भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
पूर्वी क्षेत्रीय विद्युत समिति
Eastern Regional Power Committee
14, गोल्फ क्लब रोड, टालीगंज, कोलकाता-700033
14 Golf Club Road, Tollygunj, Kolkata-700033

सत्यमेव जयते

वसुधैव कुटुम्बकम्
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सं./NO. पू.क्षे.वि.स./PROTECTION/2023/356 **दिनांक /DATE:02.06.2023**

सेवा में / To,

संलग्न सूची के अनुसार / As per list enclosed.

विषय : दिनांक – 17.05.2023 को आयोजित 126 वीं पीसीसी बैठक का कार्यवृत्त ।

Sub: Minutes of the 126th PCC meeting held on 17.05.2023

महोदय/ Sir,

17.05.2023 को आयोजित **126वीं** पीसीसी बैठक का कार्यवृत्त पू.क्षे.वि.स. की वेबसाइट (**http://www.erpc.gov.in/**) पर उपलब्ध है । कृपया देखें ।

Please find the minutes of the **126th PCC** meeting of ERPC held on **17.05.2023** available at ERPC website (**http://www.erpc.gov.in/**).

यदि कोई अवलोकन हो, तो कृपया इस कार्यालय को यथाशीघ्र भेजा जाए ।

Observations, if any, may please be forwarded to this office at the earliest.

यह सदस्य सचिव, पू. क्षे. वि. स. के अनुमोदन से जारी किया जाता है ।

This issues with approval of Member Secretary, ERPC.

भवदीय / Yours faithfully,

02.06.23.

(पी. पी. जेना / P.P.Jena)
Executive Engineer (PS)
कार्यपालक अभियंता(पी.एस)

LIST OF ADDRESSES:

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Chief Engineer(System Operation), SLDC , BSPTCL, Patna-800021	
Chief Engineer (SLDC) Damodar Valley Corporation, GOMD-I Premises, P.O.- DaneshSeikh Lane, Howrah- 711109	Chief Engineer (CTC) Damodar Valley Corporation, P.O. Maithon Dam, Dist. Dhanbad,Jharkhand-828207
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General Manager (OS), ERHQ-I, NTPC Ltd., LoknayakJaiprakashBhawan, (2nd Floor), DakBunglowChawk, Patna-800001	Manager (Electrical), Adhunik Power & Natural Resources Ltd. "Lansdowne Towers, Kolkata-700020 (Fax No. 033-2289 0285)
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Dy. General Manager (Electrical) IB Thermal Power Station, OPGCL Banhapalli, Dist. Jharsuguda-768234, Orissa	General Manager (AM), ER-I Power Grid Corporation of India Ltd., Alankar Place, Boring Road, Patna-800001
Chief Engineer (Trans.) Power Deptt., Govt. of Sikkim, Gangtok-731010	Sr. Manager (CTMC) Durgapur Projects Limited, Durgapur-713201
Executive Director, ERLDC, POSOCO, Tollygunge, Kolkata-700033	The Head Maithon Power Limited, Maithon Office, MA 5 Gogna, Dist. Dhanbad, Jhankand State, PIN-828207
General Manager (AM), ER-II Power Grid Corporation of India Ltd., J-I-15, Block-EP, Sector-V,Salt Lake,Kolkata-91	Head –Regulatory and contracts, IndiGrid Limited , 247 Embassy, Office No 107, 'B' Wing, Hindustan Co. Bus Stop, Gandhi Nagar, L.B.S. Road, Vikhroli West, Mumbai – 400 079. Ph : +91 845509 96408
General Manager (P&O), PTC Ltd., Kanchanjunga Bldg.,18, Barakhamba Road, New Delhi-110001	
Managing Director, Bhutan Power Corporation Post Box no. 580, Thimpu, Bhutan.	Managing Director, Druk Green Power Corprn. P.O. Box-1351, Thimpu, Bhutan.

Associate Director (Commercial and Regulatory) Darbhanga-Motihari Transmission Company Limited (DMTCL),503, Windsor, Off CST Road, Kalina, Santacruz(E), Mumbai-400098	The Plant Head, JITPL, Angul, Odisha (FAX:011-26139256-65)
Shri D. P. Bhagava, Chief Consultant (O&M), TeestaUrja Limited, New Delhi (FAX:011-46529744)	Director (GM Division), Central Electricity Authority Sewa Bhawan, R. K. Puram, New Delhi-110066
Director (NPC), CEA, NRPC Building, Katwaria Sarai, New Delhi- 110016	President, Dans Energy Pvt. Ltd, 5th Floor, DLF Building No. 8, Tower-C, Gurgaon - 722OO2
Director, Shiga Energy Pw. Ltd., 5th Floor, DLF Building No. 8, Tower-C, Gurgaon - 722OO2	DGM (E&I), HALDIA ENERGY LIMITED, BARIK BHAWAN, KOKATA-700072, FAX: 033-22360955
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Minutes
of
126th PCC Meeting

Date:02/06/2023
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 126th PROTECTION COORDINATION SUB-COMMITTEE MEETING HELD ON 17.05.2023 AT 10:30 HRS THROUGH MS TEAMS PLATFORM

Member Secretary ERPC chaired the meeting. List of participants is attached at **Annexure A.**

PART – A

ITEM NO. A.1: Confirmation of Minutes of 125th Protection Coordination sub-Committee Meeting held on 19th April 2023 through MS Teams online platform.

The minutes of 125th Protection Coordination sub-Committee meeting held on 19.04.2023 was circulated vide letter dated 26.04.2023.

Members may confirm.

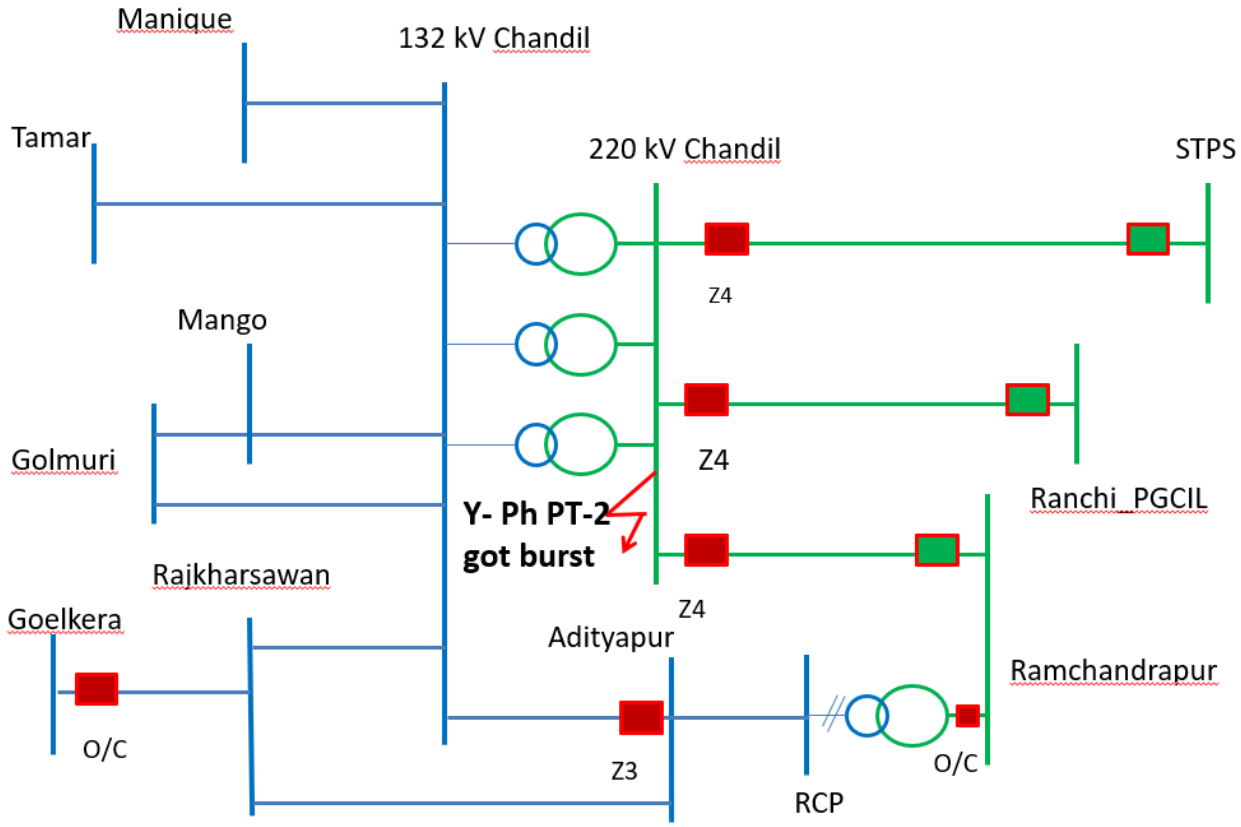
Deliberation in the meeting

Members confirmed the minutes of 125th PCC Meeting.

PART – B

ITEM NO. B.1: Total Power Failure at 220 kV Chandil S/s on 27.04.2023 at 07:12 Hrs

On 27.04.2023 at 07:12 Hrs, 220 kV Bus PT at Chandil S/s got burst. Subsequently all the elements got tripped resulting in total power failure at Chandil S/s. As reported, busbar protection is not available at 220 kV Chandil S/s.



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

Load Loss: 250 MW
Outage Duration: 00:21 Hrs
JUSNL may explain.

Deliberation in the meeting

*JUSNL representative explained the event with the help of a presentation. The same is enclosed at **Annexure B.1.2.***

The disturbance occurred due to PT Burst at 220 kV Chandil Bus. Subsequently, all the 220 kV line feeders got tripped on Zone 4 protection from Chandil end within 350 ms.

As 220 kV Chandil is having min and transfer bus arrangement and the busbar protection is not available, zone 4 settings for 220 kV feeders has been set at 250 m. There was no tripping of these 220 kV line feeders from remote ends.

Relay indications of different feeders and ICTs tripped during the event is as follows-

Element's Name	***Relay End-1***	***Relay End-2***	***Remarks***
220 kV Chandil - RCP	*Z4, Ir- 5.28 kA, Iy- 5.66 kA, Ib- 5.50 kA*	*Didn't Trip Z2 Pick up*	*All 220 kV lines were tripped within 350 ms at Chandil. tZ4 = 0.250 s*
220 kV Chandil - STPS	*Z4, Ir- 2.17 kA, Iy- 2.31kA, Ib- 2.32 kA*		

220 kV Chandil – Ranchi_PG	*Z4, Ir- 2.72 kA, Iy- 2.93 kA, Ib- 2.78 kA*		
150 MVA ICT-II (at RCP)	***HV Side -** O/C, Ir-1.21 kA, Iy-1.31 kA, Ib- 1.26 kA*		*fault cleared in 1350 ms*
150 MVA ICT-III (at RCP)	*O/C (Electromechanical relay)*		
132 kV Chandil - Adityapur	*Didn't Trip*	*Z3, 33.9 km, Ir- 1.64 kA, Iy- 1.70 kA, Ib- 1.64 KA*	*Fault cleared in 900 ms.*
132 kV Goelkera - Rajkharsawan	***High set O/C** (tripped on 124 ms), Ir- 0.63 kA, Iy- 0.63 kA, Ib- 0.64 kA*	*Didn't Trip*	*Improper O/C setting at Goelkera*

On enquiry from PCC regarding tripping of 132 kV Goelkera – Rajkharsawan in high set o/c from Goelkera end, JUSNL representative informed that tripping of this feeder had occurred due to improper o/c settings at Goelkera end which had been revised after this incident.

Regarding tripping of 220/132 k V ICTs at Chandil, JUSNL representative informed that overcurrent relay of these ICTs picked up (o/c protection settings- 265 A, TMS- 0.5 second) however no tripping was observed for them.

The fault was continuously fed from Ramchandrapur end and finally the fault was cleared after tripping of both ICTs at RCP S/s. The overcurrent settings of 220/132 kV ICTs at RCP end, JUSNL representative replied that pick-up settings of these ICTs is 1.09(CT ratio – 600A:1) with TMS- 0.42 second.

PCC opined that 220/132 kV ICTs at Chandil should have been tripped before tripping of ICTs at RCP to isolate the fault. PCC observed that the O/C settings of ICTs at RCP end is set with a conservative value and advised to review the o/c settings of 220/132 kV ICTs at Chandil and RCP S/s with proper coordination.

Regarding tripping of 132 kV Chandil – Adityapur in zone-3 from Adityapur end, PCC advised JUSNL to review reach settings of zone 3 distance relay at Adityapur end.

PCC viewed that O/C settings of feeders and ICTs at substations under JUSNL are not coordinated as per the present fault level of the substations due to which improper coordination of settings is observed resulting in such type of grid disturbance. JUSNL was advised to review O/C settings of feeders and ICTs at each S/s as per present fault level data available with SLDC Jharkhand.

PCC further enquired L about progress of implementation of bus sectionalizer at Chandil S/s along with implementation of bus differential protection for which JUSNL representative replied that detailed scheme along with details of cost involved for implementation had been forwarded to their higher authority for approval.

ITEM NO. B.2: Disturbance at 220 kV Tenughat S/s on 18.04.2023 at 13:19 Hrs

At 13:19 Hrs, B phase CT of 220 kV Tenughat-Govindpur-2 got burst at Tenughat. At the same time, both running units at Tenughat also got tripped.

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

Gen. Loss: 305 MW
Outage Duration: 00:56 Hrs

TVNL may explain.

Deliberation in the meeting

Based on the details received from JUSNL/Tenughat TPS, ERLDC representative explained the event.

- *The fault was initiated due to bursting of B phase line side CT of 220 kV Tenughat-Govindpur-2 at Tenughat TPS end. The relay at Tenughat end sensed the fault in zone 1 and the line tripped within 100 ms.*
- *The blast of CT resulted in heavy fire and smoke because of which subsequent R phase fault also got developed in 220 kV Tenughat-Govindpur-1 for which relay at Tenughat end sensed fault in zone 1 and got tripped.*
- *He further informed that 220 kV Tenughat-Patratu and 220 kV Tenughat-Biharsharif did not trip however zone-4 had been picked by relay at Tenughat end for these feeders. Both the units also got tripped resulting in total power failure at Tenughat TPS.*
- *It was informed that unit -2 got tripped in GT high set O/C protection within 80 ms of the fault initiation. Since relay is of electrotechnical type, it was not possible to extract the DR from that relay. PCC observed that the similar type of tripping due to conservative setting was observed in past and it was advised to replace the relay as soon as possible.*

On enquiry from PCC regarding reason behind tripping of unit 1, TVNL representative replied that because of load throw off caused due to tripping of 220 kV Tenughat-Govindpur D/c line, unit 1 tripped in over frequency protection.

ERLDC representative informed that since 220 kV Tenughat-Patratu and 220 kV Tenughat-Biharsharif had not tripped during the event so unit should not have tripped in over frequency protection. He opined that there is a possibility that time delay set for over frequency relay may be very less due to which this tripping may had occurred because of transient over frequency. So the time delay setting may be checked and the same may be disabled, if required. MPL representative also shared the views of ERLDC.

PCC advised TVNL to check time delay set for electrical based over frequency relay and it may be kept disabled if required in order to avoid unnecessary tripping of unit as occurred in this event.

On enquiry from PCC regarding implementation of numerical protection for unit 2, TVNL representative replied that it is expected that numerical protection will be implemented by Sep-23. PCC advised to review(increase) the high set overcurrent settings (delay and pickup whichever possible) for unit-2 till numerical protection is implemented for that relay.

On enquiry from PCC regarding status of implementation of numerical bus bar protection at Tenughat, TVNL representative replied that the same is under consideration.

ITEM NO. B.3: Repeated Tripping of 400 kV Teesta III-Dikchu line

A) On 17.04.2023 at 21:33 Hrs

400 kV Rangpo-Dikchu got tripped due to B phase fault leading to tripping of all running units at Teesta 3 and Dikchu due to loss of evacuation path as 400 kV Teesta 3-Rangpo had already tripped at 20:53 Hrs due to Y_B_N fault.

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

Gen. Loss: 1234 MW
Outage Duration: 00:35 Hrs

B) On 17.04.2023 at 22:53 Hrs

400 kV Rangpo-Dikchu got tripped again due to B phase fault leading to tripping of all running units at Teesta 3 and Dikchu.

Gen. Loss: 1237 MW
Outage Duration: 00:28 Hrs

C) On 18.04.2023 at 03:27 Hrs

On 18.04.2023 at 03:27 Hrs, 400 kV Rangpo-Dikchu got tripped due to B phase fault leading to tripping of all running units at Teesta 3 and Dikchu due to loss of evacuation path as 400 kV Teesta 3-Rangpo was already under breakdown.

Gen. Loss: 1096 MW
Outage Duration: 00:36 Hrs

Teesta III HEP and Dikchu HEP may explain.

Deliberation in the meeting

Similar type of tripping was observed in April-23 which was discussed in last PCC Meeting.

Teesta III representative informed that as per their internal discussion held after these incidents, proposed O/V settings(stage-2) is 125% with delay of 100 ms which will be implemented after confirmation from ERPC/ERLDC. He further intimated that distance protection settings had also been also reviewed and proposed settings will be shared to ERPC/ERLDC shortly.

Regarding wiring issue at Dikchu end, Dikchu representative informed that the issue has been rectified.

ITEM NO. B.4: Tripping of 400 kV Barh-Kahalgaon-2 at 08:21 Hrs on 15.04.2023

While availing shutdown of 400 kV Barh-Motihari-2, its dia element at Barh i.e. 400 kV Barh-Kahalgaon-2 got tripped. As reported, tie bay of this dia was not opened and in live condition isolator opening was attempted at Barh. 400 kV Barh-Kahalgaon-2 tripped immediately from Barh, however, it should have tripped in Zone-4 after 500 msec, which if had happened, total blackout would have occurred at Barh S/s and around 1900 MW generation loss would have occurred.
A brief report is attached as **Annexure B.4.**

NTPC Barh may explain. Members may discuss.

Deliberation in the meeting

ERLDC representative informed that on 15.04.2023, while availing shutdown of 400 kV Barh-Motihari-2, its dia element at Barh i.e. 400 kV Barh-Kahalgaon-2 got tripped. It is reported that tie bay of this dia was not opened and in live condition isolator opening was attempted at Barh end. This resulted in initiation of fault and 400 kV Barh-Kahalgaon-2 tripped immediately from Barh end. He further added that main bay had opened correctly from barh end and both main and tie bays were hand tripped from other (Motihari) end for 400 kV Barh-Motihari-2.

On tripping of 400 kV Barh-Motihari-2, NTPC Barh representative informed that line got tripped in zone 1 from Barh end whereas for 400 kV Barh-Kahalgaon-2 the fault was picked up in zone-4 of distance protection.

ERLDC representative intimated that though relay had picked up in zone 4, the tripping had occurred instantaneously instead of 500 ms.

PCC advised NTPC to test the relay healthiness at Barh end for 400 kV Barh-Kahalgaon-2 feeder.

On enquiry from PCC regarding reason opening of isolator in live condition, NTPC representative informed that on investigation it was found that for 400 kV Barh-Motihari-2, SCADA system is of M/s Siemens make and tie bay is of M/s BHEL make and status of breaker and isolator is communicated through goose links which was not communicated correctly during that instance resulting in issue in interlocking system. He further added that as remedial measure, hardware logic of breaker contact had put up in series with isolator. He also added that visit of OEM engineer is scheduled on 22nd May 2023 for further testing.

PCC opined that for reliability and safety point of view, hardware logic should always be implemented for opening of isolator along with the soft logic. He further added that voltage and current measurements/ checking for null conditions should also be done before opening isolator as safety measure.

PCC advised NTPC Barh following:

- *to share detailed SOP adopted for operation of isolators along with modified scheme of interlocking to ERPC/ERLDC.*
- *to share DR/EL and report for future events in timely manner so that proper analysis regarding such incident can be carried out.*
- *to test interlinking scheme for other feeders also along with implementing hardware logic if needed.*

ITEM NO. B.5: Frequent tripping of FSC of 400 kV Jeypore-Gazuwaka D/c

In last 3 months, FSC of 400 kV Jeypore-Gazuwaka D/c had tripped 50 times, mostly either due to transient undercurrent or bypass CB status discrepancy. FSCs should not bypass for transient undercurrent for short duration say 100 msec. It is observed that FSCs installed at other S/s are not tripping at this frequency. Details of tripping of FSCs are as below:

SrNo	Element Name	Tripping Date	Tripping Time	Reason	Revival Date	Revival Time
1	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	10-05-2023	04:45	R_ph Bypass CB discrepancy		
2	FSC OF 400KV-JEYPORE-	05-05-2023	16:30	Bypass CB status discrepancy	09-05-2023	17:57

	GAZUWAKA-1 AT JEYPORE					
3	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	05-05-2023	05:20	Due to status discrepancy	05-05-2023	16:25
4	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	05-05-2023	00:06	MOV high energy and signal missing(Y_ph)	05-05-2023	01:05
5	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	04-05-2023	20:16	Bypass CB status discrepancy	04-05-2023	21:23
6	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	03-05-2023	16:24	Bypassed due to lockout operated in Y_ph	03-05-2023	21:55
7	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	02-05-2023	15:30	Bypass CB status discrepancy	02-05-2023	17:58
8	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	01-05-2023	07:29	Transient Undercurrent	01-05-2023	12:26
9	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	29-04-2023	22:50	transient undercurrent	01-05-2023	14:51
10	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	27-04-2023	08:50	Bypassed due to Transient Undercurrent.	27-04-2023	15:47
11	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	27-04-2023	09:55	Bypassed due to signal missing	27-04-2023	11:41
12	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	25-04-2023	19:45	Due to under current	26-04-2023	17:00
13	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	26-04-2023	15:51	Bypassed due to capacitor unbalance and subsequently lockout operated	26-04-2023	18:34
14	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	25-04-2023	16:31	Transient undercurrent	25-04-2023	17:37
15	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	25-04-2023	16:31	Transient undercurrent	25-04-2023	17:37
16	FSC OF 400KV-JEYPORE-	23-04-2023	05:27	Y-Ph lockout operation	24-04-2023	19:09

	GAZUWAKA-1 AT JEYPORE					
17	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	24-04-2023	16:59	current Signal from Breaker to FSC Missing	24-04-2023	19:09
18	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	18-04-2023	12:16	due to transient under current	18-04-2023	18:10
19	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	11-04-2023	13:35	Bypassed due to Transient Under current	12-04-2023	13:31
20	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	11-04-2023	13:35	Bypassed due to Transient Under current	12-04-2023	13:31
21	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	09-04-2023	15:37	due to transient under current	10-04-2023	11:17
22	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	07-04-2023	19:25	TRIPPED DUE TO TRANSIENT UNDER CURRENT	07-04-2023	20:56
23	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	06-04-2023	20:47	UNDERCURRENT	07-04-2023	16:27
24	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	04-04-2023	19:04	Under current	05-04-2023	11:29
25	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	04-04-2023	19:04	Under current	05-04-2023	11:29
26	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	02-04-2023	19:45	tripped due to under current	02-04-2023	22:26
27	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	30-03-2023	01:33	General Lockout operated.	30-03-2023	14:08
28	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	28-03-2023	13:31	Due to Capacitor Unbalance and Lockout optd in R phase.	28-03-2023	13:58
29	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	25-03-2023	10:02	Due to under current	25-03-2023	12:14
30	FSC OF 400KV-JEYPORE-	25-03-2023	10:02	Due to under current	25-03-2023	12:14

	GAZUWAKA-1 AT JEYPORE					
31	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	25-03-2023	02:40	Due to transient undercurrent.	25-03-2023	07:59
32	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	25-03-2023	02:40	Due to transient undercurrent.	25-03-2023	07:59
33	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	22-03-2023	17:01	Transient under current	22-03-2023	19:34
34	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	22-03-2023	02:33	Due to undercurrent transient in Y phase.	22-03-2023	07:36
35	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	19-03-2023	04:57	Transient undercurrent in R-ph and B-ph.	21-03-2023	12:35
36	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	19-03-2023	04:57	Transient undercurrent in R-ph and B-ph.	19-03-2023	13:24
37	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	18-03-2023	16:45	BYPASSED DUE TO UNDER CURRENT	18-03-2023	20:06
38	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	09-03-2023	00:50	FSC bypassed due to undercurrent	09-03-2023	10:15
39	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	02-03-2023	12:03	Transient under current.	03-03-2023	06:26
40	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	25-02-2023	23:33	Due to undercurrent	27-02-2023	14:56
41	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	22-02-2023	05:41	Due to under current detection	22-02-2023	07:15
42	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	22-02-2023	05:41	Due to under current detection	22-02-2023	07:15
43	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	21-02-2023	00:46	Due to general lockout	21-02-2023	13:09
44	FSC OF 400KV-JEYPORE-	20-02-2023	15:51	Bypassed due to transient under current detection	20-02-2023	17:41

	GAZUWAKA-2 AT JEYPORE					
45	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	20-02-2023	15:51	Bypassed due to transient under current detection	20-02-2023	17:41
46	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	17-02-2023	17:46	Bypassed due to signal missing	17-02-2023	23:42
47	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	17-02-2023	11:03	BYPASSED DUE TO SINGNAL MISSING	17-02-2023	13:54
48	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	16-02-2023	10:10	Bypassed due to General lockout (contactor burnt)	16-02-2023	12:30
49	FSC OF 400KV-JEYPORE-GAZUWAKA-2 AT JEYPORE	21-12-2022	10:25	Bypassed due to undercurrent	07-02-2023	17:06
50	FSC OF 400KV-JEYPORE-GAZUWAKA-1 AT JEYPORE	07-02-2023	14:21	Due to transient under current.	07-02-2023	16:35

Powergrid may explain.

Deliberation in the meeting

ERLDC representative informed that for last 3 months, it had been observed that FSC of 400 kV Jeypore-Gazuwaka D/c is getting bypassed frequently mostly due to transient undercurrent or bypass CB status discrepancy.

Powergrid representative informed that FSC is of M/s BHEL make and commissioned in the year 2006. This model has no facility to extract DR, TFR records etc. Therefore, it is difficult to analyze the root cause behind frequent bypassing of FSC.

He further informed that cards had been replaced various times but it was observed that a new card is getting bypassed again after maximum 12 hours.

As remedial measure they have planned to retrofit the relay panel and control panel at S/s for which supply of material had been received at site except few items which need to be supplied from Germany which is expected by June 2023. After which retrofitting will be done and it is expected that this issue will be resolved by August-23.

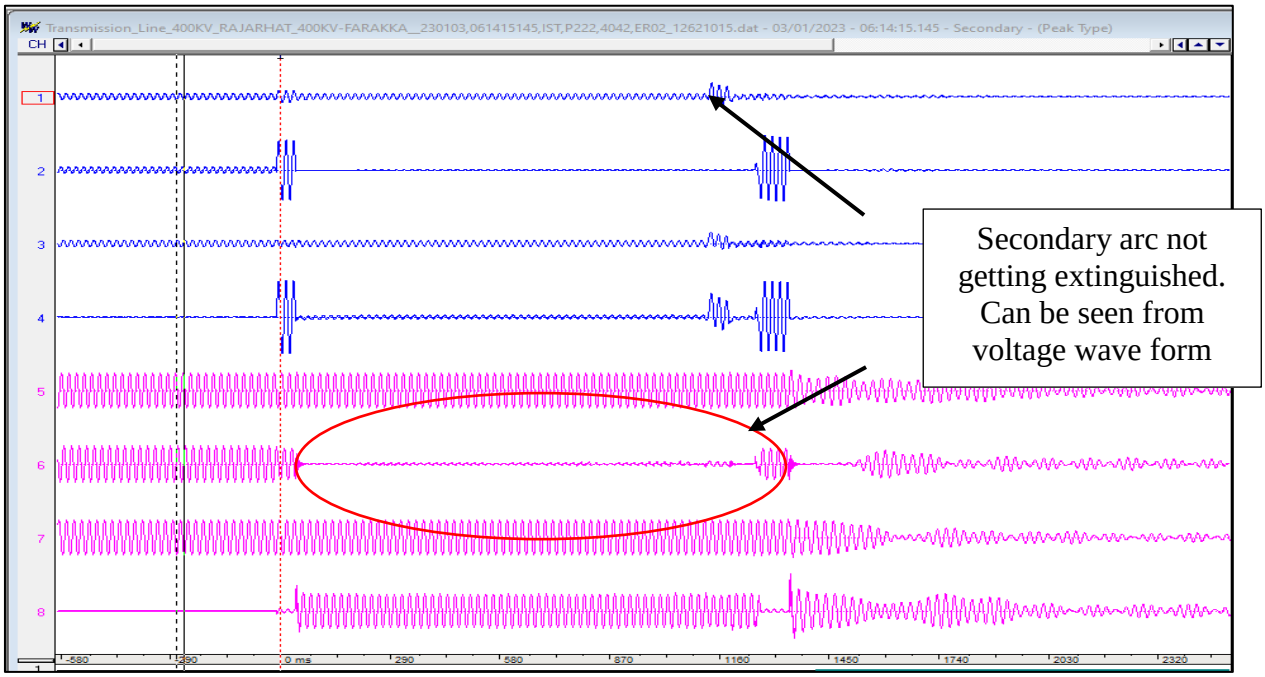
PCC advised OPTCL to check whether any fault had occurred at 220 kV Jeypore and connected substations on the date and time of these tripping of FSC at Jeypore and furnish the details to ERLDC.

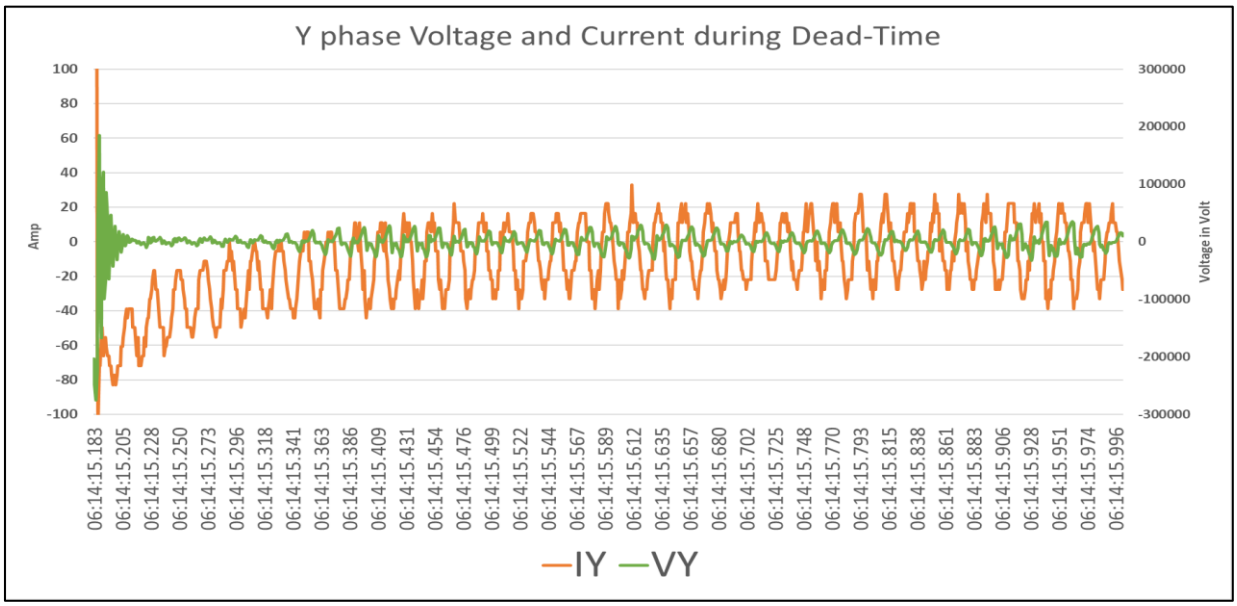
ITEM NO. B.6: Frequent failure of A/R for 400 kV Farakka- Rajarhat line

In the last four month the 400 kV-Rajarhat-Farakka-1 had tripped three times and every time A/R was failed. Details is as follows-

Element Name	Date & Time
400KV-RAJARHAT-FSTPP-1	06/04/2023 11:59
400KV-RAJARHAT-FSTPP-1	28/02/2023 09:19
400KV-RAJARHAT-FSTPP-1	03/01/2023 06:14

From the DR of all the tripping it can be seen that secondary arc is not getting extinguished.



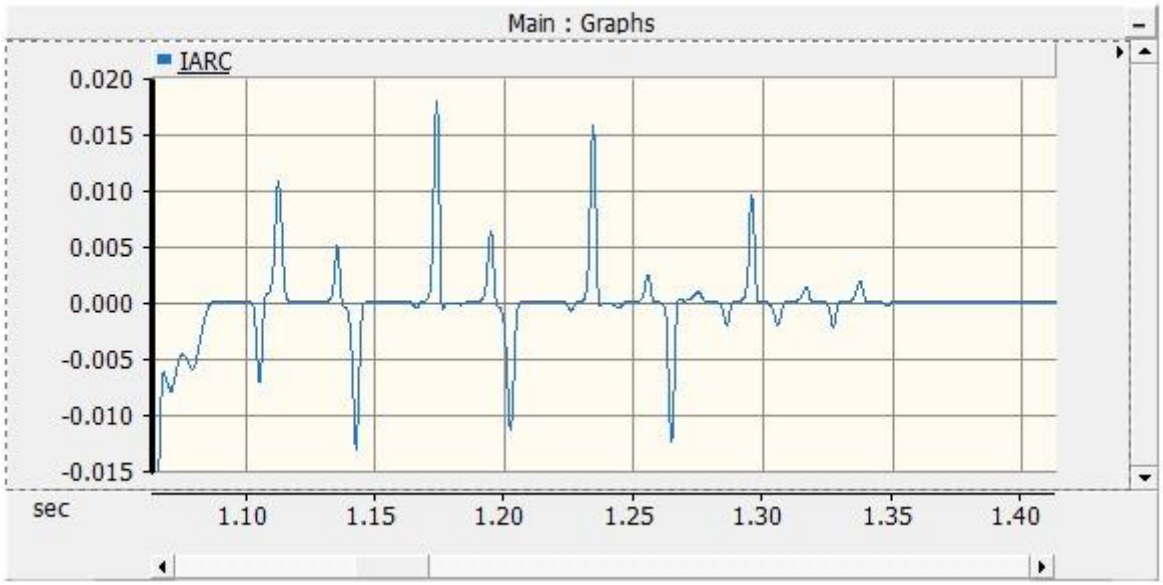


This phenomenon is seen during all events mentioned above from which it can be opined that NGR value installed at both ends may be reviewed, or a three Phase tripping of L/R may be employed. Increment in dead time may be tried also however as the line is 312 km long so with increase of dead time chance of secondary arc extinction is less.

During an event on 5th June 2017, when the line was charged as Farakka-Gokarna the NGR of Farakka side got burnt out. The line later become 400 kV Farakka-Rajarhat. The physical healthiness of the same NGR may be confirmed by concerned utility.

PSCAD study has been carried out to check the secondary arcing phenomena. And it is found that with NGR at both end (value as shared by POWERGRID) secondary arc is extinguishing fast, however in absence of NGR at Farakka end arc extinction is not taking place successfully.

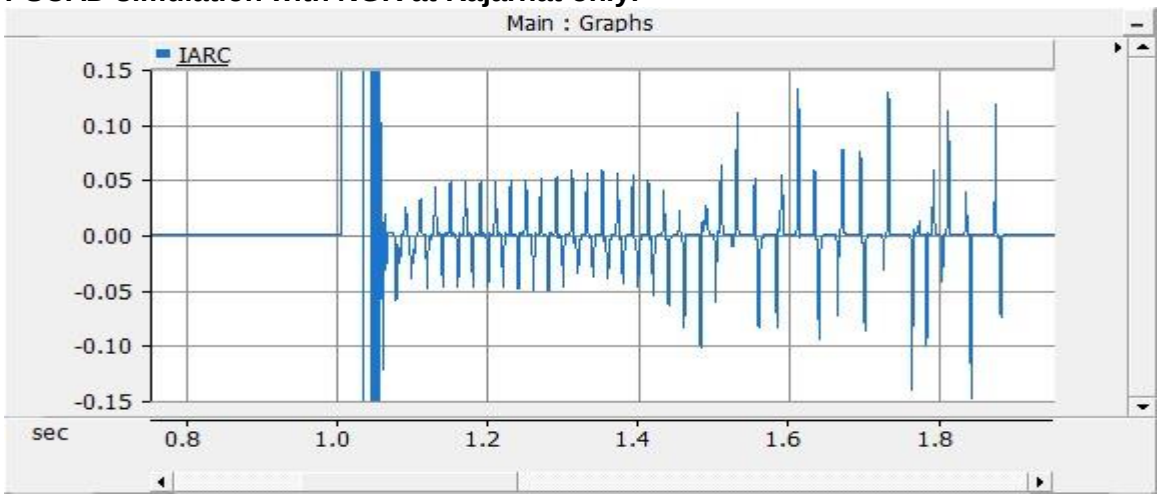
PSCAD simulation with NGR at both end:



Secondary arc current (Y axis in kA)

Secondary arc is extinguishing within 200-300 ms when NGR of 414.44 Ohm is present at both ends.

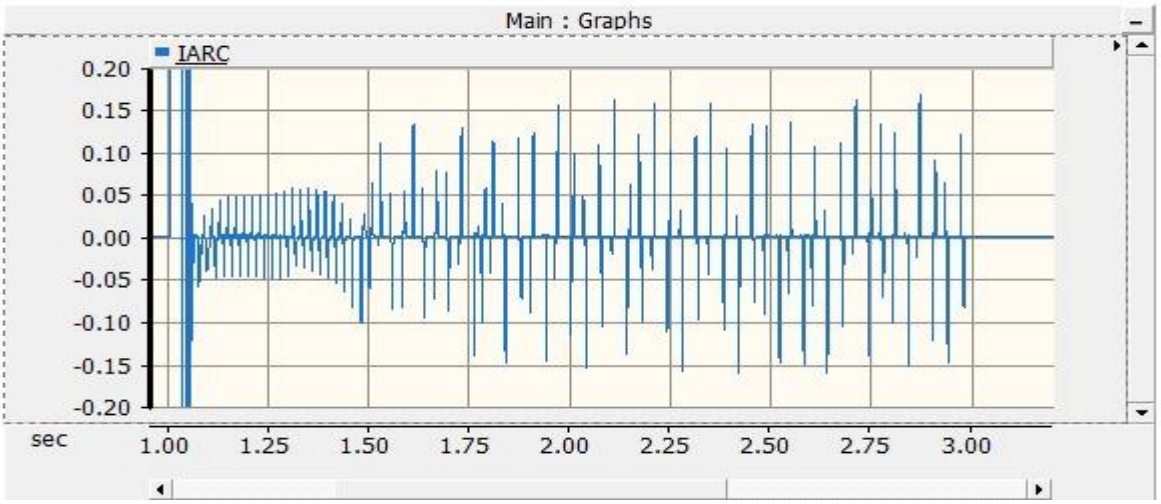
PSCAD simulation with NGR at Rajarhat only:



Secondary arc current (Y axis in kA)

It is also observed that secondary arc is not extinguishing within dead time when NGR of Farakka end removed. In real time also, similar phenomena is observed.

The effect of increase in dead time without an NGR at Farakka end also studied and it is found that even a dead time of 2 sec is not able to extinguish the secondary arc.



Secondary arc current (Y axis in kA)

Members may discuss.

Deliberation in the meeting

ERLDC representative informed that for 400 kV Farakka- Rajarhat line, it had been observed that many of the times A/R is unsuccessful in the line though the line was getting charged within one hour of tripping which indicated fault might be temporary in nature.
He further added that since line is quite long, so extinguishment of secondary arc is one of critical phenomena for success of A/R and for that well designed NGR is required to be installed in line reactor. He further informed that for this line, line reactor of 80 MVAR is present at both ends and there is 414 mho NGR at two end and based on these values, simulation was done on PSCAD subsequently it was observed that if NGR is bypassed or not in service at any one end then extinguishing secondary arc is difficult.
Powergrid representative informed that NGR is in service at Rajarhat end and as per DR for the event on 30th March 2023 and 27th April 2023, A/R was successful from Rajarhat end and secondary arcing issue was also not observed.
On enquiry from PCC regarding healthiness of NGR at Farakka end, PG representative informed that NGR is healthy and in service at Farakka end. He further added that on 27th April 2023, fault was near Farakka end for which A/R was successful and for event on 30th March 2023, fault was near Rajarhat end for which also A/R was successful. ERLDC representative requested PG representative to share DR of event held on 30th March 2023.
ERLDC representative replied that since some of events had observed where A/R is unsuccessful so it is advised that proper testing of NGR need to be done at Farakka end. It is further requested to share report of testing done for NGR after event held on 2017.
Powergrid representative suggested that secondary arcing phenomena was observed for few events but it had not been observed for the event on 27th April 2023 and 30th March 2023 so it would be better to increase dead time of A/R for time being and in case similar occurrence of secondary arcing is observed for future events then further testing of NGR will be done. He also confirmed that meanwhile report of testing done for NGR after event held on 2017 will be shared to ERPC/ERLDC.
NTPC representative informed that for most of time, A/R is successful from Farakka end and tripping of line had occurred as fault was persistent in nature. He further added that on 06/04/2023 only A/R lockout had operated due to failure of both channel of carrier.
After detailed discussion, PCC advised Powergrid to analyze the events and issue of secondary arcing phenomenon at their end and further share the observations of ERLDC to CTU for review of NGR value designed for this line.
PCC also advised Powergrid to test PLCC on either end in coordination with NTPC and further A/R scheme may be upgraded through DTPC if required.

ITEM NO. B.7: Tripping Incidence in month of April-2023

Single line tripping incidents in the month of April-2023 which needs explanation from constituents of either end is attached.

Members may discuss**.**

Deliberation in the meeting

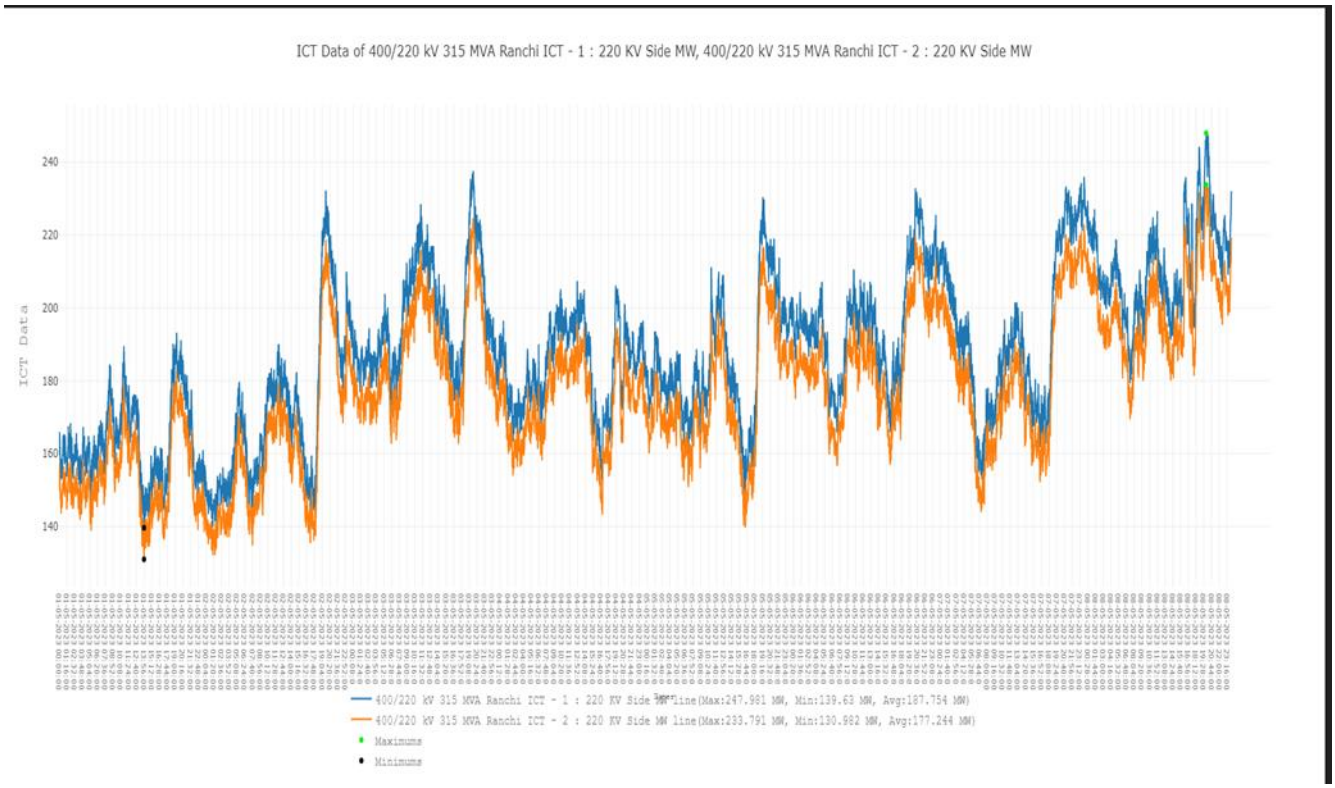
Explanation from constituents of either end for single line tripping incidents in April 2023 is attached at ***Annexure B.7.***

PART- C :: OTHER ITEMS

ITEM NO. C.1: Removal of SPS for 2*315 MVA 400/220 kV Ranchi ICTs

500 MVA 400/220 kV ICT-3 at Ranchi is going to be first time charged soon, after which loading of ICTs at Ranchi will remain N-1 compliant. It is suggested that existing SPS scheme at Ranchi for 400/220 kV ICTs may be disabled.

Recent trend of ICT loading for 1st May-8th May'23 is given as-



Members may discuss.

Deliberation in the meeting

On enquiry from PCC, Powergrid representative informed that 500 MVA 400/220 kV ICT-3 at Ranchi is going to be commissioned by end of May 2023.

As per loading pattern of ICT, PCC inferred that there is no need of SPS scheme for ICTs at Ranchi after installation of 3rd ICT.

*PCC advised Powergrid to disable/remove the SPS scheme implemented for 2*315 MVA 400/220 kV ICTs at Ranchi after commissioning of 3rd ICT. This may be carried out in coordination with ERLDC.*

ITEM NO. C.2: Implementation of Single-Phase Auto recloser feature in DEF Relays for the 400 kV transmission lines of TPTL-(Agenda by TPTL)

In 108th PCC meeting, the proposal of implementing auto reclosure with DEF protection was discussed and after discussion it was opined that the proposal needs elaborate technical discussion and confirmation from the relay manufacturers regarding provision of the single-phase auto reclosing functionality in DEF relay for which PCC had further advised TPTL to furnish relevant document / information for further discussion in this regard.

Subsequently TPTL had contacted with the relay suppliers of 400 kV D/C Teesta III HEP – Kishanganj transmission line at Teesta III end and Kishanganj end. The supplier of P442 relay at Teesta III HEP end, i.e., M/s GE Renewable Energy has confirmed that single phase tripping and auto reclose is possible in aided DEF protection function in the P442 relay. Further, as per the relay manual of MiCOM P127 relay, supplied by M/s Areva (formerly M/s Schneider) at Teesta III end, auto reclosure feature is available in DEF protection function of the relay. At Kishanganj end it was also confirmed by the relay supplier, i.e., M/s Hitachi Energy (formerly M/s ABB Power Systems India) that single phase auto reclose is available in DEF protection function of REL670 relay.

In view of above, it is proposed to implement Single Phase Auto recloser feature in DEF Relays for the 400 kV transmission lines of TPTL.

Discussion was held in 121st PCC Meeting regarding this agenda and after detailed deliberation, the following way forward was decided:

- ERLDC to coordinate with NERLDC to get feedback regarding reliability and success rate of auto recloser scheme in DEF relay.
- TPTL to make a detailed presentation on proposed scheme & its logic and on implementation of the scheme at relay level along with wiring & communication channel detailing in next PCC meeting.
- All transmission utilities were advised to share comments to ERPC/ERLDC regarding implementation of single-phase auto reclosing feature in DEF relay.

In 122nd PCC Meeting, ERLDC representative informed that as per communication received from NERLDC, single phase auto-recloser scheme in DEF relay had been implemented in 400 kV Silchar- Imphal d/c and 400 kV Silchar- Misa d/c line and it is operating satisfactorily. He further informed that current reversal guard need to be implemented along with auto recloser scheme in DEF relay for its successful operation.

In 124th PCC, Powergrid representative shared case study paper of IIT Mumbai describing about mal operation of DEF protection resulting in spurious tripping of healthy line. He suggested that comments may be shared by utilities before implementing single phase auto recloser feature in DEF Relays for the 400 kV transmission lines of TPTL.

ERLDC informed that spurious tripping of healthy line is even possible if single phase auto recloser feature is disabled in DEF relays however they requested all utilities to share the observation on the proposed scheme.

TPTL representative informed that as per communication made with M/s GE, the detail scheme & its implementation will be presented at the earliest.

In 125th PCC Meeting, TPTL representative informed that they had received scheme details from M/s GE and they are planning to have a discussion with the OEM before making the presentation in PCC meeting.

PCC advised TPTL to share the scheme/details as received from M/s GE to ERPC/ERLDC. The presentation on detailed logic/scheme may be made in next PCC meeting.

TPTL may update.

Deliberation in the meeting

PCC advised TPTL to present the scheme in coordination with M/s GE in next PCC meeting.

ITEM NO. C.3: Delay in uploading DR/EL in PDMS

It has been observed that DR/EL etc. are being uploaded by utilities in PDMS with an inordinate delay. There has been a tendency to upload these files at the end of the month in one go which is not in line with IEGC and hampers proper analysis of the events.

Members may discuss.

Deliberation in the meeting

ERLDC representative informed that DR/EL etc. are being uploaded by utilities in PDMS with an inordinate delay due to which sufficient time for proper analysis of the event is not available for ERLDC.

PCC advised all the utilities to upload DR/EL within 24 hrs of the occurrence of the event.

ITEM NO. C.4: Submission of protection settings for newly charged elements/change in network configuration

The updated status of protection settings for new elements charged in ER Grid from Nov 22 to April 2023 is given at **Annexure C.4.**

In 123rd PCC Meeting, PCC advised all the utilities to intimate any changes in network configuration in their intra state network regularly and review the settings accordingly & upload the relay settings in PDMS by using DMNS portal or by sending the settings file in desired format to erpc-protection@gov.in.

On enquiry from ERLDC regarding facility in PDMS to review the settings implemented in the relay, PRDC representative replied that settings can be extracted from PDMS and analysis/review of same can be done by simulation tool of PSCT.

It was decided that the substation-wise review of protection settings may be carried out using PDMS & PSCT for that PRDC was advised to make a presentation in this regard in PCC.

In 125th PCC Meeting, it was decided that PRDC would made a presentation in next PCC meeting on protection setting coordination using PSCT & PDMS.

PRDC may update.

Deliberation in the meeting

PCC advised all concerned utilities (mostly from OPTCL, North Karanpura and NTPC Barh) to share pending relay settings in desired format to erpc-protection@gov.in or upload the relay settings in PDMS by using DMNS portal.

ITEM NO. C.5: Follow-up of Decisions of the Previous Protection Sub-Committee Meeting(s)

The decisions of previous PCC meetings are attached.
Members may update the latest status.

Deliberation in the meeting

Updated status of decisions of previous PCC meetings is given at ***Annexure C.5.***

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Annexure A

List of Participants in 126th PCC Meeting held on 17.05.2023 at 10:30 AM

Name	First Join	Email
A Basu AEE (Guest)	5/17/23, 10:55:52 AM	
ABAKASH ADHIKARY	5/17/23, 10:33:04 AM	abakash.adhikary@dvc.gov.in
Abhisharika	5/17/23, 12:45:13 PM	
abhisharika critl jee	5/17/23, 12:57:54 PM	
aditya jha	5/17/23, 10:30:21 AM	
Aee Critl	5/17/23, 11:04:01 AM	
AEE Latehar	5/17/23, 11:33:35 AM	
Akash Kumar Modi	5/17/23, 10:28:38 AM	akmodi@erldc.onmicrosoft.com
Alok Kumar Gupta, Teesta-V PS, Sikkim	5/17/23, 10:34:26 AM	
Alok Pratap Singh	5/17/23, 10:29:22 AM	apsingh@erldc.onmicrosoft.com
Amresh Prusti	5/17/23, 10:49:05 AM	amresh.prusti@opgc.co.in
ANUP KR SAHA	5/17/23, 10:36:10 AM	
arindam bsptcl	5/17/23, 10:29:14 AM	
ATUL PRAKASH	5/17/23, 10:31:44 AM	
BGCL	5/17/23, 11:42:05 AM	
bsptcl	5/17/23, 10:37:44 AM	
BSptcl	5/17/23, 11:36:29 AM	
CE,CRITL	5/17/23, 11:04:11 AM	
Chandan kumar	5/17/23, 10:37:07 AM	chandan@erldc.onmicrosoft.com
Chilakalapalli Mohana Rao {सी एच मोहन राव}	5/17/23, 12:11:49 PM	mohan.rao@powergrid.in
Debdas Mukherjee, WBPDCL	5/17/23, 10:15:09 AM	
Deepak Kumar	5/17/23, 10:38:10 AM	
Deepak Kumar singh	5/17/23, 11:14:59 AM	
DEVENDRA CHOUBEY BSPTCL	5/17/23, 11:35:19 AM	
DGM E&MR DIV. JAJP	5/17/23, 10:46:59 AM	
DGM E&MR.J.ROAD.OPTCL	5/17/23, 10:28:52 AM	
Dharm Das Murmu, CRITL	5/17/23, 10:39:28 AM	
Dilip kant jha EEE CRITL	5/17/23, 10:35:40 AM	
EEE Bsptcl	5/17/23, 11:35:45 AM	
EEE Critl	5/17/23, 12:15:00 PM	
ele.smajhi	5/17/23, 11:46:27 AM	
ERPC Kolkata	5/17/23, 10:15:02 AM	ERPC@KolkataMST.onmicrosoft.com
gaurav	5/17/23, 10:37:36 AM	
Gautam Manish	5/17/23, 10:29:15 AM	Manish.Gautam@andritz.com
GM, CRITL, JUSNL	5/17/23, 10:45:49 AM	

Gulsan Rongnichu	5/17/23, 10:35:48 AM	
jaganath pani	5/17/23, 10:33:11 AM	
jashbant kumar Singh	5/17/23, 11:10:25 AM	
Jayathran P S	5/17/23, 10:34:12 AM	JAYATHRANPS@NTPC.CO.IN
K A Madanpuri	5/17/23, 10:41:33 AM	
K Arunkumar	5/17/23, 11:10:58 AM	Arunkumar.K@andritz.com
KIRAN SAI	5/17/23, 10:43:54 AM	KIRANSAIMS@NTPC.CO.IN
Kumar Niraj	5/17/23, 10:36:16 AM	nirajkumar@tatapower.com
Manan kr singh	5/17/23, 11:03:49 AM	
Mithun Gayen {मिथुन गायेन}	5/17/23, 10:33:26 AM	mithun.gayen@powergrid.in
Mohan	5/17/23, 11:54:05 AM	
MOHAN KUMAR	5/17/23, 12:15:48 PM	MKPATEL@NTPC.CO.IN
N S MONDAL (Guest)	5/17/23, 10:15:54 AM	
NIRMAL MONDAL (WBSETCL) (Guest)	5/17/23, 10:15:22 AM	
OPTCL MERAMUNDALI	5/17/23, 10:23:03 AM	
PARAG CHATTERJEE	5/17/23, 11:49:36 AM	PARAGCHATTERJEE@NTPC.CO.IN
Patrali	5/17/23, 10:23:44 AM	
PATRALI MONDAL (Guest)	5/17/23, 11:58:25 AM	
Prabhat Kumar, TPTL	5/17/23,10:40:35 AM	
Prasanna Kumar Sahoo	5/17/23, 10:23:32 AM	PRASANNASAHOO@NTPC.CO.IN
pravin ram	5/17/23, 11:00:26 AM	
Pritam Goswami	5/17/23, 10:40:49 AM	pg@sikkimurjalimited.in
Priyam Maity {प्रियम मैती}	5/17/23, 10:41:11 AM	pmaity@powergrid.in
RAHUL RAJ	5/17/23, 10:51:54 AM	
Rajendra Prasad	5/17/23, 10:15:10 AM	
Ramchandrapur	5/17/23, 11:05:59 AM	
Saibal Ghosh	5/17/23, 10:35:53 AM	saibal@erldc.onmicrosoft.com
sankhadeep	5/17/23, 10:25:41 AM	
Sankhadeep Choudhury	5/17/23, 10:49:30 AM	
Sarfraj bsptcl	5/17/23, 11:10:13 AM	
Saurabh Vijay Agarwal	5/17/23, 11:11:35 AM	saurabhvagarwal@erldc.onmicrosoft.com
Saurav Kr Sahay	5/17/23, 10:30:51 AM	saurav.sahay@erldc.onmicrosoft.com
Senior Manager Latehar	5/17/23, 11:01:54 AM	
shadab	5/17/23, 10:51:27 AM	
shanker	5/17/23, 10:46:08 AM	
Shyamal Konar	5/17/23, 10:30:26 AM	konar_s@erldc.onmicrosoft.com
sk	5/17/23, 10:26:39 AM	
SLDC ODISHA (Guest)	5/17/23, 10:24:01 AM	

SMS SAHOO, DGM(ELECT), OPTCL, BHUBANESWAR (Guest)	5/17/23, 10:27:58 AM	
Somnath Chatterjee	5/17/23, 10:25:47 AM	schatterjee@tatapower.com
Sougato Mondal	5/17/23, 10:31:42 AM	saugato@erldc.onmicrosoft.com
Sr. Manager Daltonganj	5/17/23, 10:43:15 AM	
Sudeep Kumar {सुदीप कुमार}	5/17/23, 10:44:35 AM	sudeepkumar@powergrid.in
sudhir kumar/AEE/Chatra	5/17/23, 11:14:38 AM	
Supriya kumari	5/17/23, 10:30:50 AM	
VALLAMSETTY ANIL KRISHNA {वेलमसेठी अनिल कृष्णा}	5/17/23, 12:20:19 PM	anil.krishna.250@powergrid.in

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

घटना संख्या: 27-04-2023/1 **दिनांक: 08-05-2023**

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

Summary of the event (घटना का सारांश):

At 07:12 Hrs, 220 kV Bus PT at Chandil burst leading to tripping of all elements connected to 220 kV Bus at Chandil as bus bar protection is not available. This led to completer power failure at Chandil S/s and load loss of around 250 MW occurred at Rajkhasrawan, Chakradharpur, Jadugoda, Dalbhumgarh, Golmuri, Kendposi, Tamar, Khunti, Adityapur.

- **Date / Time of disturbance:** 27-04-2023 at 07:12 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 220/132 kV Chandil S/s
- **Load and Generation loss**.
  - No generation loss was reported during the event.
  - Around 250 MW load loss reported during the event at Rajkhasrawan, Chakradharpur, Jadugoda, Dalbhumgarh, Golmuri, Kendposi, Tamar, Khunti, Adityapur by Jharkhand SLDC.

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

- NIL

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Ranchi-Chandil
- 220 kV Ramchandrapur-Chandil
- 220 kV Chandil-Santaldih
- 220/132 kV ICT-2 & 3 at Ramchandrapur
- 132 kV Chandil-Adityapur

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

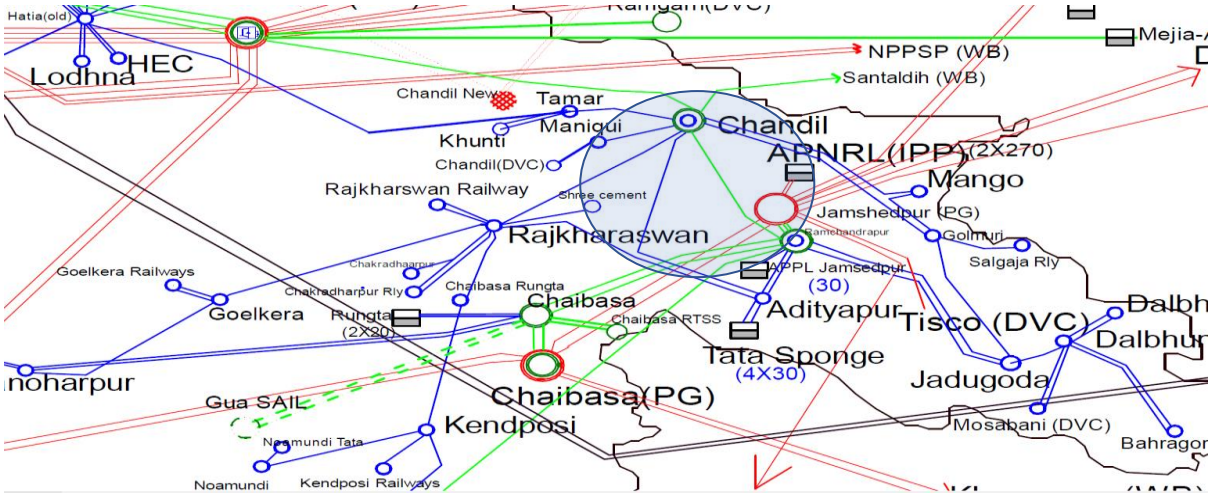


Figure 1: Network across the affected area

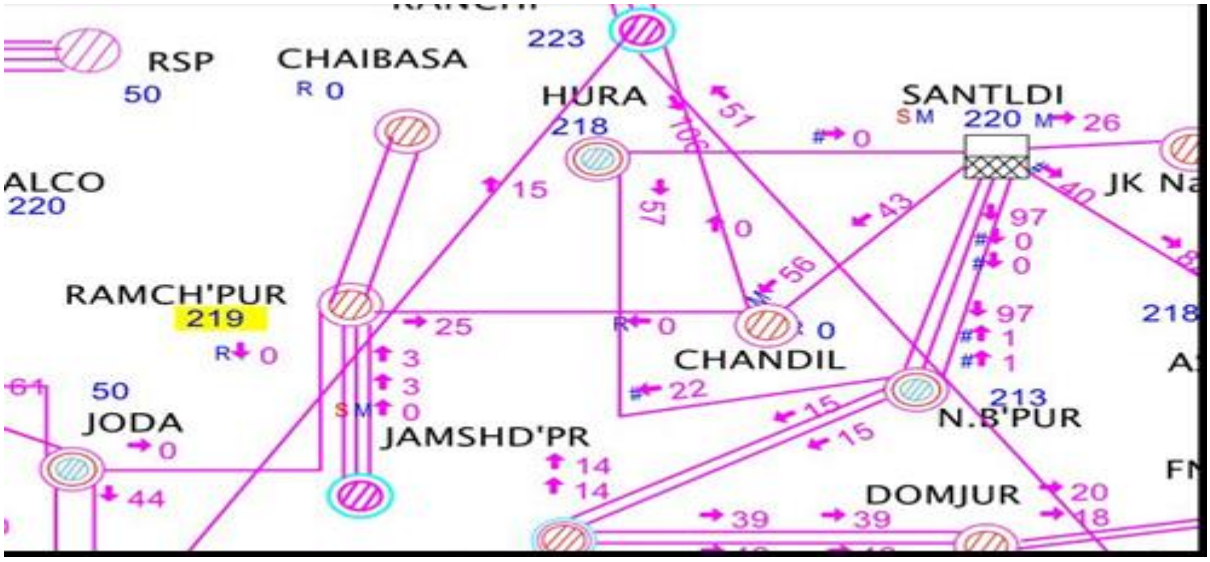


Figure 2: SCADA snapshot of the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
07:12	220 kV Ranchi-Chandil	Ranchi: Didn't trip	Chandil: R_Y_B, Zone-4, Ir:2.72 kA, Iy:2.93 kA, Ib: 2.78 kA	Around 30 kV dip in all three-phase voltage at Jamshedpur. Total fault clearance time: 1400 msec
	220 kV Ramchandrapur-Chandil	Ramchandrapur: Didn't trip	Chandil: R_Y_B, Zone-4, Ir:2.72 kA, Iy:2.93 kA, Ib: 2.78 kA	
	220 kV Santaldih-Chandil	Santaldih: Didn't trip	Chandil: R_Y_B, Zone-4, Ir:2.72 kA, Iy:2.93 kA, Ib: 2.78 kA	
	220/132 kV ICT-2 & 3 at Ramchandrapur	Tripped on O/c		
	132 kV Chandil-Adityapur	Chandil: Didn't trip	Adityapur: R_Y_B, Zone-3, 33.9 km, Ir: 1.64 kA, Iy: 1.70 kA, Ib: 1.64 kA	

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

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Ranchi-Chandil	07:58
220 kV Ramchandrapur-Chandil	07:33
220 kV Santaldih-Chandil	07:54

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

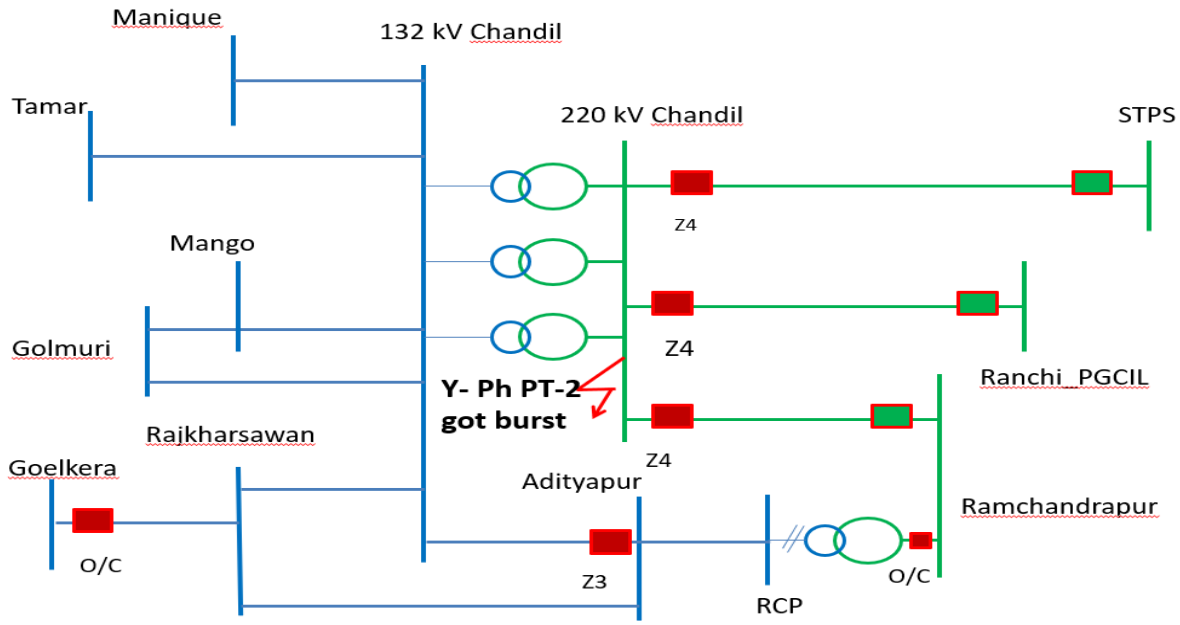


Fig 4: Schematic Network diagram and tripping (prepared by JUSNL)

At 07:12 Hrs, Y_ph PT of 220 kV Bus-2 at Chandil burst and three phase fault occurred.
Sequence of events:

- 132 kV Goelkera-Rajkharsawan tripped on O/c after 120 msec. O/c settings were later revised by JUSNL.
- All three 220 kV feeders at Chandil tripped in Zone-4 after 250 msec from Chandil. Lines remained charged from remote end.
- 220/132 kV ICTs at Chandil did not trip and fault continued to be fed through 132 kV with Ramchandapur acting as source. LV side O/c settings to be reviewed. **JUSNL may update.**
- 132 kV Adityapur-Chandil tripped from Adityapur end in Zone-3 after 900 msec. Time co-ordination may be done to avoid tripping of 132 kV lines during fault in 220 kV lines. **JUSNL may update.**
- After 1400 msec, 220/132 kV ICT-2&3 at Ramchandrapur tripped on O/c and fault was isolated. O/c settings may be reviewed at Ramchndrapur also. **JUSNL may update.**
- It has been observed that Back Up O/c setting of 220/132 kV ICTs in JUSNL system are not implemented in a co-ordinated manner. Earlier also, many cases of ICT tripping were observed due to incorrect setting. JUSNL is requested to study their entire system and set up O/c setting of ICTs at all S/s duly considering fault level of respective S/s.
- Report submitted by JUSNL is attached at Annexure-3.

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

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

Status of Reporting (रिपोर्टिंग की स्थिति):

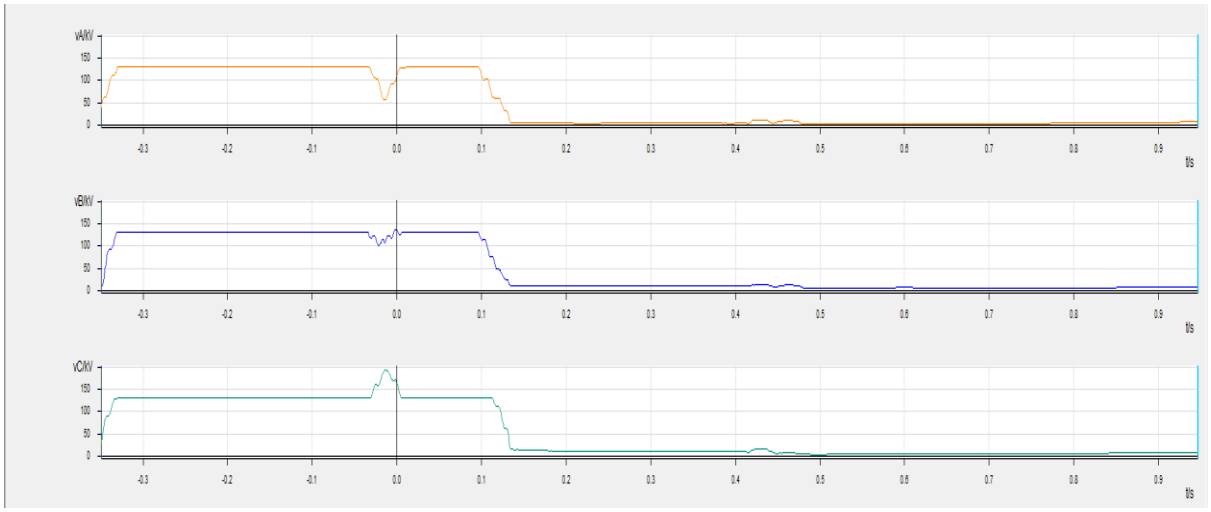
- DR/EL received from JUSNL.

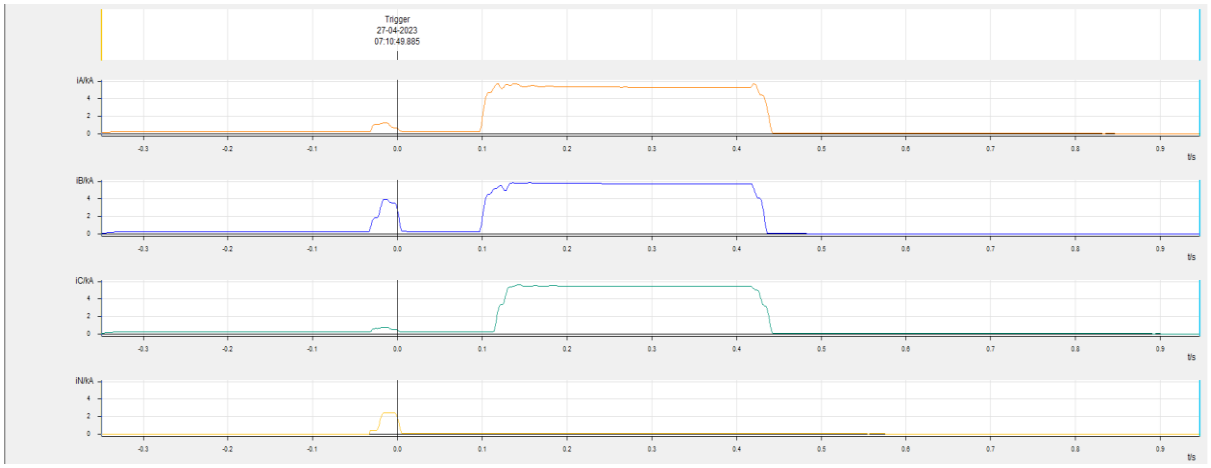
Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event

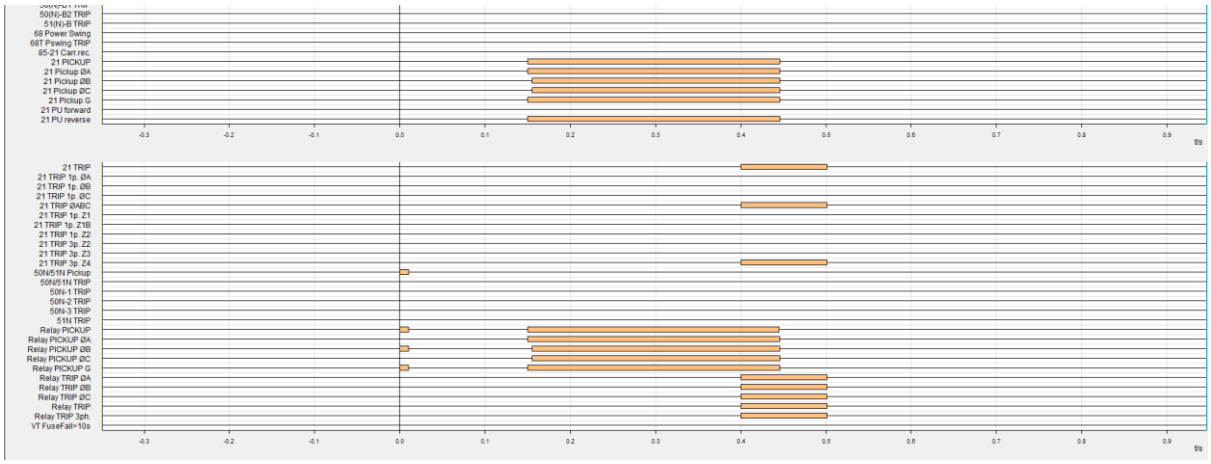
Sequence of Events not recorded at the time of event.

Annexure 2: DR recorded

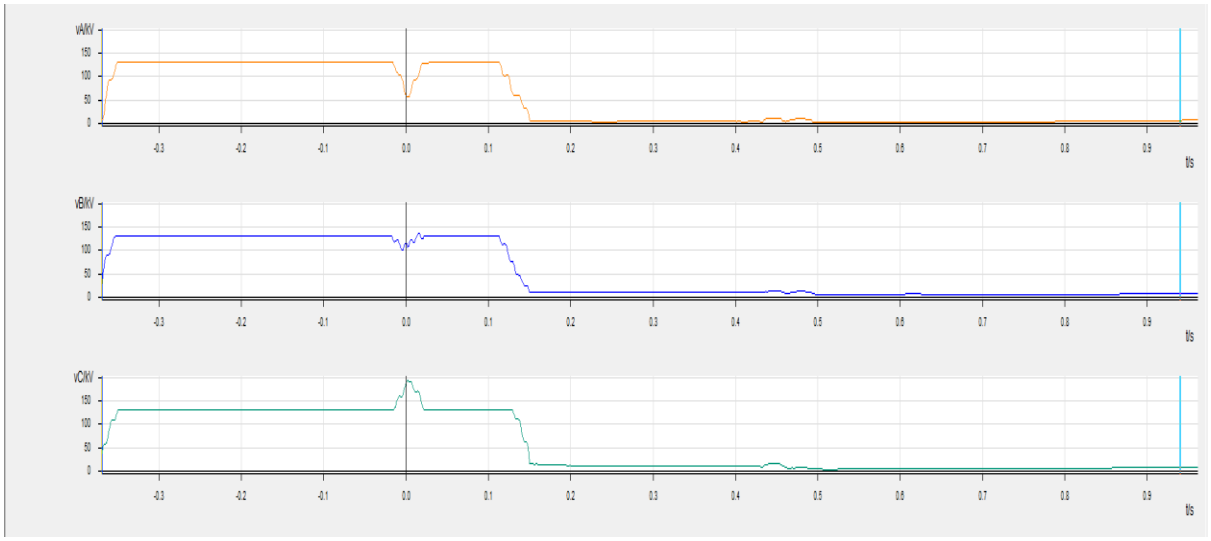
DR of 220 kV Ramchandrapur-Chandil (Chandil)

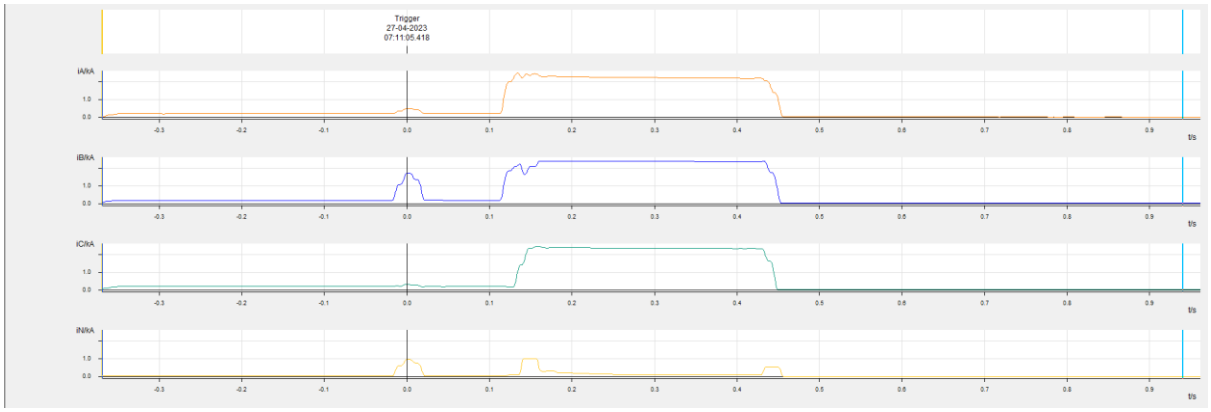


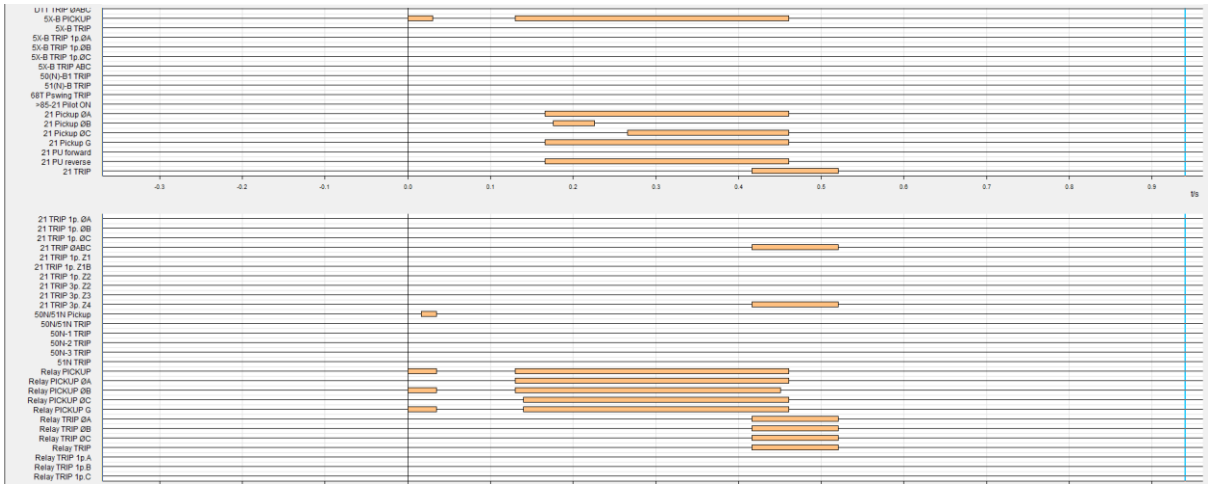




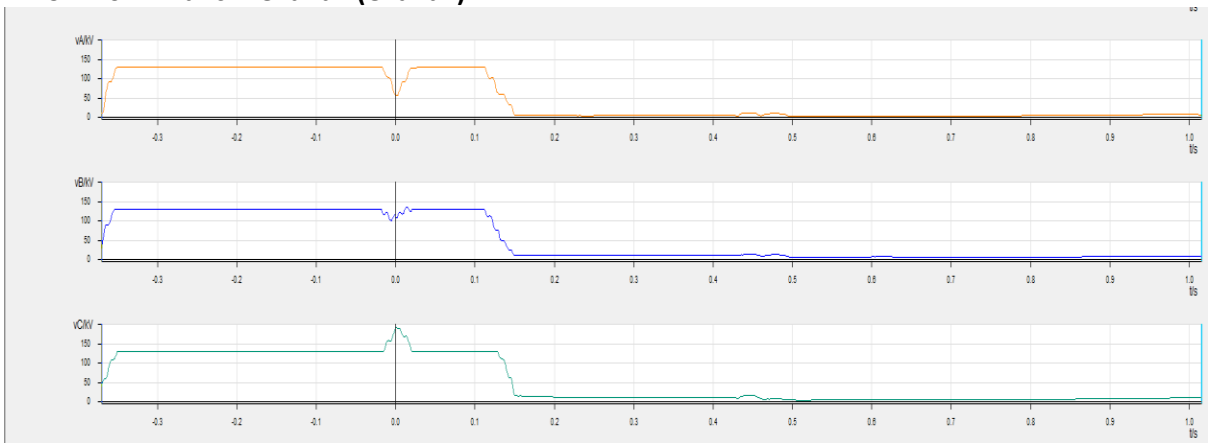
DR of 220 kV Santaldih-Chandil (Chandil)

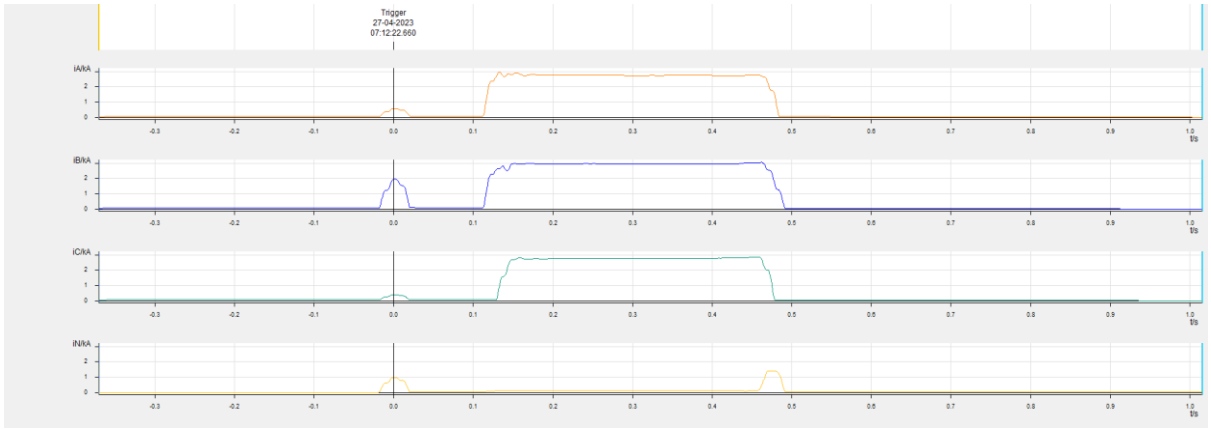


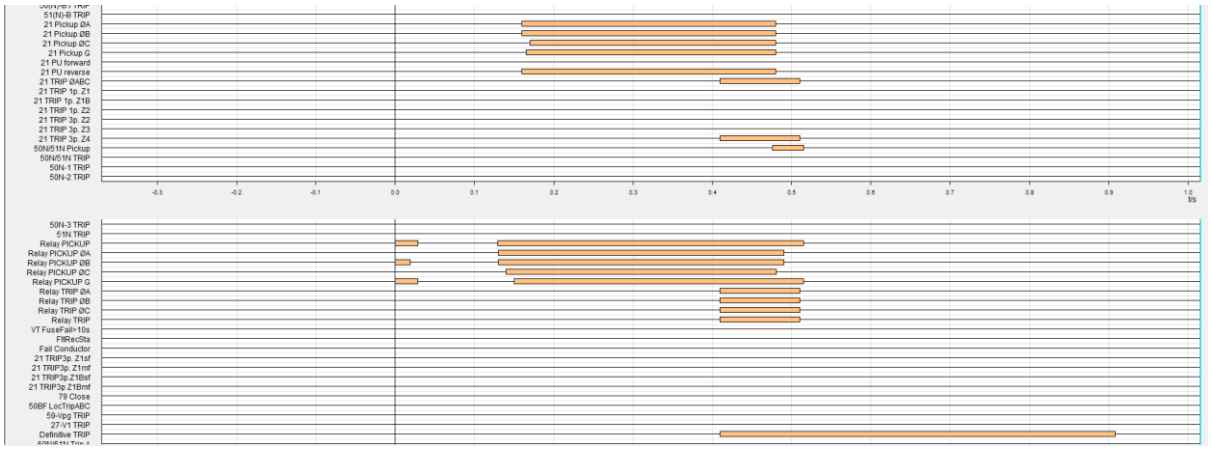




DR of 220 kV Ranchi-Chandil (Chandil)







GRID DISTURBANCE AT 220/132 kV CHANDIL GSS ON 27.04.2023 at 07:12 hrs

Disturbance at Chandil GSS

- **Overview of Incident :-**

  At 07:12 hrs, Y-Phase, 220 kV PT-2 was got burst due to which all the 220 kV line feeders tripped on Z4 (tz=0.250 s) from Chandil end resulting TPF at Chandil GSS.

  Load loss: 192 MW

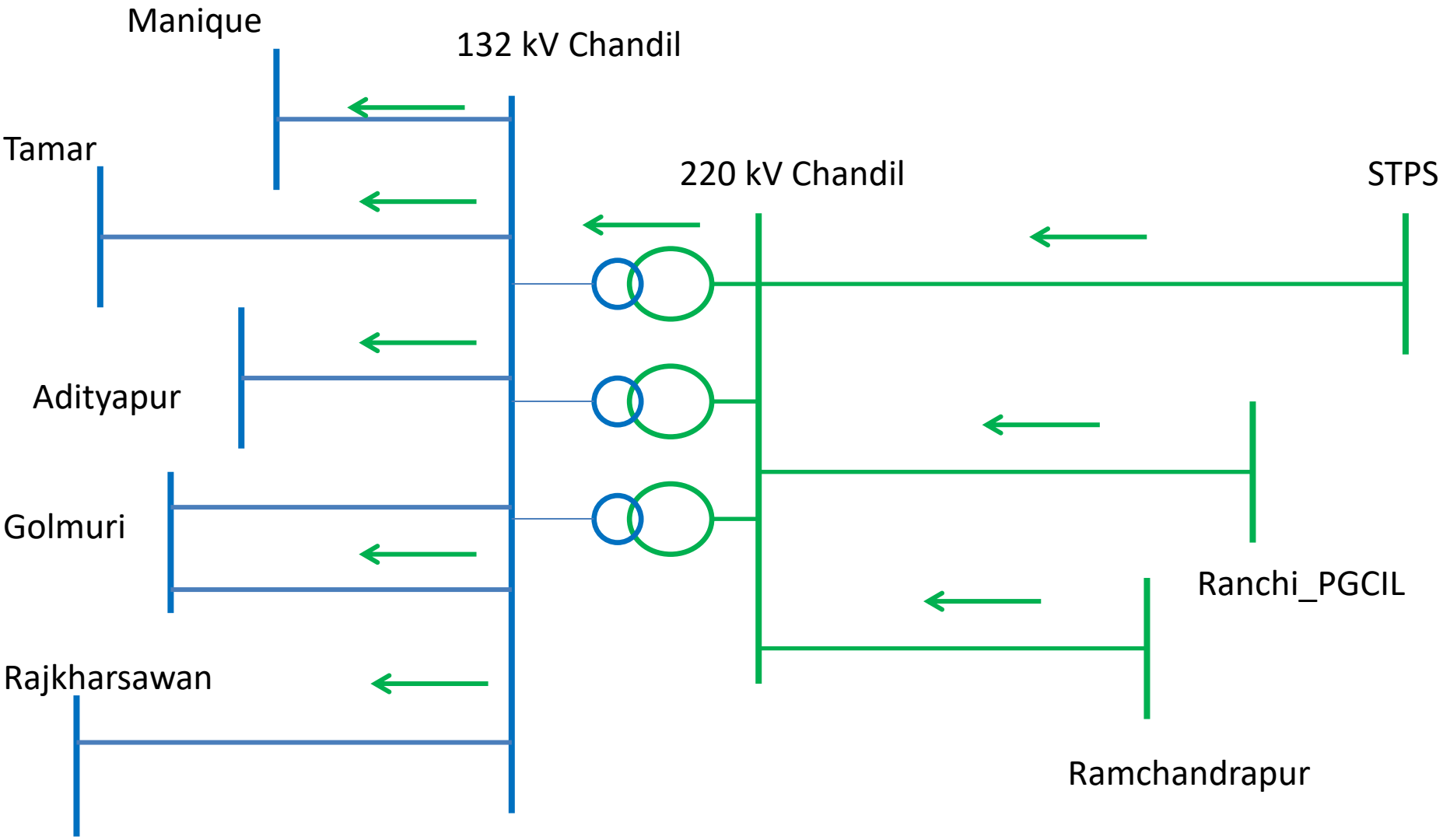
  Wheather Condition- Normal

Elements tripped during the event:-

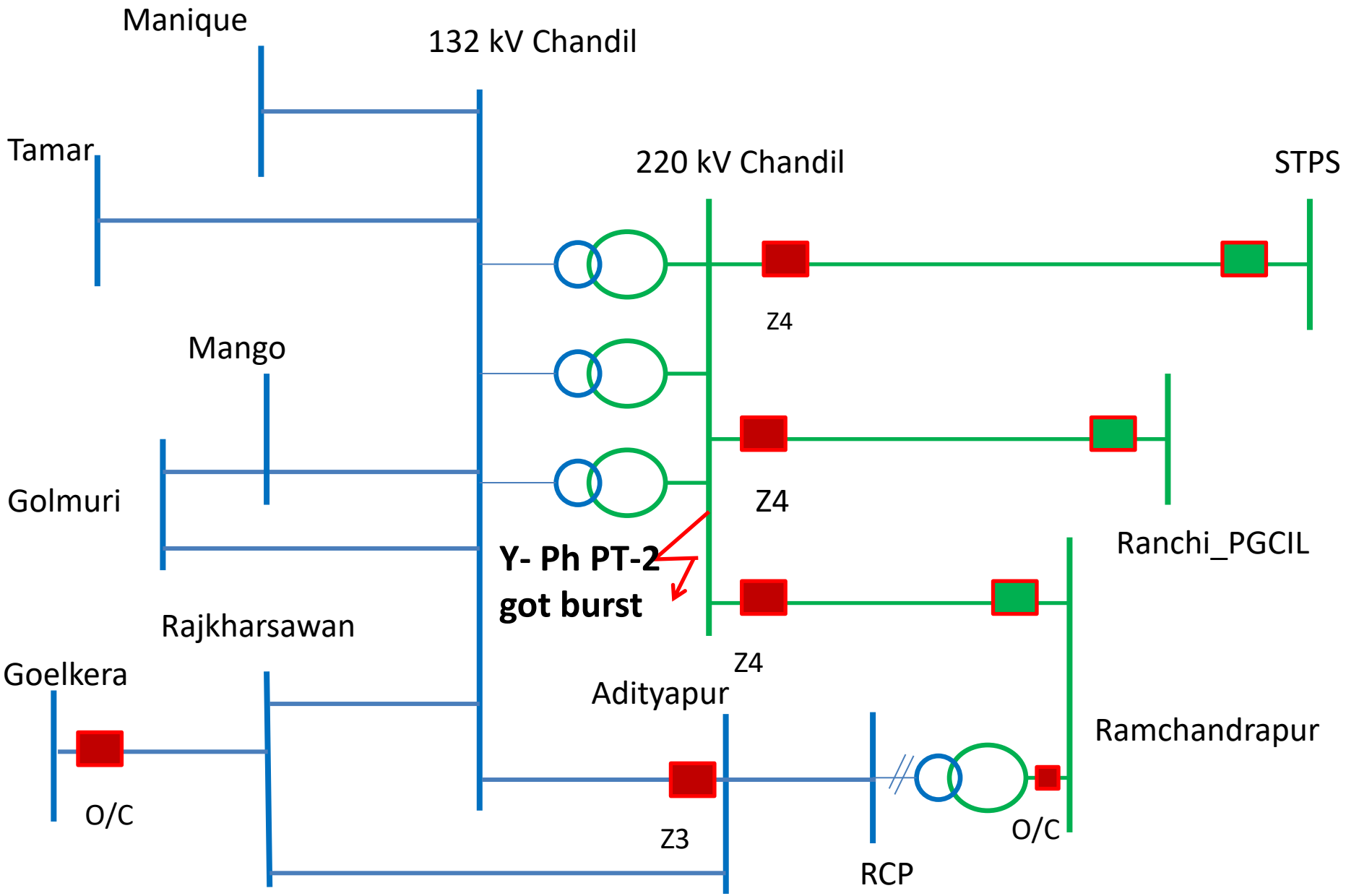
- 220 kV Chandil – Ramchndrapur s/c
- 220 kV Chandil – STPS s/c
- 220 kV Chandil – Ranchi(PG) s/c
- 132 kV Chandil – Adityapur s/c tripped from Adityapur end.

Elements under outage:- None

➢ Pre-fault conditions :-



➢Fault conditions :-



- **Relay Indications:-**

Element's Name	Relay End-1	Relay End-2	Remarks
220 kV Chandil - RCP	Z4, Ir- 5.28 kA, Iy- 5.66 kA, Ib- 5.50 kA	Didn't Trip Z2 Pick up	All 220 kV lines were tripped within 350 ms at Chandil. tZ4 = 0.250 s
220 kV Chandil - STPS	Z4, Ir- 2.17 kA, Iy- 2.31kA, Ib- 2.32 kA		
220 kV Chandil – Ranchi_PG	Z4, Ir- 2.72 kA, Iy- 2.93 kA, Ib- 2.78 kA		
150 MVA ICT-II (at RCP)	**HV Side -** O/C, Ir-1.21 kA, Iy-1.31 kA, Ib- 1.26 kA		fault cleared in 1350 ms
150 MVA ICT-III (at RCP)	O/C (Electromechanical relay)		
132 kV Chandil - Adityapur	Didn't Trip	Z3, 33.9 km, Ir- 1.64 kA, Iy- 1.70 kA, Ib- 1.64 KA	Fault cleared in 900 ms.
132 kV Goelkera - Rajkharsawan	**High set O/C** (tripped on 124 ms), Ir- 0.63 kA, Iy- 0.63 kA, Ib- 0.64 kA	Didn't Trip	Improper O/C setting at Goelkera

- **Tripping Analysis :-**

❖ Due to bursting of Y-Phase, 220 kV PT-2, Y-ph to ground bus fault created. After 100 ms it got converted to 3ph bus fault which sensed by all the 220 kV line feeders and tripped on Z4 within 350 ms (tZ4=0.250 s) from Chandil end.

❖ O/C pick up was observed in all ICTs but none of the ICTs (3x100 MVA) tripped during the event at Chandil.

❖ **132 kV Chandil – Adityapur s/c** tripped on Z3 from Adityapur end (Fault cleared in approx. 900 ms).

❖ **132 kV Chandil – Rajkharsawan s/c** also didn't tripped (distance relay picked up).

❖ After tripping of 220 kV line feeders and 132 kV Chandil – Adityapur s/c, **132 kV Chandil – Rajkharsawan s/c** was only source for feeding the fault via 132 kV Rajkharsawan – Adityapur, 132 kV Adityapur – Ramchandrapur d/c.

❖ After tripping of both **150 MVA, 220/132 kV ICT- II & III** on O/C fault got cleared.

Tripping Analysis :-

- **150 MVA, 220/132 kV ICT- II & III** tripped on O/C at Ramchandrapur due to shifting fault and load of Jamshedpur region on these ICTs (tripped in approx. 1250 ms).

Protection Issue observed during the event:-

- None of the ICTs (3x100 MVA) tripped during the event, seems there is relay co-ordination issue. High O/C set not operated due to low fault current.

- **Remedial Measures:-**

After isolating faulted PT all the elements are normalized.

- **Restoration of elements:-**

Sl. No.	Element's Name	Restoration Time
1	220 kV Chandil - Ramchandrapur	07:33 hrs
2	220 kV Chandil - STPS	07:54 hrs
3	220 kV Chandil – Ranchi_PG	07:58 hrs
4	132 kV Chandil - Adityapur	07:56 hrs
5	132 kV Chandil - Rajkharsawan	07:42 hrs
6	132 kV Chandil - Manique	07:38 hrs
7	132 kV Chandil - Tamar	07:57 hrs
8	132 kV Chandil - Mango	07:44 hrs

Failed PT Details:-

Make- SCT Ltd , Mfd. Year – 2012

PT Insulation Resistance Test Report

Name of GSS: 220/132kv Chandil-1

Name of Bay: 220kv PT-2

Date: 28.03.2023

Insulation Resistance in MΩ:

Cores	R	Y	B
Core-1 to Core-2	1000	500	600
Core-1 to Core-3	900	500	600
Core-2 to Core-3	1100	600	800
Core-1 to Earth	1500	650	700
Core-2 to Earth	1000	400	600
Core-3 to Earth	1000	500	500
Primary to Core-1	1100	500	500
Primary to Core-2	900	400	500
Primary to Core-3	1000	500	600
Primary to Earth	450	400	400

28.03.2023

MANAGER

TRANSMISSION SUB-DIVISION

CHANDIL-I

Thank You

Annexure B.1.2

GRID DISTURBANCE AT 220/132 kV CHANDIL GSS ON 27.04.2023 at 07:12 hrs

Disturbance at Chandil GSS

- **Overview of Incident :-**

  At 07:12 hrs, Y-Phase, 220 kV PT-2 was got burst due to which all the 220 kV line feeders tripped on Z4 (tz=0.250 s) from Chandil end resulting TPF at Chandil GSS.

  Load loss: 192 MW

  Wheather Condition- Normal

Elements tripped during the event:-

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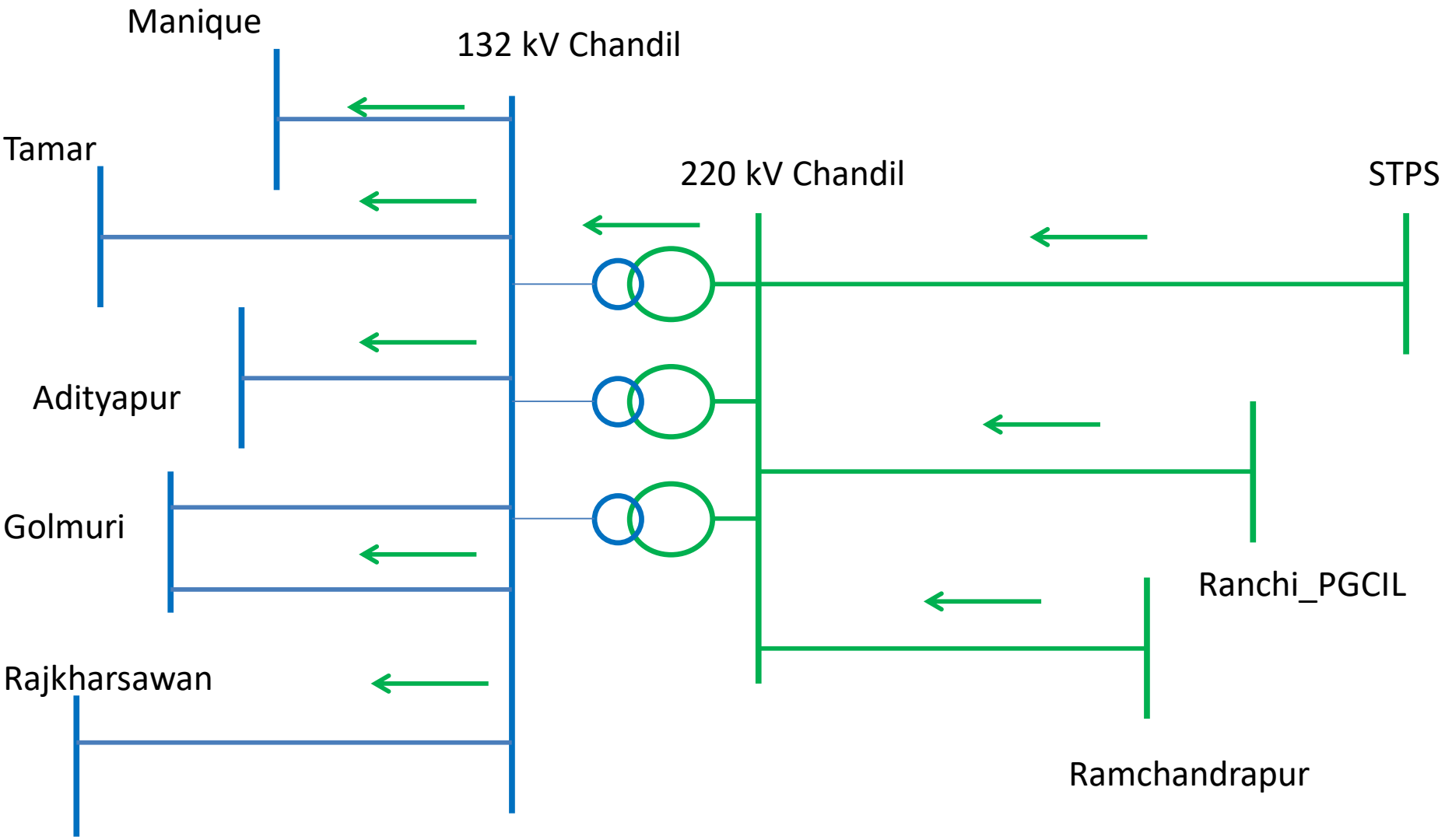
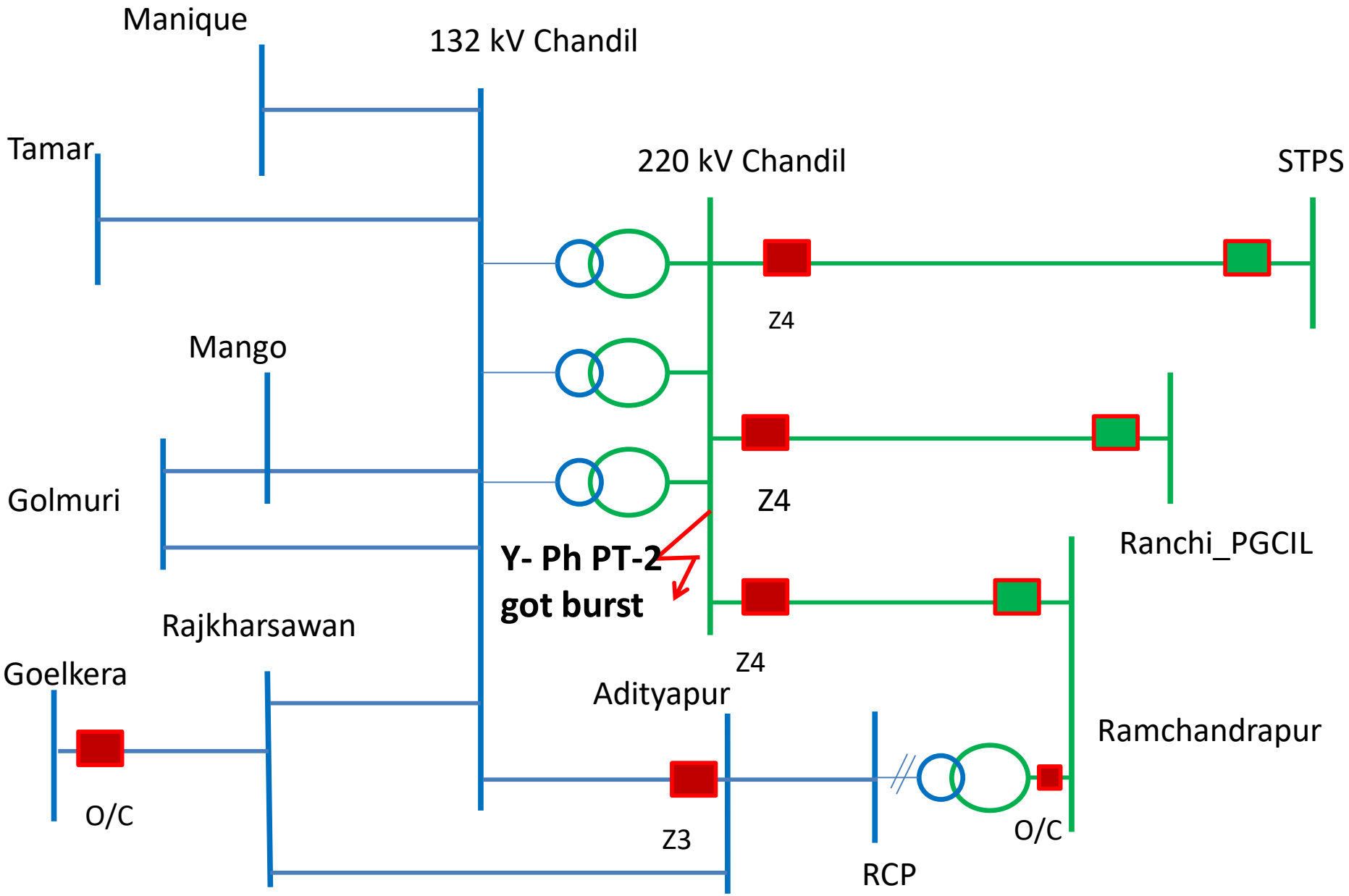
- 220 kV Chandil – Ranchi(PG) s/c
- 132 kV Chandil – Adityapur s/c tripped from Adityapur end.

Elements under outage:- None

➢Pre-fault conditions :-



➢ Fault conditions :-



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❖ Due to bursting of Y-Phase, 220 kV PT-2, Y-ph to ground bus fault created. After 100 ms it got converted to 3ph bus fault which sensed by all the 220 kV line feeders and tripped on Z4 within 350 ms (tZ4=0.250 s) from Chandil end.

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Tripping Analysis :-

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Protection Issue observed during the event:-

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- **Remedial Measures:-**

After isolating faulted PT all the elements are normalized.

- **Restoration of elements:-**

Sl. No.	Element's Name	Restoration Time
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Failed PT Details:-

Make- SCT Ltd , Mfd. Year – 2012

PT Insulation Resistance Test Report

Name of GSS: 220/132kv Chandil-1

Name of Bay: 220kv PT-2

Date: 28.03.2023

Insulation Resistance in MΩ:

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Primary to Core-1	1100	500	500
Primary to Core-2	900	400	500
Primary to Core-3	1000	500	600
Primary to Earth	450	400	400

28.03.2023

MANAGER

TRANSMISSION SUB-DIVISION

CHANDIL-I

Thank You

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

घटना संख्या: **18-04-2023/1** दिनांक: **11-05-2023**

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

1. Summary of the event (घटना का सारांश):

At 13:19 Hrs, B_ph CT of 220 kV Tenughat-Govindpur-2 burst at Tenughat. At the same time, both running units at Tenughat also tripped. Around 305 MW generation loss occurred at Tenughat.

- **Date / Time of disturbance:** 18-04-2023 at 13:19 hrs.
- **Event type:** GI - 1
- **Systems/ Subsystems affected:** 220 kV Tenughat (TVNL) S/s
- **Load and Generation loss**.
  - 305 MW generation loss reported during the event.
  - No load loss occurred during the event

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

- NIL

3. Major elements tripped (प्रमुख ट्रिपिंग)

- 220 kV Tenughat-Govindpur-D/c
- U#1 & U#2 at Tenughat

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

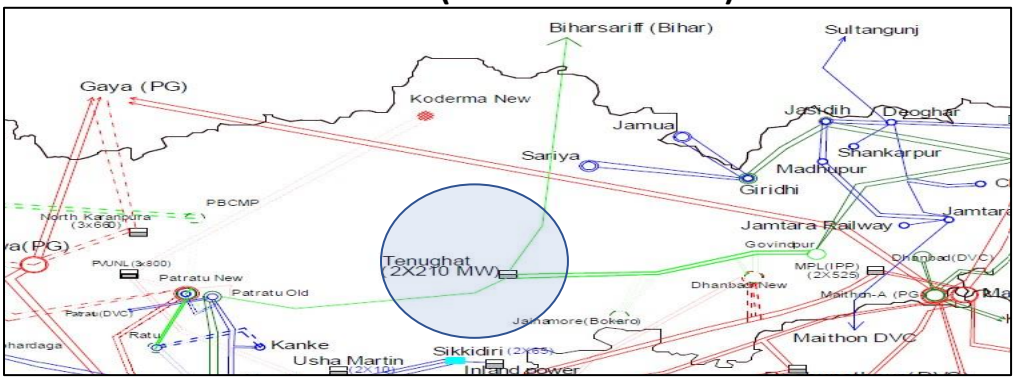


Figure 1: Network across the affected area

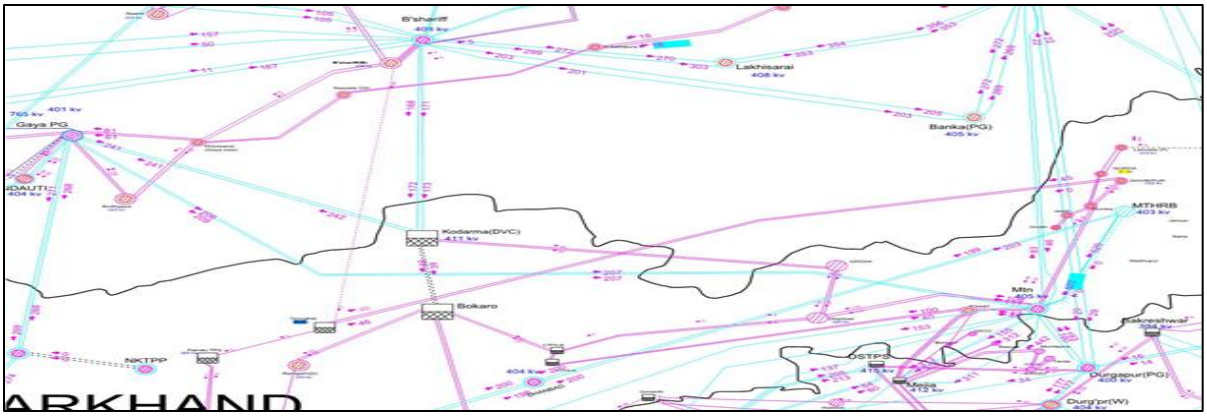
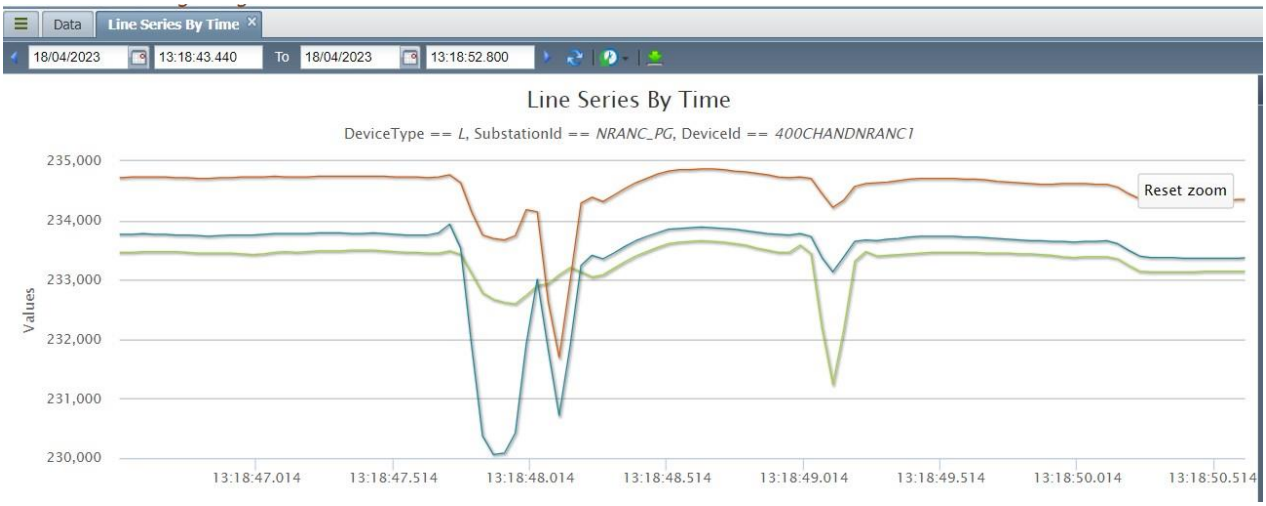


Figure 2: SCADA snapshot for of the system

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

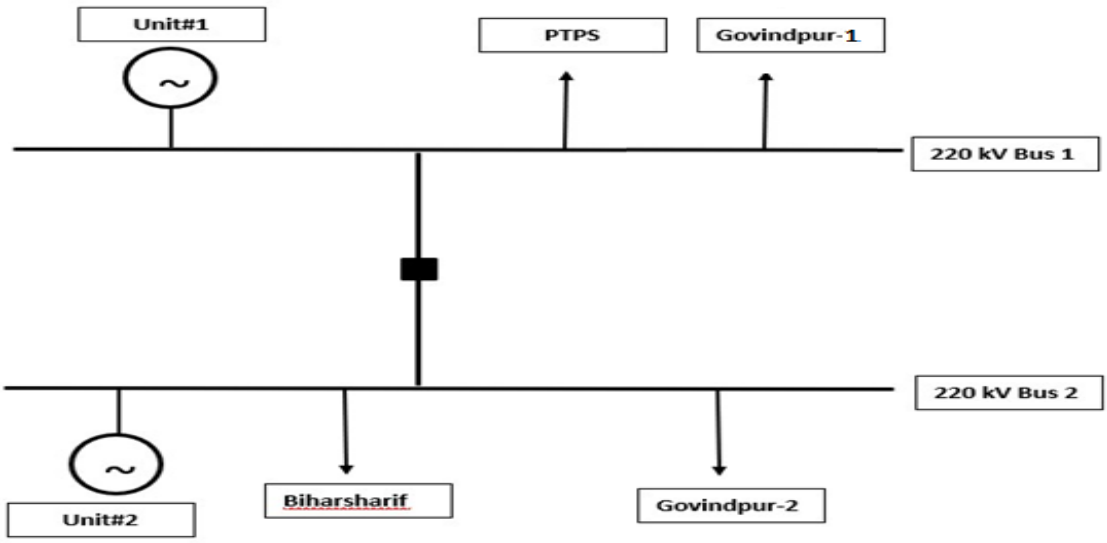
समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
13:19	220 kV Tenughat-Govindpur-1	Tenughat: R_N, Zone-1, 8 kA		B phase fault first led to R phase fault .
	220 kV Tenughat-Govindpur-2	Tenughat: B_N, Zone-1, 10 kA		
	Tenughat U#1 & U#2	O/C Highset		



5. Restoration (पूर्वावस्था की प्राप्ति)

Transmission/Generation element name	Restoration time
220 kV Tenughat-Govindpur-1	17;59
220 kV Tenughat-Govindpur-2	17;19
Tenughat U#1	14:30
Tenughat U#2	14:15

6. Analysis of the event (घटना का विश्लेषण):



220 kV Bus arrangement at Tenughat

DR Analysis

- B phase line side CT of Tenughat-Govindpur-II blasted at tenughat end ,Fault was sensed in Zone-1 from tenughat end and line tripped within 100 ms.
- CT blast created heavy fire and smoke which created fault in Govindpur-I in R phase which also tripped in zone-1 from Tenughat end.
- 220 kV Tenughat-Patratu and 220 kV Tenughat-Biharsharif did not tripped but ,zone-4 should have been picked ,which should be checked and confirmed by tenughat to ensure proper protection functioning .**Tenughat to confirm.**
- At the same time Unit -2 tripped in GT High set O/C , which should not occur . Relay is electro mechanical in nature **JUSNL to look into this .**
- 210 MW U#1 Tenughat also tripped. Reason is not clear **and Tenughat should confirm** the reason. But it is not desired for any of the unit to trip for such transient fault which got cleared within 100ms .

7. Protection issue (सुरक्षा समस्या):

- U#2 tripped immediately within 80 msec. **O/c Hi-set setting to be checked and kept in such a way that it should not trip for a close line fault which is getting cleared within z-1 time. If possible it was advised to disable settings maybe reviewed.**
- Unit -**2 relays are electromechanical so DR is not available. It should be replaced with Numerical.**

8. Recommendations (सुझाव):

- Installation of Numerical bus bar protection scheme may be explored at the earliest as same kind of fault is causing complete outage of S/s.
- U#2 of Tenughat has electromechanical relay. Numerical relay maybe installed for the unit to ensure security and reliability in line with CEA standard.
- DR channels should be configured properly as per DR standards ratified in PCC and these DRs should be time synchronised.

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

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

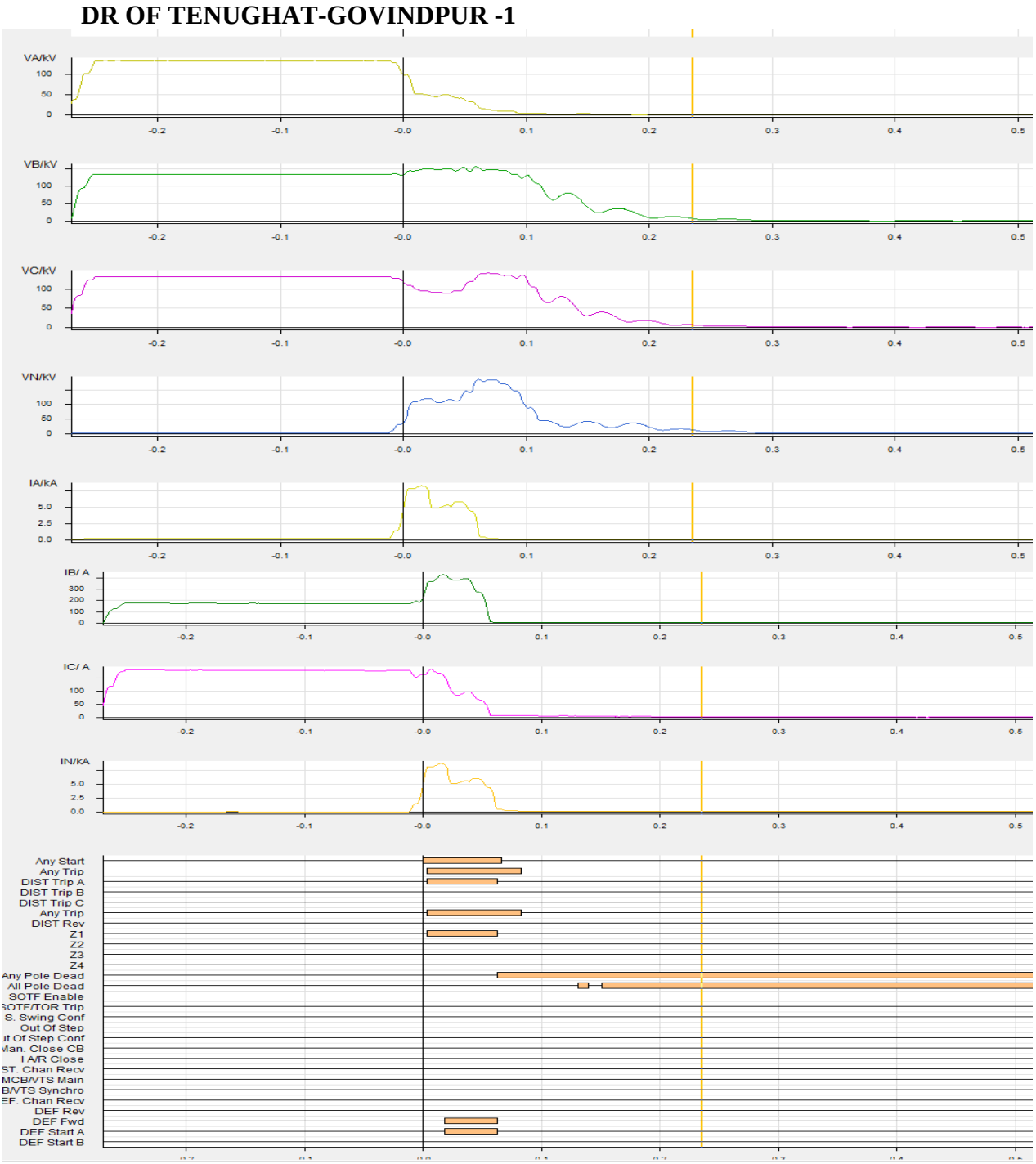
10. Status of Reporting (रिपोर्टिंग की स्थिति):

- Complete DR/EL yet to be received from TVNL, JUSNL.

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

Sequence of event not recorded at time of event.

Annexure 2: DR recorded



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

दिनांक: **08-05-2023**

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

Summary of the events (घटना का सारांश):

Event 1:

At 21:33 Hrs on 17.04.2023, 400 kV Rangpo-Dikchu tripped due to B_N Fault leading to tripping of all running units at Teesta 3 and Dikchu due to loss of evacuation path as 400 kV Teesta 3-Rangpo already tripped at 20:53 Hrs due to Y_B_N fault. Around 1234 MW generation loss occurred (Teesta 3:1187 MW, Dikchu: 47 MW).

- **Date / Time of disturbance:** 17-04-2023 at 21:33 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta 3, 400 kV Dikchu S/s
- **Load and Generation loss**.
  - 1234 MW generation loss reported during the event.
  - No load loss occurred during the event.

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

- 400 kV Teesta 3-Rangpo

Major elements tripped (प्रमुख ट्रिपिंग)

- 400 kV Teesta 3-Dikchu
- 400 kV Rangpo-Dikchu

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
20:53	400 kV Teesta 3-Rangpo	Teesta 3: Y_B, 20.9 km, Iy: 6.5 kA, Ib: 5.7 kA	Rangpo: Y_B, 32.41 km, Iy:6.679 kA, Ib: 7.416 kA	66 kV dip in Y_ph and 71 kV dip in B_ph voltage at Rangpo. Fault clearance time: 100 msec
21:33	400 kV Teesta 3-Dikchu	Teesta 3: Tripped on O/V	Dikchu: DT received	Fault clearance time: 100 msec. Other two phase tripped from Dikchu after 350 msec
	400 kV Rangpo-Dikchu	Rangpo: B_N, 15.9 km, 7.414 kA	Dikchu: B_N, 25.5 km, 4.72 kA	

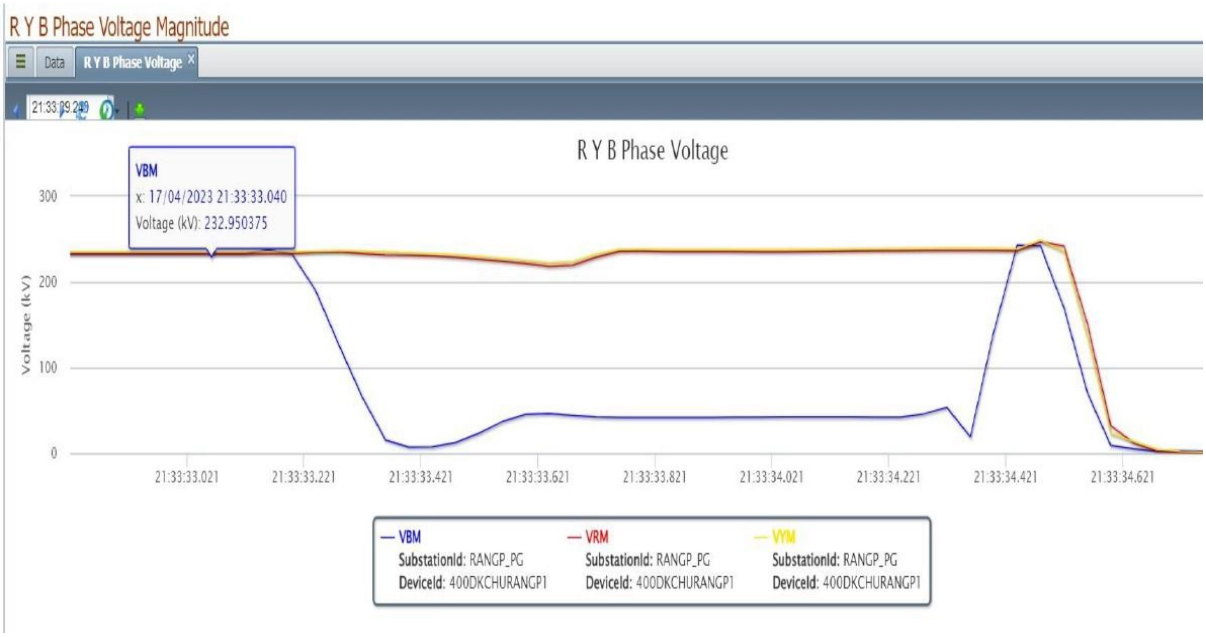


Figure 1: PMU Voltage snapshot of 400/220 kV Rangpo S/s

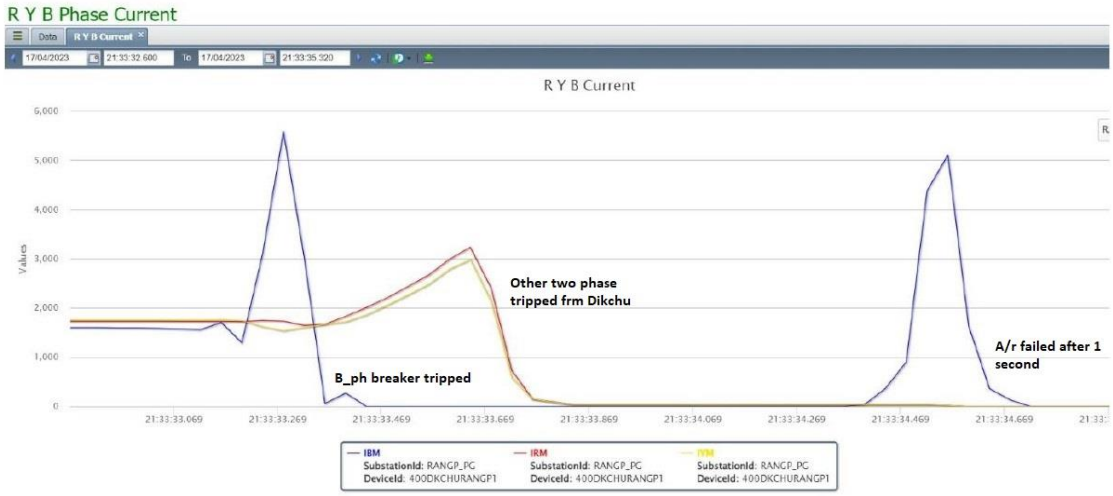


Figure 2: PMU snapshot of current in 400 kV Rangpo-Dikchu @ Rangpo

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 3-Dikchu	22:08
400 kV Rangpo-Dikchu	22:07

Event 2:

At 22:53 Hrs on 17.04.2023, 400 kV Rangpo-Dikchu tripped again due to B_N Fault leading to tripping of all running units at Teesta 3 and Dikchu due to loss of evacuation path as 400 kV Teesta 3-Rangpo was already under breakdown. Around 1237 MW generation loss occurred (Teesta 3:1188 MW, Dikchu: 49 MW).

- **Date / Time of disturbance:** 17-04-2023 at 22:53 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta-3, 400 kV Dikchu S/s
- **Load and Generation loss**.
  - 1237 MW generation loss reported during the event.
  - No load loss occurred during the event.

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

- 400 kV Teesta 3-Rangpo

Major elements tripped (प्रमुख ट्रिपिंग)

- 400 kV Teesta 3-Dikchu
- 400 kV Rangpo-Dikchu

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
22:53	400 kV Teesta 3-Dikchu	Teesta 3: Tripped on O/V	Dikchu: DT received	Around 80 kV dip in B_ph voltage at Rangpo. Fault clearance time: 100 msec. Other two phase tripped from Dikchu after 350 msec
	400 kV Rangpo-Dikchu	Rangpo: B_N, 15.9 km, 8.94 kA	Dikchu: B_N, 28.6 km, 4.821 kA	

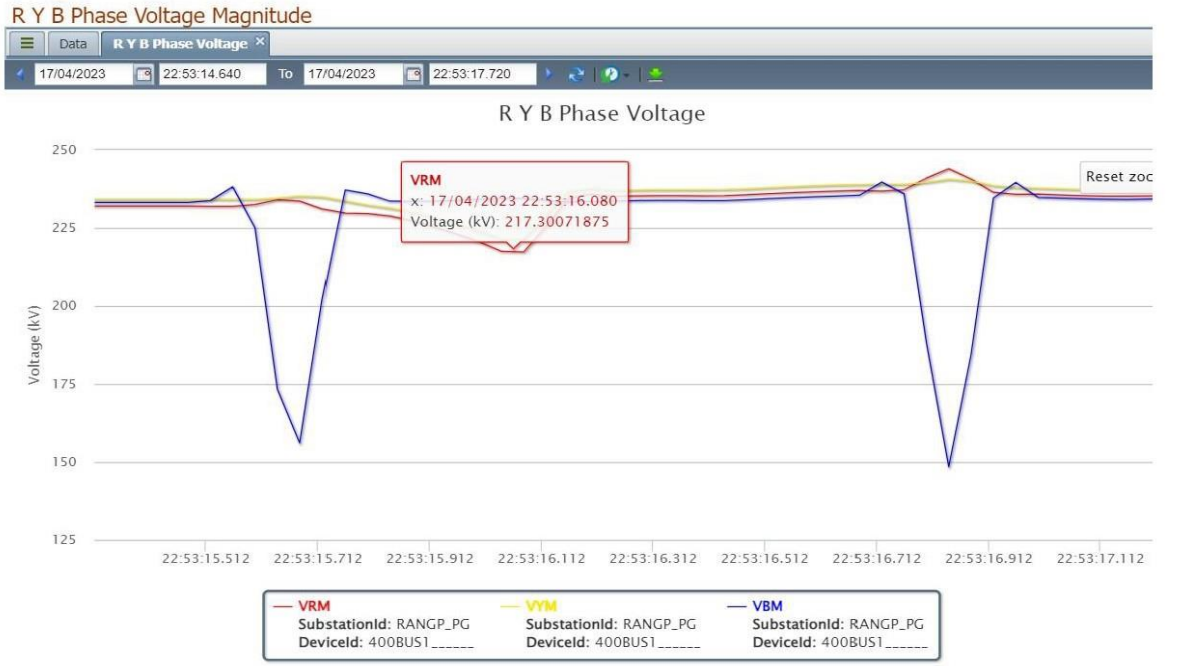


Figure 3: PMU Voltage snapshot of 400/220 kV Rangpo S/s

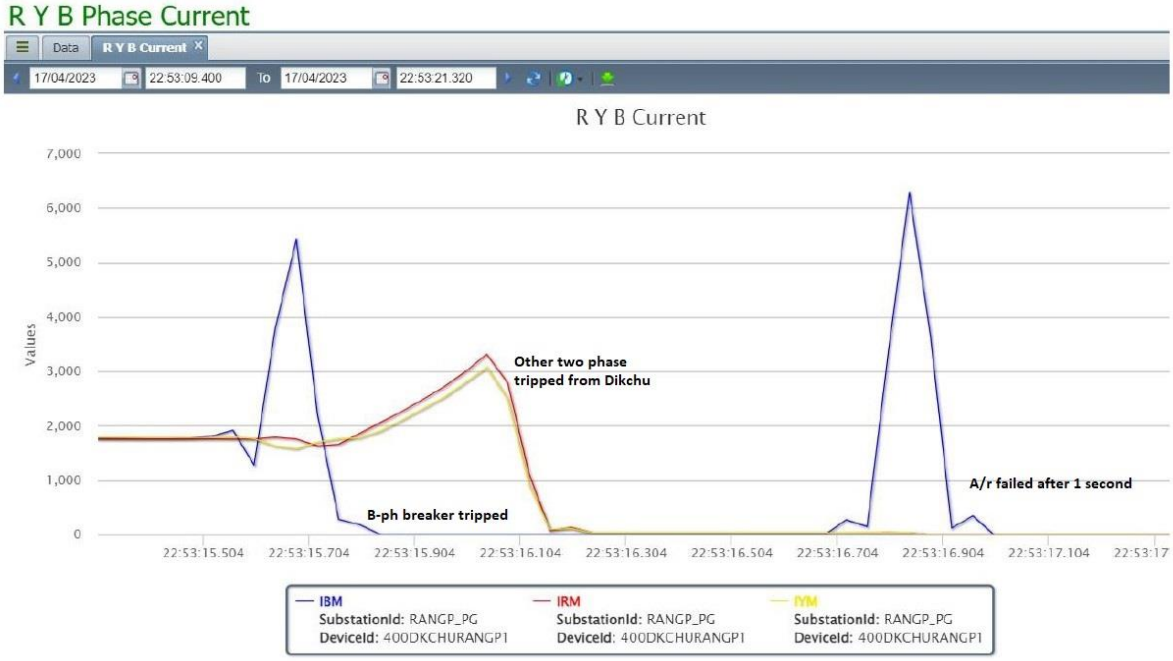


Figure 4: PMU snapshot of current in 400 kV Rangpo-Dikchu @ Rangpo

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 3-Dikchu	23:21
400 kV Rangpo-Dikchu	23:19

Event 3:

At 03:27 Hrs on 18.04.2023, 400 kV Rangpo-Dikchu tripped again due to B_N Fault leading to tripping of all running units at Teesta 3 and Dikchu due to loss of evacuation path as 400 kV Teesta 3-Rangpo was already under breakdown. Around 1096 MW generation loss occurred (Teesta 3:1000 MW, Dikchu: 96 MW).

- **Date / Time of disturbance:** 18-04-2023 at 03:27 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta-3, 400 kV Dikchu S/s
- **Load and Generation loss**.
  - 1096 MW generation loss occurred during the event.
  - No load loss occurred during the event.

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

- NIL

Major elements tripped (प्रमुख ट्रिपिंग)

- 400 kV Teesta 3-Dikchu
- 400 kV Rangpo-Dikchu

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
03:27	400 kV Teesta 3-Dikchu	Teesta 3: Tripped on O/V	Dikchu: DT received	Around 83 kV dip in B_ph voltage at Rangpo. Fault clearance time: 100 msec. Other two phase tripped from Dikchu after 350 msec
	400 kV Rangpo-Dikchu	Rangpo: B_N, 15.41 km, 7.9 kA	Dikchu: B_N, Zone-2, 35.25 km, 4.725 kA	

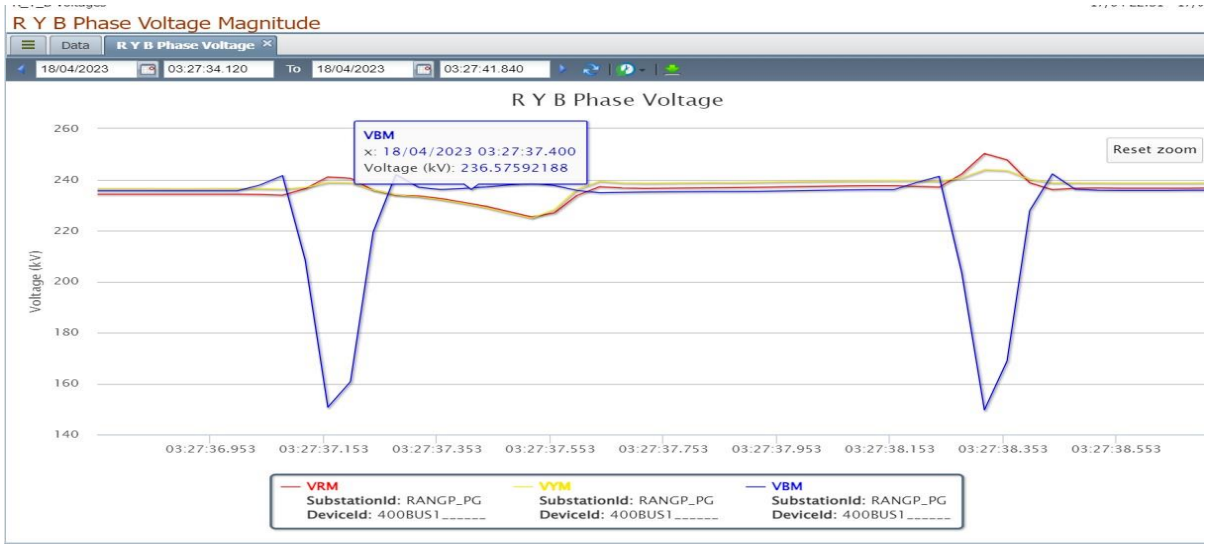


Figure 5: PMU Voltage snapshot of 400/220 kV Rangpo S/s

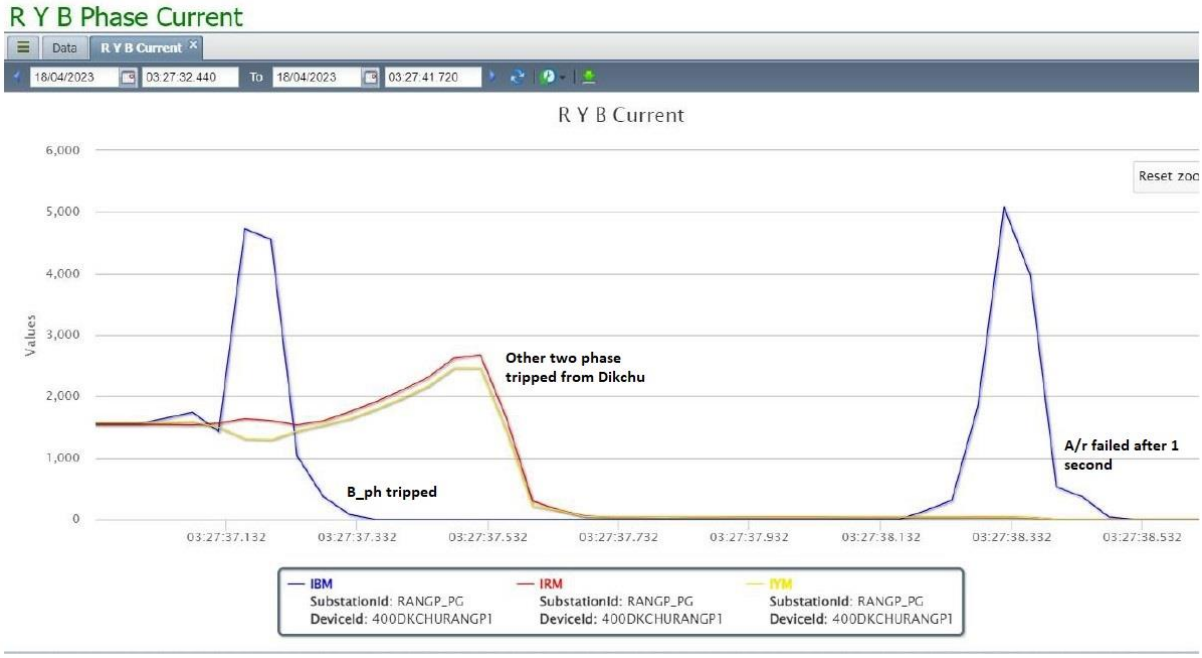


Figure 6: PMU snapshot of current in 400 kV Rangpo-Dikchu @ Rangpo

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 3-Dikchu	04:03
400 kV Rangpo-Dikchu	04:00

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

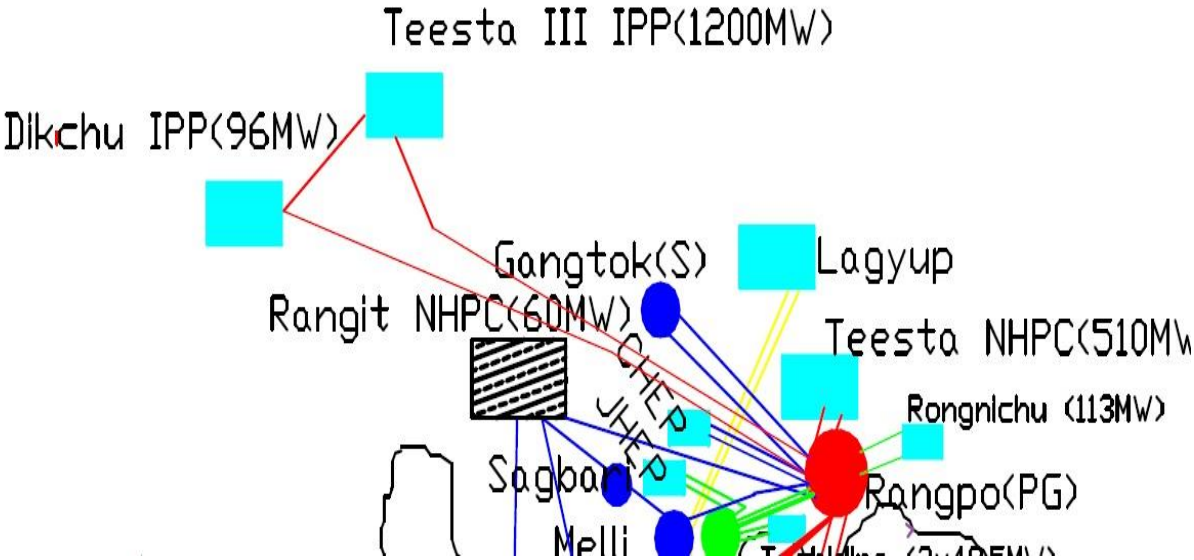


Figure 7: Network across the affected area

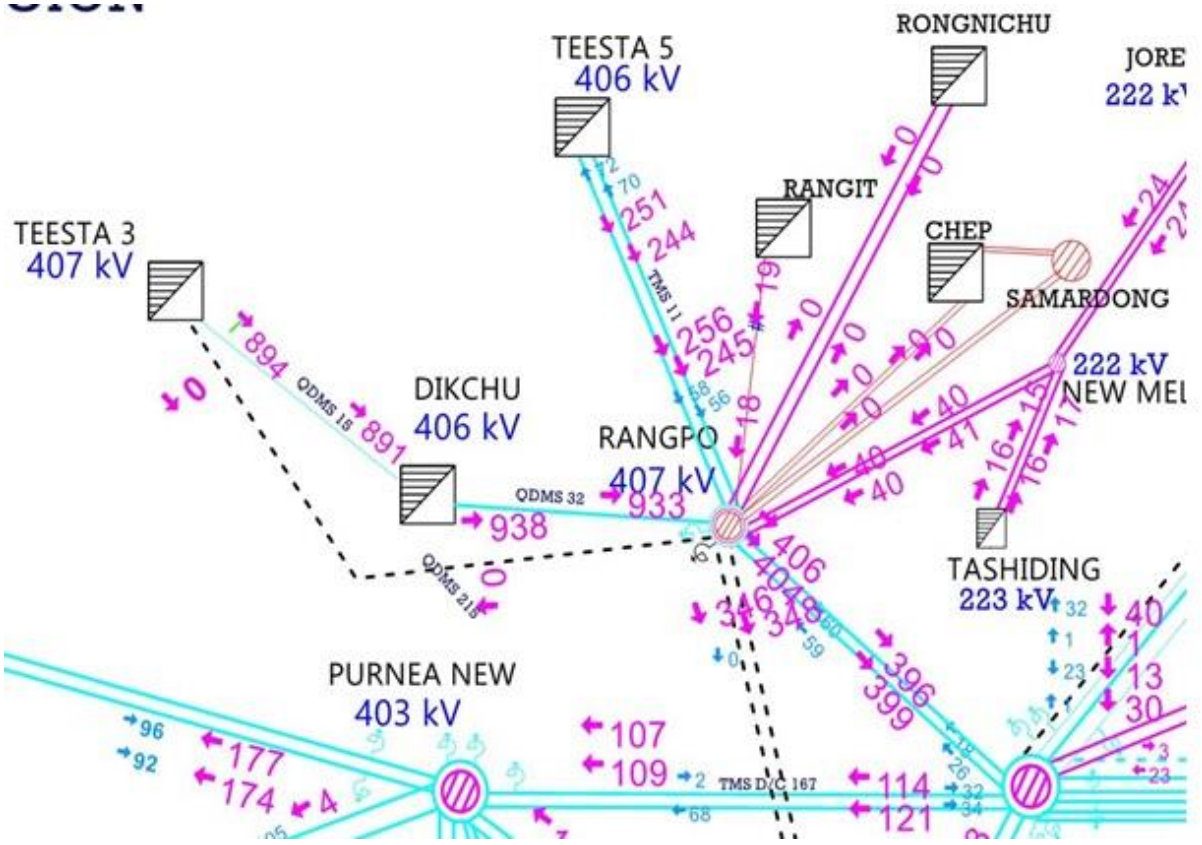


Figure 8: SCADA snapshot of the affected area

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

- Nature and sequence of operation in all three events were similar.

400 kV Rangpo-Dikchu

- There was a B_N fault in the line, which was cleared within 100 msec. B_ph breaker opened at both ends within 100 msec. However, other two phases at Dikchu tripped after 350 msec. Dikchu intimated that there was some issue in its tie bay which is giving three phase tripping command after some time. **Dikchu may update.**
- A/r attempt failed after 1 second from Rangpo end.
- This line tripped thrice in one night. As reported, a tree came in the induction zone of the line in LILO section. All utilities are requested to proactively take up preventive maintenance activities as these incidents which lead to large generation loss poses threat to grid on both stability and adequacy front.

400 kV Teesta 3-Dikchu

- After tripping of 400 kV Rangpo-Dikchu line, 400 kV Teesta-3 Dikchu tripped on O/V from Teesta-3 and DT sent to Dikchu.

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

Issues	Regulation Non-Compliance	Utility
DR/EL not provided within 24 Hours	1. IEGC 5.2 (r) 2. CEA grid Standard 15.3	**PG ER-2, Dikchu, Teesta-3**

Status of Reporting (रिपोर्टिंग की स्थिति):

- Complete DR/EL yet to be received from Teesta 3, Dikchu.

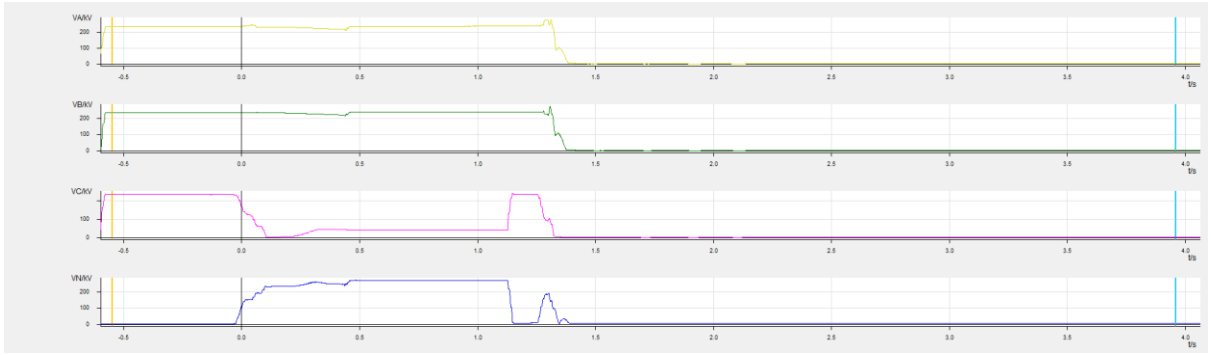
Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event.

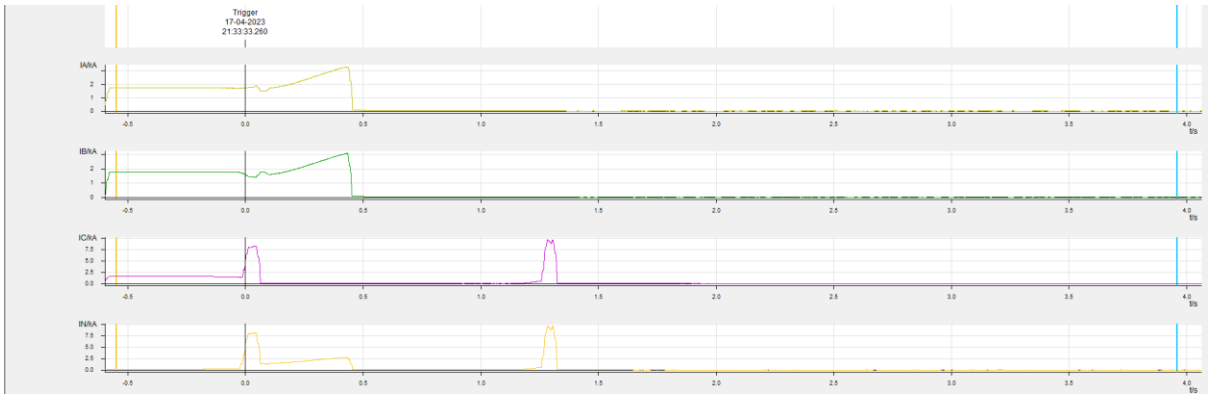
Sequence of Event not recorded at the time of event.

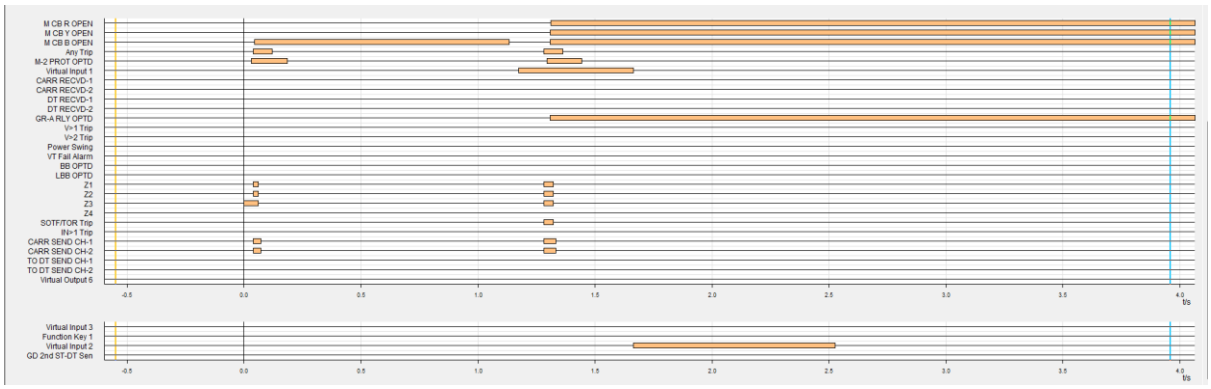
Annexure 2: DR recorded

Event 1:

DR of 400 kV Rangpo-Dikchu (Rangpo)

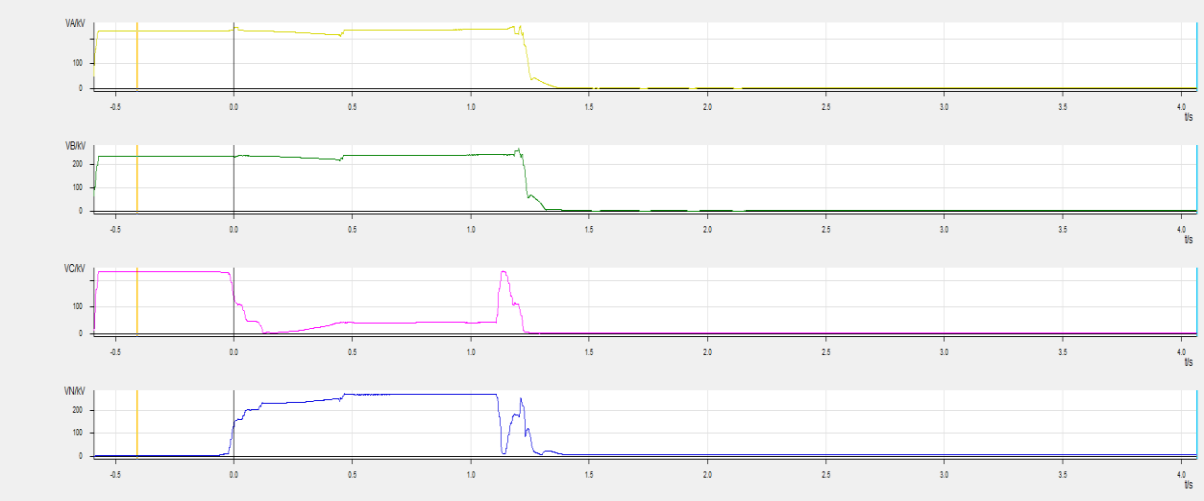


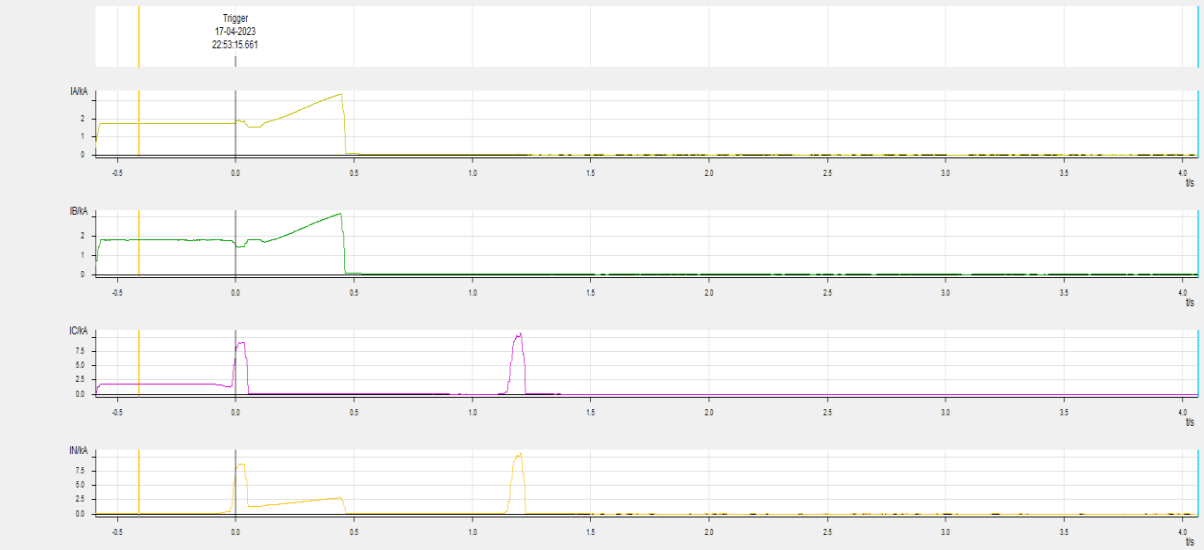


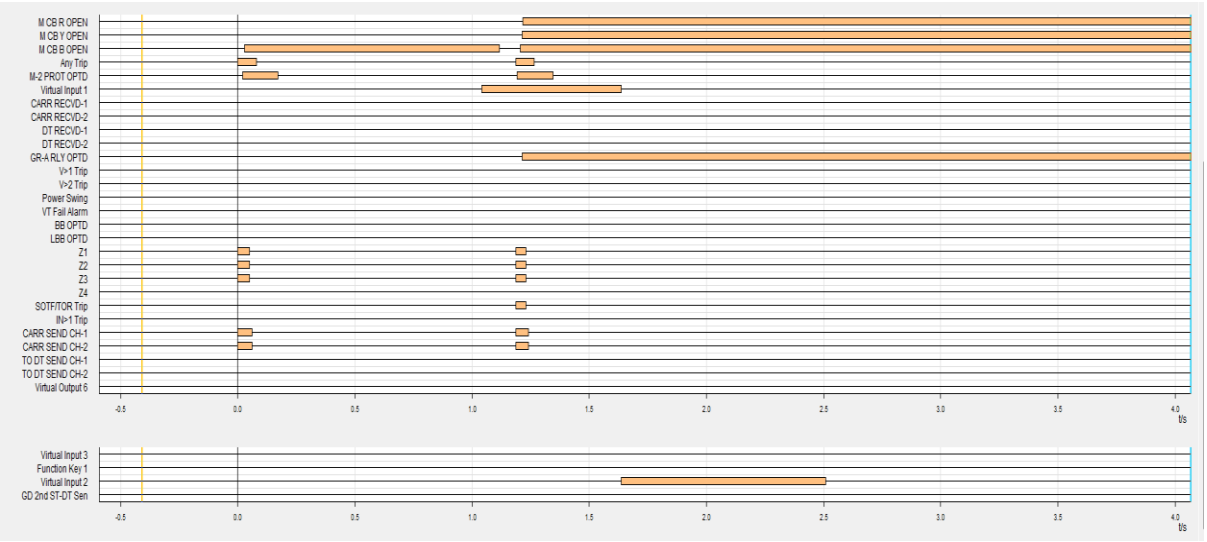


Event 2:

DR of 400 kV Rangpo-Dikchu (Rangpo)

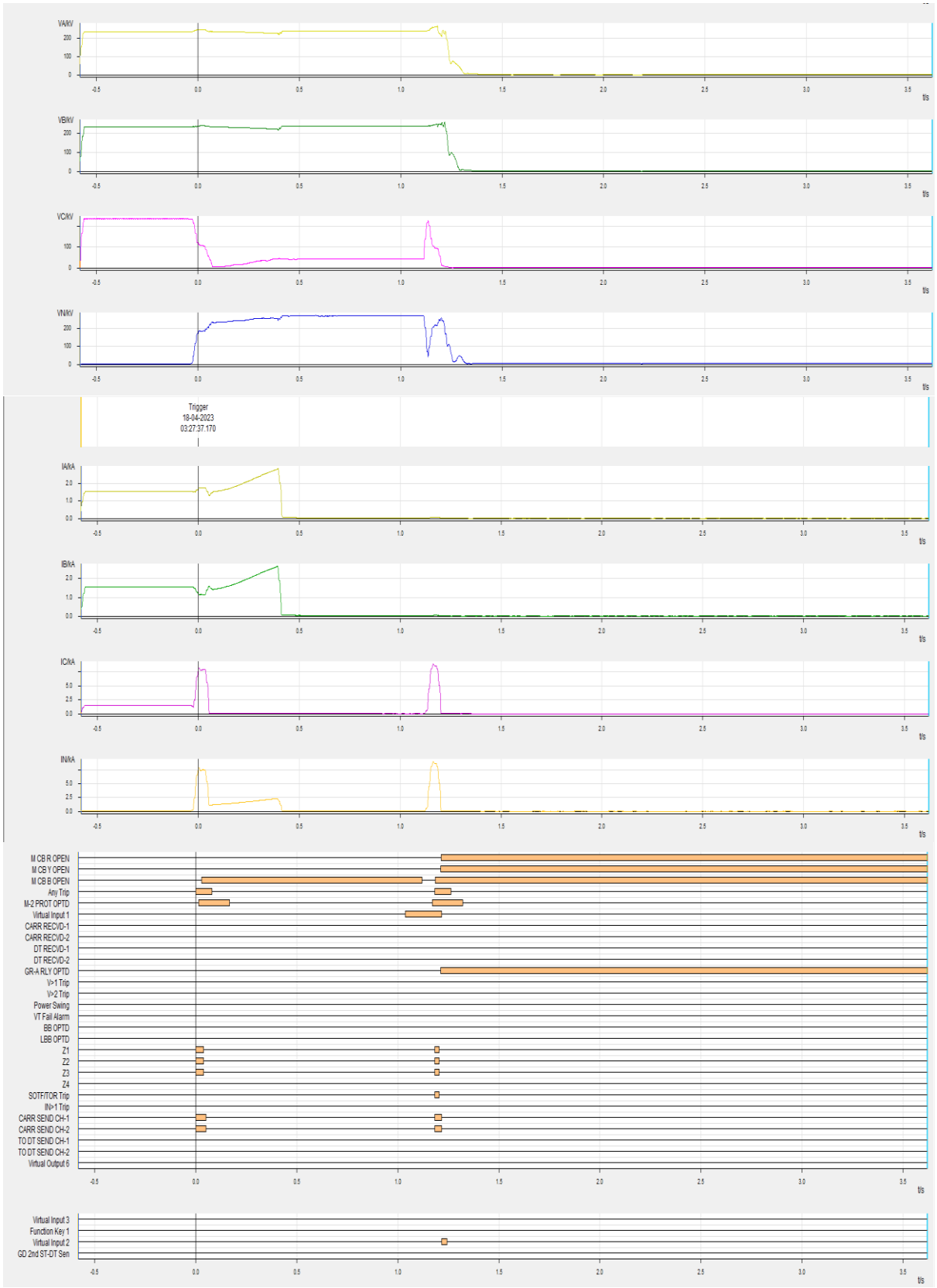




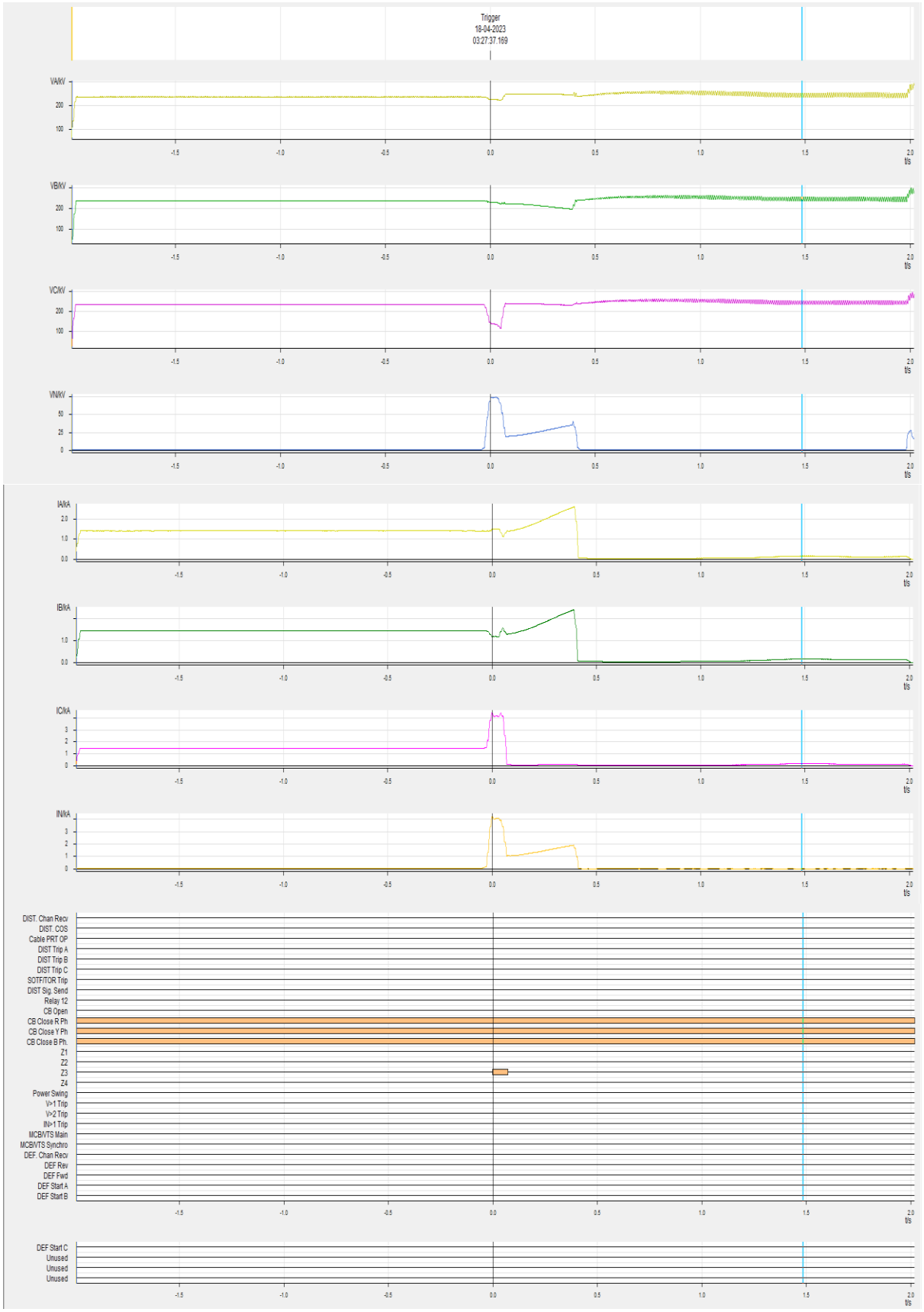


Event 3:

DR of 400 kV Rangpo-Dikchu (Rangpo)



DR of 400 kV Teesta 3-Dikchu (Teesta 3)



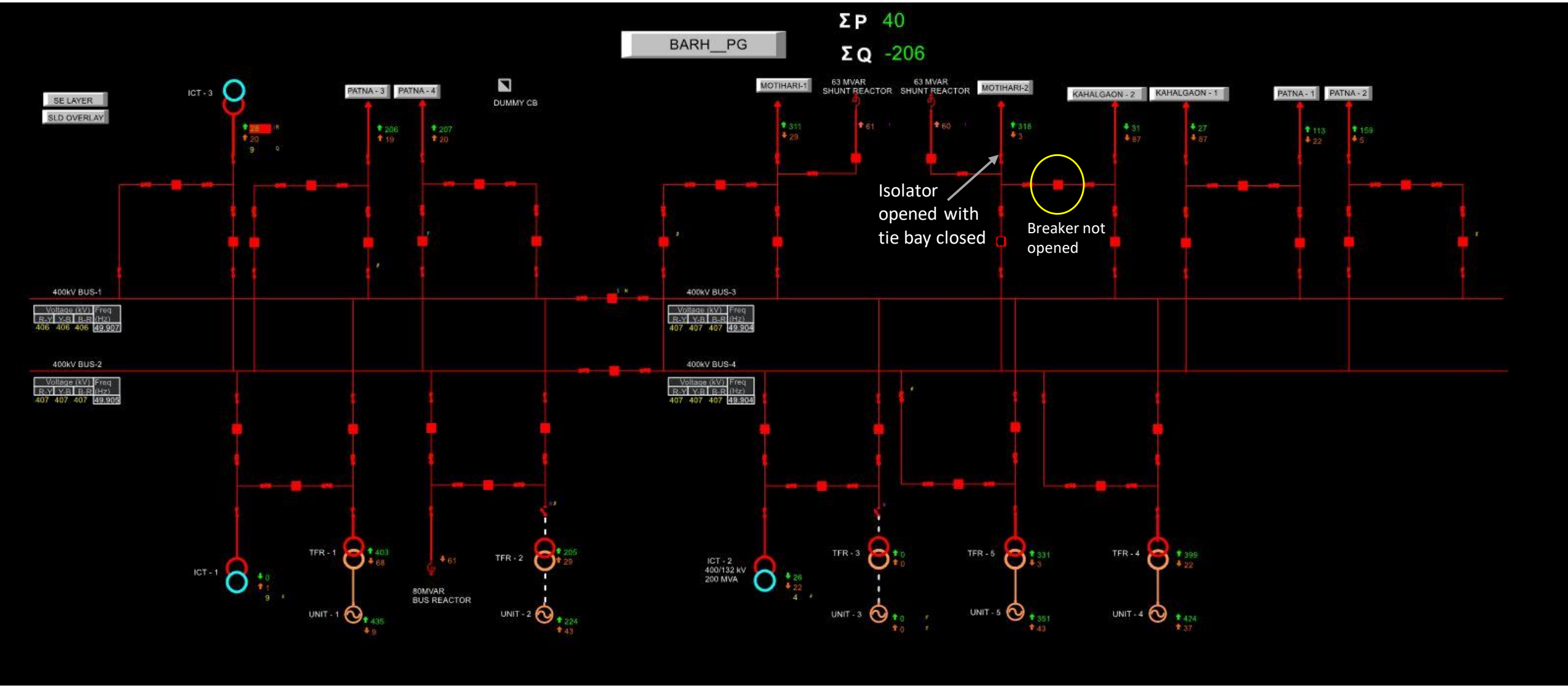
Annexure B.4

Tripping of 400 kV Barh-Kahalgaon-2

08:21 Hrs, 15.04.2023

Tripping of 400 kV Barh-Kahalgaon-2

- While availing shutdown of 400 kV Barh-Motihari-2, its dia element at Barh, i.e. 400 kV Barh-Kahalgaon-2 tripped.
- As reported, tie bay of this dia was not opened and in live condition isolator opening was attempted at Barh.
- 400 kV Barh-KhSTPP-2 tripped immediately from Barh.


BARH__PG
ΣP 40
ΣQ -206
SE LAYER
SLD OVERLAY
ICT - 3
PATNA - 3
PATNA - 4
DUMMY CB
MOTIHARI-1
63 MVAR SHUNT REACTOR
63 MVAR SHUNT REACTOR
MOTIHARI-2
KAHALGAON - 2
KAHALGAON - 1
PATNA - 1
PATNA - 2
Isolator opened with tie bay closed
Breaker not opened
400kV BUS-1
400kV BUS-3
400kV BUS-2
400kV BUS-4
ICT - 1
TFR - 1
UNIT - 1
80MVAR BUS REACTOR
TFR - 2
UNIT - 2
ICT - 2 400/132 kV 200 MVA
TFR - 3
UNIT - 3
TFR - 5
UNIT - 5
TFR - 4
UNIT - 4

Scheme discrepancies

- Interlocking should have not allowed opening of line isolator under live condition at Barh
- 400 kV Barh-Kahalgaon-2 tripped immediately from Barh in Zone-4, which if had taken 500 msec to operate as per scheme, then all feeders at Barh would have tripped and around 1900 MW generation loss would have occurred.

Operational Issues

- Before opening of isolator, voltage was not checked at both ends.
- Breaker status also was not checked at NTPC Barh.
- SoP for switching was not followed

Way Forward

- Interlocking scheme to be checked for all bays at NTPC Barh.
- SoPs may be relooked into to further make it robust and deviations from SoP may be taken up promptly.
- Proper communication and exchange of information between concerned pair of S/s.

List of important transmission lines in ER which tripped in April-2023

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

1	220KV MAITHON-DHANBAD-1	01-04-2023	19:28	01-04-2023	19:42	Maithon: R_N, Zone-2, 175 km, 1.2 kA	Dhanbad: A/r Successful	R-Earth	350	Tripped in Zone-2 time from Maithon. A/r successful at Dhanbad		Yes	Yes	Main-1 received carrier but issue in Siemens relay. Main-2 didn't receive carrier at Maithon
2	400KV MEERAMUNDALI-MENDHASAL-II	02-04-2023	12:50	02-04-2023	18:59	Meramundali: R_N, Zone-1, 60.3 km, 3.88 kA	Mendhasal: R_N, Zone-1, 32.9 km, 5.78 kA	R-Earth	100	A/r failed after 1 second at Meramundali. Three phase tripping at Mendhasal		Yes	Yes	R_ph cable insulation used to send DT command damaged at Meramundali
3	220KV SAHARSA-BEGUSARAI-2	05-04-2023	13:15	05-04-2023	16:13		Begusarai: Master trip	No fault	NA	Master trip operated. BSPTCL may explain.		NA	NA	DC earth fault

4	220KV SAHARSA-BEGUSARAI-1	05-04-2023	13:15	05-04-2023	16:14		Begusarai: Master trip	No fault	NA	Master trip operated at Begusarai and tripped from Begusarai only. Later at 13:43 Hrs, line tripped from Saharsa due to R_N fault.		Yes	NA	DC earth fault
5	220KV CHANDIL-STPS(WBPDCL)-1	05-04-2023	20:40	05-04-2023	21:15	Chandil:Y_N, Zone-1, 15.3 km, 5.76 kA	Santaldih: Y_N, Zone-2, 87 km, 1.9 kA	Y-Earth	350	Tripped in Zone-2 from Santaldih. A/r successful at Chandil		No	Yes	Carrier not sent from Chandil
6	220KV DARBHANGA(DMTCL)-LAUKAHI-1	13-04-2023	11:03	13-04-2023	12:31	Dharbhanga: R_N, Zone-2, 73 km, 2.2 kA	Laukahi: R_N, 4.87 kA	R-Earth	100	A/r attempt successful from DMTCL after 650 msec. Three phase tripping at Laukahi.		No	Yes	PLCC channel-2 defective. A/r lockout appeared.
7	220KV PATNA-FATUHA-1	18-04-2023	11:47	18-04-2023	18:07	Patna: B_E, 12.22 km, 9.015 kA	Fatuha: B_E, Zone-1, 5.967 kA	B-Earth	100	Three phase tripping for single phase fault however, B_ph at Fatuah didn't trip. Whether LBB operated. A/r attempt also taken by Fatuah after 1 second however, Y_ph breaker didn't close. BSPTCL may explain.		Yes	Yes	B_ph breaker stuck and Bus bar protection was not available

8	400KV BARIPADA(PG)-NEW DUBURI-1	21-04-2023	10:05	21-04-2023	10:44	Baripada: DT received		No fault	NA	DT received at Baripada. OPTCL/PG Odisha may explain.		Yes	No	Main bay of Baripada opened at New Duburi instead of its dia element.
9	400KV MEDINIPUR-KHARAGPUR-1	21-04-2023	10:59	21-04-2023	15:41	Medinipur: R_N, 37 km, 5.2 kA	Kharaghpur: R_N, 63 km, 4.2 kA	R-Earth	100	A/r successful from Kharagpur, however, unbalanced current observed atfer A/r. WBSETCL may share the details.		No	No	PD relay mal-operated at Medinipur
10	220KV KATAPALLI-BOLANGIR(PG)-1	22-04-2023	17:04	22-04-2023	17:21	Katapalli:R_N, A/r successful	Bolangir: R_N, Zone-1, 116.7 km, 1.715 kA	R-Earth	100	A/r successful from Katapalli. Three phase tripping at Bolangir		Yes	No	DTPC to be installed by OPTCL.
11	220KV PUSAULI(PG)-DURGAUTI-2	23-04-2023	14:42	23-04-2023	20:02	Sasaram: R_N, Zone-1, 7.41 km, 11.69 kA		R-Earth	100	Three phase tripping for single phase fault at Pusauli end.		Yes	No	A/r kept off at Pusauli

12	400KV RANCHI-NEW RANCHI-1	24-04-2023	14:00	24-04-2023	14:16	Ranchi:B_N, 60.73 km, 6.17 kA, A/r successful	New Ranchi: B_N, 25.67 km, 12.295 kA	B-Earth	100	A/r successful from Ranchi. Three phase tripping at New Ranchi		Yes	Yes	TC-1 and TC-2 faulty of both main and tie bay for around 10 msec.
13	400KV NABINAGAR (NPGC)-JAKKANPUR(BH)-2	24-04-2023	23:09	25-04-2023	00:59	Nabinagar: R_N, 2.5 km, 2.5 kA	Jakkanpur: R_N, 120.6 km	R-Earth	100	DT received from Jakkanpur and three phase tripped at NPGC. BGCL may explain.		No	No	Wring logic implemented at Jakkanpur.
14	400KV NABINAGAR (NPGC)-JAKKANPUR(BH)-1	24-04-2023	23:09	25-04-2023	00:45	Nabinagar: R_N	Jakkanpur: R_N, A/r successful	R-Earth	100	seen in reverse zone by NPGC and line tripped immediately. Jakkanpur sensed the fault in Zone-1 and later A/r attempt taken by Jakkanpur which was succeesful. Zone reach settings at Jakkanpur to be reviewed. Zone-4 delay		No	No	Zone-4 setting at NPGC revised

15	220KV NEW TOWN(AA-III)-RAJARHAT-2	30-04-2023	16:03	30-04-2023	16:17	New town: Y_N, Zone-1, 1.07 km, 15.6 kA	Rajarhat:Y_N, Zone-2, 5.9 km, 8.92 kA	Y-Earth	100	A/r successful from Rajarhat only.		No	No	Back Up relay replaced with distance relay but three phase tripping commnad given on operation of main-2 as per old scheme

16	765KV FATEHPUR-PUSAULI-1	30-04-2023	19:08	30-04-2023	20:36		Pusauli: B_N, 2.159 kA, 144.6 km	B-Earth	100	Three phase tripping for single phase fault		NA	Yes	Main bay of the line tripped due to waterlogging in marshalling box at Pusauli and DT sent to remote end. PLCC was kept off during this and later fault appeared and three phase tripped.

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_NOV_2022	NTPC (North Karanpura)	ICT	660MW New Generating Unit charged a Tandwa,Jharkhand	DATA REQUIRED
2	OCC_NOV_2022	NTPC (North Karanpura)	ICT	400KV MAIN BAY OF 400KV/11.50KV 315 MVA ST-3 AT NORTH KARANPURA	DATA REQUIRED
3	OCC_NOV_2022	NTPC (North Karanpura)	GT-1	400KV MAIN BAY OF 400KV/21KV 265 MVA GT-1 AT NORTH KARANPURA	DATA REQUIRED
4	OCC_NOV_2022	NKTL	T/L	400 kV North Karanpura(NTPC)- Chandwa(PG) Transmission Line -1	PDMS AND PSCT DONE AT NORTH KARANPURA END AND DATA REQUIRED CHANDWA END
5	OCC_NOV_2022	NKTL	T/L	400 kV North Karanpura(NTPC)- Chandwa(PG) Transmission Line 2	PDMS AND PSCT DONE AT NORTH KARANPURA END AND DATA REQUIRED CHANDWA END
6	OCC_NOV_2022	JUSNL	T/L	400KV MAIN BAY OF LATEHAR(JUSNL)-1 AT CHANDWA(PG)	PDMS AND PSCT DONE AT CHANDWA END AND DATA REQUIRED AT LATEHAR END
7	OCC_NOV_2022	JUSNL	T/L	400KV MAIN BAY OF LATEHAR(JUSNL)-2 AT CHANDWA(PG)	PDMS AND PSCT DONE AT CHANDWA END AND DATA REQUIRED AT LATEHAR END
8	OCC_DEC_2022	BGCL	ICT	400KV MAIN BAY OF 400KV/220KV/132kV/33kv 500 MVA ICT 2 AT JAKKANPUR JIS	PDMS AND PSCT DONE
9	OCC_DEC_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV/33kV 315 MVA ICT 2 AT DURGAPUR SS	DATA REQUIRED
10	OCC_JAN_2023	JUSNL	T/L	400 kV Chandwa (PG) - Latehar (JUSNL) D/C Line	PDMS AND PSCT DONE AT CHANDWA END AND LATEHAR END DATA REQUIRED
11	OCC_JAN_2023	BSPTCL	T/L	220 kV Patna (PG) - Sipara (BSPTCL) D/C Line after re conductorin	PDMS AND PSCT DONE
12	OCC_JAN_2023	OPTCL	B/R	400 kV 125 MVAr Bus Reactor at Mendhasal GSS	PDMS AND PSCT DONE
13	OCC_JAN_2023	NTPC	T/L	Main Bays of 400 kV Gaya D/C Line at NTPC sitchyard	DATA REQUIRED
14	OCC_JAN_2023	BSPTCL	T/L	132kV Ganwara-Pandaul line(reconducting)	PDMS AND PSCT DONE
15	OCC_JAN_2023	BSPTCL	T/L	132kV Darbhanga-samastipur line(reconducting)	PDMS AND PSCT DONE
16	OCC_JAN_2023	PGCIL	T/L	PG-Patna-Gaurichak TL CKT-2(reconducting)	PDMS AND PSCT DONE
17	OCC_JAN_2023	PGCIL	T/L	PG-Patna-Gaurichak TL CKT-1(reconducting)	PDMS AND PSCT DONE
18	OCC_JAN_2023	BGCL	T/L	220kV JAKKANPUR NEW(BGCL)-KHAGAUL(BSPTCL)	PDMS AND PSCT DONE
19	OCC_JAN_2023	BGCL	T/L	220kV JAKKANPUR NEW(BGCL)-SIPARA(BSPTCL)	PDMS AND PSCT DONE
20	OCC_JAN_2023	BSPTCL	T/L	132kV Dumraon-Bikramganj line(reconducting)	PDMS AND PSCT DONE
21	OCC_JAN_2023	OPTCL	B/R	125kva bus reactorat Mendhasal	PDMS AND PSCT DONE
22	OCC_JAN_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT Lapanga	PDMS AND PSCT DONE
23	OCC_JAN_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-II ATGIS Hinjili	PDMS AND PSCT DONE
24	OCC_FEB_2023	PGCIL	T/L	220 kV Pusauli (PG) - Durgauti (IR) D/C Line	Data required in both end
25	OCC_FEB_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT ASKA NEW	Data required
26	OCC_FEB_2023	OPTCL	ICT	132kV Barbil-Kamanda line	Data required in both end
27	OCC_FEB_2023	OPTCL	T/L	132kV Switching station kutra 132Kv along with LILO of kuchinda rajgangpur s/c line to kutra	Data required
28	OCC_FEB_2023	OPTCL	T/L	132kV Kutra m/s shiva cement s/c line	Data required
29	OCC_FEB_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT 132/33 kV,GSS,CHANDIPUR	Data required
30	OCC_FEB_2023	OPTCL	T/L	132kV Switching station near M/s Ultrateh Cement ltd at Khamarnuagaon,Khuntuni,132kV LI	Data required
31	OCC_FEB_2023	OPTCL	T/L	12.5 MW Solar power plant at 33kV Level in 132/33kV witchyard M/S ARBEL having connecti	Data required
32	OCC_FEB_2023	OPTCL	T/L	220kV Switchyard at 220/132/33kV GSS,BAMRA having LILO connectivity 220kV Budhipadar-	Data required
33	OCC_FEB_2023	OPTCL	ICT	220/132kV160MVA Power Auto TRF-1 AT 220/132/33 kV,GSS,BAMRA	Data required
34	OCC_FEB_2023	OPTCL	ICT	220/132kV160MVA Power Auto TRF-2 AT 220/132/33 kV,GSS,KURAMUNDA	Data required
35	OCC_FEB_2023	OPTCL	ICT	220/132kV 40MVA Power Auto TRF-1 AT 220/132/33 kV,GSS,KURAMUNDA	Data required
36	OCC_MAR_2023	NTPC		NTPC Barh Stage Unit #2, 24 kV, 660 MW is yet to be synchronized	Data required
37	OCC_MAR_2023	NTPC	GT(3*260MVA)	400kV GT#2 of NTPC Barh	Data required
38	OCC_MAR_2023	BGCL	ICT-1	400/220/33kV ICT 1 500MVA at Naubatpur SS	Data required
39	OCC_MAR_2023	OPTCL	T/L	400 kV GMR - Meramundali-B S/C Line after LILO work of 400 kV GMR - Meramundali-A Line	Data required
40	OCC_MAR_2023	OPTCL	T/L	132kV 2 PH S/C LINE,132kV GSS,KAMAKHYANAGAR FOR EXTENTION OF P/S TO RTSS KAMAK	Data required
41	OCC_MAR_2023	OPTCL	T/L	400kV GMR-MERAMUNDALI-B SC LINE & MERAMUNDALI-B TO MERAMUNDALI-A LINE AFTE	Data required
42	OCC_MAR_2023	OPTCL	ICT	132/33kV 20MVA POWER TR NO-2 AND 1 132kV FEEDER BAY GSS BIRMAHARAJPUR	Data required
43	OCC_MAR_2023	BSPTCL	T/L	220kV BIHARSARIFF-TTPS S/C(RECONDUCTING)	Data required
44	OCC_MAR_2023	BSPTCL	T/L	132kV SONENAGAR(OLD)-NAGARUNTARI TSS,SCTL(RECONDUCTING)	Data required
45	OCC_MAR_2023	BGCL	ICT	500MVA ICT-1 400/220/132/33kV ,NAUBATPUR	Data required
46	OCC_MAR_2023	BGCL	T/L	132kV KHAGAUL-BIHITA NEW(BGCL) S/L	PDMS AND PSCT DONE AT BIHTA END
47	OCC_MAR_2023	BGCL	T/L	132kVBIHITA NEW(BGCL)-DIGHA(BSPTCL)	PDMS AND PSCT DONE AT BIHTA END
48	OCC_MAR_2023	BSPTCL	T/L	132kV RAJGIR ASTHAWAN CKT1&2	Data required
49	OCC_APR_2023	NTPC	GT	NTPC Barh Stage 1 Unit #2 660MW	DATA REQUIRED
50	OCC_APR_2023	OPTCL	ICT	400KV MAIN BAY OF 400KV/220kV 315 MVA ICT-3 AT KALINGANAGAR	DATA REQUIRED
51	OCC_APR_2023	BSPTCL	T/L	220 kV Sitamarhi (PMTL) - Raxaul Line 1 along with associated bays at Raxaul end	DATA REQUIRED
52	OCC_APR_2023	BSPTCL	T/L	220 kV Sitamarhi (PMTL) - Raxaul Line 2 along with associated bays at Raxaul end	DATA REQUIRED
53	OCC_APR_2023	POWERGRID	T/L	132 kV Ranpo (PG) - Samardong (EPD, Sikkim) Line 1	PDMS AND PSCT DONE AT RANGPO END
54	OCC_APR_2023	POWERGRID	T/L	133 kV Ranpo (PG) - Samardong (EPD, Sikkim) Line 2	PDMS AND PSCT DONE AT RANGPO END

ANNEXURE-C.5

Sl No.	Name of the incidence	PCC Recommendation	Latest status
125th PCC Meeting			
1.	Total Power failure at 400 kV Dikchu S/s on 26.03.2023 at 04:02 Hrs.	PCC advised Teesta III to enable voltage measurement for O/V protection as phase to ground. Further the settings may be set at 110% with delay of 5-6 sec for stage 1 and 120-125 % with delay of 100 ms for stage-2. The settings may be implemented in consultation with ERLDC. Regarding tripping of the line from Teesta III end, PCC advised the Teesta III to review the reach settings of both main-I & main-II relay as per ERPC Protection philosophy in consultation with ERLDC/ERPC. Further it was advised that relay testing may be carried out for main-2 relay (Siemens relay) to check the healthiness of relay.	*ERPC representative informed that as per communication received from Dikchu, issue of tie breaker had been resolved on 28th April 2023.*
2.	Repeated Line tripping of 220 kV Ramchandrapur - Joda in April 2023	Regarding status of commissioning of DTPC in the line, PCC advised the matter may be taken with their telecom wing for early commissioning of the same.	
3.	Bus tripping at Ramchandrapur in April 2023	PCC expressed concern on repeated mal-operation of busbar protection at Ramchandrapur and advised JUSNL to carry out a detail checking of the scheme as well as testing of the busbar protection in coordination with the Relay OEM. PCC further advised to reduce zone 4-time settings of all feeders at Ramchandrapur end to 250 ms till the time busbar is out of service	*JUSNL representative informed that issue of busbar operation during tripping of zone 1 protection for 220 kV Ramchandrapur -Joda had been rectified on 21.04.2023 and further testing was done which gave satisfactorily results subsequently bus bar protection at Ramchandrapur was put in service.*
124th PCC Meeting			

4.	Total Power Failure at 220 kV Barauni, Hazipur, Amnour and Mokama S/s on 22.02.2023 at 18:11 Hrs	It was observed that DRs at Hazipur end is not time synchronized accordingly BSPTCL was advised to rectify it at the earliest.	*BSPTCL representative informed that time synchronization issue has been rectified.* *He also informed that relay logic was checked and some discrepancy was found which have been rectified for concerned feeders.*
5.	Tripping of 400 kV GMR-Meramundali line and Outage of GMR unit 3 on 28.02.2023	PCC advised OPTCL following: • To disable SOTF & TOR in the relay for 400 kV Meramundali-A-Meramundali B line. • Relay OEM may be contacted for reducing the current threshold value in SOTF setting and for implementation of AND condition with manual closing for triggering of SOTF. • To remove T-connection for the lines connected among 220 k V Meramundali A/220 kV Meramundali B & 220 kV Goda, 220 kV Duburi at the earliest. • To implement line differential protection for 400 kV Meramndali A-Meramundali B line.	*OPTCL representative informed that all suggetions had been implemented. Regarding implemenatation of line differntial protection he informed that they are in process to purchase differntial relay.*