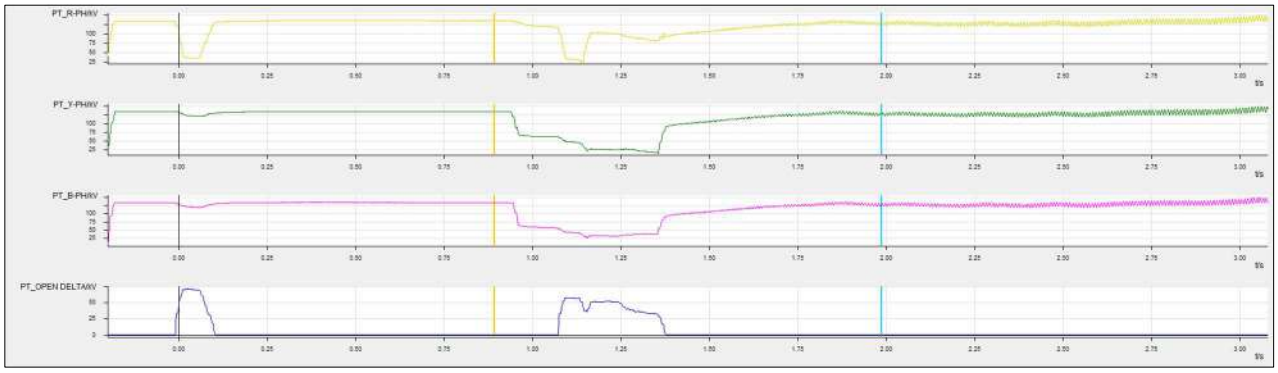


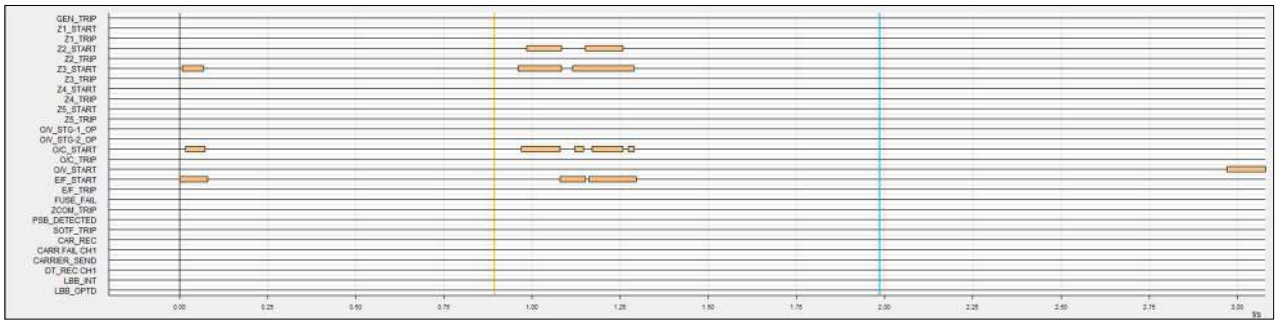
DR of 220 kV Budhipadar-IB TPS#1 (IBTPS end)

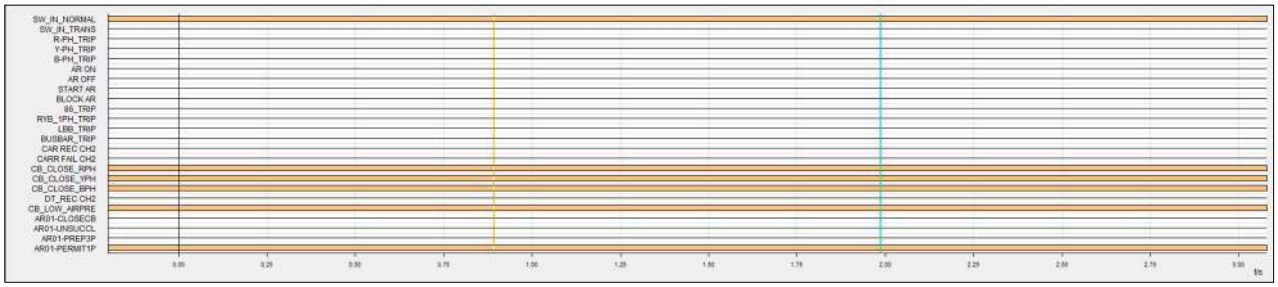


DR of 220 kV Budhipadar-IB TPS#2 (IBTPS end)

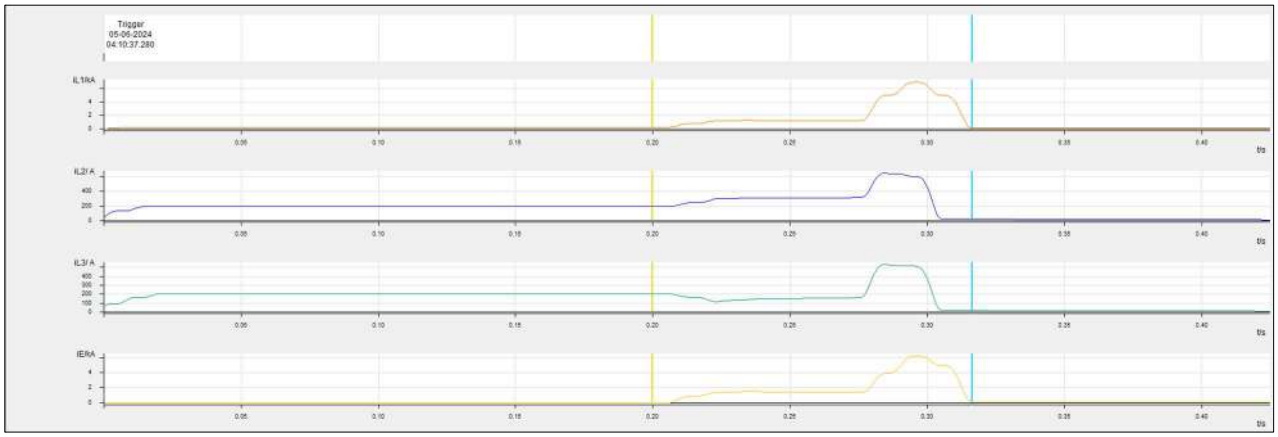


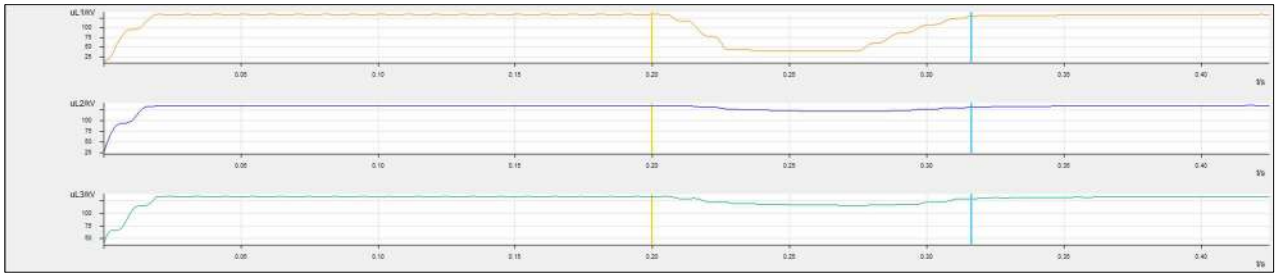


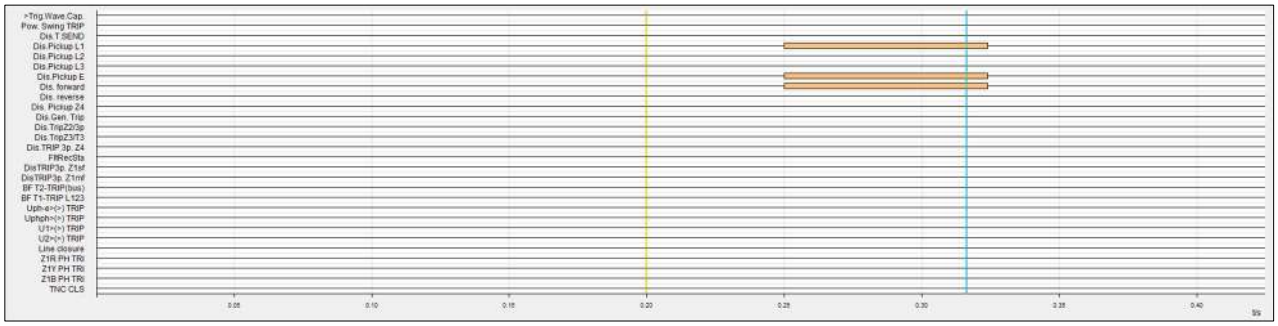


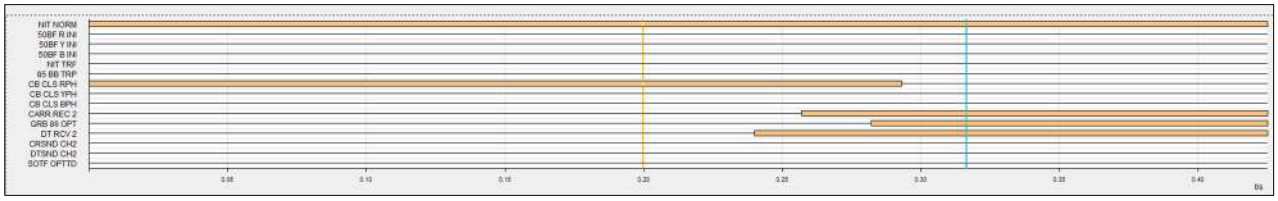


DR of 220 kV Budhipadar-IB TPS#3 (IBTPS end)

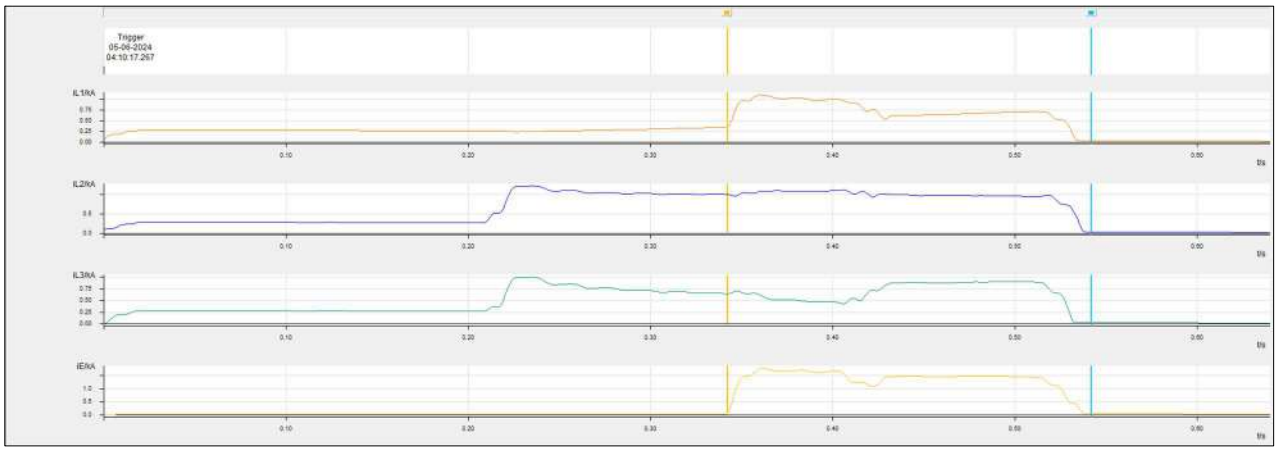


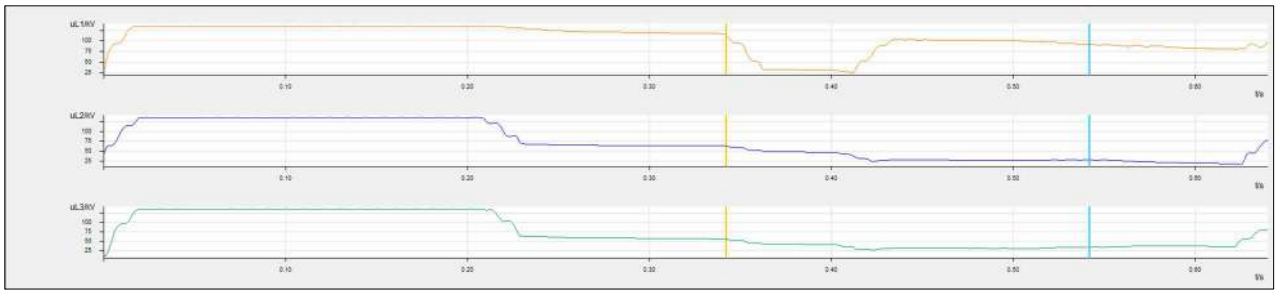


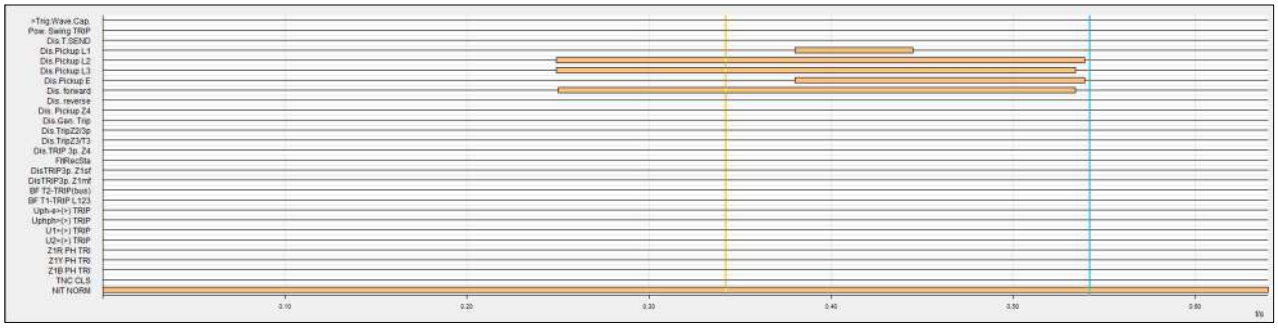


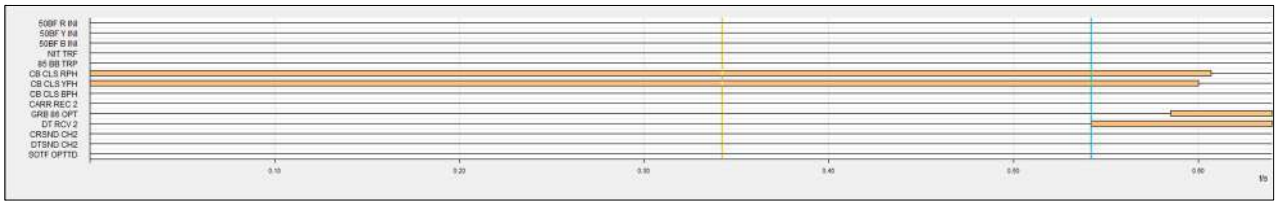


DR of 220 kV Budhipadar-IB TPS#4 (IBTPS end)

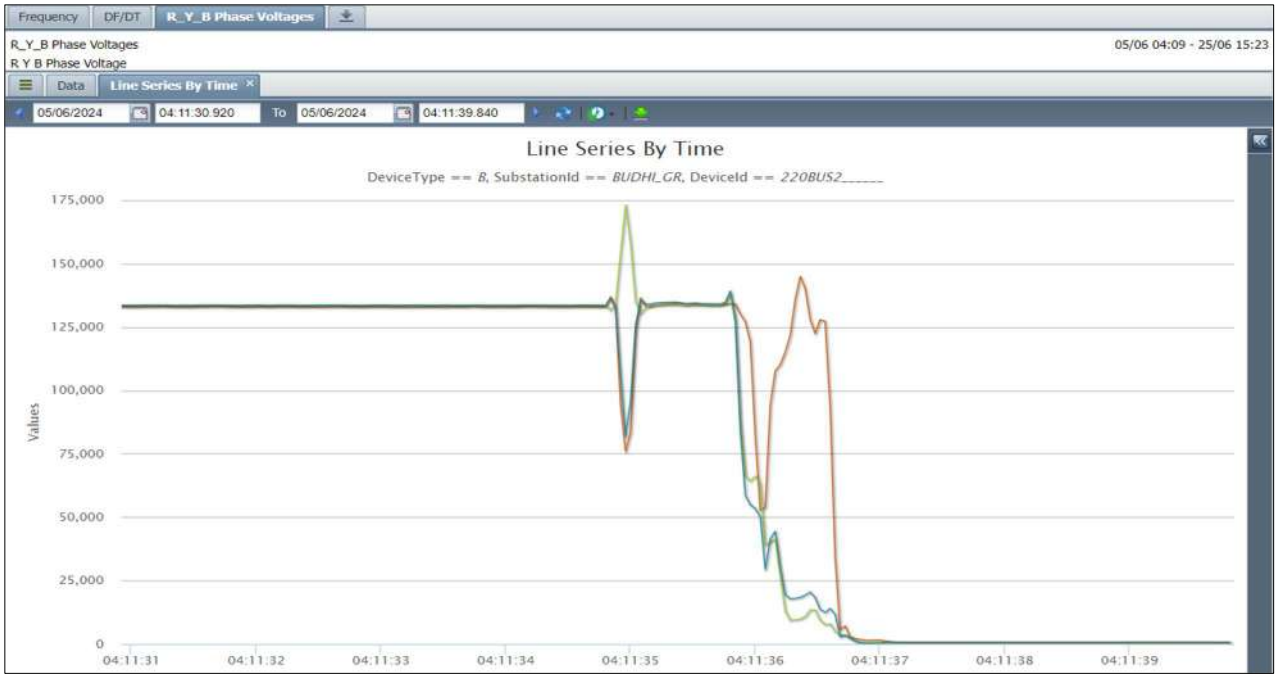




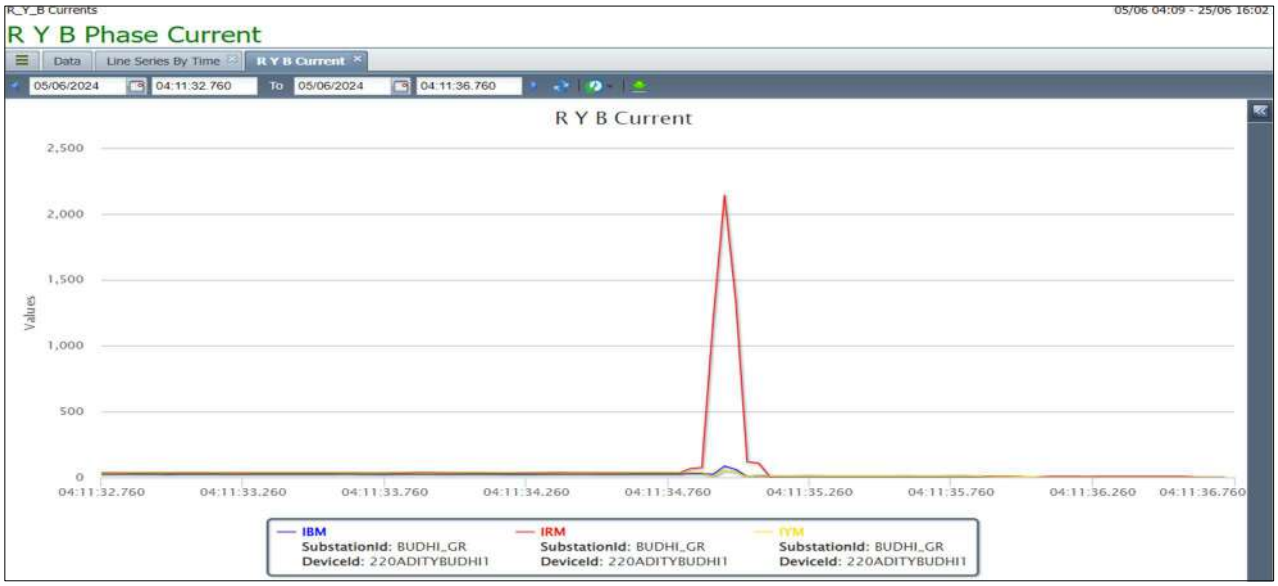




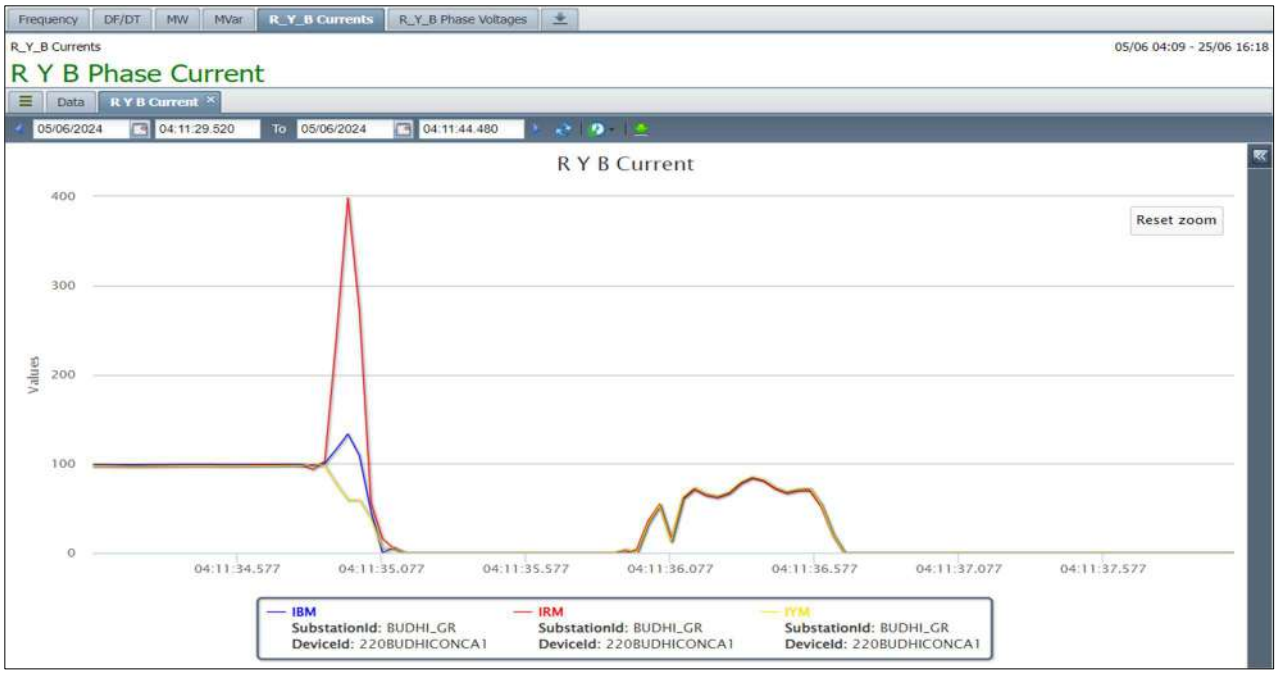
Annexure 3: PMU plots



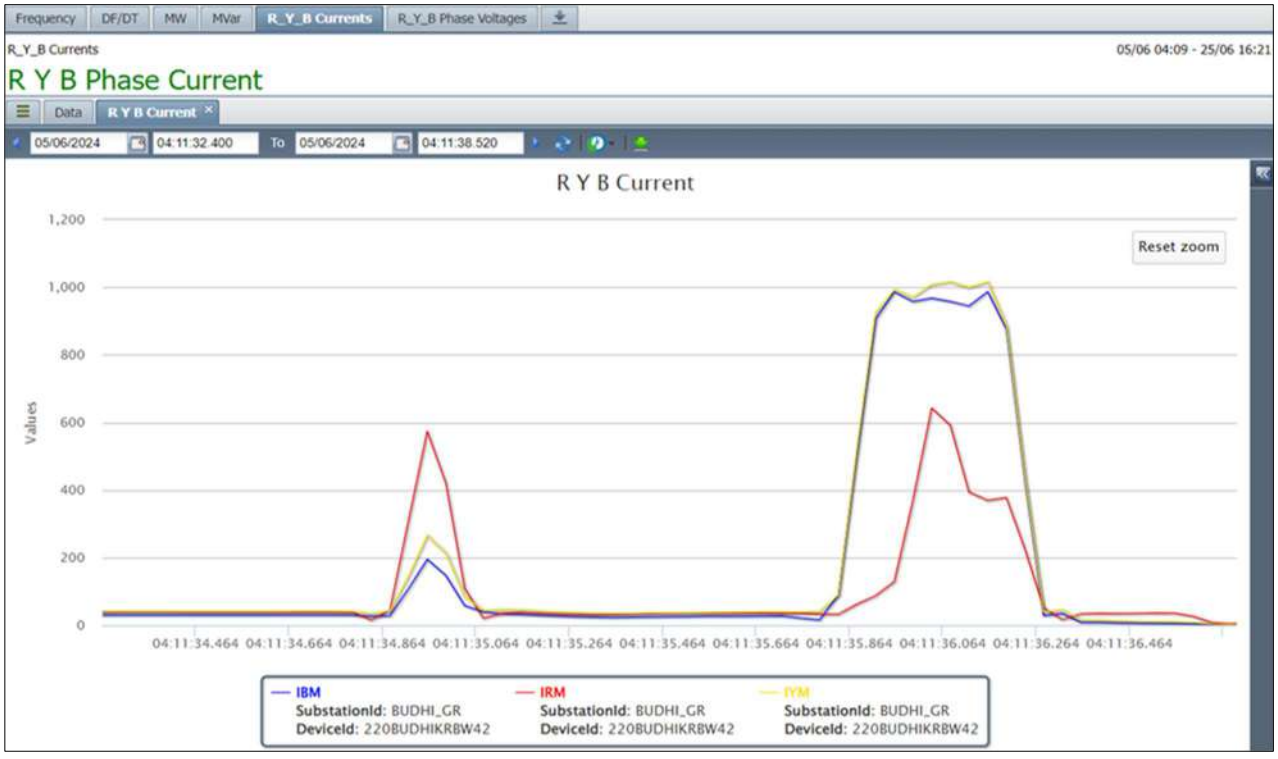
PMU voltage snapshot of 220 kV Bus-1 at Budhipadar



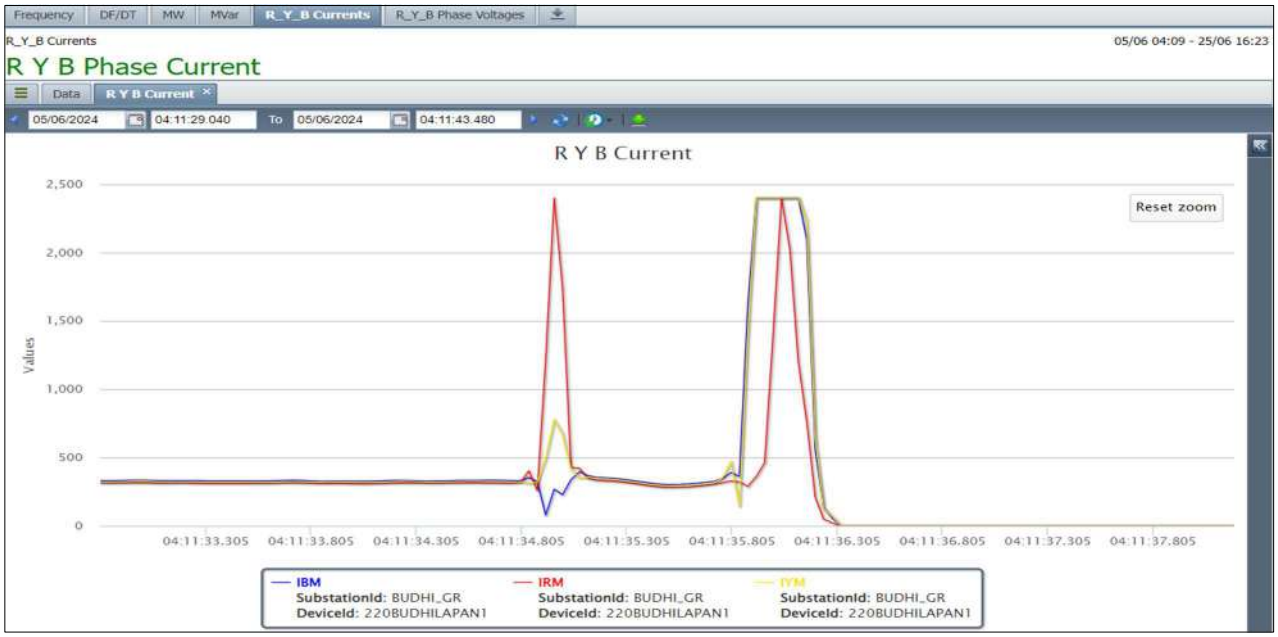
PMU Current snapshot of 220 kV Budhipadar-AAL-1



PMU Current snapshot of 220 kV Budhipadar-Concast

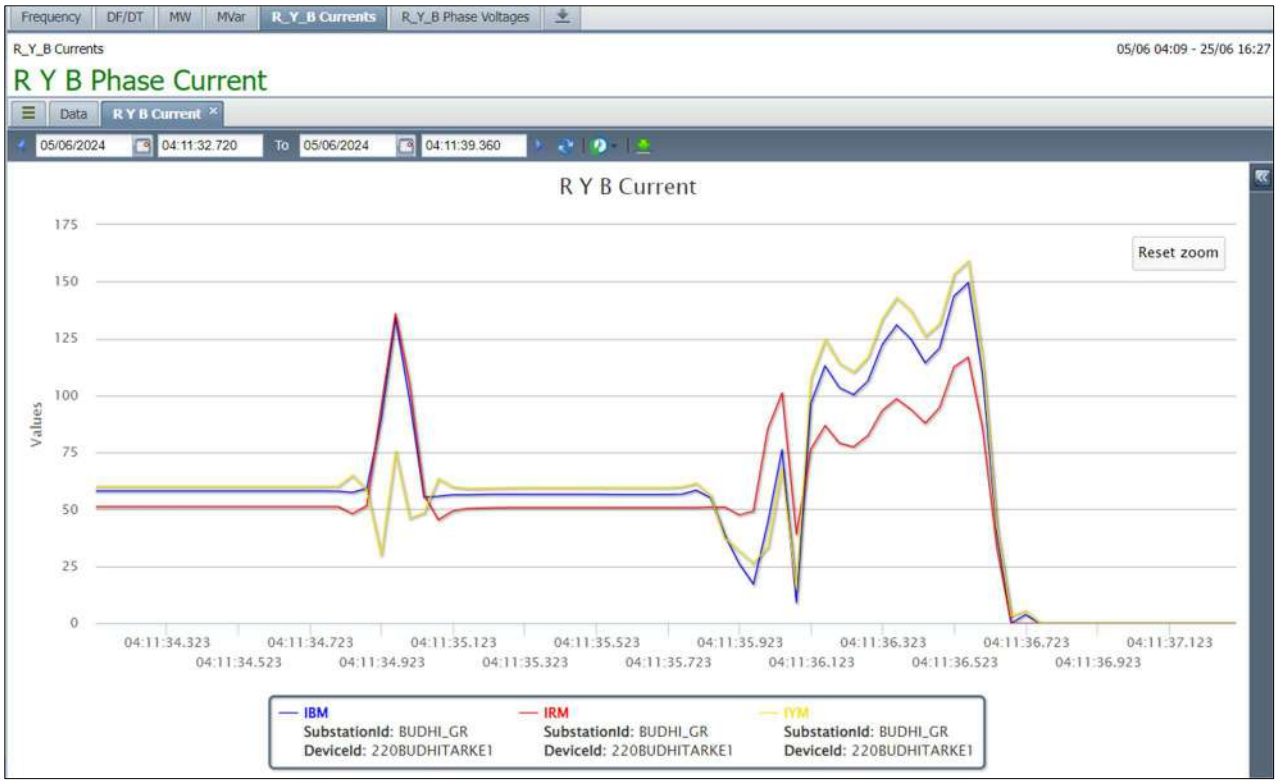


PMU Current snapshot of 220 kV Budhipadar-Korba-2



PMU Current snapshot of 220 kV Budhipadar-Lapnga-1

PMU Current snapshot of 220 kV Budhipadar-Raigarh



PMU Current snapshot of 220 kV Budhipadar-Tarkera-1

ग्रिड-इंडिया GRID-INDIA ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre
कार्यालय : 14, गोल्फ क्लब रोड, टालिगंज, कोलकाता - 700033
Office : 14, Golf Club Road, Tollygunge, Kolkata - 700033
CIN : U40105DL2009GOI188682, Website : www.erldc.in, E-mail : erldcinfo@grid-india.in, Tel.: 033 23890060/0061

पूर्वी क्षेत्र के 220/132 केवी बुढ़ीपदार, आईबी टीपीएस उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event at 220/132 kV Budhipadar (OPTCL) Station of Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date(दिनांक):01-07-2024

1. **Event Summary (घटना का सारांश):**

At 19:11 hrs on 13.06.2024, R_phase CB of 220 kV Budhipadar-Raigarh failed at Budhipadar. Bus Bar Protection operated (after 500 msec) and all feeders connected to Main Bus-2 tripped including 220KV Budhipadar-IB ckt-2 & 4. Subsequently, 220KV Budhipadar-IB ckt-1 & 3 which were connected with Main Bus-1 tripped from IB TPS. Thus, both the units of IB TPS generating station tripped due to loss of evacuation path causing generation loss of 320 MW. Power was extended to 220 kV IB TPS via charging of 220KV Budhipadar-IB ckt 1 at 20:46 Hrs.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 19:11 hrs of 13.06.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** Odisha
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				Odisha	Odisha
Pre-Event (घटना पूर्व)	50.00 Hz	29775 MW	29345MW	2486 MW	5757 MW
Post Event (घटना के बाद)	50.00 Hz	29455 MW	29345MW	2166 MW	5757 MW

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है)	220KV-Budipadar BPSL-2 & 220KV-Budipadar Concast was in tripped condition
Weather Condition (मौसम स्थिति)	Lightning and Rainy

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: 320 MW; Load loss: NIL.

7. Duration of interruption (रुकावट की अवधि): 00:35 Hrs

8. Network across the affected area (प्रभावित क्षेत्र का नक्शा)

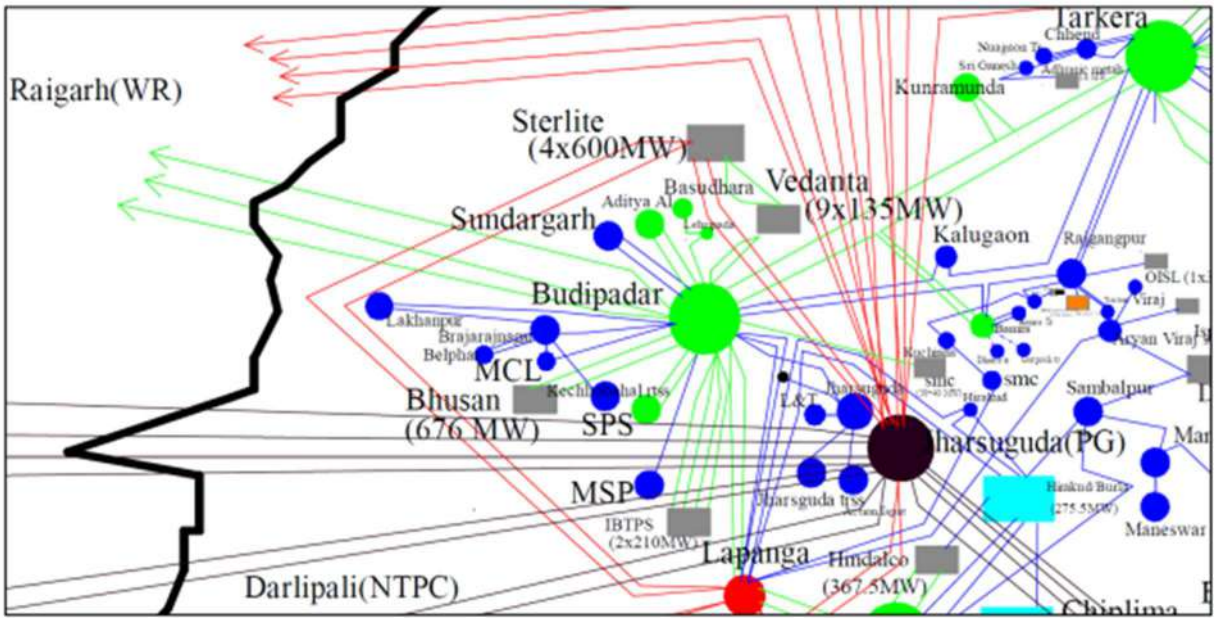


Figure 1: Network across the affected area

9. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): R_ph CB of 220kV Budhipadar-Raigarh failed at Budhipadar.

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

क्र०सं०	नाम	Trip time (hh:mm:ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	220kV Budhipadar - Raigarh ckt 1	19:11	Bus Bar protection FD- 1.1km, FC- 20.97KA		21:43 (on 14/06/24)
2	220kV Bus 2 at Budhipadar	19:11	Bus Bar protection		19:41
3	220kV Bus coupler	19:11	B/U Relay Trip, FC- Ia -21.408kA, In-14.08kA		19:41
4	220kV Budhipadar -Korba ckt 2	19:11	Bus Bar protection, FC - IL1- 793.7A, IL2- 265.98A, IL3- 204.3A,		22:56
5	220KV Budhipadar-IB ckt-2	19:11	BB protection operated	FC- Ia-1.2 KA , DT received	21:38
6	220KV Budhipadar-IB ckt-4	19:11	BB protection operated	FC- Ia-1 KA , DT received	1:46

7	20KV Budhipadar-Kuarmunda ckt 1	19:11	BB protection operated		21:07
8	220KV Budhipadar-Lapanga ckt 2	19:11	BB protection operated		19:46
9	220KV Budhipadar-Bhusan PSL ckt 1	19:11	D/P 1- Started Phase-B_N, Zone 1, FC- IB-5.97KA, F Dist-1.37Km,		20:07
10	220kV Budhipadar Vedanta ckt 1	19:11	BB protection operated		20:10
11	220kV Budhipadar Vedanta ckt 2	19:11	BB protection operated		20:11
12	220KV Budhipadar-IB ckt 1	19:11		FC- Ia-1.2 KA, Zone -2	20:46
13	220KV Budhipadar-IB ckt 3	19:11		FC- Ia-1.5 KA, Zone -2	20:48
14	210 MW IB TPS Unit 1	19:11	Unit Tripped due to loss of Evacuation Path		02:32
15	210 MW IB TPS Unit 2	19:11	Unit Tripped due to loss of Evacuation Path		06:01

11. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):

- At 19:09 hrs, R_N fault was observed as per PMU and 220KV Budhipadar-BPSL ckt 2 & 220 K Budipadar – Concast -1 tripped immediately.
- At 19:11 Hrs, R-ph CB of 220 kV Budhipadar-Raigarh failed at Budhipadar end which was connected to Bus 2 at Budhipadar resulting in R-phase fault which was sensed in Zone-1 at Budhipadar, but three phase tripping command was initiated. However, only B_ph opened at that time.
- As R-ph CB of 220 kV Budhipadar-Raigarh had failed and Y_ph CB didn't open, LBB should have operated after 200 msec at Budhipadar but it did not operate.
- After 350 msec of the fault, Y_ph of the line tripped at Budhipadar in Zone-2. Only after tripping of Y_phase the fault was sensed as a bus fault. Bus bar protection operated but it took around 160 msec to open all associated breakers.
- The fault was cleared after around 510 msec. Before that, 220 kV Budhipadar-IBTPS-1,3 which was connected to 220 kV Bus-1 at Budhipadar tripped in Zone-2 from IB TPS.
- This led to loss of evacuation path at IB TPS for its running units and both running units tripped.

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- As R-ph CB of 220 kV Budhipadar-Raigarh was in failed condition and Y_ph CB also didn't open, LBB of main Bay of 220 kV Budhipadar-Raigarh at Budipadar end should have operated after 200 msec but it did not operate.
- Since R_ph breaker had failed, and CT is after line CB, the fault should have been sensed in Zone-4, however it was sensed in Zone-1. High fault current through the faulty breaker suggests summation of contribution from all other feeders. Y_ph current was also on higher side (Around 1 kA). After opening of Y_ph breaker, this fault came in Bus bar Zone. OPTCL may explain the nature of fault and findings if any.
- Even after sensing Bus fault, all associated breakers opened after 160 msec. Delayed tripping of breakers may be checked.
- Detail of islanding of CPPs may be shared.
- DR length for some of the DRs at Budhipadar and IB TPS is very less, and pre-fault data is not recorded. All DRs are not time synchronized. OPTCL and IB TPS may look into it.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय): Nil

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

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	**DR/EL not provided within 24 Hours**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	

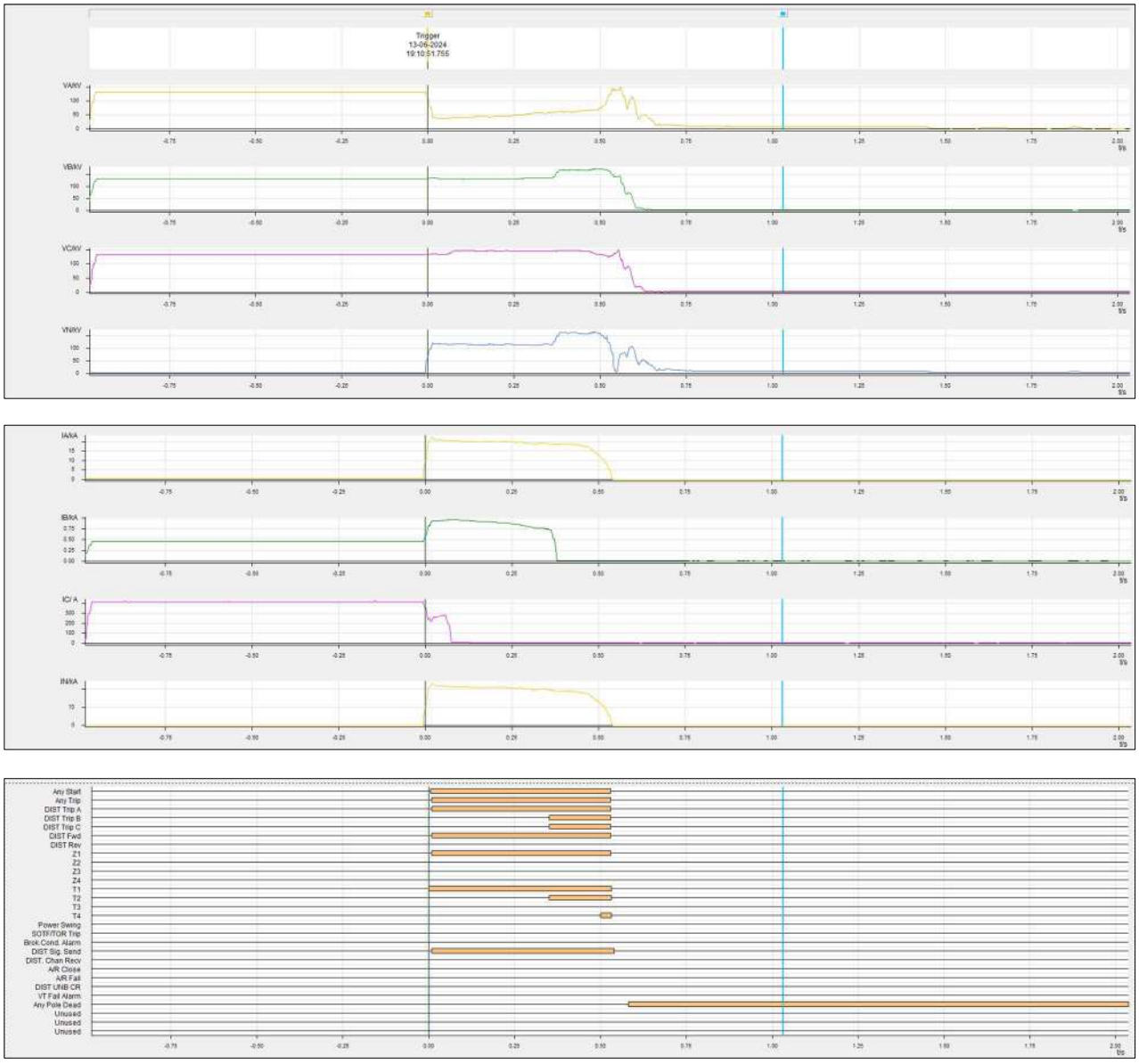
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

Annexure 1: (Sequence of Events-As per ERLDC SCADA)

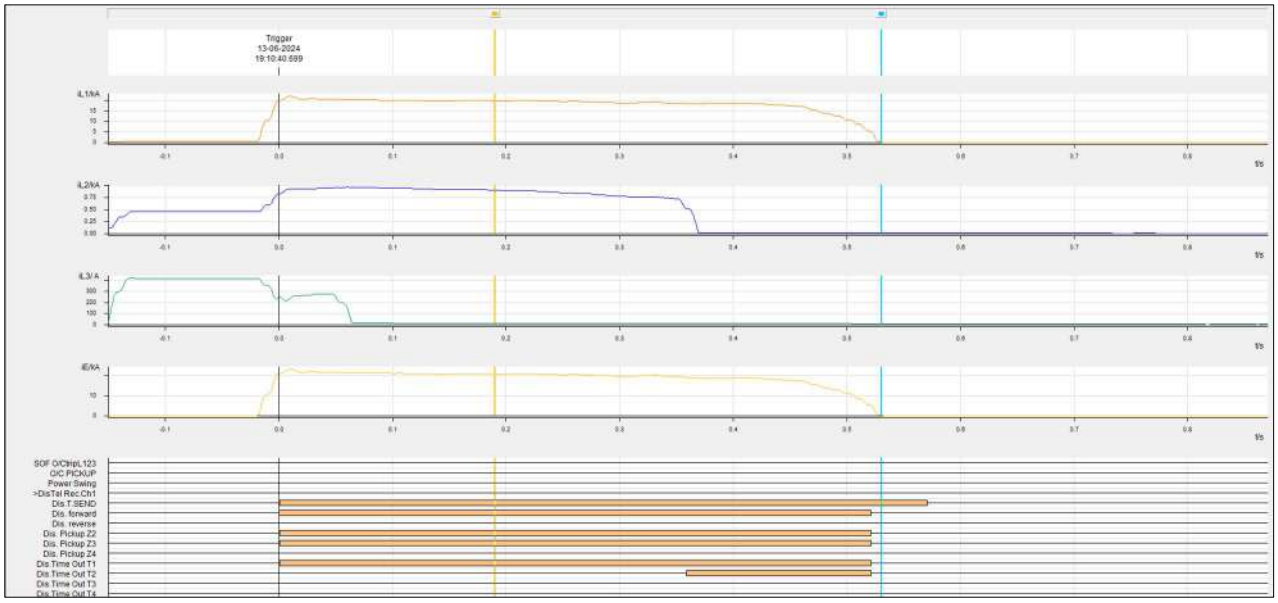
SOE data not available in ERLDC Scada.

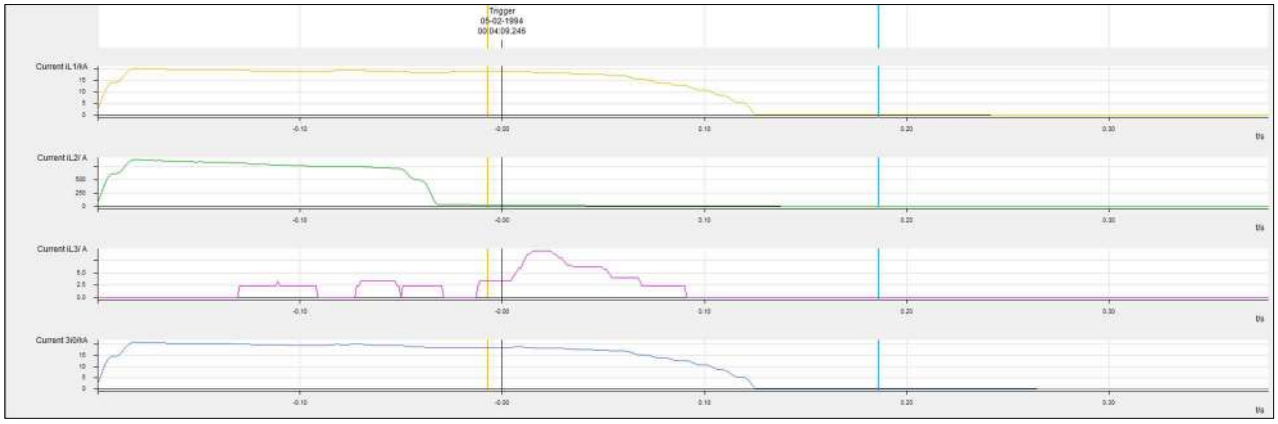
Annexure 2:

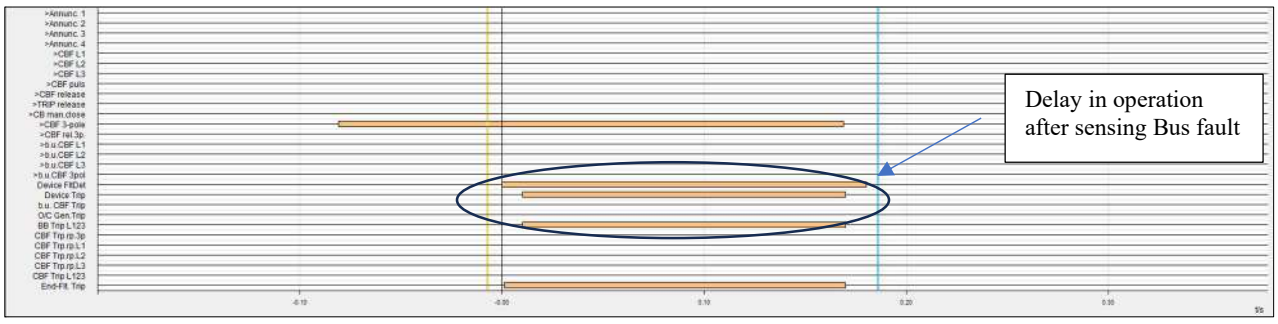
DR of 220 kV Budhipadar -Raigarh (MCU) (Budhipadar end)



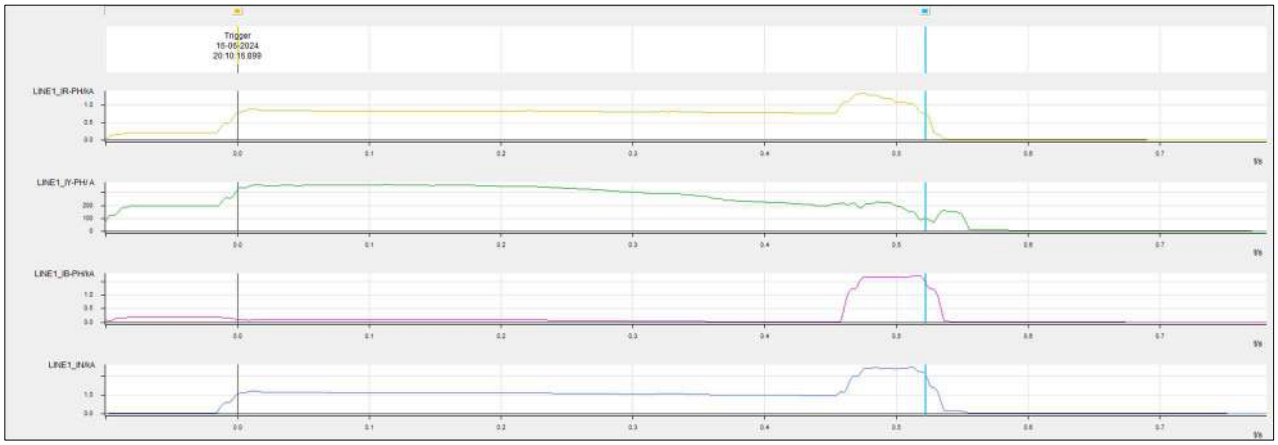
DR of 220 kV Budhipadar -Raigarh (BCU) (Budhipadar end)

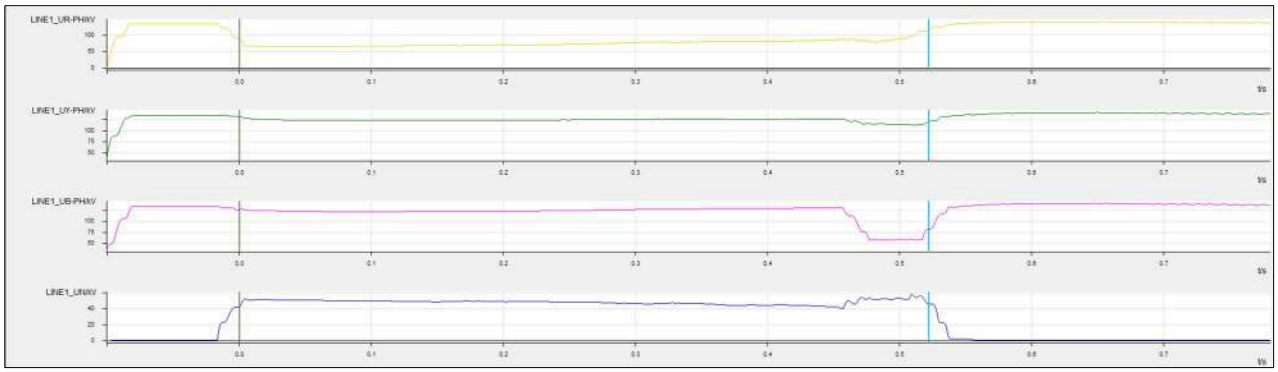


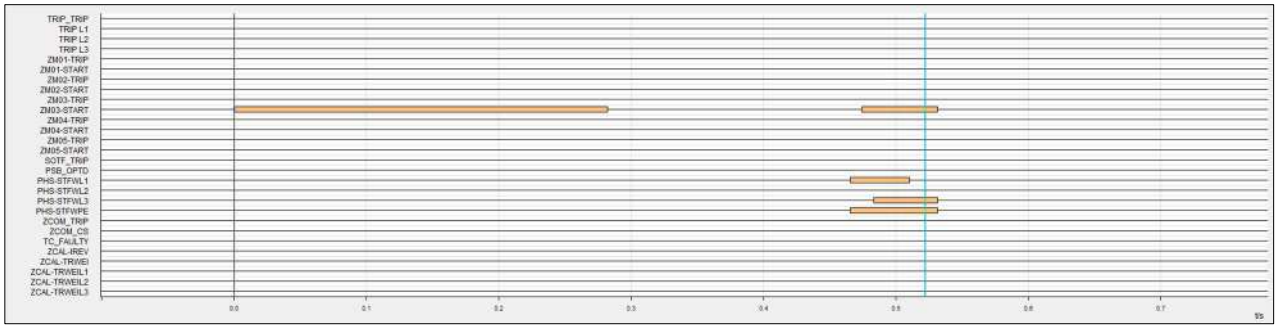


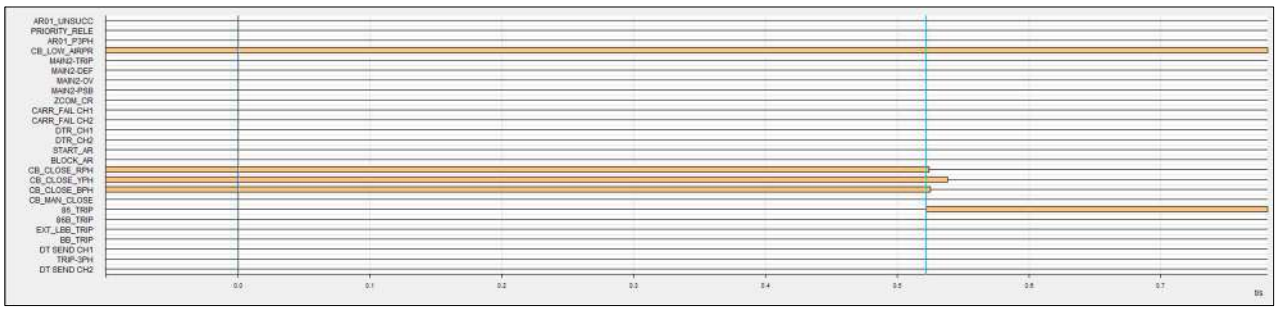


DR of 220 kV Budhipadar -IBTPS- 1 (IBTPS end)

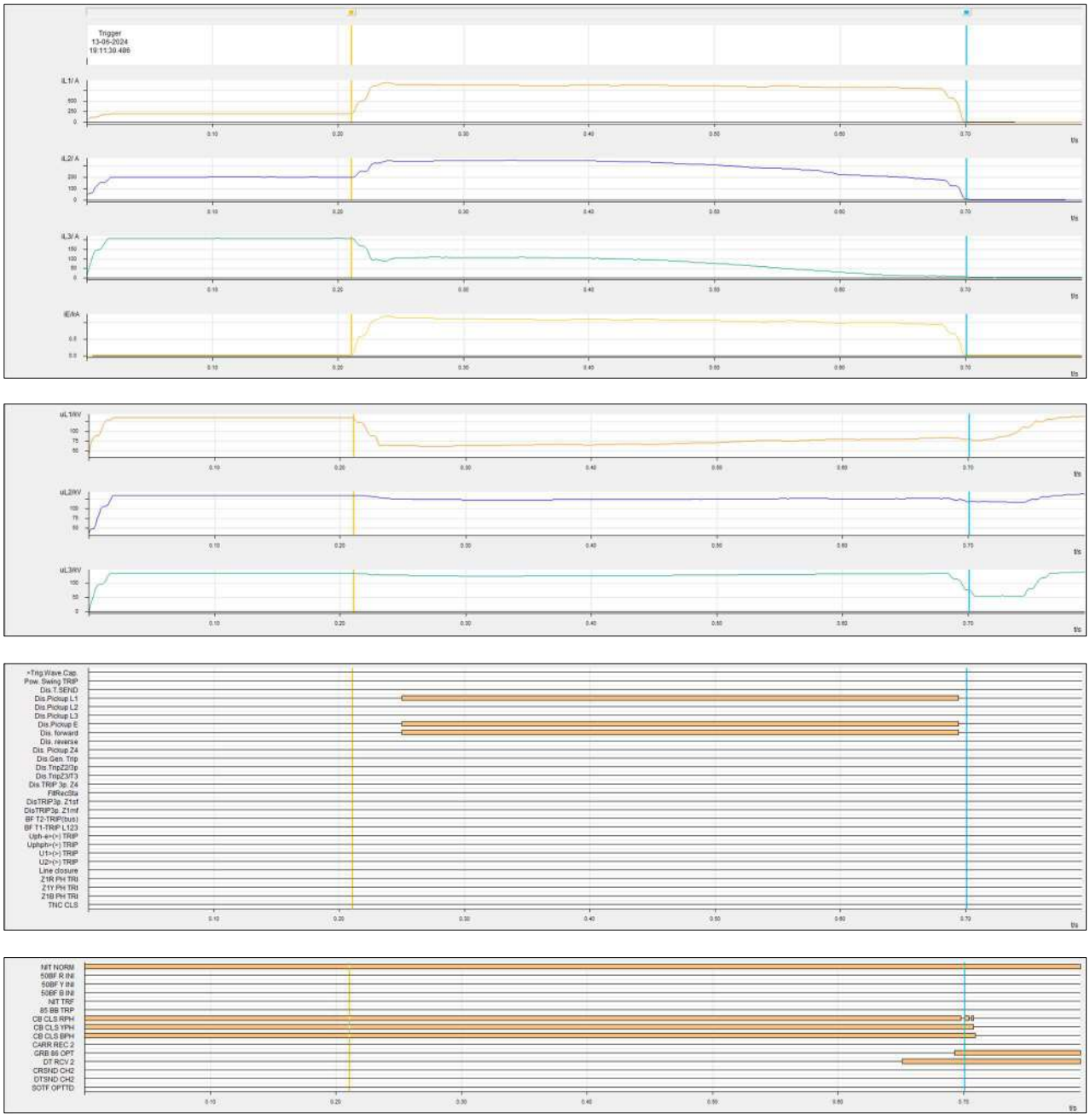




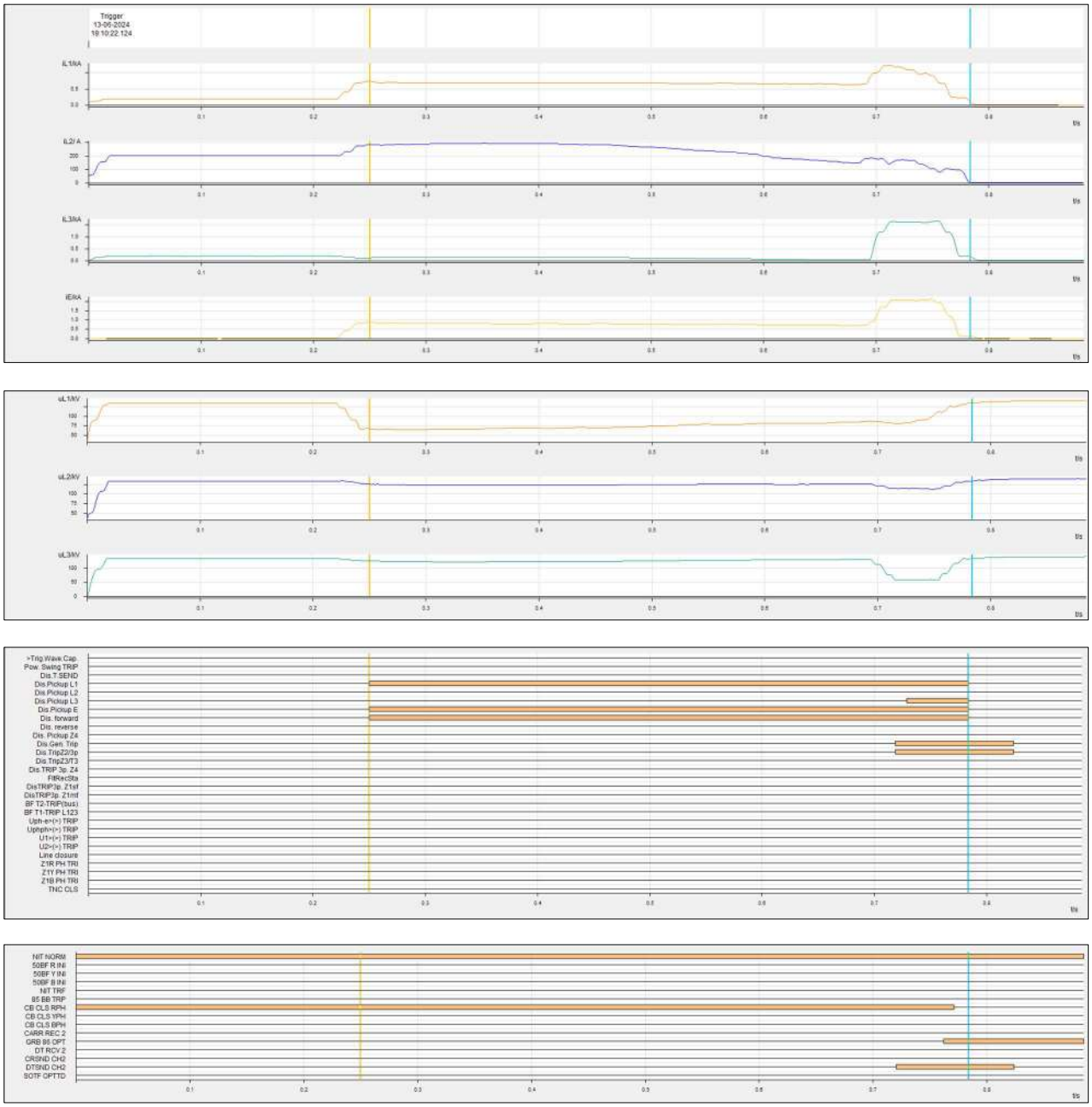




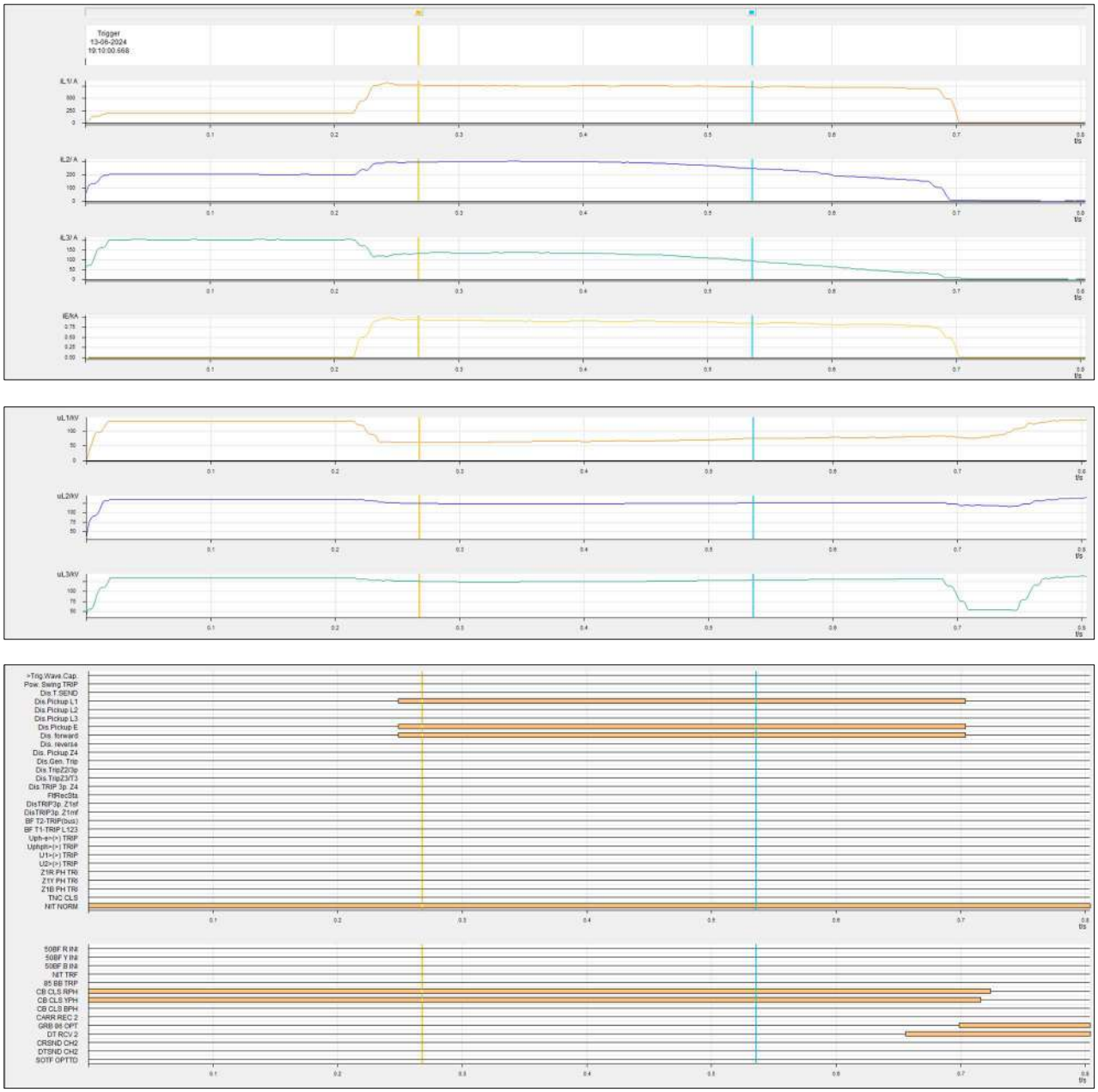
DR of 220 kV Budhipadar -IBTPS- 2 (IBTPS end)



DR of 220 kV Budhipadar -IBTPS- 3 (IBTPS end)



DR of 220 kV Budhipadar -IBTPS- 4 (IBTPS end)



Annexure 3:

PMU Snapshot:

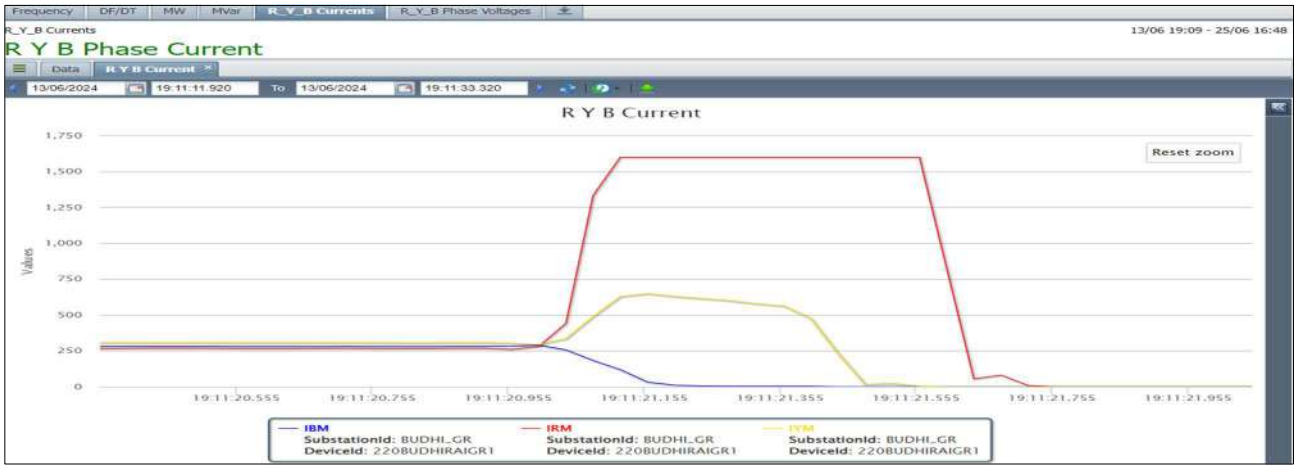


Fig3: -PMU Current plot of 220 kV Budhipadar Raigarh

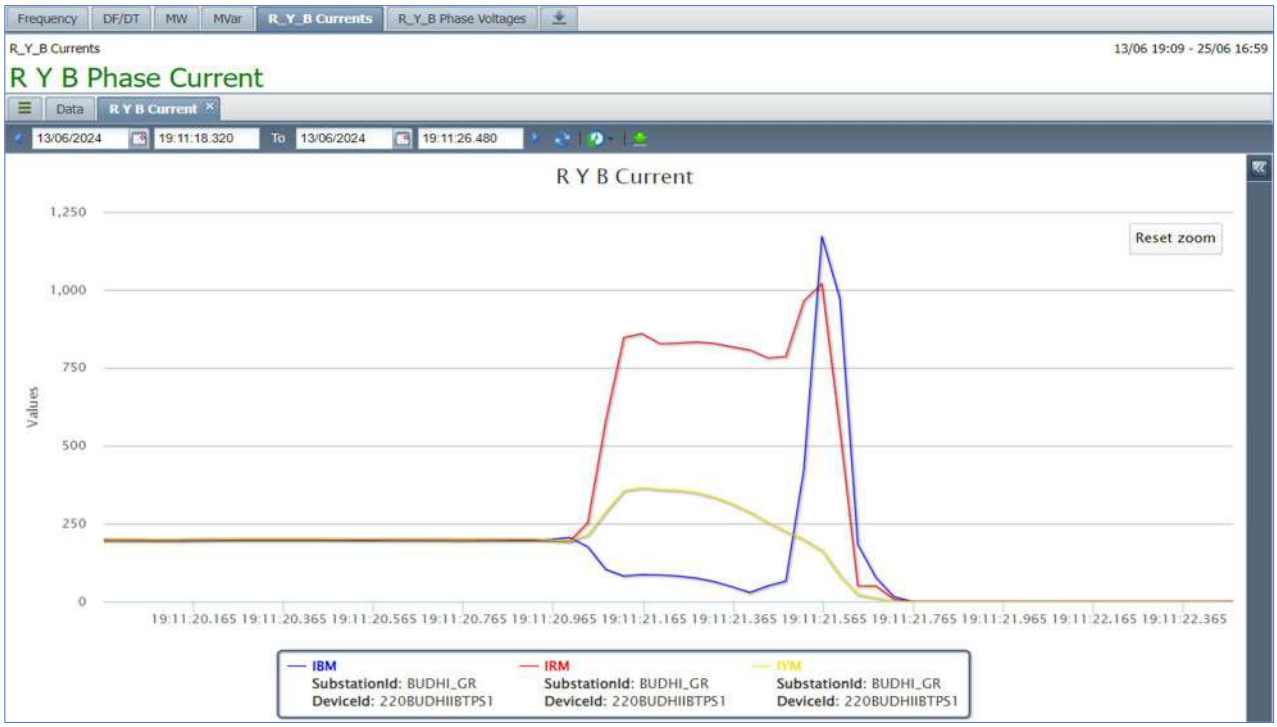


Fig4: -PMU Current plot of 220 kV Budhipadar IB #1

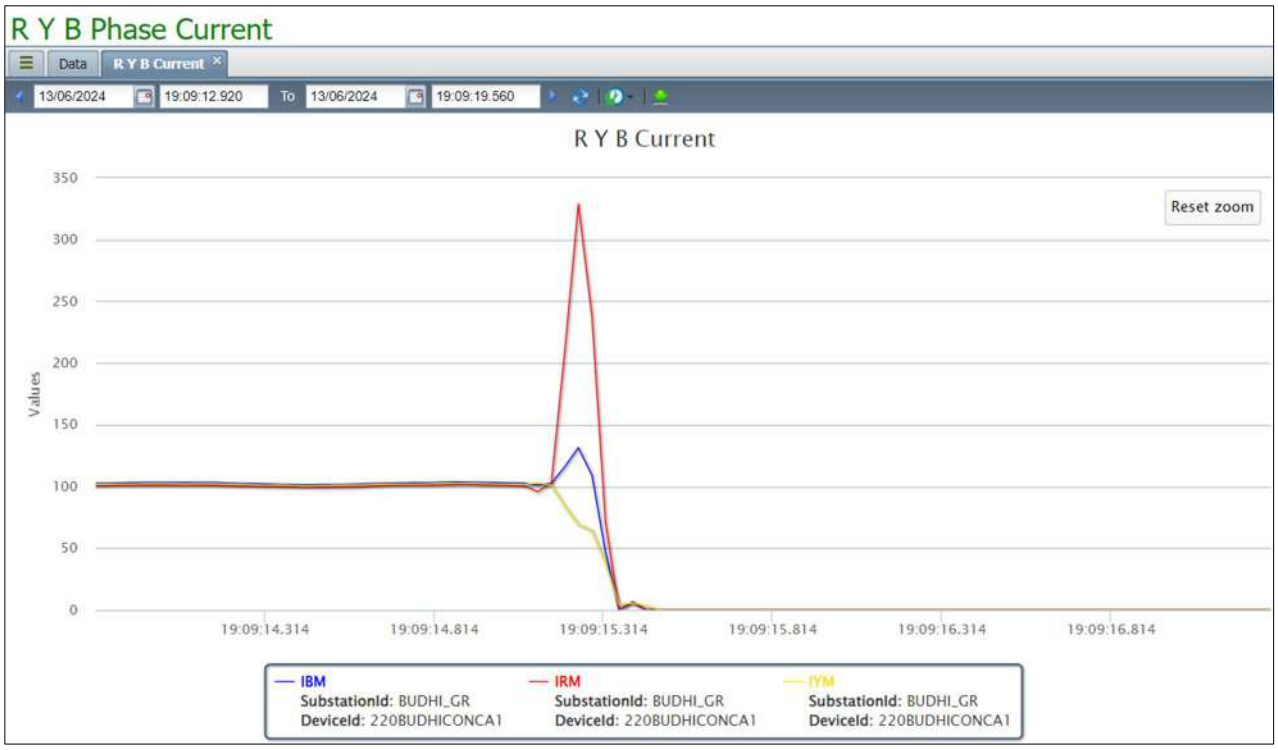


Fig5: -PMU Current plot of 220 kV Budhipadar Concast - 1

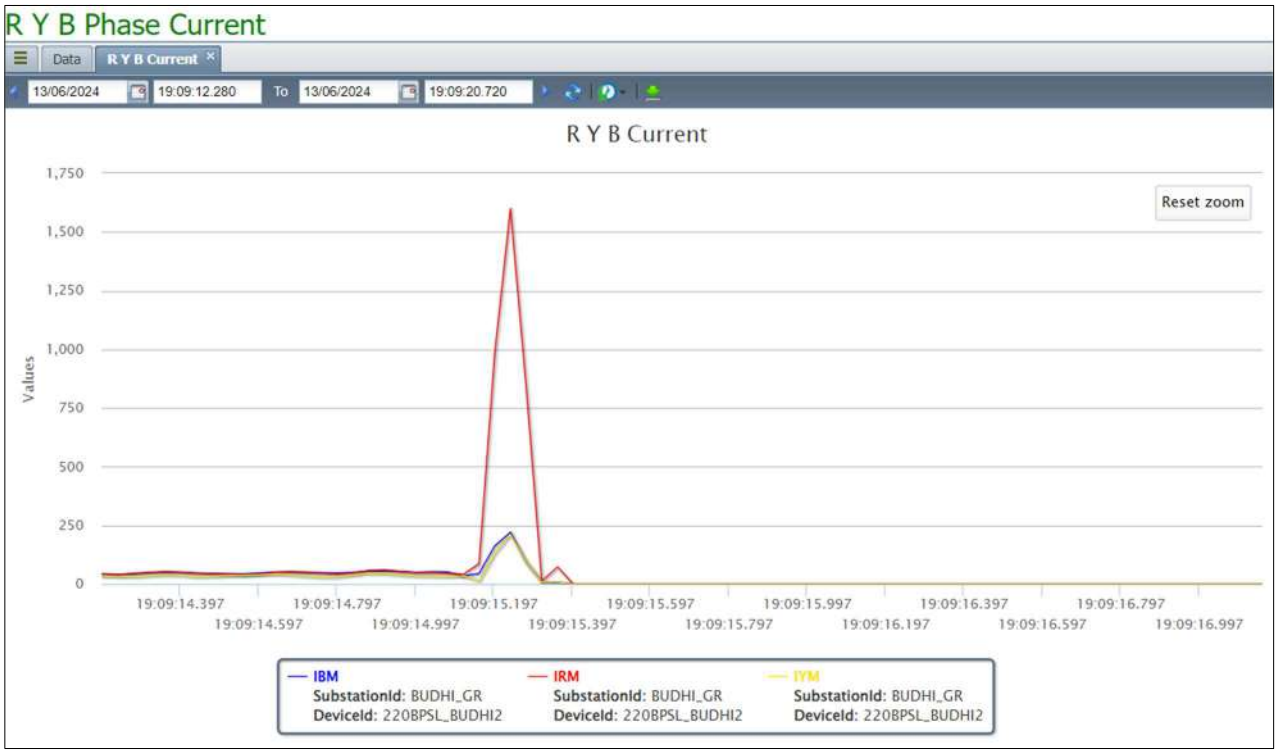


Fig6: -PMU Current plot of 220 kV Budhipadar Bhusan - 2

ग्रिड-इंडिया GRID-INDIA ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre
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CIN : U40105DL2009GOI188682, Website : www.erldc.in, E-mail : erldcinfo@grid-india.in, Tel.: 033 23890060/0061

पूर्वी क्षेत्र के 400/220 केवी उप-केन्द्र तेनुघाट में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event in 400/220 kV Tenughat of Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date(दिनांक):08-07-2024

1. **Event Summary (घटना का सारांश):**

At 16:55 hrs on 13.06.2024, 220KV Dumka-Govindpur-2 tripped on R_N Fault from Govindpur end while 220KV Dumka-Govindpur –1 tripped from Dumka end. As 220 kV Tenughat-Biharsharif was already under breakdown, Tenughat unit -2 (unit -1 was under forced shutdown) got islanded with Govindpur load but this island survived for 12 seconds only, resulting in a generation loss of 142 MW at Tenughat and load loss of 140 MW at Govindpur, Chandankyari & Jainamod area.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 16:55 hrs of 13.06.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** Jharkhand
5. **Report received from Utility on:** 07-07-2024
6. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				Jharkhand	Jharkhand
Pre-Event (घटना पूर्व)	50.05 Hz	28515 MW	28582MW	142 MW	1584 MW
Post Event (घटना के बाद)	50.05 Hz	28373 MW	2442MW	0 MW	1444 MW

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है)	1. 220KV-Tenughat-Biharsariff-1 under planned S/D 2.Tenughat Unit #1 Under forced outage
Weather Condition (मौसम स्थिति)	Normal weather

7. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: 142 MW; Load loss: 140.

8. Duration of interruption (रुकावट की अवधि): 00:13 Hrs

9. Network across the affected area (प्रभावित क्षेत्र का नक्शा)

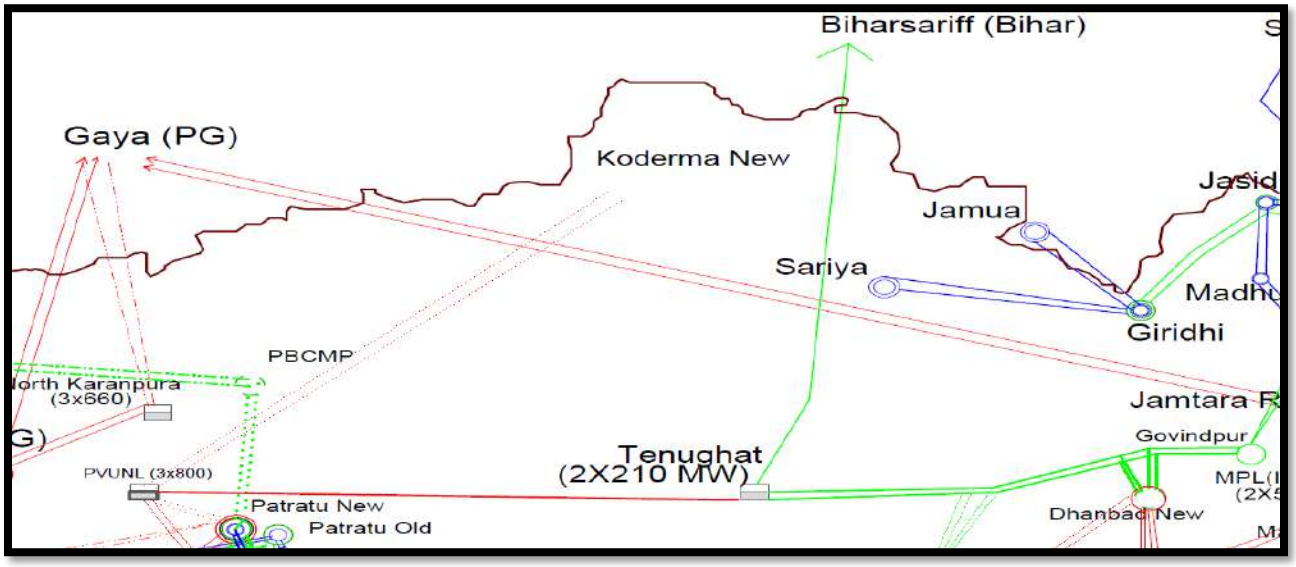


Figure 1: Network across the affected area

10. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): NA

11. Major Elements Tripped (प्रमुख ट्रिपिंग):

क्र०सं०	नाम	Trip time (hh:mm:ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	220KV Dumka-Govindpur #1	16:55	Dumka: M2:- R_N, Z3, FC -1.8 kA, Inst. tripping by Main 2 relay.	Didn't trip	17:23
2	220KV Dumka-Govindpur #2		Dumka: M1: - R_N, Z1, 8.47 km, FC- 5.17 kA A/R successful from Dumka end.	Govindpur - RN, Z1, 73.26 km, FC- 759.5A	17:08
4	210 MW Unit 2 at Tenughat		Islanded with Govindpur load and survived for around 12 seconds		20:03
5	220 kV Bus-1 & 2 at Tenughat		All emanating lines tripped		17:08

12. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):

- There was R-Earth fault in 220 kV Dumka – Govindpur ckt-2, which was sensed in Z1 from both ends. A/r was successful from Dumka while all three phase tripped at Govindpur.
- 220 kV Dumka-Govindpur-1 sensed the fault in Zone-3 from Dumka, however tripped instantaneously. There was no tripping at Govindpur.
- One running unit at Tenughat got islanded with Govindpur load but Island did not survive and Tenughat Unit -2 tripped after 12 secs of Initial fault.
- Report received from JUSNL is attached at Annexure-3.

PMU Snapshot:

Figure 2: PMU Voltage snapshot of 400/220 kV Tenughat S/S

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

13. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- A/R did not operate for 220 kV Dumka – Govindpur-2 at Govindpur.
- 220 kV Dumka-Govindpur-1 tripped immediately from Dumka despite seeing the fault in Zone-3. It was found that Zone-3 time delay was set to Zero.
- DR length at Dumka end is less.
- DRs are not time synchronized at Dumka and Govindpur.

14. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- The issue with A/r scheme at Govindpur end may be investigated.
- Zone-3 time delay has been reset at Dumka in 220 kV Dumka-Govindpur-1.

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

S.No.	Issues	Regulation Non-Compliance	Utilities
2.	**DR/EL not provided within 24 Hours**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**JUSNL**

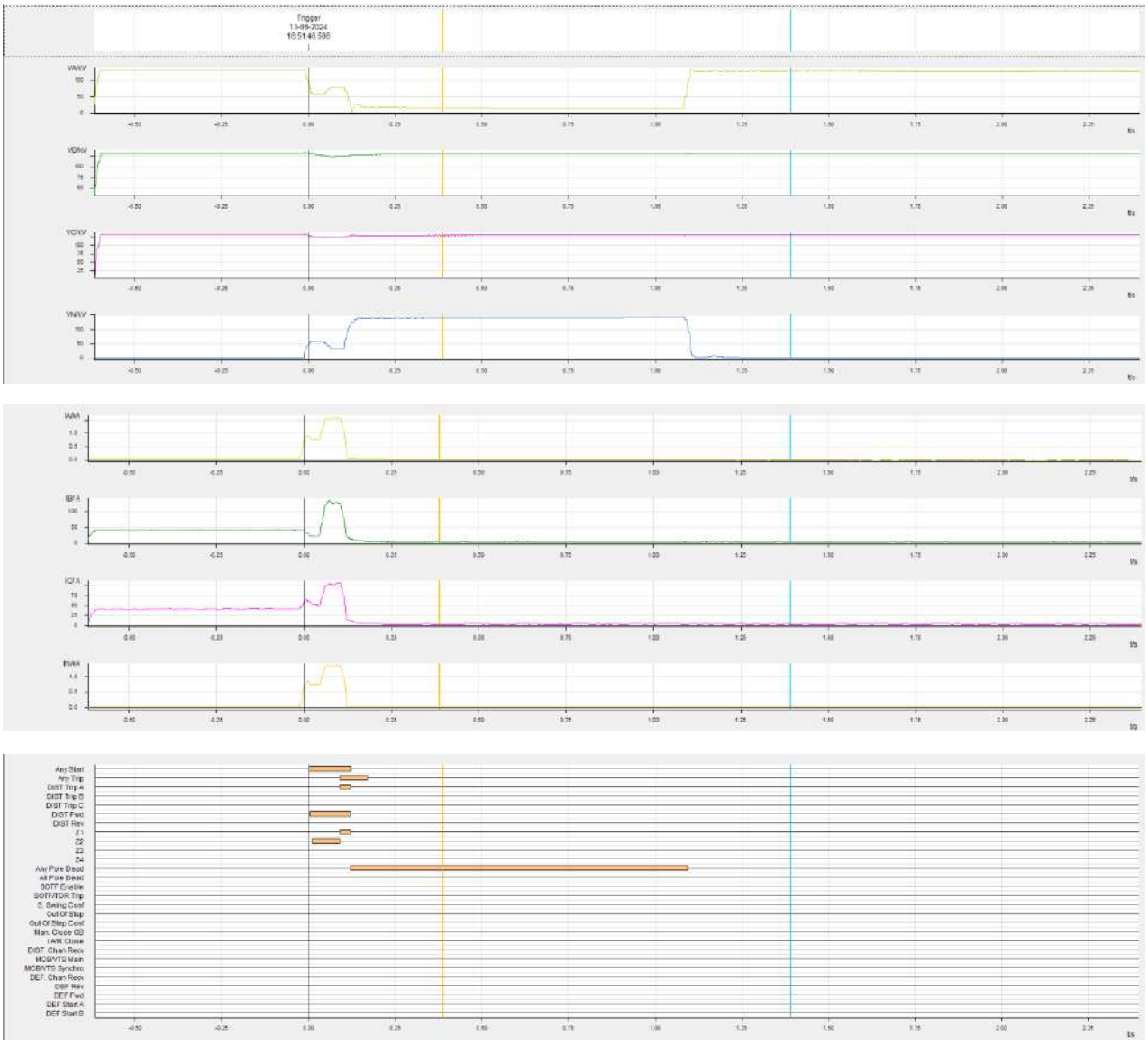
16. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

Annexure 1: (Sequence of Events-As per ERLDC SCADA)

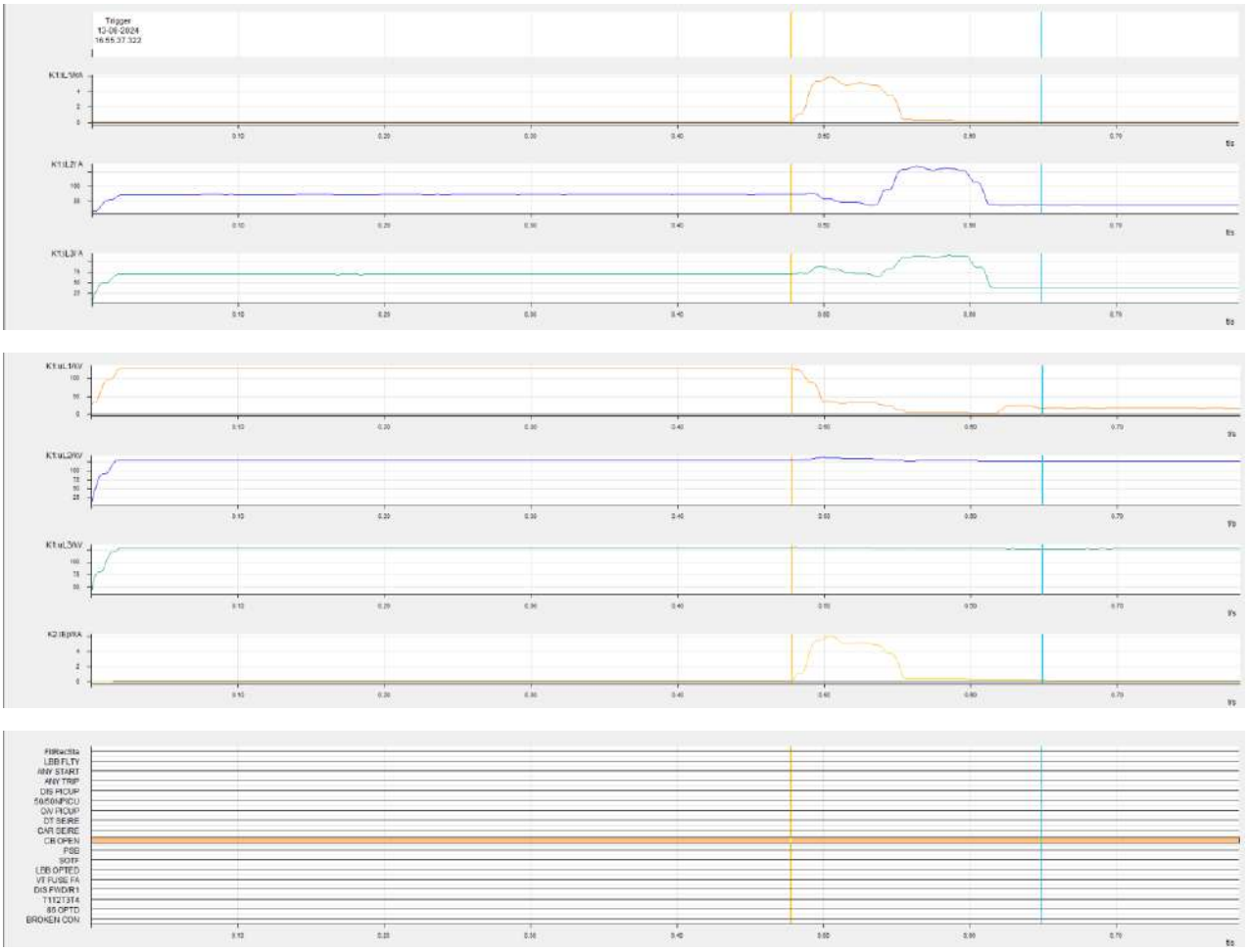
SOE data not available in ERLDC Scada.

Annexure 2:

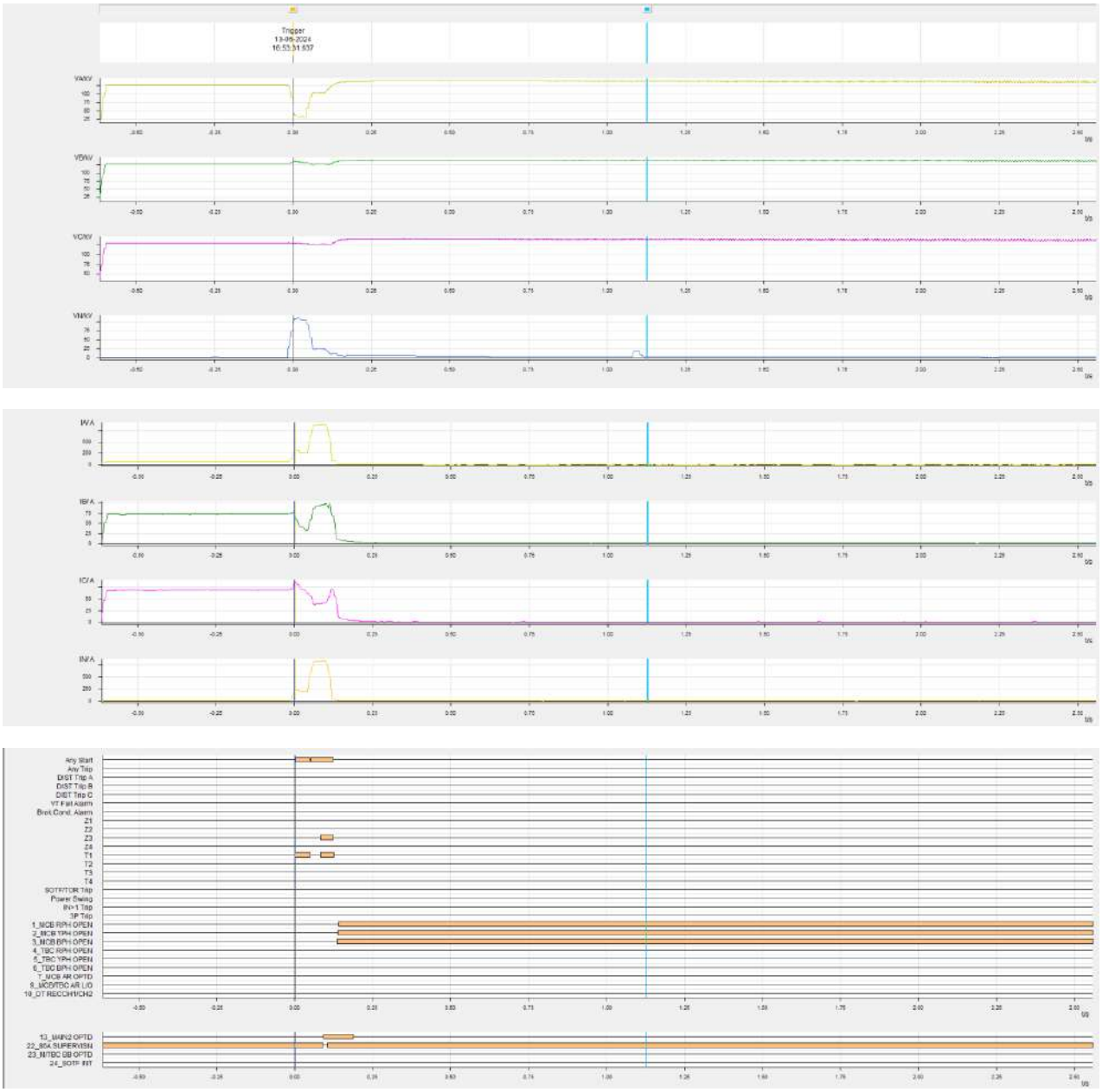
DR of 220 kV Dumka-Govindpur-2 (Govindpur)



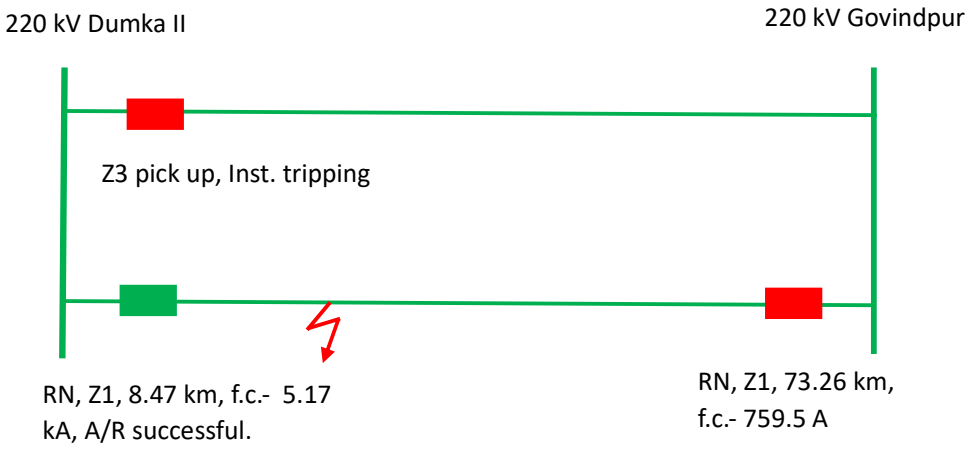
DR of 220 kV Dumka-Govindpur-2 (Dumka)



DR of 220 kV Dumka-Govindpur-1 (Dumka)



Tripping of 220 kV Dumka II – Govindpur d/c on dated- 13.06.2024 at 16:55 hrs :-



Relay Indications :-

Name of the elements	Date & Time	Relay Indication End- 1	Relay Indication End- 2	Remarks
220 kV Dumka II – Govindpur - 1	13.06.2024, 16:55 hrs	**M1:-** RN, Z3 pick up, IR- 882.5 A, **M2:-** RN, Z3, IR- 1.8 kA, Inst. tripping by Main-2 relay.	Didn't trip	Z3 Time delay of main- 2 relay was found (tZ3) = 0 s.
220 kV Dumka II – Govindpur - 2		**M1:-** RN, Z1, 8.47 km, IR- 5.17 kA **M2:-** RN, Z1, 6.4 km, IR- 5.09 kA A/R successful from Dumka II end.	**M2:-** RN, Z1, 73.26 km, IR- 759.5A	3ph tripping for single phase fault at Govindpur end.

Event Analysis:-

- There was RN fault in 220 kV Dumka II – Govindpur ckt- 2, which was sense in Z1 from both end. A/R Successful from dumka II end but 3-ph tripping occurred for single phase fault at Govindpur end. There was issue in A/R circuit at Govindpur end.
- This fault was seen in Z3 by relays of ckt- 1 from Dumka II end and tripped instantaneously. The time delay of Z3 in main-2 relay of 220 kV Dumka II – Govindpur ckt- 1 at Dumka II end found at 0 s.

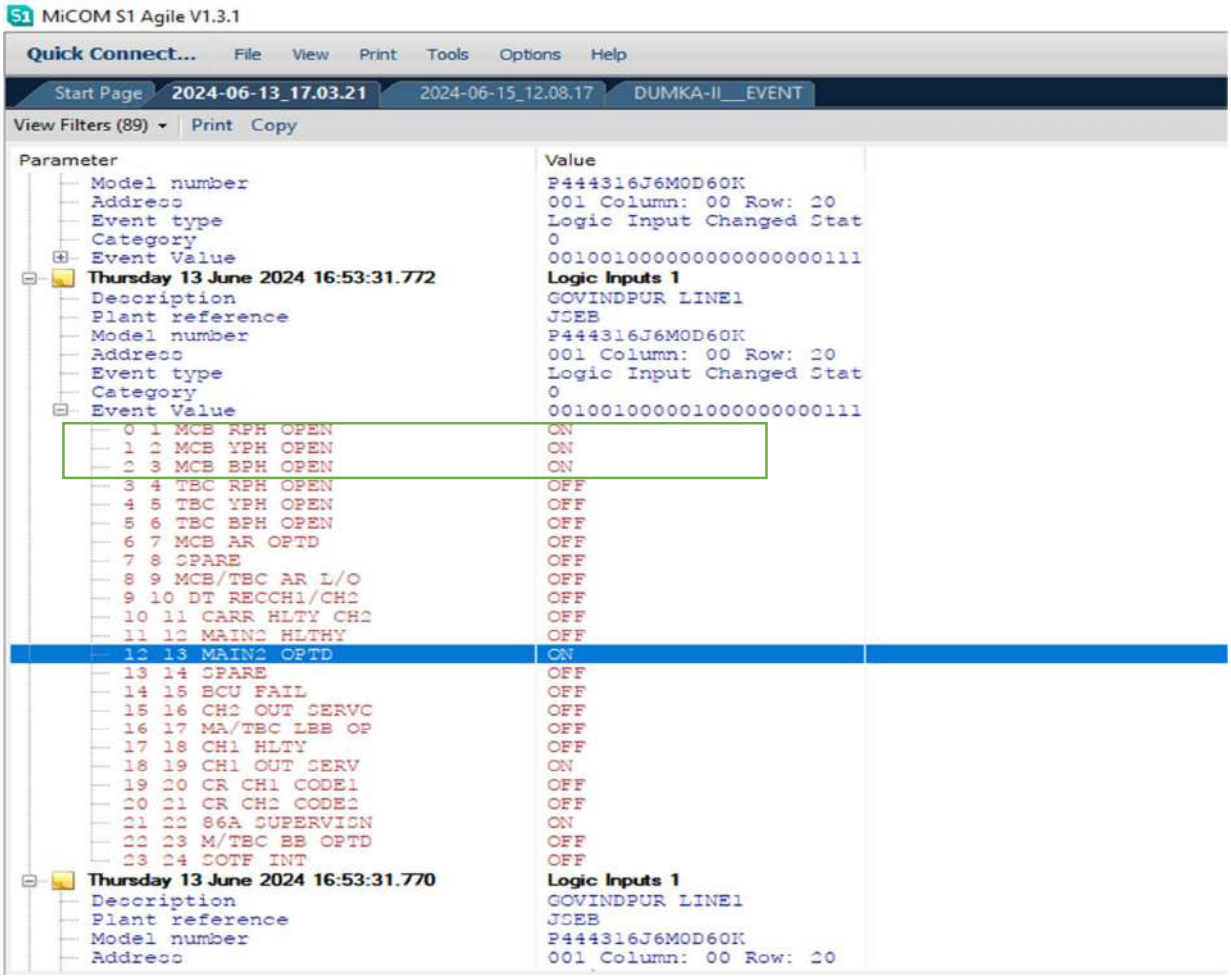
Protection Issue observed during the Event :-

- Incorrect zone-3 time delay setting in main-2 relay of 220 kV Dumka II – Govindpur ckt- 1 at Dumka II end.
- A/R circuit is unhealthy at Govindpur end for 220 kV Dumka II – Govindpur ckt- 2.
- DR channels and length of main-2 relays at Dumka II end are not configured properly.

Compliance of protection issues –

- The setting has been revised on 04.07.2024.
- Instruction has been given to concern field officials for checking and rectification of A/R circuit.
- DR channels and length of main-2 relays at Dumka II end have been configured as per PCC guidelines. (on 04.07.2024)

Relay indication 220 kV Dumka II – Govindpur – 1 at Dumka II end:-



Relay Indication of 220 kV DUMKA II – GOVINDPUR – 2 at DUMKA II END:-

Thursday 13 June 2024 16:53:35.041: Full DR Alarm ON
Thursday 13 June 2024 16:53:33.230: TOR Enable OFF
Thursday 13 June 2024 16:53:33.086: Logic Inputs 1
Thursday 13 June 2024 16:53:32.728: Any Pole Dead OFF
Thursday 13 June 2024 16:53:32.593: Logic Inputs 1
Thursday 13 June 2024 16:53:32.098: Fault Recorded
Description: GOVINDPUR_LINE2
Plant reference: JSEB
Model number: P444316J6M0D60K
Address: 001 Column: 01 Row: 00
Event type: Fault Record
Category: 0
Event Value : 0

Active Group : 1
Faulted Phase : 00011001
Start Elements : 00000000000000100000000001000001
Tripped Elts : 00000000000000010000000000000001
Time Stamp : Thursday 13 June 2024 16:53:31.624
Fault Alarms : 0000000000000000
System Frequency : 50.07 Hz
Fault Duration : 69.91ms
Relay Trip Time : 79.89ms
Fault Location : 8.473km
IA : 5.176kA
IB : 35.95 A
IC : 76.21 A
VAN : 29.59kV
VBN : 143.5kV
VCN : 120.5kV
Fault Resistance : 1.121 Ohm
Fault in Zone : Zone 1
Tripped Elts 2 : 00000000000000000000000
Start Elements 2 : 0000000000000000
Thursday 13 June 2024 16:53:31.891: TOR Enable ON
Thursday 13 June 2024 16:53:31.752: Logic Inputs 1
Thursday 13 June 2024 16:53:31.714: Output Contacts2
Thursday 13 June 2024 16:53:31.714: Output Contacts1
Thursday 13 June 2024 16:53:31.714: 1P Trip OFF
Thursday 13 June 2024 16:53:31.714: Any Trip A OFF
Thursday 13 June 2024 16:53:31.714: Any Int. Trip A OFF
Thursday 13 June 2024 16:53:31.714: Any Trip OFF
Thursday 13 June 2024 16:53:31.714: Any Int. Trip OFF
Thursday 13 June 2024 16:53:31.704: Output Contacts1
Thursday 13 June 2024 16:53:31.704: DIST Sig. Send OFF
Thursday 13 June 2024 16:53:31.694: Any Pole Dead ON
Thursday 13 June 2024 16:53:31.694: IN>1 Start OFF
Thursday 13 June 2024 16:53:31.694: Z3 OFF
Thursday 13 June 2024 16:53:31.694: Z2 OFF
Thursday 13 June 2024 16:53:31.694: Z1 OFF
Thursday 13 June 2024 16:53:31.694: Dist Start N OFF
Thursday 13 June 2024 16:53:31.694: DIST Start A OFF
Thursday 13 June 2024 16:53:31.694: DIST Trip A OFF
Thursday 13 June 2024 16:53:31.694: DIST Fwd OFF
Thursday 13 June 2024 16:53:31.694: Any Start OFF
Thursday 13 June 2024 16:53:31.658: Logic Inputs 1
Thursday 13 June 2024 16:53:31.634: Output Contacts2
Thursday 13 June 2024 16:53:31.634: Output Contacts1
Thursday 13 June 2024 16:53:31.634: 1P Trip ON
Thursday 13 June 2024 16:53:31.634: Any Trip A ON
Thursday 13 June 2024 16:53:31.634: Any Int. Trip A ON
Thursday 13 June 2024 16:53:31.634: Any Trip ON
Thursday 13 June 2024 16:53:31.634: Z3 ON
Thursday 13 June 2024 16:53:31.634: Z2 ON
Thursday 13 June 2024 16:53:31.634: Z1 ON
Thursday 13 June 2024 16:53:31.634: DIST Trip A ON
Thursday 13 June 2024 16:53:31.634: DIST Fwd ON
Thursday 13 June 2024 16:53:31.634: DIST Sig. Send ON
Thursday 13 June 2024 16:53:31.634: Any Int. Trip ON
Thursday 13 June 2024 16:53:31.631: Dist Start N ON
Thursday 13 June 2024 16:53:31.631: DIST Start A ON
Thursday 13 June 2024 16:53:31.624: IN>1 Start ON
Thursday 13 June 2024 16:53:31.624: Any Start ON

Relay indication 220 kV Dumka II – Govindpur – 1 at Govindpur end:-

Thursday 13 June 2024 16:51:47.659: Any Pole Dead OFF
Thursday 13 June 2024 16:51:47.275: Fault Recorded
Description: DUMKA-2
Plant reference: DUMKA-2
Model number: P444916J6M0710M
Address: 001 Column: 01 Row: 00
Event type: Fault Record
Category: 0
Event Value : 0
Active Group : 1
Faulted Phase : 01111001
Start Elements : 00000000000000100000000001000001
Tripped Elts : 00000000000000010000000000000001
Time Stamp : Thursday 13 June 2024 16:51:46.566
Fault Alarms : 0000000100000000
System Frequency : 50.07 Hz
Fault Duration : 121.5ms
Relay Trip Time : 79.89ms
Fault Locatio XY : 73.26km
IA : 759.5 A
IB : 18.39 A
IC : 52.18 A
VAN : 58.24kV
VBN : 128.3kV
VCN : 124.5kV
Fault Resista XY : 1.898 Ohm
Fault in Zone : Zone 1
Tripped Elts 2 : 00000000000000000000000
Start Elements 2 : 0000000000000000
Evt Unique Id : 39771
Thursday 13 June 2024 16:51:46.887: TOR Enable ON
Thursday 13 June 2024 16:51:46.737: Dist Start N OFF
Thursday 13 June 2024 16:51:46.734: Output Contacts2
Thursday 13 June 2024 16:51:46.734: Output Contacts1
Thursday 13 June 2024 16:51:46.734: 3P Trip OFF
Thursday 13 June 2024 16:51:46.734: Any Trip C OFF
Thursday 13 June 2024 16:51:46.734: Any Trip B OFF
Thursday 13 June 2024 16:51:46.734: Any Trip A OFF
Thursday 13 June 2024 16:51:46.734: Any Int. Trip C OFF
Thursday 13 June 2024 16:51:46.734: Any Int. Trip B OFF
Thursday 13 June 2024 16:51:46.734: Any Int. Trip A OFF
Thursday 13 June 2024 16:51:46.734: Any Trip OFF
Thursday 13 June 2024 16:51:46.734: Any Int. Trip OFF
Thursday 13 June 2024 16:51:46.727: Logic Inputs 1
Thursday 13 June 2024 16:51:46.695: Output Contacts1
Thursday 13 June 2024 16:51:46.695: DIST Sig. Send OFF
Thursday 13 June 2024 16:51:46.687: IN>1 Start OFF
Thursday 13 June 2024 16:51:46.687: Dist Start N ON
Thursday 13 June 2024 16:51:46.687: Any Start OFF
Thursday 13 June 2024 16:51:46.686: Output Contacts1
Thursday 13 June 2024 16:51:46.686: Any Pole Dead ON
Thursday 13 June 2024 16:51:46.686: Z1 OFF
Thursday 13 June 2024 16:51:46.686: Dist Start N OFF
Thursday 13 June 2024 16:51:46.686: DIST Start A OFF
Thursday 13 June 2024 16:51:46.686: DIST Trip A OFF
Thursday 13 June 2024 16:51:46.686: DIST Fwd OFF
Thursday 13 June 2024 16:51:46.681: Logic Inputs 1

Thursday 13 June 2024 16:51:46.654: Output Contacts2
Thursday 13 June 2024 16:51:46.654: Output Contacts1
Thursday 13 June 2024 16:51:46.654: 3P Trip ON
Thursday 13 June 2024 16:51:46.654: Any Trip C ON
Thursday 13 June 2024 16:51:46.654: Any Trip B ON
Thursday 13 June 2024 16:51:46.654: Any Trip A ON
Thursday 13 June 2024 16:51:46.654: Any Int. Trip C ON
Thursday 13 June 2024 16:51:46.654: Any Int. Trip B ON
Thursday 13 June 2024 16:51:46.654: Any Int. Trip A ON
Thursday 13 June 2024 16:51:46.654: Any Trip ON
Thursday 13 June 2024 16:51:46.654: Z2 OFF
Thursday 13 June 2024 16:51:46.654: Z1 ON
Thursday 13 June 2024 16:51:46.654: DIST Trip A ON
Thursday 13 June 2024 16:51:46.654: DIST Sig. Send ON
Thursday 13 June 2024 16:51:46.654: Any Int. Trip ON
Thursday 13 June 2024 16:51:46.574: Z2 ON
Thursday 13 June 2024 16:51:46.569: DIST Fwd ON
Thursday 13 June 2024 16:51:46.568: IN>1 Start ON
Thursday 13 June 2024 16:51:46.566: Dist Start N ON
Thursday 13 June 2024 16:51:46.566: DIST Start A ON
Thursday 13 June 2024 16:51:46.566: Any Start ON

ग्रिड-इंडिया GRID-INDIA ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre
कार्यालय : 14, गोल्फ क्लब रोड, टालिगंज, कोलकाता - 700033
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CIN : U40105DL2009GOI188682, Website : www.erldc.in, E-mail : erldcinfo@grid-india.in, Tel.: 033 23890060/0061

पूर्वी क्षेत्र के 400/220 केवी उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event in 220 kV Baruipur (WB) Station of Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date(दिनांक):02-07-2024

1. Event Summary (घटना का सारांश):

At 14:35 Hrs on 14.06.2024, 220 kV Newtown-Subhasgram (PG)- Baruipur tripped due to R-N fault while 220 kV Baruipur Subhasgram (WB) was already in opened condition to control Loading of ICTs at Subhasgram (PG). This led to a total load loss of 138 MW at Baruipur S/s (Renia, Behala, Sirakol & Baruipur Area). Power to the downstream network was made available through 132 kV Lakhikantapur- Sirakol at 14:41 Hrs. 220 kV Bus at Baruipur was charged at 14:48 Hrs through 220 kV Baruipur- Subhasgram (WB).

2. Time and Date of the Event (घटना का समय और दिनांक): 14:35 hrs of 14.06.2024

3. Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1

4. Location/Control Area (स्थान/नियंत्रण क्षेत्र): 220 kV Baruipur S/S (West Bengal)

5. Antecedent Conditions (पूर्ववर्ती स्थिति):

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				West Bengal	West Bengal
Pre-Event (घटना पूर्व)	50.00 Hz	29864 MW	29839MW	5443 MW	11537 MW
Post Event (घटना के बाद)	49.98 Hz	29864 MW	29701MW	5443 MW	11399 MW

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है)	220 kV Baruipur- Subhasgram (WB) was opened at 14:29 Hrs. to control Loading of ICTs at Subhasgram (PG)
Weather Condition (मौसम स्थिति)	Normal weather

6. **Load and Generation loss (लोड और जेनरेशन हानि)**: Generation loss: Nil; Load loss:138 MW.
7. **Duration of interruption (**रुकावट की अवधि**): 00:06 Hrs**
8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा):**

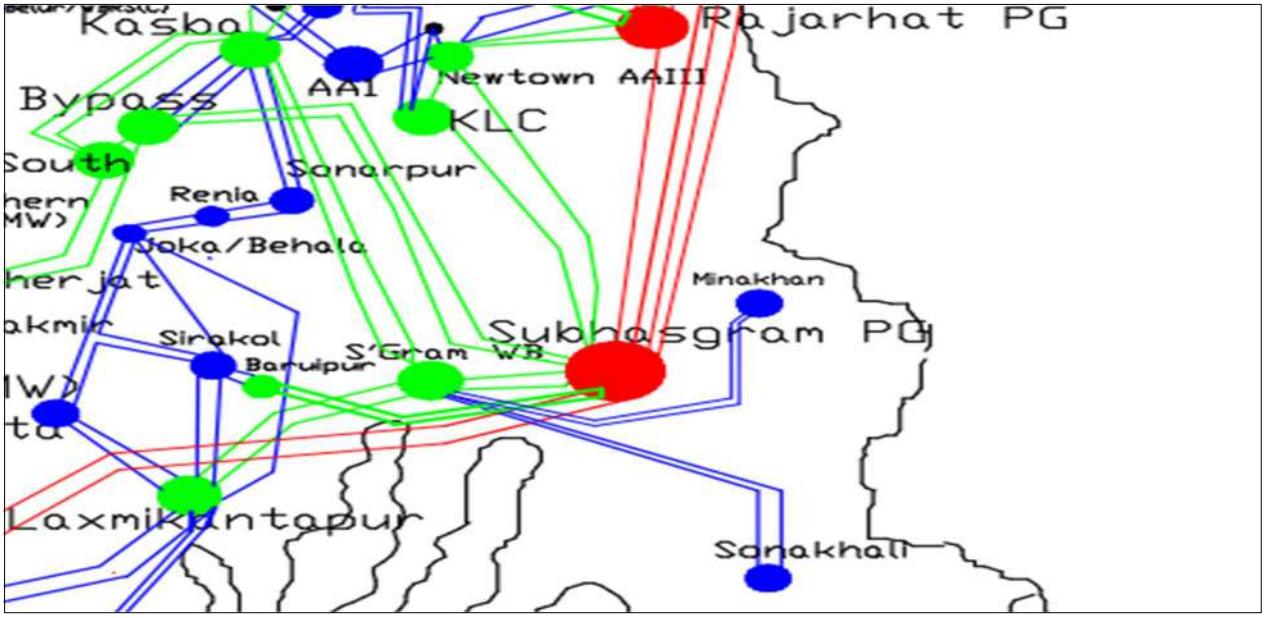


Figure 1: Network across the affected area

9. **Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण):** NA

10. **Major Elements Tripped (प्रमुख ट्रिपिंग):**

क्र०सं०	नाम	Trip time (hh:mm:ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	220 kV Baruipur-Subhasgram (PG)- Newtown.	14:35	Baruipur: B_N, 1.28 KA	Newtown: R_N, 4.01 kA	21:59

11. **Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):**

- 220 kV Newtown-Subhashgram (PG) and 220 kV Subhashgram (PG)-Baruipur had been reconfigured as 220 kV Newtown-Subhasgram-Baruipur using only transfer bus at Subhashgram. Baruipur was fed through this line only.
- At 14:35 Hrs, R_N fault struck the line. Newtown sensed the fault in R_ph and line tripped in Zone-1. However, Baruipur sensed the fault in B_ph and line tripped in Zone-1.
- All 3 phases tripped at both ends as A/R was kept disabled due to change in configuration and non-availability of carrier communication.
- AT 14:48 Hrs 220 kV Bus was charged through 220 kV Baruipur- Subhasgram (WB).

PMU Snapshot:

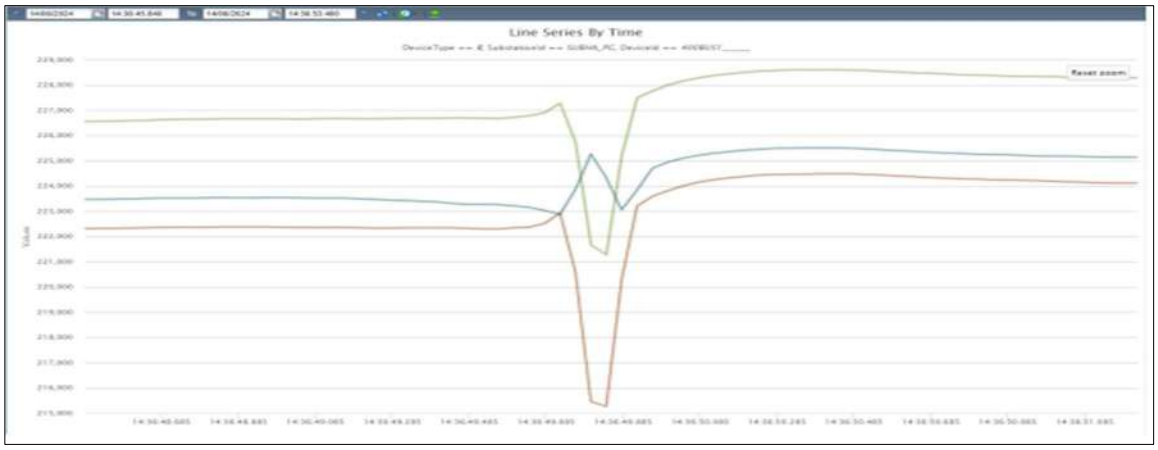


Figure 2: PMU Voltage snapshot of 400/220 kV Subhasgram S/S

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या): Nil.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय): Nil

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

S.No.	Issues	Regulation Non-Compliance	Utilities
2.	**DR/EL not provided within 24 Hours**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	

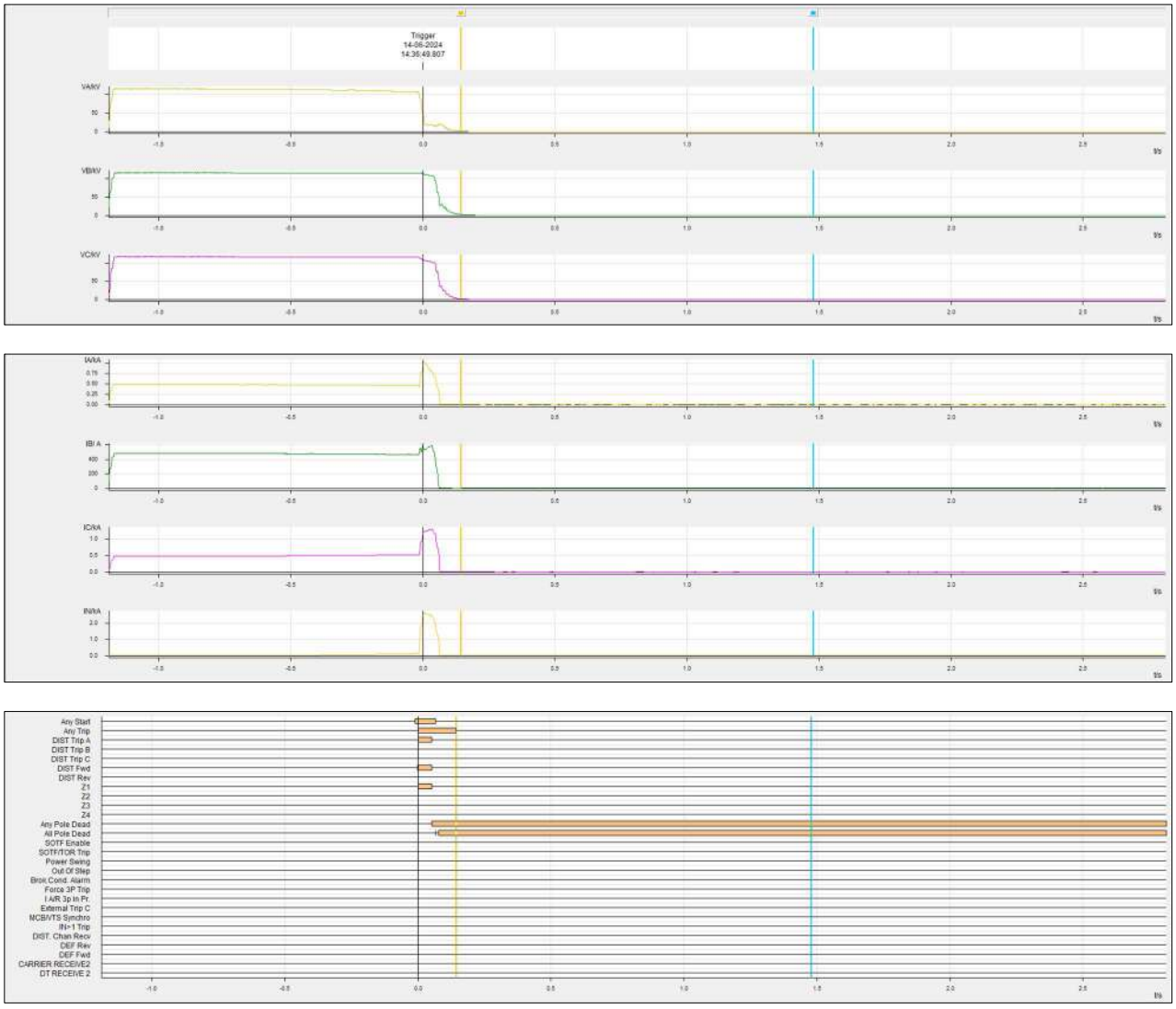
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

Annexure 1: (Sequence of Events-As per ERLDC SCADA)

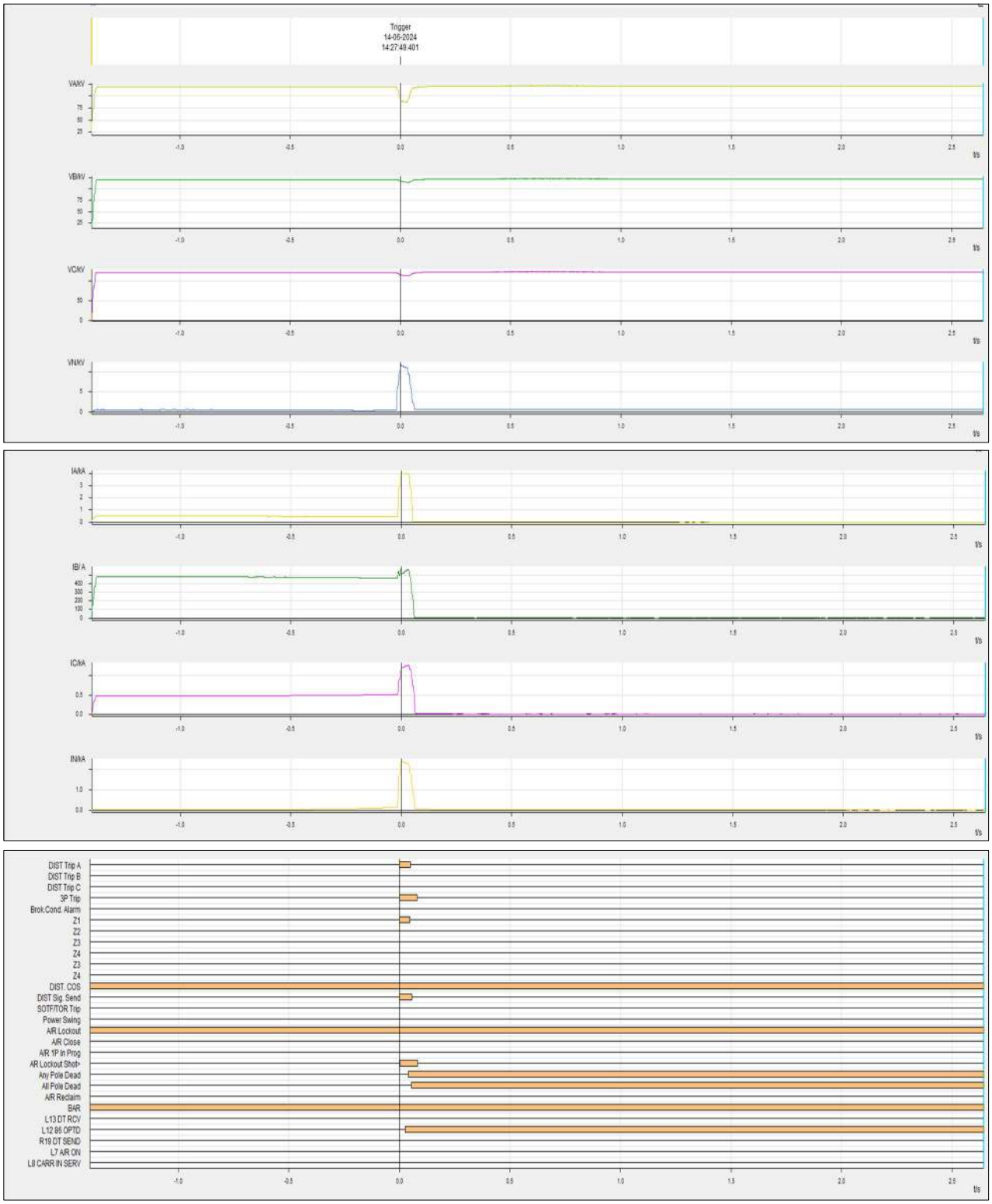
SOE data not available in ERLDC Scada.

Annexure 2:

DR of 220 kV Baruipur-Subhasgram (PG)- Newtown. (At Baruipur end)



DR of 220 kV Baruipur-Subhasgram (PG)- Newtown (At Newtown end)



ग्रिड-इंडिया GRID-INDIA ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre
कार्यालय : 14, गोल्फ क्लब रोड, टालिगंज, कोलकाता - 700033
Office : 14, Golf Club Road, Tollygunge, Kolkata - 700033
CIN : U40105DL2009GOI188682, Website : www.erldc.in, E-mail : erldcinfo@grid-india.in, Tel.: 033 23890060/0061

पूर्वी क्षेत्र के 220 केवी उपकेन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event in 220 kV New Melli (Sikkim) Station of Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date(दिनांक):02-07-2024

1. **Event Summary (घटना का सारांश):**

At 06:38 hrs on 19.06.2024, 220 kV Rangpo- New Melli-1 tripped due to Y-B fault. 220 kV Rangpo-New Melli-2 was under planned shutdown since 21.05.2024. Consequently, New Melli s/s became dead and generating units at Tashiding and Jorethang tripped due to loss of the single evacuation path available. Generation Loss of around 200 MW occurred (Tashiding-105 MW, Jorethang- 95 MW).

2. **Time and Date of the Event (घटना का समय और दिनांक):** 06:38 hrs of 19.06.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** 220 kV New Melli S/s, 220 kV Jorethang S/s, 220 kV Tashiding S/S
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				Sikkim	Sikkim
Pre-Event (घटना पूर्व)	50.01 Hz	30782 MW	25080MW	0 MW	25 MW
Post Event (घटना के बाद)	50.01 Hz	30582 MW	25080MW	0 MW	25 MW

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है)	220 kV Rangpo- New Melli-2 was under planned shutdown since 21/05/2024
Weather Condition (मौसम स्थिति)	Heavy rainfall

6. **Load and Generation loss (लोड और जेनरेशन हानि)**: Generation loss: 200 MW; Load loss: Nil.
7. **Duration of interruption (**रुकावट की अवधि**): 03:18 Hrs**
8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा):**

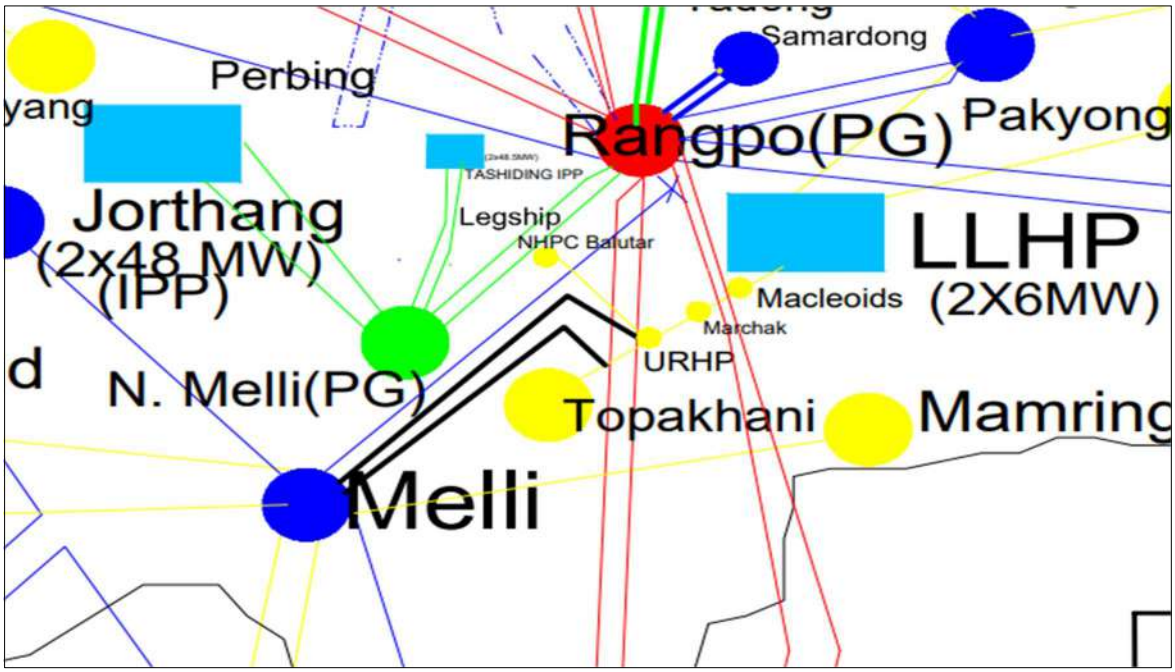


Figure 1: Network across the affected area

9. **Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण):** NA

10. **Major Elements Tripped (प्रमुख ट्रिपिंग):**

क्र०सं०	नाम	Trip time (hh:mm:ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	220 kV Rangpo- New Melli-1	06:38	Rangpo: Y_B, Iy=Ib=14.3 kA	New Melli: Y_B_N, Iy: 2.03 kA, Ib: 2.61 kA	09:56

11. **Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):**

- 220 kV Rangpo-New Melli-1 tripped at 06:38 Hrs due to Y_B fault from Rangpo end immediately. Initially fault was seen in Zone-3 from New Melli end which came in Zone-1 after 150 msec and line tripped from New Melli also.
- 220 kV Jorethang-New Melli D/c tripped from Jorethang end in Zone-1. Ckt-1 didn't trip from New Melli while ckt-2 tripped immediately.

- 220 KV Tashiding-New Melli D/c tripped from New Melli on DT receipt.
- This led to loss of evacuation path for generators at Tashiding and Jorethang and all units at these stations tripped.

PMU Snapshot:

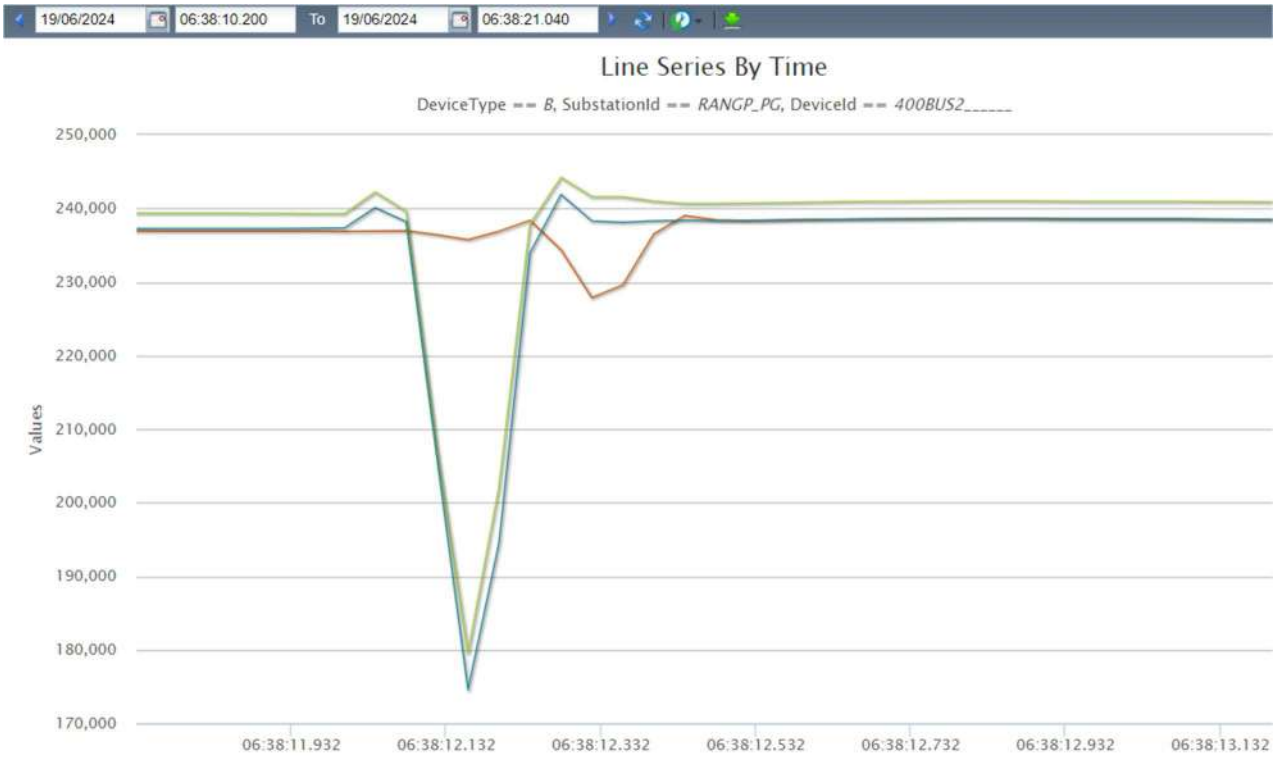


Figure 6: PMU Voltage snapshot of 400/220 kV Rangpo S/S

12. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- 220 kV Jorethang-New Melli D/c tripped from Jorethang end in Zone-1 for fault in adjacent line. Zone reach settings may be reviewed by JLHEP.
- 220 kV Jorethang-New Melli-2 tripped from New Melli end also. Reason for the same may be explained by Powergrid.
- 220 kV Tashiding-New Melli D/c tripped from New Melli on DT receipt. Reason for DT send may be explained by Tashiding.

13. Action Taken/Remedial Measures (सुधारात्मक उपाय):

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

S.No.	Issues	Regulation Non-Compliance	Utilities
2.	**DR/EL not provided within 24 Hours**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**Powergrid ER-2, THEP**

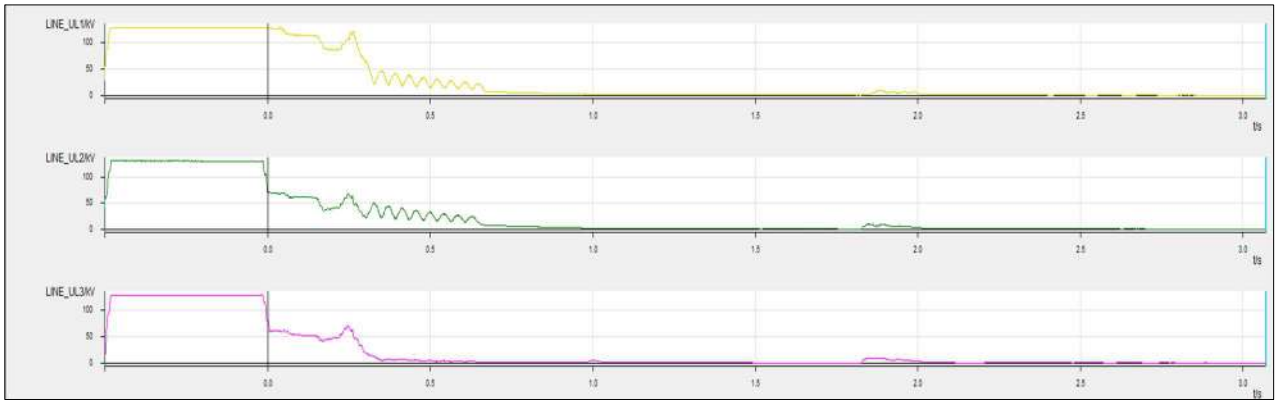
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

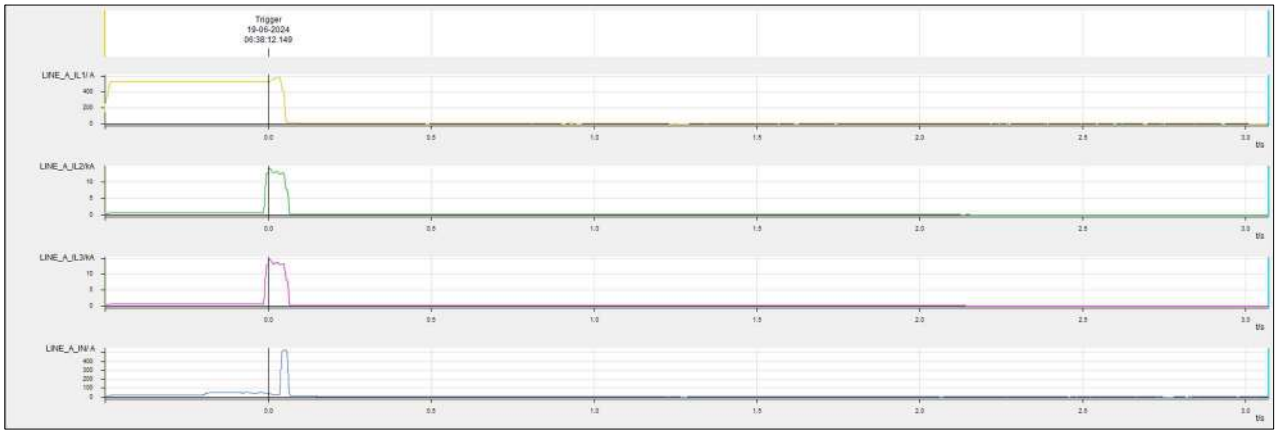
Annexure 1: (Sequence of Events-As per ERLDC SCADA)

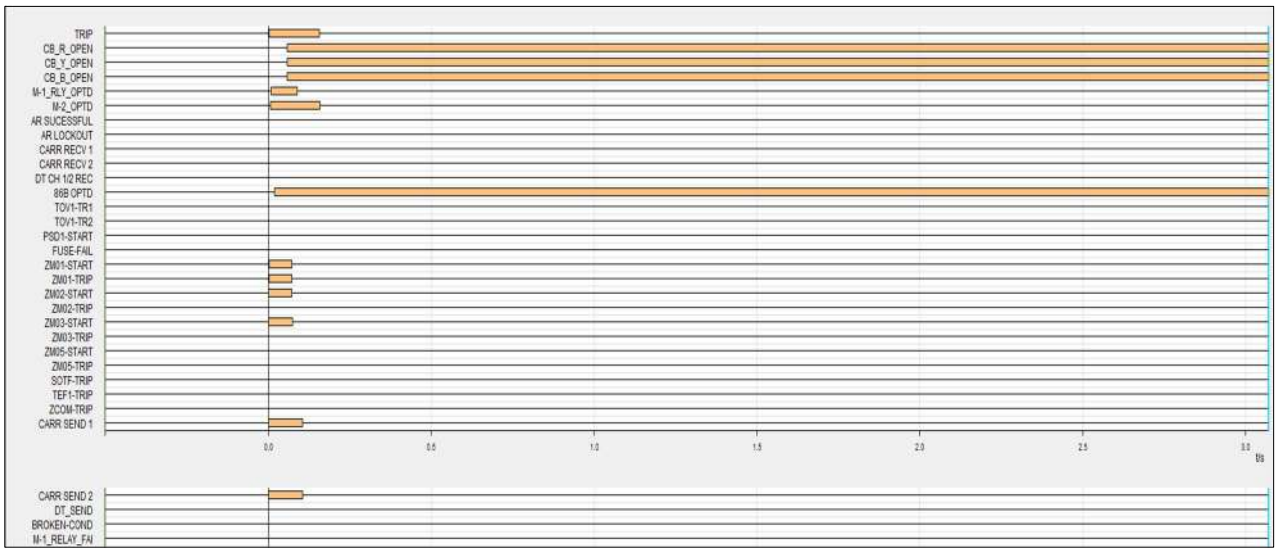
SOE data not available in ERLDC Scada.

Annexure 2:

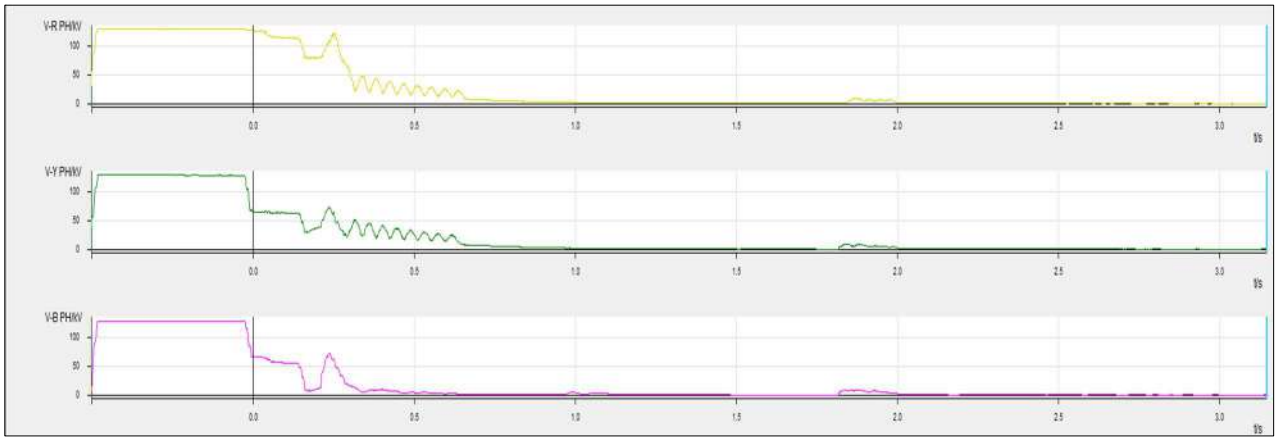
DR of 220 kV Rangpo-New Melli-1 (Rangpo)

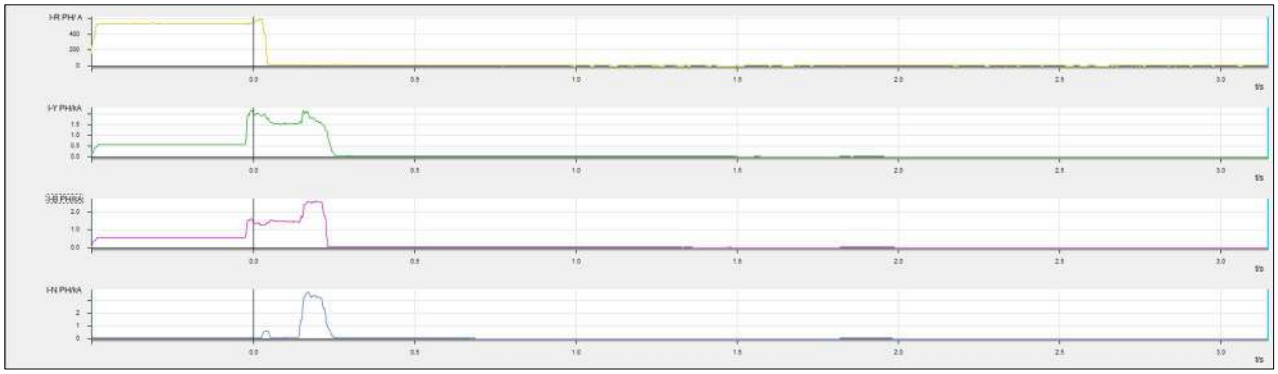


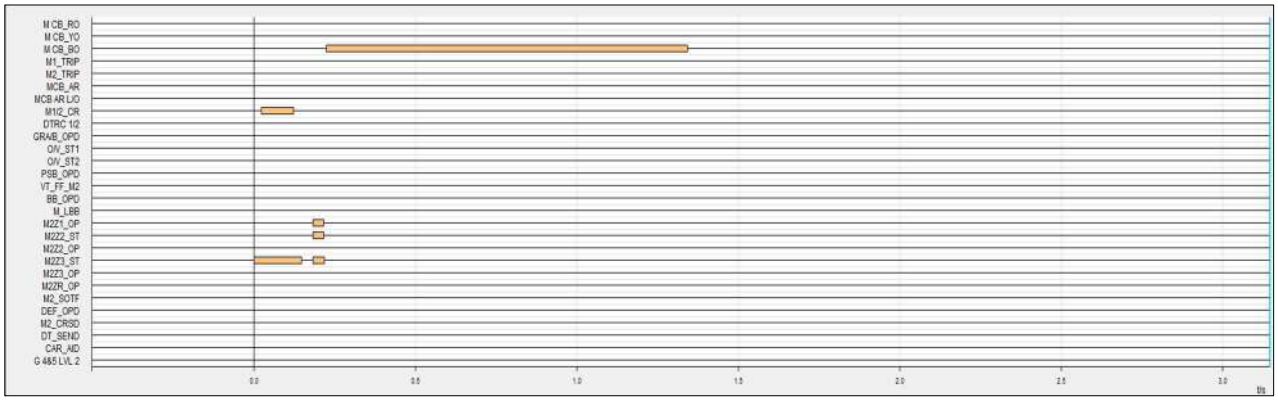




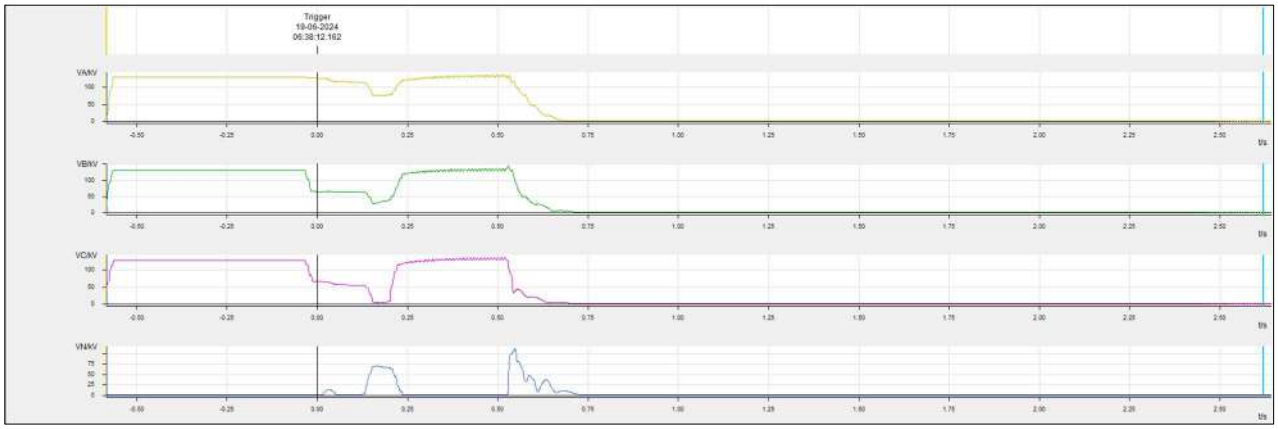
DR of 220 kV Rangpo-New Melli-1 (New Melli)

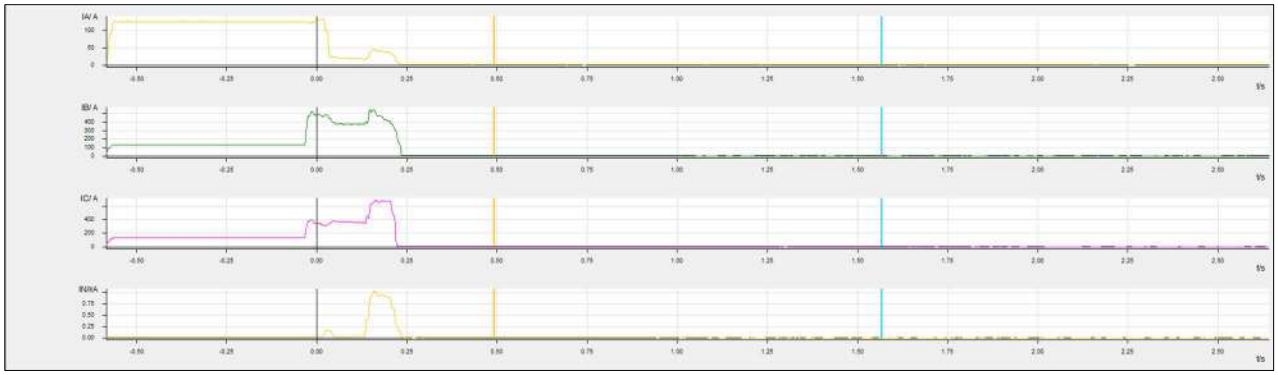


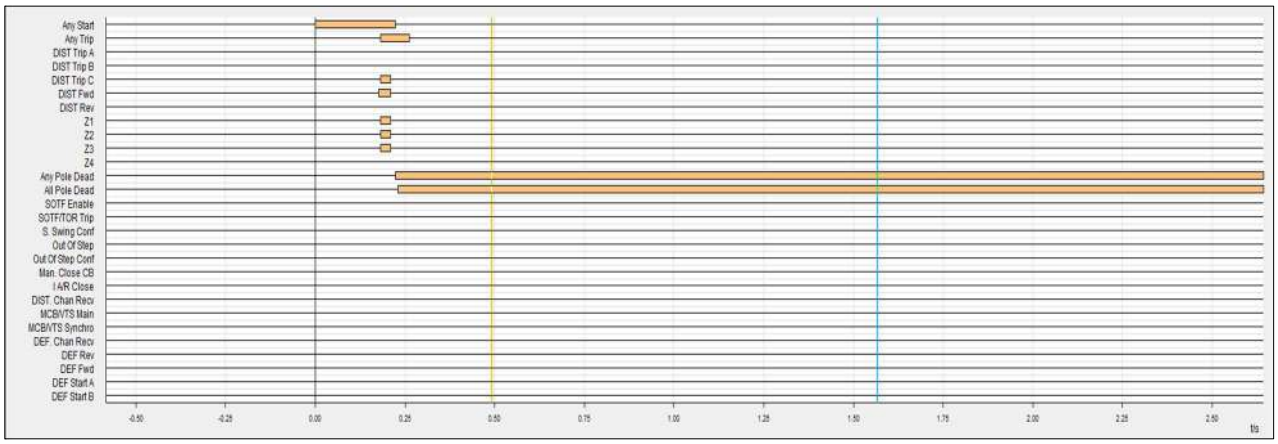




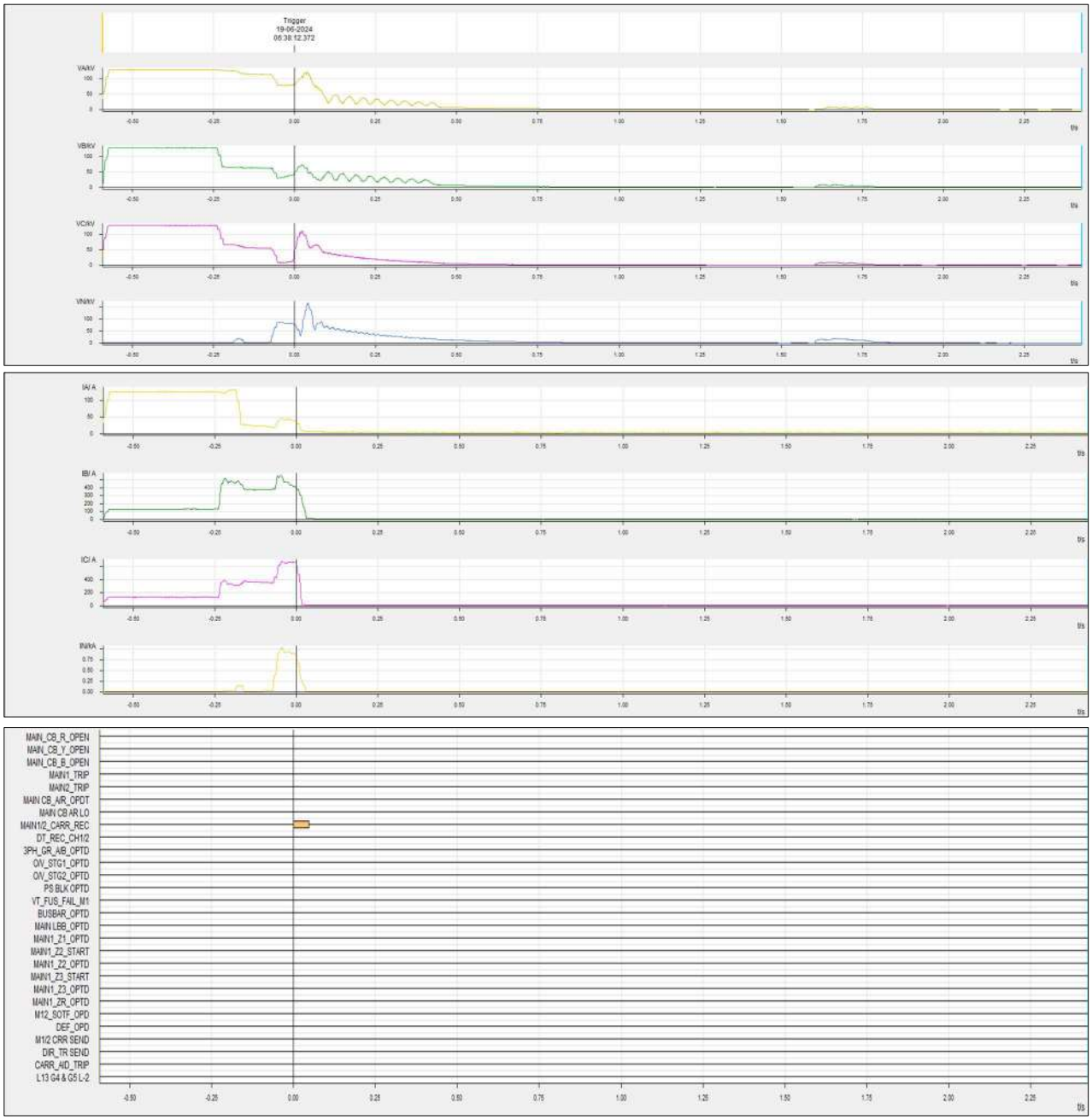
DR of 220 kV Jorethang-New Melli-1 (Jorethang)



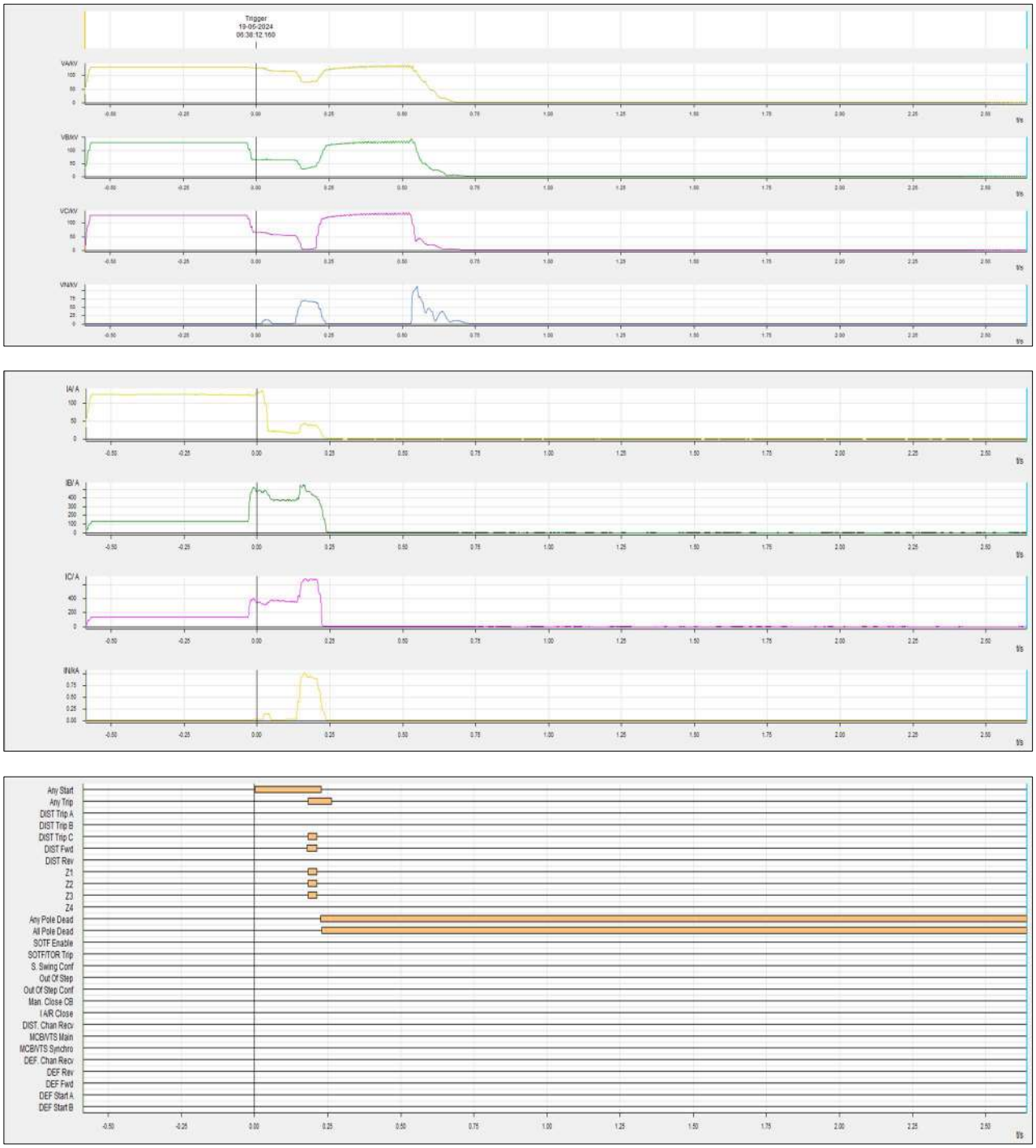




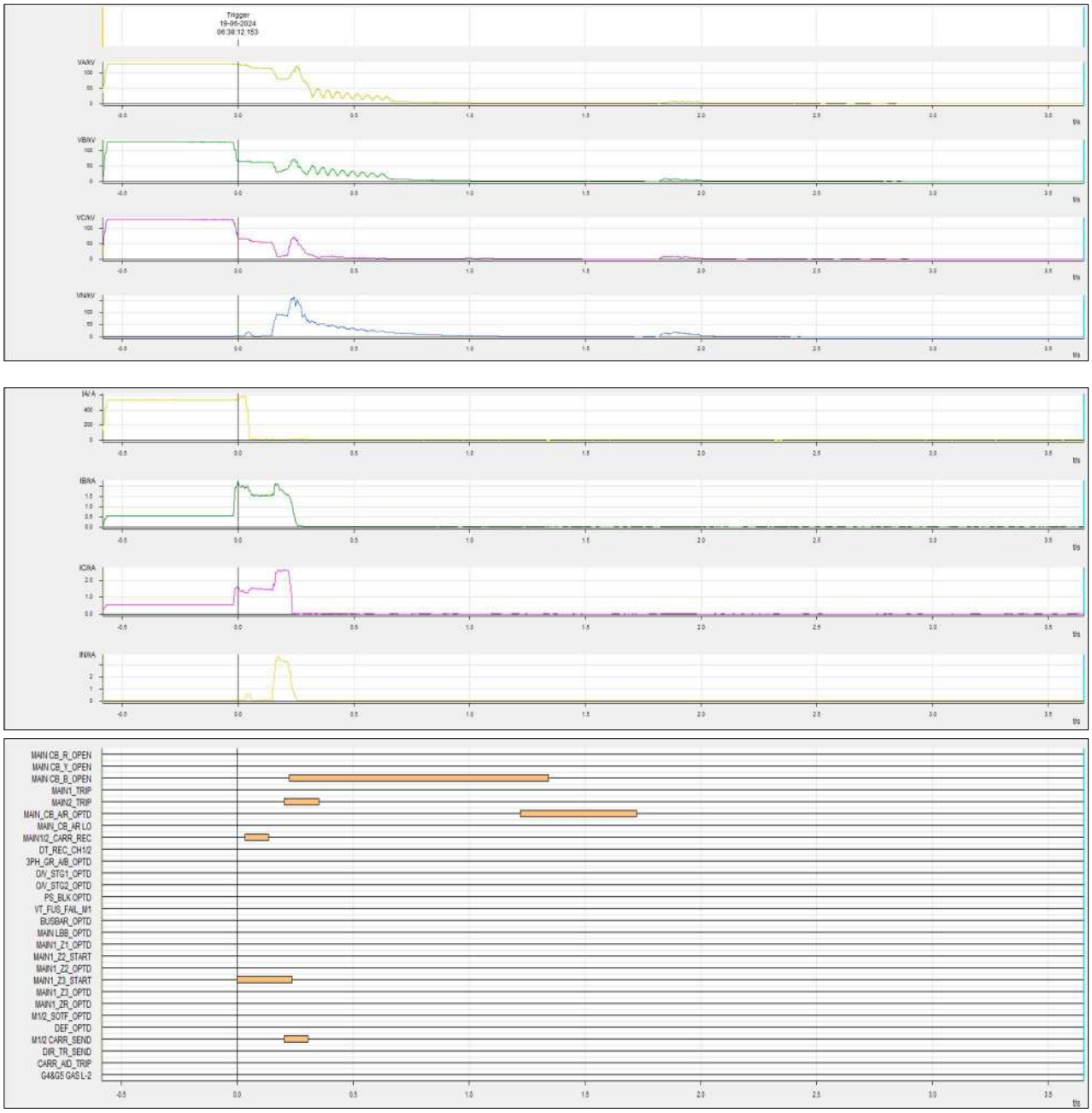
DR of 220 kV Jorethang-New Melli-1 (New Melli)



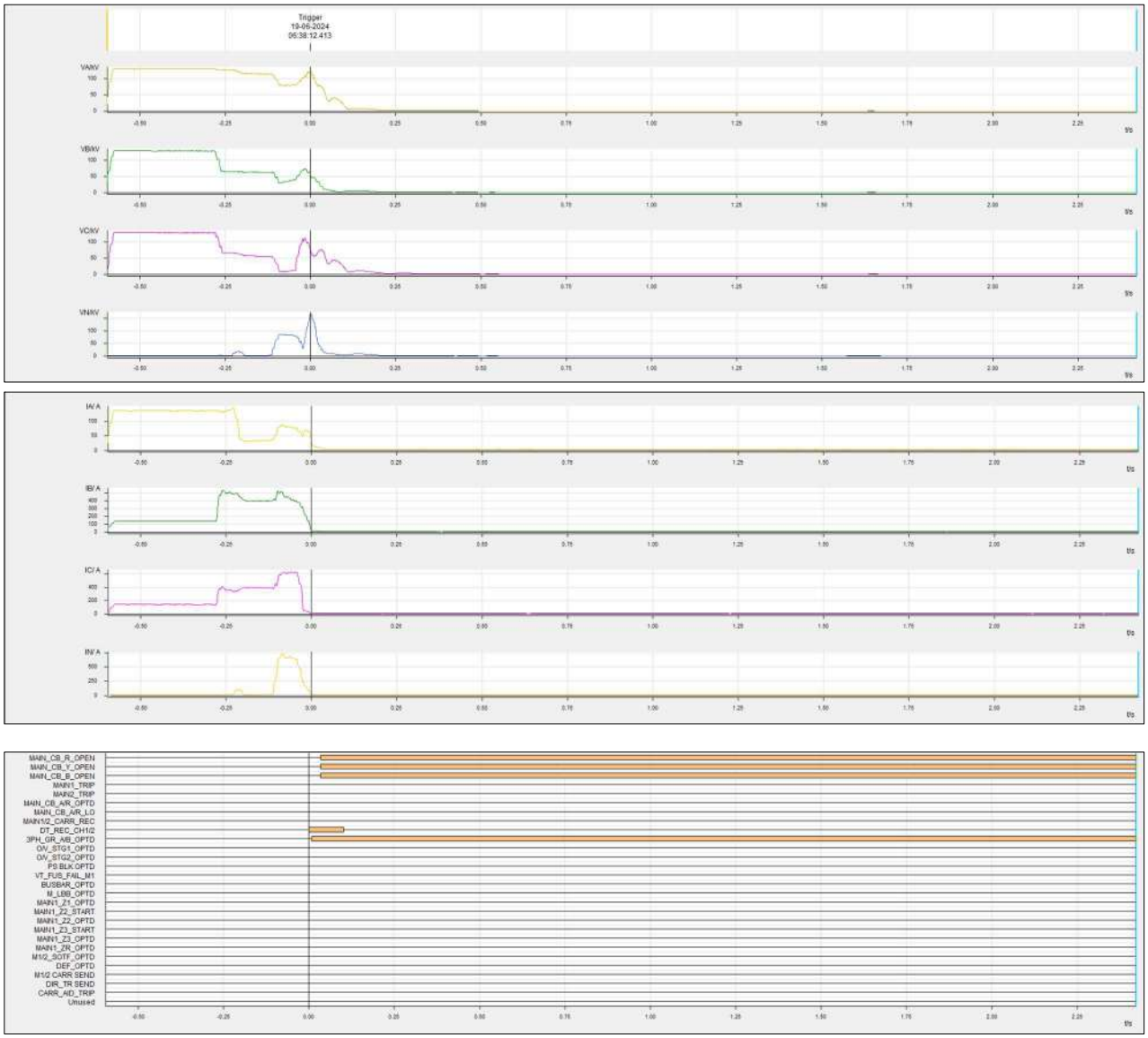
DR of 220 kV Jorethang-New Melli-2 (Jorethang)



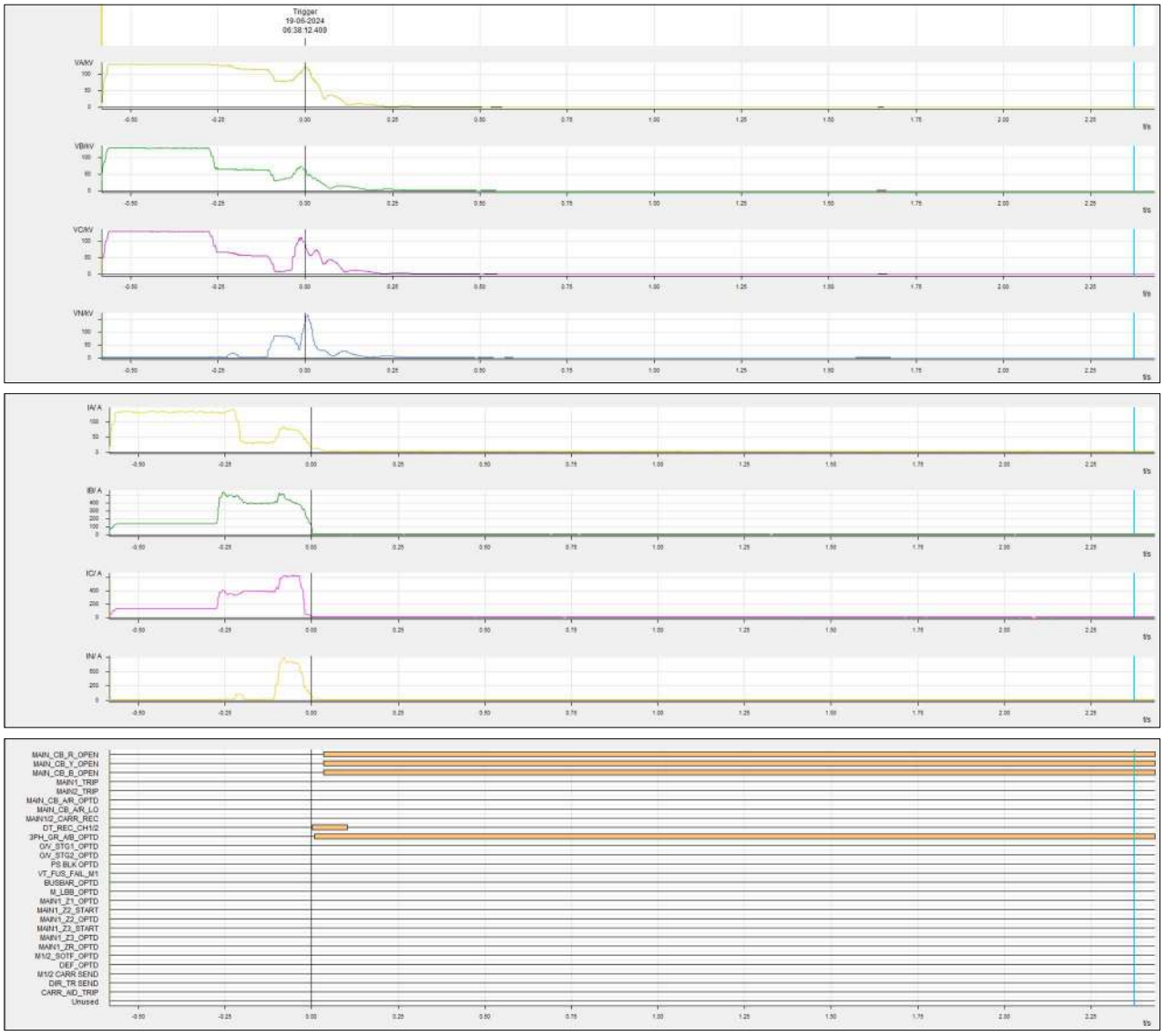
DR of 220 kV Jorethang-New Melli-2 (New Melli)



DR of 220 kV Tashiding-New Melli-1 (New Melli)



DR of 220 kV Tashiding-New Melli-2 (New Melli)



ग्रिड-इंडिया GRID-INDIA ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre
कार्यालय : 14, गोल्फ क्लब रोड, टालिगंज, कोलकाता - 700033
Office : 14, Golf Club Road, Tollygunge, Kolkata - 700033
CIN : U40105DL2009GOI188682, Website : www.erldc.in, E-mail : erldcinfo@grid-india.in, Tel.: 033 23890060/0061

पूर्वी क्षेत्र के 400 केवी जीएमआर (एसटीयू) उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event 400 kV-GMR(STU) Station of Eastern Region

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

(आई ई जी सी 37.2 (एफ) के अनुपालन में)

Date(दिनांक):01-07-2024

1. **Event Summary (घटना का सारांश):**

At 19:18 Hrs of 20/06/2024, 400kV-GMR-Meramundali-B tripped due to R_N fault which led to tripping of GMR Unit #3 (350 MW) due to loss of evacuation path as GMR Unit #3 is connected to Meeramundali-B only through single ckt. This resulted in a generation loss of about 252 MW.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 19:18 hrs of 20.06.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** Odisha / 400kV-GMR (Unit#3 Bus Section)
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				Odisha	Odisha
Pre-Event (घटना पूर्व)	49.92 Hz	30964 MW	26743MW	3449 MW	5661 MW
Post Event (घटना के बाद)	49.92 Hz	30712 MW	26743MW	3197 MW	5661 MW

Pre and post data of 1 minute before and after the event

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है)	Nil
Weather Condition (मौसम स्थिति)	Inclement weather along with heavy rain and wind.

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: 252 MW; Load loss: NIL.
7. **Duration of interruption (रुकावट की अवधि): 01:57 Hrs**

8. Network across the affected area (प्रभावित क्षेत्र का नक्शा)

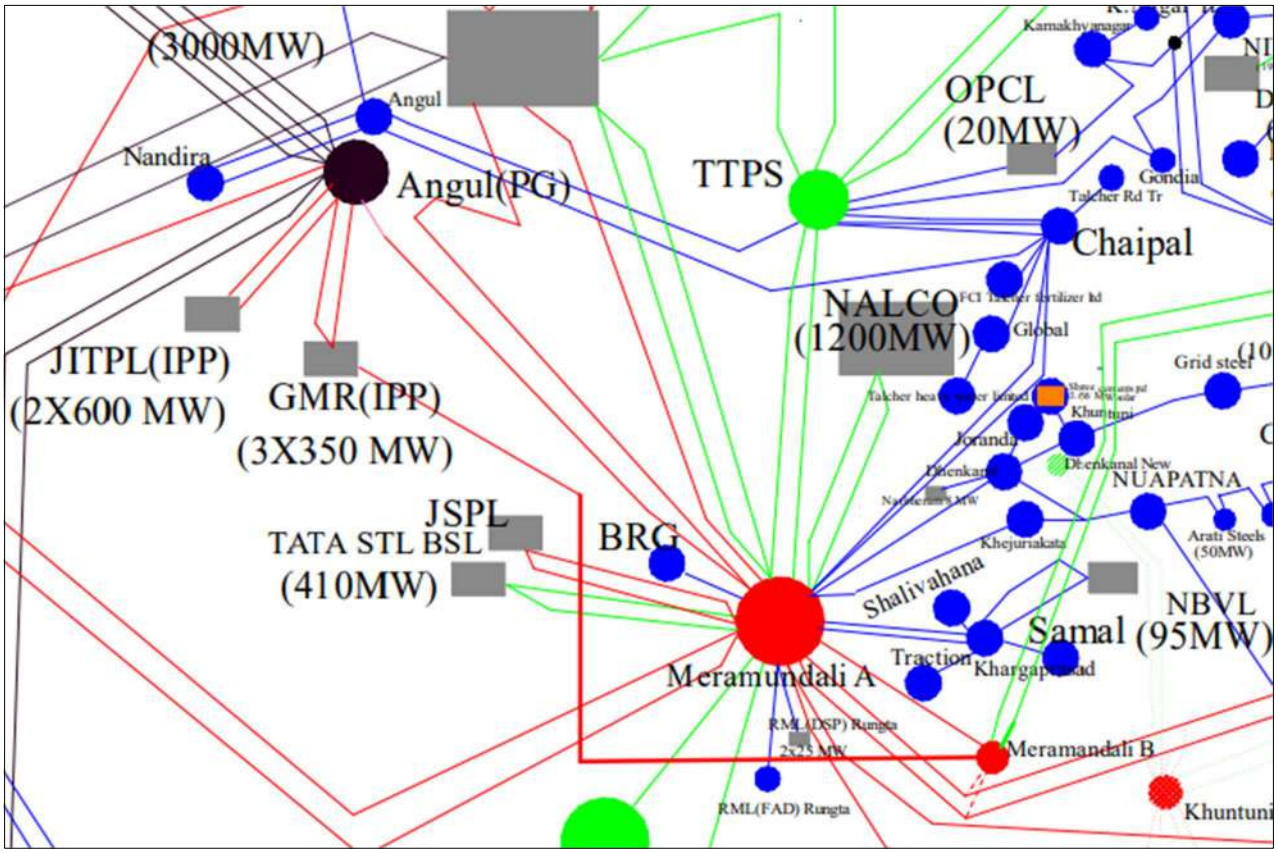


Figure 1: Network across the affected area

9. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): NA

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

क्र०सं०	नाम	Trip time (hh:mm: ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	GMR Unit#3 (350 MW)	19:18	Tripping of Unit due to loss of evacuation.		04:26 (21/06/2024)
2	400kV-GMR-Meramundali-B		GMR: R_N, 3.22 kA, Zone-3 pick, DT received	Meramundali B: R-N, 5.65 Km, 17.41 KA	21:15

11. Event Analysis (Based on PMU, SCADA & DR) (घटना का विश्लेषण):

- On 20.06.2024 at 19.18Hrs, a R-N fault struck 400kV GMR – Meramundali B and line tripped from Meramundali end in Zone-1. However, GMR sensed the fault in Zone -3.
- GMR continued sensing the fault in Zone-3, even after 1 second. Distance protection didn't operate at GMR.
- After around 1.1 seconds, when A/R failed at Meramundali-B. DT was sent to GMR and the line tripped from GMR.
- As GMR unit 3 is radially connected to 400 kV Meramundali-B through this line, unit tripped due to loss of evacuation Path.

12. PMU Snapshot:

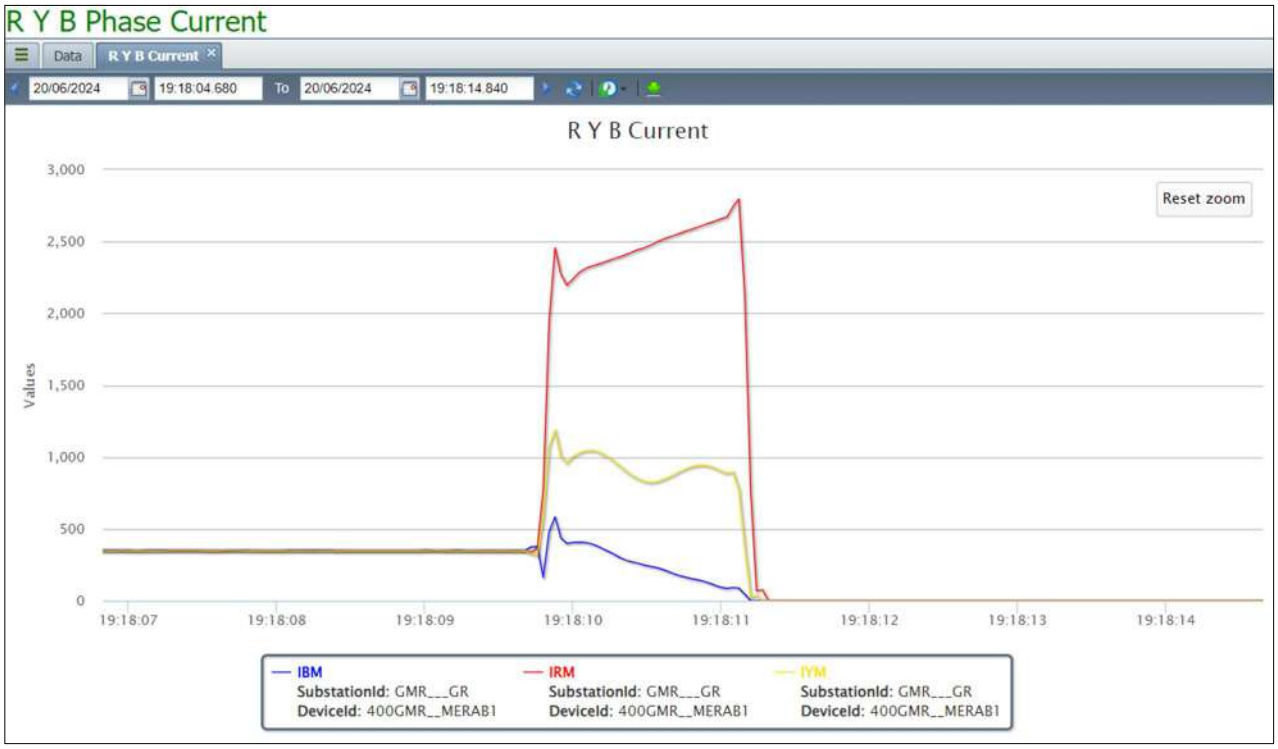


Fig3: -PMU Current plot of 400 kV GMR Meramundali – B

Fig4: -PMU Voltage plot of 400 kV GMR Meramundali – B

13. Protection/Operational issues observed (सुरक्षा/परिचालन संबंधी समस्या):

- As per DR at GMR, no carrier received at GMR end. The same may be checked and rectified.

14. Action Taken/Remedial Measures (सुधारात्मक उपाय):

- As 400 kV GMR-Meramundali B line length is around 7 km, its Zone reach setting are very less. With only one generating unit at GMR (STU), fault current fed is not enough for any fault to be sensed in Zone-1. Weak infeed trip scheme may be enabled at GMR end.
- Since this line is very short, differential protection may be implemented in this line.
- DR length at GMR may be increased to 3 seconds.

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

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	**DR/EL not provided within 24 Hours**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**GMR, OPTCL**

16. Key Lessons Learnt (प्रमुख अधिगम बिंदु):

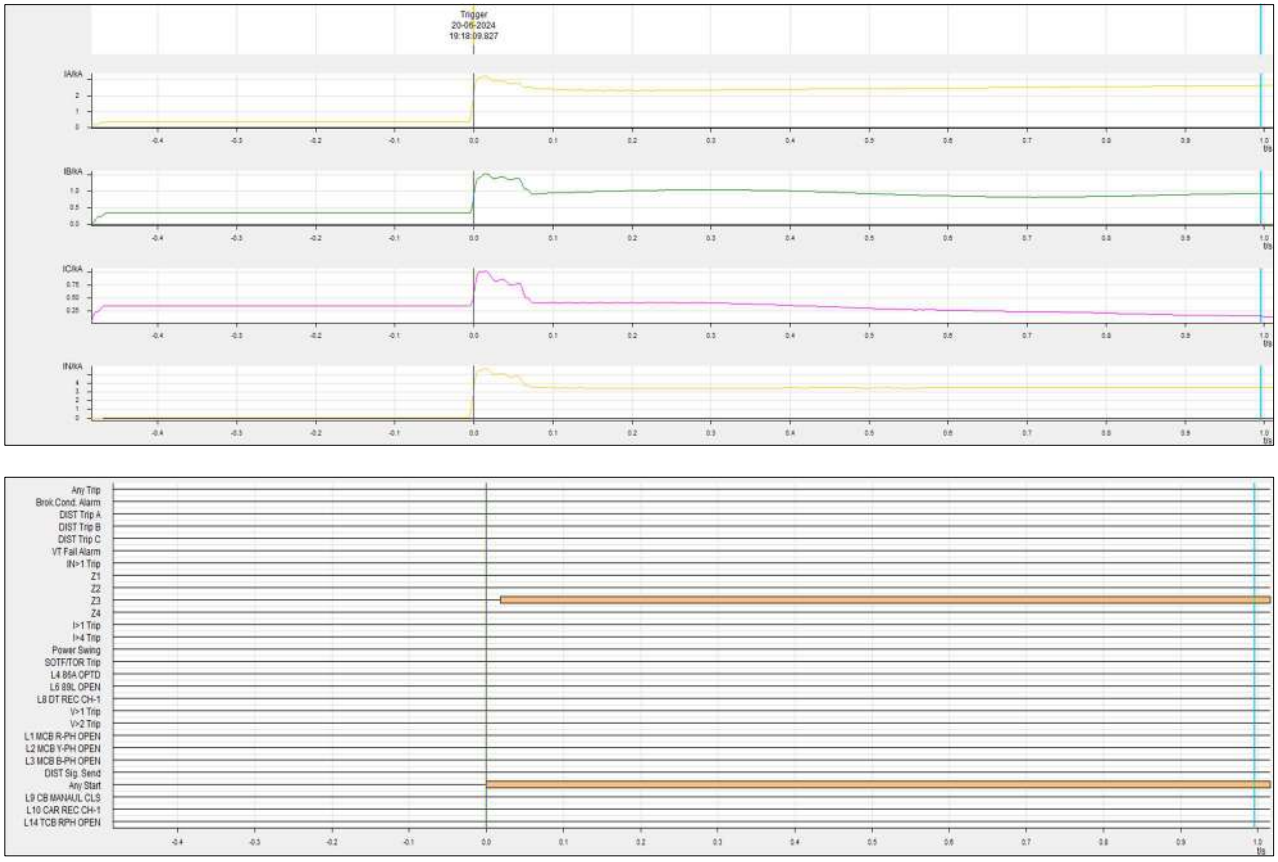
- Weak infeed effect needs to be taken care of, if single unit is connected through short lines.

Annexure 1: (Sequence of Events-As per ERLDC SCADA)

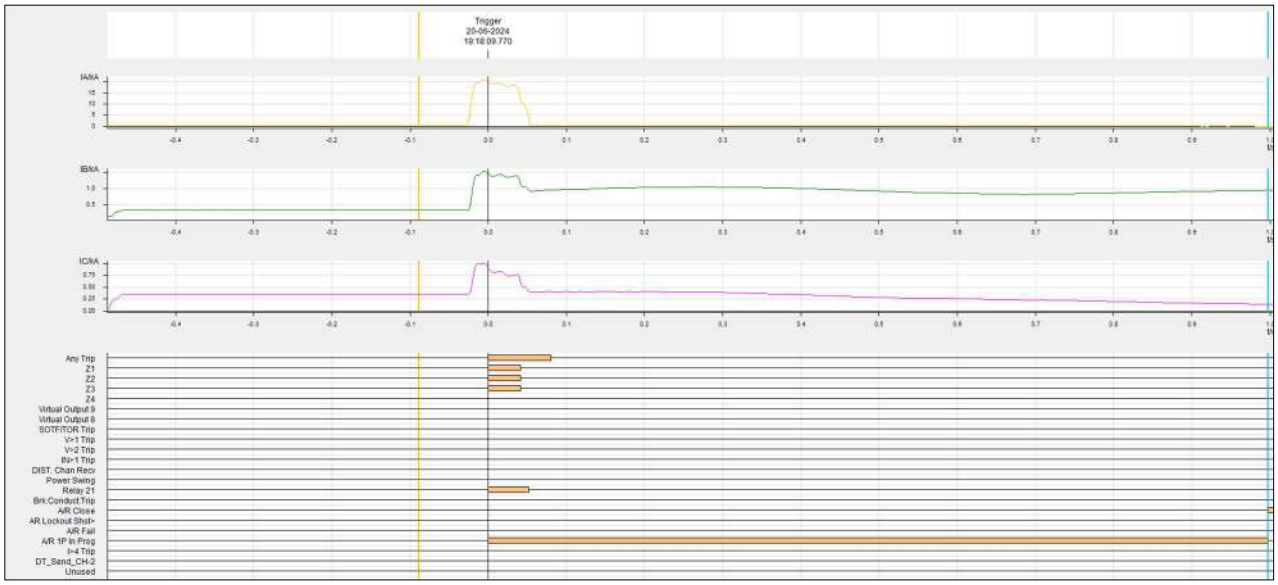
SOE data not available at ERLDC Scada.

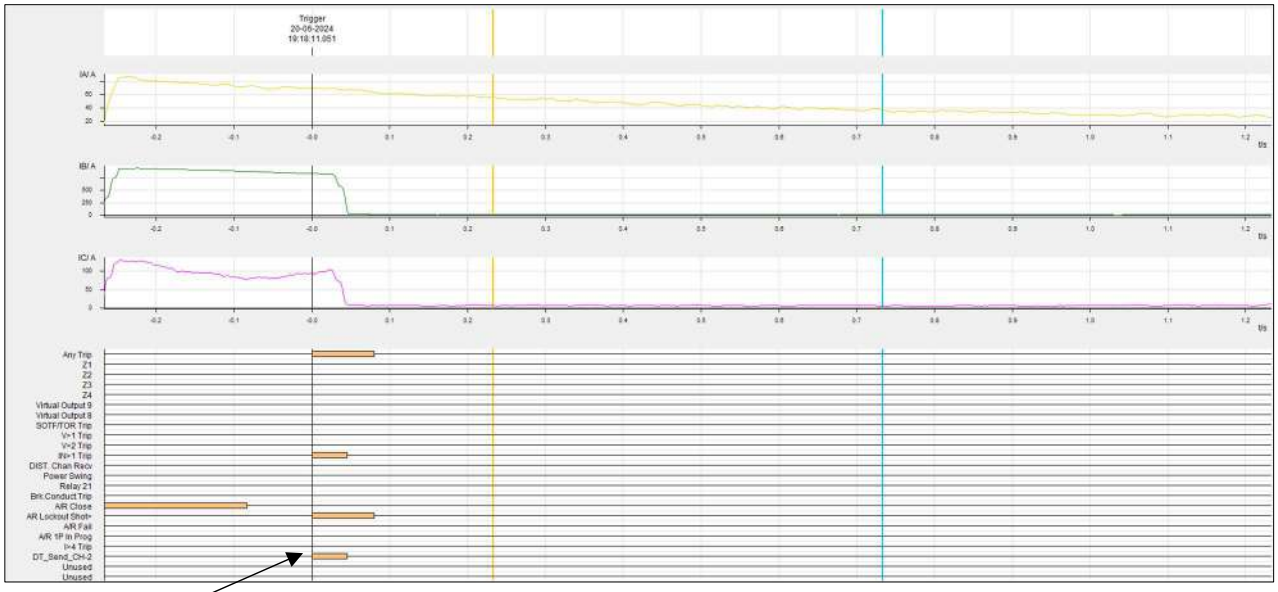
Annexure 2:

<u>DR of 400kV GMR – Meramundali B (GMR end)</u>



DR of 400kV GMR – Meramundali B (Meeramundali - END)





DT sent after A/r failure

Annexure B.10

Protection Performance Indices for the month of June '24 (In compliance of Clause 15(6) of IEGC 2023)																	
NAME OF STATION:			**NTPC NORTH KARANPURA SUPER THERMAL POWER PROJECT (3 X 660MW)**														
S. No.	**Name of the element**	**Tripping Date**	**Tripping Time**	**Restoration Date**	**Restoration Time**	**Reason (Relay**		**Nc**		**Nu**		**Nf**		**Dependability index (Nc/(Nc+Nf))**	**Security Index (Nc/(Nc+Nu))**	**Reliability Index (Nc/(Nc+Nu+Nf))**	**Remarks (Reason for performance indices less than 1)**
						End A	End B	End A	End B	End A	End B	End A	End B				
1	0					NA	NA	0	0	0	0	0	0	1	1	1	NO electrical tripping in the month of June 24'

PP Indices for NTPC Barh for June 2024

Month	June

Date	Line tripping	Cause of Tripping	Tripping Analysis	Correct Operations at NTPC Barh (Nc)	Failed operations at NTPC Barh(Nf)	Number of Unwanted Operation (Nu)	Number of incorrect operations (Ni= Nf+Nu)
19.06.2024	400 kV Barh-Kahalgaon Line 2	R-N, Z1, 24 kA, 11.6 kms	Distance protection operated. Successful auto-reclosure at NTPC Barh end. Kahalgaon end breaker tripped. Line thereafter tripped on Stage-1 over-voltage protection	1	0	0	0
25.06.2024	400 kV Barh-Motihari Line 1	B-N, Z1,7.5 kA, 42 kms	Distance protection operated. Successful auto-reclosure at NTPC Barh end. Same fault occurred during reclaim time, leading to 3 ph tripping on SOTF/TOR.	1	0	0	0
26.06.2024	400 kV Barh-Motihari Line 2	DT send from NTPC Barh end	While availing Bus-IV shutdown at NTPC Barh end, spurious DT signal send to Motihari end. Breaker tripped only from Motihari end. Line remained idle charged from NTPC Barh end. Problem identified in SAS logic.	0	0	1	1
27.06.2024-28.06.2024	400 kV Barh-Kahalgaon Line 1	DT received at NTPC Barh end	Multiple tripping occurred between 27.06-28.06 due to DT receive at Barh end from Kahaglaon. Breaker tripped at Barh end. Line remained idle charged from Kahalgaon end. NTPC Kahalgaon may address the issue.	1	0	0	0
				3	0	1	1

Dependability Index D = Nc/(Nc+Nf)	1
Security Index S = Nc /(Nc+Nu)	0.75
Reliability Index R= Nc/(Nc+Ni)	0.75

Protection Perfomance Indices for the month-June-2024 - BRBCL NABINAGAR

SL No.	Name of ELEMENT	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason(Relay indication)		Nc		Nu		Nf		Dependability index (Nc/(Nc+Nf))	Security Index (Nc/(Nc+Nu))	Reliability Index (Nc/(Nc+Nu+Nf))	Remark(Reason for perfomace indices less than 1)	Analysis for the event
						End A	End B	End A	End B	End A	End B	End A	End B					
1	Unit-4 Main & Tie CB	23.06.2024	02:27	26.06.2024	12:40	BTL		1		0		0		1	1	1		Boiler Tube Leakage(BTL). It was a planned shutdown
2	Unit-1 Main & Tie CB	28.06.2024	11:59	01.07.2024	13:33	Condenser leakage		1		0		0		1	1	1		Condenser Leakage. It was a planned shutdown

Nc	Number of correct operation at internal power system Faults
Nf	Number of failures to opearte at internal power system Faults
Nu	Number of unwanted opeartions

Prepared By Brajesh Kumar Singh Manager

Checked By 04/07/2024
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Reviewed By 04.07.24
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BRBCL/ NTPC LTD. NABINAGAR

Protection Performance Indices for the month of June'24 (In compliance of Clause 15(6) of IEGC 2023)

NTPC Farakka

S. No.	Name of the element	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason (Relay indication)		Nc		Nu		Nf		Dependability index (Nc/(Nc+Nf))	Security Index (Nc/(Nc+Nu))	Reliability Index (Nc/(Nc+Nu+Nf))	Remarks (Reason for performance indices less than 1)
						End A	End B	End A	End B	End A	End B	End A	End B				
	No tripping	-	-	-	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA

Protection Perfomance Indices for the month-June-2024 - NTPC Kahalgaon

Sl. No	Name of ELEMENT	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason(Relay indication)		Nc		Nu		Nf		Dependability index (Nc/(Nc+Nf))	Security Index (Nc/(Nc+Nu))	Reliability Index (Nc/(Nc+Nu+Nf))	Remark(Reason for perfomace indices less than 1)	Analysis for the event
						End A	End B	End A	End B	End A	End B	End A	End B					
1	Barh-2 Line (Main & Tie CB)	19.06.2024	19.29	19.06.2024	22.06	Zone-2 trip & O/V Stage - 1	Zone - 1& DT received	1		0		0		1	1	1		
2	Unit-7 Main & Tie CB	24.06.2024	00.58	25.06.2024	15.16	BTL		1		0		0		1	1	1		Boiler Tube Leakage(BTL) It was a planned shutdown at NTPC Kahalgaon
3	Barh-1 Main & Tie CB at Remote End	27.06.2024	17.09/ 21.28	27.06.2024	17.30/ 21.55	DT send	DT received	1		1		0		1	0.5	0.5	Remote end(B) tripped due to DT send from Kahalgaon end(A)	Preliminary checking done and fault tracing activity is in progress.As a precautionary measure, new control cable laid from relay panel to PLCC panel Shutdown of Kahalgaon Barh Line- 1 will be taken on 02.07.2024 for TEED test of TIE bay of Kh Barh- 1 & Banka - 1 Line. During this shutdown, new cable termination will be done and PLCC circuit for both Kh - Barh Line - 1 & Kh Banka Line - 1 will be checked. NOTE: 1 Kh Barh Line - 1 & Banka Line - 1 TIE Bay (Bay No. 41) is under shutdown for Uprating works of Kh Banka Line - 1 2 Uprating works of Kh - Banka - 1 Line completed . testing is in progress and planned for charging before 10.07.2024 after CEA clearance

01/07/24
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Deepak Kumar Patra
AGM (O&M E.M.D.)
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4	Barh-1 Main & Tie CB at Remote End	28.06.2024	10:08/ 12.31	28.06.2024	10.53/ 13.00	DT send	DT received	1		1		0		1	0.5	0.5	Remote end(B) tripped due to DT send from Kahalgaon end(A)	Preliminary checking done and fault tracing activity is in progress As a precautionary measure, new control cable laid from relay panel to PLCC panel Shutdown of Kahalgaon Barh Line- 1 will be taken on 02.07.2024 for TELD test of TIE bay of Kh Barh- 1 & Banka - 1 Line During this shutdown, new cable termination will be done and PLCC current for both Kh - Barh Line - 1 & Kh Banka Line - 1 will be checked NOTE 1 Kh Barh Line - 1 & Banka Line - 1 TIE Bay (Bay No. 41) is under shutdown for Uprating works of Kh Banka Line - 1 2 Uprating works of Kh - Banka - 1 Line completed , testing is in progress and planned for charging before 10.07.2024 after CEA clearance
5	Unit-4 Main & Tie CB	29.06.2024	14:00	30.06.2024	7.31	Unit tripped on Electrical Fault		1		0		0		1	1	1		

Nc	Number of correct operation **at internal** power system
Nf	Number of failures **to** opearte **at** internal power system
Nw	Number of **unwanted** opeartions

Prepared By 01/07/24

Checked By 01/07/24

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Reviewed By 01/07/24

दीपक कुमार पात्रा / Deepak Kumar Patra
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Protection Perfomance Indices for the month-June-2024 - NTPC Nabinagar

SL No.	Name of ELEMENT	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason(Relay indication)		Nc		Nu		Nf		Dependability index Nc/(Nc+Nf)	Security Index Nc/(Nc+Nu)	Reliability Index Nc/(Nc+Nu+Nf)	Remark (Reason for perfomace indices less than 1)	Analysis for the event
						End A	End B	End A	End B	End A	End B	End A	End B					
1	Unit-2 : Main & Tie CB (Bay 409& 408)	22.06.2024	4:14	22.06.2024	23:28	IP turbine control valve oil leakage		1		0		0		1	1	1		
2	Unit-1 : Main & Tie CB (Bay 403& 401)	29.06.2024	1:29	02.07.2024	16:30	Boiler Tube Leakage		1		0		0		1	1	1		Boiler Tube Leakage(BTL)

Nc	Number of correct operation at internal power system
Nf	Number of failures to opearte at internal power system
Nu	Number of unwanted opeartions

Prepared by	Checked by	Reviewed by
PANKAJ KUSHWAHA Digitally signed by PANKAJ KUSHWAHA Date: 2024.07.04 16:43:34 +05'30'		

Protection Performance Indices for the month of June'24 (In compliance of Clause 15(6) of IEGC 2023)

Powergrid(Odisha)

S. No.	Name of the element	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason (Relay indication)		Nc		Nu		Nf		Dependability index (Nc/(Nc+Nf))	Security Index (Nc/(Nc+Nu))	Reliability Index (Nc/(Nc+Nu+Nf))	Remarks (Reason for performance indices less than 1)
						End A	End B	End A	End B	End A	End B	End A	End B				
1	220KV Baripada-Balasore-2	20-06-2024	13:13:00	20-06-2024	13:32:00	Tripped on B Phase to ground fault & Carrier Fail occurred just before the fault. Which is caused external autoreclose lockout initian to Autoreclose Relay. Due to autoreclose lockout operation, R & Y Pole of Main CB also opened .	AR successful	0	1	1	0	0	0	1	0.5	0.5	**Tripped on B Phase to ground fault & Carrier Fail occurred just before the fault. PLCC Belongs to OPTCL.**
2	765KV Sundargarh-Raipur Ckt#1	15-06-2024	15:06:00	15-06-2024	18:44	R-Y fault was came in Zone-1. Due to Ph-Ph nature of fault, line tripped without AR. Protection operated as per scheme. M1:Z1B; RY Fault; 301.3 km; 3.678 kA M2:Z1B; RY Fault; 307.2 km; 4.45 kA	Ph-Ph fault	1	1	0	0	0	0	1	1	1	
3	765KV Sundargarh-Raipur Ckt#1	07-06-2024	18:16:00	07-06-2024	23:28:00	R-Y fault was came in Zone-1. Due to Ph-Ph nature of fault, line tripped without AR. Protection operated as per scheme R/I at Sundargarh M1: Z1 RY Fault 183.8 km 6.76 kA M2: Z1 RY Fault 183.9 km 6.76 kA	Ph-Ph fault	1	1	0	0	0	0	1	1	1	
4	220KV Budhipadar-Korba ckt-3	05-06-2024	04:11:00	05-06-2024	18:20:00	During CT failure at 220kV Budhipada-IB ckt, line Voltage of Y & B phase was dropped to below 10kV & fault current was 1.6kA in reverse direction. So reverse zone detected by distance protection relay & after 500msec, line tripped in Z-4.	R/I at Korba M1: Z2; BN Fault; 201.01 km; 0.94 kA M2:NA; BN Fault; NA km; 0 kA	1	1	0	0	0	0	1	1	1	

5	400KV Sundargarh-Raigarh Ckt#4	02-06-2024	19:06:00	02-06-2024	19:06:00	B-G fault was came in zone-1. AR attempted through main bay but during AR, line side B-ph LA fail at Sundargarh end. Hence 3-ph tripping occurs R/I at Sundargarh M1: Z1 RN Fault 30.2 km 14 kA M2: Z1 RN Fault 29.4 km 15 kA	R/I at Raigarh M1: Z1; BN Fault; 115.8 km; 3.7 kA M2: Z1; BN Fault; 115.4 km; 3.68 kA	1	1	0	0	0	0	1	1	1	
6	765KV Sundargarh-Dharamjaygarh Ckt#3	02-06-2024	18:28:00	02-06-2024	22:58:00	R-G fault was came in Zone-1. AR attempted through main bay but due to persistent nature of fault, line tripped on reclose. Protection operated as per scheme. R/I at Sundargarh M1: Z1 RN Fault 30.2 km 14 kA M2: Z1 RN Fault 29.4 km 15 kA	R/I at Dharmajaygarh M1: Z1; RN Fault; 128.36 km; 7.8 kA M2: Z1; RN Fault; 130 km; 7.7 kA	1	1	0	0	0	0	1	1	1	
7	220KV Budhipadar-Korba ckt-3	01-06-2024	19:36:00	01-06-2024	20:18:00	R-G fault sense by Main-1 & Main-2 in Z1. AR attempted but CB at korba end blast during AR. So due to persistent nature of fault line tripped on reclose. Protection operated as per scheme. R/I at Budhipadar M1:Z1 RN Fault 72.65 km 2.346 kA M2: Z1 RN Fault 71.8 km 2.336	R/I at Korba M1: Z-1; RN Fault; 71.7 km; 2.38 kA M2:NA; RN Fault; NA km; 0 kA	1	1	0	0	0	0	1	1	1	
8	400KV Sundargarh-Raigarh Ckt#2	01-06-2024	19:13:00	01-06-2024	20:36:00	R-G transient fault came in zone-1. Both Main & Tie CB AR operated succesfully. But fault again came within reclaim time(4sec after 1st fault) in the same phase & same location. So 3-ph tripping issued by both main & tie BCU. Hence tripped the line. Protection operated as per scheme. R/I at Sundargarh M1: Z1 RN Fault 37.3 km 7.85 kA M2: Z1 RN Fault 42.5 km 7.97 kA	R/I at Raigarh M1: Z1B; RN Fault; 72.76 km; 4.23 kA M2: Z1B; RN Fault; NP km; 4.2 kA	1	1	0	0	0	0	1	1	1	

9	400KV Sundargarh-Raigarh Ckt#4	01-06-2024	18:48:00	01-06-2024	20:24:00	Transient Y-G fault was came in zone-1. But AR for that line was kept in non auto mode for 400kV Sundargarh Rourkela 3&4 reconductering wok. Hence both BCU extend 3-ph tripping command to both Main & Tie breaker. Protection operated as per scheme. R/I at Sundargarh M1: Z1 YN Fault 13.92 km 14.86 kA M2: Z1 YN Fault 16.3 km 14.56 kA	R/I at Raigarh M1: Z1; YN Fault; 136.23 km; 3.067 kA M2: Z1; YN Fault; NA km; 3.15 kA	1	1	0	0	0	0	1	1	1	

Protection Performance Indices of BSPTCL for the month of JUNE'24

S. No.	Name of the element	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason (Relay indication)		Nc		Nu		Nf		Dependability index (Nc/(Nc+Nf))	Security Index (Nc/(Nc+Nu))	Reliability Index (Nc/(Nc+Nu+Nf))	Remarks (Reason for performance indices less than 1)
						End A	End B	End A	End B	End A	End B	End A	End B				
1	220KV-BEGUSARAI-SAHARSA-1	11-06-2024	14:40:00	12-06-2024	16:14:00	Begusarai-Z2,Ir=1.2KA,R phase fault, FD=74.2KM		1		0		0		1	1	1	A/r Successful from Begusarai end. In Dead time Period of one second, R phase Jumper at Tower loc-41, snapped.
2	220KV-MADHEPURA-NEW PURNEA	20-06-2024	05:34:00	20-06-2024	19:40:00	Madhepura-Z1,Iy=4KA,,Ib=1.5KA, YB phase fault, FD=70.3KM	New Purnea-Z1,YB phase fault, FD=28KM	1	1	0	0	0	0	1	1	1	
3	220KV-MOTIPUR-DARBHANGA (DM	20-06-2024	18:17	22-06-2024	15:37	Motipur-Not applicable as Breaker was open from Motipur end											Line was under S/D, In shutdown return process, line didnot hold when charged from DMTCL end. Breaker was open in Motipur end. In line patrolling, Y-phase polymer insulator found punctured at Tower Loc. 54.

4	220KV-MUZAFFARPUR(PG)-GORAU	26-06-2024	08:15:00	26-06-2024	09:00H	MUZAFFARPUR(PG)-Zone-03,Ib-2.4KA,Fault distance-47 KM		0		1		0		0	0	0	Fault was in 132 KV Bus of GSS Goraul.220 KV Muzaffarpur - Goraul line tripped at Zone -3 .Setting of the same line has been revised to prevent encroachment in lower voltage level.

Protection Performance Indices for the month of JUNE'24 (In compliance of Clause 15(6) of IEGC 2023)

WBSETCL

Sl. No.	Name of the element	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason (Relay indication)		Nc		Nu		Nf		Dependability index (Nc/(Nc+Nf))	Security Index (Nc/(Nc+Nu))	Reliability Index (Nc/(Nc+Nu+Nf))	Remarks (Reason for performance indices less than 1)	Analysis of the event
						End A	End B	End A	End B	End A	End B	End A	End B					
1	Kharagpur-Chaibasa	01.06.24	16:44:00	01.06.24				1		0		0		1	1	1		
2	Gokarna-Sagardighi #1	04.06.24	20:08:00	04.06.24	20:18:00	B-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
3	Gokarna-Sagardighi #2	04.06.24	20:07:00	04.06.24	20:50:00	B-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
4	Durgapur-PPSP #1	12.06.24	18:52:00	12.06.24	19:28:00	B-phase, Zone-1, A/R L/O		1		0		0		1	1	1		
5	Durgapur-PPSP #2	12.06.24	19:07:00	12.06.24	19:07:00	Y-phase, Zone-1, CS,CR, A/R L/O		1		0		0		1	1	1		

6	Baruipur -- New Town	14.06.24	14:35:00	14.06.24	14:45:00	R-phase, Zone-1, A/r optd.	R-phase, Zone-1, A/R L/O	1	1	0	0	0	0	1	1	1		
7	Barasat-Rajarhat PG #2	06.05.24	20:29:00	06.05.24		R-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
8	Durgapur 315 MVA TR #1	15.06.24	17:40:00	15.06.24	18:36:00	B-phase, Zone-1, 3-phase trip		1		0		0		1	1	1		
9	Durgapur 315 MVA TR #2	15.06.24	17:42:00	15.06.24	18:36:00	B-phase, Zone-1, 3-phase trip		1		0		0		1	1	1		
10	Durgapur 315 MVA TR #3	15.06.24	17:50;00	15.06.24	18:57:00	R-phase, Zone-1, 3-phase trip		0		1		0		0	#	#	Relay settings re-viewed	
11	Durgapur-New-Chanditala	15.06.24	17:59:00	15.06.24	18:38:00	R-phase, Zone-1, A/R close, A/R L/O	R-phase, Zone-2, A/R close,A/R L/O	1	1	0	0	0	0	1	1	1		
	Durgapur- PPSP #1	19.06.24	19:55:00	19.06.24	20:21:00	R-phase, Zone-1, 3-phase Trip		1		0		0		1	1	1		
12	NJP-Siliguri PG #1 132 KV Line	20.06.24	10:50:00	20.06.24	11:12:00	R-phase, Zone-1, A/R L/O		1		0		0		1	1	1		

13	NJP-Binaguri #1	25.06.24	03:53:00	25.06.24	05:08:00	No Relay		0		1		0		#	#	#	Inter cable found defective	
14	NJP-Binaguri #2	25.06.24	03:50:00	25.06.24	05:08:00	No Relay		0		1		0		#	#	#	Inter cable found defective	
15	New-town-Rajarhat PG #2	26.06.24	01:12:00	26.06.24	01:45:00			1		0		0		1	1	1		
16	Arambag-New-Chanditala	26.06.24	16:18:00	26.06.24	16:37:00	No Relay		0		1		0		#	#	#	DC positive terminal shorted with DT Receive wire due to puncture of TB. Replace the TB and normalise.	
17	NJP- Binaguri #1	28.06.24	12:37:00	28.06.24	12:59:00	No Relay		0		1		0		#	#	#	Inter cable found defective	
18	NJP- Binaguri #2	28.06.24	12:59:00	28.06.24	12:59:00	No Relay		0		1		0		#	#	#	Inter cable found defective	
19	Jeerat 400 KV(WB)- New Jeerat(765 KV) #1	29.06.24	12:26:00	29.06.24	18:48:00	R-phase, Diff. trip, A/R close, A/R L/O		1		0		0		1	1	1		
20	New-Chanditala- Midnapur PG #1	29.06.24	16:44:00	30.06.24	01:51:00	R-phase, Zone-2, A/R close, A/R L/O		1		0		0		1	1	1	Suspension disc failure	

Jorethang Loop Hydro Electric Project 2 X 28 MW

Protection Performance Indices for the June-2024 (In compliance of Clause 15(6) of IEGC 2023)

Sl. No.	Name of the element	Tripping Date	Tripping Time	Restoration Date	Restoration Time	Reason (Relay indication)		Nc		Nu		Nf		Dependability index (Nc/(Nc+N f))	Security Index (Nc/(Nc+Nu))	Reliability Index (Nc/(Nc+ Nu+Nf))	Remarks (Reason for performance indices less than 1)	Analysis of the event
						End A	End B	End A	End B	End A	End B	End A	End B					
1	220KV Jorethang-New Melli Line-1	19-06-2024	06:38	19-06-2024	10:35	Line-1 P442 Relay record: Started phase BCN Tripped Phase -C over current I>1 Distance trip Z1 06:38:12 fault duration-223.3 ms Relay trip time-79.91 ms fault to cation x7-379.5 system frequency-51.09 Fault record: IA-75.93A,VAN-126.0 KV IB-481.4A,VBN-65.50 KV IC-307.6A,VCN-65.42 KV		**1**		**0**		**0**		**1**	**1**	**1**		Due to tripping of 220 kV Rangpo- New Melli Line-1.(220 kV Rangpo- New Melli Line-2 is under planned shutdown since 21/05/2024) So power evacution path not available.

2	220KV Jorethang-New Melli Line-2	19-06-2024	06:30	19-06-2024	10:35	Line-2 P442 Relay record: Started phase BCN Tripped Phase -C E.F start IN1 over current I>1 Distance trip Z1 06:38:12 fault duration-226.6 ms Relay trip time-79.91 ms fault location x7-434.2 M system frequency-51.09 Fault record: IA-75.93A,VAN-126.0 KV IB-481.4A,VBN-65.50 KV IC-307.6A,VCN-65.42 KV Zone-01		**1**		**0**		**0**		**1**	**1**	**1**		Due to tripping of 220 kV Rangpo- New Melli Line-1.(220 kV Rangpo- New Melli Line-2 is under planned shutdown since 21/05/2024) So power evacution path not available.

Annexure B.11

List of important transmission lines in ER which tripped in June-2024													
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
1	400KV-KODERMA-BOKARO-1	01-06-2024	14:04	01-06-2024	15:43	Koderma: B-N, 10.208 kA, 15.36 km	Bokaro: B-N, 2.4 KA, 92.3 Km	B-Earth	100	A/r successful. Tripped again within reclaim time.	DR length less at Koderma	Yes	No
2	220KV-BIRPARA-MALBASE-1	01-06-2024	16:07	01-06-2024	17:12	Birpara: Y-N, 2.52 kA, 40.7 km,	Malbase: Y-N, 6.33 KA, 10.37 Km	Y-Earth	100	A/r successful from Birpara. Tripped again during reclaim time in Zone-2.		No	No
3	220KV-DALTONGANJ-CHATRA-1	01-06-2024	16:27	01-06-2024	23:18	Daltonganj: R-N, 6 kA, 6 km	S/D taken by JUSNL To replace R-phase broken jumper at location no 111; S/D code: 50	R-Earth	200	At Daltonganj, R_ph current was zero before tripping. Suddenly a fault struck R_ph and DEF operated. DEF pickup settings may be reviewed. At Garhw, it seems multiple failed A/r attempted and only R_ph tripped after 3 seconds. Other two phase remained close. PD time may be checked.		Yes	No
4	400KV-KHARAGPUR-CHAIBASA-1	01-06-2024	16:44	01-06-2024	17:46	Kharagpur: Y-N, 2.93 kA	Chaibasa: Y-N, 16.74 kA, 0.1 km	Y-Earth	100	A/r successful. Tripped again within reclaim time.		No	Yes

5	220KV-CHANDIL-RANCHI-1	01-06-2024	16:58	01-06-2024	17:44	Chandil: R-Y, Ir: 2.99kA, Iy: 2.96 kA, 51.9 km	Ranchi: R-Y, Ir- 6.3 kA, Iy-6.3 kA, 39.06 km	R-Y-Earth	100	Phase to phase fault.		Yes	Yes
6	220KV-JODA-RAMCHANDRAPUR-1	01-06-2024	18:18	01-06-2024	19:00	Joda: R_N, 19.5 km	Ramchandrapur: R_N, 6.58 kA	R-Earth	100	Three phase tripping for single phase fault at Rmachandrapur.		No	Yes
7	400KV-JHARSUGUDA-STERLITE-2	01-06-2024	18:37	01-06-2024	21:32	Jharsuguda: Y-B, Iy-26 kA, Ib-26 kA	Sterlite:Y-B, Iy-8.291 kA, Ib-8.006 kA, 34.57 Km.	Y-B-Earth	100	Phase to phase fault.		Yes	No
8	400KV-JHARSUGUDA-RAIGARH-4	01-06-2024	18:48	01-06-2024	20:24	Jharsuguda: Y-N, 14.7 KA, 136 Km	Raigarh: Y-N, 3.067 KA, 9.26 Km	Y-Earth	100	Three phase tripping at both ends. A/r was in non-A/r mode to facilitate reconductoring of 400 kV Jharsuguda-Rourkela-4.		Yes	No
9	400KV-JHARSUGUDA-RAIGARH-2	01-06-2024	19:13	01-06-2024	20:36	Jharsuguda-R-N,8.064 kA,72km	Raigarh: -R-N,4.2 kA,72 km.	R-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	No
10	220KV-BUDHIPADAR-KORBA-3	01-06-2024	19:36	02-06-2024	20:18	Budhipadar: R_N	Korba: Failure of R-Ph CB	R-Earth	100	A/r failed after 1 second		No	No
11	220KV-JODA-RAMCHANDRAPUR-1	01-06-2024	19:53	02-06-2024	16:58	Joda: R-N, 75.27 km, 1.6kA	Ramchandrapur: R-N, 54.6 km, 3.09 KA	R-Earth	100	Three phase tripping for single phase fault at Rmachandrapur.		No	Yes

12	400KV-LAPANGA-OPGC (IB THERMAL)-2	01-06-2024	20:57	01-06-2024	23:49	Lapanga: R_N , 1.516 Km, 21.86 kA	OPGC: A/r successful	R-Earth	100	A/r successful at OPGC. At Lapanga, no A/r attempt by main bay and other two phase tripped on PD after 3 seconds. Tie bay attempted A/r after 1.7 seconds but during this instance other two phase of tie bay tripped, later R_ph tripped on PD.		Yes	No
13	400KV-LAPANGA-OPGC (IB THERMAL)-1	01-06-2024	21:05	01-06-2024	23:14	Lapanga: B_N	OPGC: A/r successful	B-Earth	100	At 20:49 Hrs, R_ph fault struck the line, A/r was successful from Lapanga after 1.7 seconds. At 21:05 Hrs, fault struck B_ph, A/r was successful at OPGC only.		Yes	No
14	400KV-SAHARSA-DARBHANGA (DMTCL)-1	01-06-2024	22:12	01-06-2024	22:27	Saharsa: Y_N, 9.7 kA	Darbhanga: Y-N, 4.86 kA, 38.8 km	Y-Earth	100	Three phase tripping for single phase fault from Darbhanga , A/r Successful from Saharsha		Yes	No
15	765KV-JHARSUGUDA-DHARAMJAIGARH-3	02-06-2024	18:28	02-06-2024	22:58	Jharsuguda :R-N, 14 kA, 30.2 km		R-Earth	100	A/r failed after 1 second	DR of another instance uploaded.	Yes	No
16	400KV-JHARSUGUDA-RAIGARH-4	02-06-2024	19:06	03-06-2024	07:27	Jharsuguda: B-N, 10.98km, 15.3 kA		B-Earth	100	A/r failed after 1 second		Yes	No
17	400KV-IBEUL-JHARSUGUDA-1	02-06-2024	19:06	02-06-2024	23:05	IBEUL: B-N, 79 km	Jharsuguda : Didn't trip	No fault	NA	Line tripped from IBEUL endonly during fault in adjacent 400 kV Jharsuguda-Raigarh-4. Zone-3 picked up but line tripped immediately.		No	NA

18	400KV-NEW DUBURI-MEERAMUNDALI-1	02-06-2024	19:51	02-06-2024	22:44	New Dubari: Y-N, 7.48 KA, 39.3 Km	Meeramundali: Y-N, 5.03 kA, 54.3 Km.	Y-Earth	100	A/r failed after 1 second		No	Yes
19	400KV-PATNA-SAHARSA-2	03-06-2024	15:46	03-06-2024	18:53	Patna : R-B, Ib:4.04 kA, Ir:1.9 kA, 124.2 km	Saharsa: R-B, Ib:3.4 kA, Ir:3.5, 105 Km	R-B-Earth	100	Phase to phase fault.		Yes	Yes
20	400KV-NEW PURNEA-BIHARSARIFF(PG)-1	03-06-2024	15:54	11-06-2024	06:04	New Purnea: R-N, 120.1 Km, 3.926 kA		R-Earth	100	A/r failed after 1 second		Yes	Yes
21	220KV-NEW MELLI-TASHIDING-1	03-06-2024	18:18	03-06-2024	19:16	New Melli: Y-N, 3.253 kA		Y-Earth	100	Three phase tripping for single phase fault at Tashiding. DT received at New Melli and all three phase tripped.		No	No
22	220KV-DALTONGANJ-CHATRA-1	04-06-2024	12:43	04-06-2024	15:04	Daltonganj: Y-B, 57.095 Km, 2.324 kA	Chatra:Y-B, 84.37 km	Y-Earth	100	Phase to phase fault		Yes	No
23	400KV-KODERMA-BOKARO-1	04-06-2024	13:14	04-06-2024	15:19	Koderma :B-N, 16.48 kA, 20.4 Km	Bokaro: B-N, 2.29 kA, 89.2 Km	B-Earth	100	A/r successful. Tripped again within reclaim time.	DR length less at Koderma end	Yes	Yes
24	220KV-NEW MELLI-TASHIDING-1	04-06-2024	16:28	04-06-2024	18:14	New Melli: Y_N, 4.41 kA	Tashiding: Y-N, 2.214 kA, 6.9 Km	Y-Earth	100	Three phase tripping for single phase fault at Tashiding. DT received at New Melli and all three phase tripped.		No	No

25	400KV-GOKARNA-SAGARDIGHI-2	04-06-2024	20:07	04-06-2024	20:21	Gokarno: B-N, 16Km, 9.54 kA	Sagardighi: B-N	B-Earth	100	A/r successful. Tripped again within reclaim time.		No	No
26	400KV-GOKARNA-SAGARDIGHI-1	04-06-2024	20:08	04-06-2024	20:50	Gokarna : B-N, Ib:11.45 KA, 17.31 Km	Sagardighi: B-N, Ib:10.21KA, 31.37 Km	B-Earth	100	A/r failed after 1 second		No	No
27	220KV-DALTONGUNJ-GARWAH (NEW)-2	05-06-2024	01:04	05-06-2024	01:56	Daltongunj: R-N, 4.05 kA, 18.09 Km.		R-Earth	100	A/r failed after 1 second from Daltongunj end only while no A/r attempt at Garwah end and only R phase opened. PD time may be checked.		Yes	No
28	400KV-SAHARSA-DARBHANGA (DMTCL)-1	05-06-2024	15:31	05-06-2024	15:41	Saharsa: Y_N, 11.9 kA	Darbhanga: Y-N, 4.5 KA, 42 km	Y-Earth	100	A/r successful from Saharsa end only , while 3 phase tripped at Darbhanga		Yes	No
29	400KV-SAHARSA-DARBHANGA (DMTCL)-2	05-06-2024	15:37	05-06-2024	15:44	Saharsa: Y_N, 10.8 kA	Darbhanga: Y-N, 4.7 KA, 48.9 km	Y-Earth	100	A/r successful from Saharsa end only , while 3 phase tripped at Darbhanga		Yes	No
30	220KV-MAITHON(PG)-DUMKA-1	07-06-2024	11:29	07-06-2024	12:20	Maithon: Y-B, Iy- 8.48 kA, Ib- 8.06 kA, 22 Km	Dumka: Y-B, Iy: 1.845 kA, Ib: 2.287 kA, 49.66 Km	Y-B-Earth	100	Phase to phase fault.		No	Yes
31	220KV-MAITHON(PG)-DUMKA-1	07-06-2024	14:08	07-06-2024	15:03	Maithon: B_N, 4.45 KA, 24.98 Km		B-Earth	100	Three phase tripping at Dumka for single phase fault. A/r failed after 1 second from Maitohon.		No	Yes

32	765KV-JHARSUGUDA-RAIPUR PS (DURG)-1	07-06-2024	18:16	07-06-2024	23:28	Jharsuguda : R_Y, 184 Km, 6.13 KA	Raipur: R-Y, 116 Km, 9.75 kA	R-Y-Earth	100	Phase to phase fault.		Yes	No
33	220KV-MAITHON(PG)-DUMKA-1	09-06-2024	11:21	11:21	11:49	Maithon: B-N , 20.1 km, 4.2 kA	Dumka: B-N, 47.1 km	B-Earth	100	Three phase tripping at Dumka for single phase fault. A/r successful from Maithon.		No	Yes
34	220KV-SAHARSA-BEGUSARAI-1	11-06-2024	14:40	12-06-2024	16:12	Saharsa: R_N, 11.24 Km, 7.93 kA		R-Earth	100	A/r failed after 1 second from Saharsa but Y& B phase remained close at Begusarai. Pole discrepancy time at begusarai may be checked.		Yes	No
35	220KV-JODA-RAMCHANDRAPUR-1	11-06-2024	15:46	11-06-2024	16:28		Ramchandrapur: Y-N, 49.3 Km, 2.42 kA	Y-Earth	100	Three phase tripping for single phase fault at Rmachandrapur.		No	Yes
36	400KV-PPSP-BIDHANNAGAR-1	12-06-2024	18:52	12-06-2024	19:28	PPSP: B-N, 146.6km	Durgapur: B-N, FD: 24.53 Km, 8.403 KA	B-Earth	100	A/r kept disabled as per OEM advise		No	Yes
37	400KV-PPSP-BIDHANNAGAR-2	12-06-2024	19:07	12-06-2024	19:30	PPSP : Y_N, 137.9 km	Durgapur: Y_N, 29.84 km, 3.58 KA	Y-Earth	100	A/r kept disabled as per OEM advise		No	Yes

38	220KV-RANCHI-MTPS(DVC)-1	12-06-2024	19:44	12-06-2024	22:42	Ranchi: R-N, 335.8 Km, 0.45 KA	MTPS : R-N, 7.93 km, 11.55 kA	R-Earth	800	Fault seen in Zone-3 from Ranchi while A/r was kept disabled at Mejia and all three phase tripped in Zone-1. DVC/ PG ER-1 may share findings.		Yes	Yes
39	220KV-JODA-RAMCHANDRAPUR-1	13-06-2024	13:45	13-06-2024	14:35		Ramchandrapur: Y_N, 47.2 Km, 2.42 KA,	Y-Earth	100	Three phase tripping for single phase fault at Rmachandrapur.		No	Yes
40	400KV-BINAGURI-RANGPO-2	13-06-2024	19:08	14-06-2024	16:52	Binaguri: Y_N, 66.80 Km, 4.503 kA	Rangpo : Y_N, 37.703 Km, 4.899 kA	Y-Earth	100	A/r failed after 1 second		No	No
41	400KV-LAPANGA-OPGC (IB THERMAL)-2	13-06-2024	19:19	13-06-2024	20:47	Lapanga: R_N, 20 KA, 1.5 Km		R-Earth	100	3 phase tripping at Lapanga for single phase fault while A/R successful at OPGC end		Yes	No
42	400KV-TENUGHAT-PVUNL-1	13-06-2024	21:29	13-06-2024	22:46	Tenughat : R_Y_B_N		R-Y-B Earth	100	Three phase fault		No	No
43	400KV-BINAGURI-TALA-1	15-06-2024	07:58	15-06-2024	08:36	Binaguri: R_N, 40.7 km, 6.7 kA		R-Earth	100	A/r successful from Binaguri. Other two phase at Tala tripped after 1.5 seconds and DT sent to remote end.		No	Yes
44	765KV-JHARSUGUDA-RAIPUR PS (DURG)-1	15-06-2024	15:06	15-06-2024	18:44	Jharsuguda: R-Y, Ir-3.698 kA, Iy-3.294 kA, 301.3 km		R-Y- Earth	100	Phase to phase fault.		No	No

45	220KV-MAITHON(PG)-DUMKA-2	15-06-2024	15:36	15-06-2024	15:54	MAithon: R_N, 8.01kA, 14.9km	Dumka: R-N, 51.4km, 1.526 kA	R-Earth	100	A/R successful from Maithon only. Three phase tripping at Dumka		No	Yes
46	400KV-BIDHANNAGAR-NEW CHANDITALA-1	15-06-2024	17:59	15-06-2024	18:38	Bidhannagar: R-N, 3.3Km ,11 kA	New Chanditala: R-N, 101.3 Km ,5 kA	R-Earth	100	A/r failed after 1 second		Yes	Yes
47	400KV-MALBASE-BINAGURI-1	17-06-2024	07:30	17-06-2024	10:49	Malbase : R_N, Ir: 3.234 kA	Binaguri : R-N, 3.681 Km, 26.19 kA	R-Earth	800	Tripped in Zone-3 from Binaguri.		No	Yes
48	400KV-RANCHI-NEW RANCHI-1	17-06-2024	17:07	17-06-2024	18:00	Ranchi: B-N, 27.33 km, 9.88 kA.		B-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	Yes
49	220KV-MAITHON-DHANBAD-1	18-06-2024	19:57	18-06-2024	20:34	Maithon: B-N, 3.78 kA		B-Earth	100	A/r successful at Dhanbad. Three phase tripping at Maithon.		No	No
50	220KV-BUDHIPADAR-RAIGARH-1	18-06-2024	20:19	18-06-2024	22:59	Budhipada: R-N , IR=2.65 kA, 63.4 km	Raigarh: R-N, 11kA, 11km	R-Earth	400	Tripped in Zone-2 from Budhipadar		No	No
51	220KV-RANCHI-MTPS(DVC)-1	18-06-2024	22:57	18-06-2024	23:36	Ranchi: R-N, 169.3 km, 1.05 kA, A/r successful	Mejia: R _N, 70.81 Km, 2412.11 A	R-Earth	100	A/r kept disabled at Mejia		Yes	No

52	400KV-MALBASE-BINAGURI-1	19-06-2024	02:26	19-06-2024	03:47		Binaguri: Y_N, 2.96 kA	Y-Earth	300	A/r successful from Binaguri only.		No	No
53	400KV-KHSTPP-BARH-2	19-06-2024	19:29	19-06-2024	22:06	Khstpp: R-N	Barh:R_N, 11.61 km, 24 kA, A/r successful	R-Earth	100	A/r successful from Barh only.	Only cfg file uploaded by Barh	No	No
54	400KV-PPSP-BIDHANNAGAR-1	19-06-2024	19:55	19-06-2024	20:21	PPSP :R-N, 54Km	Bidhanagar : R-N, 125 Km , 2.7 KA	R-Earth	100	A/r kept disabled as per OEM advise		No	Yes
55	220KV-NEW PURNEA-MADHEPURA-2	20-06-2024	05:34			New Purnea: B_N, 2.673 kA, 66.548 km	Madhepura : Y_B_N, R: 0.52 kA, Y: 4.07 kA, B: 1.55 kA, 70.3 km.	B-Earth	100	Phase to phase fault during A/r attempt	DR length less at New Purnea	Yes	No
56	220KV-RANCHI-HATIA-3	20-06-2024	10:32	20-06-2024	16:23	Ranchi: R_N, 2.437 km , 19.309 kA		R-Earth	100	Three phase tripping at Ranchi. It seems A/r was successful at Hatia. Another fault struck this line after around 1 minute in B_ph. A/r attempt failed after 1 second from Hatia.		Yes	Yes
57	220KV-BARIPADA-BALASORE-2	20-06-2024	13:13	20-06-2024	13:32	Baripada : B_N, 76 Km, 2.66 kA		B-Earth	100	A/r successful at Balasore. Three phase tripping at Baripada.		Yes	No
58	220KV-BUDHIPADAR-RAIGARH-1	20-06-2024	17:08	20-06-2024	21:34	Budhipadar: R-N, 23.89 KA, 1.273 km	Raigarh: R-N, 75.85 Km, 2.4 KA	R-Earth	500	Tripped in Zone-2 from Korba. No A/r attempt at Budhipadar.		No	No

59	220KV-BUDHIPADAR-KORBA-1	20-06-2024	17:36	20-06-2024	20:46	Budhipadar: 166.57 Km, Ia= 1.03 KA		R-Earth	400	Tripped in Zone-2 from Korba. A/r successful from Budhipadar.		No	No
60	220KV-DARBHANGA (DMTCL)-MOTIPUR-2	20-06-2024	18:17	22-06-2024	15:35	DMTCL : Y_N, 8.9 kA, 24 Km	Motipur : Y_N, 2.25 kA, 11 Km	Y-Earth	100	Tripped on SOTF while charging after shutdown. DMTCL/BSPTCL may share details		No	No
61	400KV-MEERAMUNDALI-JSPL-1	20-06-2024	19:47	20-06-2024	20:51	Meramundali : R_N, 21.2 kA		R-Earth	100	A/r successful at Meramundali. Tripped again after 280 msec on DEF. DEF settings may be reviewed at Meramundali. A/r successful at JSPL		Yes	No
62	220KV-JODA-RAMCHANDRAPUR-1	20-06-2024	22:27	20-06-2024	23:01	Joda : B-N, 33.92 km, 2.79 kA, A/r successful	Ramchandrapur: B-N, 86.4 km	B-Earth	100	Three phase tripping for single phase fault at Ramchandrapur	DR length less at Ramchandrapur	No	Yes
63	220KV-JODA-RAMCHANDRAPUR-1	20-06-2024	23:03	21-06-2024	00:08	Joda : B-N, 4.192 kA, A/r successful	Ramchandrapur: B-N, 104.7 Km	B-Earth	100	Three phase tripping for single phase fault at Ramchandrapur	DR length less at Ramchandrapur	No	Yes
64	220KV-RANCHI-HATIA-2	21-06-2024	12:52	21-06-2024	13:31	Y-N ,21.03 Km , 6.07 KA		Y-Earth	100	Three phase tripping for single phase fault from both ends	DR length less at Hatia	Yes	Yes
65	400KV-PATNA-SAHARSA-1	22-06-2024	15:07	22-06-2024	16:05	Patna: R_N, 31.1 Km,10.41KA	Saharsa: R_N, 211.22 Km, 2.003 KA	R-Earth	100	A/r failed after 1 second		Yes	Yes

66	220KV-BUDHIPADAR-KORBA-2	23-06-2024	16:34	23-06-2024	19:12	Budhipadar: Y-B, 96.3km, 2.68kA		Y-B	100	Phase to phase fault.		Yes	No
67	400KV-ALIPURDUAR (PG)-JIGMELLING-1	25-06-2024	02:23	25-06-2024	03:06	Alipurduar: R_B, 145 Km, Ir-3.5kA, Ib-3.5kA	Jigmelling: R_B, Ir: 5.06 kA, Ib: 6.83 kA	R-B	100	Phase to phase fault. Three phase A/r successful at Jigmelling.		No	No
68	220KV-BIRPARA-MALBASE-1	25-06-2024	02:29	25-06-2024	03:02	Birpara: R_N, 8.87 kA	Malbase: R_N, 3.128 kA, 43.6km	R-Earth	100	A/r successful from Birpara. Three phase tripping at Malbase.		Yes	Yes
69	220KV-BINAGURI-NJP-2	25-06-2024	03:50	25-06-2024	05:07	Binaguri: Inter trip received from NJP	NJP: Didn't trip	No fault	NA	Inter trip command received from NJP to Binaguri.		No	NA
70	220KV-BINAGURI-NJP-1	25-06-2024	03:53	25-06-2024	05:08	Binaguri: Inter trip received from NJP	NJP: Didn't trip	No fault	NA	Inter trip command received from NJP to Binaguri.		No	NA
71	220KV-BINAGURI-BIRPARA-1	25-06-2024	04:14	25-06-2024	06:36	Binaguri: Y_B, 4.90 KA, 47.418 Km	Birpara: Y_B, 5.96 KA, 31.2 Km	Y-B- Earth	100	Phase to phase fault.		Yes	Yes
72	220KV-BINAGURI-BIRPARA-2	25-06-2024	04:51	25-06-2024	05:26	BINAGURI: R_B, 7.23 KA,36 Km	Birpara: R_B, Ir: 3.17 kA, Ib: 4.55 kA	R-B- Earth	100	Phase to phase fault.		Yes	Yes

73	220KV-ALIPURDUAR (PG)-BIRPARA-1	25-06-2024	06:11	25-06-2024	06:58	Alipurduar: R_B, Ir: 7.69 kA, Ib: 5.05 kA	Birpara: R-B-N, R-3.058 kA, B-2.099 KA, 44.85 km	R-B Earth	100	Phase to phase fault.		Yes	Yes
74	400KV-BARH-MOTIHARI-1	25-06-2024	12:16	25-06-2024	12:47	Barh: B-N , 39.9 km,6.95 kA	Motihari: B_N, 1.84 kA, 171.7 km	B-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	Yes
75	400KV-MAITHON-GAYA-1	25-06-2024	21:36	25-06-2024	22:04	Maithon : Y_N, 20.556 Km, 6.948 kA	Gaya: Y_N, 257.57 Km, 1.96 kA	Y-Earth	100	A/r successful from Gaya however, a Maithon, other two phase tripped after 1 second. PG ER-2 may explain.		Yes	Yes
76	220KV-NEW TOWN(AA-III)-RAJARHAT-2	26-06-2024	01:12	26-06-2024	21:09	New Town: R_Y, 6.4 Km, Ir-3.5 kA, Iy-3.5 kA	Rajarhat: R_Y, Ir=Iy=13.9 kA	R-Y	100	Phase to phase fault.		Yes	Yes
77	220KV-MUZAFFARPUR(PG)-GORAUL(BH)-2	26-06-2024	08:15	26-06-2024	09:18	Muzaffarpur: B_N, 3.88 kA	Goraul: Didn't trip	B-Earth	800	Tripped in Zone 3 from Muzaffarpur End		Yes	No
78	400KV-MOTIHARI-BARH-2	26-06-2024	10:13	26-06-2024	10:22	Motihari: DT received	Barh: Didn't trip	No fault	NA	DT received at Motihari. No fault in line. NTPC Barh may explain.		Yes	No
79	400KV-ARAMBAGH-NEW CHANDITALA-1	26-06-2024	16:18	26-06-2024	16:37	Arambagh: DT received		No fault	NA	No fault in line. WBSETCL may explain.		No	No

80	220KV-PUSAULI(PG)-DURGAUTI-1	27-06-2024	11:29	27-06-2024	19:11	Pusauli : R-N, 6.838 Km, 11.43 kA		R-Earth	100	Three phase tripping for single phase fault		Yes	No
81	400KV-KHSTPP-BARH-1	27-06-2024	17:09	27-06-2024	17:30	KhSTPP: Didn't trip	Barh: DT received	No fault	NA	DT received at Barh. No fault in line. NTPC may explain.		No	Yes
82	400KV-KHSTPP-BARH-1	27-06-2024	21:28	27-06-2024	21:55	KhSTPP: Didn't trip	Barh: DT received	No fault	NA	DT received at Barh. No fault in line. NTPC may explain. (tie bay is already showing open at Barh)		No	Yes
83	400KV-NEW DUBURI-MEERAMUNDALI-2	28-06-2024	07:16	28-06-2024	12:59		Meramundali: DT received	No fault	NA	DT received at Meramundali . No fault in line. OPTCL may explain.		No	Yes
84	220KV-CHUKHA-BIRPARA-2	28-06-2024	07:17	28-06-2024	08:15		Birpara: Didn't trip	No fault	NA	Line tripped from Bhutan only.		No	NA
85	220KV-CHUKHA-BIRPARA-1	28-06-2024	07:17	28-06-2024	08:18	Chukha: Y_B, 15.35 km	Birpara: Y_B, Iy=Ib=3.3 kA	Y-B- Earth	100	Phase to phase fault.		No	Yes
86	400KV-KHSTPP-BARH-1	28-06-2024	10:08	28-06-2024	10:12		Barh: DT received	No fault	NA	DT received at Barh. No fault in line. NTPC may explain. (tie bay is already showing open)		No	Yes

87	400KV-KHSTPP-BARH-1	28-06-2024	12:31	28-06-2024	13:02		Barh: DT received	No fault	NA	DT received at Barh. No fault in line. NTPC may explain. (tie bay is already showing open)		No	Yes
88	220KV-BINAGURI-NJP-2	28-06-2024	12:37	28-06-2024	13:00	Binaguri: Inter trip received from NJP		No fault	NA	DT received at Binaguri . No tripping from NJP end		No	No
89	220KV-BINAGURI-NJP-1	28-06-2024	12:37	28-06-2024	12:59	Binaguri: Inter trip received from NJP		No fault	NA	DT received at Binaguri . No tripping from NJP end		No	No
90	400KV-NEW DUBURI-MEERAMUNDALI-2	29-06-2024	03:07	29-06-2024	08:14		Meramundali: DT received	No fault	NA	DT received at Meeramundali end. No fault in line.		No	No
91	400KV-NEW DUBURI-MEERAMUNDALI-2	29-06-2024	08:25	29-06-2024	10:38		Meramundali: DT received	No fault	NA	DT received at Meramundali . No fault in line. OPTCL may explain.		No	Yes
92	400KV-JEERAT-NEW JEERAT-1	29-06-2024	12:26	29-06-2024	18:48	Jeerat: R _N, 4.5 Km, 21.5 kA	New Jeerat : R-N , 6.187 kA, 20.40 Km	R-Earth	100	A/r failed after 1 second		No	Yes
93	400KV-JHARSUGUDA-RAIGARH-3	29-06-2024	14:53	30-06-2024	01:49	Jharsudha: R-N, 1.285 Km, 29.317 kA		R-Earth	100	A/r failed after 1 second		No	No

94	400KV-MEDINIPUR-NEW CHANDITALA-1	29-06-2024	16:44	30-06-2024	01:51	Mednipur: R_N, 5.583 kA, 80.67km		R-Earth	100	A/r failed after 1 second		YES	No
95	220KV-MAITHON-DHANBAD-2	30-06-2024	19:05	30-06-2024	19:35		Dhanbad: R-N, 36.6km, 3.19kA	R-Earth	100	Three phase tripping for single phase fault as per PMU		No	No

ANNEXURE - 1

THIRD PARTY PROTECTION SYSTEM CHECKING & VALIDATION TEMPLATE FOR A SUBSTATION

1. INTRODUCTION

(1) The audit reports, along with action plan for rectification of deficiencies found, if any, shall be submitted to RPC or RLDC within a month of submission of report by auditor.

(2) The third-party protection system checking shall be carried at site by the designated agency. The agency shall furnish two reports:

(a) Preliminary Report: This report shall be prepared on the site and shall be signed by all the parties present.

(b) Detailed Report: This report shall be furnished by agency within one month after carrying out detailed analysis.

2. CHECKLIST

(1) The protection system checklist shall contain information as per this Regulation.

(a) General Information (to be provided prior to the checking as well as to be included in final report):

(i) Substation name

(ii) Name of Owner Utility

(iii) Voltage Level (s) or highest voltage level?

(iv) Short circuit current rating of all equipment (for all voltage level)

(v) Date of commissioning of the substation

(vi) Checking and validation date

(vii) Record of previous tripping's (in last one year) and details of protection operation

(viii) Previous Relay Test Reports

(ix) Overall single line diagram (SLD)

(x) AC aux SLD

(xi) DC aux SLD

(xii) SAS architecture diagram

(xiii) SPS scheme implemented (if any)

(b) The preliminary report shall inter-alia contain the following:

TABLE A: FORMAT OF PRELIMINARY REPORT

S. No.	Issues	Remarks
1	Recommendation of last protection checking and validation	Status of works and pending issues if any
2	Review of existing settings at substation	Recommended Action
3	Disturbance Recorder out available for last 6 tripping's (Y/N)	Recommended Action
4	Chronic reason of tripping, if any	Recommended Action
5	Major non-conformity/deficiency observed	Recommended Action

(c) The relay configuration checklist for available power system elements at station:

(i) Transmission Line

(ii) Bus Reactor/Line Reactor

(iii) Inter-connecting Transformer

(iv) Busbar Protection Relay

(v) AC auxiliary system

(vi) DC auxiliary system

(vii) Communication system

(viii) Circuit Breaker Details

(ix) Current Transformer Details

(x) Capacitive Voltage Transformers Details

(xi) Any other equipment/system relevant for protection system operation

(d) The minimum set of points on which checking and validation shall be carried out is covered in this clause. The detailed list shall be prepared by checking and validation team in consultation with concerned entity, RLDC and RPC.

(i) Transmission Line Distance Protection/Differential Protection

a. Name and Length of Line

b. Whether series compensated or not

c. Mode of communication used (PLCC/OPGW)

d. Relay Make and Model for Main-I and Main-II

e. List of all active protections & settings

f. Carrier aided scheme if any

g. Status of Power Swing/Out of Step/SOTF/Breaker Failure/Broken Conductor/STUB/Fault Locator/DR/VT fuse fail/Overvoltage Protection/Trip Circuit supervision/Auto-reclose/Load encroachment etc.

h. Relay connected to Trip Coil-1 or 2 or both

i. CT ratio and PT ratio

j. Feed from DC supply-1 or 2

k. Connected to dedicated CT core (mention name)

l. Other requirements for protection checking and validation

(ii) Shunt Reactor & Inter-connecting Transformer Protection

a. Whether two groups of protections used (Group A and Group B)

b. Do the groups have separate DC sources

c. Relay Make and Model

d. List of all active protections along with settings

e. Status of Differential Protection/Restricted Earth Fault Protection/Back-up Directional Overcurrent/Backup Earth fault/ Breaker Failure

f. Status of Oil Temperature Indicator/Winding Temperature Indicator/Bucholz/Pressure Release Device etc.

g. Relay connected to Trip Coil-1 or 2 or both

h. CT ratio and PT ratio

i. Feed from DC supply-1 or 2

j. Connected to dedicated CT core (mention name)

k. Other requirements for protection checking and validation

(iii) Busbar Protection Relay

a. Busbar and redundant relay make and model

b. Type of Busbar arrangement

c. Zones

d. Dedicated CT core for each busbar protection (Yes/No)

e. Breaker Failure relay included (Yes/No), if additional then furnish make and model

f. Trip issued to both Busbar protection in case of enabling

g. Isolator indication and check relays

h. Other requirements for protection checking and validation

(iv) AC auxiliary system

a. Source of AC auxiliary system

b. Supply changeover between sources (Auto/Manual)

c. Diesel generator (DG) details

d. Maintenance plan and supply changeover periodicity in DG

e. Single Line Diagram

f. Other requirements for protection checking and validation

(v) DC auxiliary system

a. Type of Batteries (Make, vintage, model)

b. Status of battery Charger

c. Measured voltage (positive to earth and negative to earth)

d. Availability of ground fault detectors

e. Protection relays and trip circuits with independent DC sources

f. Other requirements for protection checking and validation

g. Communication system

i. Mode of communication for Main-1 and Main-2 protection

ii. Mode of communication for data and speech communication

iii. Status of PLCC channels

iv. Time synchronization equipment details

v. 7OPGW on geographically diversified paths for Main-1 and main-2 relay

vi. Other requirements for protection checking and validation

(vi) Circuit Breaker Details

a. Details and Status

b. Healthiness of Tripping Coil and Trip circuit supervision relay

c. Single Pole/Multi pole operation

d. Pole Discrepancy Relay available(Y/N)

e. Monitoring Devices for checking the dielectric medium

f. Other requirements for protection checking and validation

(vii) Current Transformer (CT)/Capacitive Voltage Transformer (CVT) Details

a. CT/CVT ID name and voltage level

b. CT/CVT core connection details

c. Accuracy Class

d. Whether Protection/Metering

e. CT/CVT ratio available and ratio adopted

f. Details of last checking and validation of CT/CVT healthiness

g. Other requirements for protection checking and validation

h. Other protections: Direction earth fault, negative sequence, over current, over voltage, over frequency, under voltage, under frequency, forward power, reverse power, out of step/power swing, HVDC protection etc.

3. SUMMARY OF CHECKING:

The summary shall specifically mention minimum following points:

(1) The settings and scheme adopted are in line with agreed protection philosophy or any accepted guidelines (e.g. Ramakrishna guidelines or CBIP manual based).

(2) The deviations from the RPC protection philosophy, if any and reasons for taking the deviations shall be recorded.

(3) All the major general deficiency shall be listed in detail along with remedial recommendations.

(4) The relay settings to be adopted shall be validated with simulation based or EMTP studies and details shall be enclosed in report.

(5) The cases of protection maloperation shall be analysed from protection indices report furnished by concerned utility, the causes of failure along with corrective actions and recommendations based on the findings shall be noted in the report.

ANNEXURE-C3

Sl No.	Name of the incidence	PCC Recommendation	Latest status
136th PCC Meeting			
1.	Disturbance at 765/400 kV Jharsuguda (Powergrid) S/s and tripping of units at Darlipalli STPP (NTPC) and OPGC on 21.05.2024 at 17:02 Hrs	NTPC representative replied that already team is deployed for reviewing settings and OEM support is also required for review of these settings for which communication is already made with OEM and updates will be shared with ERPC/ERLDC. PCC advised OPGC representative to coordinate with OEM (M/s BHEL and M/s Siemens) to review LSR settings (slope, time delay etc) and update status to ERPC/ERLDC. PCC further advised to share slope of LSR ramp settings and protection scheme to ERPC/ERLDC.	
2.	Disturbance at 400 kV Haldia (HEL) S/s on 29.05.2024 at 12:38 Hrs	PCC advised Powergrid representative to coordinate with OEM in order to find root cause behind tripping of zone 2 fault in zone 1 and share the analysis received from OEM to ERPC/ERLDC. PCC further advised PG representative to share DR of the event to ERPC/ERLDC. PCC advised HEL representative to coordinate with OEM in order to find reason behind operation of DEF protection.	
3.	Disturbance at 220 kV Tenughat (TVNL) S/s on 29.05.2024 at 12:57 Hrs	PCC advised JUSNL representative to rectify auto-reclose issue at Govindpur end by next week and intimate to ERPC/ERLDC.	

		TVNL representative informed that settings at their end had been implemented by CRITL, JUSNL team and he further assured that O/C E/F settings will be revised at the earliest after consultation with CRITL, JUSNL team. PCC advised CRITL, JUSNL team to test auto-reclose and carrier at both Govindpur as well as Tenughat end.	
4.	Total Power Failure at 220 kV Chandiposh (OPTCL)S/s and 220 kV Barkot (OPTCL) S/s on 21.05.2024 at 18:09 Hrs	OPTCL representative informed that regarding tripping of 220 kV Rengali-Deogarh in zone 2 from Deogarh end before 250 ms, already communication had been made to site to test relay and review the settings and further revision of settings will be done accordingly. PCC opined those issues like restoration of bus bar, bus bar protection etc at Rengali S/s are very important for reliability of grid. PCC also advised OPTCL representative to share target date and plan to ERPC/ERLDC for resolving mentioned issues. PCC advised SLDC Odisha representative to coordinate with concerned utilities for submission of disturbance report on time.	

5.	Total Power Failure at 220 kV Garaul (BSPTCL) S/s on 09.05.2024 at 08:02 Hrs	BSPTCL representative added that shutdown has been planned in next month for this line during which configuration issue for A/R will be checked and resolved at both ends.	
6.	Disturbance at 220 kV Dalkhola (WBSETCL) S/s on 31.05.2024 at 02:42 Hrs	PCC suggested Powergrid representative to implement group setting at Kishangunj end so that settings may be selected as per bus coupler configuration at Dalkhola. Powergrid representative submitted that they will discuss the with their corporate and will intimate accordingly to ERLDC/ERPC. PCC advised PG representative to revise time settings at Kishangunj end to 1 second.	
7.	Repeated Tripping of 220 kV Joda-Ramchandrapur-1	On enquiry from PCC regarding remedial measures taken, JUSNL representative informed that shutdown has been planned and it is expected that all issues will be resolved by 5th July 2024. PCC advised JUSNL to intimate ERPC/ERLDC after completion of rectification work. PCC advised JUSNL representative to carry out preventive maintenance activities periodically in order to avoid such disturbances.	
8.	Repeated Tripping of 220 kV Daltoganj-Chatra-1	On enquiry from PCC regarding preventive maintenance, JUSNL representative replied that tightening of jumper was done for major portion for line by availing shutdown and will be executed for remining part of line by taking shutdown soon. He further	

		added that permission of tree cutting was received recently from forest department subsequently tree cutting work is in progress from Daltongunj end.	
135th PCC Meeting			
9.	Disturbance at 220 kV Tenughat (TVNL) S/s on 18.04.2024 at 22:12 Hrs	PCC advised TVNL that the testing of existing busbar relay may be done in consultation with the OEM and the present event may be referred to OEM for analysis and suggestion. As the implementation with numerical relay will take considerable time, the existing relay may be tested thoroughly and the problems may be rectified. PCC advised TVNL representative that they may take help of DVC for identifying and resolving the issues in existing busbar relay. On DR synchronization issue, TVNL intimated that the work order has been issued and the issue will be resolved by Aug-24. For Biharsharif end, BSPTCL representative replied that GPS clock is not working at Biharsharif end and regarding rectification of the same, they would update at the earliest.	*Regarding bus bar relay, TVNL representtaive replied that DVC has been consulted in this regard and that issue will be resolved by June 2024.* *PCC advised to revise zone 4 settings at Tenughat to 250 ms till bus bar protection is non operational at Tenughat end.*
10.	Total Power Failure at 220 kV Chatra (JUSNL) S/s on 06.04.2024 at 14:05 Hrs	JUSNL was advised following: ➢ Disturbance Recorders of all the relays at Chatra end may be reconfigured as per the PCC guidelines and compliance of the same shall be intimated to ERLDC/ERPC at the earliest. ➢ The relays at Chatra end may be tested for their healthiness in phased manner.	*Regarding disturbance recorders, JUSNL representative replied that configuration had been done as per PCC guidelines.* *Regarding healthiness of relays at Chatra end, JUSNL representative informed that main 2 relay was not present at chatra*

		➢ Submit the event analysis report after site visit of CRITL team	*end,for which order has been placed and it will be installed by July-24.* *Regarding event analysis report, he replied that CRITL team had visited site however due to isue in DR configuration, DR could not be extracted.*
11.	Total Power Failure at 220 kV Pratapsasan (OPTCL)S/s on 23.04.2024 at 14:22 Hrs	PCC opined that blocking of isolator and CB status should not cause busbar relay operation and suggested that this event of mal-opertaion of busbar relay shall be consulted with relay OEM and logic of busbar relay may be reviewed. PCC advised the issue may be resolved within a month.	*No further update on this issue. OPTCL was advised to take the matter with the OEM.*
12.	Tripping of 220 Kv Bus-1 at Ramachandrapur on 02.04.2024 at 22:46	PCC advised JUSNL following: ➢ The overcurrent settings of bus coupler relay may be revised and some time delay may be kept instead of making it instantaneous. ➢ The rectification status of busbar & LBB protection at Ramchandrapur may be submitted.	*Regarding overcurrent settings of bus coupler, JUSNL representative replied that settings had been revised and time delay is kept as 100 ms.* *Regarding rectification status of bus bar and LBB, JUSNL representative replied that they are in discussion with OEM.*
13.	Islanding of CESC system	CESC representative replied that detailed report for each of the events will be shared to ERPC/ERLDC at earliest. ERLDC suggested to increase islanding criteria of undervoltage from 2 seconds to around 8 seconds. CESC representative replied that this issue of delayed recovery of undervoltage and its effect on islanding criteria is already being discussed internally and it will be	

		revised after getting approval from higher authority.	
14.	Repeated Tripping of 400 kV Barh-Kahalgaon-1 without any fault	PCC opined that as this issue might get be repeated again so the procurement process must be expedited and replacement of cable and relay may be completed at the earliest at Kahalgaon end.	*NTPC representative informed that new cable had been laid. Regarding relay replacement work, NTPC representative informed that procurement work had been initiated however it will take around 6 months to replace all relays.* *PCC advised that relay may be replaced from spare to which NTPC representative replied that status of spare will be taken from site and accordingly replacement work of relay will be expedited and status will be shared to ERPC/ERLDC.*
133rd PCC Meeting			
15.	Review of SPS at Sterlite (Vedanta)	SLDC Odisha representative informed that the meeting to discuss the modalities of implementation of proposed SPS scheme will be convened within a week.	*SLDC Odisha representative informed that Vedanta has sough some additional time for implementation of the SPS. PCC advised SLDC to coordinate with Vedanta for early implementation of the SPS.* *SLDC Odisha representative informed that internal approval had been taken for SPS however around one and half month will be required to implement scheme.*
132nd PCC Meeting			

16.	Disturbance at 220 kV Biharsharif S/s on 14.01.2024	➢ PCC advised Powergrid and BSPTCL to jointly review the highset overcurrent protection considering the present network configuration and fault level. ➢ PCC advised BSPTCL to review E/F setting of the ICTs as well as lines at 220 kV Biharsharif S/s ➢ DR configuration to be done by BSPTCL for the relays of ICT-1 & 2 and relays of Mokama lines.	*In 136th PCC Meetings, Powergrid representative proposed that definite time o/c settings of ICT kept at their side (hv side) may be kept as it would operate after zone 2 time settings for upstream fault until bus bar is defective and LV side ICT settings may be kept disbaled from BSPTCL side.* *PCC advised BSPTCL representative to enable directional feature in ICT o/c settings stage 1 on LV side and intimate ERPC/ERLDC.*