



सत्यमेव जयते

भारत सरकार

Government Of India

विद्युत मंत्रालय

Ministry Of Power

पूर्वी क्षेत्रीय विद्युत समिति

Eastern Regional Power Committee

14 Golf Club Road, Tollygunje-70033 Website: www.erpc.gov.in

सं./NO. पू.क्षे.वि.स./PROTECTION/2024/1728

दिनांक /DATE:08/03/2024

सेवा में / To,

संलग्न सूची के अनुसार / As per list enclosed.

विषय : दिनांक – 27.02.2024 को आयोजित 132 वीं पीसीसी बैठक का कार्यवृत्त ।

Sub: Minutes of the 132nd PCC meeting held on 27.02.2024

महोदय/ Sir,

27.02.2024 को आयोजित 132वीं पीसीसी बैठक का कार्यवृत्त पू.क्षे.वि.स. की वेबसाइट (<http://www.erpc.gov.in/>) पर उपलब्ध है । कृपया देखें ।

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

भवदीय / Yours faithfully,

(पी. पी. जेना / P.P.Jena)

कार्यपालक अभियंता(पी.एस)

Executive 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, 7 th 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), WBPDC, 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., 3 rd flr. 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., LoknayaJaiprakashBhawan, (2 nd 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, Jharkhand 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 , TPTEL, 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 - 722002
Director, Shiga Energy Pw. Ltd., 5th Floor, DLF Building No. 8, Tower-C, Gurgaon - 722002	DGM (E&I), HALDIA ENERGY LIMITED, BARIK BHAWAN, KOKATA-700072, FAX: 033-22360955
The Plant Head, Dikchu HEP, Sikkim	



Minutes of 132nd PCC Meeting

Date: 27/02/2024
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 132nd PROTECTION COORDINATION SUB-COMMITTEE MEETING HELD ON 27th FEBRUARY 2024 AT 10:30 HRS THROUGH MS TEAMS

The list of Participants is attached at **Annexure A**.

ERLDC highlighted the protection performance of the ER utilities for the month of Jan 2024 which is enclosed at **Annexure A.1**.

PART – A

ITEM NO. A.1: Confirmation of Minutes of 131st Protection Coordination sub-Committee Meeting held on 19th Jan 2024 at ERPC, Kolkata.

The minutes of 131st Protection Coordination sub-Committee meeting held on 19.01.2024 was circulated vide letter dated 12.02.2023.

Deliberation in the meeting

Members confirmed the minutes of 132nd PCC Meeting.

PART – B

ITEM NO. B.1: Disturbance at 400/132 kV Kahalgaon S/s on 30.01.2024 at 06:48 Hrs.

On 30.01.2024 at 06:47 hrs, while synchronizing 210 MW unit #2 at Kahalgaon, 400 kV B phase CB of its tie bay got burst. During this fault, differential protection of 2*400/132 kV 200 MVA ICTs at Kahalgaon got operated however one of the ICTs failed to open and LBB operated leading to tripping of 400 kV Bus 2. It is noted that both ICTs were connected to Bus 2.

At the same time, 400 kV Bus 4 also tripped as bus sectionalizer didn't open.

500 MW unit #6 got tripped due to loss of auxiliary supply as its entire auxiliary load was fed through station transformer at 132 kV (ST supply lost due to tripping of 400/132 kV ICTs) due to unavailability of UAT at that time.

Later at 07:12 Hrs and 07:13 Hrs, 500 MW unit #7 and unit #5 were tripped respectively due to low vacuum pressure. Several auxiliaries were fed through station transformers, supply of which was lost due to tripping of 400/132 kV ICTs. Subsequently all three units of Kahalgaon Stage2 got tripped.

In this regard a committee comprising of ERPC, ERLDC & Powergrid was formed to investigate the grid incident. The disturbance analysis report is enclosed at Annexure-B1.

Load Loss: 110 MW, Gen. Loss: 473 MW

Outage Duration: 02:15 Hrs

NTPC may explain.

Deliberation in the meeting

The event was explained by NTPC as follows:

- *The bursting of B-pole tie Circuit Breaker(Siemens make) of Unit #2 initiated the disturbance. The busbar protection of bus-2 to which unit #2 was connected was operated however the bus sectionalizer breaker failed to open. This led to operation of LBB protection and resulted in tripping of elements connected to bus-4.*
- *Unit #6 (500 MW) was tripped as the main breaker connected to bus-4 failed to open during the operation of busbar protection of bus-4 which resulted in operation of LBB and tripping of the unit.*
- *During the disturbance total six numbers of breaker were malfunctioned and failed to open in busbar protection resulting in tripping of multiple feeders.*
- *The 400/132 kV ICTs got tripped on the LBB protection leading to loss of supply at 132 kV. This further resulted into loss of auxiliary supply to Unit #5 & Unit #7 and tripping of both the units.*

The report of the committee was discussed in the meeting and following deliberation took place:

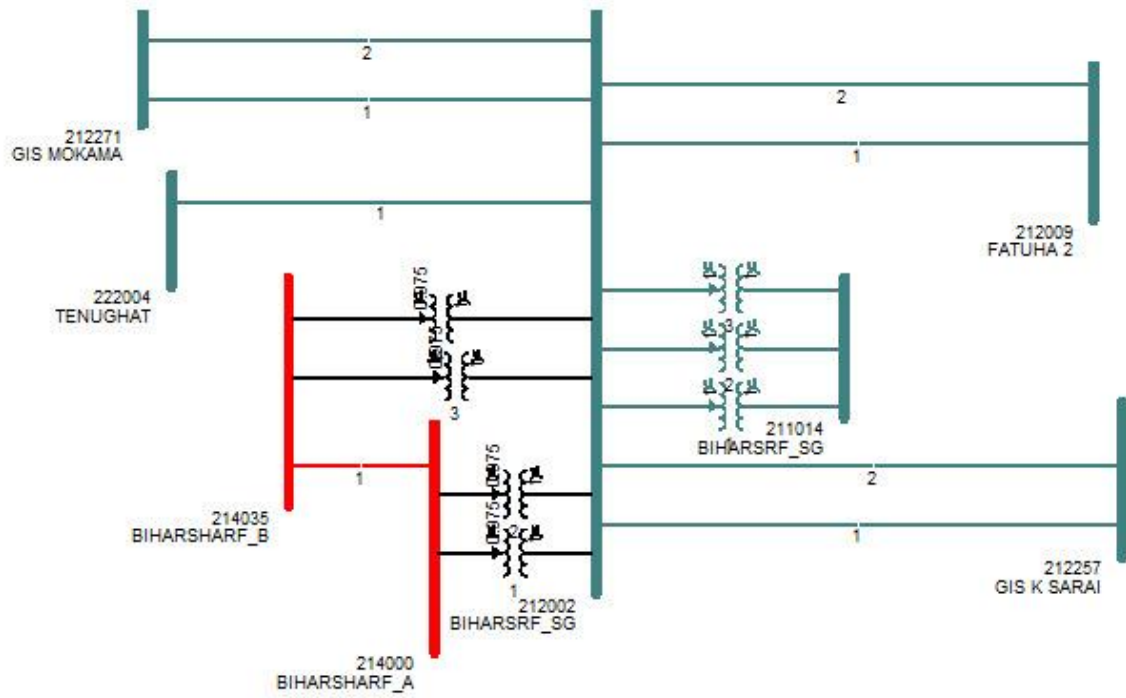
- *NTPC representative intimated that faulty breaker of Siemens make had been sent to the factory for analysis. A joint analysis would be carried out on the reason of failure of the breakers by NTPC and Siemens.*
- *Regarding failure of other breaker, she intimated that some of the BHEL make breakers are old and there might have sluggish operation in opening of the breakers. The old breakers will be replaced in phased manner. The reason for non-opening of Unit # 6 breaker has not yet been found out and the same is being investigated.*
- *She added that the busbar protection will be thoroughly checked after availing the bus shutdown at the earliest.*
- *Regarding the discrepancies observed in tripping of the outgoing lines, she informed that there were issues in logic of the PU relay which would be rectified soon. Further she mentioned that the settings of the all the outgoing feeders are being reviewed and any discrepancy would be rectified during the review.*

After detailed deliberation, PCC advised NTPC Kahalgaon following:

- I. *To submit action taken report on the observations made by the technical committee in its disturbance analysis report as well as for discrepancies discussed in this meeting. The report shall include compliance for all the observations/discrepancies as discussed along with the timeline.*
- II. *To submit last test report of failed circuit breakers and data regarding last successful operation of the breaker.*
- III. *To submit data of relay functionality test last carried out for the relays where discrepancies were observed during this disturbance, and the periodicity of testing of the relays followed at site*
- IV. *To carry out the testing of 400 kV busbar protection at the earliest*
- V. *To carry out periodical protection audit of all substations as per the IEGC 2023 and compliance of the audit observations in time bound manner.*
- VI. *To make the event logger of the station functional at the earliest*
- VII. *To ensure time synchronization of all the relays with GPS clock and configuration DR with proper DR time length. After completion of the task, sample DR for all the relays shall be submitted for verification.*

ITEM NO. B.2: Total Power failure at 220/132 kV Biharsharif S/s on 14.01.2024 at 04:22 Hrs.

220 kV Biharsahrif-Mokama-1 got tripped due to R phase fault. While attempting to charge the line at 04:22 Hrs, all emanating lines tripped from remote end and total power occurred at 220/132 kV Biharsharif S/s.



Load Loss: 128 MW

Outage Duration: 00:44 Hrs

BSPTCL may explain.

Deliberation in the meeting

The event was explained in the report submitted by ERLDC. The same is enclosed at Annexure-B2.

Regarding the discrepancies the following were discussed:

- 220 kV Biharsharif-Khizersarai line tripped on highest overcurrent protection from Biharsharif end though the current was not so high. BSPTCL intimated that the settings were kept considering the highset settings of ICT at Powergrid Biharsharif end. PCC felt that the coordination was not proper as the present setting may cause unwanted tripping of the lines. PCC advised Powergrid and BSPTCL to jointly review the highset overcurrent protection considering the present network configuration and fault level.
- The tripping of Biharsharif-Fatuah Line was due to tripping of ICT-2. This is as per the load trimming scheme implemented for Biharsarif ICTs. BSPTCL was advised to submit the LV side settings of ICT-2 through a aml to ERLDC/ERPC. PCC suggested to for overload detection-based logic in place of trip based logic for the ICTs under load tripping scheme.

- 220 kV Biharsharif-Mokama-2 line, BSPTCL representative informed that the relay at Biharsharif end has picked up the fault during the disturbance and the line tripped after 400 msec in back up protection.
- On the issue of fault clearance time of 3 sec, 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.
- Regarding non-availability of busbar protection, PCC observed that the matter was discussed in earlier TCC meetings however no progress has been made for commissioning of the busbar protection. PCC advised to raise the issue in next TCC/ERPC meeting.
- Regarding DC fuse failure during the fault in the feeder, members opined that the issue may be due to persisting DC earth fault in the switchyard. PCC suggested that being a old substation, there might be earthing related issue and therefore checking of earthing integrity of the substation may be done.

ITEM NO. B.3: Tripping Incidence in month of Jan 2024

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

Members may discuss.

Deliberation in the meeting

*Explanation from constituents of either end for single line tripping incidents in the month of Dec 2023 is attached at **Annexure B.3**.*

PART- C: OTHER ITEMS

ITEM NO. C.1: 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),

Users shall submit the following protection performance indices of previous month to their respective RPC and RLDC on monthly basis for 220 kV and above (132 kV and above in NER) system, which shall be reviewed by the RPC:

(a) The Dependability Index defined as $D = \frac{N_c}{N_c + N_f}$

where,

N_c is the number of correct operations at internal power system faults and

N_f is the number of failures to operate at internal power system faults.

(b) The Security Index defined as $S = \frac{N_c}{N_c + N_u}$

Where,

N_c is the number of correct operations at internal power system faults

N_u is the number of unwanted operations.

(c) The Reliability Index defined as $R = \frac{N_c}{N_c + N_i}$

Where,

N_c is the number of correct operations at internal power system faults

N_i is the number of incorrect operations and is the sum of N_f and N_u

Further, as per IEGC 2023 Clause 15 (7),

“Each user shall also submit the reasons for performance indices less than unity of individual element wise protection system to the respective RPC and action plan for corrective measures. The action plan will be followed up regularly in the respective RPC.”

In 131st PCC meeting, all utilities were advised to submit mentioned protection performance indices of 220 kV and above system (132 kV and above for Sikkim) to ERPC/ERLDC every month in compliance to the Grid Code.

NTPC NKSTPP vide email dated 02.02.2024 had submitted protection performance Indices for Jan 2024

Concerned utilities may note and comply.

Deliberation in the meeting

PCC once again advised all utilities to submit mentioned protection performance indices of 220 kV and above system (132 kV and above for Sikkim) to ERPC/ERLDC every month in compliance to the Grid Code. The format for the submission of the indices is enclosed at Annexure-C1.

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.

Concerned utilities may update.

Deliberation in the meeting

JUSNL informed that they have submitted the audit plan. PCC advised all other utilities to submit annual audit plan for the substations 220kV and above voltage level for FY 2024-25 to ERPC at earliest.

ITEM NO. C.3: Support Service for the Protection Database project of ERPC

The existing support service of PSDF funded project of ERPC "Creation & Maintaining a web-based Protection database and Desktop based Protection Setting calculation tool for Eastern Regional Grid" has ended in Dec-23. At present the support service has been extended for three months i.e. till 31.03.2024.

In 51st ERPC, the proposal of continuing support service of the database project was approved for period of one year.

In this regard utilities may submit their feedback/suggestions on the Protection Database so that the same may be discussed and incorporated in the contract of the vendor.

Members may discuss.

Deliberation in the meeting

ERPC Secretariat informed that the support service contract of the protection database is going to be renewed with the existing vendor for a period of one year w.e.f. 01.04.2024 and requested all the utilities to share their feedback on the database so that the same may be discussed and addressed in the contract of the vendor.

ITEM NO. C.4: Review of SPS at Sterlite(Vedanta)

In 131st PCC meeting, ERLDC intimated that existing SPS scheme at Vedanta Ltd. has been modified. The import/export figure of 1600/800 MW has been chosen respectively for SPS to act irrespective of line flows of all four 400 kV lines at 400 kV Sterlite S/s (400 kV Sterlite-Lapanga D/c,

400 kV Sterlite-Jharsuguda D/c) as considered in earlier SPS scheme. He further informed that modified scheme has been implemented without discussion/concurrence of ERPC forum.

Vedanta representative replied that the review was necessitated considering the network changes in recent times. The SPS has been modified taking into consideration the commercial aspects also. However, they are ready to discuss the scheme with all concerned utilities.

PCC advised that a separate meeting may be convened among Vedanta, SLDC Odisha, OPTCL, ERLDC and ERPC to discuss the SPS scheme.

Deliberation in the meeting

*ERLDC informed that a special meeting was held on 23.02.2024 to discuss the SPS scheme of Vedanta. The MoM is enclosed at **Annexure-C4**.*

In the special meeting the followings were agreed:

- *Vedanta to implement the SPS scheme as discussed for quick relief in the line flow in case it crosses 800 MW in any of the four abovementioned lines.*
- *A meeting will be called by SLDC Odisha with members from GRIDCO, OPTCL and Vedanta to discuss the modalities of implementation of proposed SPS scheme.*

SLDC Odisha intimated that they would convene the meeting at the earliest.

ITEM NO. C.5: Submission of protection settings for newly charged elements/change in network configuration

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

The updated status of protection settings for new elements charged in ER Grid from Nov 22 to Dec 2023 is given at **Annexure C.5**.

In 131st PCC Meeting, PCC advised concerned utilities to share protection settings to ERPC. BSPTCL and NTPC were advised to share pending relay settings at the earliest.

Deliberation in the meeting

BSPTCL informed that they have submitted the pending protection settings. PCC advised NTPC Barh to submit the settings at the earliest.

ITEM NO. C.6: Follow-up of Decisions of the Previous Protection Sub-Committee Meeting(s)

The decisions of previous PCC meetings are attached at **Annexure C.6**.

Members may update the latest status.

Deliberation in the meeting

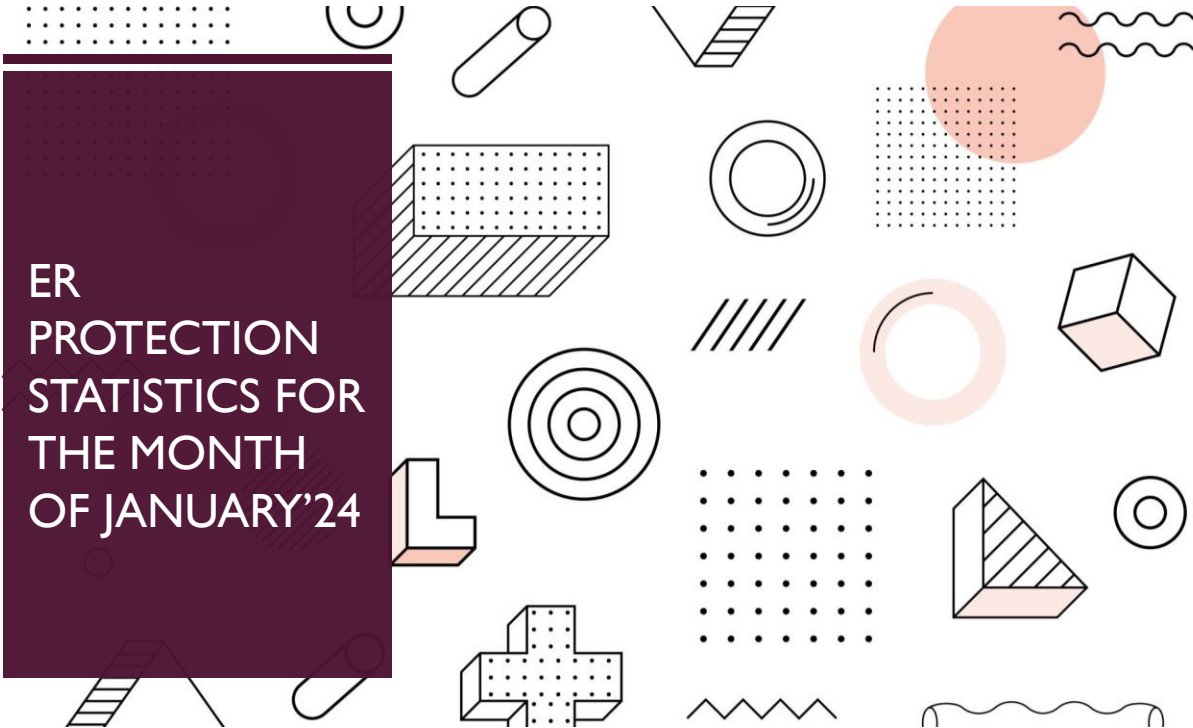
*Updated status of decisions of previous PCC meetings are attached at **Annexure C.6**.*

Annexure-A

Name	First Join
ERPC	2/27/24, 10:19:08 AM
MERAMUNDALI OPTCL	2/27/24, 10:20:14 AM
NIRMAL MONDAL (WBSETCL) (Guest)	2/27/24, 10:20:15 AM
SUDIPTA MAITI, DVC	2/27/24, 10:20:16 AM
NIRMAL MONDAL (WBSETCL) (Guest)	2/27/24, 10:24:28 AM
Laldhari Kumar, ERLDC	2/27/24, 10:24:46 AM
Dilip Kant Jha	2/27/24, 10:24:47 AM
Akash Kumar Modi, ERLDC	2/27/24, 10:24:58 AM
SMS SAHOO, DGM(ELECT), OPTCL, BHUBANESWAR	2/27/24, 10:25:03 AM
jitesh kumar	2/27/24, 10:27:22 AM
ABAKASH ADHIKARY, DVC	2/27/24, 10:28:14 AM
Babul Choudhary	2/27/24, 10:28:39 AM
Abakash Adhikary	2/27/24, 10:28:40 AM
ce critl bsptcl	2/27/24, 10:28:50 AM
Dilip Kant Jha	2/27/24, 10:29:11 AM
Bilash Achari	2/27/24, 10:29:16 AM
"prabhat kumar CGM(SPTL)	2/27/24, 10:29:20 AM
Premkant	2/27/24, 10:29:26 AM
Somnath Chatterjee, MPL	2/27/24, 10:29:59 AM
S Konar	2/27/24, 10:30:33 AM
SLDC ODISHA	2/27/24, 10:30:34 AM
arindam bsptcl	2/27/24, 10:30:39 AM
Rahul Anand NTPC	2/27/24, 10:31:02 AM
Gunjan Gagan {गुंजन गगन}	2/27/24, 10:31:22 AM
Chandan kumar	2/27/24, 10:31:42 AM
SMS SAHOO, DGM(ELECT), OPTCL, BHUBANESWAR (Guest)	2/27/24, 10:32:09 AM
Dillip ERPC	2/27/24, 10:32:24 AM
Gulshan, Rongnichu	2/27/24, 10:32:43 AM
Sudeep Kumar	2/27/24, 10:32:56 AM
GRIDCO LTD	2/27/24, 10:33:17 AM
Srimalya Ghosal	2/27/24, 10:34:03 AM
Chilakalapalli Mohana Rao {सी एच मोहन राव}	2/27/24, 10:34:50 AM
Prasant Senapathy	2/27/24, 10:35:20 AM
Rahul	2/27/24, 10:35:24 AM
Lily Chowdhury, NTPC Kahalgaon	2/27/24, 10:35:45 AM
Dilshad Alam BSPTCL	2/27/24, 10:35:50 AM
WBPDC (Guest)	2/27/24, 10:36:47 AM
Alok Pratap Singh	2/27/24, 10:36:47 AM
Amresh Prusti	2/27/24, 10:37:25 AM
BSPTCL	2/27/24, 10:37:59 AM
SMS Sahoo, DGM(Elect), OPTCL	2/27/24, 10:38:35 AM
Mithun Gayen {मिथुन गायेन}	2/27/24, 10:38:38 AM
SHADABUL HASAN	2/27/24, 10:38:46 AM
EEE Critl	2/27/24, 10:39:15 AM
Aee Critl	2/27/24, 10:39:55 AM
SMS SAHOO, DGM(ELECT), OPTCL, BHUBANESWAR	2/27/24, 10:40:46 AM
Saibal	2/27/24, 10:41:57 AM

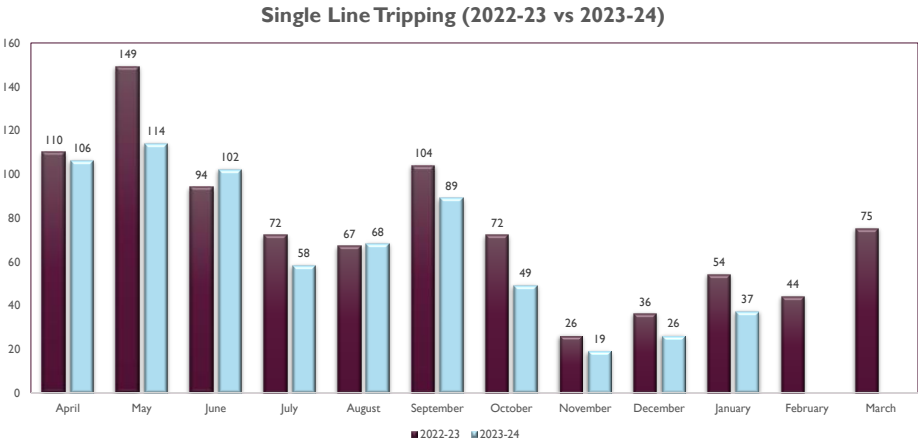
Jitendra Prasad Mallik	2/27/24, 10:42:11 AM
rajendra prasad (Guest)	2/27/24, 10:50:56 AM
avinash kumar	2/27/24, 10:51:30 AM
AEE CRITL BSPTCL	2/27/24, 10:52:20 AM
EEE Critl	2/27/24, 10:53:58 AM
Alok Kumar {आलोक कुमार}	2/27/24, 10:55:18 AM
Rajerdra Prasad	2/27/24, 10:55:28 AM
Samai Majhi	2/27/24, 10:56:58 AM
Rajendra prasad	2/27/24, 10:59:11 AM
Sudeep Kumar {सुदीप कुमार}	2/27/24, 11:02:02 AM
CRITL, JUSNL	2/27/24, 11:03:16 AM
sibesh kumar	2/27/24, 11:04:15 AM
Varun Vinit/ESE/CRITL/BSPTCL	2/27/24, 11:07:11 AM
rp	2/27/24, 11:08:40 AM
Pinki Debnath/ERLDC	2/27/24, 11:14:45 AM
Alok Kumar, PG ER1	2/27/24, 11:18:07 AM
CRITL, JUSNL	2/27/24, 11:22:39 AM
"prabhat kumar CGM(SPTL)	2/27/24, 11:23:03 AM
ahsan bsptcl	2/27/24, 11:30:05 AM
patralli	2/27/24, 11:30:25 AM
Bihar grid mokama	2/27/24, 11:52:57 AM
Mokama GIS	2/27/24, 11:54:10 AM
rahul	2/27/24, 11:58:33 AM
Nishant Kumar Shankwar	2/27/24, 12:03:58 PM
manish kumar	2/27/24, 12:08:19 PM
patralli	2/27/24, 12:15:34 PM
Amit Bsptcl	2/27/24, 12:50:18 PM

Annexure-A.1



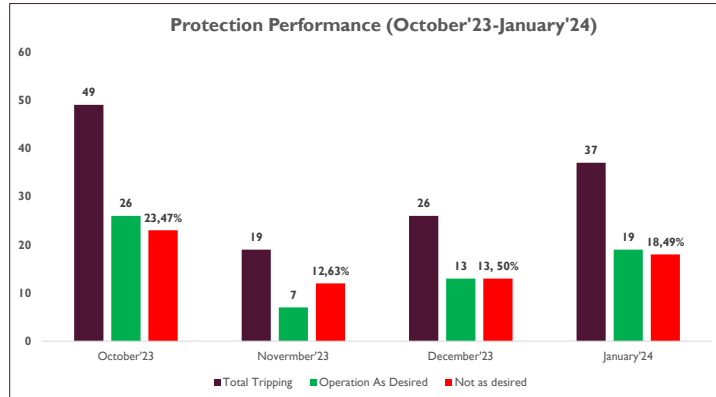
1

SINGLE LINE TRIPPING



2

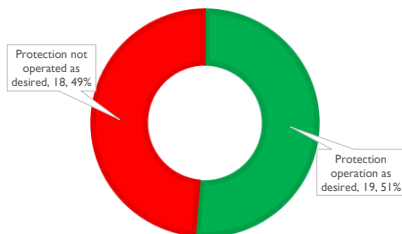
PROTECTION PERFORMANCE



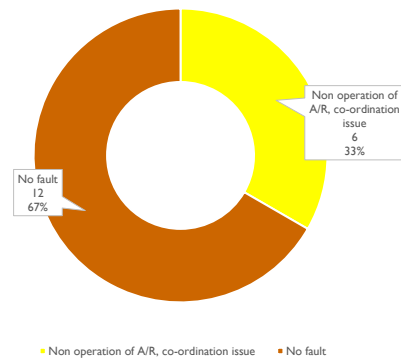
3

PROTECTION PERFORMANCE (JANUARY'24)

PROTECTION PERFORMANCE



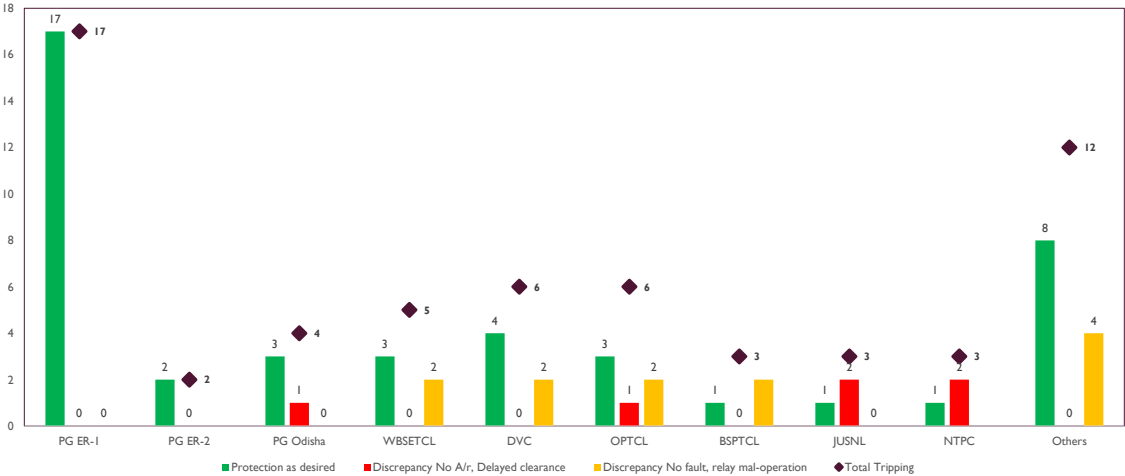
Protection not operated as desired



4

UTILITY WISE PERFORMANCE

Utility wise performance for the month of January'24



5



THANK YOU

6



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, टॉलीगंज, 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 400/132 केवी कहलगांव उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event at 400/132 kV Kahalgaon 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):30-01-2024

1. Event Summary (घटना का सारांश):

There was a grid event at NTPC, Kahalgaon on 30th January 2024 at 06:48Hrs in which 400kV Bus no-2 &4 (coupled) had tripped, and it led to outage of 3 nos. of 500MW generating units. At 06:48Hrs, 400kV Bus#2&4 (coupled) tripped due to bus fault caused by B phase TCB blast of Unit -2, connected with Bus-2, in switched off condition, Bus bar operated but some of the breakers got stuck including TCB leading to tripping of both buses and leading to tripping of all elements connected to it as mentioned below. Unit#6 (500MW) generating 473MW tripped during the event. 400kV Bus#1&3 (coupled) was live. Later, Unit#5 (500MW) and Unit#7(500MW) tripped at 07:13Hrs and 07:12Hrs respectively due to loss of auxiliary power.

2. Time and Date of the Event (घटना का समय और दिनांक): 06:48 hrs of 30.01.2024

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

4. Location/Control Area (स्थान/नियंत्रण क्षेत्र): Bihar

5. Antecedent Conditions (पूर्ववर्ती स्थिति):

	Frequency	Regional Generation	Regional Demand	State Generation		State Demand	
				BIHAR	Jharkhand	Bihar	Jharkhand
Pre-Event (घटना पूर्व)	50.085 Hz	27872 MW	20477 MW	456 MW	287 MW	4452 MW	1313 MW
Post Event (घटना के बाद)	50.064 Hz	27399MW	20367MW	456 MW	287 MW	4412	1243 MW

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

Important Transmission Line/Unit if under outage महत्वपूर्ण संचरण लाइने/ विद्युत उत्पादन इकाइयां जो बंद है	Unit#2 (210MW) out due to BTL since 27.01.24 13:27Hrs.
Weather Condition (मौसम स्थिति)	Normal

6. Load and Generation loss (लोड और जेनरेशन हानि): Generation loss: NIL; Load loss: 128 MW.

7. Duration of interruption (रूकावट की अवधि): 00:44 Hrs

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

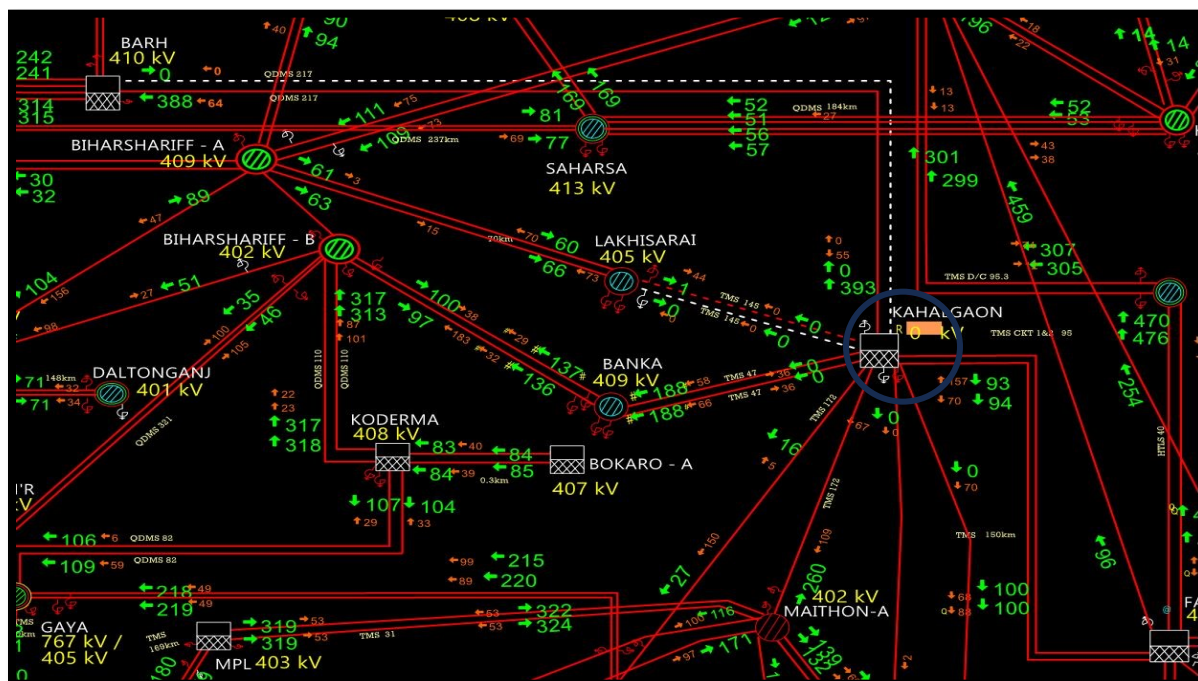
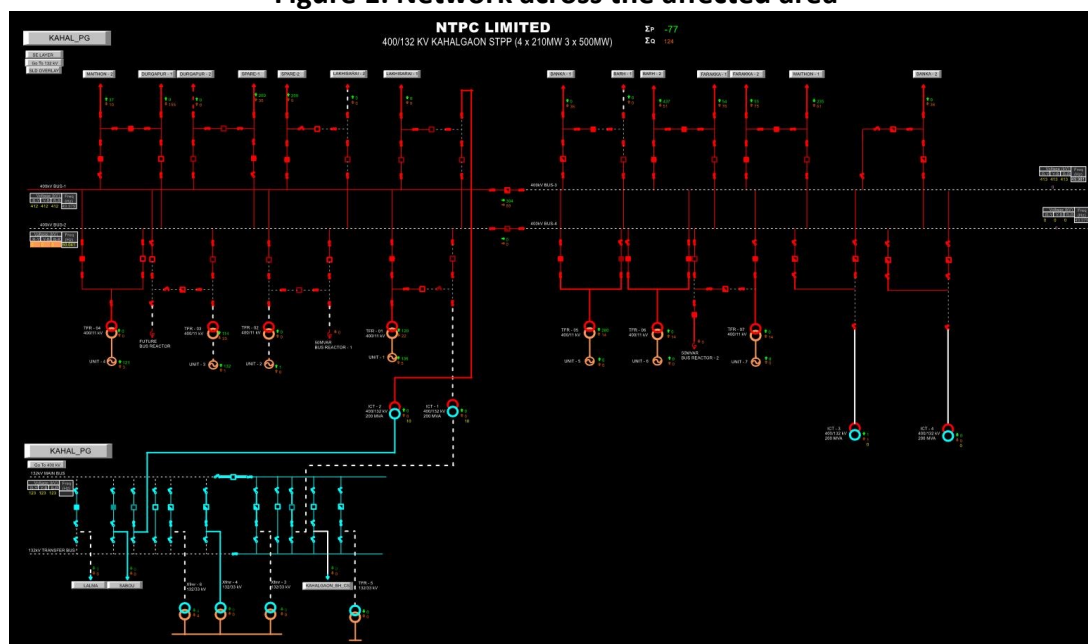


Figure 1: Network across the affected area



9. Details of Equipment Failure (if any during the event) (उपकरण विफलता का विवरण): B Phase TCB of Siemens Make

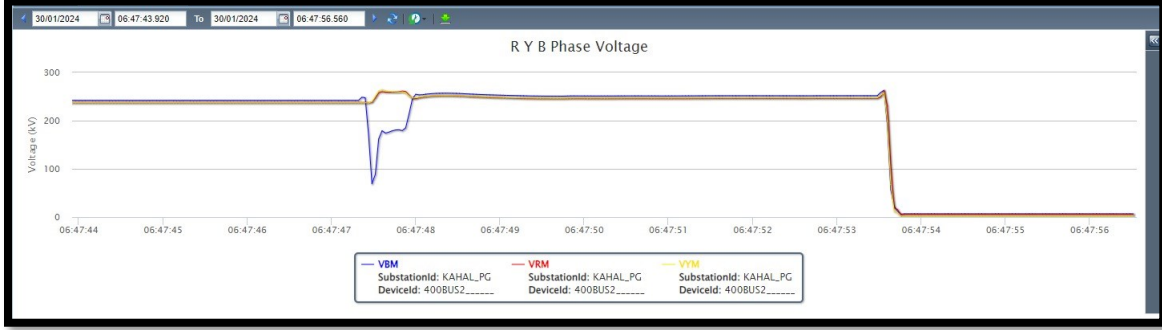
10. Major Elements Tripped (प्रमुख ट्रिपिंग)

Name of the Element	Relay Indication		Present Status/Remarks
	End A	End B	
400 kV Bus 2 at Kahalgaon	-		Charged at 09:12 Hrs
400 kV Bus 4 at Kahalgaon	-		Charged at 09:06 Hrs
500 MW U#6 at Kahalgaon	Loss of auxiliary supply		-
400/132 kV ICT-1&ICT-2 at Kahalgaon	Differential protection operated		ICT-1: 09:15 Hrs/ ICT-2: 11:20 Hrs
400 kV Kahalgaon-Lakhisarai-1	-	Lakhisarai: B-N, Z-2, 220 Km, 1.715 KA, A/r successful	Line remained charged from Lakhisarai. Breaker closed at Kahalgaon at 12:45 Hrs
400 kV Kahalgaon-Lakhisarai-2	-	Lakhisarai : B-N, Z-2, 221.5 Km, Ib= 1.64 KA (Tripped after 350 msec)	Line extended from Lakhisarai. However, breaker didn't close at Kahalgaon (Zone-4 operated)
400 kV Kahalgaon-Banka-1	Kahalgaon : Didn't trip	Banka: B-N, Z-2, 94.93 Km, 1.7 KA (Tripped after 500 msec)	Charged at 15:41 Hrs
400 kV Kahalgaon-Banka-2	Kahalgaon : Didn't trip	Banka: B-N, Z-2, 92.71 Km, 1.76 KA (Tripped after 500 msec)	Charged at 15:42 Hrs
400 kV Kahalgaon-Barh-1	-	Barh: O/V St.1 operated (Tripped after 5 seconds, however voltage at Barh was 415 kV)	Charged at 13:25 Hrs
400 kV Kahalgaon-Durgapur-1	Kahalgaon: Didn't trip	Durgapur: DT received (Tripped after 200 msec)	Charged at 09:57 Hrs
400 kV Kahalgaon-Durgapur-2	-	Durgapur: DT received (Tripped after 200 msec)	Charged at 13:03 Hrs
50 MVar Bus Reactor-1 at Kahalgaon	-		Not charged yet
132 kV Bus-1 at Kahalgaon	400/132 kV ICTs tripped, consequently 132 kV Bus tripped and 132 kV lines tripped.		Charged at 09:15 Hrs
132 kV Kahalgaon-Kahalgaon			Charged at 13:23 Hrs
132 kV Kahalgaon-Sabour			Charged at 08:16 Hrs
132 kV Kahalgaon-Lalmatia			Charged at 13:16 Hrs

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

PMU Snapshot:

BUS-2 at Kahalgaon



Bus-1 at Kahalgaon

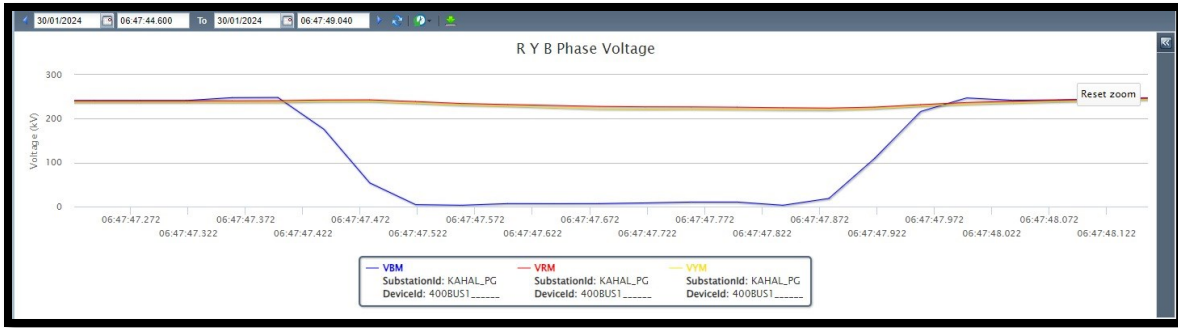


Figure 2: PMU Voltage snapshot of 400 Kv KahalgaonS/S

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

Taken/Remedial Measures (सुधारात्मक उपाय):

. A committee was formed by ERPC consisting of members from ERPC secretariat, ERLDC and POWERGRID to investigate and analyze the matter. The committee visited NTPC, Kahalgaon on 02nd February 2024 and discussed in detail about the event after going through the records available at NTPC, Kahalgaon.

The committee observations, recommendations and action to be taken by M/s NTPC have been listed below.

1. The B-pole interrupter of Unit#2 tie CB (M/s Siemens make) connected to 400kV Main Bus-2 blasted causing the fault while the CB was in OFF condition. The breaker was relatively new and was retrofitted on 30.12.2022. The pre-commissioning test results were checked and found to be in order. As intimated by NTPC, similar problem has also been reported at NTPC, Dadri.



Fig. – 1 (B-Pole found to be damaged with shattering of interrupter porcelain)

NTPC is requested to take up with OEM M/s Siemens for root cause analysis of the failure of the circuit breaker and replacement of the interrupter pole at the earliest. The RCA report may be shared with ERPC.

2. 400KV Main Bus–II Busbar Differential protection operated to isolate the fault. As per the protection scheme, all the circuit breakers connected to 400kV Main Bus-2 and the bus-sectionalizer CB should have opened on operation of busbar differential protection to clear the fault within minimal time. However, considerable time delay in opening of 152 (Main Breaker ICT1), 452 (Main Breaker ICT2), 752 (Main Breaker Lakhisarai 2), 5352 (Bus-Sectionalizer), 3452 (Tie of Unit 6) were observed. (Detailed Analysis is attached as Annexure-A). As learnt, Bus bar protection checking was done last in year 2019 during bus splitting activities.

NTPC is requested to carry out Busbar protection checking to identify and rectify the anomalies at the earliest. Reason for delayed opening time/non-opening of aforesaid breakers is required to be checked.

3. The event logger at NTPC, KHSTPP was found to be non-functional. As per Cl. 15.4 of CEA Grid Standard Regulation 2010, the disturbance recorders and event loggers shall be kept in healthy condition, so that under no condition important data is lost.

NTPC is requested to replace the non-functional Event Logger on immediate basis.

4. Time drift was observed in the disturbance recorders (DR). The DR time window was found to be 1.75 seconds. Besides, mandatory DR signals are not mapped for different protections of transmission lines and equipment.

NTPC is requested to time synchronize all the Disturbance recorders with GPS clock (as per Cl. 7 of CEA Technical Standards for connectivity Regulations 2007) for proper understanding of events in future. Besides, the DR time window needs to be configured to minimum of 3 seconds and mandatory DR signals to be mapped as per ER protection philosophy (Ref. 79th PCC meeting).

5. To reduce fault level for safe and reliable operation of the GRID, bus splitting was proposed at 400kV Kahalgaon switchyard as per CEA recommendation in the standing committee on Power System held on 20.09.2010 and was approved in 24th ERPC and 29th NRPC meeting. NTPC was requested to carry out bus splitting scheme vide ERPC letter dtd. 24.07.2014. Although bus splitting scheme is implemented in 400kV Switchyard, it is non-operational due to non-availability of 400/132kV ICT in Bus section 3&4. The fault would have limited to 400kV Bus 2 if the bus splitting were operational.

As intimated by NTPC, the PO for purchase of ICT's were placed on M/s EMCO which went bankrupt causing delay in purchase. Later on, the contract was awarded to M/s BHEL in March 2019. The ICTs are now supplied at Kahalgaon and Oil filling is in progress.

NTPC needs to expedite commissioning of 400/132kV ICT-3&4 and make bus-splitting scheme operational in Kahalgaon at the earliest to limit the fault level.

6. 400kV KHSTPP-Lakhisarai Ckt-2 line tripped at KHSTPP end due to Main2 forward direction fault detection for reverse direction fault and sent carrier to Lakhisarai end. Line tripped from Lakhisarai end due to DT send from Kahalgaon end, this has happened due to incorrect logic in PUB relay at KHSTPP end. The Main-2 relays in 400kV KHSTPP-Lakhisarai Ckt-1 &2 have sensed fault in forward zone and sent carrier whereas the fault was in reverse zone.

DT Send Channel 1 Logic for 400kV KHSTPP-Lakhisarai Ckt-2 in PUB needs to be corrected. Forward direction in 400kV KHSTPP-Lakhisarai Ckt-1 and 400kV KHSTPP-Lakhisarai Ckt-2 by Main 2 (Siemens Relay) at Kahalgaon end needs to be checked.

7. It was observed that the unit no. 5 & 7 tripped at 07:13Hrs & 07:12Hrs respectively, almost 25 minutes after the bus tripping event due to loss of auxiliary power supply from station

bus. All the drives connected to station bus got tripped, mainly the cooling water system meant for compressors & condenser vacuum and finally units tripped on Instrument air pressure low & vacuum low protection. As intimated, station systems have been planned to get segregated for stage-I & II and is currently under progress.

When Unit#6 got tripped, if discharge valves of Cooling Water (CW) pumps running for it would have been closed manually, it would have helped in maintaining CW pressure of running Units# 7&8 thus increasing the operation margin of the unit.

Necessary arrangements may be put in place to feed power to the unit auxiliaries from alternate stage station bus in case of outage of any station bus.

For cooling of Screw compressor, a standby option may be explored for e.g. a line from ACW/CW inlet may be diverted by some mechanical modification during overhauling of the units for redundancy.

M/s NTPC is requested to take corrective actions as suggested by the committee and intimate ERPC for information and record.

13. 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	NTPC KAHALGAON

14: Annexure

Bus - 2 (Main CB)				
Element	Opening Time	Opened on BB	Time Synch	Remark
Unit-4 (210MW)	50 ms	Yes	No	
400kV KHSTPP- Durgapur-1	50 ms	Yes	No	DT Sent from KHSTPP (Tie CB was Closed, So DT should not have been sent, Bus Bar Scheme to be checked). PSL logic for PUA and PUB may be checked for ascertaining the reason of DT Send
Unit-3 (210MW)	53 ms	Yes	No	
Spare-1 (Old 400kV KHSTPP- Banka-2 1652)	Not Known	No	No	CB status (closed) not changed in available DR. This breaker should also trip in case of Bus 2 Fault. M/s NTPC may check.
400kV 50MVAR BR-1	48 ms	BB	No	
400kV KHSTPP- Lakhisarai-2	50 Sec	No	No	Current has become less than 100A after 100ms, however Breaker status is showing close for 50 seconds across two different DRs in PU relay. M/s NTPC may check protection wiring.
400/132kV 200MVA ICT-1	32 Sec	No	No	Tripped after very long delay of 32 seconds as per information in two different DRs. M/s NTPC may check protection wiring.
400/132kV 200MVA ICT-2	50 Sec	No	No	Tripped after very long delay of 50 seconds as per information in two different DRs. M/s NTPC may check protection wiring.
400kV Main Bus-2 and 4 Sectionalizer	2.5 Sec	No	No	Tripped after long delay of 2.5 seconds as per information in two different DRs. M/s NTPC may check protection wiring.

Bus - 4 (Main CB)				
Element	Opening Time	Opened on LBB of Sectionalizer	Time Synch	Remarks
Unit-5 (500MW)	40ms	Yes	Yes	2552 Opened as per PUA relay DR
400kV KHSTPP-Barh-1	25 ms	-	Yes	Barh1 Main CB has opened before operation of LBB of sectionalizer. M/s NTPC may check.
400kV KHSTPP-Farakka-1	40 ms	Yes	Yes	
Unit-6 (500MW)				During site visit, DR was checked and it was observed that 3452 Breaker did not open on LBB of Sectionalizer, but it opened on Generator Class A protection along with Main CB 3652. The same needs to be checked
400kV 50MVAR BR-2				DR not provided for the said event as they have been overwritten as intimated by M/s NTPC.
400kV KHSTPP-Maithon-1	40 ms	Yes	Yes	
400kV KHSTPP-Banka-2	45 ms	Yes	Yes	

Line, ICT and BR			
Element Name	Relay Indication		Remarks
	Kahalgaon End	Remote End	
400kV KHSTPP-Durgapur-1	DT Sent (BB)	DT Received	DT Sent from KHSTPP (Tie CB was Closed, So DT should not have been sent, Bus Bar Scheme to be checked). PSL logic for PUA and PUB may be checked for ascertaining the reason of DT Send
400kV KHSTPP-Durgapur-2	Main-2, O/V Operated Y-ph, DT sent	DT Received	It is on Bus 1. Breaker opened before desired OV Trip time delay. M/s NTPC may check OV trip time delay. Reason for DT send may be ascertained to check whether it is from OV or PUA/PUB. Earthing at Kahalgaon to be checked as there was voltage rise in healthy phase.
400kV KHSTPP-Lakhisarai-2	Main-2 Distance Forward (Fault was in reverse zone)	Z-2, Carrier Received, DT Received	Carrier received at Lakhisarai due to Main 2 forward direction fault detection at KHSTPP. DT Received at remote end, due to incorrect logic in PUB relay at Kahalgaon end. M/s NTPC may check DT send and distance forward logic.
400kV KHSTPP-Lakhisarai-1	Main-2 Distance Forward (Fault was in reverse zone)	Z-2, Carrier Received, A/R successful	It is on Bus 1. Carrier Received at Lakhisarai due to Main 2 forward direction fault detection at Kahalgaon end. Line opened due to Main 2 operation. M/s NTPC may check distance forward logic.
400/132kV 200MVA ICT-1	No DR Available (Transformer Protection Relay are electromechanical)		Tipped due to non-opening of Main Bay CB and consequent operation of LBB Backtrip for Main CB.
400/132kV 200MVA ICT-2	No DR Available (Transformer Protection Relay are electromechanical)		Tipped due to non-opening of Main Bay CB and consequent operation of LBB Backtrip for Main CB.
400kV KHSTPP-Barh-1	Tie CB was already out of service. DR of distance relay could not be extracted as relay is very old	DT Received	Barh1 Main CB has opened before operation of LBB of sectionalizer. M/s NTPC may check. At Barh end line tripped after 5 sec on DT receipt possibly due to open end line over voltage at KHSTPP.
400kV KHSTPP-Banka-1	No Tripping	Z-2, 456 msec	
400kV KHSTPP-Banka-2	No Tripping (Tie CB)	Z-2, 380 msec	Main CB Opened at Kahalgaon end on LBB of sectionalizer
400kV 50MVAR BR-1	--		BR tripped due to tripping of main CB on BB. Unit-2 in dia was out of service.
Unit			
Unit No.	Remark		
Unit-5	During site visit it was informed that Unit Tripped on loss of Auxillary supply from Station Transformer due to tripping of ICT-1 and 2		
Unit-6	During site visit, DR of PUA/PUB were checked and it was observed that 3452 Breaker did not open on LBB of Sectionalizer, but it opened on Generator Class A protection along with Main CB 3652. The same needs to be checked		
Unit-7	During site visit it was informed that Unit Tripped on loss of Auxillary supply from Station Transformer due to tripping of ICT-1 and 2		



ग्रिड-इंडिया
GRID-INDIA

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)

[formerly Power System Operation Corporation Limited (POSOCO)]

पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre

कार्यालय : 14, गोल्फ क्लब रोड, टॉलीगंज, 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

Annexure-B2



पूर्वी क्षेत्र के 220/132 केवी बिहारशरीफ उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट / Detailed Report of grid event at 220/132 kV Biharsharif 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):20-01-2024

1. Event Summary (घटना का सारांश):

At 04:04 Hrs on 14.01.2024, 220 kV Biharsahrif-Mokama-1 tripped due to R_N fault. While attempting to charge the line at 04:22 Hrs, all emanating lines tripped from remote end and total power interrupted at 220/132 kV Biharsharif S/s. Around 128 MW load loss reported at Bihar Sharif.

2. Time and Date of the Event (घटना का समय और दिनांक): 04:22 hrs of 14.01.2024

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

4. Location/Control Area (स्थान/नियंत्रण क्षेत्र): Bihar

5. Antecedent Conditions (पूर्ववर्ती स्थिति):

	Frequency	Regional Generation	Regional Demand
Pre-Event (घटना पूर्व)	50.048 Hz	23916	15853
Post Event (घटना के बाद)	50.048 Hz	23916	15725

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

Important Transmission Line/Unit if under outage (महत्वपूर्ण संचरण लाइने/ विद्युत उत्पादन इकाइयां जो बंद हैं)	Nil
Weather Condition (मौसम स्थिति)	Normal weather

6. Load and Generation loss (लोड और जेनरेशन हानि): Generation loss: NIL; Load loss: 128 MW.

7. Duration of interruption (रूकावट की अवधि): 00:44 Hrs

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

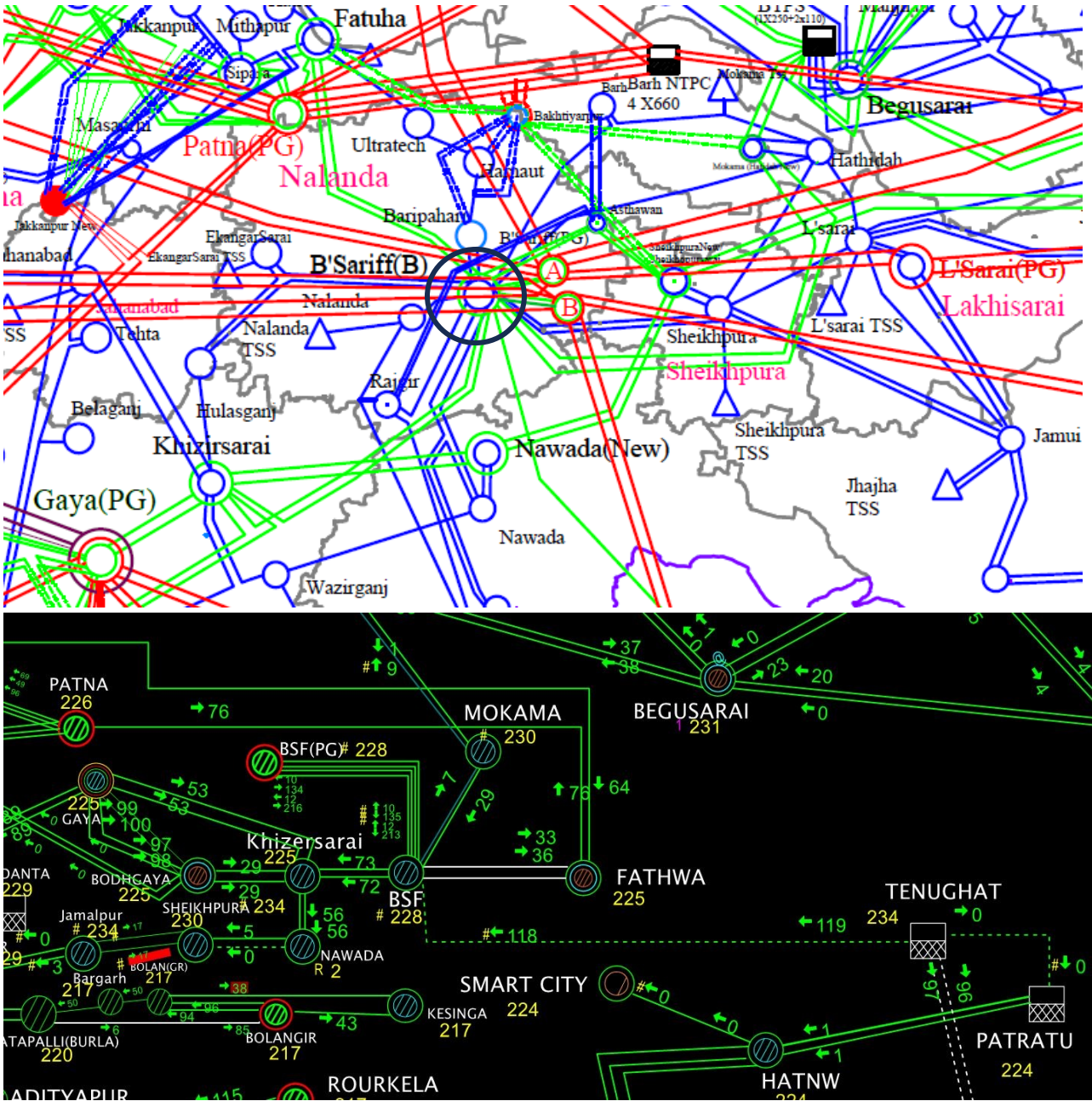


Figure 1: Network across the affected area

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

10. Major Elements Tripped (प्रमुख ट्रिपिंग)

क्र०स०	नाम	Trip time (hh:mm:ss)	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	Restoration time
1	220 kV Biharsharif-Mokama-1	04:04	Biharsharif: R_N, 34 km, 1.01 kA	Mokama: R_N,	

	220 kV Biharsharif-Mokama-2	04:22	Tripped from Bsf	Mokama: Didn't trip	
	220 kV Biharsharif-Tenughat-1		-	Tenughat: R_N, Zone-3, 277.5 km, 0.4 kA	
	220 kV Biharsharif-Fatuah-1		-	Fatuah: Didn't trip	
	220 kV Biharsharif-Fatuah-2			Fatuah: Didn't trip	
	220 kV Biharsharif-Khizersarai-1		Tripped from Bsf	Khizersarai: Didn't trip, Zone-3 started	
	220 kV Biharsharif-Khizersarai-2		Tripped from Bsf	Khizersarai: Didn't trip , Zone-3 started	
	400/220 kV ICT-1 at Biharsharif				
	400/220 kV ICT-2 at Biharsharif				
	400/220 kV ICT-3 at Biharsharif				
	400/220 kV ICT-4 at Biharsharif				

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

- At 04:04 Hrs, 220 kV Biharsharif-Mokama-1 tripped due to R_N fault which was around 34 km from Biharsharif. As reported, after tripping, of this line DC supply fuse of this line's panel failed at Biharsharif.

- At 04:22 Hrs, charging attempt was taken from Biharsharif with DC fuse fail condition and as the fault was persisting and there was no DC supply, no protection operated at Biharsharif end for Mokama line -1.
- Other 220 kV lines at Biharsharif either tripped from remote end or Biharsharif end.
- 220 kV Tenughat-Biharsharif tripped in Zone-3 time from Tenughat.
- As per DR of 220 kV Biharsharif-Khizersarai D/c, Zone-3 picked up at Khizersarai but line tripped from Biharsharif before Zone-3 time. No details available from Biharsharif regarding this tripping.
- As reported, 220 kV Biharsharif-Fatuah D/c didn't trip from Fatuah end. Details of tripping from Biharsharif may be shared.
- 220 kV Biharsharif-Mokama-2 also didn't trip from Mokama end.
- 400/220 kV ICT-1 and ICT-2 tripped from LV side on Earth fault. BSPTCL may confirm whether directional feature enabled or not.
- Details of tripping of 400/220 kV ICT-3&4 may be shared by PG ER-1.

PMU Snapshot:

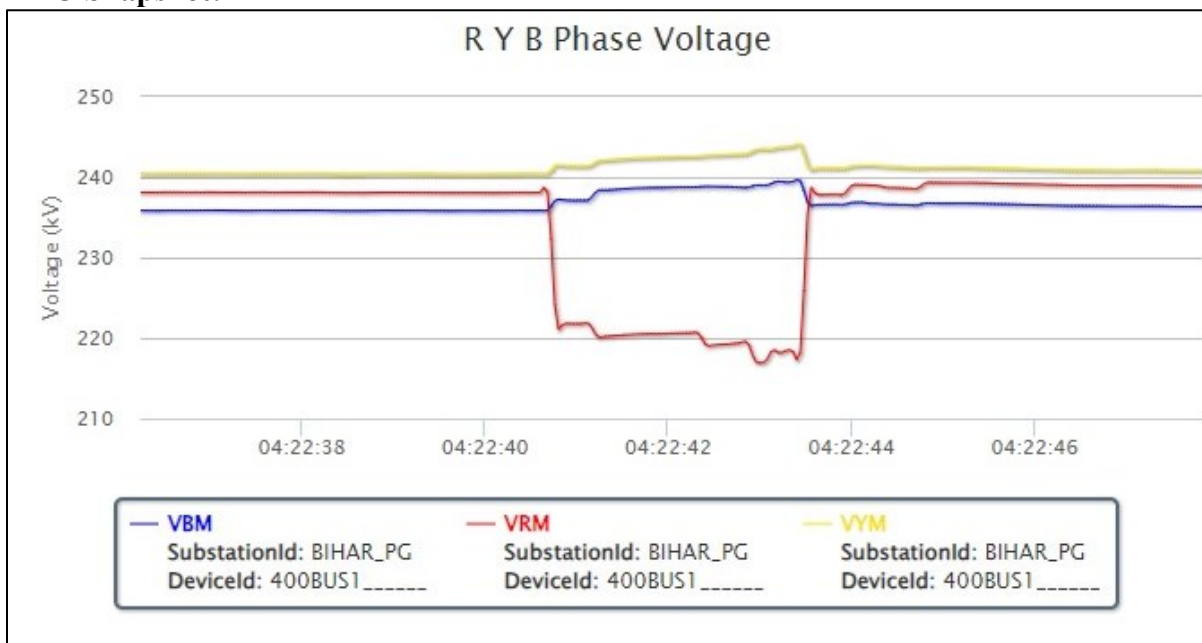


Figure 2: PMU Voltage snapshot of 220 kV Tenughat S/S

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

- Charging attempt of 220 kV Biharsharif-Mokama-1 was taken from Biharsharif despite DC fuse fail. Whether any alarm or annunciation came for fuse failure? Reason for DC fuse fail may be ascertained.

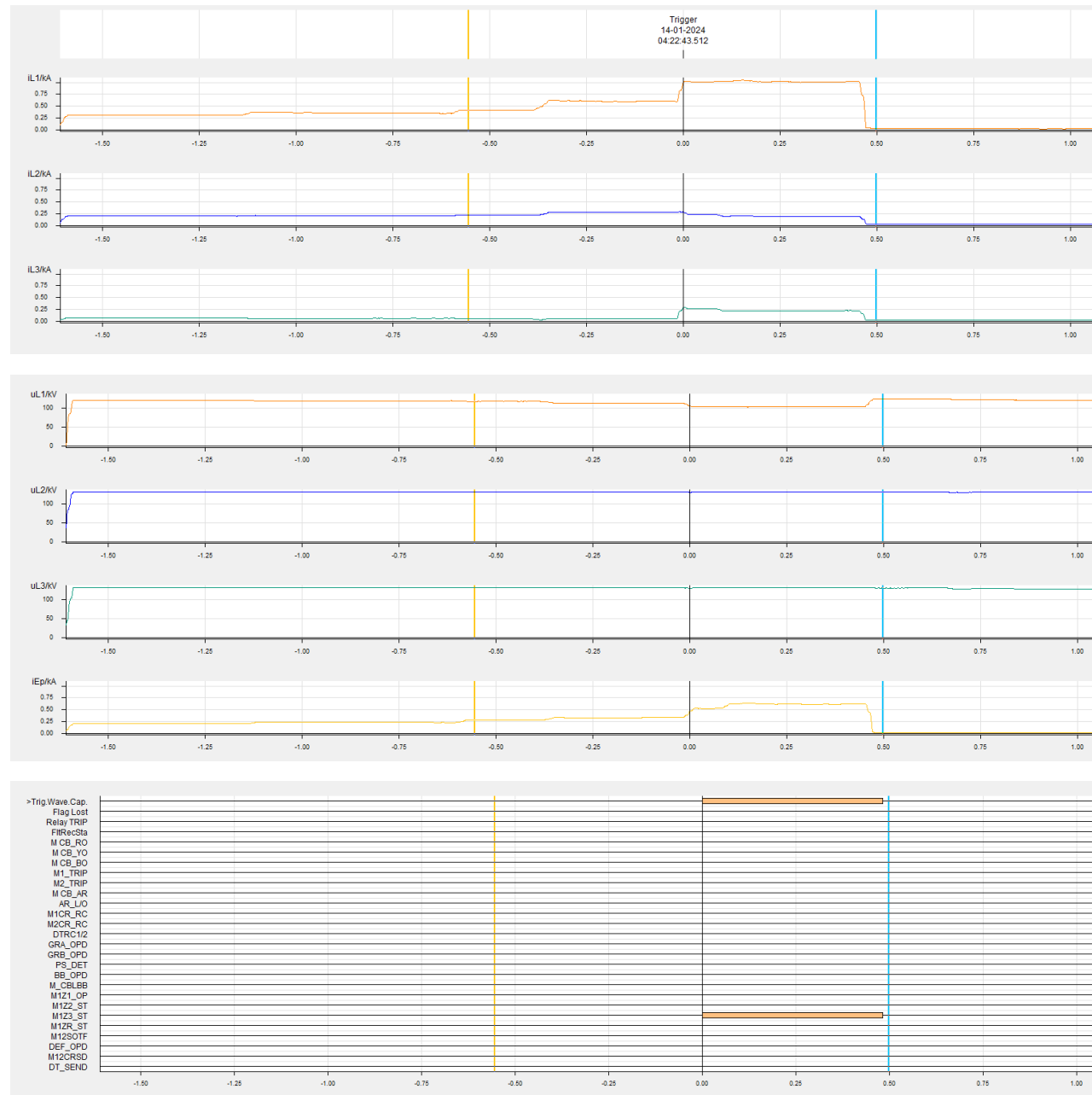
- Other 220 kV lines except 220 kV Tenughat-Biharsharif didn't trip from remote ends. However, lines tripped from Biharsharif. Reason for the same may be found out.
- 400/220 kV ICT-1 & 2 tripped from LV side on E/f. Direction feature may be enabled.
- From PMU it can be observed that fault clearance time is around 3 seconds, without visibility and data from DR it is not certain which protection failed to operate so, DR requirement is necessary.
- No DR was available at Biharsharif. Necessary action may be taken to configure DR triggering criteria.
- Bus bar protection at Biharsharif is still not available.

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

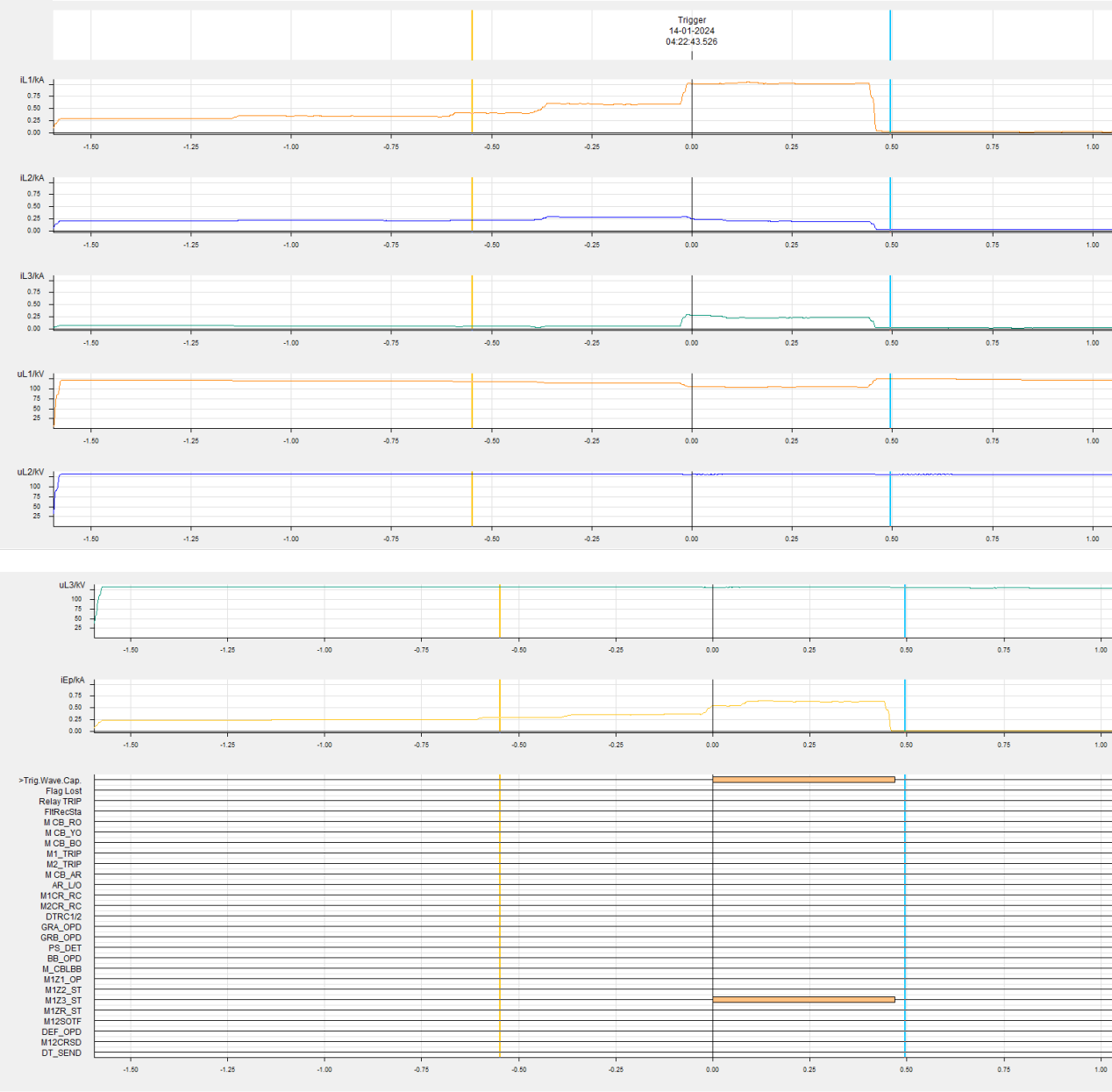
14. Non-compliance observed (विनियमन का गैर-अनुपालन):

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, BGCL, PG ER-1, TVNL

15. Key Lessons Learnt (प्रमुख अधिगम बिंदु):



Khezesarai end DR for BSF line-2:



List of important transmission lines in ER which tripped in January-2024

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Remarks	LOCAL END UTILITY	REMOT E END UTILIT Y	UTILITY RESPONSE
5	400 KV-GOKARNA-NEW PURNEA-1	06-01-2024	11:43		New Purnea: DT received	No fault	No fault observed, tripped without any fault DT received at New purnea.	WBSETCL	PG ER-1	ZIV make PLCC faulty @ Gokarna. Faulty card replaced.
23	220 KV DALKHOLA-DALKHOLA(PG)-1	18-01-2024	13:22	Dalkhola: Master Trip relay operated		No fault	WBSETCL may explain	WBSETCL	PG ER-2	Broken conductor trip was enabled.
24	220 KV CHANDIL-SANTALDIH-1	18-01-2024	23:25		Santal dih: Y_N, 15.57 km, 6.87 kA	Y-N	3 phase tripping at Chandil end no A/R attempt while at STPS A/R attempted but failed.	JUSNL	WBPDC	Pole discrepancy time set less at Chandil
25	765 KV JHARSUGUDA-DHARAMJAIGARH-1	19-01-2024	01:19	Jharsuguda: B_N, 114 km, 5.03 kA		B-N	A/R attempted but unsuccessful from both ends.	PG Odisha	WR	
26	220 KV-RENGALI-RENGALI(PG)-1	21-01-2024	07:04	Rengali: Iy: 5.2 kA	Rengali (PG): Didn't trip	No fault	Y_ph LA of 220 kV Rengali-Deogarh feeder burst at Rengali(OPTCL) S/s. No fault in 220 kV Rengali-Rengali D/c. Seems both lines tripped on O/C E/F in reverse direction. Directionality of O/c, E/f may be checked by OPTCL.	OPTCL	PG Odisha	O/c time delay increased at Rengali end
27	220 KV-RENGALI-RENGALI(PG)-2	21-01-2024	07:04	Rengali: Iy: 5.4 kA	Rengali (PG): Didn't trip	No fault		OPTCL	PG Odisha	
28	400 KV-DURGAPUR-SAGARDIGHI-1	21-01-2024	10:31		Saagrdighi: Master trip relay operated	No fault	WBPDC may explain.	PG ER-2	WBPDC	86 relay maloperated
29	220 KV PATNA-FATUAH-1	21-01-2024	20:17	Patna: DT received	Fatuah: LBB operated	No fault	LBB operated. BSPTCL may explain	PG ER-1	BSPTCL	LBB maloperated
32	400 KV-RANCHI-RAGHUNATHPUR-2	23-01-2024	09:33	Ranchi: Didn't trip		No fault	No fault in the line. DVC may explain.	PG ER-1	DVC	No relay indiation. Only lockout operated. There is a persisting prolem in PLCC Panel which is in discussion to be replaced.
34	400 KV-DSTPS-JAMSHEDPUR-1	27-01-2024	06:51	DSTPS: O/V Operated	Jamshedpur: DT received	No fault	No fault in line DT received at Jamshedpur. DVC may explain.	DVC	PG ER-1	Tripping was issued from faulty M1 Distance Relay. Relay replacement is scheduled in second week of February.
35	400 KV-BIHARSHARIF-KODERMA-1	28-01-2024	20:33	Biharsharif: R_N, 4 km, 13.5 kA	Koderma: R_N, 111 km, 3.4 kA	R-Earth	A/r failed after 1 second	PG ER-1	DVC	Persistent fault within reclaim time. When line was manually closed, SOTF trip occurred. Punctured insulator was found during patrolling.

Annexure-C1

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

[illegible]

Minutes of Meeting to review SPS at 400 kV Sterlite (Vedanta) S/s

A meeting was held on 23.02.2024 on MS Teams platform to review SPS scheme at 400 kV Sterlite (Vedanta) S/s. Members from ERPC, ERLDC, SLDC Odisha, OPTCL and Sterlite were present. Following points were discussed:

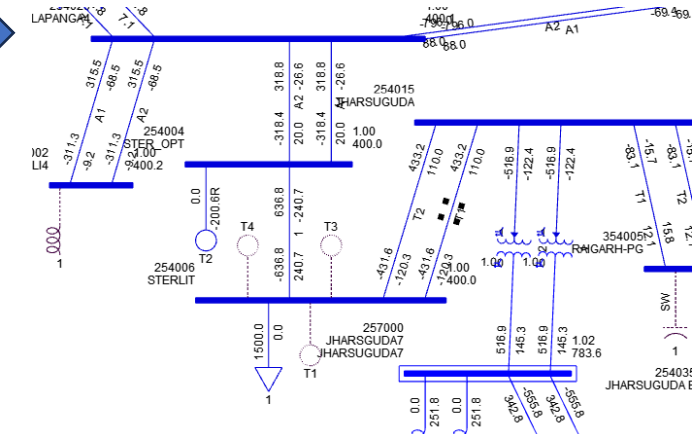
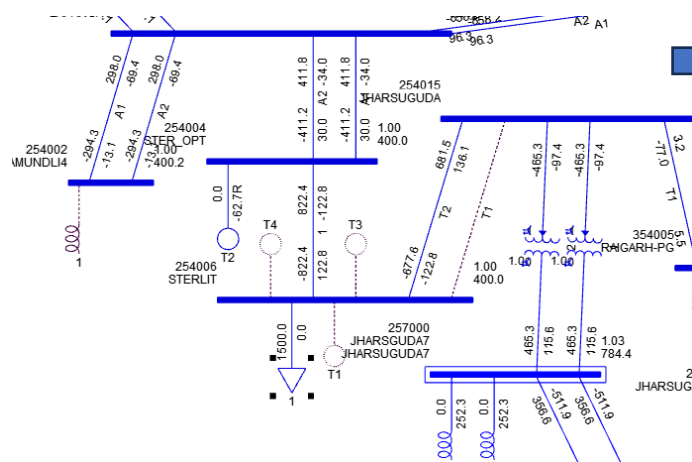
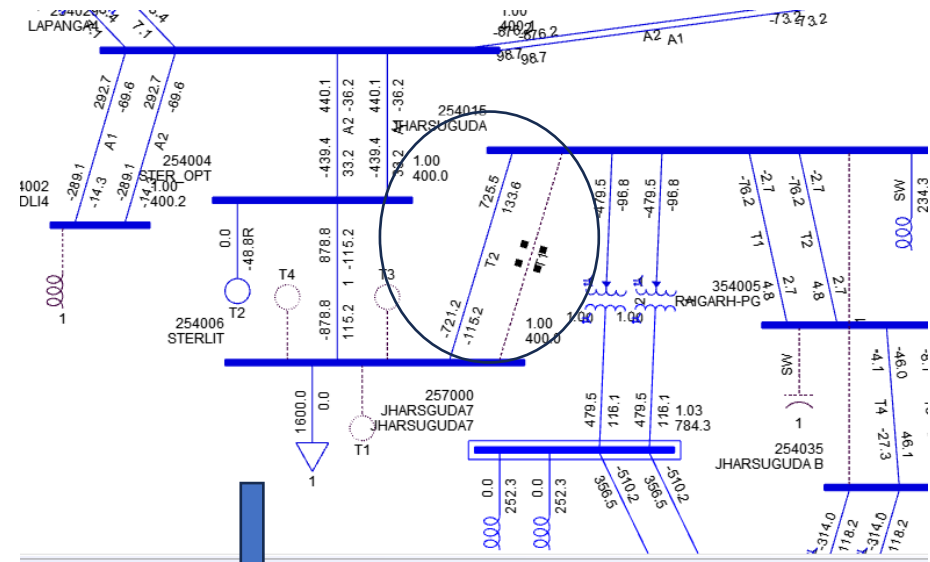
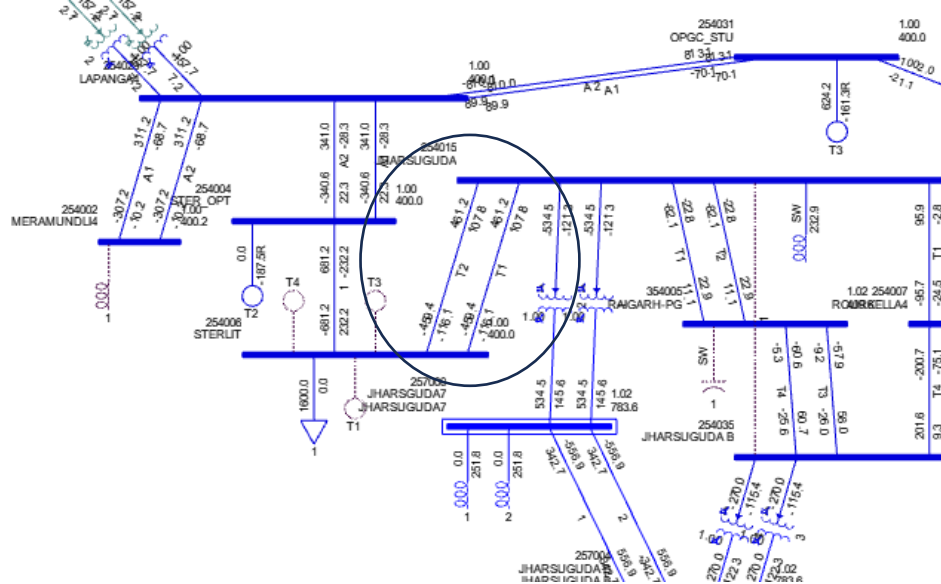
- Line flow of all four 400 kV lines at Sterlite S/s, i.e., 400 kV Sterlite-Jharsuguda D/c and 400 kV Sterlite-Lapanga D/c will be monitored.
- Based on system studies, N-1 limit for 400 kV Sterlite-Jharsuguda D/c is around 540 MW and N-1 limit for 400 kV Sterlite-Lapanga D/c is around 477 MW. Keeping some margin, it was decided that whenever flow of each circuit of 400 kV Sterlite-Jharsuguda D/c and 400 kV Sterlite-Lapanga D/c crosses 500 MW and 450 MW respectively an alarm will be generated at Sterlite for manual action to minimize net interchange with the grid. Alarm signal will also be sent to SLDC Odisha and ERLDC for taking necessary action to reduce the loading of these lines.
- Whenever loading of any of the four lines crosses 800 MW, generation reduction/load reduction will be done through SPS action at Sterlite depending on net export/import of Sterlite to reduce the loading of the lines.

The above points were agreed by all the members present and further following course of action was decided:

- A meeting will be called by SLDC Odisha with members from GRIDCO, OPTCL and Vedanta to discuss the modalities of implementation of proposed SPS scheme.
- Vedanta to implement the SPS scheme as discussed for quick relief in the line flow in case it crosses 800 MW in any of the four abovementioned lines.

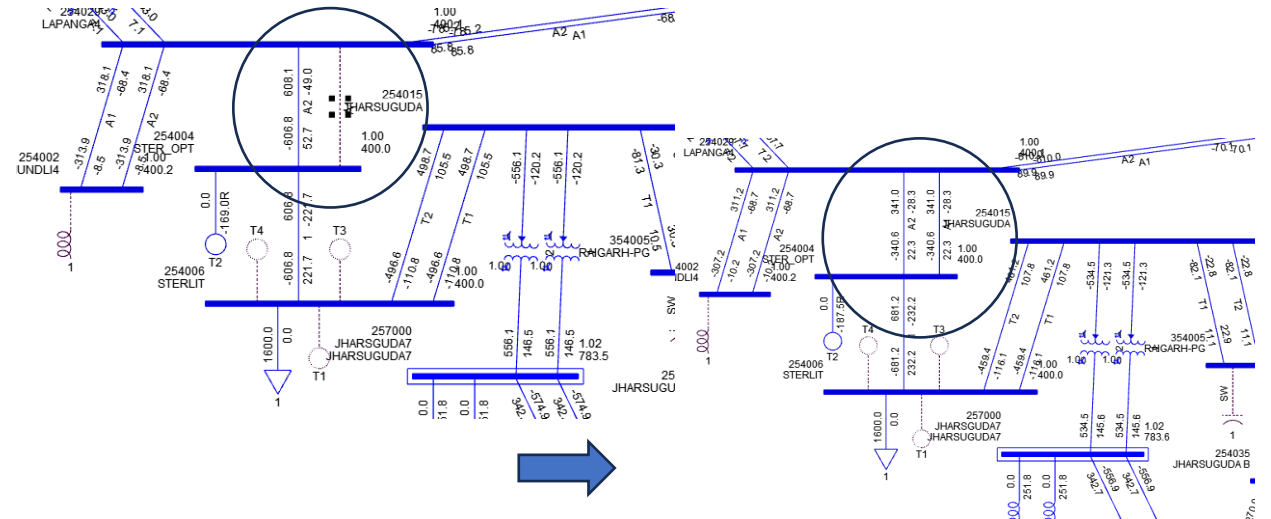
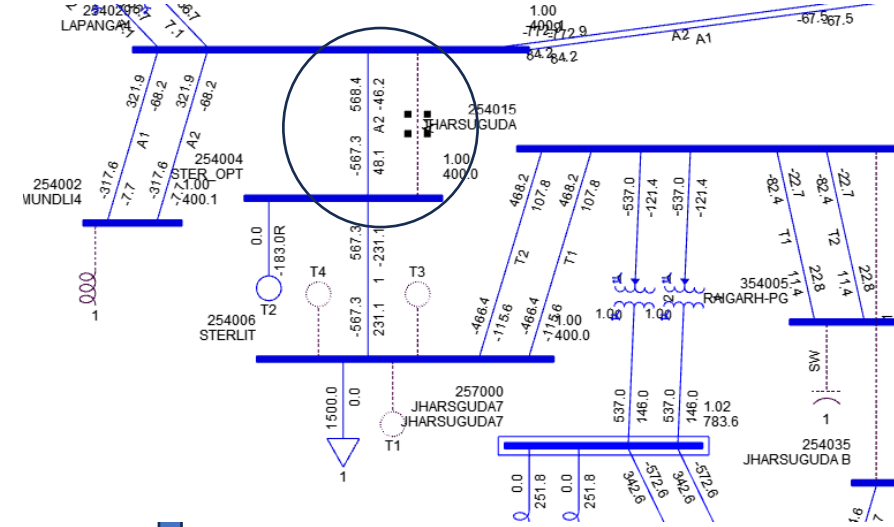
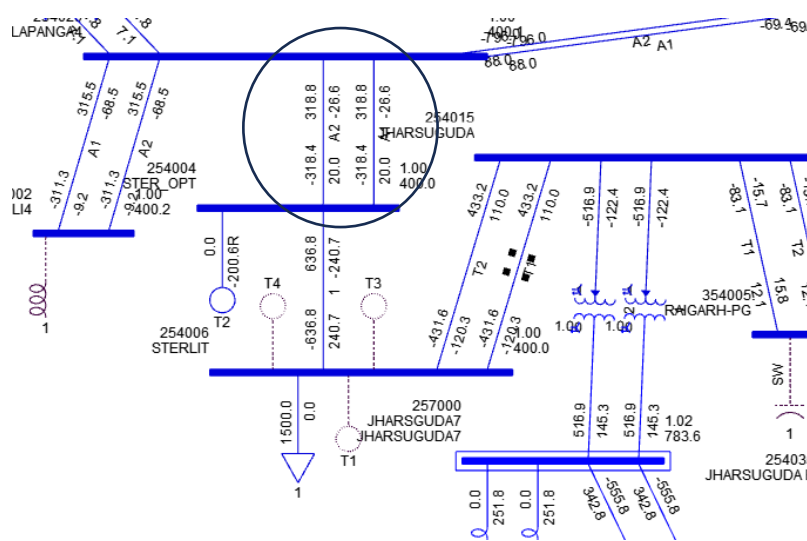
N-1 limit of 400 KV Sterlite-Jharsguda D/c

Annexure-1



- From given simulation, the sensitivity of one 400 Sterlite Jharsguda ckt on the other is 57.2%
- So, considering line limit as 850 MW,N-1 limit here is 541 MW or 540 MW
- From 3rd figure ,it is clear that effect of load/generation reduction on single line is 43.5% and on both ckt individually when present is 28%

N-1 limit of 400 KV Sterlite Lapanga d/c



- From given simulation, it appears sensitivity of one 400 Sterlite Lapanga ckt on the other is 78.2%
- So, considering line limit as 850 MW, N-1 limit here is 477.5 MW or 477 MW.
- From 3rd figure, it is clear that effect of load/generation reduction on single line is 39 % and on both ckt. individually when present is 23 %

SI No.	Name of the incidence	PCC Recommendation	Latest status
131st PCC Meeting			
1.	Total Power failure at 400/220 kV Tenughat TPS(TVNL) on 06.12.2023 at 07:04 Hrs.	<p>PCC advised TVNL following:</p> <ul style="list-style-type: none"> <input type="checkbox"/> To replace the static busbar relay with numerical relay for better performance and reliability. <input type="checkbox"/> To time-synchronize the relays with GPS clock. <input type="checkbox"/> To enable directional feature in earthfault relay of the 220 kV feeders. <p>JUSNL was advised to rectify the GPS clock synchronization issue at Govindpur end.</p>	TVNL representative was not available in 132 nd PCC Meeting.
130th PCC Meeting			
2.	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.	<i>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.</i>
125th PCC Meeting			
6.	Repeated Line tripping of 220 kV Ramchandrapur - Joda in April 2023	Regarding status of commissioning of DTPC in the line, PCC advised the matter may be taken with their telecom wing for early commissioning of the same.	<i>The tendering for procurement of DTPC is in process.</i>