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

स./**NO.** पू.क्षे.वि.स./**PROTECTION/2024/** 701 दिनांक /**DATE:19/07/2024**

सेवा में / To,

संलग्न सूची के अनुसार / As per list enclosed.

विषय : दिनांक – **19.06.2024** को आयोजित **136** वीं पीसीसी बैठक का कार्यवृत्त ।

Sub: Minutes of the 136th PCC meeting held on 19.06.2024

महोदय/ Sir,

19.06.2024 को आयोजित **136वीं** 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 **136th PCC** meeting of ERPC held on **19.06.2024** available at ERPC website (http://www.erpc.gov.in/).

यदि कोई अवलोकन हो, तो कृपया इस कार्यालय को यथाशीध्र 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,**

for Kumar Satyam
19/7/2024

(आई.के.मेहरा / I.K.Mehra)
अधीक्षण अभियंता(पी.एस)
Superintending Engineer (PS)

LIST OF ADDRESSES:

Chief Engineer, Trans (O&M) Bihar State Power Transmission Limited, Vidyut Bhawan, Bailey Road, Patna-800021	Chief Engineer (CRITL) Bihar State Power Transmission Limited, Vidyut Bhawan, Bailey, Road, Patna-800021
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
Chief Engineer, (CRITL) Jharkhand Urja Sancharan Nigam Limited Kusai Colony, Doranda, Ranchi-834002	Chief Engineer (CLD) Jharkhand UrjaSancharan Nigam Limited, Kusai Colony,Doranda, Ranchi-834002
Chief General Manager (O&M), OPTCL, Janpath, Bhubaneswar, Odisha – 751 022. FAX: 0674-2542932 cgm.onm@optcl.co.in	Sr. General Manager (PPA), Technical Wing, OHPCL, Orissa State Police Housing & Welfare Corpn. Bldg. VaniviharChowk, Janpath, Bhubaneswar-752022
Chief Load Dispatcher, SLDC OPTCL, P.O. Mancheswar Rly. Colony Bhubaneswar-751017	Chief Engineer (Testing), WBSETCL Central Testing Laboratory, Abhikshan, Salt Lake, Kolkata-700091 (Fax no. 2367-3578/1235)
Chief Engineer (CLD) WBSETCL, P.O.Danesh Sheikh Lane, AndulRoad, Howrah-711109	Addl. Chief Engineer (ALDC) West Bengal Electricity Distribution Company Ltd VidyutBhavan, 7th Floor, Bidhannagar, Sector-I Salt Lake City, Kolkata-700091(Fax-033-2334-5862)
Dy. Chief Engineer (Testing)/ Sr. Manager (Testing) CESC Ltd.,4, SasiSekhar Bose Road, Kolkata-700025	General Manager (O&M) KhSTPS, NTPC Ltd., P.O. Deepti Nagar, Dist. Bhagalpur, Bihar-813203
General Manager(O&M) FSTPS, NTPC Ltd., P.O. Nabarun, Dist. Murshidabad, West Bengal-742236	Dy. General Manager (Engineering), WBPDCL, OS Dept. Corporate Office, 3/C, L.A Block, Salt Lake-III, Kolkata-700098 (Fax-033-23350516)
General Manager (O&M) Barh STPS, NTPC Ltd., P.O. NTPC Barh, Dist. Patna, Bihar-803213	General Manager (OS), ERHQ-II, NTPC Ltd., 3rdflr. OLIC Building, Plot no. N 17/2, Nayapalli, Unit-8 Bhubaneswar- 751012 (Fax No. 0674-2540919)
General Manager(O&M), TSTPS, NTPC Ltd., P.O.Kaniha, Dist. Angul, Orissa-759117	General Manager (AM), POWERGRID, Odisha Projects, Sahid Nagar, Bhubaneswar – 751 007
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)
Executive Director (O&M) NHPC Ltd., NHPC Office Complex, Sector-33, Faridabad, Haryana-121003 (Fax-01292272413)	Electrical Superintending Engineer, TTPS, TenughatVidyut Nigam Ltd.,Lalpania, Dist. Bokaro, Jharkhand-829149
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	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 (AM), ER-II Power Grid Corporation of India Ltd., J-I-15, Block-EP, Sector-V,Salt Lake,Kolkata-91	The Plant Head, Maithon Power Limited, Maithon Office, MA 5 Gogna, Dist. Dhanbad, Jhankand State, PIN-828207
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. (FAX:011-26139256-65)
General Manager, Sikkim Urja Limited, New Delhi (FAX:011-46529744)	President , TPTL, Bhikaji Cama Place, New Delhi , 110066
Director (NPC), CEA, NRPC Building, KatwariaSarai, 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
The Plant Head, Dikchu HEP, Sikkim	

मुख्य अभियंता, ट्रांस (ओ एंड एम), बिहार स्टेट पावर ट्रांसमिशन लिमिटेड, विद्युत भवन, बेली रोड, पटना-800021	मुख्य अभियंता (सीआरआईटीएल), बिहार स्टेट पावर ट्रांसमिशन लिमिटेड, विद्युत भवन, बेली, रोड, पटना-800021
मुख्य अभियंता (सिस्टम ऑपरेशन), एसएलडीसी, बीएसपीटीसीएल, पटना-800021	
मुख्य अभियंता (एसएलडीसी), दामोदर वैली कॉर्पोरेशन, जीओएमडी-I परिसर, पी.ओ.-दानेशशेख लेन, हावड़ा- 711109	मुख्य अभियंता (सीटीसी), दामोदर घाटी निगम, पी.ओ. मैथन बांध, जिला। धनबाद, झारखण्ड-828207
मुख्य अभियंता (सीआरआईटीएल), झारखण्ड ऊर्जा संचरण निगम लिमिटेड कुसाई कॉलोनी, डोरंडा, रांची-834002	मुख्य अभियंता (सीएलडी), झारखंड ऊर्जा संचरण निगम लिमिटेड, कुसाई कॉलोनी, डोरंडा, रांची-834002
मुख्य महाप्रबंधक (ओ एंड एम), ओपीटीसीएल, जनपथ, भुवनेश्वर, ओडिशा – 751 022. फैक्स: 0674-2542932 cgm.onm@optcl.co.in	वरिष्ठ महाप्रबंधक (पीपीए), तकनीकी विंग, ओएचपीसीएल, उड़ीसा राज्य पुलिस आवास एवं कल्याण निगम बिल्डिंग वाणीविहार चौक, जनपथ, भुवनेश्वर-752022
मुख्य लोड डिस्पैचर, एसएलडीसी ओपीटीसीएल, पी.ओ. मंचेश्वर रेलवे कॉलोनी भुवनेश्वर-751017	मुख्य अभियंता (परीक्षण), डब्ल्यूबीएसईटीसीएल केंद्रीय परीक्षण प्रयोगशाला, अभिक्षण, साल्ट लेक, कोलकाता-700091 (फैक्स नंबर 2367-3578/1235)
मुख्य अभियंता (सीएलडी), डब्ल्यूबीएसईटीसीएल, पी.ओ. दानेश शेख लेन, अंदुलरोड, हावड़ा-711109	अतिरिक्त मुख्य अभियंता (एएलडीसी), पश्चिम बंगाल विद्युत वितरण कंपनी लिमिटेड विद्युत भवन, 7वीं मंजिल, बिधाननगर, सेक्टर-I साल्ट लेक सिटी, कोलकाता-700091 (फैक्स-033-2334-5862)
उप मुख्य अभियंता (परीक्षण)/वरिष्ठ प्रबंधक (परीक्षण) सीईएससी लिमिटेड, 4, शशि शेखर बोस रोड, कोलकाता-700025	महाप्रबंधक (ओ एंड एम), खएसटीपीएस, एनटीपीसी लिमिटेड, पी.ओ. दीप्ति नगर, जिला भागलपुर, बिहार-813203
महाप्रबंधक (ओ एंड एम) एफएसटीपीएस, एनटीपीसी लिमिटेड, पी.ओ. नबारून, जिला-मुर्शिदाबाद, पश्चिम बंगाल-742236	उप. महाप्रबंधक (इंजीनियरिंग), डब्ल्यूबीपीडीसीएल, ओएस विभाग कॉर्पोरेट कार्यालय, 3/सी, एलए ब्लॉक, साल्ट लेक-III, कोलकाता-700098 (फैक्स-033-23350516)
महाप्रबंधक (ओ एंड एम), बाढ़ एसटीपीएस, एनटीपीसी लिमिटेड, पी.ओ. एनटीपीसी बाढ़, जिला-पटना, बिहार-803213	महाप्रबंधक (ओएस), ईआरएचक्यू-II, एनटीपीसी लिमिटेड, 3rd Floor, ओएलआईसी बिल्डिंग, प्लॉट नं. एन 17/2, नयापल्ली, यूनिट-8 भुवनेश्वर- 751012 (फैक्स नंबर 0674-2540919)
महाप्रबंधक (ओ एंड एम), टीएसटीपीएस, एनटीपीसी लिमिटेड, पी.ओ.कनिहा, जिला- अंगुल, उड़ीसा-759117	महाप्रबंधक (एएम), पावरग्रिड, ओडिशा प्रोजेक्ट्स, साहिद नगर, भुवनेश्वर - 751 007
महाप्रबंधक (ओएस), ईआरएचक्यू-I, एनटीपीसी लिमिटेड, लोकनायक जयप्रकाश भवन, (दूसरी मंजिल), डाकबंगलाचौक, पटना-800001	प्रबंधक (इलेक्ट्रिकल), आधुनिक पावर एंड नेचुरल रिसोर्सेज लिमिटेड, लैंसडाउन टावर्स, कोलकाता-700020 (फैक्स नंबर 033-2289 0285)

कार्यकारी निदेशक (ओ एंड एम), एनएचपीसी लिमिटेड, एनएचपीसी कार्यालय परिसर, सेक्टर-33, फरीदाबाद, हरियाणा-121003 (फैक्स-01292272413)	विद्युत अधीक्षण अभियंता, टीटीपीएस, तेनुघाट विद्युत निगम लिमिटेड, ललपनिया, जिला। बोकारो, झारखण्ड-829149
उप महाप्रबंधक (विद्युत), आईबी थर्मल पावर स्टेशन, ओपीजीसीएल बनहापल्ली, जिला। झारसुगुड़ा-768234, उड़ीसा	महाप्रबंधक (एएम), ईआर-I पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड, अलंकार प्लेस, बोरिंग रोड, पटना- 800001
मुख्य अभियंता (ट्रांस.), विद्युत विभाग, सरकार। सिक्किम, गंगटोक-731010	वरिष्ठ प्रबंधक (सीटीएमसी), दुर्गापुर प्रोजेक्ट्स लिमिटेड, दुर्गापुर-713201
कार्यकारी निदेशक, ईआरएलडीसी, पोसोको, टॉलीगंज, कोलकाता-700033	प्रमुख-नियामक और अनुबंध, इंडीग्रिड लिमिटेड, 247 दूतावास, कार्यालय संख्या 107, 'बी' विंग, हिंदुस्तान कंपनी बस स्टॉप, गांधी नगर, एल.बी.एस. रोड, विक्रोली, पश्चिम, मुंबई - 400 079 फ़ोन: +91 845509 96408
महाप्रबंधक (एएम), ईआर-II इंडिया लिमिटेड का पावर ग्रिड कॉर्पोरेशन।, जे-आई-15, ब्लॉक-ईपी, सेक्टर-वी, साल्ट लेक, कोलकाता- 91	प्लांट हेड, मैथन पावर लिमिटेड, मैथन कार्यालय, एमए 5 गोगना, जिला। धनबाद, झारखंड राज्य, पिन-828207
महाप्रबंधक (पी एंड ओ), पीटीसी लिमिटेड, कंचनजंगा बिल्डिंग, 18, बाराखंभा रोड, नई दिल्ली-110001	
प्रबंध निदेशक, भूटान पावर कॉर्पोरेशन पोस्ट बॉक्स नं. 580, थिम्पू, भूटान।	प्रबंध निदेशक, ड्रुक ग्रीन पावर कॉर्पोरेशन। पी.ओ. बॉक्स-1351, थिंपू, भूटान।
सह निदेशक (वाणिज्यिक एवं नियामक), दरभंगा-मोतिहारी ट्रांसमिशन कंपनी लिमिटेड (डीएमटीसीएल), 503, विंडसर, ऑफ सीएसटी रोड, कलिना, सांताक्रूज़ (पूर्व), मुंबई- 400098	प्लांट हेड, जेआईटीपीएल। (फैक्स:011-26139256-65)
महाप्रबंधक, सिक्किम ऊर्जा लिमिटेड, नई दिल्ली (फैक्स:011-46529744)	अध्यक्ष, टीपीटीएल, भीकाजी कामा प्लेस, नई दिल्ली-110066
निदेशक (एनपीसी), सीईए, एनआरपीसी बिल्डिंग, कटवारियासराय, नई दिल्ली- 110016	अध्यक्ष, डान्स एनर्जी प्रा. लिमिटेड, 5वीं मंजिल, डीएलएफ बिल्डिंग नंबर 8, टावर-सी, गुड़गांव - 722OO2
निदेशक, शिगा एनर्जी पी.डब्ल्यू. लिमिटेड, 5वीं मंजिल, डीएलएफ बिल्डिंग नंबर 8, टावर-सी, गुड़गांव - 722OO2	डीजीएम (ई एंड आई), हल्दिया एनर्जी लिमिटेड, बारीक भवन, कोकाता-700072, फैक्स: 033-22360955
प्लांट हेड, डिक्चु एचईपी, सिक्किम ।	

Minutes
of
136th PCC Meeting

Date:19.07.2024
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 136th PROTECTION COORDINATION SUB-COMMITTEE MEETING HELD ON 19.06.2024 AT 10:30 HRS THROUGH MS TEAMS

*Superintending Engineer (Protection), ERPC chaired the meeting. ERLDC representative explained the protection performance of May 2024 with help of presentation which is attached at **Annexure A.1**. During the meeting, CBIP team had also given brief presentation on protection and technical audit. Further, ERLDC representative also demonstrated software developed in MS excel file by ERLDC team in order to analyze DR files for events.*

Superintending Engineer (Protection), ERPC advised to conduct preparatory meeting between ERPC and ERLDC before one week from PCC Meeting so that availability of report can be confirmed and further in case of non availability of report from any utility, same may be communicated to share report else issue will not be discussed in PCC Meeting and letter will be shared to higher authority asking reason behind non availability of report.

*List of participants is attached at **Annexure A.2.***

PART – A

ITEM NO. A.1: Confirmation of Minutes of 135th Protection Coordination sub-Committee Meeting held on 21st May 2024 at ERPC, Kolkata.

The minutes of 135th Protection Coordination sub-Committee meeting held on 21.05.2024 was circulated vide letter dated 13.06.2024

Members may confirm the minutes of the Meeting.

Deliberation in the meeting

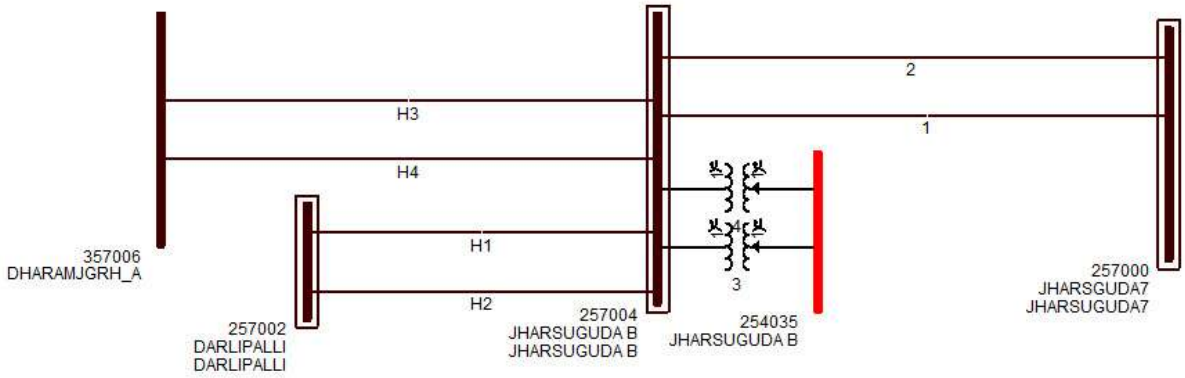
Members confirmed the minutes of 135th PCC Meeting.

PART – B

ITEM NO. B.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

On 21.05.2024, at 17:02 Hrs, 765 kV Bus Reactor-1 & 1500 MVA 765/400 kV ICT-1 at Jharsuguda tripped due to failure of tie bay CT at Jharsuguda. At the same time, 800 MW Unit 1 at Darlipalli tripped due to tripping of VFDs used for pulverisers which led to loss of fuel. Subsequently, Unit 3 and Unit 4 at OPGC also tripped one by one on low forward power.

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



Gen. Loss: 1900 MW
Outage Duration: 01:48 Hrs

Powergrid Odisha, NTPC and OPGC may explain.

Deliberation in the meeting

The event was explained by ERLDC as below:

- *R phase and Y phase CT of tie bay of 240 MVAr Bus Reactor-1 at Jharsuguda S/s got failed resulting in development of fault. Subsequently differential protection of reactor operated. However, after opening of main and tie bay CB of Bus reactor, fault still persisted as location of CT was on the other side of tie bay and ICT-1 which is in the same dia kept feeding the fault.*
- *Consequently, LBB of the tie CB and ICT-1 tripped from both HV and LV side and fault were cleared. Meanwhile, 765 kV Jharsuguda-Darlipalli-2 tripped from Darlipalli end in Zone-1.*
- *At Darlipalli STPP, drives for coal pulveriers tripped on undervoltage protection resulting in tripping of 800 MW unit# 2 at Darlipalli on loss of all fuel. Further, 660 MW unit 4 and unit 3 at OPGC tripped on low forward power as turbines of both units tripped.*

ERLDC representative enquired NTPC representative that as reported, undervoltage settings for drives is U/V <65% for 300 msec which is on conservative side and lead to unnecessary tripping of unit 2 at Darlipalli for which 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.

On enquiry from PCC regarding reason behind tripping of units at OPGC even for external faults cleared within 300 ms, OPGC representative replied that during the disturbance load got dropped suddenly from 630 MW to -60 MW subsequently Load shedding relay operated (M/s Siemens make) which led to operation of HP turbine protection and subsequently both units got tripped.

OPGC representative informed that load rejection relay is kept at load rejection settings of 464 MW with instantaneous tripping and in this incident, load drop for more than 464 MW was observed consequently relay tripped in order to protect HP turbine.

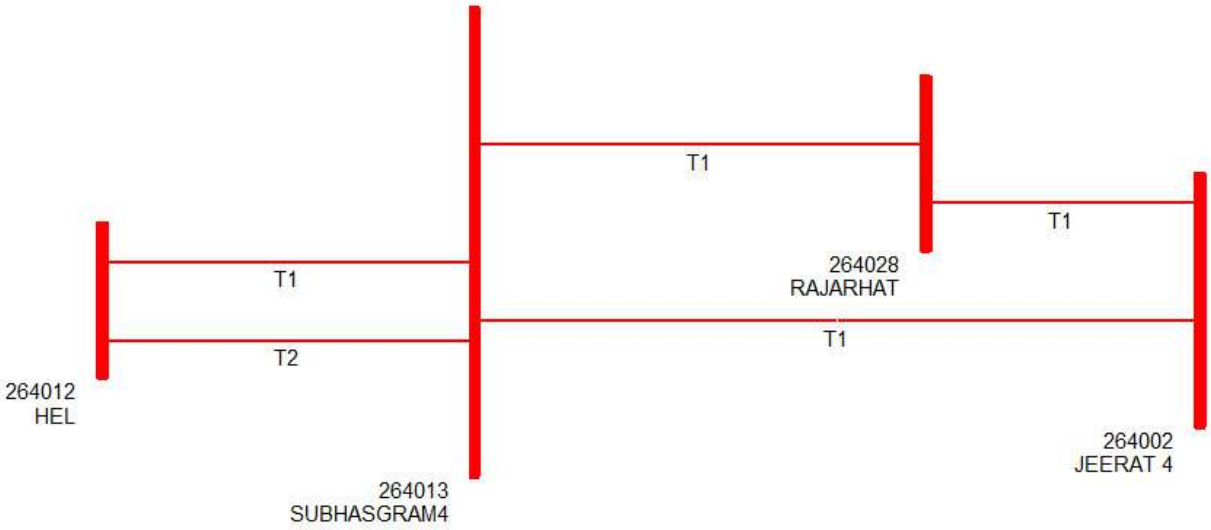
PCC advised OPGC representative to coordinate with OEM (M/s BHEL and M/s Siemens) to review LSR settings (slope, time delay etc) and update status to ERPC/ERLDC. OPGC representative informed that communication is already given to OEM however it will be taken up with OEM in order to get reason behind tripping of units.

PCC further advised to share slope of LSR ramp settings and protection scheme to ERPC/ERLDC.

ITEM NO. B.2: Disturbance at 400 kV Haldia (HEL) S/s on 29.05.2024 at 12:38 Hrs

R phase bushing of GT-1 at Haldia caught fire which led to tripping of Unit-1 on operation of GT-1 transformer differential protection. At the same time, 400 kV Haldia-Subhashgram-2 got tripped due to fault in R phase LA & 400 kV Haldia-Subahshgram-1 also tripped due to E/F. Consequently, Unit 2 also tripped due to loss of evacuation path.

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



Gen. Loss: 566 MW
Outage Duration: 00:19 Hrs

HEL and Powergrid may explain.

Deliberation in the meeting

ERLDC explained the disturbance as follows:

- *On 29.05.2024 at 12:38 Hrs, R phase LA of 400 kV Haldia-Subhashgram-2 got failed at Haldia S/s. The fault was sensed by both distance and differential relay at Haldia end and R phase breaker got opened from both ends. A/R attempt was made after 1 second but line got tripped due to persisting fault.*
- *During auto reclose attempt of circuit-2, R phase of 400 kV Haldia-Subahshgram-1 got opened from Subhashgram end in Zone-1 however breakers at Haldia end remained closed. As current was flowing through only two phases residual current rose to around 750 A. It was informed that fault had resulted in fire in R phase bushing of GT and consequently GT differential protection operated and GT-1 tripped ultimately leading to tripping of unit 1.*
- *Meanwhile, 400 kV Haldia-Subhashgram-1 tripped from Haldia end in DEF and remaining two phases of 400 kV Haldia-Subahshgram-1 tripped from Subhashgram end.*
- *After tripping of 400 kV Haldia-Subahshgram d/c, evacuation path for unit 2 at HEL got lost leading to tripping of unit 2.*

Regarding reason behind tripping of 400 kV Haldia-Subhashgram-1 in zone 1 despite fault being in zone 2, Powergrid representative replied that as per DR of 400 kV Haldia-Subhashgram-2, Main 1 and Main 2 relay at Subhasgram end sensed the fault in zone 2 initially however after tripping of line from HEL end from zone 1, current contribution to fault rose and subsequently relay got picked

up and tripped in zone 1. He added that during auto-reclose attempt of circuit 2, main 1 relay (MICOM) at PG end sensed fault in zone 1 however main 2 relay sensed fault in Zone 2. He added that both differential relay and distance relay is present.

On enquiry from PCC regarding reach settings, PG representative replied that reach settings were checked and found in order.

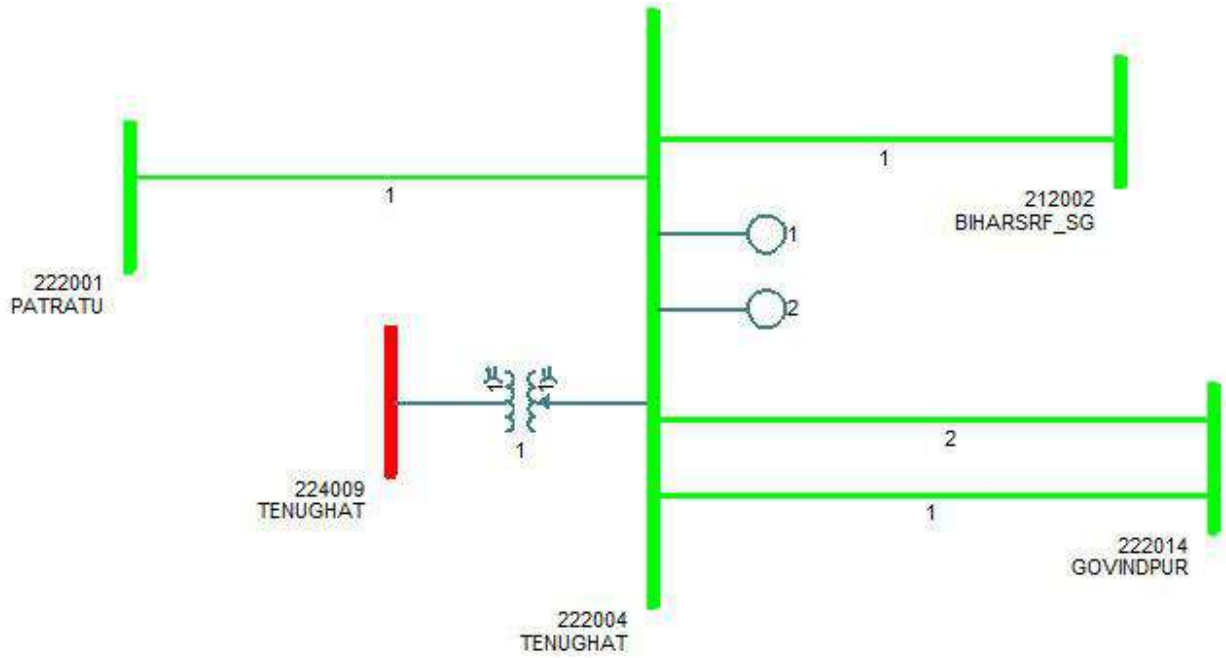
Powergrid representative informed that carrier was received for circuit 1 from HEL end during auto reclose attempt of circuit 2 for which HEL representative replied that no carrier was sent from their end. HEL representative further informed that after 700 ms from inception of first fault, unbalance current was developed following which Directional definite time earth fault operated for circuit 1 from HEL end during which DT was sent to PG end.

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 opined that as per DR at Haldia end, unbalanced current is observed in neutral during opening of single phase however voltage unbalance was not observed during the event therefore 400 kV Haldia-Subhashgram-1 should not have tripped from Haldia end in DEF. PCC advised HEL representative to coordinate with OEM in order to find reason behind operation of DEF protection.

ITEM NO. B.3: Disturbance at 220 kV Tenughat (TVNL) S/s on 29.05.2024 at 12:57 Hrs

On 29.05.2024, at 12:57 hrs 220 kV Tenughat-Govindpur-1 tripped due to Y-B Fault. 220 kV Tenughat Govindpur-2 also tripped at the same time from Tenughat only. As 220 kV Tenughat-Biharsharif was already was already under breakdown, both units of Tenughat got tripped subsequently due to loss of evacuation path.



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

Gen. Loss: 333 MW
Outage Duration: 00:17 Hrs

TVNL may explain.

Deliberation in the meeting

JUSNL informed that a high resistive fault developed in B phase of 220 kV Tenughat-Govindpur-1. The line got tripped from Tenughat end however initially there was no tripping from Govindpur end as current was very less to pick up the relay.

As fault evolved and current increased, Govindpur end relay sensed fault in zone 2 and subsequently in zone 1 and the line tripped from Govindpur end.

Regarding 220 kV Tenughat-Govindpur-2, he informed that during the incident, relay at Tenughat end was sensing the same fault and tripped in O/C E/F protection after 700 ms from tripping of circuit 1. Since, 220 kV Tenughat- Biharsharif line was already out, tripping of 220 kV Tenughat-Govindpur D/C resulted in loss of evacuation path for Tenughat unit. The Tenughat units got islanded with PVUNL load and soon tripped in over frequency due to load- generation mismatch.

JUSNL representative informed that vegetation issue was existing in corridor and villagers were creating objection in tree cutting work due to which faults were getting developed in line however the issues had already been resolved.

ERLDC representative enquired about non operation of auto-reclose at Govindpur end during the incident to which JUSNL representative replied that the A/R scheme will be checked after availing the shutdown. PCC advised JUSNL representative to rectify auto-reclose issue at Govindpur end by next week and intimate to ERPC/ERLDC.

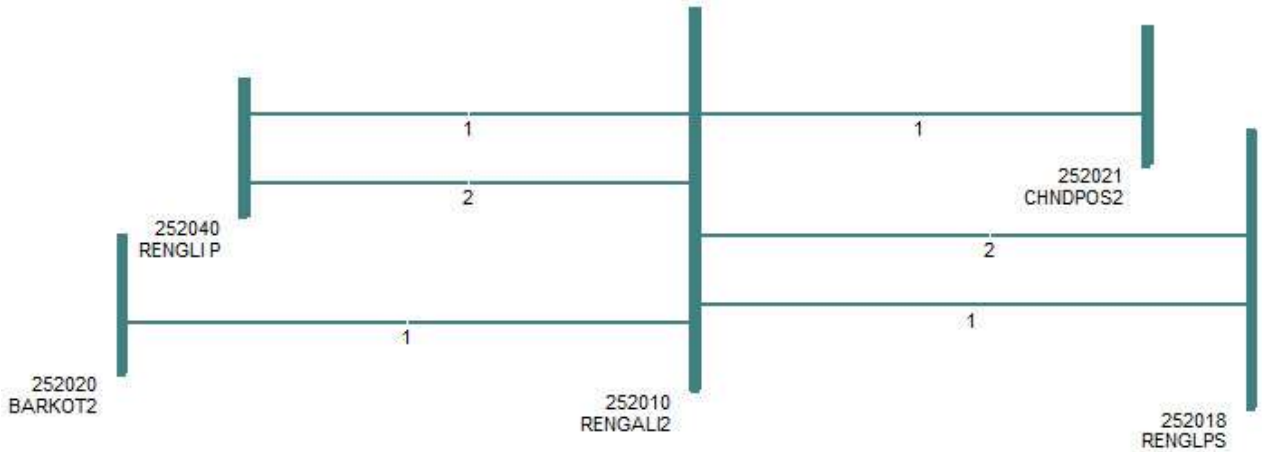
TVNL representative informed that settings at their end had been implemented by CRITL, JUSNL team and he further assured that O/C E/F settings will be revised at the earliest after consultation with CRITL, JUSNL team.

PCC advised CRITL, JUSNL team to test auto-reclose and carrier at both Govindpur as well as Tenughat end.

ITEM NO. B.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

Y phase BPI of 220 kV Rengali-Rengali (PH)-1 punctured at Rengali end. At the same time, 220 kV Rengali-Rengali (PG) D/c, 220 kV Rengali-Chandiposh and 220 kV Rengali-Barkot also tripped. This led to total power failure at Chandiposh and Barkot S/s.

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



Load Loss:40 MW
Outage Duration: 00:16 Hrs

OPTCL may explain.

Deliberation in the meeting

OPTCL representative explained that t*he bus fault occurred due to puncture of BPI of Rengali-Rengali(PH)-I at Rengali end. Since bus bar protection is out of service at Rengali(OPTCL) end, 220 kV Rengali-Rengali (PG) d/c tripped immediately in Zone-1 from Rengali (PG) end, 220 kV Rengali-Rengali (PH) d/c tripped in Zone-4 from Rengali (OPTCL) after 250 msec and 220 kV Rengali- Deogarh tripped from Deogarh in Zone-2.*

He added that since 220 kV Rengali-Rengali (PG) d/c is only 500 meter long, there is a possibility that relay at PG end was unable to differentiate between zone 1 and zone 2 therefore lines got tripped in zone 1 from PG end.

ERLDC representative pointed out following discrepancies during the incident-

- *Non-availability of bus bar protection at Rengali.*
- *Keeping all elements on only one bus at Rengali and Non-availability of other bus.*
- *Non availability of differential protection for 220 kV Rengali-Rengali (PG) d/c (500 m long line) leading to unnecessary tripping of said line without any fault.*
- *Charging of 220 kV Tarkera-Chandiposh from Tarkera end without isolating 220 kV Rengali-Chandiposh which led to tripping of both lines on SOTF.*
- *Disturbance report is not being shared by OPTCL/SLDC Odisha within prescribed timeline which is hampering timely analysis of the event.*

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.

Regarding restoration of other bus bar at Rengali, OPTCL representative submitted that issue had been communication to higher authority. He updated that the substation is already covered under phase-2 of project for SAS upgradation. Under SAS project implementation, issues like bus bar protection, restoration of other bus and implementation of differential protection will be resolved.

PCC opined those issues like restoration of bus bar, bus bar protection etc at Rengali S/s are very important for reliability of grid and there are chances of further grid disturbances involving huge generation loss and load loss if issues will not be resolved in timely manner. Further as per status deliberated by OPTCL, it can be assumed that around 2- 3 yrs will be taken to resolve issues at Rengali S/s and there is no alternative arrangement for the same hence PCC advised ERPC Secretariat to highlight the issue in higher forums of ERPC.PCC also advised OPTCL representative to share target date and plan to ERPC/ERLDC for resolving mentioned issues.

On tripping of 220 kV Tarkera-Chandiposh from Tarkera end in SOTF protection due to charging of line from Tarkera end without isolating 220 kV Rengali-Chandiposh fault, PCC viewed that standard operating procedure/safe practices was not followed by SLDC Odisha/OPTCL for this case and advised SLDC Odisha to strictly follow the Standard procedure before charging of a line/element.

Regarding DR submission, PCC advised SLDC Odisha representative to coordinate with concerned utilities for submission of disturbance report on time.

ITEM NO. B.5: Total Power Failure at 220 kV Garaul (BSPTCL) S/s on 09.05.2024 at 08:02 Hrs

220kV Muzaffarpur-Garaul circuit 1 was under breakdown prior to the disturbance. At 08:02 hrs, 220kV Muzaffarpur-Garaul-2 tripped due to R-N fault which led to total power failure at Garaul.

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

Load Loss:15 MW
Outage Duration: 03:00 Hrs

BSPTCL may explain.

Deliberation in the meeting

220kV Garaul is fed by 220kV Muzaffarpur-Garaul D/C line. 220kV Muzaffarpur-Garaul circuit 1 is under breakdown since 11th June 2022.

On 9th May 2024 at 08:02 Hrs, R phase fault developed in 220kV Muzaffarpur-Garaul circuit 2 and line got tripped leading to total power failure at Garaul S/s. Heavy thunderstorm was reported during the incident. The line was charged after delay of 3 hrs due to failure of closing command of breaker at Muzaffarpur (PG) end whose bay is owned and maintained by BSPTCL.

BSPTCL representative informed that there was issue in spring charge mechanism of one pole of breaker due to which contactor was not getting picked up and further there was issue in dc circuit due to which dc was not extended therefore charging of line was delayed by 3 hrs at PG end.

On unsuccessful A/R operation, he informed that at Garaul end, Main 1 and Main 2 relay pick up the fault in zone 1 and single pole tripping was observed however the A/R signal was not extended through BCU. He 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.

ITEM NO. B.6: Disturbance at 220 kV Dalkhola (WBSETCL) S/s on 31.05.2024 at 02:42 Hrs

132 kV Bus PT got burst at Dalkhola(WB) and 132 kV Bus became dead. At the same time, 220 kV Dalkhola(PG)-Kishanganj D/c also tripped from Ksihanganj in Zone-3. Consequently, 220 kV Dalkhola (WB) S/s became dead.

Disturbance report from ERLDC is attached at **Annexure B.6.**

Load Loss:4 MW
Outage Duration: 00:10 Hrs

WBSETCL may explain.

Deliberation in the meeting

Based on the report received from WBSETCL, ERLDC representative explained the event as follows:

- *A three-phase fault was developed in 132 kV Dalkhola-Islampur-2 in close vicinity of Dalkhola S/s. The line tripped in Zone-1 at Dalkhola end and in Zone-2 protection from Islampur end after 450 msec.*
- *Due to aforesaid tripping, it is suspected that 132 kV R phase bus PT at Dalkhola got failed. During this, 132/33 kV 20 MVA transformer tripped on REF.*

- *After around 350 msec, another phase-to-phase fault developed at Dalkhola (WB) which persisted for around 900 msec leading to development of fire and resulting in bus fault. 132 kV Bus Bar protection didn't operate as it was under commissioning stage.*
- *Due to non operation of bus bar protection, 132 kV Dalkhola-Islampur-1, 132 kV Dalkhola-Raiganj D/c tripped in Zone-1 from Dalkhola end instead of Zone 4 probably due to absence of R ph PT secondary voltages because of fault in the PT itself.*
- *Fault was finally cleared when 220 kV Kishanganj-Dalkhola (PG) tripped from Kishanganj end in Zone-3.*

WBSETCL updated that busbar protection at 132 kV Dalkhola which was in commissioning stage during the time of disturbance has been commissioned on 11.06.2024.

ERLDC representative opined that as per ideal protection scheme, tripping of 220/132 kV ICT at Dalkhola should have occurred first following with tripping of 220 kV Dalkhola-Dalkhola (PG) and 220 kV Kishanganj-Dalkhola (PG) at last. However, during the incident, 220 kV Kishanganj-Dalkhola (PG) tripped from Kishanganj end in Zone-3 and there was no tripping of ICT. WBSETCL representative replied that after the incident, relay setting at 160 MVA transformer HV side was reviewed and revised to 456A/NI/Directional forward/0.2 so that bus fault on 132 KV side can be cleared within 800 ms.

ERLDC representative enquired WBSETCL representative regarding reason behind operation of REF protection in transformer during the bus fault for which WBSETCL representative replied that during REF stability test it was found that neutral CT connection was loose leading to high CT resistance which had been rectified on 18th June 2024.

Regarding tripping of 220 kV Kishanganj-Dalkhola from Kishanganj end in zone-3, Powergrid representative replied that settings were reviewed at Kishangunj end and as per network configuration, longest line from Dalkhola is 98 km and Dalkhola- Dalkhola(PG) is 1 km so by considering longest line, zone 3 reach is encroaching lower voltage level. He suggested that time settings may be increased to 1 second.

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.

ITEM NO. B.7: Major grid events other than GD/GI

A) Bus tripping occurred in Eastern Region during April'24

Element Name	Tripping Date	Reason	Utility
765 kV Bus-2 at New Ranchi	11.05.2024 at 18:19 Hrs	-	PG ER-1

Powergrid may explain.

Deliberation in the meeting

Powergrid representative explained the event with help of report which is attached at ***Annexure B.7.A.***

- *765kV New Ranchi-Dharamjaygarh-I got tripped due to SOTF/TOR operation and after 7 minutes, 765kV Main Bus-II got tripped due to Busbar differential protection operation.*
- *Subsequently all bays connected with bus 2 got tripped along with ICT-II from HV side. After 220 ms, LBB protection got operated for 706 Bay due to which 400 kV side bay of ICT-II got tripped on intertrip from LBB trip to clear the fault.*

After detailed investigation, very high SO2 was found in R-Ph CT of 706 Bay, which shows that internal flash has occurred in CT (Make- Trech Germany) due to which Bus fault has occurred. As the location of CT is towards feeder side (i.e. after CB), the fault was not cleared even after Bus bar operation, hence LBB of this bay also operated, which in turn tripped the ICT from 400kV side and fault was cleared.

B) Repeated tripping of transmission lines during the month of May'24

S.No.	Name of the Element	No. of times Tripped	Remarks	Utility
1	220 kV Joda-Ramchandrapur-1	7	Fault in B_ph in 5 instances.	JUSNL/OPTCL
2	220 kV Daltoganj-Chatra-1	5	Y_B fault in three instances.	JUSNL
3	220 kV Rengali (PH)-TSTPP-1	4	Fault in R_ph in three instances.	OPTCL

Concerned utilities may explain.

Deliberation in the meeting

- ***Repeated Tripping of 220 kV Joda-Ramchandrapur-1***

JUSNL representative informed that repeated tripping on this line was observed in May 2024 and most of tripping had occurred near 50-55 km from Ramchandrapur end. During patrolling/survey, issues like vegetation growth (forest area), damaged insulators (cracks in insulators) were found.

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.

- ***Repeated Tripping of 220 kV Daltoganj-Chatra-1***

JUSNL representative informed that tripping of the line occurred due to conductor snapping at Daltongunj end.

On 24/5/2024, tripping occurred due to jumper snapping of 220 kV Latehar – Chatra resulting in total power failure at Chatra.
On 28th May 2024, during tree cutting work, branch of tree fell on circuit 1 and circuit 2 resulting in tripping of both circuits.
On 6th May 2024 tripping had occurred at 105 km from Chatra end however no physical fault was found.
On 11th May 2024, heavy thunderstorm was reported and tripping had occurred at 19 km from Chatra end however on patrolling, no fault was found physically.

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.

PCC advised JUSNL representative to do all preventive maintenance activities periodically in order to avoid repeated tripping of line.

- ***Repeated Tripping of 220 kV Rengali (PH)-TSTPP-1***

OPTCL representative informed that 220 kV Rengali (PH)-TSTPP-1 had tripped repeatedly in May 2024 due to R phase transient faults developed due to clearance issues in corridor. He further informed that clearance issues have already been resolved and it is expected that no further tripping will be observed for this line.

ITEM NO. B.8: 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. For the month of May'24, only WBSETCL has submitted the same, which is attached as **Annexure B.8**. Other utilities are requested to submit the details every month for necessary compliance.

Concerned utilities may update.

Deliberation in the 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.

ITEM NO. B.9: Single Line Tripping Incidences in month of May 2024

Single line tripping incidents in the month of May 2024 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 2024 is attached at ***Annexure B.9.***

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.

Members may discuss.

Deliberation in the 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.

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.

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

Deliberation in the 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.

ITEM NO. C.3: 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 attached at ***Annexure C.3.***

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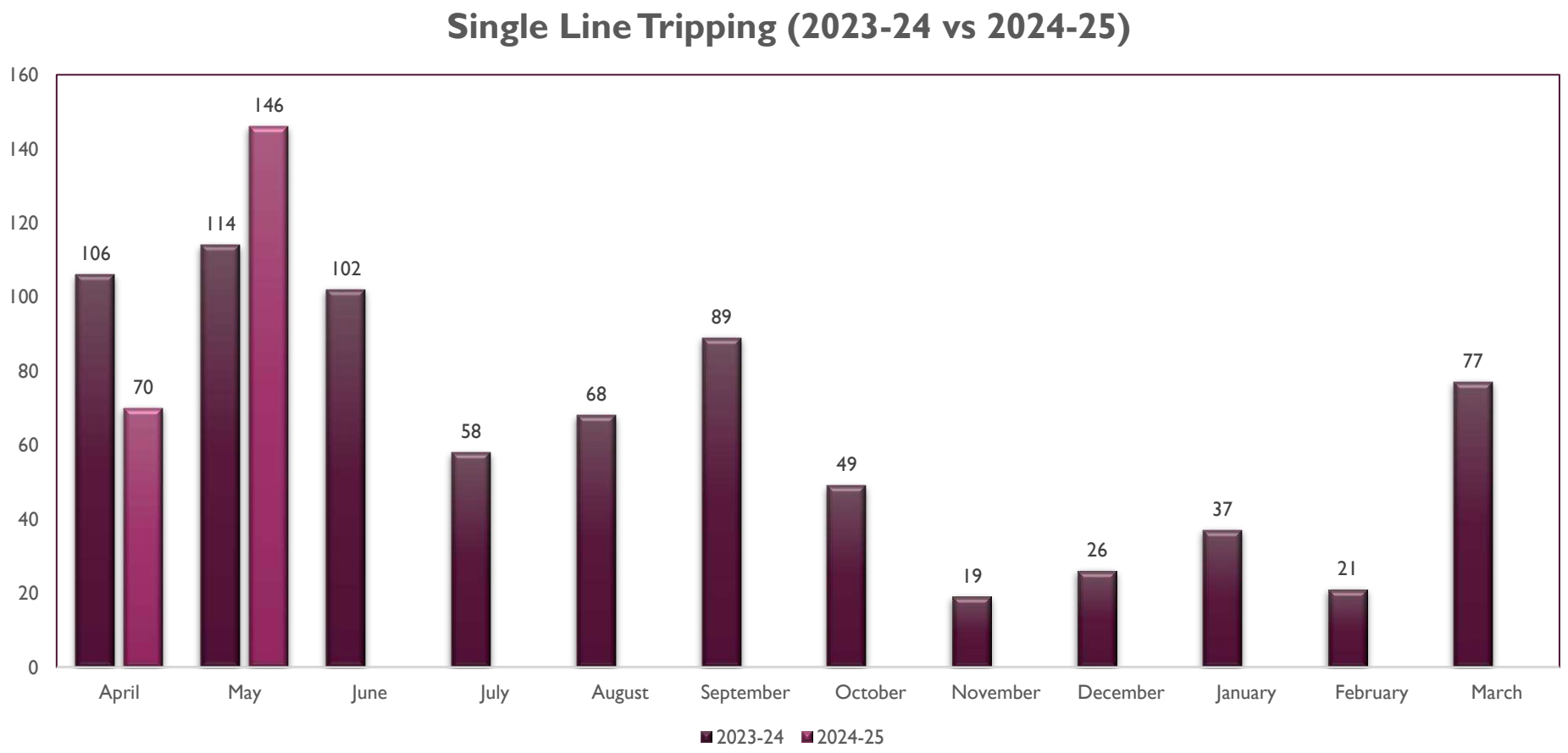
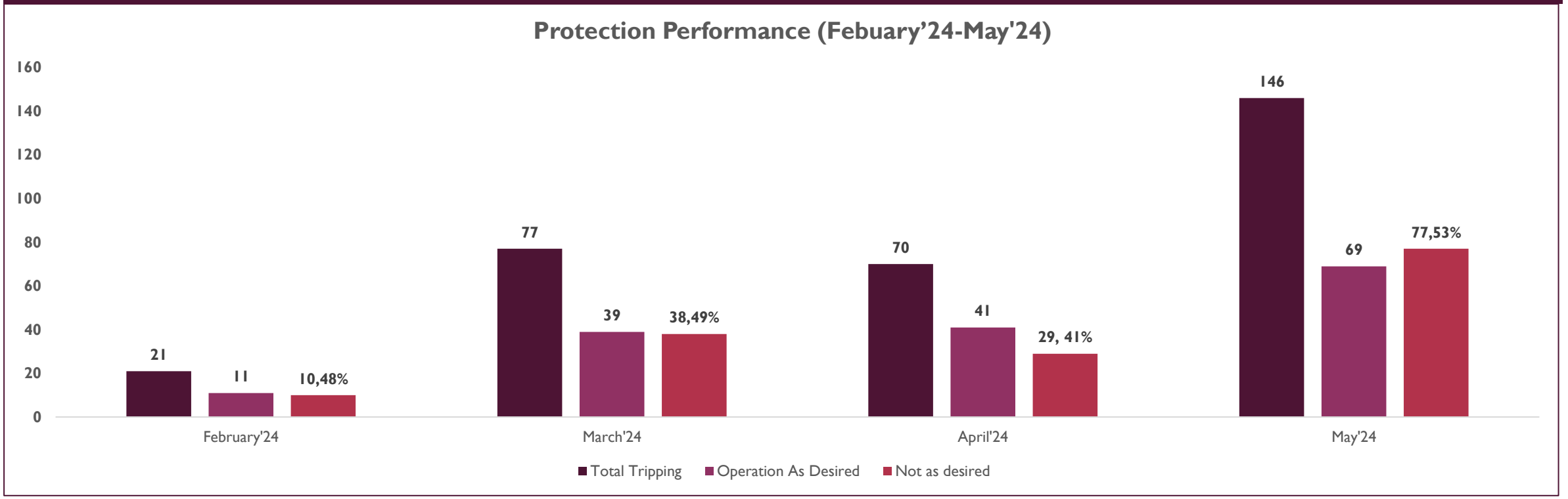
Annexure A.1

ER PROTECTION STATISTICS FOR THE MONTH OF MAY'24

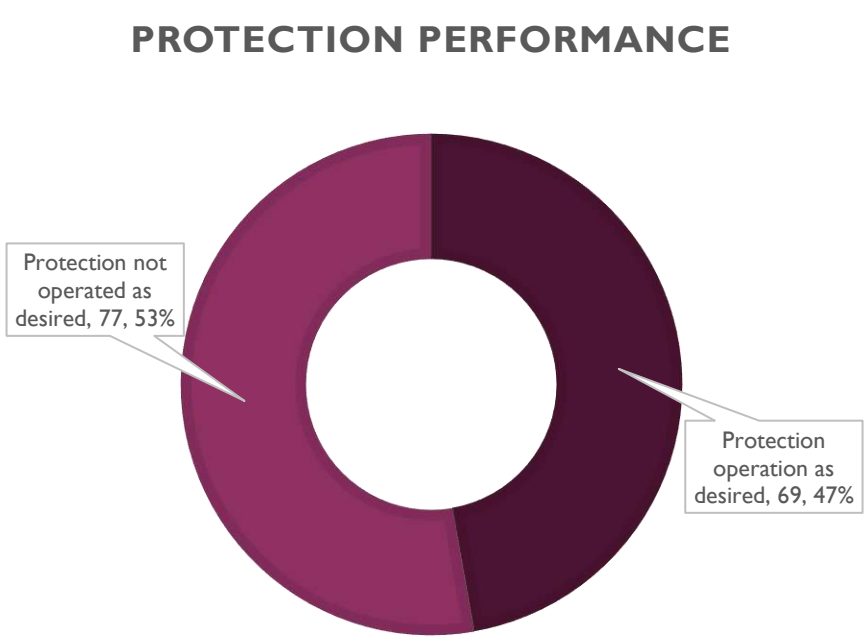
SINGLE LINE TRIPPING

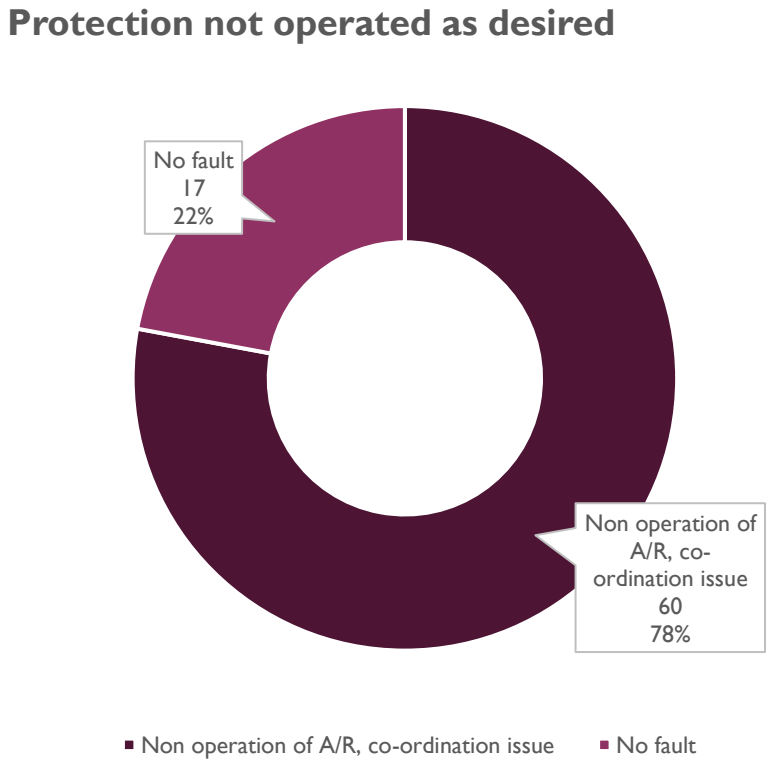


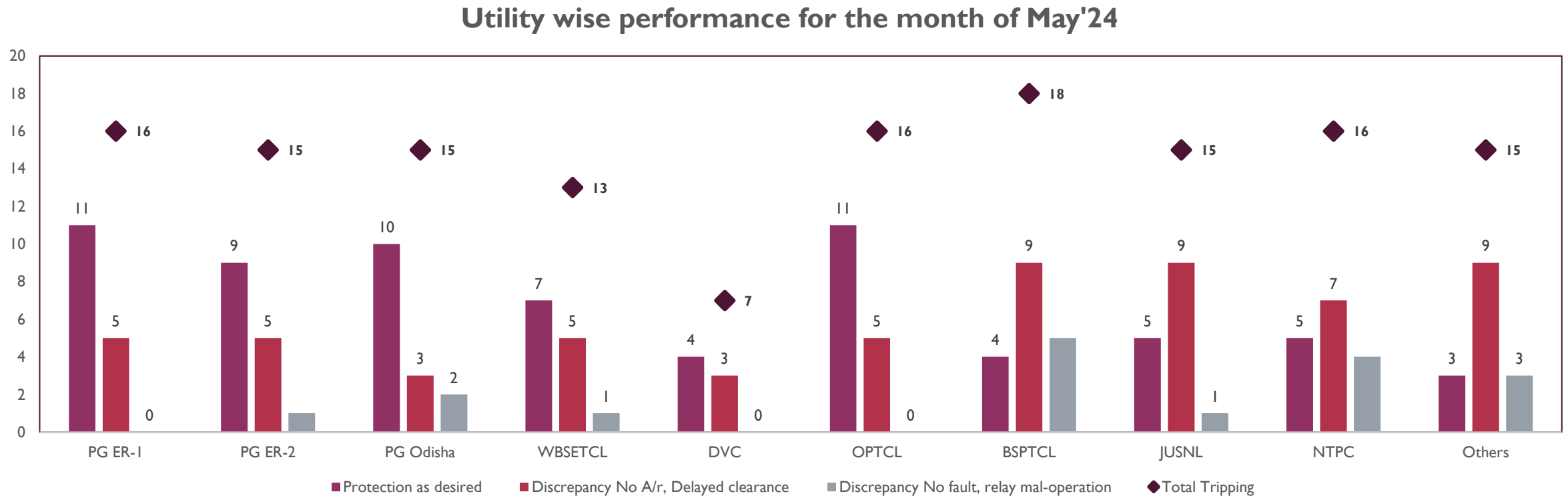


PROTECTION PERFORMANCE

PROTECTION PERFORMANCE (MAY'24)







UTILITY WISE PERFORMANCE

THANK YOU

List of participants in 136th PCC Meeting held on 19/06/2024 Annexure A.2

Name	**First Join**	**Email**			
ERPC Kolkata	6/19/24, 10:27:55 AM	ERPC@KolkataMST.onmicrosoft.com			
Rakesh Kr Pradhan (External)	6/19/24, 10:28:04 AM	rkpradhan@erldc.onmicrosoft.com			
Director(E) (Guest) (Unverified)	6/19/24, 10:28:04 AM				
MR Chauhan (Unverified)	6/19/24, 10:28:04 AM				
SLDC ODISHA (Unverified)	6/19/24, 10:28:04 AM				
CE CTD WBSETCL (Unverified)	6/19/24, 10:28:05 AM				
Kumar Satyam, ERPC (Unverified)	6/19/24, 10:28:05 AM				
CRITL BSPTCL (Unverified)	6/19/24, 10:28:05 AM				
Surajit Roy (HEL) (Unverified)	6/19/24, 10:28:06 AM				
Rajerdra Prasad Tenughat (Unverified)	6/19/24, 10:28:07 AM				
Sudeep Kumar {सुदीप कुमार} (External)	6/19/24, 10:28:07 AM	sudeepkumar@powergrid.in			
SMS SAHOO, DGM(ELECT), OPTCL, BHUBANESWAR (Unverified)	6/19/24, 10:28:07 AM				
OPTCL MERAMUNDALI (Unverified)	6/19/24, 10:28:14 AM				
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Akash Kumar Modi (External)	6/19/24, 10:28:46 AM	akmodi@erldc.onmicrosoft.com			
SLDC,ODISHA (Unverified)	6/19/24, 10:29:03 AM				
Subtoto Khastagir	6/19/24, 10:29:22 AM				
arindam (Unverified)	6/19/24, 10:29:32 AM				
Pranav Rathore (External)	6/19/24, 10:29:43 AM	pranav.rathore@indigrid.com			
Gulshan - Rongnichu (Unverified)	6/19/24, 10:30:19 AM				
Birendra kumar ttps (Unverified)	6/19/24, 10:31:00 AM				
Kumar Niraj (External)	6/19/24, 10:31:25 AM	nirajkumar@tatapower.com			
Alok Pratap Singh (External)	6/19/24, 10:31:46 AM	apsingh@erldc.onmicrosoft.com			
Rahul Anand (External)	6/19/24, 10:31:53 AM	RAHULANAND@NTPC.CO.IN			
s k (Unverified)	6/19/24, 10:32:55 AM				
WBPDCL (Unverified)	6/19/24, 10:33:03 AM				
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Dilip Kant Jha (Unverified)	6/19/24, 10:33:55 AM				
V Anil krishna (Unverified)	6/19/24, 10:33:59 AM				
jitesh kumar (Unverified)	6/19/24, 10:34:04 AM				
Mayank Teotia (External)	6/19/24, 10:34:22 AM	mayankteotia@erldc.onmicrosoft.com			
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Vallamsetty Anil Krishna {वेलमसेठी अनिल कृष्णा} (External)	6/19/24, 10:35:05 AM	anil.krishna.250@powergrid.in			
ATUL PRAKASH	6/19/24, 10:35:39 AM				
D Tripathi (Unverified)	6/19/24, 10:35:55 AM				
DGM,EMR,Burla,OPTCL (Unverified)	6/19/24, 10:36:03 AM				
Rajiv Kumar Singh (Unverified)	6/19/24, 10:36:07 AM				
Suraj Gupta (Unverified)	6/19/24, 10:36:50 AM				
Rahul (Unverified)	6/19/24, 10:37:11 AM				
Mithun Gayen {मिथुन गायेन} (External)	6/19/24, 10:37:23 AM	mithun.gayen@powergrid.in			
Bilash Achari (External)	6/19/24, 10:39:07 AM	bilash.achari@erldc.onmicrosoft.com			
pravin ram (Unverified)	6/19/24, 10:39:39 AM				
Pinki Debnath (External)	6/19/24, 10:41:05 AM	pinkidebnath@erldc.onmicrosoft.com			
Dilshad Alam (Unverified)	6/19/24, 10:42:02 AM				
ms erpc (Unverified)	6/19/24, 10:42:48 AM				
Vikash Kumar	6/19/24, 10:43:12 AM				
AEE Critl BSPTCL (Unverified)	6/19/24, 10:43:37 AM				
TCSD, Tenughat (Unverified)	6/19/24, 10:46:20 AM				
Braja Das (External)	6/19/24, 10:47:43 AM	braja.das@opgc.co.in			
Pranay Jena	6/19/24, 10:47:59 AM	ppjena@KolkataMST.onmicrosoft.com			
CRITL, JUSNL (Unverified)	6/19/24, 10:48:06 AM				
Sarfraj (Unverified)	6/19/24, 10:49:00 AM				
Manas Mohapatra (External)	6/19/24, 10:50:44 AM	manas.mohapatra@opgc.co.in			
DGM,E&MR.J.Road.OPTCL (Unverified)	6/19/24, 10:50:59 AM				
Asit (Unverified)	6/19/24, 10:55:57 AM				
M P Yadav (Unverified)	6/19/24, 10:57:27 AM				
Eee Critl Bsptcl (Unverified)	6/19/24, 10:59:23 AM				
Satyapriya Behera (External)	6/19/24, 11:02:00 AM	satyapriya.behera@opgc.co.in			
Kurshna samntray (External)	6/19/24, 11:02:01 AM	krushna.samantray@opgc.co.in			
ajay jha (Unverified)	6/19/24, 11:04:05 AM				
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electrical orissa	6/19/24, 11:08:12 AM	electrical_orissa@Jindalgroup.com			
s k (Unverified)	6/19/24, 11:08:15 AM				
Pandi Krishnan N {पाण्डी कृष्णन एन.} (External)	6/19/24, 11:08:47 AM	pandikrishnan.n@powergrid.in			
R.L.PASWAN, DY. GENERAL MANAGER, TC HAZARIBAGH (Unverified)	6/19/24, 11:09:22 AM				

chandan Prasad (Unverified)	6/19/24, 11:10:32 AM				
Ajaykant Jha (Unverified)	6/19/24, 11:16:31 AM				
SEPL_Sanjeev (Unverified)	6/19/24, 11:18:16 AM				
Boni Dhananjay (Unverified)	6/19/24, 11:18:46 AM				
E&MR S/D , BURLA (Unverified)	6/19/24, 11:20:58 AM				
Samai Majhi (Unverified)	6/19/24, 11:27:42 AM				
Saibal Ghosh (External)	6/19/24, 11:29:47 AM	saibal@erldc.onmicrosoft.com			
MRSS BARBIL (Unverified)	6/19/24, 11:30:44 AM				
emr division balangir (Unverified)	6/19/24, 11:33:54 AM				
Ranjan/Ramchandrapur (Unverified)	6/19/24, 11:35:13 AM				
Kuldeep (Unverified)	6/19/24, 11:38:11 AM				
NISAR HUSAIN (Unverified)	6/19/24, 11:41:37 AM				
Prasanna Kumar Sahoo (External)	6/19/24, 11:42:53 AM	PRASANNASAHOO@NTPC.CO.IN			
manish kumar (Unverified)	6/19/24, 11:43:36 AM				
erpc (Unverified)	6/19/24, 11:44:57 AM				
Suresh Babu Kummara (External)	6/19/24, 11:46:29 AM	KSURESHBABU@NTPC.CO.IN			
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Rajiv kr Singh (Unverified)	6/19/24, 12:19:35 PM				
Srity Kumari (External)	6/19/24, 12:39:29 PM	srity.k@tvnl.in			
Nishant Kumar Shankwar (External)	6/19/24, 1:22:37 PM	Nishant.Kumar@energy-sel.com			
SMS SAHOO, DGM, OPTCL (Unverified)	6/19/24, 2:16:56 PM				

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 प्रताप सासन उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event at 765/400 kV Jharsuguda, Pratapsasan S/s 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):05-06-2024

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

At 17:02 Hrs on 21.05.2024, 765 kV Bus Reacotr-1 & 1500 MVA 765/400 kV ICT-1 at Jharsuguda tripped due to failure of the tie bay CT at Jharsuguda. At the same time, 800 MW U#1 at Darlipalli tripped due to tripping of VFDs used for pulverisers which led to loss of fuel. Subsequently, U#3 and U#4 at OPGC also tripped one by one on low forward power. Total generation loss of around 1900 MW occurred within a span of 3 minutes.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 17:02 hrs of 21-05-2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Incident (GI)-2**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** Odisha
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
Pre-Event (घटना पूर्व)	50.09 Hz	30391 MW	25500 MW	3098 MW	5530 MW
Post Event (घटना के बाद)	49.98 Hz	28490 MW	25337 MW	1948 MW	5393 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 around Jharsuguda

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: Approx. 1900 MW (in succession); Load loss: Nil
7. **Duration of interruption (रुकावट की अवधि): 01:48 Hrs**

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

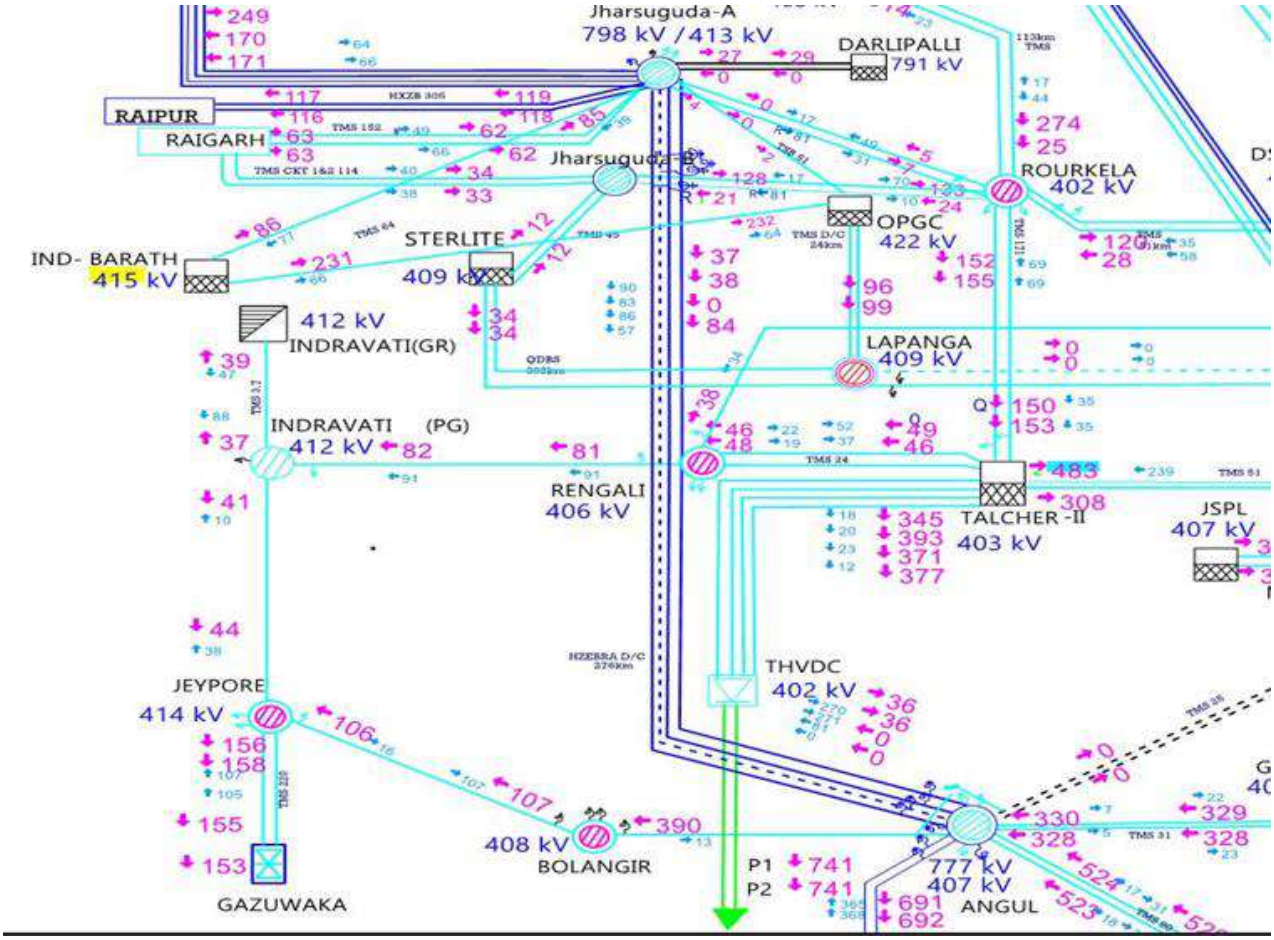


Figure 1: Network across the affected area

9. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): 765 kV R_ph and Y_ph CT of tie bay of 240 MVAr Bus reactor-1 and 765/400 kV ICT-1 at Jharsuguda failed.

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	240 MVAr Bus Reactor-1 at Jharsuguda	17:02:01	Differential protection Operated		18:51
2	1500 MVA 765/400 kV ICT-1 at Jharsuguda		765 kV Tie Bay LBB operated		18:50

3	765 kV Jhasuguda-Darlipalli-2	17:02:01	Jharsuguda: Didn't trip	Darlipalli: R-Y, Zone-1,	19:12
4	800 MW U#2 at Darlipalli	17:02:12	Boiler Tripped. Loss of all fuel, MFT Trip		23:36
5	660 MW U#3 at OPGC	17:04:43	Low forward power		20:13
6	660 MW U#4 at OPGC	17:04:24	Low forward power		23:30

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

- At 17:02:01.520 Hrs, differential protection of 240 MVAr Bus Reactor-1 operated at Jharsuguda due to failure of R_ph and Y_ph CT of its tie bay. However, even after opening of main and tie bay CB of Bus Reacotr, fault still persisted as location of CT was on the other side of TB and ICT-1 which is this dia, kept feeding the fault. This led to operation of LBB of the tie CB at 17:02:01.750 Hrs and ICT-1 tripped from both HV and LV side and fault was cleared.
- At 17:02:01.700 Hrs, 765 kV Jharsuguda-Darlipalli-2 tripped from Darlipalli end as it detected the above fault in Zone-1.
- Subsequently at 17:02:12 Hrs, 800 MW U#2 at Darlipalli tripped due to tripping of Boiler on loss of all fuel. As reported, drives for coal pulveriers tripped on undervoltage. Undervoltage setting is as follows: U/V <65% for 300 msec.
- At 17:04:24 Hrs, 660 MW U#4 at OPGC tripped on Low forward power and 17:04:43 Hrs, 660 MW U#3 at OPGC tripped on low forward power as turbines of both units tripped.

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

- Protection setting of auxiliary drives at Darlipalli is kept on conservative side which led to unnecessary tripping of U#2.
- Both units at OPGC tripped on low forward power one by one. OPGC may explain the reason and take necessary action to avoid unit tripping on such external faults which was cleared within 300 msec.

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

- Protection setting of auxiliary drives at Darlipalli needs to be reviewed.

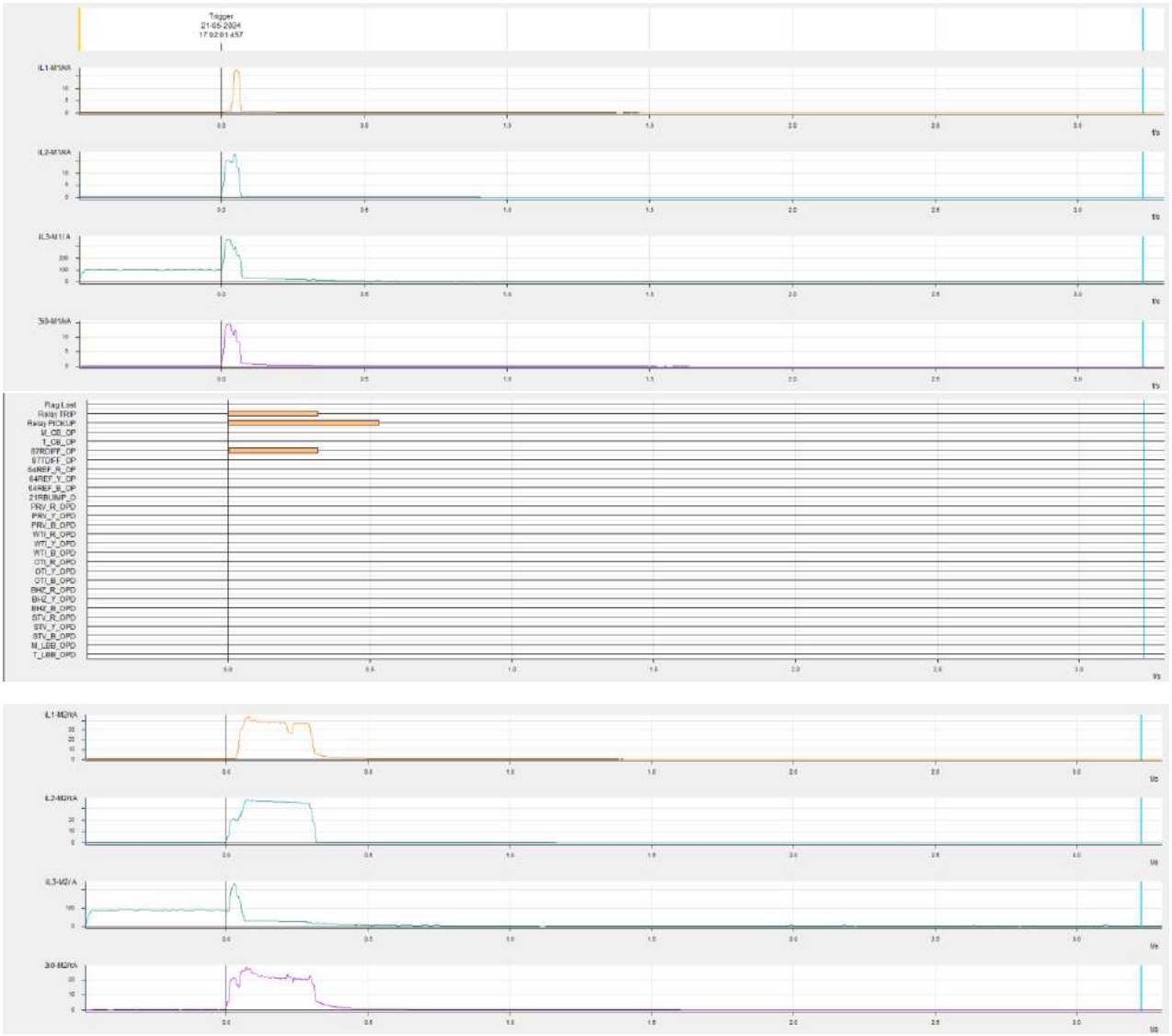
14. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

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

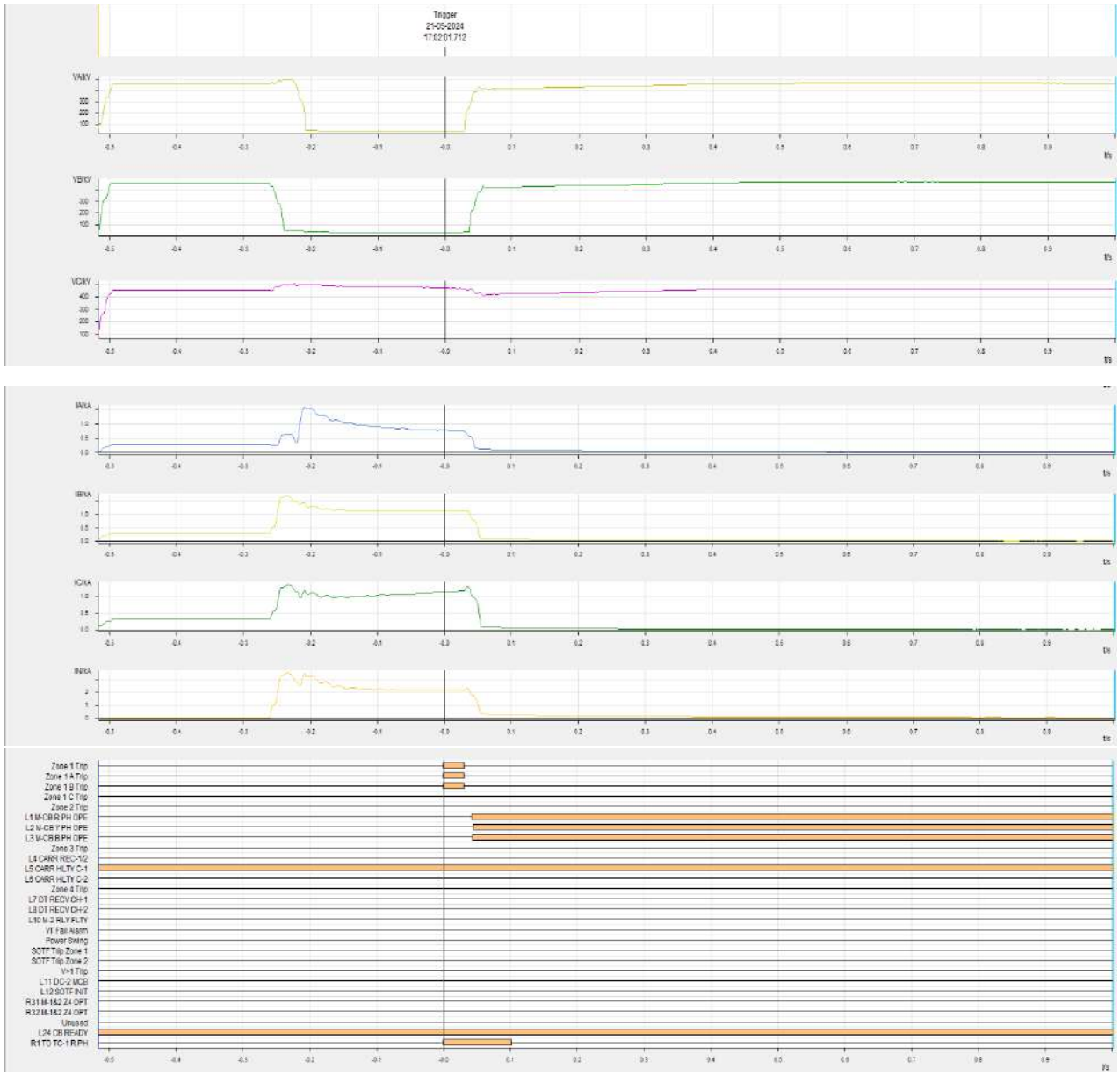
TIME	STATION	DESCRIPTION	STATUS
17:02:01.457	JHRS2_PG	765_Main_Bus_R3_DFP	Operated
17:02:01.712	DSTPP_PG	765_JHARS_PG_2_MP2	Operated
17:13:53.000	DSTPP_PG	765_JHARS_PG_2_MP1	Operated
17:02:01.746	DSTPP_PG	765_JHARS_PG_1_Main_CB	Open
17:02:01.750	DSTPP_PG	765_JHARS_PG_2_Main_CB	Open
17:02:01.753	JHRS2_PG	400_ICT1_Main_CB	Open
17:02:01.790	JHRS2_PG	400_RAIGR_WR_2_ICT1_Tie	Open
17:02:01.821	JHRS2_PG	765_Main_Bus_R1_Main_CB	Open
17:02:01.898	JHRS2_PG	765_ICT1_Main_CB	Open
17:02:02.007	JHRS2_PG	765_ICT1_Main_Bus_R1_Tie	Open
17:02:11.886	DSTPP_PG	765_GT_2_JHARS_PG_2_Tie	Open

Annexure 2:

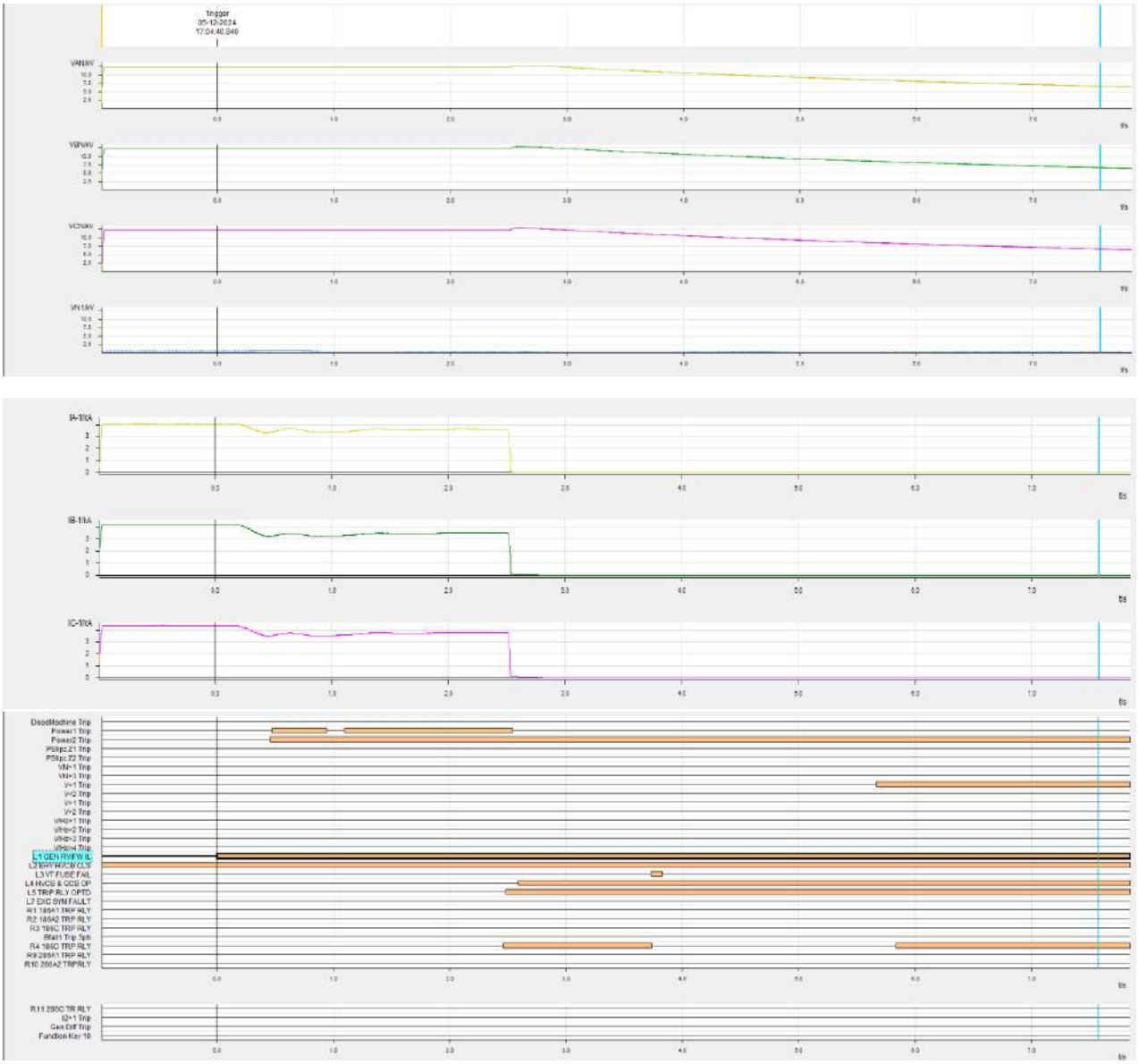
DR of Bus reactor-1 at Jharsuguda



DR of 765 kV Jharsuguda-Darlipalli-2 (Darlipalli)



DR of 660 MW U#3 at OPGC



Report on Multiple Elements Tripping on Dt. 21.05.2024 at Sundargarh SS

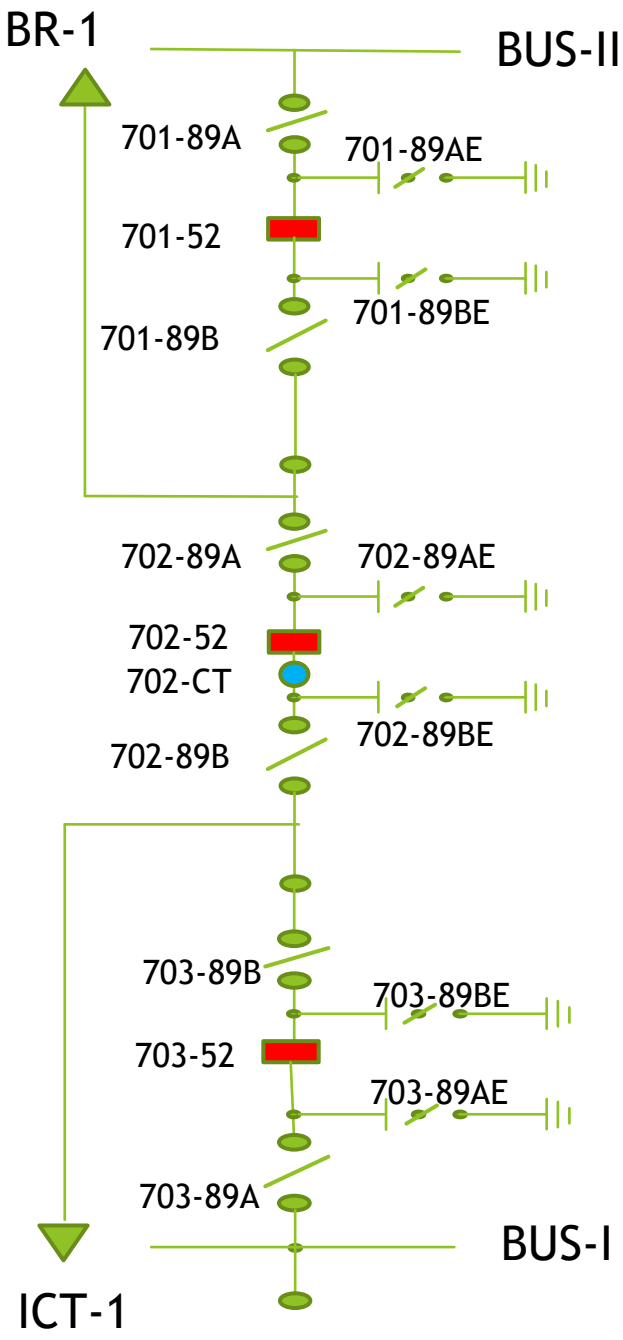
Background:

At Sundargarh SS very heavy lightning & thunderstorm observed from 16:30 hrs for 1 hr on 21-05-2024. During thunderstorm following elements got tripped-

i. 765kV Sundargarh-Angul ckt#4 tripped at 16:53:49 hrs.
ii. 765kV Bus Reactor-1 tripped at 17:02:01:482 hrs
iii. 765/400kV ICT-1 tripped at 17:02:01:718 hrs.

Tripping details of 765kV Sundargarh-Angul ckt#4:

- 765kV Sundargarh-Angul ckt#4 tripped at 16:53:49 hrs on 21-05-2024 due to
- persistent B-G fault at a distance of 0.9KM from Sundargarh end. Fault Current
- Was 28.56kA.
- Line is restored at 18:12 hrs
- B-ph is bottom conductor.
- Flashover noticed in B-ph conductor between loc 786-787 (crossing 400kV LILO-1 i.e. Rourkela-1 & Raigarh-1).
- Clearance measurement is being done.



Tripping details of 765kV BR-1 & ICT-1:

701- MAIN BAY OF 765KV BUS REACTOR-1
702- TIE BAY OF BR-1 & ICT-1
703- MAIN BAY OF 765kV Side of ICT-1
403- MAIN BAY OF 400kV Side of ICT-1
402- TIE BAY OF ICT-1 & Raigarh#2

SEQUENCE OF Events:

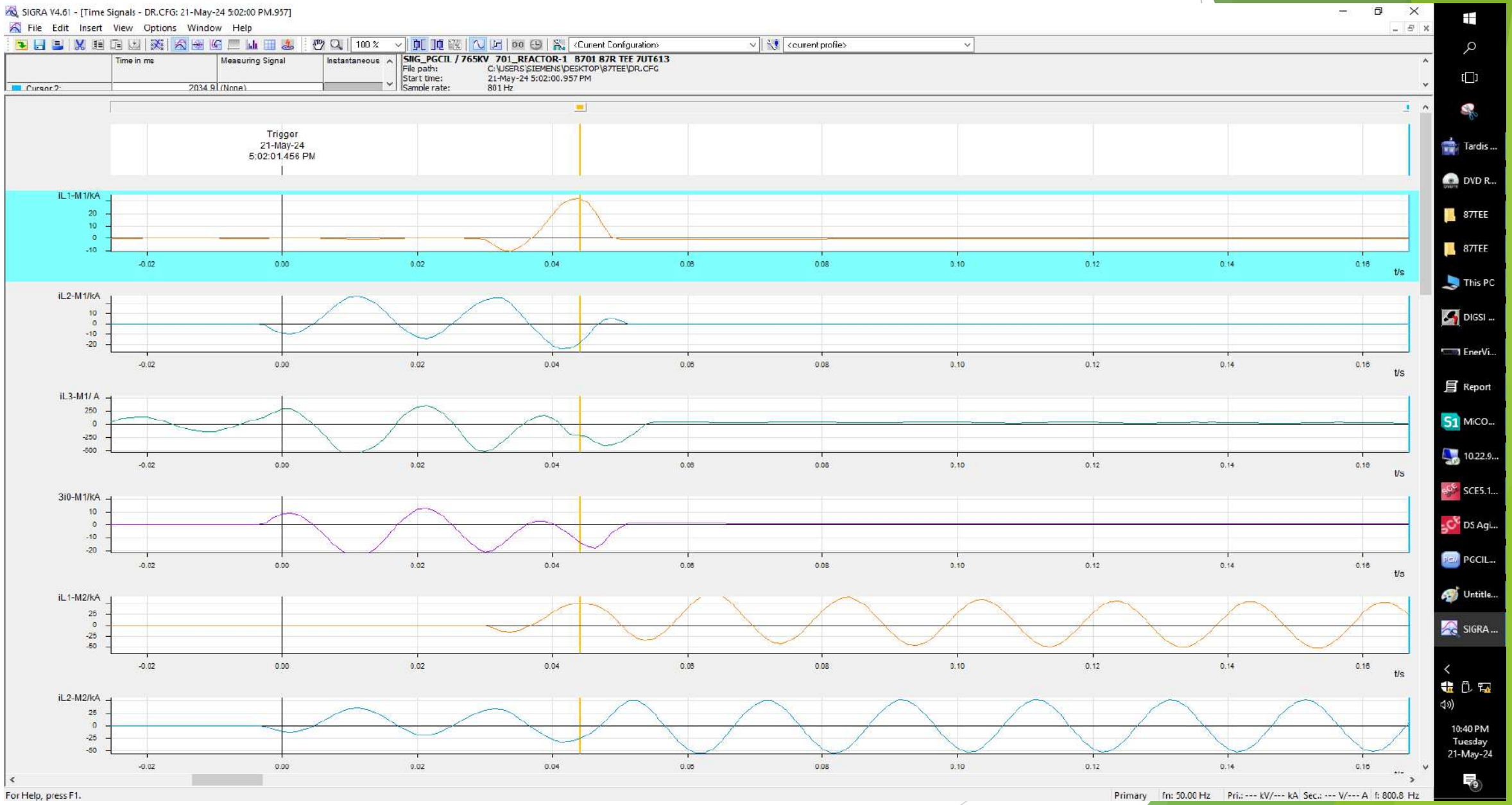
17:02:01:482 Due to R & Y Ph CT failure, Differential current of 18kA detected by Bus Reactor Differential protection. Hence differential protection operated & actuate the Group Relays of 701(Main bay) & 702(Tie Bay). Hence Bus Reactor tripped.

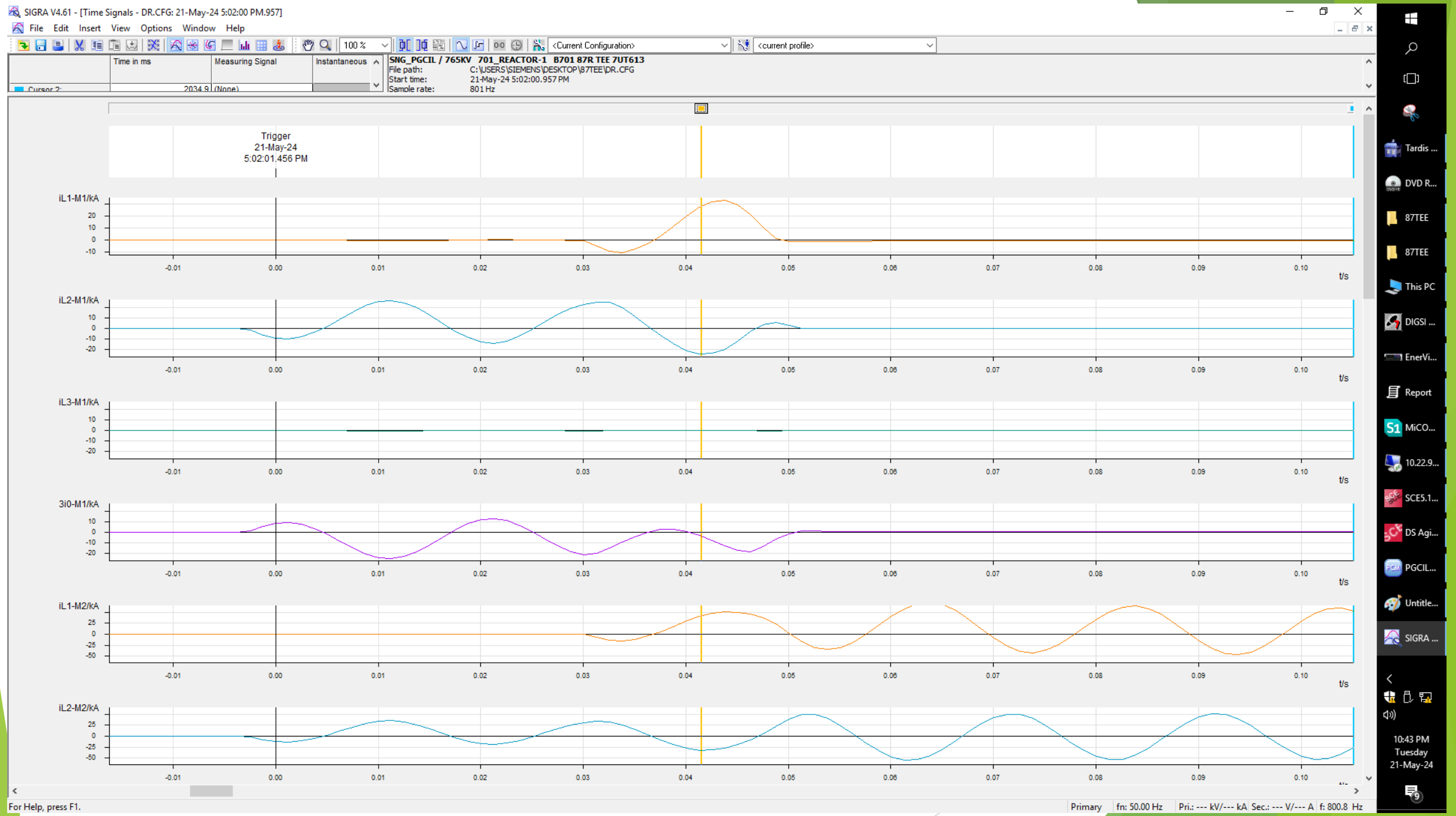
17:02:01:682 702 breaker was open but fault current still flowing through the bay 703, 403 & 402 bays. 3-ph LBB initiation was already there. So after 200msec of fault, LBB protection operated & tripped CB-703, CB-403 & CB-402.

Hence Tripped ICT-1 & isolate the fault.

- Both the suspected damaged CTs are below the shield wire.
- Few 400kV CTs were failed in 2023 due to lightning and earthing audit done in Apr 2024. Report awaited.

DR OF BUS REACTOR DIFFERENTIAL RELAY:

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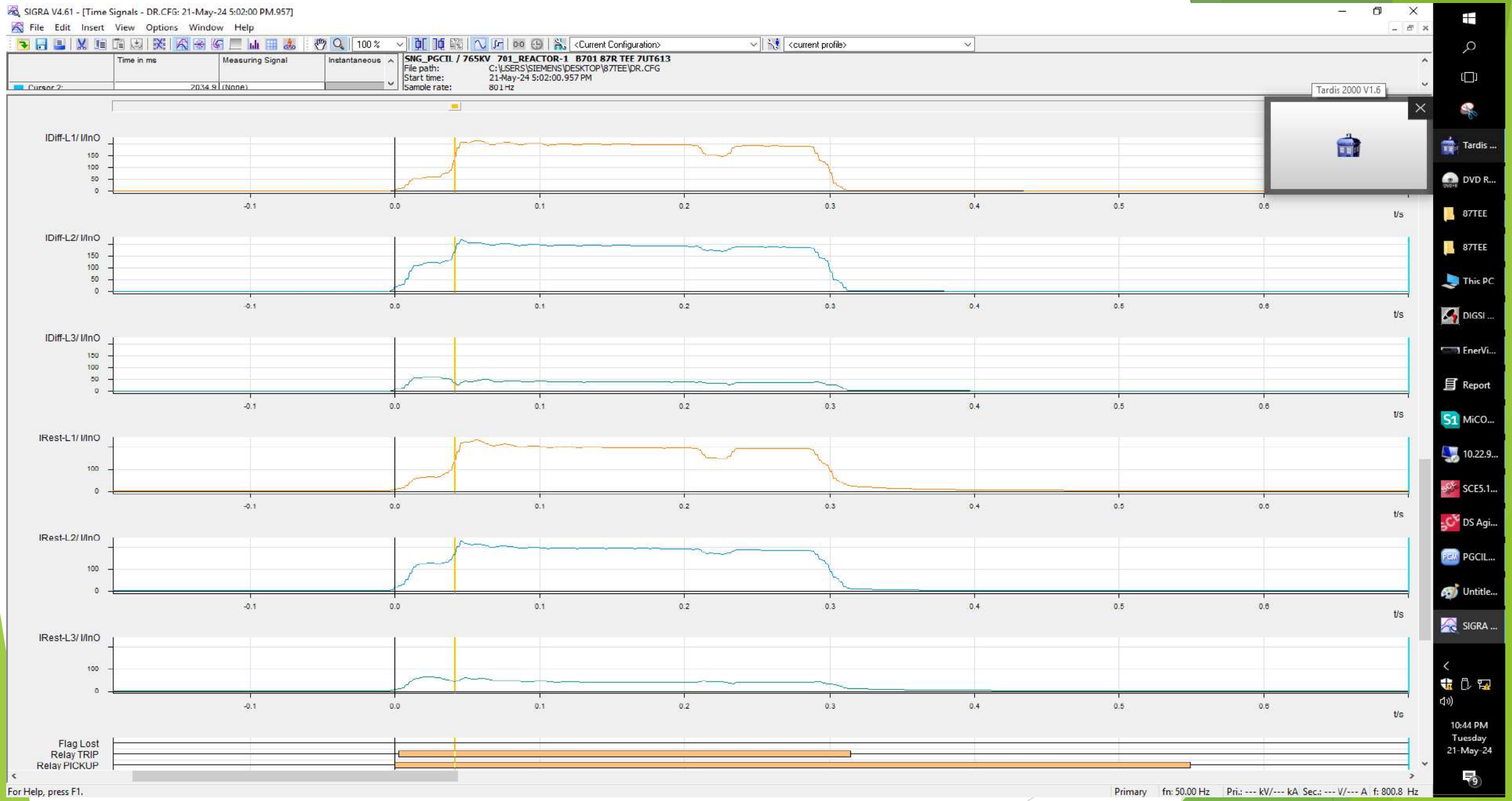
Time in ms
Measuring Signal
Instantaneous
Cursor 2:
2034.9
(None)
SNG_PGCIL / 765KV_701_REACTOR-1_B701 87R TEE 7UT613
File path: C:\USERS\SIEMENS\DESKTOP\87TEE\DR.CFG
Start time: 21-May-24 5:02:00.957 PM
Sample rate: 801 Hz
Trigger
21-May-24
5:02:01.456 PM
iL1-M1/kA
iL2-M1/kA
iL3-M1/kA
3i0-M1/kA
iL1-M2/kA
iL2-M2/kA
t/s
For Help, press F1.
Primary
fn: 50.00 Hz
Pri.: --- kV/--- kA
Sec.: --- V/--- A
f: 800.8 Hz
10:43 PM
Tuesday
21-May-24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File Edit Insert View Options Window Help
Time in ms
Measuring Signal
Instantaneous
SNG_PGCIL / 765KV_701_REACTOR-1_B701 87R TEE 7UT613
File path: C:\USERS\SIEMENS\DESKTOP\87TEE\DR.CFG
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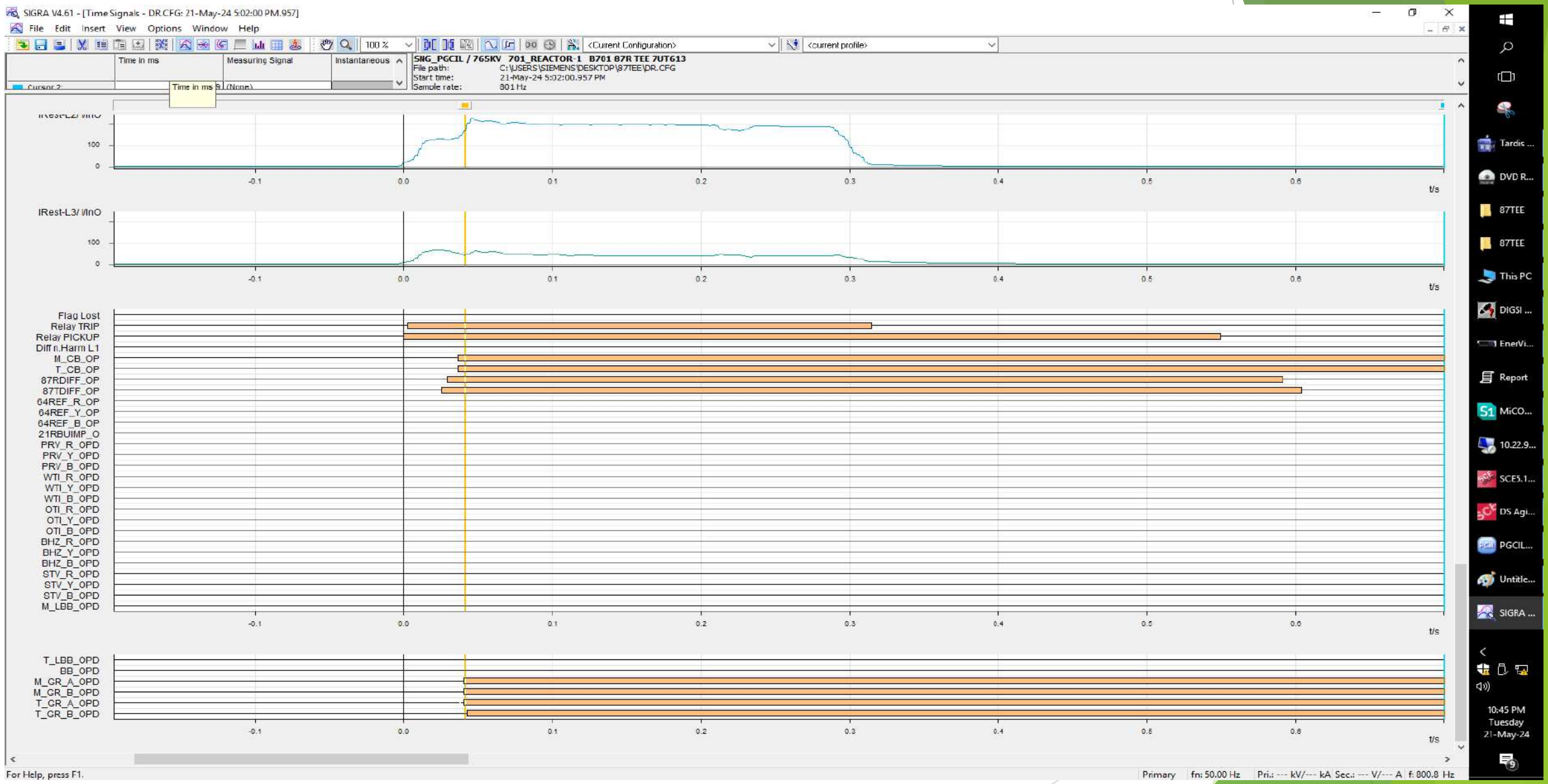
IDiff-L2/ I/InO
IDiff-L3/ I/InO
IRest-L1/ I/InO
IRest-L2/ I/InO
IRest-L3/ I/InO
t/s
Flag Lost
Relay TRIP
Relay PICKUP
Tardis 2000 V1.6
For Help, press F1.
Primary
fn: 50.00 Hz
10:44 PM
Tuesday
21-May-24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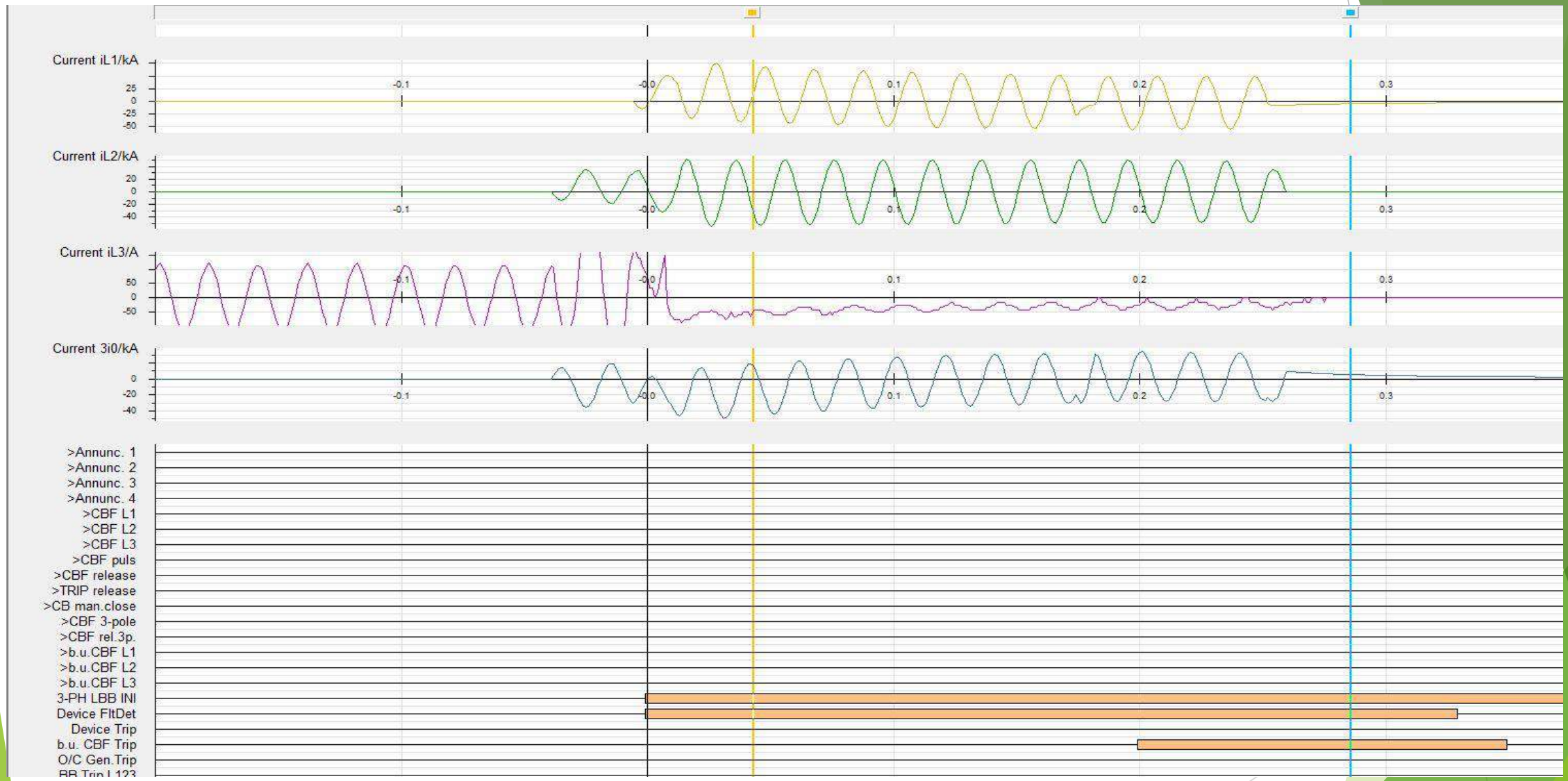
File Edit Insert View Options Window Help
Time in ms
Measuring Signal
Instantaneous
SIG_PGCIL / 765KV_701_REACTOR-1_B701 87R TEE 7UT613
File path: C:\USERS\SIEMENS\DESKTOP\87TEE\DR.CFG
Start time: 21-May-24 5:02:00.957 PM
Sample rate: 801 Hz
IRest-L3/ IInO
Flag Lost
Relay TRIP
Relay PICKUP
Diff n.Harm L1
M_CB_OP
T_CB_OP
87RDIFF_OP
87TDIFF_OP
64REF_R_OP
64REF_Y_OP
64REF_B_OP
21RBUIMP_O
PRV_R_0PD
PRV_Y_0PD
PRV_B_0PD
WTI_R_0PD
WTI_Y_0PD
WTI_B_0PD
OTI_R_0PD
OTI_Y_0PD
OTI_B_0PD
BHZ_R_0PD
BHZ_Y_0PD
BHZ_B_0PD
STV_R_0PD
STV_Y_0PD
STV_B_0PD
M_LBB_0PD
T_LBB_0PD
BB_0PD
M_GR_A_0PD
M_GR_B_0PD
T_GR_A_0PD
T_GR_B_0PD
t/s
For Help, press F1.
Primary
fn: 50.00 Hz
10:45 PM
Tuesday
21-May-24

DR OF Tie LBB Relay:



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 400/220 केवी उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event in 400 kV Haldia TPS 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):14-06-2024

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

At 12:34 hrs., GT-1 at Haldia caught fire due to fault in 400 kV R Phase bushing. Resulting in tripping of Unit-1 due to operation of GT-1 Transformer Differential. At the same time, 400 kV circuit-2 tripped due fault in R phase LA & 400 kV circuit-1 tripped due to E/F. As a result of the outage of both 400 kV circuits, Unit-2 tripped due to over frequency and resulted in a generation loss of about 566 MW.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 12:34 hrs of 29.05.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** West Bengal
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				West Bengal	West Bengal
Pre-Event (घटना पूर्व)	49.96 Hz	25886 MW	28256MW	5975 MW	9965 MW
Post Event (घटना के बाद)	49.96 Hz	25320 MW	28256MW	5409 MW	9965 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)	NA
Weather Condition (मौसम स्थिति)	Normal weather

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: 566 MW; Load loss: NIL.

7. **Duration of interruption (रुकावट की अवधि): 00:46 Hrs**

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

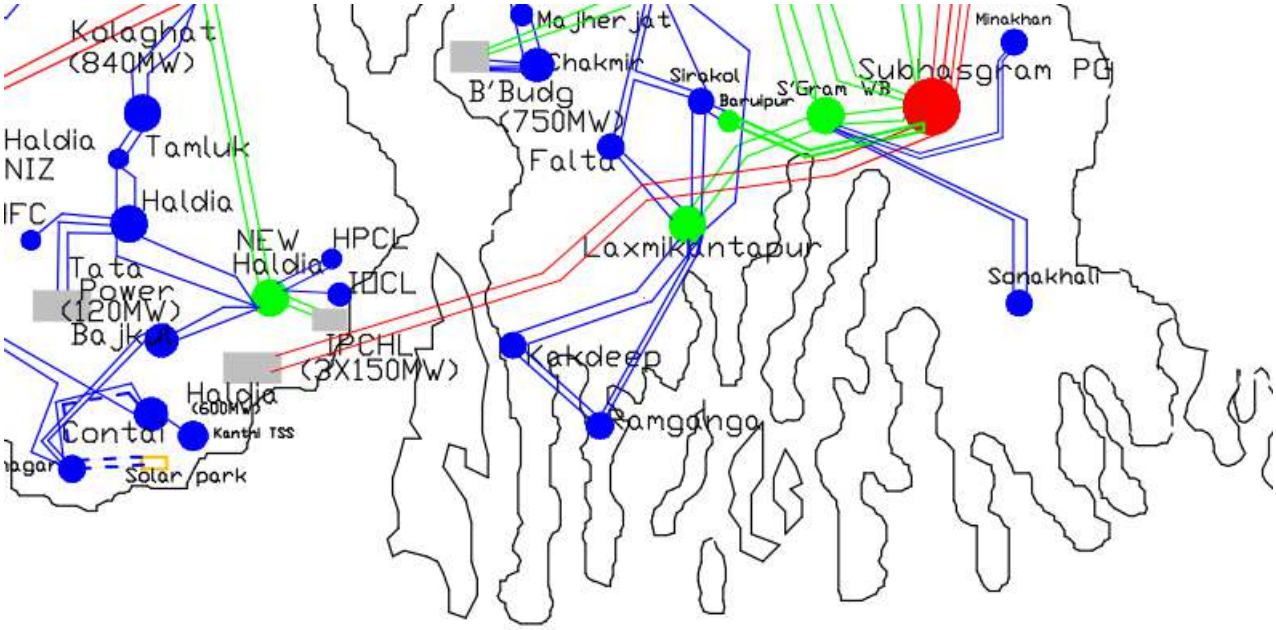


Figure 1: Network across the affected area

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	400KV-Subhasgram -Haldia-2	12:34:04	Subhasgram : R-N , - 63.71 KM , FC - 4.70 kA	Haldia: R_N, 9.59 kA, A/r failed	22:37
2	350 MW U#1 at Haldia		GT differential protection operated. R_ph bushing of GT caught fire.		Not revived yet.
	400KV-Subhasgram -Haldia-1	12:34:05	Subhasgram: R-N - 76.31 KM , FC - 5.63 KA	Haldia: DEF operated, In: 0.7 kA	13:20
4	350 MW U#2 at Haldia	12:34:06	Haldia: Loss of evacuation path		20:25

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

- **At 12:34:04.840 Hrs:** As reported, R_ph LA of 400 kV Haldia-Subhashgram-2 failed at Haldia which was seen by both distance and differential relay at Haldia and R_ph breaker got opened from both ends. A/r attempted after 1 second but line tripped due to persisting fault.
- **At 12:34:05.840 Hrs:** During A/r attempt of Ckt-2, R_ph of 400 kV Haldia-Subahshgram-1 opened from Subhashgram end in Zone-1. Breakers at Haldia remained closed. Current was flowing through only two phase which led to increase in residual current to around 750 A.
- **At 12:34:05.850 Hrs:** GT differential protection operated due to fire in its R_ph bushing and U#1 tripped.
- **At 12:34:06.550 Hrs:** 400 kV Haldia-Subhashgram-1 tripped from Haldia.
- **At 12:34:06.850 Hrs:** Other two phase of 400 kV Haldia-Subahshgram-1 tripped from Subhashgram end.
- Haldia U#2 tripped due to loss of evacuation path.

PMU Snapshot:

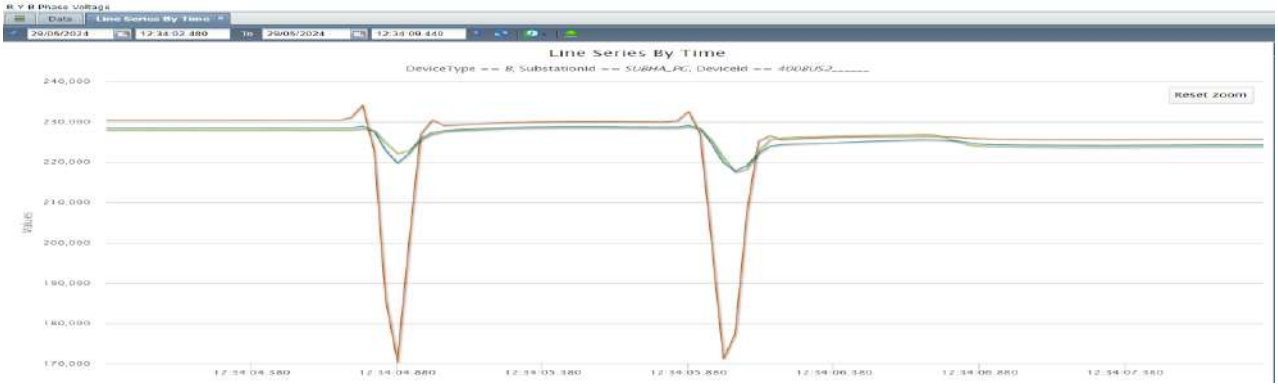


Figure 2: PMU Voltage snapshot of 400 kV Subhasgram S/S

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

- 400 kV Haldia-Subhashgram-1 tripped from Subhahsgram end in Zone-1 despite fault being in its Zone-2. Reason for overreaching may be analyzed by Powergrid.

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

- Zone reach settings at Subhashgram may be reviewed.

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	**Haldia, POWERGRID (ER-II)**

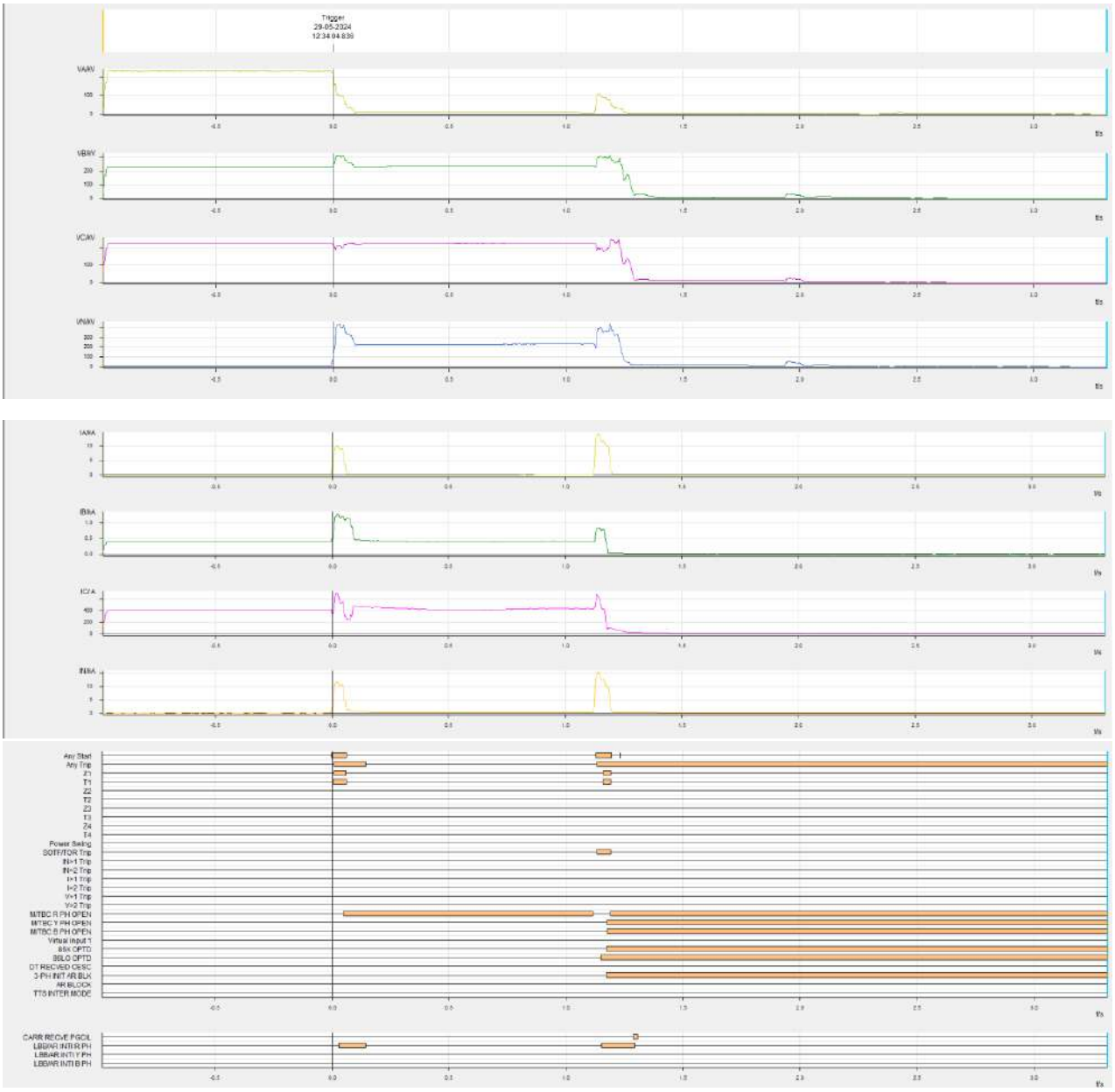
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

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

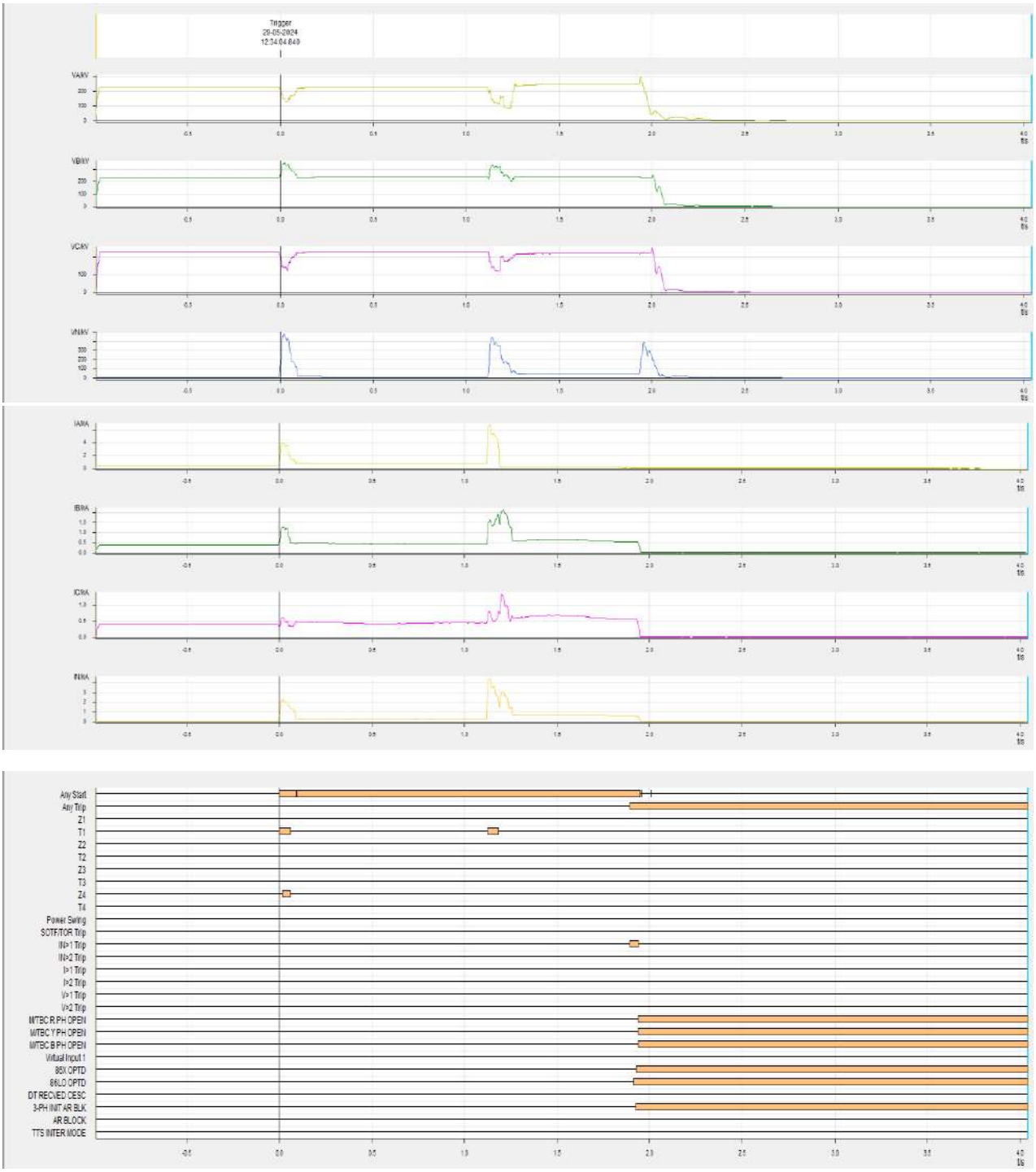
SoE data of Haldia Substation not available in ERLDC Scada.

Annexure 2:

DR of 400 kV Haldia-Subhahsgram-2 (Haldia)



DR of 400 kV Haldia-Subhashgram-1 (Haldia)



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पूर्वी क्षेत्र के 400/220 केवी उप-केन्द्र 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):14-06-2024

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

At 12:57 Hrs on 29.05.2024, Tenughat-Govindpur ckt-I tripped on Y-B Fault and Tenughat-Govindpur ckt II tripped only from Tenughat end as 220KV-Tenughat – Biharsariff was already in tripped condition.This caused tripping of both the running units due to loss of evacuation path at Tenughat and resulted in a generation loss of about 333 MW.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 12:57 hrs of 29.05.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** Jharkhand
5. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				Jharkhand	Jharkhand
Pre-Event (घटना पूर्व)	49.94 Hz	25657 MW	28796MW	333 MW	1923 MW
Post Event (घटना के बाद)	49.94 Hz	25324 MW	28796 MW	0 MW	1923 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-Tenughat – Biharsariff was in tripped condition
Weather Condition (मौसम स्थिति)	Normal weather

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: 333 MW; Load loss: NIL.
7. **Duration of interruption (रुकावट की अवधि): 00:17 Hrs**
8. **Network across the affected area (प्रभावित क्षेत्र का नक्शा)**

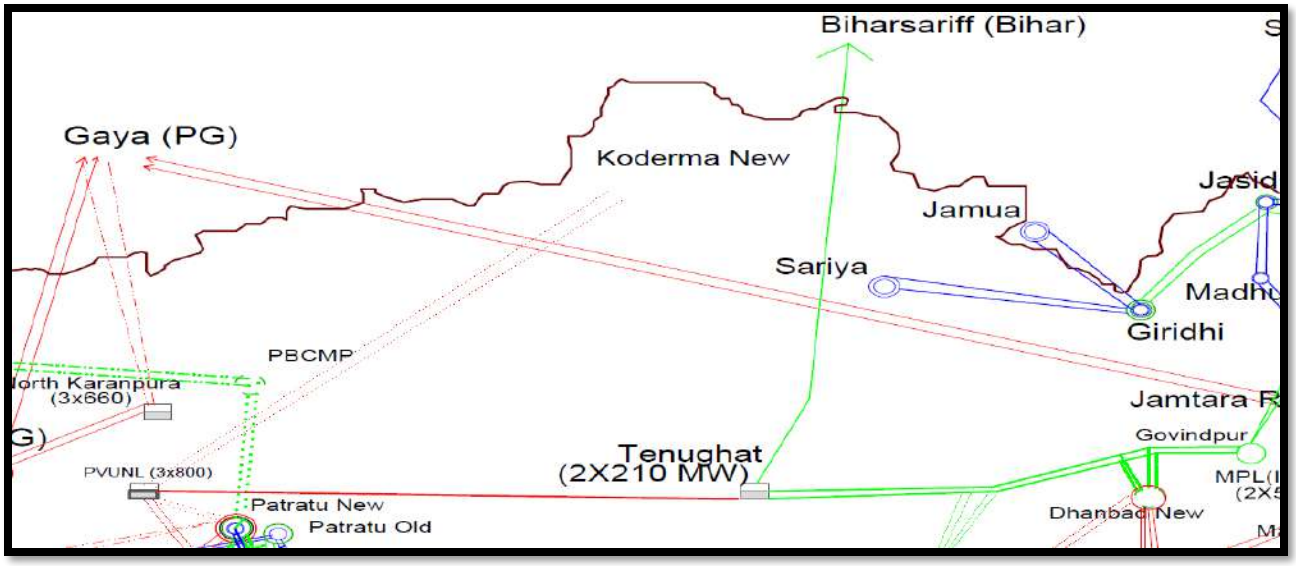


Figure 1: Network across the affected area

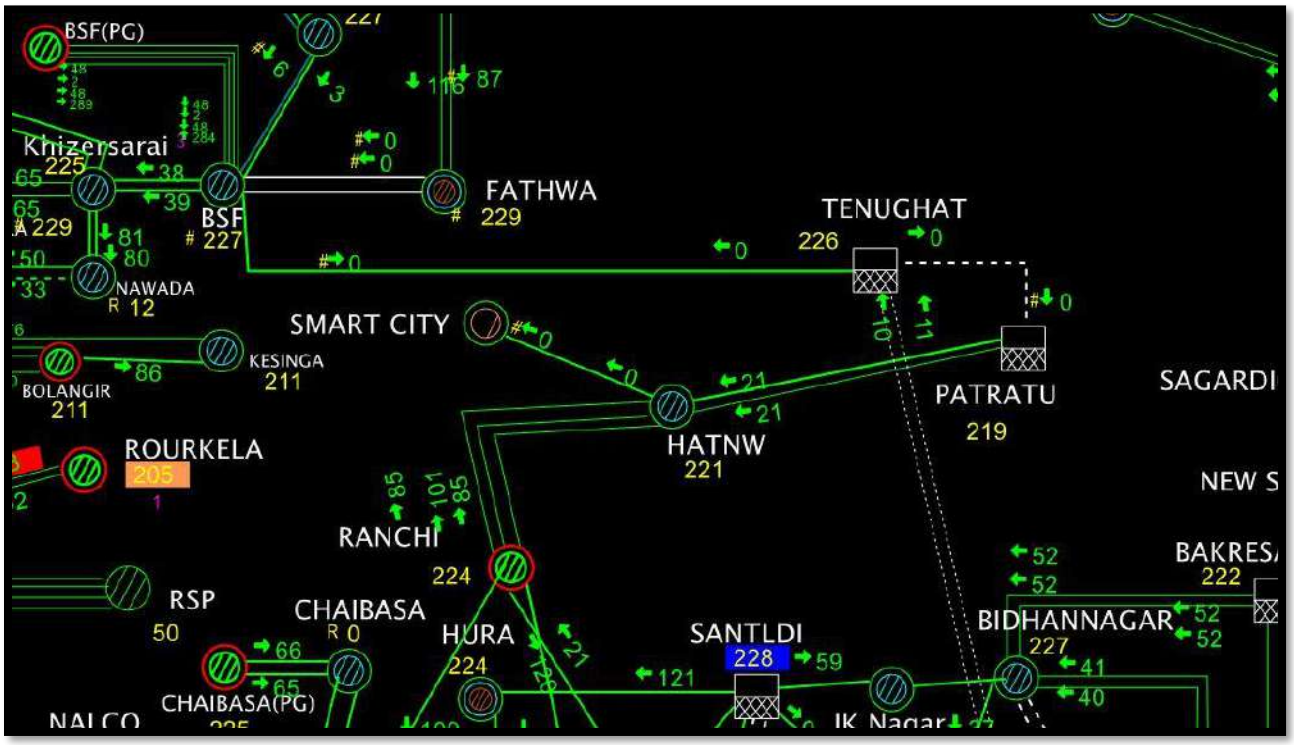


Figure 2: SCADA snapshot of the affected area

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

10. Major Elements Tripped (प्रमुख ट्रिपिंग):

क्र०स०	नाम	Trip time (hh:mm:ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	220 kV Tenughat-Govindpur-1	12:57	Tenughat: O/C, E/F	Govindpur: R-Y, 62Km	13:25
2	220 kV Tenughat-Govindpur-2		Tenughat: Tripped from only Tenughat end		13:14
4	2*210 MW Units at Tenughat	12:57	Tenughat: Loss of evacuation path		U#1: 17:37 U#2: 21:54
5	220 kV Bus-1 & 2 at Tenughat		All emanating lines tripped		-Bus 1 & 2: 13:14

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

- There was a high resistive fault in B phase of TTPS-Govindpur line 1 and line tripped at Tenught end sensing the fault but it did not trip at Govindpur end as current was very less due to high resistive fault.
- As soon as TTPS end breaker tripped, R&Y phase at Govindpur end was intact so feeding charging current while B phase started feeding the fault as there was high resistive fault in B phase, which is visible from DR phasor.

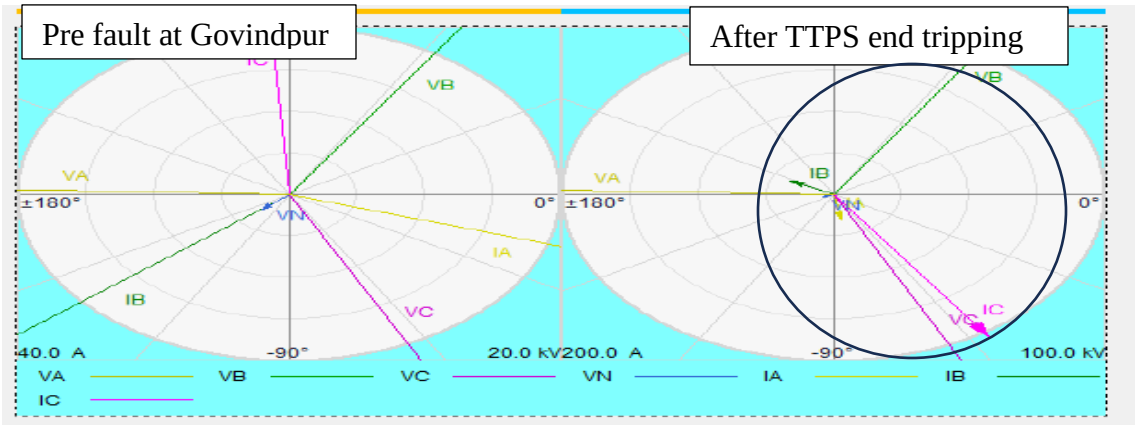


Figure 3: Current reversal in 220 kV Tenughat-Govindpur-1 at Govindpur

- B (C) phase at Govindpur became source after tripping from TTPS end for circuit -1 while in R&Y phase, there was charging current.
- Later when fault evolved and current increased, Govindpur sensed zone2 then zone-1 and tripped the line.

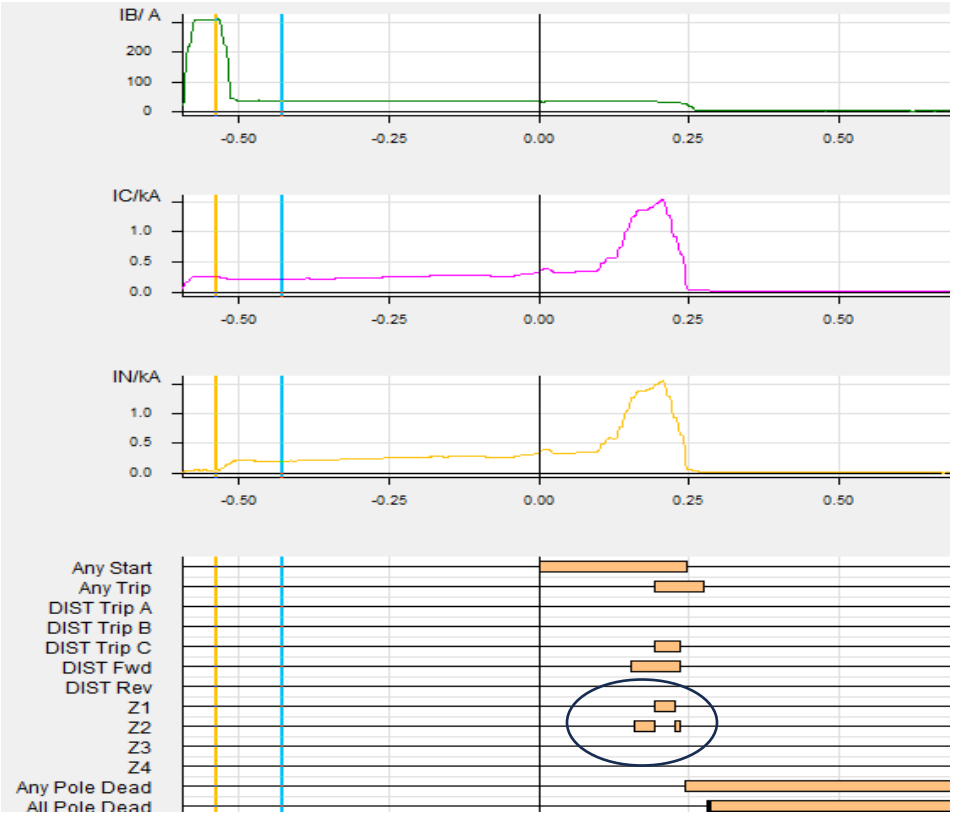


Figure 4: DR of 220 kV Tenughat-Govindpur-1 at Govindpur

- Seems auto reclose was not attempted at Govindpur end. Reason may be explained by JUSNL.
- At the same instance, as circuit 2 at TTPS end was also sensing the same resistive fault continuously, it also tripped on O/C/ E/f protection after 700ms leading to tripping of both circuits.

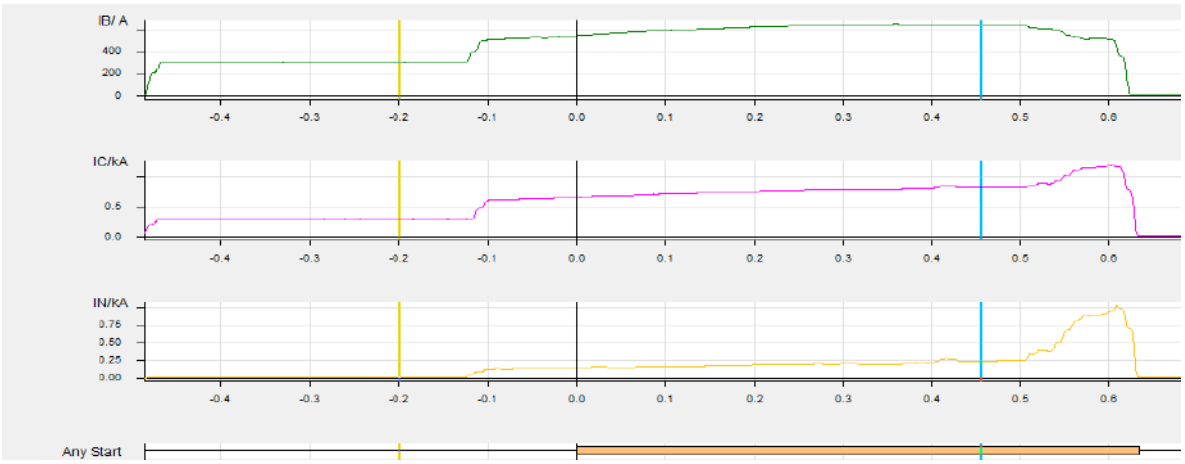


Figure 5: DR of 220 kV Tenughat-Govindpur-1 at Tenughat

- As Tenughat -Biharshariif line was already out and Tenught-Govidpur D/C tripped, there was no evacuation path for Tenughat machines.
- So Tenughat machines got islanded with the load of PVUNL, which is taking start up power and machines tripped on over frequency.
- Over frequency can be seen in below PMU plot.

PMU Snapshot:

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

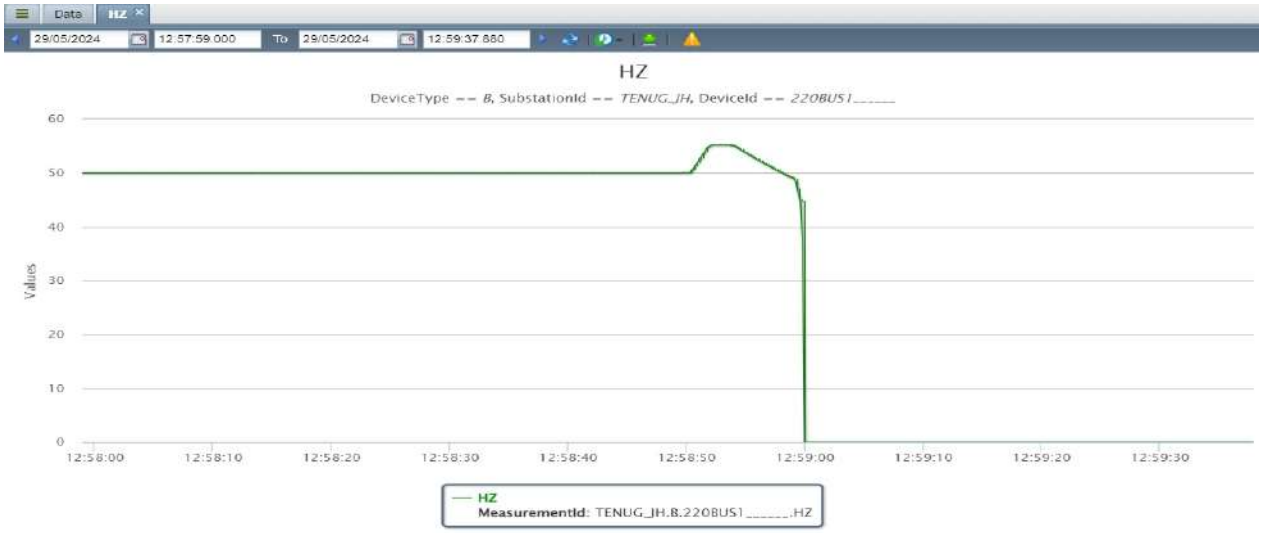


Figure 7: PMU Frequency snapshot of 400/220 kV Tenughat S/s

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

- DEF and O/C E/F to be co-ordinated and operation time to be kept after zone-3 time. If at TTPS end TSM is changed in a manner it takes some more time for tripping which can prevent tripping of another circuit on O/C E/f or DEF.
- Auto recloser at Govindpur end to be checked.
- DR is not Time Synchronised.

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

- Setting for DEF &O/C E/F to be revised.

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	**JUSNL**

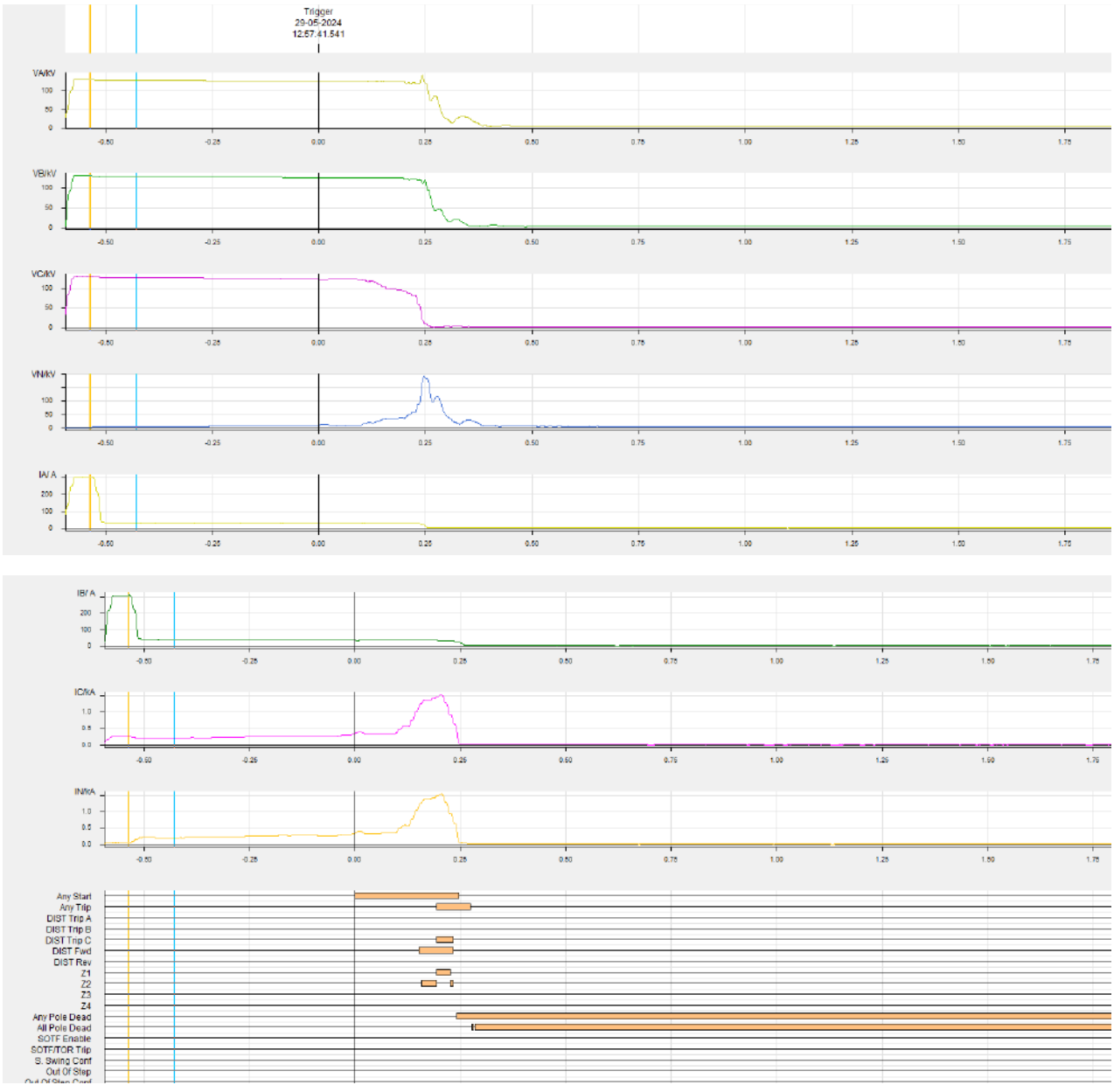
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

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

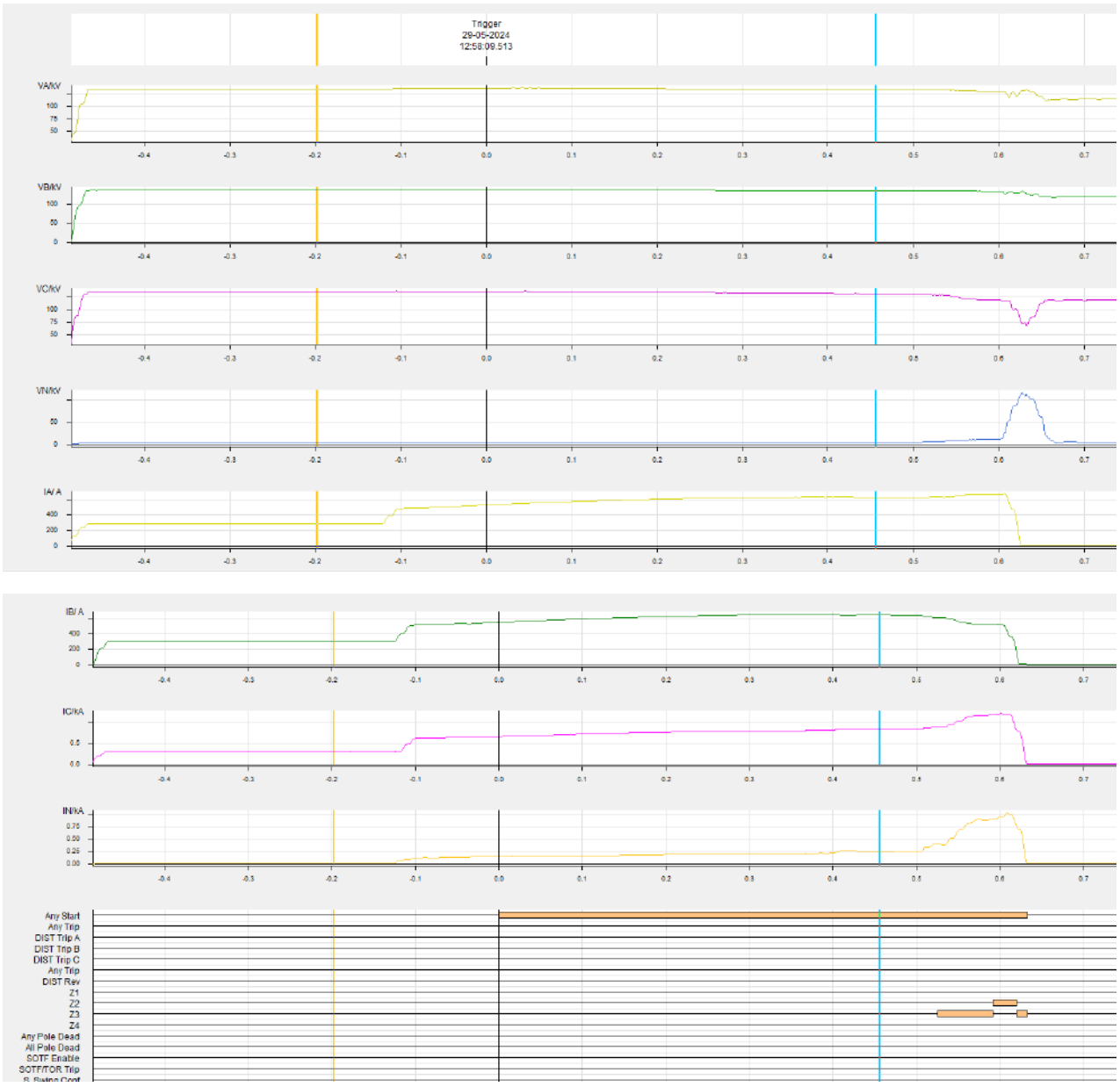
SOE data not available in ERLDC Scada.

Annexure 2:

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



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



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पूर्वी क्षेत्र के 220 केवी उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event in 220 kV Chandiposh & Barkot 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):14-06-2024

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

At 18:09 Hrs on 21.05.2024, due to puncture in 220 kV BPI of Rengali-Rengali(PH)-I at Rengali, bus fault occurred at Rengali. Since bus bar protection is out of service, all emanating lines at Rengali (OPTCL) tripped. This led to total power failure in Rengali, Chandiposh Barkot Area. Approximate load loss of 30 MW at Chandiposh and 10 MW at 220 kV Barkot was reported. Total Load Loss was 40 MW.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 18:19 hrs of 21.05.2024
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 (Hz)	Regional Generation (MW)	Regional Demand (MW)	State Generation Odisha (MW)	State Demand Odisha (MW)
Pre-Event (घटना पूर्व)	50.07	28931	24949	2404	4911
Post Event (घटना के बाद)	50.07	28931	24909	2404	4871

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है)	220 kV Tarkera-Chandiposh and 220 kV Tarkera-Barkot were hand tripped due to overloading of 220 kV Bamra- Tarkera and 220 kV Kuarmunda- Tarkera
Weather Condition (मौसम स्थिति)	Rain and Wind conditions.

6. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: NIL; Load loss: 40 MW.

7. Duration of interruption (रुकावट की अवधि): 00:46 Hrs

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

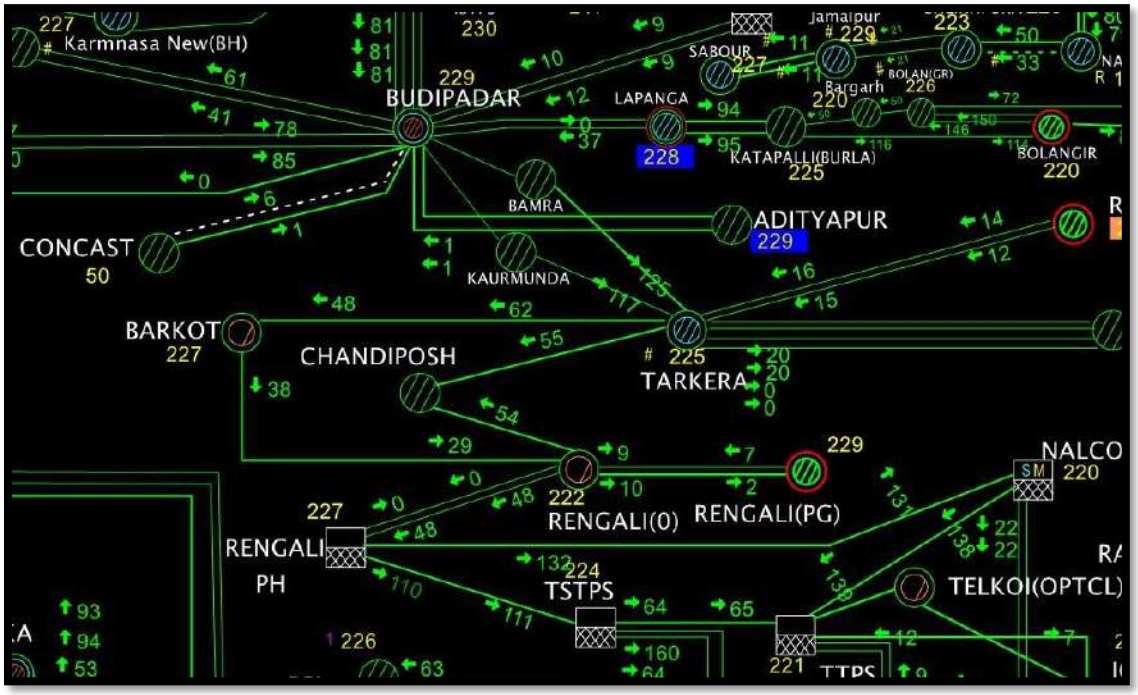


Figure 1: Network across the affected area

9. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): Y Phase BPI failure at Rengali OPTCL end for 220 Kv Rengali -Rengali(PH)-I

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 Rengali-Rengali (PH)-I	18:19	Zone-4,		Restored later
2	220 kV Rengali-Rengali (PH)-II	18:19	Hand tripped later from OPTCL end		Restored later
3	220 kV Rengali-Rengali (PG) D/C	18:19		Tripped from PG end	19:42&19:43
4	220 kV Rengali -Barkot			Tripped rom Barkot end	19:48
5	220 kV Rengali -Chandiposh	18:19	Tripped from Chnadiposh end.		19:05

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

- There was failure of 220 kV Y phase BPI of Rengali-Rengali (PH)-I at OPTCL end and this has resulted into Bus fault at Rengali (OPTCL).
- 220 kV Rengali-Rengali (PG) tripped immediately in Zone-1 from Rengali (PG) end.
- 220 kV Rengali-Rengali (PH) tripped in Zone-4 from Rengali (OPTCL) after 250 msec.
- 220 kV Rengali-Deogarh tripped from Deogarh in Zone-2.

PMU Snapshot:

Figure 2: PMU Voltage snapshot of 220 kV Regali-Talcher-2

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

- Bus bar protection is not available at Rengali.
- All elements are kept on only one bus and other bus is not available. Reason for the same may be explained by OPTCL.
- Length of 220 kV Rengali-Rengali (PG) is only 500 metres, therefore it is unable to differentiate between Zone-1 & Zone-2.

- 220 kV Tarkera-Chandiposh was charged from Tarkera end without isolating 220 kV Rengali-Chandiposh which led to tripping of both lines on SOTF.
- Disturbance report is not being shared by OPTCL/SLDC Odisha within prescribed timeline which is hampering timely analysis of the event.

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

- Bus bar protection may be commissioned at Rengali on priority basis. Since, this S/s is evacuating Rengali (PH) generation, its reliability is severily impacted.
- Only one 220 kV Bus is used at Rengali. Necessary measures may be taken to resotre another bus.
- Differential protection may be commissioned for 220 kV Rengali-Rengali (PG) lines at the earliest.
- Any charging from remote S/s is to be done after isolating the faulty element.

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

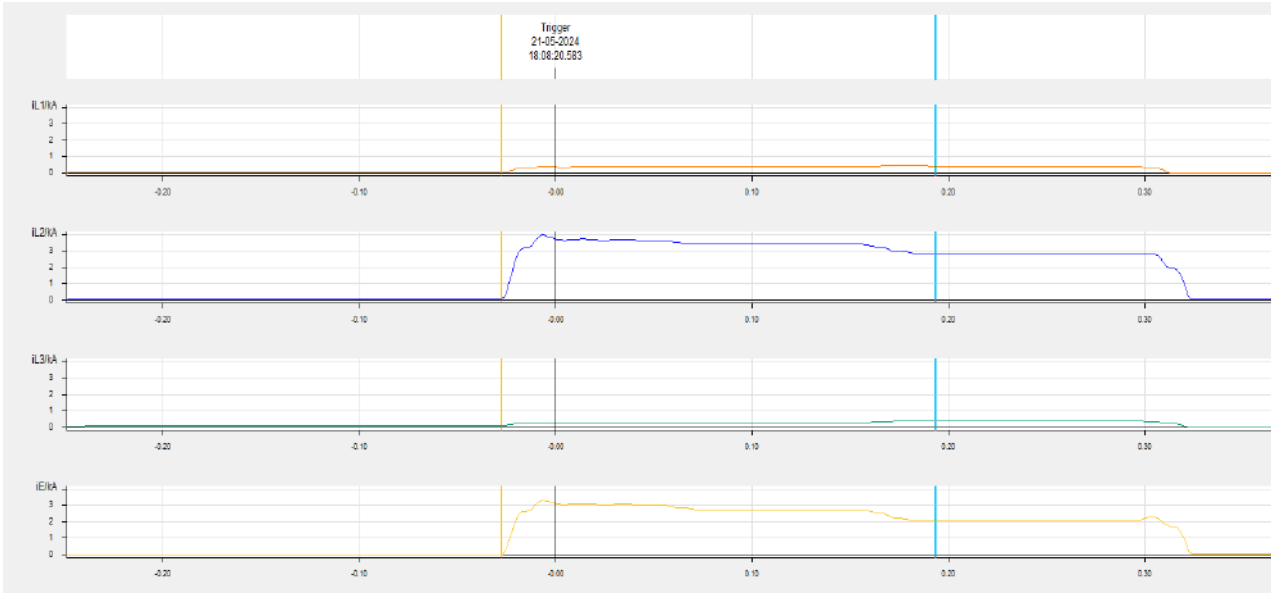
S.No.	Issues	Regulation Non-Compliance	Utilities
2.	**DR/EL not provided within 24 Hours**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**OPTCL**

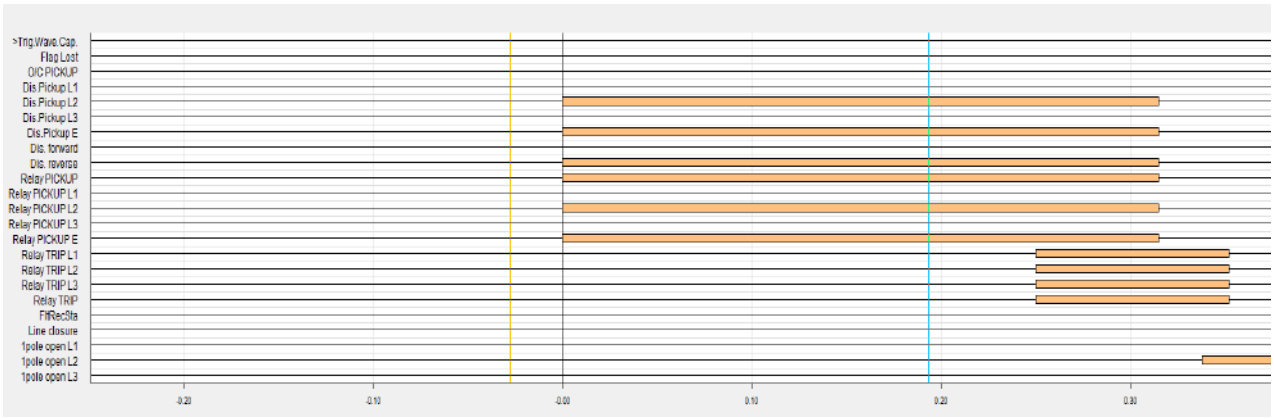
15. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

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

SOE data not available in ERLDC Scada.

Annexure 2: DR of of Rengali-Rengali(PH)-I at OPTCL





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 गरौल उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event at 220/132 kV Goraul S/s 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):14-06-2024

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

At 08:02 hrs on 09.05.2024, 220kV Muzaffarpur-Goraul-2 tripped due to R-N fault which led to total power failure at Goraul as 220kV Muzaffarpur-Goraul Ckt#1 was under breakdown. Total load loss of around 15 MW at Goraul was reported. Power was extended through 132kV system via Hazipur, Jandaha and Manhar link.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 08:02 hrs of 09.05.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** Bihar
5. **Report submitted by Utility on: Not submitted**
6. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

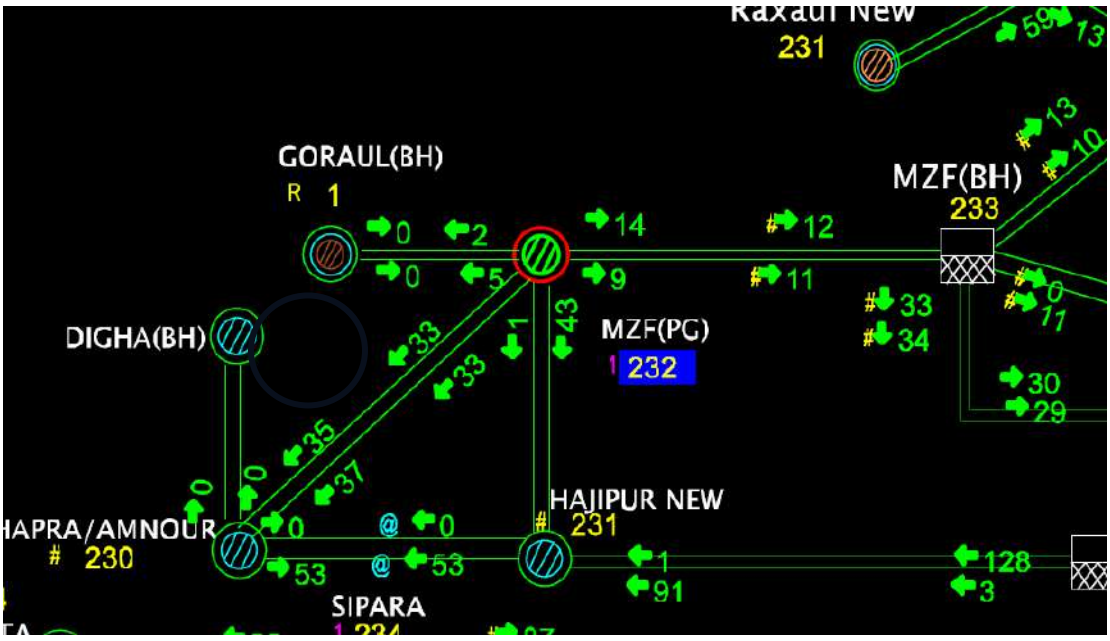
	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				Bihar	Bihar
Pre-Event (घटना पूर्व)	50.10	24825	20809	340	3797
Post Event (घटना के बाद)	50.10	24825	20794	340	3782

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 Muzaffarpur-Goraul Ckt#1 in outage condition since 11/06/2022 due to GIS bay CT Blast.
Weather Condition (मौसम स्थिति)	Rain and Wind conditions.

7. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: NIL; Load loss: 15 MW.
8. **Duration of interruption (रुकावट की अवधि): 00:10 Hrs**

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



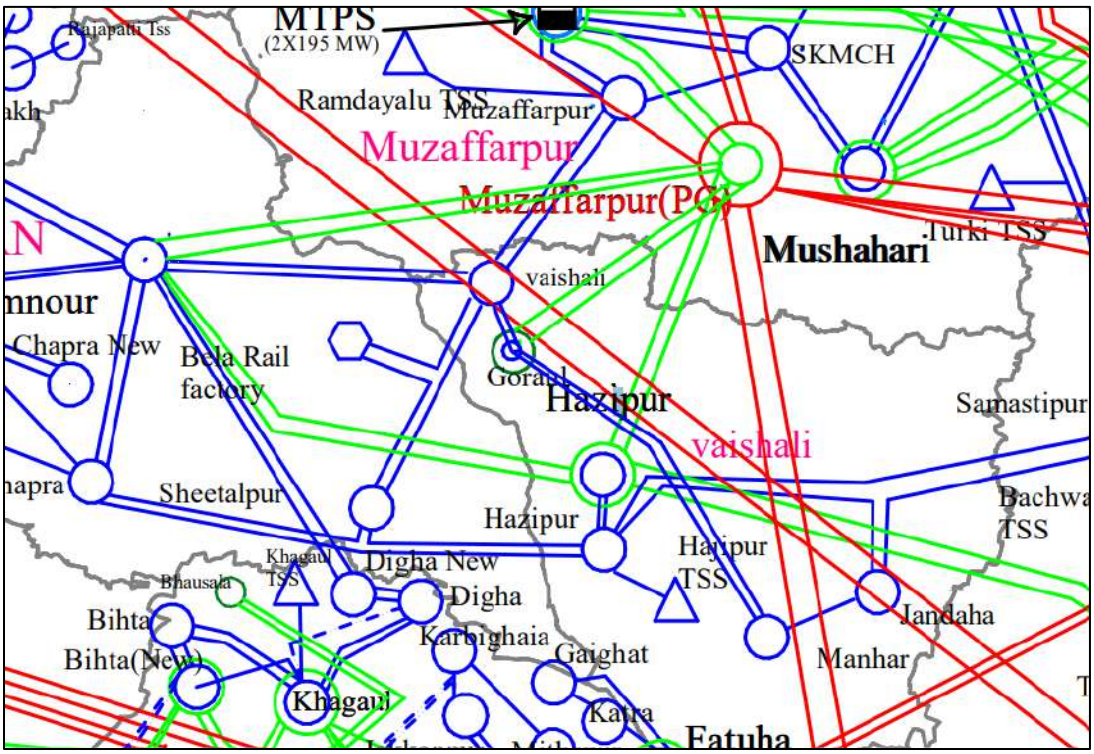


Figure 1: Network across the affected area

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

11. Major Elements Tripped (प्रमुख ट्रिपिंग)

S.No. (क्र० सं०)	Transmission/Generation element name (संचरण लाइन / विधुत उत्पादन इकाई का नाम)	Trip Time (बंद होने का समय)	Restoration time (वापस आने का समय)	Reason/ Relay Indication (कारण/रिले संकेत)
1	220kV Muzaffarpur-Goraul Ckt#2	08:02	11:02	R-N Fault, 10.5Km from Muzaffarpur end, F/C-11.8KA
2	220kV Bus#1&2 at Goraul (BH)			Tripping of 220kV Muzaffarpur-Goraul#2

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

- At 08:02 Hrs 220kV Goraul buses became dead as 220kV Muzaffarpur-Goraul Ckt#2 tripped due to R-N fault and 220kV Muzaffarpur-Goraul Ckt#1 was already under outage due to GIS Bay CT blast at Muzaffarpur. Heavy lightning and adverse weather reported around the area.
- Total load loss reported was around 15 MW in Goraul area.
- At 08:12 Hrs Power was extended through 132kV system via Hazipur, Jandaha and Manhar link.
- The charging attempt of Ckt#2 was delayed due to failure of closing command of breaker at Muzaffarpur (PG) end (bay owned and maintained by Bihar). Later, 220kV buses at Goraul charged through 220kV Muzaffarpur-Goraul Ckt#2 at 11:02hrs.

PMU Snapshot:

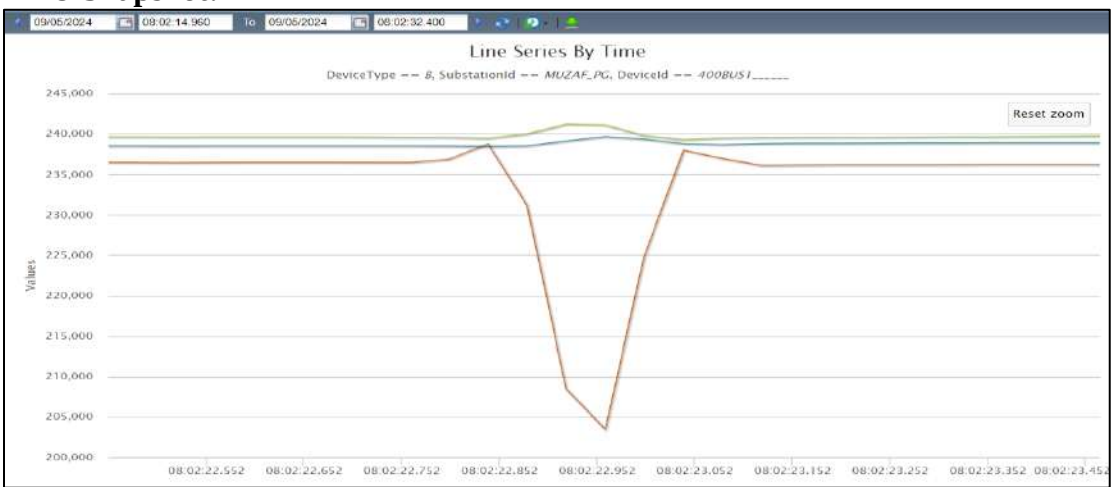


Figure 2: PMU Voltage snapshot of 400/220 kV New Purnea S/S

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

- Charging attempt was delayed by 03 Hrs due to failure of closing command of breaker, issue with the breaker or control may be explained along with remedial measures. **BSPTCL to explain.**
- Whether Auto reclose attempted or not could not be ascertained as DR/EL not submitted**.** **BSPTCL to explain?**

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

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

S.No.	Issues	Regulation Non-Compliance	Utilities
2.	**Whether DR/EL provided within 24 Hours?**	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	**BSPTCL, PG ER-1 (No)**

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

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

SoE data not available for the event.

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 400/220 केवी उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event in 220/ 132 kV Dalkhola 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):14-06-2024

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

At 02:42 Hrs on 31.05.2024, 132 kV Bus PT burst at Dalkhola(WB) and 132 kV Bus became dead. 220 kV Dalkhola(PG)-Kishanganj D/c also tripped from Kishanganj in Zone-3. Consequently, 220 kV Dalkhola (WB) S/s became dead. Load loss of 4 MW occurred at Dalkhola as other areas remained on alternate sources. All load was restored within 10 minutes.

2. **Time and Date of the Event (घटना का समय और दिनांक):** 02:42 hrs of 31.05.2024
3. **Event Category (ग्रिड घटना का प्रकार): Grid Disturbance (GD)-1**
4. **Location/Control Area (स्थान/नियंत्रण क्षेत्र):** West Bengal
5. **Report submitted by Utility on: 13.06.2024**
6. **Antecedent Conditions (पूर्ववर्ती स्थिति):**

	Frequency	Regional Generation	Regional Demand	State Generation	State Demand
				West Bengal	West Bengal
Pre-Event (घटना पूर्व)	49.99 Hz	28426 MW	22896MW	4813 MW	7319 MW
Post Event (घटना के बाद)	49.99 Hz	28426 MW	22892MW	4813 MW	7315 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 Bus Coupler at Dalkhola(PG) was under open condition.
Weather Condition (मौसम स्थिति)	Normal weather

7. **Load and Generation loss (लोड और जेनरेशन हानि):** Generation loss: NIL; Load loss: 4 MW.
8. **Duration of interruption (रुकावट की अवधि): 00:10 Hrs**

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

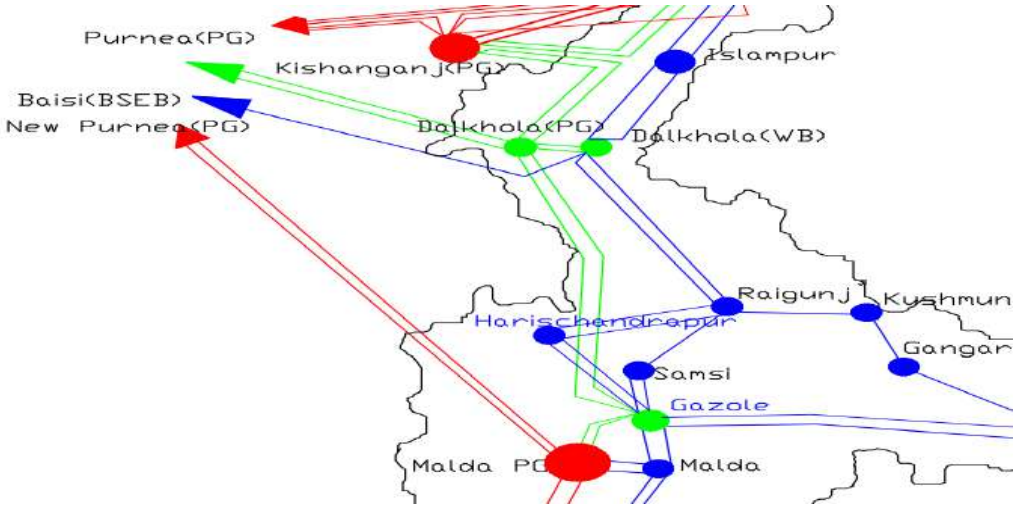


Figure 1: Network across the affected area

10. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): 132 kV Bus PT at Dalkhola (WB) burst

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	132 kV Dalkhola-Islampur-2	02:42:53	Dalkhola: R_Y_B, 8.89 km, Ir: 8.667 kA, Iy: 7.924 kA, Ib:7.732 kA	Islampur: R_Y_B, Zone-2, 58.294 km	04:41
2	132 kV Dalkhola-Raiganj D/c	02:42:54	Dalkhola: Y_B_N, Zone-1, 1.71 kA (Ckt-1); Y_B_N, Zone-1, 1.15 kA (CKt-2)	-	03:55
3	132 kV Dalkhola-Islampur-1		Islampur: Y_B, Zone-1	-	04:41
4	220 kV Dalkhola-Kishanganj D/c		Y_B_N, Zone-3	-	03:55

6	220 kV Dalkhola-Dalkhola D/c	04:12/04:11	Handtripped for restoration	04:32/09:07

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

- A three phase fault struck 132 kV Dalkhola-Islampur-2 in close vicinity of Dalkhola. This line tripped in Zone-1 at Dalkhola and in Zone-2 time from Islampur after 450 msec.
- It is suspected that this led to failure of 132 kV R_ph bus PT at Dalkhola.
- 132/33 kV 20 MVA transformer tripped on REF.
- After around 350 msec, another phase-to-phase fault developed at Dalkhola (WB) which persisted for around 900 msec. 132 kV Bus Bar protection didn't operate as it was under commissioning stage.
- 132 kV Dalkhola-Islampur-1, 132 kV Dalkhola-Raiganj D/c tripped in Zone-1 instead of Zone-4.
- The fault was finally cleared when 220 kV Kishanganj-Dalkhola (PG) tripped from Kishanganj end in Zone-3.
- Report from WBSETCL is attached at Annexure-3.

PMU Snapshot:

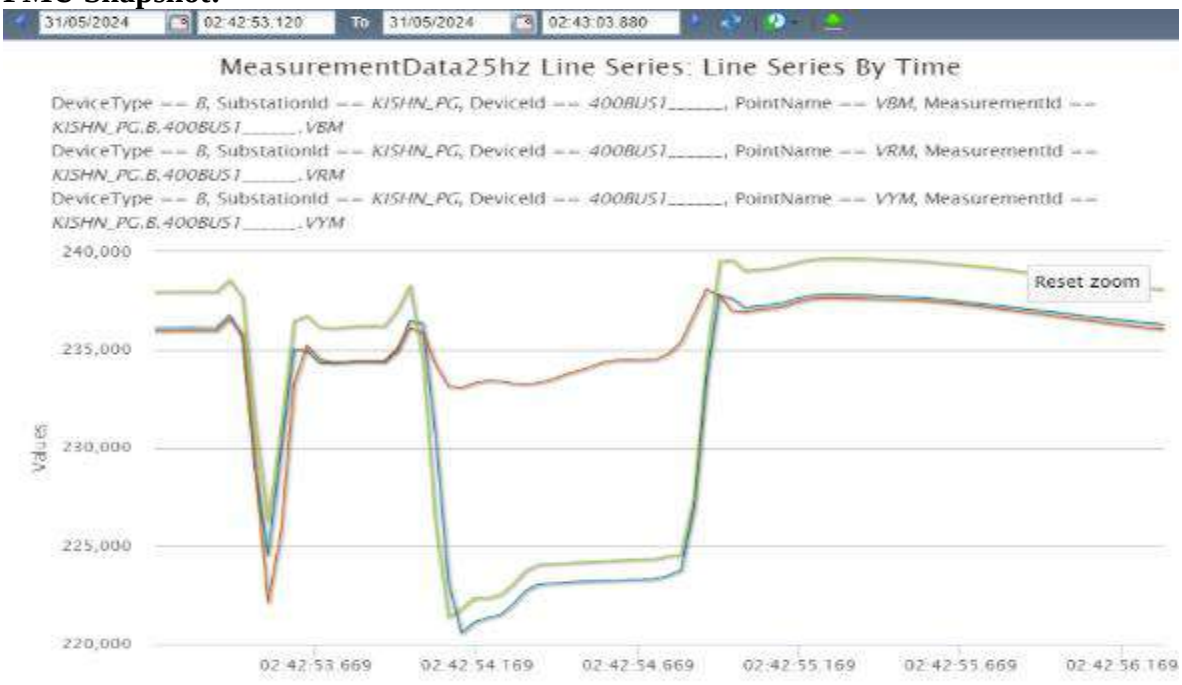


Figure 2: PMU Voltage snapshot of 400 kV Kishanganj S/S

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

- Zone-3 of 220 kV Dalkhola-Kishanganj D/c is encroaching next voltage level at Dalkhola.
- REF should not operate for bus fault in transformers. REF stability test may be done.

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

- Zone-3 time delay of 220 kV Dalkhola-Kishanganj-3 may be increased at Kishanganj.
- As reported relay setting of HV side of 220/132 kV transformes at Dalkhola has been revised so that bus fault can be within 800 msec.
- Bus bar protection has been commissioned on 11.06.2024.

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	**WBSETCL, PG ER-1**

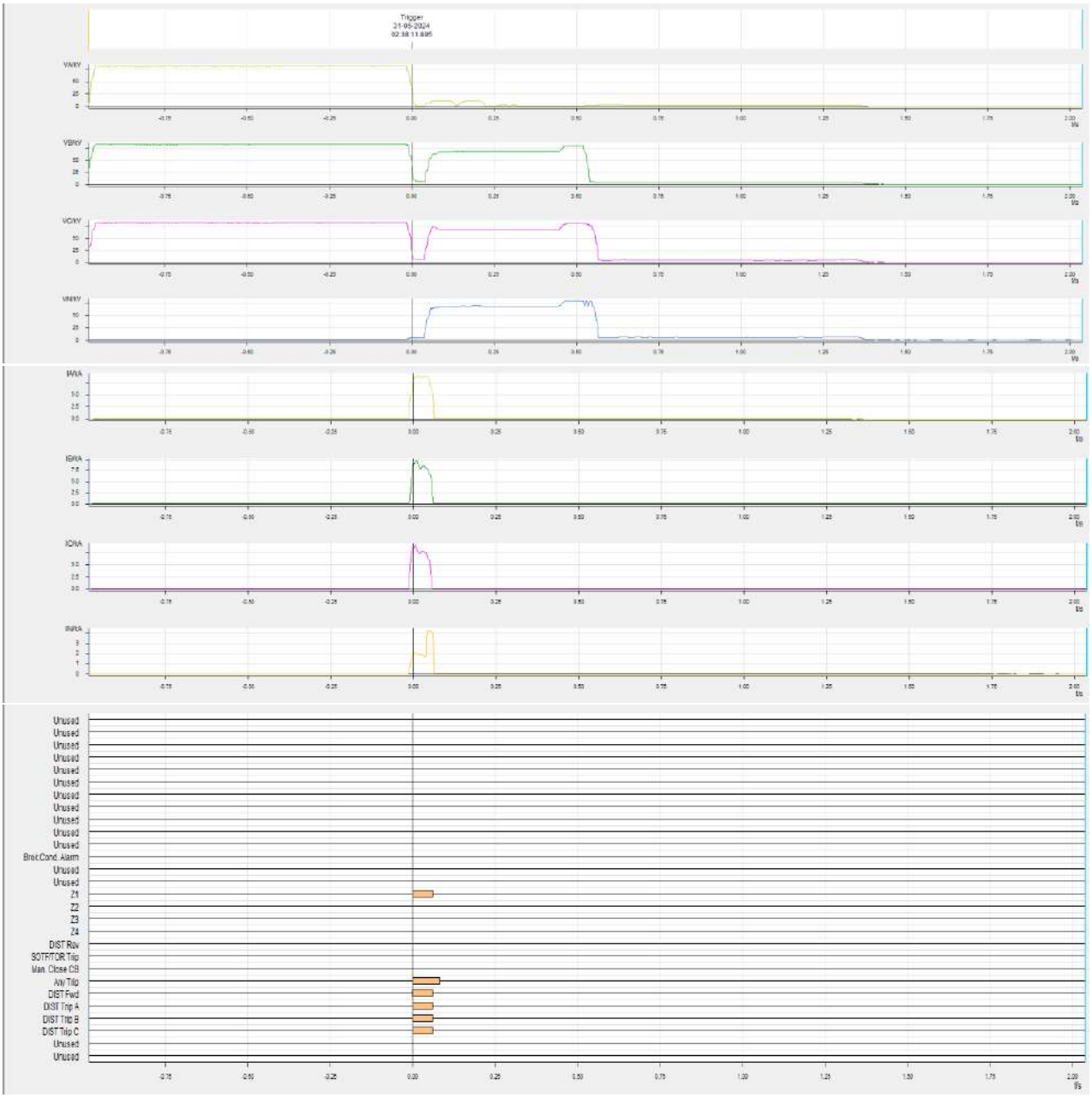
16. Key Lessons Learnt (प्रमुख अधिगम बिंदु): Nil

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

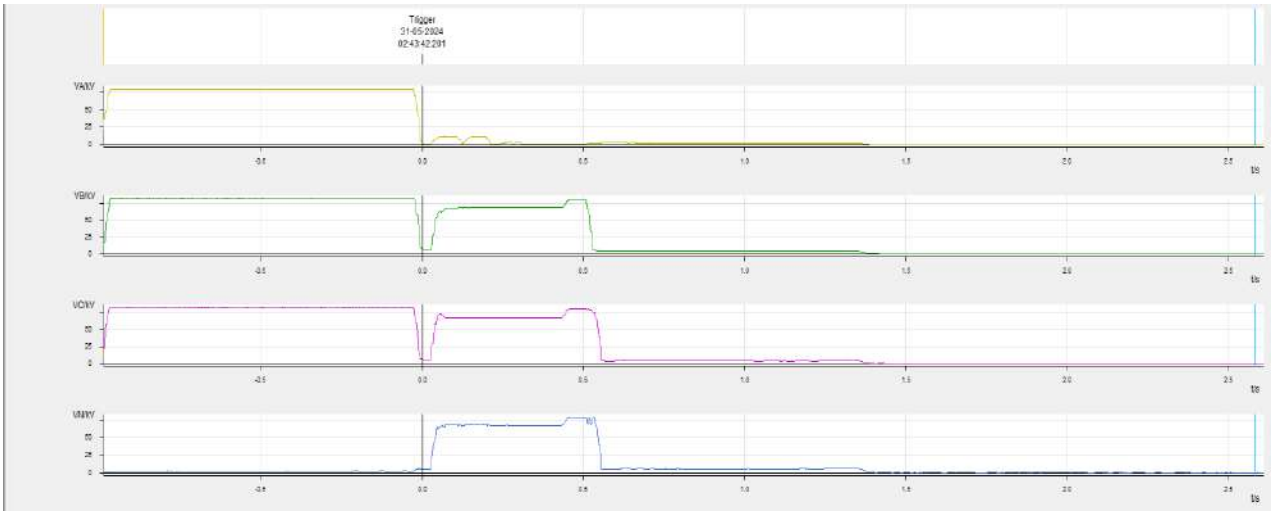
SOE data of Dalkhola Substation not available in ERLDC Scada.

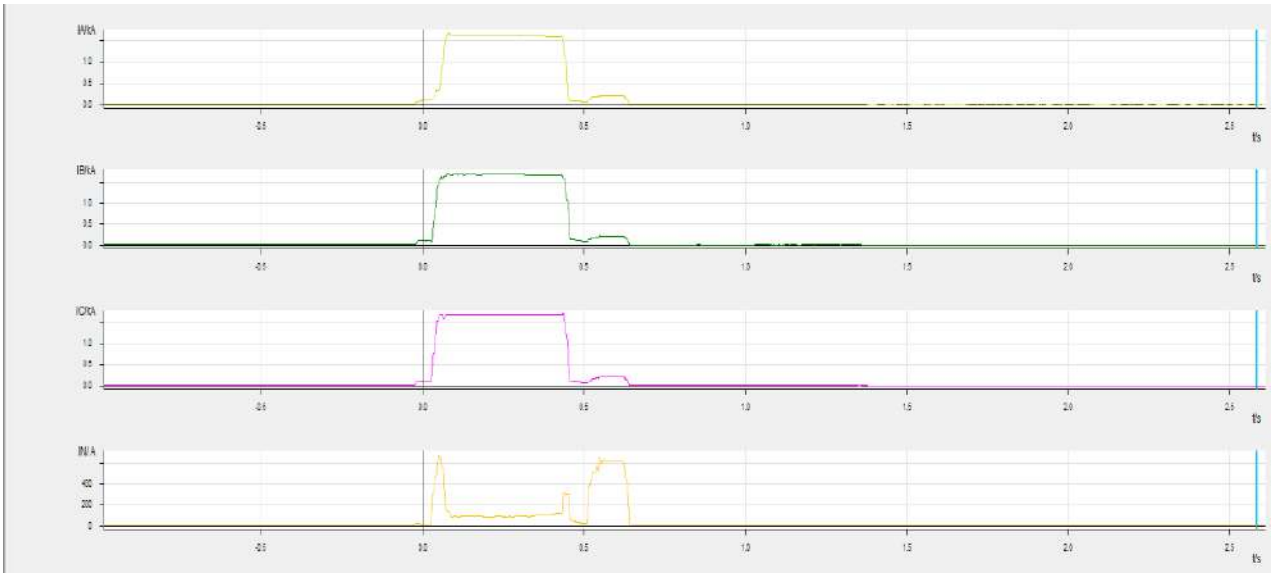
Annexure 2:

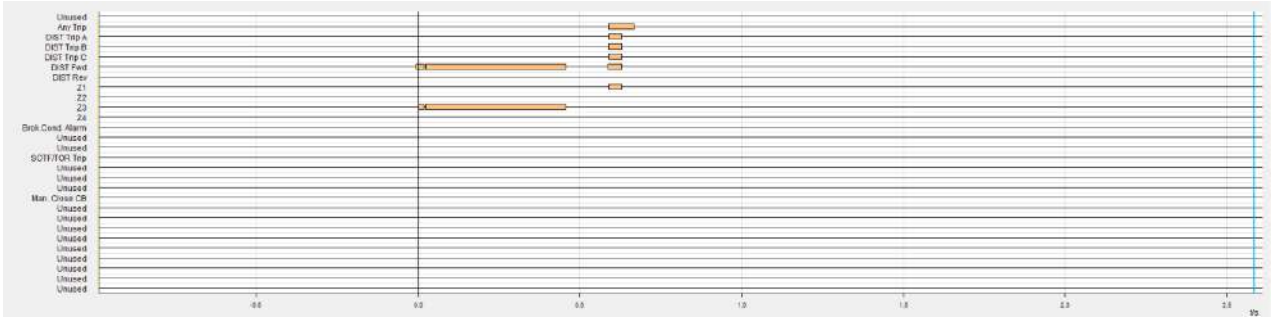
DR of 132 kV Dalkhola-Islampur-2 (Dalkhola)



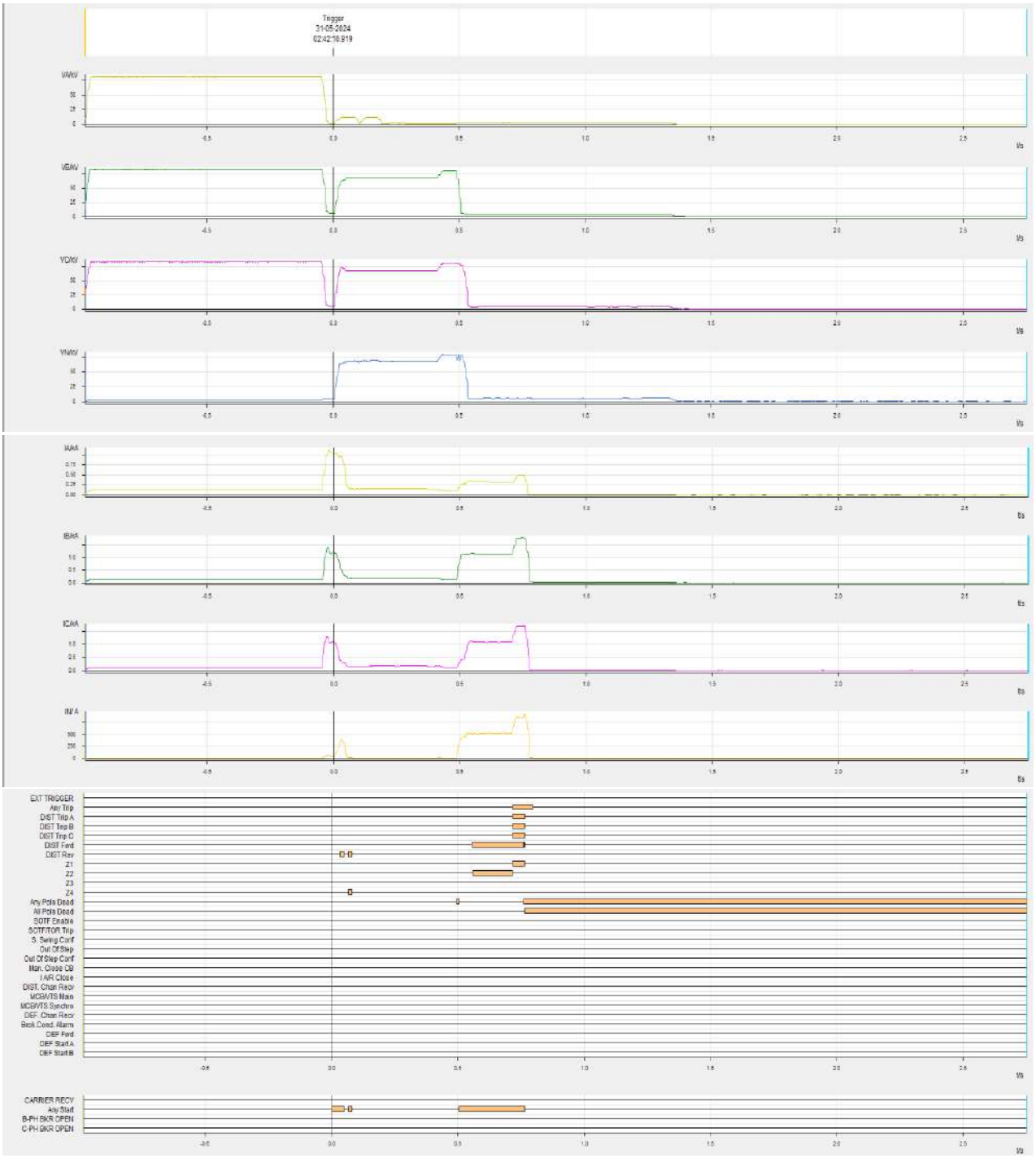
DR of 132 kV Dalkhola-Islampur-1 (Dalkhola)



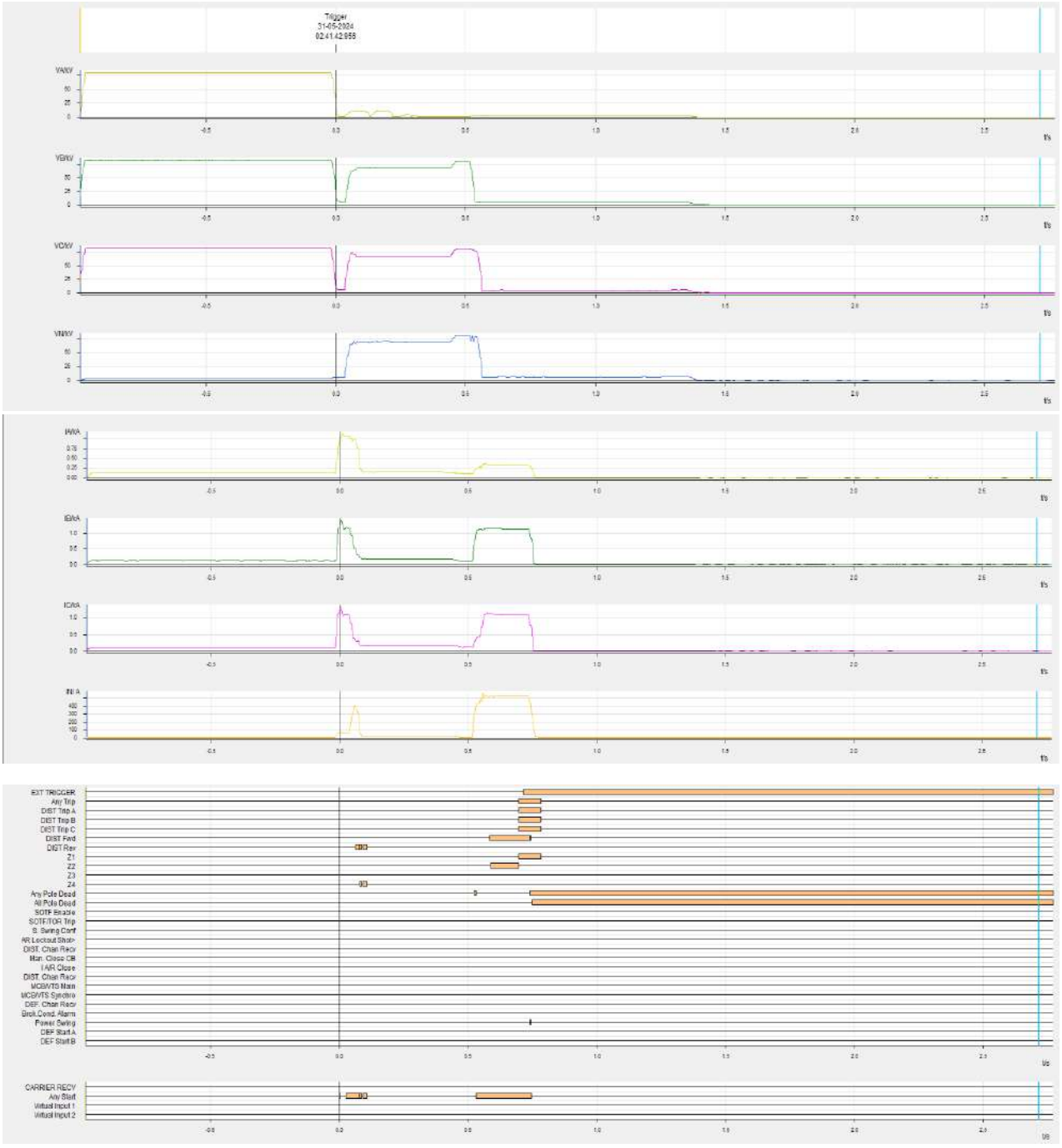




DR of 132 kV Dalkhola-Raiganj-1 (Dalkhola)



DR of 132 kV Dalkhola-Raiganj-2 (Dalkhola)



Annexure-3

FORMAT FOR REPORTING SYSTEM DISTURBANCES
(Detailed Report)

OCCURRNCE REPORT

(1) Date & Time of Occurrence

31-05-2024 & 02:45 Hrs

(2) Name of the Sub Station / Generating Station

Dalkhola 220 kV Sub-station

(3) Details of Occurrence

During severe thunderstorm, heavy rain and lightening, the 132kV 'R' Phase PT burst out at 02:45 Hrs on 31.05.2024 and total power failure occurred at 132kV Bus with tripping of the following feeders,

(i) 132kV Raiganj D/C tripped at Dalkhola S/S end
(ii) 132Kv Islampur D/C tripped at Dalkhola S/S end
(iii)220kV Dalkhola – Dalkhola PGCIL D/C did not trip but Dalkhola PGCIL-Kishanganj PGCIL ckt tripped at Kishanganj PGCIL S/S end.

(At Dalkhola PGCIL 220KV S/S :- 220kV Kishanganj D/C & 220KV Dalkhola (WBSETCL) D/C was connected to Bus-1 & 220kV B/C was open during the fault)

At the time of occurrence the disposition of feeders was as below

220 KV System : 1) 220 KV Dalkhola PG D/C
2) 160 MVA TR #1 &2
132 KV System : 1) Raiganj 132 KV D/C
2) Islampur 132 KC D/C
3) Baisi 132 KV Feeder
4) 132 KV Traction feeder
5) 31.5 MVA 132/33 KV TR 1&3
6) 20 MVA 132/33 KV TR #2

BUS Configuration : One Main and one Transfer for both 220 KV and 132 KV system.

For one and half breaker scheme

	Feeder I	Feeder II	Tie-breaker(On/Off)
Diameter 1			
Diameter 2			
Diameter 3			

(4) Sequence of Trippings

Time: (hh mm ss) **Event:** .

Generation Loss

Load Loss :-

(5) Relay Indication for Faulted Line/Transformer/Bus

			Relay Indication
Sl No	**Name of Bay/Line**	**Local End Relay Type/Make And Indications**	**Remote End Relay Type/Make And Indications**
1	Raiganj ckt-1	**Dist Trip Z1**	No
2	Raiganj ckt-2	**Dist Trip Z1**	No
3	Islampur Ckt-1	**Dist Trip Z1**	No
4	Islampur Ckt-2	**Trip Z1, Fault location = 8.89 km** **Ia = 8.667 kA, Ib = 7.924 kA, Ic = 7.732 kA**	Zone-2, Dist – 58.294 km

(9) Restoration

Sl No		From	To
1.	132KV RAIGANJ D/C	02:45 hrs	03:55 hrs
2	132KV TRACTION	02:45 hrs	04:02 hrs
3	132kV Baisi	02:45 hrs	04:16 hrs
4	220kV PG Ckt-1	02:45 hrs	04:32 hrs
5	132kV Islampur D/C	02:45 hrs	04:41 hrs
6	220kV PG Ckt-2	02:45 hrs	09:07 hrs

Remarks:

- After studying of Disturbance report, it has been understood that, initially a very close in 3 phase fault had occurred in line 132kV Dalkhola – Islampur Ckt-2 and the ckt got tripped at Dalkhola S/S end with Zone1 in approx. 60ms from the fault inception.
- It has been observed from the DR that the R phase voltage was not re-developed after clearance of above fault from Dalkhola S/S end due to burst out of 132 KV R phase PT.
- After approx. 500 ms from the initial fault, double phase to ground fault in Y & B ph. had started which might be due to bursting out of R ph PT and fire hazard happened thereafter and turned out to be a bus fault .
- Since, the tripping circuits of 132 KV Busbar Relay was not connected to the respective bays, tripping could not take place from Busbar relay.(Commissioning stage).
- Raiganj D/C and Islampur ckt 1 got tripped at Dalkhola end in Z1 instead of Z4 might be due to absence of R ph PT secondary voltages because fault in the PT itself.
- Eventually, the Bus fault was cleared after approx. 850 ms from the initiation of bus fault by tripping 220kV Dalkhola (PG) - Kishanganj (PG) D/C Line at Kishanganj S/S end (in Z3 distance as information received)

Remedial Measures/Lessons Learnt:-

- A new Numerical busbar was in commissioning stage in Dalkhola 132 KV system.All bay CT's were connected and tripping ckt to 132 KV bays were isolated to check busbar stability for outzone fault.However,132 KV busbar relay tripping circuit made connected to all corresponding 132 KV bays on 11.06.2024.
- Relay setting at 160 MVA transformer HV side was reviewed and revised the settings. 456A/NI/Directional forward/0.2 so that bus fault on 132 KV side can be cleared within 800 ms.

Annexure B.7.A

Tripping report on 765KV New Ranchi-DMG CKT-I, 765KV Main Bus-II and 1500MVA ICT-II on dt:11.05.2024 at 765/400KV New Ranchi SS

***Tripping of New Ranchi-Dharmajaygarh CKT-I**

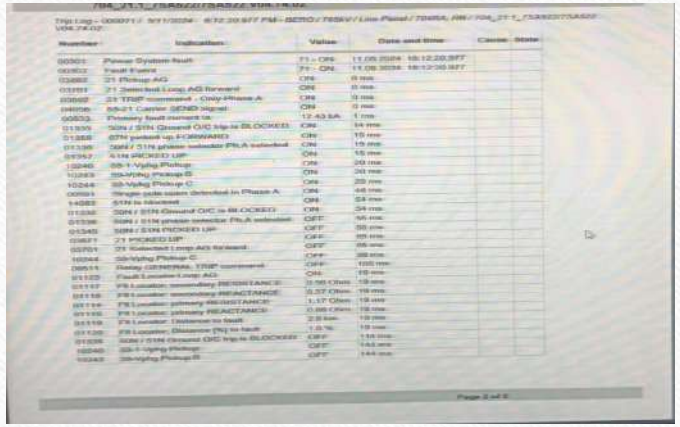
INCIDENT:-

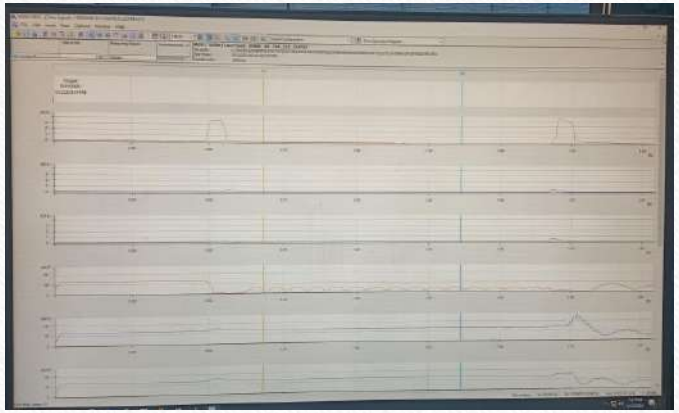
On date 11.05.2024 at 18:12:20 hrs 765KV New Ranchi-Dharamjaygarh CKT-I tripped due to SOTF/TOR operation with following details

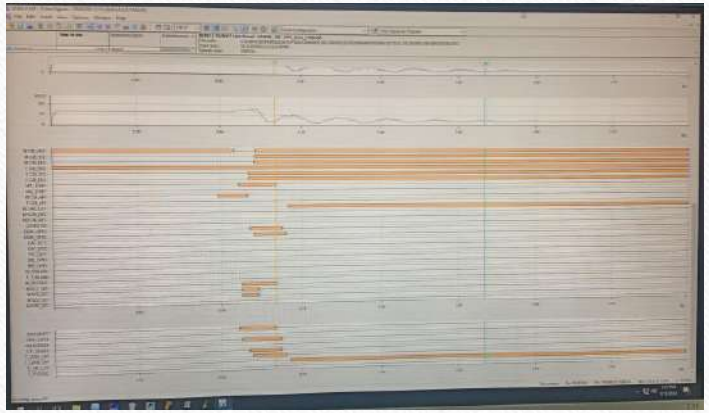
Main-I : R-G, FC= 12.43 KA, FD= 2.9 KM

Main-II : R-G, FC= 12.27KA, FD= 2.9KM

Main-I trip log and Fault DR

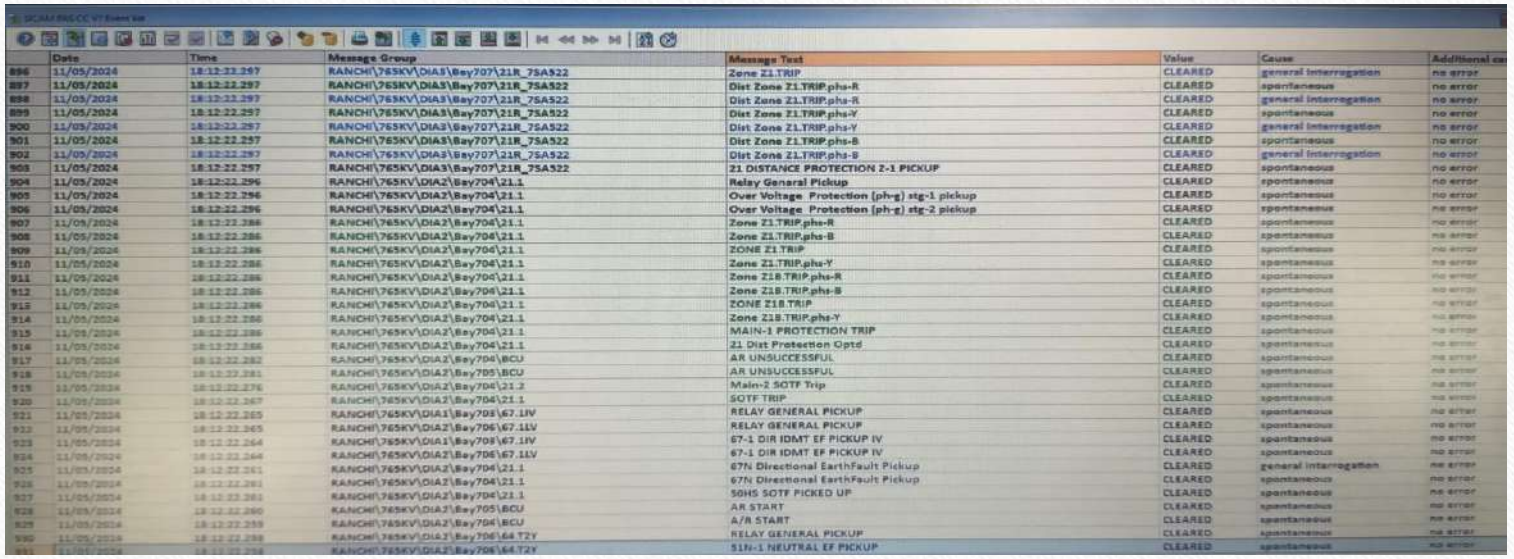






AR become unsuccessful due to persistent fault on 765KV New Ranchi-Dharamjaygarh CKT-I and due to this line got tripped in SOTF/TOR trip.

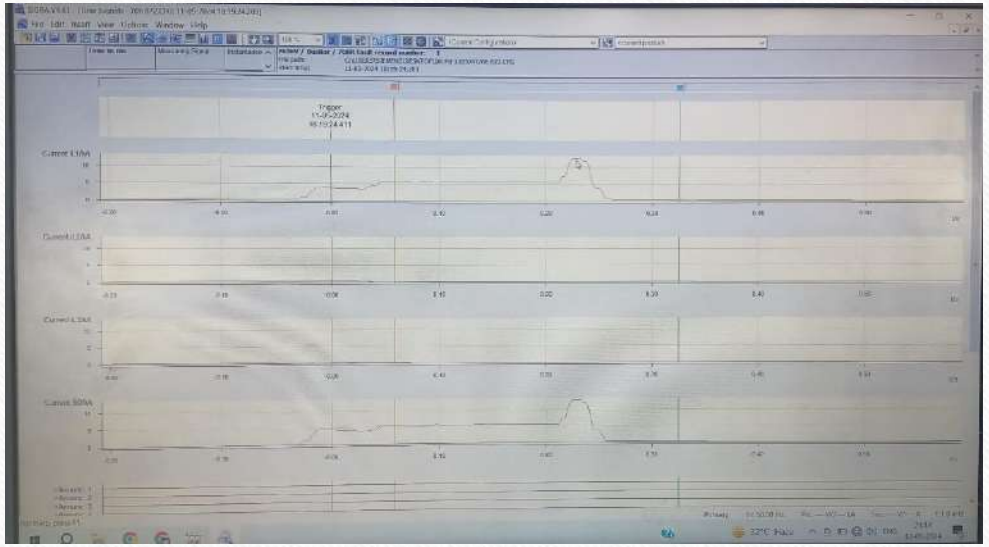
SCADA Event log

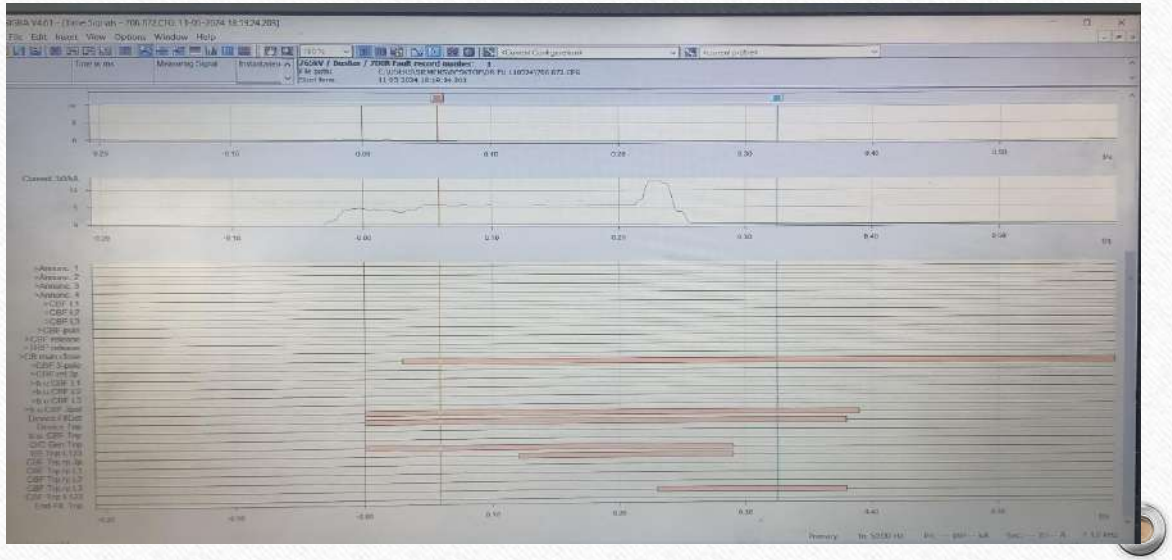


	Date	Time	Message Group	Message Text	Value	Cause	Additional cau
896	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	Zone Z1.TRIP	CLEARED	general interrogation	no error
897	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	Dist Zone Z1.TRIP.phs-R	CLEARED	spontaneous	no error
898	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	Dist Zone Z1.TRIP.phs-R	CLEARED	general interrogation	no error
899	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	Dist Zone Z1.TRIP.phs-Y	CLEARED	spontaneous	no error
900	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	Dist Zone Z1.TRIP.phs-Y	CLEARED	general interrogation	no error
901	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	Dist Zone Z1.TRIP.phs-B	CLEARED	spontaneous	no error
902	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	Dist Zone Z1.TRIP.phs-B	CLEARED	general interrogation	no error
903	11/05/2024	18:12:22.297	RANCHI\765KV\DIA3\Bay707\21R_7SA522	21 DISTANCE PROTECTION Z-1 PICKUP	CLEARED	spontaneous	no error
904	11/05/2024	18:12:22.296	RANCHI\765KV\DIA2\Bay704\21.1	Relay General Pickup	CLEARED	spontaneous	no error
905	11/05/2024	18:12:22.296	RANCHI\765KV\DIA2\Bay704\21.1	Over Voltage Protection (ph-g) stg-1 pickup	CLEARED	spontaneous	no error
906	11/05/2024	18:12:22.296	RANCHI\765KV\DIA2\Bay704\21.1	Over Voltage Protection (ph-g) stg-2 pickup	CLEARED	spontaneous	no error
907	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	Zone Z1.TRIP.phs-R	CLEARED	spontaneous	no error
908	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	Zone Z1.TRIP.phs-B	CLEARED	spontaneous	no error
909	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	ZONE Z1.TRIP	CLEARED	spontaneous	no error
910	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	Zone Z1.TRIP.phs-Y	CLEARED	spontaneous	no error
911	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	Zone Z1B.TRIP.phs-R	CLEARED	spontaneous	no error
912	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	Zone Z1B.TRIP.phs-B	CLEARED	spontaneous	no error
913	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	ZONE Z1B.TRIP	CLEARED	spontaneous	no error
914	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	Zone Z1B.TRIP.phs-Y	CLEARED	spontaneous	no error
915	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	MAIN-1 PROTECTION TRIP	CLEARED	spontaneous	no error
916	11/05/2024	18:12:22.286	RANCHI\765KV\DIA2\Bay704\21.1	21 Dist Protection Optd	CLEARED	spontaneous	no error
917	11/05/2024	18:12:22.282	RANCHI\765KV\DIA2\Bay704\BCU	AR UNSUCCESSFUL	CLEARED	spontaneous	no error
918	11/05/2024	18:12:22.281	RANCHI\765KV\DIA2\Bay705\BCU	AR UNSUCCESSFUL	CLEARED	spontaneous	no error
919	11/05/2024	18:12:22.276	RANCHI\765KV\DIA2\Bay704\21.2	Main-2 SOTF Trip	CLEARED	spontaneous	no error
920	11/05/2024	18:12:22.267	RANCHI\765KV\DIA2\Bay704\21.1	SOTF TRIP	CLEARED	spontaneous	no error
921	11/05/2024	18:12:22.265	RANCHI\765KV\DIA1\Bay703\67.1IV	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
922	11/05/2024	18:12:22.265	RANCHI\765KV\DIA2\Bay706\67.1IV	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
923	11/05/2024	18:12:22.264	RANCHI\765KV\DIA1\Bay709\67.1IV	67-1 DIR IDMT EF PICKUP IV	CLEARED	spontaneous	no error
924	11/05/2024	18:12:22.264	RANCHI\765KV\DIA2\Bay706\67.1IV	67-1 DIR IDMT EF PICKUP IV	CLEARED	spontaneous	no error
925	11/05/2024	18:12:22.261	RANCHI\765KV\DIA2\Bay704\21.1	67N Directional EarthFault Pickup	CLEARED	general interrogation	no error
926	11/05/2024	18:12:22.261	RANCHI\765KV\DIA2\Bay704\21.1	67N Directional EarthFault Pickup	CLEARED	spontaneous	no error
927	11/05/2024	18:12:22.261	RANCHI\765KV\DIA2\Bay704\21.1	50HS SOTF PICKED UP	CLEARED	spontaneous	no error
928	11/05/2024	18:12:22.260	RANCHI\765KV\DIA2\Bay705\BCU	AR START	CLEARED	spontaneous	no error
929	11/05/2024	18:12:22.259	RANCHI\765KV\DIA2\Bay704\BCU	A/R START	CLEARED	spontaneous	no error
930	11/05/2024	18:12:22.258	RANCHI\765KV\DIA2\Bay706\64.T2Y	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
931	11/05/2024	18:12:22.258	RANCHI\765KV\DIA2\Bay706\64.T2Y	51N-1 NEUTRAL EF PICKUP	CLEARED	spontaneous	no error

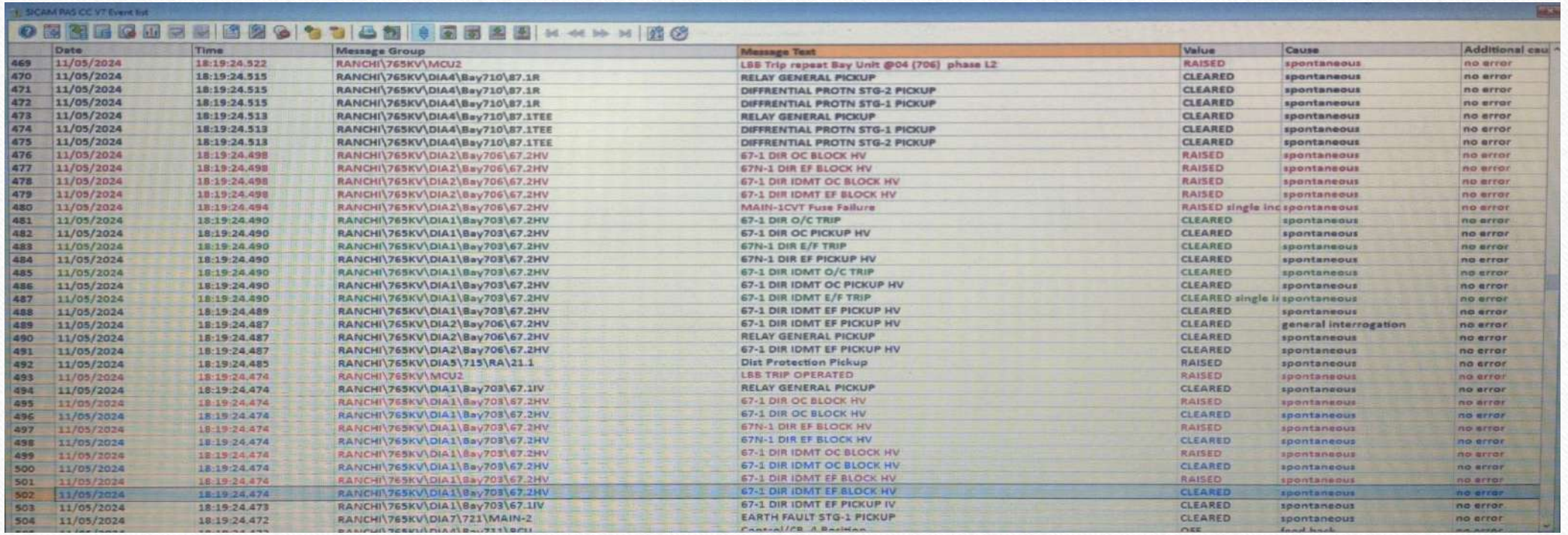
*Tripping of 765KV Main Bus-II & 1500MVA ICT-II:-

At 18:19 hrs on same day i.e. about 7 minutes after tripping of Dharamjaigarh ckt-I, 765KV Main Bus-II got tripped due to Busbar differntial protection operation with a current of 12.8 KA as per DR log of 706 bay Bus bar Peripheral unit 86.2.

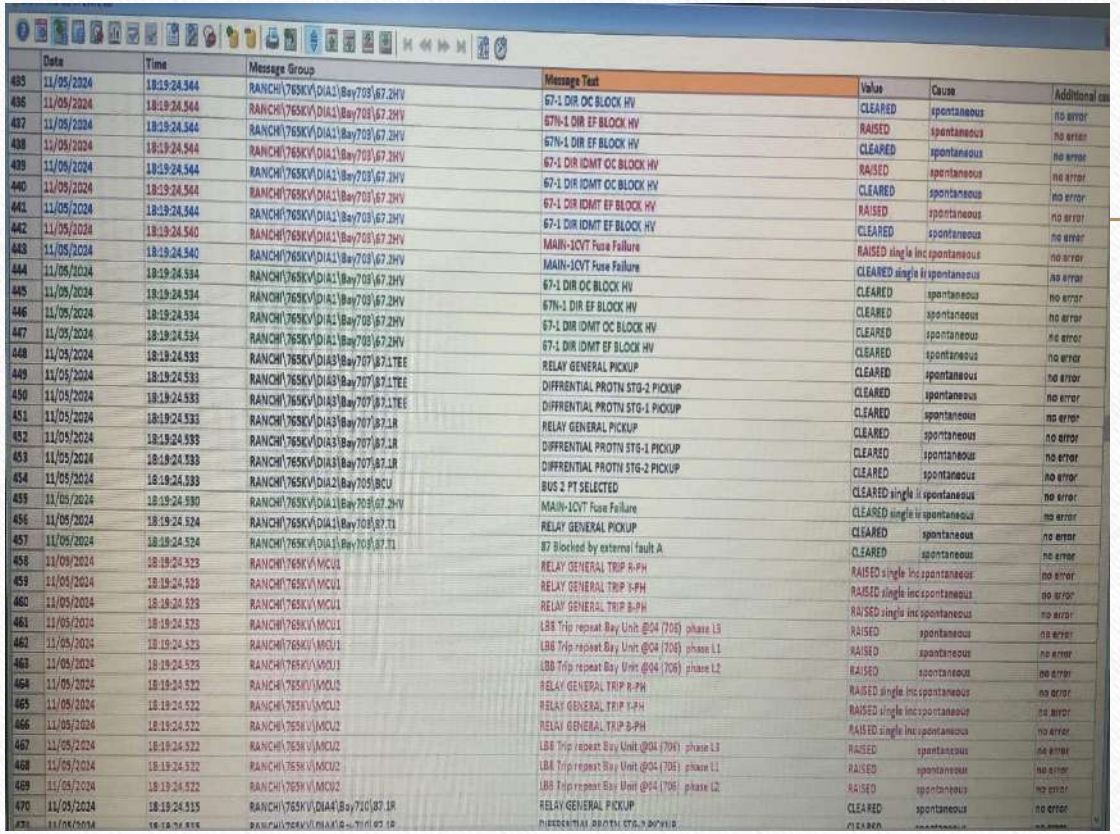




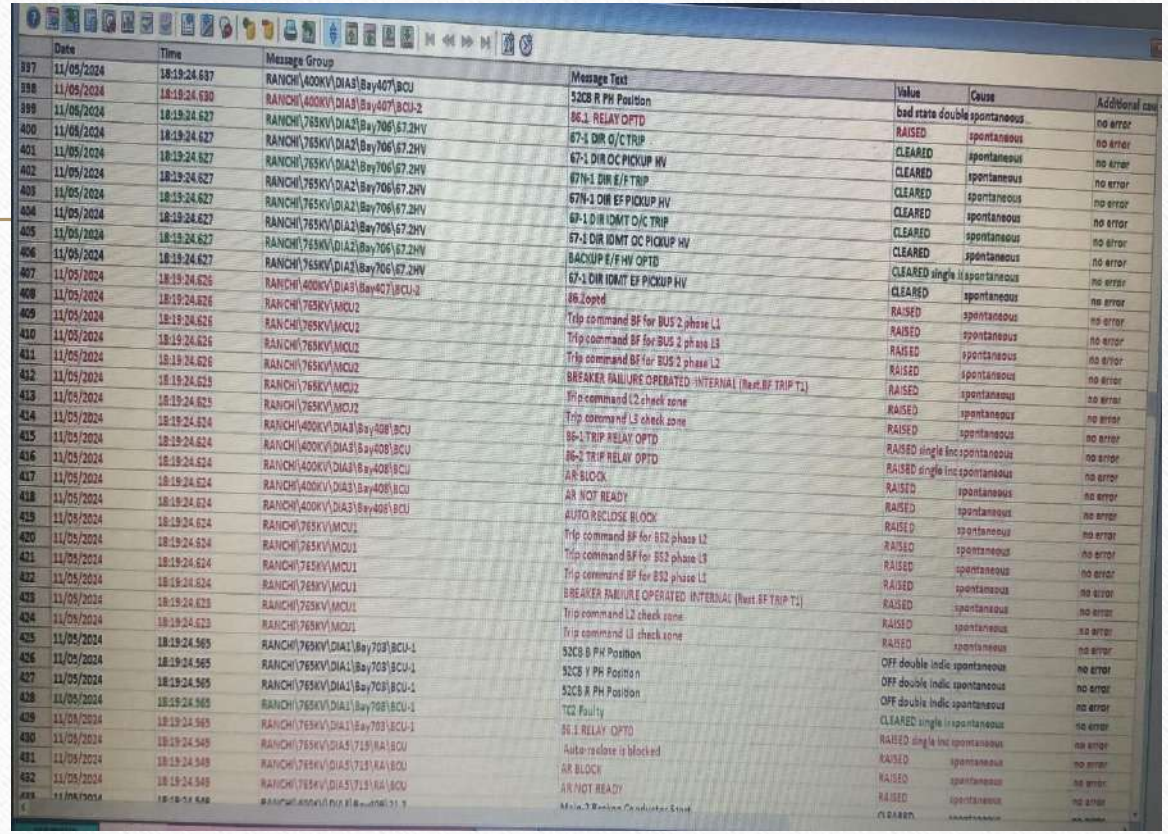
- Due to this, all the bays (703,706,708,711,715,718,721) connected with 765KV Main Bus -II got tripped. As ICT-II tie bay 705 got tripped previously due to SOTF operation in Dharmajaygarh CKT-I , 1500 ICT-II from 765 Kv side got tripped at 18:19 hrs.
- After that LBB relay of 706 main bay picked (As initiation was already there due to operation of 86 relays of 706 bay) and LBB operated after 220 ms from 18:19 hr, due to which 400 kV side bay of ICT-II got tripped on intertrip from LBB trip to clear the fault.



	Date	Time	Message Group	Message Text	Value	Cause	Additional cau
469	11/05/2024	18:19:24.522	RANCHI\765KV\MCU2	LBB Trip repeat Bay Unit @04 (706) phase L2	RAISED	spontaneous	no error
470	11/05/2024	18:19:24.515	RANCHI\765KV\DIA4\Bay710\87.1R	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
471	11/05/2024	18:19:24.515	RANCHI\765KV\DIA4\Bay710\87.1R	DIFFRENTIAL PROTN STG-2 PICKUP	CLEARED	spontaneous	no error
472	11/05/2024	18:19:24.515	RANCHI\765KV\DIA4\Bay710\87.1R	DIFFRENTIAL PROTN STG-1 PICKUP	CLEARED	spontaneous	no error
473	11/05/2024	18:19:24.513	RANCHI\765KV\DIA4\Bay710\87.1TEE	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
474	11/05/2024	18:19:24.513	RANCHI\765KV\DIA4\Bay710\87.1TEE	DIFFRENTIAL PROTN STG-1 PICKUP	CLEARED	spontaneous	no error
475	11/05/2024	18:19:24.513	RANCHI\765KV\DIA4\Bay710\87.1TEE	DIFFRENTIAL PROTN STG-2 PICKUP	CLEARED	spontaneous	no error
476	11/05/2024	18:19:24.498	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR OC BLOCK HV	RAISED	spontaneous	no error
477	11/05/2024	18:19:24.498	RANCHI\765KV\DIA2\Bay706\67.2HV	67N-1 DIR EF BLOCK HV	RAISED	spontaneous	no error
478	11/05/2024	18:19:24.498	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR IDMT OC BLOCK HV	RAISED	spontaneous	no error
479	11/05/2024	18:19:24.498	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR IDMT EF BLOCK HV	RAISED	spontaneous	no error
480	11/05/2024	18:19:24.494	RANCHI\765KV\DIA2\Bay706\67.2HV	MAIN-1CVT Fuse Failure	RAISED single inc	spontaneous	no error
481	11/05/2024	18:19:24.490	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR O/C TRIP	CLEARED	spontaneous	no error
482	11/05/2024	18:19:24.490	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR OC PICKUP HV	CLEARED	spontaneous	no error
483	11/05/2024	18:19:24.490	RANCHI\765KV\DIA1\Bay703\67.2HV	67N-1 DIR E/F TRIP	CLEARED	spontaneous	no error
484	11/05/2024	18:19:24.490	RANCHI\765KV\DIA1\Bay703\67.2HV	67N-1 DIR EF PICKUP HV	CLEARED	spontaneous	no error
485	11/05/2024	18:19:24.490	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT O/C TRIP	CLEARED	spontaneous	no error
486	11/05/2024	18:19:24.490	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT OC PICKUP HV	CLEARED	spontaneous	no error
487	11/05/2024	18:19:24.490	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT E/F TRIP	CLEARED single i	spontaneous	no error
488	11/05/2024	18:19:24.489	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT EF PICKUP HV	CLEARED	spontaneous	no error
489	11/05/2024	18:19:24.487	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR IDMT EF PICKUP HV	CLEARED	general interrogation	no error
490	11/05/2024	18:19:24.487	RANCHI\765KV\DIA2\Bay706\67.2HV	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
491	11/05/2024	18:19:24.487	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR IDMT EF PICKUP HV	CLEARED	spontaneous	no error
492	11/05/2024	18:19:24.485	RANCHI\765KV\DIA5\715\RA\21.1	Dist Protection Pickup	RAISED	spontaneous	no error
493	11/05/2024	18:19:24.474	RANCHI\765KV\MCU2	LBB TRIP OPERATED	RAISED	spontaneous	no error
494	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.1IV	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
495	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR OC BLOCK HV	RAISED	spontaneous	no error
496	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR OC BLOCK HV	CLEARED	spontaneous	no error
497	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67N-1 DIR EF BLOCK HV	RAISED	spontaneous	no error
498	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67N-1 DIR EF BLOCK HV	CLEARED	spontaneous	no error
499	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT OC BLOCK HV	RAISED	spontaneous	no error
500	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT OC BLOCK HV	CLEARED	spontaneous	no error
501	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT EF BLOCK HV	RAISED	spontaneous	no error
502	11/05/2024	18:19:24.474	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT EF BLOCK HV	CLEARED	spontaneous	no error
503	11/05/2024	18:19:24.473	RANCHI\765KV\DIA1\Bay703\67.1IV	67-1 DIR IDMT EF PICKUP IV	CLEARED	spontaneous	no error
504	11/05/2024	18:19:24.472	RANCHI\765KV\DIA7\721\MAIN-2	EARTH FAULT STG-1 PICKUP	CLEARED	spontaneous	no error



	Date	Time	Message Group	Message Text	Value	Cause	Additional ca
435	11/05/2024	18:19:24.544	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR OC BLOCK HV	CLEARED	spontaneous	no error
436	11/05/2024	18:19:24.544	RANCHI\765KV\DIA1\Bay703\67.2HV	67N-1 DIR EF BLOCK HV	RAISED	spontaneous	no error
437	11/05/2024	18:19:24.544	RANCHI\765KV\DIA1\Bay703\67.2HV	67N-1 DIR EF BLOCK HV	CLEARED	spontaneous	no error
438	11/05/2024	18:19:24.544	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT OC BLOCK HV	RAISED	spontaneous	no error
439	11/05/2024	18:19:24.544	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT OC BLOCK HV	CLEARED	spontaneous	no error
440	11/05/2024	18:19:24.544	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT EF BLOCK HV	RAISED	spontaneous	no error
441	11/05/2024	18:19:24.544	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT EF BLOCK HV	CLEARED	spontaneous	no error
442	11/05/2024	18:19:24.540	RANCHI\765KV\DIA1\Bay703\67.2HV	MAIN-1CVT Fuse Failure	RAISED	single inc	spontaneous
443	11/05/2024	18:19:24.540	RANCHI\765KV\DIA1\Bay703\67.2HV	MAIN-1CVT Fuse Failure	CLEARED	single in	spontaneous
444	11/05/2024	18:19:24.534	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR OC BLOCK HV	CLEARED	spontaneous	no error
445	11/05/2024	18:19:24.534	RANCHI\765KV\DIA1\Bay703\67.2HV	67N-1 DIR EF BLOCK HV	CLEARED	spontaneous	no error
446	11/05/2024	18:19:24.534	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT OC BLOCK HV	CLEARED	spontaneous	no error
447	11/05/2024	18:19:24.534	RANCHI\765KV\DIA1\Bay703\67.2HV	67-1 DIR IDMT EF BLOCK HV	CLEARED	spontaneous	no error
448	11/05/2024	18:19:24.533	RANCHI\765KV\DIA3\Bay707\87.1TEE	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
449	11/05/2024	18:19:24.533	RANCHI\765KV\DIA3\Bay707\87.1TEE	DIFFRENTIAL PROTN STG-2 PICKUP	CLEARED	spontaneous	no error
450	11/05/2024	18:19:24.533	RANCHI\765KV\DIA3\Bay707\87.1TEE	DIFFRENTIAL PROTN STG-1 PICKUP	CLEARED	spontaneous	no error
451	11/05/2024	18:19:24.533	RANCHI\765KV\DIA3\Bay707\87.1R	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
452	11/05/2024	18:19:24.533	RANCHI\765KV\DIA3\Bay707\87.1R	DIFFRENTIAL PROTN STG-1 PICKUP	CLEARED	spontaneous	no error
453	11/05/2024	18:19:24.533	RANCHI\765KV\DIA3\Bay707\87.1R	DIFFRENTIAL PROTN STG-2 PICKUP	CLEARED	spontaneous	no error
454	11/05/2024	18:19:24.533	RANCHI\765KV\DIA2\Bay705\BCU	BUS 2 PT SELECTED	CLEARED	single in	spontaneous
455	11/05/2024	18:19:24.530	RANCHI\765KV\DIA1\Bay703\67.2HV	MAIN-1CVT Fuse Failure	CLEARED	single in	spontaneous
456	11/05/2024	18:19:24.524	RANCHI\765KV\DIA1\Bay703\87.T1	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error
457	11/05/2024	18:19:24.524	RANCHI\765KV\DIA1\Bay703\87.T1	87 Blocked by external fault A	CLEARED	spontaneous	no error
458	11/05/2024	18:19:24.523	RANCHI\765KV\MCU1	RELAY GENERAL TRIP R-PH	RAISED	single inc	spontaneous
459	11/05/2024	18:19:24.523	RANCHI\765KV\MCU1	RELAY GENERAL TRIP Y-PH	RAISED	single inc	spontaneous
460	11/05/2024	18:19:24.523	RANCHI\765KV\MCU1	RELAY GENERAL TRIP B-PH	RAISED	single inc	spontaneous
461	11/05/2024	18:19:24.523	RANCHI\765KV\MCU1	LBB Trip repeat Bay Unit @04 (706) phase L3	RAISED	spontaneous	no error
462	11/05/2024	18:19:24.523	RANCHI\765KV\MCU1	LBB Trip repeat Bay Unit @04 (706) phase L1	RAISED	spontaneous	no error
463	11/05/2024	18:19:24.523	RANCHI\765KV\MCU1	LBB Trip repeat Bay Unit @04 (706) phase L2	RAISED	spontaneous	no error
464	11/05/2024	18:19:24.522	RANCHI\765KV\MCU2	RELAY GENERAL TRIP R-PH	RAISED	single inc	spontaneous
465	11/05/2024	18:19:24.522	RANCHI\765KV\MCU2	RELAY GENERAL TRIP Y-PH	RAISED	single inc	spontaneous
466	11/05/2024	18:19:24.522	RANCHI\765KV\MCU2	RELAY GENERAL TRIP B-PH	RAISED	single inc	spontaneous
467	11/05/2024	18:19:24.522	RANCHI\765KV\MCU2	LBB Trip repeat Bay Unit @04 (706) phase L3	RAISED	spontaneous	no error
468	11/05/2024	18:19:24.522	RANCHI\765KV\MCU2	LBB Trip repeat Bay Unit @04 (706) phase L1	RAISED	spontaneous	no error
469	11/05/2024	18:19:24.522	RANCHI\765KV\MCU2	LBB Trip repeat Bay Unit @04 (706) phase L2	RAISED	spontaneous	no error
470	11/05/2024	18:19:24.515	RANCHI\765KV\DIA4\Bay710\87.1R	RELAY GENERAL PICKUP	CLEARED	spontaneous	no error



	Date	Time	Message Group	Message Text	Value	Cause	Additional cau
397	11/05/2024	18:19:24.637	RANCHI\400KV\DIA3\Bay407\BCU	52CB R PH Position	bad state double	spontaneous	
398	11/05/2024	18:19:24.630	RANCHI\400KV\DIA3\Bay407\BCU-2	86.1 RELAY OPTD	RAISED	spontaneous	no error
399	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR O/C TRIP	CLEARED	spontaneous	no error
400	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR OC PICKUP HV	CLEARED	spontaneous	no error
401	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	67N-1 DIR E/F TRIP	CLEARED	spontaneous	no error
402	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	67N-1 DIR EF PICKUP HV	CLEARED	spontaneous	no error
403	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR IDMT O/C TRIP	CLEARED	spontaneous	no error
404	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR IDMT OC PICKUP HV	CLEARED	spontaneous	no error
405	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	BACKUP E/F HV OPTD	CLEARED	spontaneous	no error
406	11/05/2024	18:19:24.627	RANCHI\765KV\DIA2\Bay706\67.2HV	67-1 DIR IDMT EF PICKUP HV	CLEARED	single in	spontaneous
407	11/05/2024	18:19:24.626	RANCHI\400KV\DIA3\Bay407\BCU-2	86.2optd	CLEARED	spontaneous	no error
408	11/05/2024	18:19:24.626	RANCHI\765KV\MCU2	Trip command BF for BUS 2 phase L1	RAISED	spontaneous	no error
409	11/05/2024	18:19:24.626	RANCHI\765KV\MCU2	Trip command BF for BUS 2 phase L3	RAISED	spontaneous	no error
410	11/05/2024	18:19:24.626	RANCHI\765KV\MCU2	Trip command BF for BUS 2 phase L2	RAISED	spontaneous	no error
411	11/05/2024	18:19:24.625	RANCHI\765KV\MCU2	BREAKER FAILURE OPERATED -INTERNAL (Rest.BF TRIP T1)	RAISED	spontaneous	no error
412	11/05/2024	18:19:24.625	RANCHI\765KV\MCU2	Trip command L2 check zone	RAISED	spontaneous	no error
413	11/05/2024	18:19:24.624	RANCHI\400KV\DIA3\Bay408\BCU	Trip command L3 check zone	RAISED	spontaneous	no error
414	11/05/2024	18:19:24.624	RANCHI\400KV\DIA3\Bay408\BCU	86-1 TRIP RELAY OPTD	RAISED	spontaneous	no error
415	11/05/2024	18:19:24.624	RANCHI\400KV\DIA3\Bay408\BCU	86-2 TRIP RELAY OPTD	RAISED	single inc	spontaneous
416	11/05/2024	18:19:24.624	RANCHI\400KV\DIA3\Bay408\BCU	AR BLOCK	RAISED	single inc	spontaneous
417	11/05/2024	18:19:24.624	RANCHI\400KV\DIA3\Bay408\BCU	AR NOT READY	RAISED	spontaneous	no error
418	11/05/2024	18:19:24.624	RANCHI\400KV\DIA3\Bay408\BCU	AUTO RECLOSE BLOCK	RAISED	spontaneous	no error
419	11/05/2024	18:19:24.624	RANCHI\765KV\MCU1	Trip command BF for BS2 phase L2	RAISED	spontaneous	no error
420	11/05/2024	18:19:24.624	RANCHI\765KV\MCU1	Trip command BF for BS2 phase L3	RAISED	spontaneous	no error
421	11/05/2024	18:19:24.624	RANCHI\765KV\MCU1	Trip command BF for BS2 phase L1	RAISED	spontaneous	no error
422	11/05/2024	18:19:24.624	RANCHI\765KV\MCU1	BREAKER FAILURE OPERATED -INTERNAL (Rest.BF TRIP T1)	RAISED	spontaneous	no error
423	11/05/2024	18:19:24.623	RANCHI\765KV\MCU1	Trip command L2 check zone	RAISED	spontaneous	no error
424	11/05/2024	18:19:24.623	RANCHI\765KV\MCU1	Trip command L3 check zone	RAISED	spontaneous	no error
425	11/05/2024	18:19:24.565	RANCHI\765KV\DIA1\Bay703\BCU-1	52CB B PH Position	OFF double indic	spontaneous	no error
426	11/05/2024	18:19:24.565	RANCHI\765KV\DIA1\Bay703\BCU-1	52CB Y PH Position	OFF double indic	spontaneous	no error
427	11/05/2024	18:19:24.565	RANCHI\765KV\DIA1\Bay703\BCU-1	52CB R PH Position	OFF double indic	spontaneous	no error
428	11/05/2024	18:19:24.565	RANCHI\765KV\DIA1\Bay703\BCU-1	TC2 Faulty	CLEARED	single in	spontaneous
429	11/05/2024	18:19:24.565	RANCHI\765KV\DIA1\Bay703\BCU-1	86.1 RELAY OPTD	RAISED	single inc	spontaneous
430	11/05/2024	18:19:24.549	RANCHI\765KV\DIA5\718\RA\BCU	Auto-reclose is blocked	RAISED	spontaneous	no error
431	11/05/2024	18:19:24.549	RANCHI\765KV\DIA5\718\RA\BCU	AR BLOCK	RAISED	spontaneous	no error
432	11/05/2024	18:19:24.549	RANCHI\765KV\DIA5\718\RA\BCU	AR NOT READY	RAISED	spontaneous	no error

- As per SCADA event log and Transformer protection relay DR log, It was prudent that fault may be in between 706 52 CB and 706 CT (Including fault of CT itself) .

- On further preliminary inspection of SCADA events and visual inspection of all the BPIs, jumper connection of 765KV Bus-II it was found that there are no abnormalities.
- Further IR testing of suspected section was done but nothing was found.
- Further on SF6 Quality testing, very high SO2 was found in R-Ph CT of 706 Bay, which shows that internal flash has occurred in CT due to which Bus fault has occurred.
- As the location of CT is towards feeder side (i.e. after CB), the fault was not cleared even after Bus bar operation, hence LBB of this bay i.e. 706 bay also operated, which in turn tripped the ICT from 400kV side and fault was cleared. SLD of SS is attached for reference.
- 765kV Bus-II charged at 23:13 hrs. on same day and 1500MVA ICT-II was charged at 07:52 hrs on 12.05.2022 after isolating the faulty section.

Conclusion

- All the protection operated as desired and there is no ambiguity found. The reason for tripping of 765kV BUS-2 tripping and cascading effects thereafter is flashing inside Trench Germany (It was subsidiary of M/S Siemens) 706 R phase SF6 filled CT.

THANKS

Annexure B.8

Protection Performance Indices for the month of MAY'24 (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+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-Midnapore #2	06.05.24	19:35:00	06.05.24	21:16:00	y-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
2	Kharagpur-KTPP #2	06.05.24	19:43:00	06.05.24	20:06:00	B-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
3	New Chhanditala-KTPP #1	06.05.24	20:02:00	06.05.24	20:37:00	B-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
4	Newtown AA3-Baruipur #1	06.05.24	20:06:00	06.05.24	22:33:00	B-phase, Zone-1, A/r optd., A/R L/O	C-phase, Zone-1, A/R L/O	1	1	0	0	0	0	1	1	1		
5	Kharagpur-KTPP #2	06.05.24	20:15:00	06.05.24	20:31:00	B-phase, Zone-2, DT Rec., A/R L/O		1		0		0		1	1	1		
6	Arambag-KTPP #1	06.05.24	20:15:00	06.05.24	20:36:00	B-phase, Zone-1, A/r optd., A/R L/O		1		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	Arambag-NewPPSP#1	07.05.24	20:27:00	07.05.24	20:44:00	B-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
9	Arambag-BKTPP #1	07.05.24	22:10:00	07.05.24	22:19:00	R-phase, Zone-1, A/r in prg., A/R L/O		0		0		1		#	0	#	A/R initiation not re-setted in faulty phase(R-phase)	
10	Barasat-Rajarhat PG #1	08.05.24	19:06:00	08.05.24	20:57:00	3-phase trip , Gas Zone tripping		0		1		0		0	#	#	Gas zone L/O optd.of Busduct due to water ingress	
11	Newtown AA3- Baruipur #1	11.05.24	10:56:00	11.05.24	11:02:00	R-phase, Zone-1, A/r optd., A/R L/O	R-phase, Zone-1, A/R L/O	1	1	0	0	0	0	1	1	1		
12	Newtown AA3- Baruipur #1	11.05.24	13:59:00	11.05.24	14:21:00	Y-phase, Zone-1, , A/R L/O	Y-phase, Zone-1, SOTF/TOR ,A/R L/O	1	0	0	1	0	0	#	#	#	Relay at Baruipur end is to be checked	
13	Newtown AA3- Baruipur #1	11.05.24	20:35:00	12.05.24	14:43:00	No tripping. Manual OFF of the bay		0		1		0		#	#	#	Manual off of the Feeder due to glowing at the Cable head at PG end.	
14	Gokarna-Sagardighi #1	16.05.24	17:43:00	16.05.24	18:52:00	B-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		

15	Gokarna-Sagardighi #2	16.05.24	17:43:00	16.05.24	18:29:00	B-phase, Zone-1, A/r optd., A/R L/O		1		0		0		1	1	1		
16	Jeerat- New Chanditala	22.05.24	11:42:00	22.05.24	12:29:00	B-phase, Zone-1, A/R L/O	B-phase, Zone-1, A/R L/O	1	1	0	0	0	0	1	1	1	OPGW laying work is running. A/R switch kept Off during working time.	
17	Durgapur-PPSP#2	30.05.24	21:47:00	30.05.24	22:16:00	B-phase, Zone-1, , A/R L/O		1		0		0		1	1	1	Heavy storm and thunderin g weather	

List of important transmission lines in ER which tripped in May-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**	**UTILITY RESPONSE**	**PROTECTION OPERATION AS DESIRED**
1	400KV-JAMSHEDPUR-MAITHON-1	01-05-2024	14:45	01-05-2024	16:04	Jamshedpur : F/D: 112.9 Km, F/C: 2.96 kA	Maithon: F/D: 26.8 Km, F/C: 7.4 kA, Z1	R-Earth	100	A/r successful at Jamshedpur, tripped again within reclaim time. No A/r attempt at Maithon.		Yes	Yes	A/R Auto/NA switching was done for work in line. While restoring the auto mode, RAAM relay of Tie bay did not reset and "Prep 3ph Trip" feedback was coming to Main-II relay for converting the single phase trip as three phase trip. Hence, A/R failed at Maithon SS due to failure of old static type relay.	**NO**
2	400KV-BINAGURI-TALA-4	01-05-2024	23:41	02-05-2024	17:25	Binaguri: DT Received	Bhutan: Y_B_N, Iy:8.51 kA, Ib:7.98 kA, 1 km	Y-B-Earth	1500	Phase to phase resistive fault close to Tala. DT received at Binaguri.		No	No	Fault was in Y-B phase. Z2 started at Binaguri end. However, Tala end sent the DT and 3 phases opened at Binaguri end.	**NO**
3	220KV-BOLANGIR (PG)-KESINGA-1	02-05-2024	14:47	02-05-2024	15:58	Bolangir: R-N, 1.4 kA, 68 km		R-Earth	100	A/r successful from Bolangir only.		Yes	No		**NO**
4	220KV-DARBHANGA (DMTCL)-DARBHANGA-1	03-05-2024	01:27	03-05-2024	04:08	Darbahnga: Distance protection operated		R-Earth	100	A/r couldn't be ascertained from PMU		Yes	No		**NO**

5	400KV-FSTPP-MALDA(PG)-1	03-05-2024	01:28	03-05-2024	06:19	B-Phase Faulty Isolator malfunction at FSTPS switchyard end.	Malda: DEF operated.	No fault	NA	At 01:28:04 Hrs, B_ph current reduced to around 20 A at Farakka and then after 10 seconds DEF operated at Malda and DT sent to Farakka. NTPC may explain the reason for reduced B_ph current.	DR not time synchronized and DR channels not configured properly at Farakka.	Yes	Yes		**YES**
6	400KV-JHARSUGUDA-STERLITE-2	03-05-2024	12:11	03-05-2024	15:40	Jharsuguda: Y_N, 6.92 kA, 35.7 Km		Y-Earth	100	A/r failed after 1 second		Yes	No		**YES**
7	220KV-JSPL-JAMSHEDPUR(DVC)-1	03-05-2024	12:32	03-05-2024	16:03	JSPL: Y_N, 0.718 kA	Jamshedpur: Y-N, Zone-2, 147 km, 0.77 kA	Y-Earth	500	Resistive phase to phase fault		No	No		**YES**
8	400KV-PATNA-BARH-1	04-05-2024	11:02	04-05-2024	11:58	Patna: DT received	Maintenance work of 220V chargers were in progress at barh and due to voltage fluctuation during switching may cause line tripping.	No fault	NA	NTPC Barh may explain	DR not configured properly at Barh. Prefault time for DR recording is very less	Yes	No		**NO**

9	400KV-KHSTPP-BARH-2	04-05-2024	11:02	04-05-2024	11:59	Kahalgaon: Didn't trip	Maintenance work of 220V chargers were in progress at barh and due to voltage fluctuation during switching may cause line tripping. Line tripped only from Barh end.	No fault	NA	NTPC Barh may explain		NA	No		**NO**
10	220KV-TENUGHAT-BIHARSARIFF-1	05-05-2024	14:06	05-05-2024	14:50	Tenughat: B_N, 1.099 kA, 119. 5 km	Biharshariff: B_N , Z-1, 48.99 km, 2.334 kA	B-Earth	100	Three phase tripping for signle phase fault		Yes	No		**NO**
11	220KV-BUDHIPADAR-KORBA-2	05-05-2024	14:40	07-05-2024	12:00		Budhipadar: Didn't trip	No fault	NA	No fault observed from PMU		NA	No		**NO**
12	400KV-BOLANGIR (PG)-ANGUL-1	05-05-2024	15:34	05-05-2024	16:03	Bolangir: R-N, 0.84 kA, 168 km	Angul: R-N,12.58 kA, 16.8 Km, Z1	R-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	Yes		**YES**

13	220KV-DALTONGANJ-CHATRA-1	06-05-2024	11:46	06-05-2024	12:49	Daltonganj : Y_B, 43.43 Km, Iy-2.5 KA, Ib-2.44 KA	Chatra: Y_B, 105.04 km	Y-B	100	Phase to phase fault.	DR not time synchronized at Chatra	Yes	Yes		**YES**
14	220KV-RANCHI-MTPS(DVC)-1	06-05-2024	15:42	06-05-2024	16:26	Ranchi: R_N, 97 km, 1.9 kA,A/R successful	Mejia: R_N, 1.332 kA	R-Earth	100	A/r kept disabled at Mejia		Yes	No		**NO**
15	220KV-TSTPP-MEERAMUNDALI-2	06-05-2024	15:49	06-05-2024	19:24	TSTPP:R_N, 31.7 km, 3.87 kA	Meramundali: R-N, 12.03 Km, 9.853 KA	R-Earth	100	A/r successful. Tripped again within reclaim time.		No	Yes		**YES**
16	400KV-BARIPADA-TISCO-1	06-05-2024	18:28	06-05-2024	19:51	Baripada:R_N, 75 km, 3.2 kA	TISCO: R-N, 50.7 km, 3.69 kA	R-Earth	100	Three phase tripping for single phase fault		No	No		**NO**

17	400KV-MEDINIPUR-KHARAGPUR-2	06-05-2024	19:35	06-05-2024	21:16	Medinipur:R-Y, 84.36 km, Ir-3.55 kA, Iy-3.55 kA	Kharagpur: R-Y, 22.72 Km,Ir:8.728 KA, Iy:8.821 KA	R-Earth	100	Initially fault in R_ph. After 110 msec, fault struck Y_ph and all three phase tripped	DR not time synchronized at Kharagpur	Yes	Yes		**YES**
18	400KV-KOLAGHAT-KHARAGPUR-2	06-05-2024	19:43	06-05-2024	20:01	Kolaghat: B_N,33.47 Km,7.789 KA	Kharagpur: B_N. 4.81 kA	B-Earth	100	A/r successful. Tripped again within reclaim time.	DR not time synchronized at Kharagpur	No	Yes		**YES**
19	220KV-RANCHI-MTPS(DVC)-1	06-05-2024	19:44	08-05-2024	17:49	Ranchi: B_N ,116 km,1.6 kA	Mejia:-B_N, 1.77 kA	B-Earth	100	A/r unsuccessful after 1 second at Ranchi. A/r kept disabled at Mejia, however other two phase tripped on PD later		Yes	No		**YES**
20	400KV-KOLAGHAT-NEW CHANDITALA-1	06-05-2024	20:02	06-05-2024	20:37		New Chanditala: B-N, Z1, 45.07 Km,5.989 KA	B-Earth	100	A/r failed after 1 second		No	Yes		**YES**

21	220KV-BARUIPUR-SUBHASGRAM(PG)-1	06-05-2024	20:06	06-05-2024	22:33	Baruipur : B_N, 22.3 Km, 0.8 kA	Subhashgram: B_N, 5.77 kA	B-Earth	100	Three phase tripping at Baruipur for single phase fault. A/r successful at Subahshgram, phase to phase fault within reclaim time.	DR not time synchronized at Subhashgram.	Yes	Yes	Baruipur-Subhasgram PG-Newtown AA3 circuit tripped with Zone-1 , Blue phase fault. As the circuit is passing through TBC bus at PG Substation to Newtown , there is no communication chanel between Baruipur 220 Kv and Newtown 220 KV sub-station. So carrier switch at Baruipur end kept OFF position for which A/R not operated at Baruipur end. At New town end it mistakenly kept in ON position. Latter we made it OFF position.	**YES**
22	400KV-KOLAGHAT-KHARAGPUR-2	06-05-2024	20:15	06-05-2024	20:31		Kharagpur: B_N,97.04 Km, 3.515 KA	B-Earth	100	DT received at Kharagpur and all three phase tripped.	DR not time synchronized at Kharagpur	No	Yes	Line tripped with Zone-2 , Blue-phase fault, CS, CR . But DT receive from far end within 19 ms causes A/R lock-out and three-phase trip.	**NO**
23	400KV-KOLAGHAT-ARAMBAGH-1	06-05-2024	20:15	06-05-2024	20:36		Arambagh: B_N, 4.99 kA	B-Earth	100	A/r successful. Tripped again within reclaim time.		No	Yes		**YES**
24	220KV-RAJARHAT-BARASAT-2	06-05-2024	20:29	06-05-2024	21:10	Rajarhat: R_N, 5.6 km,11.04 kA	Barasat: R_N, Z-I,13.1 km,6.88 kA	R-Earth	100	DT received at Rajarhat which was then relayed back to Barasat and three phase tripped at both ends.		Yes	Yes	Fault was single phase type. However, DT was received after 45ms from remote end. Hence, 3 phase trip happened at Rajarhat SS.Barasat - Rajarhat PG #2 tripped with Zone-1, Red phase with CS, CR . Red-phase A/R initiation , A/R in progress. But with in dead time, after around 160 ms, DT receive from far end which causes A/R L/O and three phase trip.	**NO**

25	220KV-SAHARSA(PMTL)-BEGUSARAI-2	06-05-2024	21:15	07-05-2024	00:12	Saharsa: Didn't trip	Tripped from Begusarai end only	No fault	NA	No fault observed from PMU. BSPTCL may explain.		NA	No	TRIPPED FROM BEGUSARAI END ONLY	**NO**
26	400KV-JEYPORE-BOLANGIR-1	07-05-2024	05:29	07-05-2024	06:57	Jeypore: DT received	Bolangir: O/V stage-1	O/V St.1	NA	O/V stage 1 operated		Yes	Yes		**YES**
27	400KV-JEYPORE-GAJUWAKA-1	07-05-2024	05:29	07-05-2024	07:00	O/V Stg-1 operated at Jeypore		O/V St.1	NA			Yes	NA		**YES**
28	220KV-BOLANGIR (PG)-KESINGA-1	07-05-2024	07:15	07-05-2024	07:44	Bolangir: Y-B , Iy-1.08 kA, Ib-1.08 kA, 80 km		Y-B	800	Tripped in Zone-3 from Bolangir. Whether any fault in downstream of Kesigna. OPTCL may share		Yes	No		**NO**

29	400KV-MAITHON-GAYA-1	07-05-2024	17:15	07-05-2024	18:09	Maithon: DT received	Gaya: R-N, 41 km, 4.2 kA, DEF operated	R-Earth	1000	DEF operated after 1 second at Gaya and DT sent to remote end. Very less dip in voltage, hence distance protection didn't operate despite continuous high current. PG ER-1 may share the findiings.	DR of another tripping attached at Maithon	No	Yes	Fault was high resistive type. DEF optd at remote end and three phase trip happened. Z2/Z3 started at Maithon SS.	**NO**
30	400KV-TENUGHAT-PATRATU-1	07-05-2024	17:42	08-05-2024	13:19		Patratu: Didn't trip	No fault	NA	No fault as per PMU. TVNL may explain.		No	No		**NO**
31	220KV-RANCHI-HATIA-2	07-05-2024	17:59	07-05-2024	19:05	Ranchi: Y_N, A/r successful	Hatia: Y-N, 6.15 kA	Y-Earth	100	A/r successful at Ranchi only. Three phase tripping at Hatia.	DR not time synchronized at Hatia	Yes	Yes		**NO**
32	400KV-RANCHI-NEW RANCHI-1	07-05-2024	18:10	08-05-2024	12:10	Ranchi: B-N, 27 km, 10.27 kA	New Ranchi: B_N, 7 kA	B-Earth	100	A/r failed at Ranchi and DT sent to remote end after A/r failure.		Yes	Yes		**YES**

33	400KV-RANCHI-SIPAT-2	07-05-2024	18:23	08-05-2024	17:59	Ranchi: Y-N, 23.2 km, 9.4 kA		Y-Earth	100	A/r unsuccessful after 1.2 seconds		Yes	NA		**YES**
34	220KV-DARBHANGA (DMTCL)-DARBHANGA-1	07-05-2024	18:50	07-05-2024	20:49	DMTCL: Didn't trip	Darbhanga: R-N, 1.71 kA, dist= -75.7 km	R-Earth	100	BSPTCL may share fault details.		No	No		**YES**
35	220KV-SAHARSA-BEGUSARAI-2	07-05-2024	19:06	08-05-2024	16:16	Saharsa: R-N, 13.2 kA, 6.1 km		R-Earth	100	Three phase tripping at Saharsa. A/r successful at Begusarai.		Yes	No	A/R Attempted at Saharsa But Tripped on Persisting Fault	**NO**
36	400KV-KHSTPP-BARH-1	07-05-2024	19:55	08-05-2024	19:34		BARH:- B-N, 88.57km, 4.9kA	B-Earth	100	A/r unsuccessful at Barh, however other two phase at Barh didn't open after failed A/r attempt. Later tripped on PD after 2.5 seconds.		No	Yes		**NO**

37	400KV-NEW PPSP-ARAMBAGH-1	07-05-2024	20:27	07-05-2024	20:44		Arambag: B-N, 5.28kA, 56.75Km	B-Earth	100	A/r failed after 1 second		No	Yes		**YES**
38	220KV-RANCHI-RAMGARH-1	07-05-2024	20:37	08-05-2024	02:41	Ranchi: R_Y, Ir: 8.6 kA, Iy: 6.9 kA		R-Y	100	Phase to phase fault		Yes	No		**YES**
39	220KV-MAITHON(PG)-DUMKA-2	07-05-2024	20:48	07-05-2024	22:15	Maithon: R_N, A/R Successful	Dumka- R_N, 2.629 kA, 25.12 km	R-Earth	100	Three phase tripping at Dumka.	DR not time synchronized at Dumka. DR length less at both ends.	Yes	Yes	A/R operated at Maithon end and protection operated properly at Maithon end.	**NO**
40	400KV-MAITHON-MEJIA-2	07-05-2024	21:16	08-05-2024	10:02	Maithon : B-N, 12.4 Km, 9.26 kA		Y-Earth	100	A/r failed after 1 second		Yes	No		**YES**

41	400KV-ARAMBAGH-BAKRESWAR-1	07-05-2024	22:10	07-05-2024	22:19	Arambagh: R_N, 3.61 kA		R-Earth	100	Other two phase at Arambagh tripped after 200 msec. A/r successful at Bakreshwar		Yes	No	Line tripped with Zone-2 , Red-phase fault, CR . A/R in progress From DR it is seen that R-phase initiation continue to around 610 ms after that it withdrawn. In the relay settings(Simens-) A/R T-start monitoring time is set at 0.2. Since the red-phase initiation is not with drawn with in 200 ms , it initiate A/R lock-out and three phase trips occurs. The relay will be tested shortly after getting shut down. NB : One successful Auto Reclose was occured on same phase fault on 09.05.24.	**NO**
42	400KV-NEW DUBURI-MEERAMUNDALI-2	08-05-2024	17:54	08-05-2024	19:38		Meeramundi : R_N,A/R Unsuccessful, 37.2 Km, 6.98 kA,	R-Earth	100	A/r failed after 1 second		Yes	Yes		**YES**
43	220KV-RAJARHAT-BARASAT-1	08-05-2024	19:06	08-05-2024	20:57	Rajarhat: DT received		No fault	NA	DT received at Rajarhat. WBSETCL may explain.		Yes	Yes	DT send due to shorted of Gas Zone Lock-out contact of Bus-Duct chember of the bay. This is due to ingress of water. Water ingress due to leakage of gas kit and the same attended on that date.	**NO**
44	220KV-DARBHANGA (DMTCL)-DARBHANGA-1	09-05-2024	09:11	09-05-2024	10:55	DMTCL: Didn't trip	Darbhanga - R_N, 2 kA	No fault	NA	Tripped immedaitely during fault in adjacent line. BSPTCL may explain.	DR length less at DTMCL	Yes	No		**NO**

45	220KV-DARBHANGA (DMTCL)-DARBHANGA-2	09-05-2024	09:11	09-05-2024	13:45	Darbhanga (DMTCL):-R-N, 13.97 kA,1.8 km, Z-1	Darbhanga - R_N, 13.8 kA	R-Earth	100	Three phase tripping for single phase fault.	DR length less at DTMCL	Yes	No		**NO**
46	220KV-DARBHANGA(DMTCL)-LAUKAHI-1	09-05-2024	09:45	09-05-2024	12:00	Darbhanga (DMTCL) :-R-N, 2.13 km, 15.45 kA, Z-1		R-Earth	100	A/r successful at Laukahi only.	DR length less at DTMCL	Yes	No		**NO**
47	220KV-SAHARSA-BEGUSARAI-1	09-05-2024	10:35	09-05-2024	12:06	Saharsa:-R-N, 25.03 km, 5.14 kA, Z-1	Begusarai: R-N, 61.51Km, 2.21 KA.	R-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	No		**YES**
48	220KV-RENGALI (PH)-TSTPP-1	09-05-2024	14:57	09-05-2024	19:50		TSTPP: R_N, 17 Km, 5.09 KA	R-Earth	100	Three phae tripping for single phase fault		No	No		**NO**

49	220KV-TTPS-TSTPP-1	09-05-2024	14:57	09-05-2024	16:31		TSTPP: Y_N	Y-Earth	100	Three phae tripping for single phase fault		No	No		**NO**
50	400KV-DSTPS(ANDAL)-RAGHUNATHPUR-2	09-05-2024	15:21	10-05-2024	15:07		Raghunathpur:R_N, 8.574 kA, 26.16 Km	R-Earth	100	A/r failed after 1 second		No	No		**YES**
51	220KV-MAITHON-KALYANESHWARI-1	09-05-2024	15:25	09-05-2024	19:55	Maithon:R_N, 2.2 km, 13.5 kA		R-Earth	100	Other two phase at Maithon opened after 1.5 seconds. No A/r attempt at either end.		Yes	No	A/R scheme is not implemented in this line. Line belongs to DVC.	**NO**
52	400KV-MAITHON-DURGAPUR-1	09-05-2024	15:45	10-05-2024	13:22	Maithon : R_N, 38.6 Km, 2.61 KA;	Durgapur : R_N, 10 Km,7.04 KA;	R-Earth	100	A/r failed after 1 second		Yes	Yes		**YES**

53	220KV-DARBHANGA (DMTCL)-DARBHANGA-1	09-05-2024	16:26	09-05-2024	17:26		Darbhanga : DEF, R_N, 0.27 kA	R-Earth	500	Resistive fault. DEF operated after 500 msec. Current in R_ph despite breaker trip command. BSPTCL may explain. DEF settings may be reviewed.		No	Yes		**NO**
54	220KV-JODA-RAMCHANDRAPUR-1	09-05-2024	17:45	09-05-2024	18:56		Ramchandrapur : B_N, 120.6 km, 1.8 kA	B-Earth	400	Tripped in Zone-2 time from Ramchandrapur	DR not time synchronized nad DR channels not configured properly at Joda. DR length less at both ends	Yes	Yes		**NO**
55	400KV-JHARSUGUDA-RAIGARH-1	10-05-2024	21:46	10-05-2024	22:24	Jharsuguda: B_N, 5.08 kA		B-Earth	100	No A/r attempt at Jharsuguda. Ar/ successful at Raigarh after 1.2 seconds. Other two phase at Jharsuguda tripped after 3 seconds. PG Odisha may explain.		Yes	NA		**NO**
56	220KV-NewTown-Subhashgram-Baruipur	11-05-2024	10:56	11-05-2024	12:43	NewTown: R_N, 7.0 kA	Baruipur : R_N, 16.3 km, 0.89kA	R-Earth	100	A/r successful at New Town only	DR not itme synchronized at New Town	Yes	Yes		**NO**

57	400KV-KHSTPP-BARH-1	11-05-2024	11:30	11-05-2024	12:00		DT Received at Barh	No fault	NA	DT received at Barh. No fault in line. NTPC KhSTPP may explain.		Yes	No		**NO**
58	400KV-TENUGHAT-PVUNL-1	11-05-2024	13:29	11-05-2024	14:29	Tenughat: B_N, 1.599 kA	Baruipur: Z1, 19.4 km, Y ph, E/F, FC: Y Phase: 4 kA	B-Earth	100	A/r couldn't be ascertained from PMU. TVNL may confirm.		No	No		**YES**
59	220KV-NewTown-Subhashgram-Baruipur	11-05-2024	13:59	11-05-2024	14:21	New Town : Y_N, 20 km, 2 kA	Baruipur: Y_N, 19.4 km, 4 kA	Y-Earth	100	Three phase tripping for single phase fault at Baruipur. Whether A/r attempted at NewTown? WBSETCL may confirm		Yes	No	Relay at Baruipur end is to be checked	**NO**
60	220KV-DALTONGANJ-CHATRA-1	11-05-2024	14:37	11-05-2024	15:34	B_N, 0.965 kA		B-Earth	1300	Tripped in Zone-2 time from Daltonganj. Carrier received at Daltonganj but at that time fault was not seen in any zone. Later when current increased, it was seen in Zone-2.	Chatra end is not time synchronized	Yes	Yes		**NO**

61	400KV-PUSAULI(PG)-NABINAGAR(BRBCL)-1	11-05-2024	14:52	11-05-2024	15:36	A/R successful from Pusauli end, B_E, FD-74.8 KM, FC-5.7 KA, Z-1		B-Earth	100	A/r successful after 1 second. Only from Sasaram end		No	No		**NO**
62	220KV-BARIPADA-BALASORE-1	11-05-2024	15:44	11-05-2024	16:17	Baripada: R_N, 2.74 KA,79.09 Km	Balasore: R_N, 0.8 Km, 7.4 KA	R-Earth	100	A/r successful after 1 second. Line tripped from Balasore after 5 seconds. OPTCL may explain.		No	Yes		**NO**
63	765KV-JHARSUGUDA-RAIPUR PS (DURG)-2	11-05-2024	17:05	11-05-2024	22:12	Jharsugda:R-Y, Ir-5.62 kA, Iy-4.64 kA, 36.1Km	Raipur:R-Y ph, 61.714 km	R-Y-Earth	100	Phase to phase fault.		Yes	NA		**YES**
64	400KV-MAITHON-MEJIA-1	11-05-2024	17:10	11-05-2024	17:40	Maithon : R-N, 13.08 kA, 5.8 Km	Mejia: R-N, 3.176 KA, 50.46 Km	R-Earth	100	Three phase tripping at Maithon. A/r successful from Mejia only.		Yes	No	Old static relay (RAAM) failed & issued three phase trip command.	**NO**

65	765KV-NEW RANCHI-DHARAMJAIGARH-1	11-05-2024	18:12	11-05-2024	21:35	New Ranchi : R-N, 2.9 km,12.4 kA		R-Earth	100	A/r failed after 1 second		Yes	No		**YES**
66	220KV-RENGALI(PH)-TSTPP-1	11-05-2024	21:00	15-05-2024	22:33	Rengali-O/C Tripped	TSTPP :R-N, Z-2,25 km, 4.3 kA	R-Earth	100	As per PMU, fault in R_ph during A/r.		No	No		**YES**
67	400KV-KODERMA-BOKARO-2	11-05-2024	13:56	12-05-2024	07:25		BOKARO: Z-1 Trip,, C-Phase Trip, Fault current: 2.8kA Distance : 70.48KM	B-Earth	100	A/r failed after 1 second		No	No		**YES**
68	220KV-SITAMARHI-RAXAUL(NEW)-1	12-05-2024	05:34	12-05-2024	06:47	Sitamari: B_N, 72.8 km, 2.31 kA	Raxaul: B-N, 15 km, 1.5 kA	B-Earth	100	Tripped again within reclaim time		Yes	Yes		**YES**

69	220KV-SITAMARHI-RAXAUL(NEW)-2	12-05-2024	05:42	12-05-2024	06:47	Sitamari: B_N, 74.9 km, 1.94 kA	Raxaul: B-N, 36 km, 3.1 kA	B-Earth	100	Tripped again within reclaim time		Yes	Yes		**YES**
70	220KV-DARBHANGA (DMTCL)-DARBHANGA-1	12-05-2024	12:23	12-05-2024	13:30	DMTCL: Didn't trip	Darbhanga: B_N, 1.53 kA	B-Earth	100	Tripped from BSPTCL only. BSPTCL may explain.		No	No		**NO**
71	220KV-PUSAULI-KARAMNASHA-1	12-05-2024	17:44	12-05-2024	18:35	Pusauli : B_N, 6.729 KA, 16.494 Km	Karamanasa: B_N, 2.181 kA, 9.086 Km	B-Earth	100	A/R successful from Pusauli end only. Other two phase at Karamnasha tripped later on PD. BSPTCL may explain.		No	Yes		**NO**
72	765KV-GAYA-VARANASI-2	12-05-2024	18:04	12-05-2024	19:18	GAYA : R_N, 104.7 km, 3.98 kA	Varanasi: R_N, 128.2 km, 4.65 kA	R-Earth	100	A/r failed after 1 second		Yes	No		**YES**

73	220KV-PUSAULI-KARMNASA-1	12-05-2024	18:49	12-05-2024	19:42	Pusauli: B_N, 6.32 kA		B-Earth	100	A/r successful from Pusauli. Other two phase at Karamansha tripped on PD after 1.8 seconds.		Yes	No		**NO**
74	400KV-NEW DUBURI-MEERAMUNDALI-2	13-05-2024	00:58	13-05-2024	08:08	New Duburi: R_N, 4.65 kA,56.7 km	Meeramundali: R-N, 9 kA, 37.4 km	R-Earth	100	A/r failed after 1 second		Yes	Yes		**YES**
75	220KV-DALTONGUNJ-GARWAH (NEW)-1	13-05-2024	14:16	13-05-2024	16:02	Daltongunj: Y-N, 3.09kA, 30.47 km	Garwah: Y_N, 0.60 kA, 63.90 Km	Y-Earth	100	A/r successful. Tripped again within reclaim time.	DR not itme synchronized at Garhwa	Yes	Yes		**YES**
76	400KV-SAGARDIGHI-FSTPP-2	14-05-2024	15:25	14-05-2024	18:25	Sagardighi - R_N, 70.15 km , 3.3 kA	FSTPP - R_N, 4 kA	R-Earth	100	No A/r attempt at either end.	DR channels not configured properly and DR length less at Farakka.	Yes	Yes	Three phase tripping occurred for single phase fault. S/D requisition given to check carrier scheme at SgTPP end. But S/D clearance not given.	**NO**

77	400KV-DURGAPUR-KHSTPP-1	14-05-2024	15:42	14-05-2024	16:24	Durgapur: Y-N, 134.9 km, 2.46kA	KHSTPP: Y-N, 90.94 km,4.5 kA	Y-Earth	100	A/r successful from Durgapur only. Other two phase at Kahalgaon tripped on PD.		Yes	No	A/R operated at Durgapur end and protection operated properly at PG end.	**NO**
78	400KV-KHSTPP-BARH-1	14-05-2024	17:42	14-05-2024	18:04	Kahalgaon: Didn't trip	Barh: DT received	No fault	NA	No fault in line. NTPC may explain.		Yes	No		**NO**
79	220KV-BOLANGIR(PG)-BOLANGIR(GRIDCO)-2	15-05-2024	11:51	15-05-2024	12:10	Bolangir(PG): DT received		No fault	NA	No fault in line as per PMU. OPTCL/PG Odisha may explain.		No	No		**NO**
80	765KV-JHARSUGUDA-RAIPUR PS (DURG)-2	15-05-2024	19:48	15-05-2024	22:33	Jharsuguda: R-N, 4.3 kA, 270 Km		R-Earth	100	A/r failed after 1 second		Yes	NA		**YES**

81	400KV-DURGAPUR-KHSTPP-2	16-05-2024	16:20	17-05-2024	08:47	Durgapur:-B-N,157.0 km,2.35 kA	KHSTPP: B_N, 81 km, 5.5 KA	B-Earth	100	A/r failed after 1 second from Durgapur. No A/r attempt at Kahalgaon, other two phase tripped later on PD after 2.5 seconds.		Yes	No	A/R attempted at Durgapur end and protection operated properly at PG end.	**NO**
82	400KV-GOKARNA-SAGARDIGHI-2	16-05-2024	17:43	16-05-2024	18:46	Gokarna: B_N, 13.80 Km, 13.12 KA	Sagardighi-B_N, 27.47 km, 15.25 KA	B-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	No		**YES**
83	400KV-GOKARNA-SAGARDIGHI-1	16-05-2024	17:43	16-05-2024	18:55	Gokarna: B_N, 16.09 km, 8.645 kA	Sagardighi- B_N, 21.78 km, 12.31 kA	B-Earth	100	A/r failed after 1 second		Yes	No		**YES**
84	220KV-CHUKHA-BIRPARA-1	16-05-2024	21:38	16-05-2024	22:24		Birpara: R-Y, Z1, FD- 41.34 Km, Ir-2.758 kA, Iy-2.942 KA	R-Y-Earth	100	Phase to phase fault.	DR not time synchronized at Birpara	No	Yes		**YES**

85	220KV-CHUKHA-BIRPARA-2	16-05-2024	21:38	16-05-2024	22:26		Birpara: R-Y, Z1, FD- 41.8 Km, Ir-3.355 kA, Iy-2.942 KA	R-Y-Earth	100	Phase to phase fault.		No	Yes		**YES**
86	220KV-PUSAULI-NADHOKAR-1	17-05-2024	11:04	17-05-2024	12:24	Pusauli: AR Lockout, 86 master trip		No fault	NA	No fault observed as per PMU. PG ER-1/BSPTCL may explain.		No	No		**NO**
87	220KV-PUSAULI-NADHOKAR-2	17-05-2024	11:04	17-05-2024	12:27	Pusauli: AR Lockout, 86 master trip		No fault	NA	No fault observed as per PMU. PG ER-1/BSPTCL may explain.		No	No		**NO**
88	400KV-BINAGURI-BONGAIGAON-1	18-05-2024	00:59	18-05-2024	03:31	BINAGURI - NOT TRIPPED	BONGAIGAON: R-Y , Ir 246 AMP, Iy-718 AMP & Ib-417 AMP	No fault	NA	No fault observed as per PMU. PG ER-2 may explain.		No	No		**NO**

89	400KV-BINAGURI-TALA-2	18-05-2024	09:25	18-05-2024	13:23	Binaguri : B-N, 120.5 Km,3.2311 KA	Tala: B-N,35 Km,4.07 kA	B-Earth	100	DT received at Binaguri and all three phase tripped.		Yes	No	Fault was single phase type. However, DT was received after 50ms from remote end. Hence, 3 phase trip happened at binaguri SS.	**NO**
90	220KV-RANCHI-HATIA-3	19-05-2024	14:32	19-05-2024	16:36	Ranchi: B_N,40 km, 4.9 kA	Hatia: B_N, 10.55 kA,3.5 km	B-Earth	100	A/r successful. Tripped again within reclaim time.	DR not time synchronized and DR length less at Hatia	Yes	Yes		**YES**
91	220KV-RANCHI-HATIA-1	19-05-2024	14:57	19-05-2024	15:49	Ranchi: B_N, 6.50 kA	Hatia: B_N, 4.09 kA	B-Earth	100	A/r successful. Tripped again within reclaim time.	DR not time synchronized and DR length less at Hatia	Yes	Yes		**YES**
92	400KV-BINAGURI-KISHANGANJ-2	19-05-2024	23:35	20-05-2024	00:53	Binaguri: Y_N, 88.6 Km , 2.15 kA	Kishanganj -Y-N, 0.603 km, 21.39 kA	Y-Earth	100	After 90 msec, fault struck B_ph also and three phase tripped.		Yes	Yes		**YES**

93	220KV-RENGALI(PH)-TSTPP-1	20-05-2024	21:03	20-05-2024	23:34	Rengali: R_N, 5.2 KA	TSTPP: R_N,7.8 Km, 7.3 kA	R-Earth	500	Tripped in Zone-2 time.		No	No		**NO**
94	400KV-MERAMUNDALI-LAPANGA-1	20-05-2024	21:45	Still not revived		Meramundali: B_N, 16.7 km, 6.8 kA		R-Earth	100	Fault first struck R_ph and after 700 msec fault struck B_ph and all three phase tripped.		Yes	Yes		**YES**
95	400KV-MERAMUNDALI-LAPANGA-2	20-05-2024	21:45	Still not revived		Meramundali: R_N, 16.9 km, 10.87 kA		Y-Earth	100	Fault first struck Y_ph and after 500 msec, fault converted to R_Y fault and all three phase tripped.		Yes	Yes		**YES**
96	765KV-GAYA-VARANASI-2	21-05-2024	05:07	21-05-2024	06:13	Gaya:R-N, 109.4 km, 5.05 KA	Varanasi: R-N, 146 km, 5.0 KA	R-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	NA		**YES**

97	220KV-JODA-RAMCHANDRAPUR-1	21-05-2024	12:16	21-05-2024	12:43	Joda: Y_N, 101.7 km, 0.75 kA	Ramchandrapur : Y_N, 31.2 Km, 3.08 kA	Y-Earth	100	Three phase tripping at Rmachandrapur. A/r successful at Joda, however after 200 msec line tripped again due to persisting fault.	DR not time synchronzied at Joda. DR length less at both ends.	Yes	Yes		**NO**
98	220KV-TSTPP-MEERAMUNDALI-1	21-05-2024	14:40	21-05-2024	15:09	TSTPP: B_N, 27km, 4.06 kA	Meeramundali: B_N, 3.2 kA	B-Earth	100	A/r failed after 1 second		No	Yes		**YES**
99	765KV-ANGUL-JHARSUGUDA-4	21-05-2024	16:53	21-05-2024	18:12	Angul: B-N, 331km, 3.05kA	Jharsuguda:B-N,28.8 Km,0.9 KA	B-Earth	100	A/r failed after 1 second		Yes	No		**YES**
100	220KV-BUDHIPADAR-KORBA-1	22-05-2024	11:14	24-05-2024	21:43	Budhipadar : B_N, 32.1 Km, 4.05 KA	KORBA: B_N, 145.75 km, 1.03 kA	B-Earth	100	Three phase tripped at Budhipadar and A/r attempted after 1 second which failed due to persisting fault.		Yes	No		**YES**

101	400KV-JEERAT-NEW CHANDITALA-1	22-05-2024	11:42	22-05-2024	12:29	Jeerat: B-N, 34 Km, 7.2 kA	New Chanditala: B-N, 42.8 Km, 6.5kA	B-Earth	100	Three phase tripping from both ends for single phase fault		Yes	Yes	A/R switch kept OFF at both sub-station due to OPGW laying work	**NO**
102	220KV-NEW MELLI-TASHIDING-2	22-05-2024	12:11	22-05-2024	13:03	New Melli: Y-B, 4.4 Km, Iy-2.871 kA, Ib-3.42 kA		Y-B-Earth	100	Phase to phase fault.		Yes	No		**YES**
103	220KV-BUDHIPADAR-KORBA-2	22-05-2024	17:59	22-05-2024	22:36	Budhipadar: R-N, 173.9 km, 4.573 kA	Korba: R_N, 6.43 km, 13.2 kA	R-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	NA		**YES**
104	220KV-DALTONGANJ-CHATRA-1	23-05-2024	13:05	25-05-2024	02:35	Daltonganj: B-N, 106.4 km, 1.2 kA		B-Earth	100	A/r successful. Tripped again within reclaim time.		Yes	No		**YES**

105	220KV-PUSAULI-DEHRI-1	23-05-2024	15:24	23-05-2024	16:36	Pusauli: B-N, FD: 26 km,FC: 1.7 kA	Dehri: B-N, 1.49 kA	B-Earth	500	Tripped in Zone-2 time from Sasaram. A/r failed after 1 second at Dehri.		No	Yes	Carrier Not Received at PSL	**NO**
106	220KV-JAYNAGAR-JEYPORE-4	23-05-2024	16:33	23-05-2024	18:41	Jaynagar: B-N, 6.05 km, 3.24 kA		B-Earth	100	A/r attempt couldn't be ascertained from PMU. PG Odisha/OPTCL may explain.		No	No		**NO**
107	220KV-CHAIBASA(PG)-CHAIBASA(JUSNL)-1	23-05-2024	16:33	23-05-2024	17:38	Chaibasa(PG): DT received	Chaibasa: Spurious tripping of breaker due to low SF6 gas pressure in R-Ph CT.	No fault	NA	JUSNL may explain		Yes	No		**NO**
108	400KV-LAPANGA-STERLITE-2	24-05-2024	12:08	24-05-2024	13:38	Lapanga: Iy-1.45 kA,Ib-1.63 kA, Ir-6.27 kA, FD: 11.42 km	Sterlite: Z-I, Ph: R-N, FC: 5 kA	R-N Fault	100	A/r successful. Tripped again within reclaim time.	DR length less. DR of fault instance not uploaded.	Yes	No		**YES**

109	220KV-TSTPP-MEERAMUNDALI-1	24-05-2024	15:30	25-05-2024	10:09		Meeramundali-R-N, 13.48 km, 10 kA	R-Earth	100	A/r failed after 1 second		No	Yes		**YES**
110	220KV-DALTONGANJ-CHATRA-1	25-05-2024	12:41	25-05-2024	13:29	Daltonganj : Y-B, 134.5 km, 1.27 kA	Chatra: Y-B, 41.33 km, Iy-1.03 kA , Ib-0.99 KA	Y-B	100	Phase to phase fault.		Yes	Yes		**YES**
111	400KV-JEYPORE-BOLANGIR-1	25-05-2024	13:40	25-05-2024	14:01		Bolangir:B-N, 1.4 kA,181 km	B-Earth	100	A/r failed after 1 second		No	No		**YES**
112	220KV-JODA-RAMCHANDRAPUR-1	25-05-2024	17:57	26-05-2024	22:07	Joda: R_N, 131.03 km, 1.367 kA	Ramchandrapur : Ph -R, CT blast	R-Earth	400	Tripped in Zone-2 time from Joda. 220 kV Bus-1 tripped at Ramchandrapur		Yes	Yes		**NO**

113	400KV-DSTPS(ANDAL)-RAGHUNATHPUR-2	26-05-2024	10:29	26-05-2024	11:54	DSTPS: O/V	RTPS: B_N, 1.78 kA	B-Earth	950	As per PMU, Y_ph voltage shot up to 325 kV. O/V St.2 setting may be checked. 400/220 kV ICTs at DSTPS also tripped at the same time. DVC may explain the event.		No	Yes		**NO**
114	220KV-NEW PURNEA-MADHEPURA-1	27-05-2024	13:05	27-05-2024	16:01	New Purnea: Y_B, 13.5 km, Iy: 9.79 kA, Ib: 9.59 kA	Madhepura: Y_B, 80.9 km, Iy: 2.5 kA, Ib: 2.49 kA	Y-B	400	Phase to phase fault. Tripped in Zone-2 from Madhepura.		No	No		**NO**
115	400KV-ALIPURDUAR (PG)-BONGAIGAON-2	27-05-2024	21:33	28-05-2024	03:52	Alipurduar-R_B, 38.5km, Ir-7.8 kA, Ib-7 kA	Bongaigaon-R-B, 55.53 km, 2.87 kA	R-B	100	Phase to phase fault		Yes	NA		**YES**
116	220KV-DALTONGANJ-CHATRA-1	28-05-2024	07:36	29-05-2024	14:51	Daltongunj -Y_B , 147 km, 1.055 kA		Y-B	400	Phase to phase fault. Tripped in Zone-2 from Daltonganj		No	No	Carrier Not Received at DG	**NO**

117	220KV-JODA-RAMCHANDRAPUR-1	28-05-2024	10:28	28-05-2024	10:53	Joda: B_N, 77.36 km, 1.368 kA	Ramchandrapur : B_N, 54.7 km, 2.06 kA	B-Earth	100	Three phase A/r at Joda. A/r failed after 1 second		Yes	No		**NO**
118	220KV-DEHRI-GAYA-2	28-05-2024	12:01	28-05-2024	12:56		Gaya: B_N,4.845 kA, 21.712 km	B-Earth	100	A/r successful. Tripped again within reclaim time.		No	No		**YES**
119	220KV-JODA-RAMCHANDRAPUR-1	28-05-2024	12:05	28-05-2024	12:30	Joda : B_N, 18.71 Km, 1.974 kA		B-Earth	100	A/r successful from Joda only. Line tripped from Rmachandrapur after 2 seconds on O/c E/f.		Yes	Yes		**YES**
120	220KV-JODA-RAMCHANDRAPUR-1	28-05-2024	16:02	28-05-2024	16:16	Joda : Y_N, 78 Km, 1.157 kA	Ramchandrapur : Y_N, 2.8 kA	Y-Earth	100	A/r successful from Joda. Three phase tripping at Ramchandrapur		Yes	Yes		**NO**

121	220KV-CHUKHA-BIRPARA-2	28-05-2024	21:42	28-05-2024	22:28	Chuka: Z-1, Ph: R-B, (Master trip relay)	Birpara: R-B, 47.94 km, Ir-2.318 kA, Ib-2.834 kA.	R-B-Earth	100	Phase to phase fault		Yes	Yes		**YES**
122	220KV-CHUKHA-BIRPARA-1	28-05-2024	21:42	28-05-2024	22:27	Chuka: Z-1, Ph: R-B, (Master trip relay)	Birpara: R-B, 47.73 km, Ir-2.312 kA, Ib-2.778 kA.	R-B-Earth	100	Phase to phase fault		Yes	Yes		**YES**
123	400KV-JHARSUGUDA-RAIGARH-1	29-05-2024	00:21	29-05-2024	20:15	Jharsuguda: Ph: B-N, FC:3.5 kA, FD: 105 km		B-Earth	500	Tripped in Zone-2 time from Jharsuguda		No	No		**NO**
124	400KV-JHARSUGUDA-RAIGARH-3	29-05-2024	00:21	29-05-2024	03:22	Jharsuguda:Ph: R-N, FC: 2.85 kA, FD: 152 km.	Raigarh:-Main bay LBB protection operated at Raigarh SS due to R pole CB stuck during 400 KV BB 1 protection operated .	R-Earth	250	LBB operated at Raigarh.		No	No		**YES**

125	400KV-MAITHON-MAITHON RB-2	29-05-2024	01:08	29-05-2024	02:01	Maithon: DT received	MPL: Didn't trip	No fault	NA	PG ER-2/MPL may explain.		No	No	DT received at Maithon SS. PLCC has been checked at Maithon end but no such abnormality found.	**NO**
126	400KV-JAMSHEDPUR-TISCO-1	29-05-2024	06:49	29-05-2024	19:31	Jamshedpur: Y_N, Zone-2	TISCO: Ph: Y (Insulator brust)	Y-Earth	400	Tripped in Zone-2 from Jamshedpur		No	No	Carrier Not Received at JSR	**NO**
127	400KV-JEYPORE-GAJUWAKA-2	29-05-2024	09:39	29-05-2024	12:11	Jeypore: DT received		No fault	NA	No fault as per PMU. PG Odisha may explain		No	NA		**NO**
128	400KV-MAITHON-MAITHON RB-2	29-05-2024	10:37	29-05-2024	10:54	Tripped from Maithon End		No fault	NA	No fault as per PMU. PG ER-2/MPL may explain		No	No		**NO**

129	220KV-TENUGHAT-BIHARSARIFF-1	29-05-2024	10:43	29-05-2024	19:29	Tenughat: B_N, 62.64 km, 1.806 kA		B-Earth	100	Three phase tripping for single phase fault		No	Yes		**NO**
130	220KV-JODA-RAMCHANDRAPUR-1	29-05-2024	11:49	29-05-2024	12:23	Joda: R-N , 52.9 km, 2.5 kA		R-Earth	100	Three phase tripping for single phase fault		No	No		**NO**
131	400KV-JEYPORE-BOLANGIR-1	29-05-2024	12:34	29-05-2024	14:51	Jeypore: Y_N, 100 Km, 2.2 KA	Bolangir: Y_N, 1.439 kA,163 Km	Y-Earth	100	A/r failed after 1 second		No	No		**YES**
132	220KV-CHANDIL-RANCHI-1	29-05-2024	12:46	29-05-2024	13:05	Chandil: B_N, 78.3 KM,1.7 KA		B-Earth	500	Tripped in Zone-2 from Chandil		Yes	No		**NO**

133	220KV-RENGALI(PH)-TSTPP-1	29-05-2024	13:13	29-05-2024	19:56		TSTPP: R_N, 13.3 Km, 5.03 KA	R-Earth	100	A/r couldn't be ascertained from PMU. NTPC/OHPC may confirm.		No	No		**NO**
134	400KV-MALBASE-BINAGURI-1	29-05-2024	19:37	29-05-2024	20:09		Binaguri: B-N, 17.3 km, 6.42 kA	B-Earth	100	A/r successful from Binaguri only. Three phase tripping at Malbase		No	Yes	Protection operated properly at Binaguri end.	**NO**
135	220KV-NEW MELLI-TASHIDING-1	29-05-2024	21:00	31-05-2024	10:30	New Melli : Y-N, 6.9 km, 12.3 kA		Y-Earth	100	A/r couldn't be ascertained from PMU		No	No	Fault was single phase type but DT received from remote end after 85ms. Hence, 3 phase trip happened at Tashiding end.	**NO**
136	220KV-BUDHIPADAR-KORBA-1	30-05-2024	12:06	30-05-2024	18:17	Budhipadar:B_N, 128 km,1.18 kA		B-Earth	100	Three phase A/r successful at Budhipadar. Tripped again within reclaim time.		Yes	NA		**YES**

137	220KV-KARAMNASHA (NEW)-SAHUPURI-1	30-05-2024	13:46	30-05-2024	15:45	Karmanasa: R_N, 1.65 kA, 103.4 km		R-Earth	350	O/c E/f operated at Karamnasha. Settings may be reviewed. Fault seems to be in Zone-3 of Karamnasha		Yes	NA		**NO**
138	400KV-TENUGHAT-PVUNL-1	30-05-2024	18:28	30-05-2024	20:13	TTPS : B_N, Z-3, 1.33 kA, 80.6 Km		B-Earth	1000	Tripped in Zone-3 from Tenughat. TVNL/PVUNL may share findings.		No	No		**NO**
139	400KV-KODERMA-BOKARO-1	30-05-2024	19:34	30-05-2024	21:04	Koderma:R-N, 4.8 kA,76.2Km		R-Earth	100	Three phase tripping for single phase fault at Koderma. A/r couldn't be ascertained from PMU.	DR length less at Koderma	Yes	No		**NO**
140	400KV-DHANBAD-RANCHI-1	30-05-2024	20:03	31-05-2024	15:13		Ranchi:Y_N, 7.264 kA, 44.637 km	Y-Earth	100	Fault struck B_ph after 800 msec of first fault		No	No		**YES**

141	400KV-RANCHI-RAGHUNATHPUR-3	30-05-2024	20:14	Not revived yet		Raghunathpur : R-Y, FC: 4.19 kA	Y-Earth	100	As per PMU, fault first struck Y_ph and then after 200 msec, R_ph fault occurred.		No	Yes		**YES**
142	400KV-RANCHI-RAGHUNATHPUR-2	30-05-2024	20:14	Not revived yet		Raghunathpur : R,Y,B, Ir: 6.18 kA, Iy: 8.52 kA, Ib: 6.87 kA, 61.25 km	R-Y-B-Earth	100	Three phase fault.		No	Yes		**YES**
143	220KV-MAITHON-DHANBAD-2	30-05-2024	20:44	30-05-2024	22:00		Dhanbad: Y_B, Iy: 4.43 kA, Ib: 4.25 kA	Y-B	100	Phase to phase fault		No	Yes		**YES**
144	400KV-PPSP-BIDHANNAGAR-2	30-05-2024	21:47	30-05-2024	22:16	PPSP: B-N, 76.9 Km	Bidhannagar :B-N, 104.9 Km, 3.4 KA	B-Earth	100	A/r kept disabled as per OEM advise		No	Yes	Heavy storm and thundering weather	**NO**

145	220KV-DARBHANGA(DMTCL)-LAUKAHI-1	30-05-2024	23:22	31-05-2024	10:19		Laukahi : Y-B ,Z-2, 83.10 Km, Iy-1.400 kA, Ib:1.5 kA	Y-B	100	Phase to phase fault	DR not time synchronized at Laukahi	No	Yes		**YES**
146	220KV-DARBHANGA(DMTCL)-LAUKAHI-2	30-05-2024	23:32	31-05-2024	10:22	Darbhanga:R_N, 3.9 kA, 38.1 km		R-Earth	100	A/r successful from Laukahi only. Three phase tripping at Darbhanga.		Yes	Yes		**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
135th PCC Meeting			
1.	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.*
2.	Disturbance at 220 kV Kasba (WBSETCL) S/s on 25.04.2024 at 23:17 Hrs	PCC advised that the overcurrent pick up setting may be increased to 110 % of CT ratio for these lines.	*WBSETCL representative informed that load shedding settings present at Kasba end for load > 695 A is in order to avoid overloading of 220 kV Kasba- Subhasgram d/c and further zone 3 time settings has already been coordinated with o/c time delay settings such that o/c ptotection will trip after zone 3 timing hence existing pick up (100% of CT ratio) has not been revised.*

3.	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. ➢ Submit the event analysis report after site visit of CRITL team	*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 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.*
4.	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.*
5.	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.*

6.	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.	*CESC representative was not availiable in the meeting.*
7.	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.*
8.	Repeated Tripping of 220 kV Darbhanga (DMTCL)-Darbhanga D/c	PCC advised following: ➢ As the lines are short, permissive overreach scheme may be implemented with current reversal guard. ➢ The DEF settings may be revised and for the directional element, negative sequence	*ERPC representative informed that BSPTCL had already communicated vide email dated 18th June 2024 about implementation of recommendations made by PCC as follows-*

		may be selected instead of zero sequence.	• *The 'Pickup' has been reduced to 0.20 from existing 0.35 and Time Delay has been increased to 1.1 sec from existing 0.6 sec for DEF in Main-2 (Siemens SIPROTEC 7SA522) OF 220 kv DMTCL-Darbhanga (BSPTCL) ckt-1.* • *The Main-2 Distance Protection Relay (Siemens SIPROTEC 7SA522) of ckt-1 has been tested with Relay Testing Kit and found satisfactory.* • *Ratio Test of CT in the bay of said line has been performed and found satisfactory.* • *Circuit Breaker Timer Test has been performed and found satisfactory.* • *Thorough checking of Control & Relay Panels have been done and it has been found that R-Phase wire (wire from CT to TB) is making slight contact with ground wire in TB, which has been rectified. After that balanced current parameters are getting shown in the said Relay thus "unbalanced current issue/ issue of current in*

			zero sequence" has been resolved. • *Overreach Scheme is already enabled for both ckts.* • *"Reversal Guard" is also enabled in both ckts.*
134th PCC Meeting			
9.	Bus tripping occurred in Eastern Region during March'24	PCC advised BSPTCL representative to share last test report of failed CT to ERPC/ERLDC. PCC advised BSPTCL following: • To review Protection settings of ICT • To test the relay of Laukahi-DMTCL line-1 • To test the bus bar protection and submit details by 23rd April 2024. • To segregate feeders on both bus in balanced way so that in case of one bus tripping, feeders on other bus can remain in charged condition.	*ERPC representative informed that BSPTCL had already communicated vide email dated 18th June 2024 about implementation of recommendations made by PCC as follows-* • *Protection settings of ICT have been reviewed and Coordination has been done as per requirement.* • *Zone-4 time delay setting has been modified to 250 ms from existing 500 ms.* • *Email has already been sent to concerned (Field & Project wing) for integration of all bays in Bus Bar Protection Scheme on 28/05/2024. The testing of Bus Bar Protection scheme will be carried out immediately after integration.* • *Field officials have been requested to arrange for shutdown for testing of Distance Protection Relay in 220 kv Laukahi-DMTCL ckt-1. After*

			that the testing work will be executed. • *Field officials have already been instructed to coordinate with SLDC for segregation of feeders among both Bus at Laukahi S/s.*
133rd PCC Meeting			
10.	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			
11.	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.
130th PCC Meeting			
12.	Tripping of 220 kV Main Bus-2 at Budhipadar on 06.10.23 at 16:14 Hrs	PCC advised to replace the defective bay unit at the earliest and restore the busbar protection for bus-2 thereafter. *In 132nd PCC Meeting, OPTCL representative informed that OEM M/s Siemens had been communicated for this issue. He further informed that bus bar protection for bus 2 is in off condition and for bus 1 is in service at present.*	. *OPTCL representative informed that bus bar protection has already been restored and are in operation for both the bus at Budhipadar S/s.*