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

सत्यमेव जयते

वसुधैव कुटुम्बकम्
ONE EARTH • ONE FAMILY • ONE FUTURE

Tel. No.: 033-24239651,24239658 FAX No.:033-24239652, 24239653 Web: **www.erpc.gov.in**

सं./NO. पू.क्षे.वि.स./PROTECTION/2023/ 891 **दिनांक /DATE:** 22/09/2023

सेवा में / To,

संलग्न सूची के अनुसार / As per list enclosed.

विषय : दिनांक – 08.09.2023 को आयोजित 129 वीं पीसीसी बैठक का कार्यवृत्त

Sub: Minutes of the 129th PCC meeting held on 08.09.2023

महोदय/ Sir,

08.09.2023 को आयोजित **129वीं** 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 **129th PCC** meeting of ERPC held on **08.09.2023** 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,

Jena.

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

Minutes
of
129th PCC Meeting

Date: 22/09/2023
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 129th PROTECTION COORDINATION SUB-COMMITTEE MEETING HELD ON 08.09.2023 AT 10:30 HRS THROUGH MS TEAMS

Member Secretary Chaired the Meeting. ERLDC representative highlighted the protection performance of the ER utilities for the month of July 2023 and Aug 2023 which is enclosed at **Annexure A.**

PART – A

ITEM NO. A.1: Confirmation of Minutes of 128th Protection Coordination sub-Committee Meeting held on 20th July 2023 through MS Teams online platform.

The minutes of 128th Protection Coordination sub-Committee meeting held on 20.07.2023 was circulated vide letter dated 25.08.2023.

Members may confirm.

Deliberation in the meeting

Members confirmed the minutes of 128th PCC Meeting

PART – B

ITEM NO. B.1: Tripping of 3*200 MW Unit and 2*500 MW Unit at FSTPP on 01.07.2023 at 02:17 Hrs

On 01.07.2023 at 02:17 Hrs, FSTPP Unit-4 (500 MW) got tripped on Low Vacuum and other remaining four units of FSTPP St I & II went off Bar on low vacuum within next 45 Mins one by one.

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

Gen. Loss: 1420 MW
Outage Duration: 03:11 Hrs

NTPC may explain.

Deliberation in the meeting

ERLDC representative explained the event based on the report submitted by NTPC. It was informed that there are four raw water pumps which supplies raw water to pre-treatment plant for clarification and service water production, which in turn is used by CW system and compressors. On 01.07.2023 at 00:10 hrs, raw water pump-1 was brought back into service after cable termination works after which trial run of the pump was taken and then stopped. It is suspected that at this time, NRV of raw water Pump-1 got stuck in open condition and raw water supply got short circuited to canal therefore gradually clarified/service water tank level reduced to minimum level which resulted in tripping of instrument air compressor of stage-2

and CW pumps of stage-1. Consequently all units tripped one by one in span of 45 minutes on low vacuum pressure.

On enquiry from PCC regarding remedial measures taken, he informed that they had not received any information from NTPC Farakka in this regard.

NTPC representative was not available in the meeting. PCC noted that there was no protection related discrepancy during the above tripping.

ITEM NO. B.2: Disturbance at 400 kV GMR S/s on 31.07.2023 at 16:29 Hrs

400 kV GMR-Meramundali B got tripped due to B phase fault. Consequently, 350 MW Unit # 3 at GMR got tripped due to loss of evacuation path.

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

Gen. Loss: 262 MW
Outage Duration: 24:11 Hrs

GMR and OPTCL may explain.

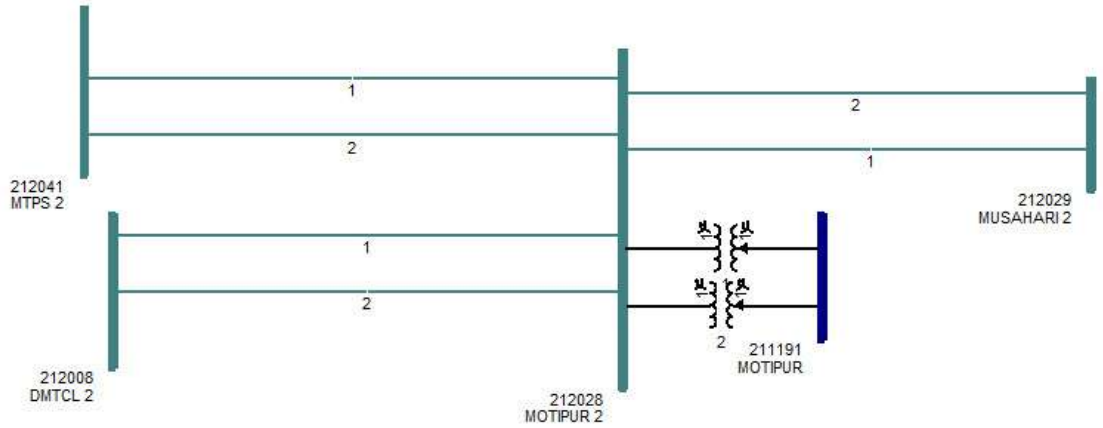
Deliberation in the meeting

Based on the DR and information received from the utilities, it was appraised that B phase to ground fault developed in 400 kV GMR- Meramundali B line due to snapping of earth wire between tower location 6 and 7 inside GMR plant. Subsequently A/R attempt was made however A/R was not successful as fault was permanent in nature resulting in the tripping of the line.

As the entire generation of U#3 of GMR is being evacuated through 400 kV GMR-Meramundali B S/C line, the said unit got tripped after tripping of the line.

ITEM NO. B.3: Disturbance at 220/132 kV Motipur (BSPTCL) S/s on 15.08.2023 at 14:31 Hrs

220 kV Motipur-MTPS-2 got tripped due to B phase-Earth fault, however, breaker at Motipur didn't open and LBB operated. As reported, isolator status of 220 kV Darbhanga (DMTCL)-Motipur-1 at Motipur end was showing connected to both buses subsequently both 220 kV Bus at Motipur got tripped and Motipur S/s became dead.



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

Load Loss: 121 MW
Outage Duration: 00:15 Hrs

BSPTCL may explain.

Deliberation in the meeting

As per the information received from BSPTCL, the event was explained as follows:

- *B phase to Earth fault developed in 220 kV Motipur – MTPS- 2 line which was not cleared from Motipur end due to stuck breaker condition.*
- *Consequently, LBB command was triggered to all feeders/elements connected to same bus however as isolator status of 220 kV Darbhanga (DMTCL)-Motipur-1 at Motipur end was showing connected to both buses, LBB command was extended to all the feeders at substation and resulted in tripping of both bus and total power failure at 220 kV Motipur S/s.*
- *However as per DR, it is observed that even after initiation of LBB command, breakers at Motipur end got stuck for 220 kV Motipur – MTPS – 1 and 220 kV Motipur – DMTCL D/C lines and ultimately fault was cleared from remote ends.*

Regarding stuck breaker condition in mentioned feeders, BSPTCL representative replied that due to heavy rain, water ingress occurred in marshalling box resulting in sorting of trip coil and latch issues in breaker. He informed that equipment manufacturer had been contacted regarding the issue in breaker and the rectification of the issue would be taken up at the earliest.

Regarding faulty isolator status, BSPTCL representative replied that as per their observation, clearance issue is found in auxiliary switch for which OEM had been communicated and it is expected that issue will be resolved at earliest.

MPL representative stated that in case of floating isolator status or isolator status showing connected to both buses for numerical bus bar protection, isolator status may be checked physically for necessary action. He also advised to ensure precautionary steps to avoid water ingress in the marshalling boxes of the switchyard equipment. PCC opined that as busbar protection is one of the important protectio in the substation, the relay shall be checked physically in periodical time interval for any discrepancy in isolator status and any other status of the relay. In case of any discrepancy preventive measure can be taken to avoid tripping of the elements.

ERLDC representative suggested that modification in the busbar protection logic to be explored to avoid such instances so that when there is floating Isolator status or when it is showing connection with both buses, last known status of the isolator or current measurements may be used to ascertain the actual status of the isolator. PCC advised BSPTCL to explore the scheme modification as suggested by ERLDC.

On enquiry from PCC regarding fault location, BSPTCL representative replied that fault was temporary in nature and physically no fault location was found.

ITEM NO. B.4: Disturbance at 400 kV APNRL S/s on 17.08.2023 at 12:18 Hrs

On 17.08.2023 at 12:18 Hrs, 2*270 MW Unit 1 & Unit 2 at APNRL got tripped. As reported, there was resistive fault in 400 kV Chaibasa-Kharagpur line which persisted for around 2.5 seconds. Consequently, GT of both units got tripped on earth fault protection.

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

Gen. Loss: 490 MW
Outage Duration: 06:25 Hrs

APNRL may explain.

Deliberation in the meeting

Based on DR analysis, ERLDC representative informed that resistive fault got was developed in 400 kV Khargapur- Chaibasa -I which was cleared in around 2.5 seconds. Meanwhile, GT of both units at APRNL which was connected to grid through 400 kV APRNL-Jamshedpur D/C line got tripped in overcurrent earth fault protection resulting in tripping of both units at APNRL. It was found that the GT settings at APNRL were not properly coordinated which led to unwanted tripping at APNRL end.

After discussion PCC advised APNRL following:

1. *to disable overcurrent protection in 400 kV APNRL-Jamshedpur lines*
2. *to implement DEF protection for 400 kV APNRL- Jamshedpur D/C at APNRL end with differential protection being the primary protection and the same may be coordinated with Jamshedpur end.*
3. *to revise earth fault protection settings of GT at APNRL end in coordination with DEF settings of outgoing feeders at APNRL.*

ITEM NO. B.5: Disturbance at 220 kV Budhipadar(OPTCL) S/s and 220 kV Ib-TPS(OPGC) S/s on 29.07.2023 at 19:13 Hrs

On 29/07/2023 at 19:13 Hrs, voltage disturbance was observed in OPTCL network due to tripping of 220 kV Budhipadar- OPGC circuit 1 and circuit 2 from both ends subsequently at 19:20 Hrs, 220 kV Budhipadar- OPGC circuit 3 got tripped.

The relay indications were as follows-

Line 1 – ZCOM trip, Fault location - 22.3km
Line 2 – ZCOM trip, Fault location – 19.8km
Line 3 – Zone-1 trip, Fault location – 13.8km

OPGC vide letter dated 16.08.2023 requested to include above agenda in PCC Meeting.

OPTCL and OPGC may explain.

Deliberation in the meeting

OPGC representative informed that on 29.07.2023 at 19:13 Hrs, 220 kV Budhipadar- OPGC circuit 1 and circuit 2 got tripped from their end on B phase to ground fault after receiving carrier and picking up fault in zone 2. Further at 19:20 Hrs, 220 kV Budhipadar- OPGC circuit 3 got tripped in zone 1 due to R phase to ground fault. However, 220 kV Budhipadar- OPGC circuit 4 remained in charged condition. He also informed that around 30-40 MW of generation back down was done due to the above disturbance.

On enquiry from PCC regarding type of fault and physical findings, OPTCL representative replied that fault was not found physically however bad/extreme weather was reported on that day. He intimated that distance relay for 220 kV Budhipadar- OPGC circuit 1 and circuit 2 picked up at Budhipadar end and tripped the line in zone 1 protection. Further, at 19:20 Hrs, 220 kV Budhipadar- OPGC circuit 3 got tripped in zone 1 from their end at 10.8 km due to R phase to ground fault. He also informed that there is discrepancy in auto-recloser of circuit 1 and circuit 3 at the time of disturbance in which CB status is not coupled to relay due to some loose connection however the issue had been rectified and at present A/R schemes are working fine. For circuit 2, he informed that auto-reclose was kept disabled mistakenly at time of incident and is working fine at present.

It was opined that 220 kV IB-Budhipadar lines are the only evacuating lines from IB TPS generating station, therefore utmost care should be taken to keep all protection system as well as communication scheme healthy for these lines. PCC advised OPTCL to rectify autorecloser issues of the connected lines to Budhipadar and take necessary action for ensuring the system healthy all the time.

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

1) Bus tripping occurred in Eastern Region during July and August 2023

Element Name	Tripping Date	Reason	Utility
220 kV Bus-2 at TSTPP	On 05.08.2023 at 11:08 Hrs	-	NTPC
220 kV Bus-1 at NJP	On 09.08.2023 at 13:33 Hrs	-	WBSETCL
220 kV Bus-1 at KASBA	On 19.08.2023 at 18:12 Hrs	Bus fault at Kasba	WBSETCL

Concerned utilities may explain.

Deliberation in the meeting

- ***Tripping of 220 kV Bus-2 at TSTPP on 05.08.2023 at 11:08 Hrs***

NTPC representative informed that on 05.08.2023 at 11:08 hrs, bus post insulator collapsed due to heavy wind and thunderstorm resulting in development of line to ground fault at 220 kV Bus-2 at TSTPP. Subsequently 220 kV Bus-2 at TSTPP got tripped resulting in tripping of connected elements.

- ***Tripping of 220 kV Bus-1 at NJP on 09.08.2023 at 13:33 Hrs***

WBSETCL representative explained that during investigation of an existing DC earth fault in the substation, maintenance engineer mistakenly touch the P5 wire (connected to 220 k V bus 1) due to which DC positive got extended to bus via disc lamp resulting in tripping of bus.

PCC advised to take precautionary steps while doing testing work so that such type of spurious tripping can be avoided.

- ***Tripping of 220 kV Bus-1 at Kasba on 19.08.2023 at 18:12 Hrs***

WBSETCL representative informed that bus fault got at 220 kV Bus-1 at Kasba due to touching of kite string on 220 kV Bus-1, bus fault was resulted at Kasba and tripping of the connected feeders.

On enquiry from ERLDC representative regarding tripping of CESC feeders and bus scheme present at Kasba, WBSETCL representative replied that both of feeder connected to CESC got tripped during the incident and the bus configuration was single main and transfer bus.

ITEM NO. B.7: Review of Protection Philosophy of Eastern Region

CERC has notified CERC (Indian Electricity Grid Code) Regulations 2023 (IEGC 2023) and shall come into force with effect from 01.10.2023.

The clause 12(2) of the IEGC 2023 states that

"There shall be a uniform protection protocol for the users of the grid:
a) for proper co-ordination of protection system in order to protect the equipment/system from abnormal operating conditions, isolate the faulty equipment and avoid unintended operation of protection system;
b) to have a repository of protection system, settings and events at regional level;
c) specifying timelines for submission of data;
d) to ensure healthiness of recording equipment including triggering criteria and time synchronization; and
e) to provide for periodic audit of protection system."

Further clause 13 of the IEGC 2023 states that
"13. Protection protocol
……..
(3) RPC shall develop the protection protocol and revise the same after review from time to time, in consultation with the stakeholders in the concerned region, and in doing so shall be guided by the principle that minimum electrical protection functions for equipment connected with the grid shall be provided as per the CEA Technical Standards for Construction, the CEA Technical Standards for Connectivity, the CEA Technical Standards for Communication, the CEA (Grid Standards) Regulations, 2010, the CEA (Measures relating to Safety and Electric Supply) Regulations, 2010, and any other CEA standards specified from time to time.
……..
"

Considering the above, the existing protection philosophy of ERPC need to be reviewed. Therefore, it is proposed that a sub-committee may be constituted with 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.

Members may discuss.

Deliberation in the 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.

It was informed by ERPC Secretariat that a separate communication would be issued from ERPC Secretariat for sending the nomination for the above committee.

ITEM NO. B.8: Tripping Incidence in month of Aug-2023

Single line tripping incidents in the month of July 2023 and Aug 2023 which needs explanation from constituents of either end is attached.

Members may discuss.

Deliberation in the meeting

*Explanation from constituents for Single line tripping incidents in the month of July 2023 and Aug 2023 is attached at **Annexure B.8.***

PART- C: OTHER ITEMS

ITEM NO. C.1: SOP for Protection Audit of ER

As per discussions held in 13th NPC Meeting held on 05.07.2023, SOP for protection system audit to be followed by RPCs has finalized which is attached at **Annexure C.1.**

Members may discuss.

Deliberation in the meeting

Members noted.

ITEM NO. C.2: Overcurrent settings in EHV lines

It has been observed that many utilities are keeping O/c settings to be enabled for 220 kV and 400 kV lines which is in contravention to “Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022”. It may be noted that wherever Main-1 and Main-2 protection is provided, Back Up O/c is not to be enabled.

Members may note.

Deliberation in the meeting

ERLDC representative informed that in recent times it was observed that overcurrent protection has been kept enabled in many of the 220 & 400 kV lines along with the two main protections which is violation of CEA Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022.

PCC advised all the utilities that for 220 kV & 400 kV transmission lines where both main-1 & main-2 protection have been provided, overcurrent protection should be disabled for those lines.

It was clarified that in case there is a restriction in transfer of power due to contract, backup o/c protection may be kept as SPS after due approval from concerned SLDC and that intimation should be given to ERPC/ERLDC.

ITEM NO. C.3: Review of methodology for Directional Earth Fault Settings

It has been observed that many utilities are using generic pick up and TMS values for Directional fault setting of EHV lines which leads to uncoordinated tripping of lines. In this regard, it is requested by all utilities to share the methodology used for arriving at DEF setting. Further, periodicity of review of these setting on changing of fault level or with addition of new generators or transmission elements may be shared.

Members may discuss.

Deliberation in the meeting

ERLDC representative informed that as per common observation, many utilities are using generic pick up and TMS values for Directional earth fault setting of EHV lines which leads to uncoordinated tripping of lines. He requested all utilities to share the methodology used for arriving at DEF setting and periodicity of review of these setting.

DVC representative informed that based on the fault level data of adjacent substations of Powergrid and the available data for their internal network, simulation studies were carried out to arrive settings of the DEF relays. He added that review of DEF settings is done whenever there is change in network or at least at an interval of two years.

Powergrid representative informed that fault level data is collected from CTU for arriving DEF settings.

WBSETCL representative informed that fault level data is provided by their planning wing and review of settings is carried out when there is modification in network configuration.

On enquiry from DVC and WBSETCL, ERLDC representative informed that fault level data for the intra-state substations can be collected from STU/SLDC. The data is also available with ERLDC for 132 kV and above substations and the same are being updated on yearly basis.

After discussion, it was decided that the above agenda may be included as a point for discussion in the committee which is going to be formed for review of protection philosophy of ER.

ITEM NO. C.4: Implementation of Single-Phase Auto recloser feature in DEF Relays

for the 400 kV transmission lines of TPTL

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

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

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

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

In 128th PCC Meeting, M/S GE representative explained the implementation of single-phase auto recloser feature in M/S GE make DEF Relays with help of presentation which is attached at **Annexure C.4.** The major points explained was as follows:

- Directional earth fault is used for high resistance ground faults as distance protection cannot sense the zone accurately in such cases due to low current.
- Either double channel can be used in this scheme i.e. one channel for distance protection, backup overcurrent protection etc and other channel for DEF protection or single channel available in PLCC can also be shared for DEF protection implementation.
- In case of separate channel for distance protection and DEF protection, directional comparison protection allows both to operate in parallel so in case of earth fault, both protection elements will pick up and the faster of the two will perform trip. However, in case of shared channel, distance protection is given priority above DEF.
- Further, use of aided trip logic in conjunction with DEF element allows less trip time and can facilitate single phase tripping if single phase tripping is applied to breaker.
- DEF schemes are identical to distance protection i.e. DEF forward is equivalent to zone 2 distance protection and DEF reverse is equivalent to zone 4 distance protection with better accuracy and sensitivity for high resistive faults. However, there is no equivalency for zone 1 distance protection as DEF elements do not have defined reach.
- Regarding algorithm followed for high resistance earth fault detection, he informed that high resistance fault will be detected if zero sequence voltage and current threshold is crossed for more than one and half cycle. The fault direction is determined by measuring angle between residual current and voltage derivative. Further phase is selected in same way as done in distance protection.

PCC advised all utilities to submit their observation on the above scheme before next PCC Meeting.

MPL vide letter dated 12th Aug 2023 had submitted following observations-

1. Existing distance protection on 400 KV system are able to sense and operate all type fault inclusive of High resistance fault.
   There are no non-operations incidents of these Distance protection for faults on lines.
2. The fault currents are adequate and impedance setting available on distance relays are sufficient to take care of high resistance faults.
3. Presently DPOC & DEF are acting as backup protection and operating three phase lockout and blocking auto recloser.
4. Line differential protection is a better alternative to Aided DEF scheme.
5. Aided DEF scheme can be selectively used where there is a week infeed and low fault levels.

Concerned utilities may update.

Deliberation in the meeting

DVC representative informed that first possibility of developing high resistive fault shall be addressed by clearing vegetation issues along the line corridor, ensuring lower tower footing resistance values, and following other precautionary steps. He added that this type of scheme is generally not used in any of the other lines so it should be considered only for specific lines where this is last resort for getting highly resistive fault cleared.

Powergrid representative informed that in Sikkim complex most of their substations are GIS and any unwanted tripping of the elements due to implementation of the above scheme may affect the performance of GIS equipment and therefore they suggested not to implement the above scheme. They added that in recent times there was no such line tripping in that corridor in DEF protection for a transient fault.

In a separate query from Powergrid, ERLDC representative replied that in case fault is sensed by only one end then carrier will not be sent by other end and A/R will operate conventionally as per the logic.

It was also pointed out that as main-1 and main-2 relay are of different make, to implement the above scheme both relays should have the required feature in it.

PCC opined that in case no technical issues are present with the implementation of single-phase auto recloser feature in DEF Relays, then this scheme may be implemented as it will enhance reliability and security of the grid as seen in case of NER system. However PCC felt that before implementation of the scheme, relay compatibility of the aforesaid feature shall be checked in the concerned substations and the queries/apprehension of Powergrid shall be addressed. Also the future tripping of the lines in Sikkim Complex may be observed for justifying the requirement of the scheme.

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 Sep 2023 is given at **Annexure C.5.**

In 127th PCC Meeting, PRDC representative requested 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.

She further demonstrated the procedure to extract relay settings from PDMS portal and how to use the relay settings to in PSCT application for relay coordination study. She requested all concerned utilities to use the protection database and the PSCT application for relay coordination purpose and in case of any help/query they may take help of PRDC personnel.

Member Secretary advised utilities take necessary steps for timely Updation of settings data in protection database and also advised to use the database with the help of PSCT tool for relay coordination, setting review of their network.

Members may update.

Deliberation in the 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.

ITEM NO. C.6: 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 are attached at **Annexure C.6.***

******

LIST OF ADDRESSES:

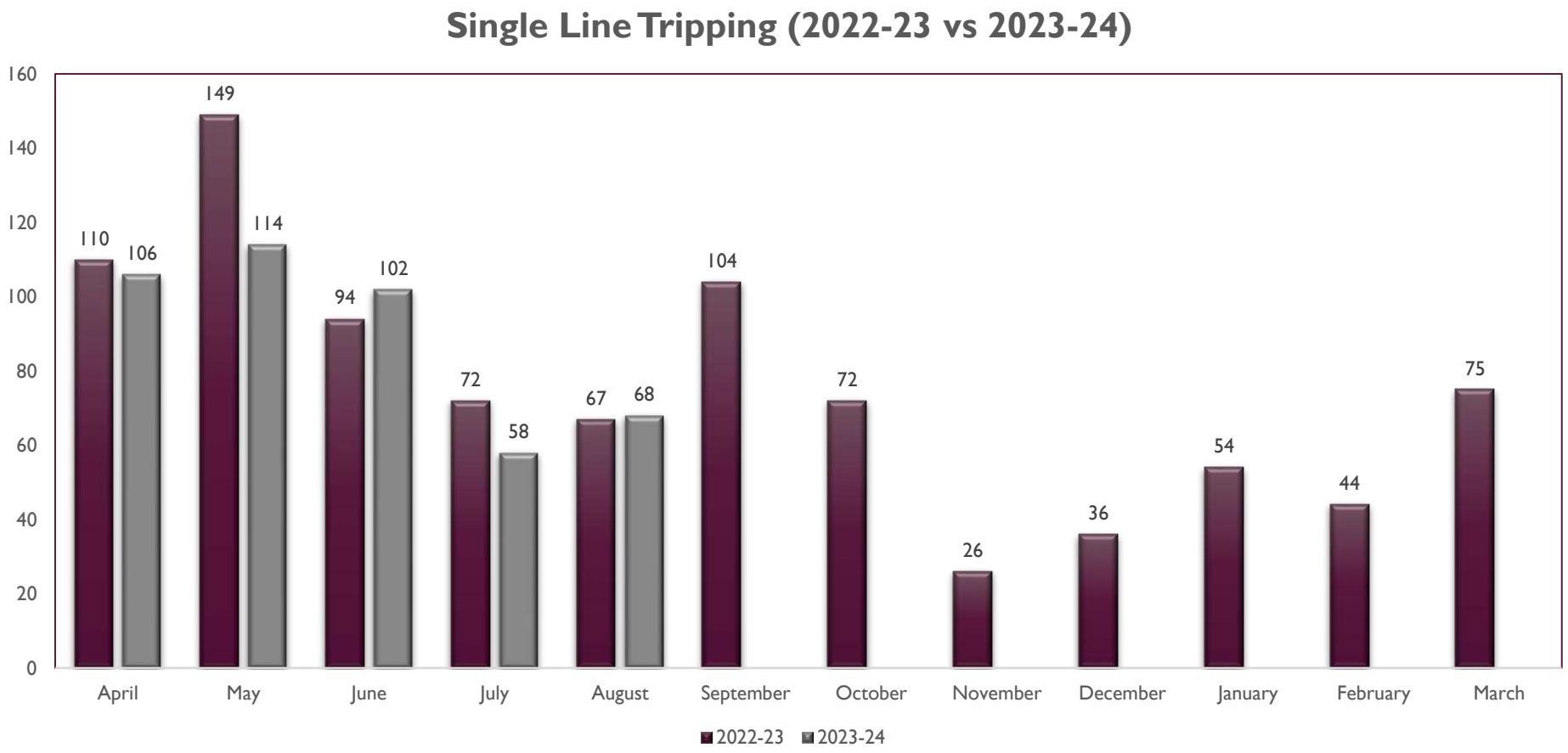
Chief Engineer, Trans (O&M) Bihar State Power Transmission Limited, VidyutBhawan, Bailey Road, Patna-800021	Electrical Supeeerintending Engineer (CRITL) Bihar State Power Transmission Limited, VidyutBhawan,Bailey Road, Patna-800021
Chief Engineer (System Operation), SLDC, BSPTCL, Patna-800021	
Chief 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 UrjaSancharan Nigam Limited Kusai Colony, Doranda, Ranchi-834002	Electrical Superintending Engineer (CLD) Jharkhand UrjaSancharan Nigam Limited, KusaiColony,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, LA 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	The Head Maithon Power Limited, Maithon Office, MA 5 Gogna, Dist. Dhanbad, Jhankand State, PIN-828207
General Manager (AM), ER-II Power Grid Corporation of India Ltd., J-I-15, Block-EP, Sector-V,Salt Lake,Kolkata-91	Head –Regulatory and contracts, IndiGrid Limited , 247 Embassy, Office No 107, 'B' Wing, Hindustan Co. Bus Stop, Gandhi Nagar, L.B.S. Road, Vikhroli West, Mumbai – 400 079. Ph : +91 845509 96408
General Manager (P&O), PTC Ltd., Kanchanjunga Bldg.,18, Barakhamba Road, New Delhi-110001	
Managing Director, Bhutan Power Corporation Post Box no. 580, Thimpu, Bhutan.	Managing Director, Druk Green Power Corprn. P.O. Box-1351, Thimpu, Bhutan.

Associate Director (Commercial and Regulatory) Darbhanga-Motihari Transmission Company Limited (DMTCL),503, Windsor, Off CST Road, Kalina, Santacruz(E), Mumbai-400098	The Plant Head, JITPL, Angul, Odisha (FAX:011-26139256-65)
Shri D. P. Bhagava, Chief Consultant (O&M), TeestaUrja Limited, New Delhi (FAX:011-46529744)	Director (GM Division), Central Electricity Authority Sewa Bhawan, R. K. Puram, New Delhi-110066
Director (NPC), CEA, NRPC Building, Katwaria Sarai, New Delhi- 110016	President, Dans Energy Pvt. Ltd, 5th Floor, DLF Building No. 8, Tower-C, Gurgaon - 722OO2
Director, Shiga Energy Pw. Ltd., 5th Floor, DLF Building No. 8, Tower-C, Gurgaon - 722OO2	DGM (E&I), HALDIA ENERGY LIMITED, BARIK BHAWAN, KOKATA-700072, FAX: 033-22360955
General Manager, TPTL, B2/1A Safdarjung Enclave, Africa Avenue, New Delhi -110029	

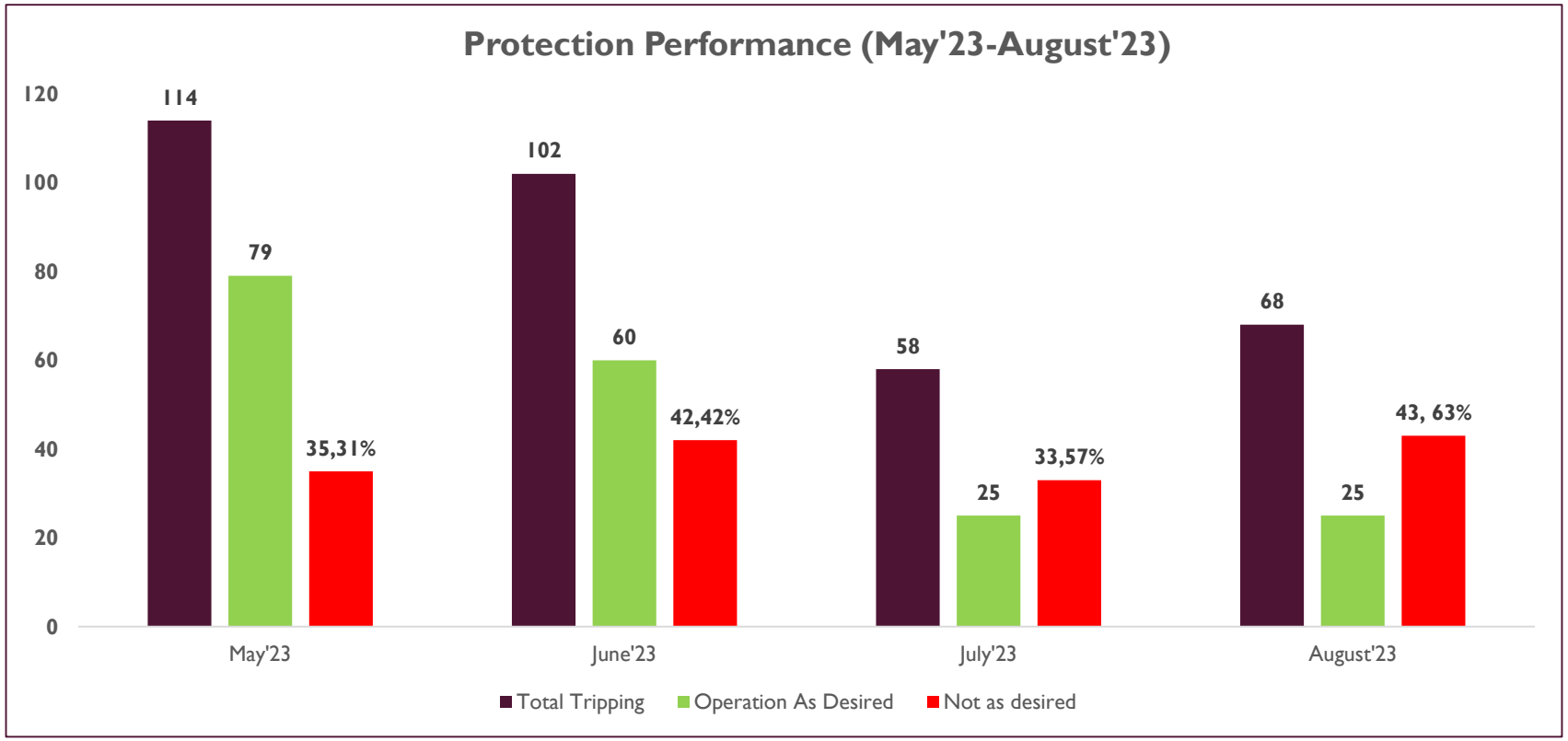
Annexure A

ER PROTECTION STATISTICS FOR THE MONTH OF JULY & AUGUST’23

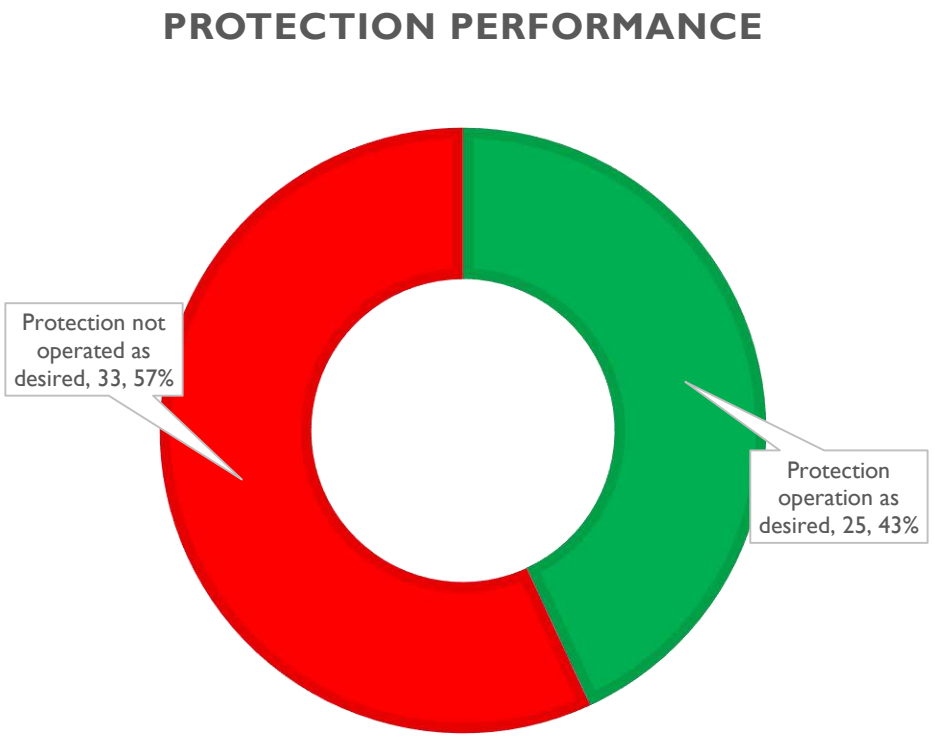
SINGLE LINE TRIPPING

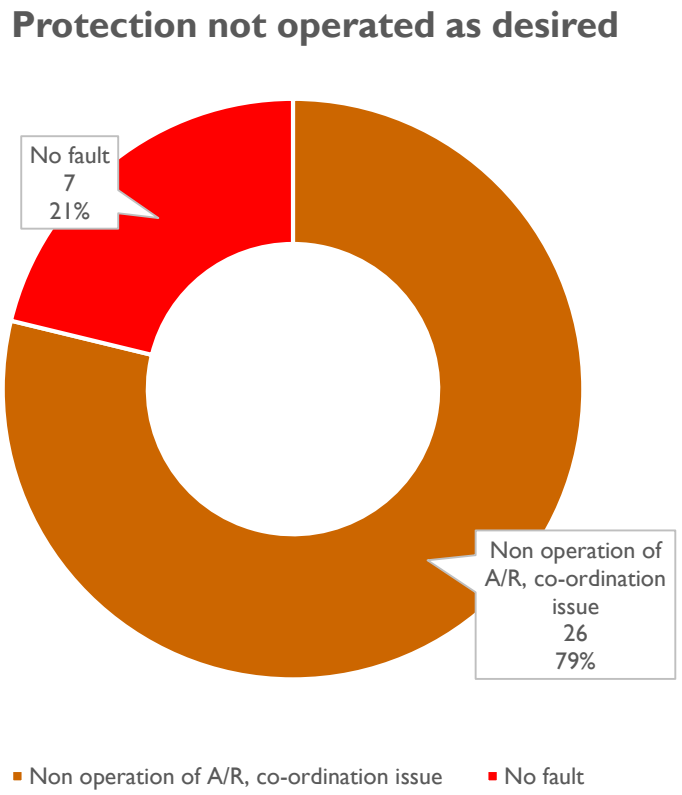


PROTECTION PERFORMANCE

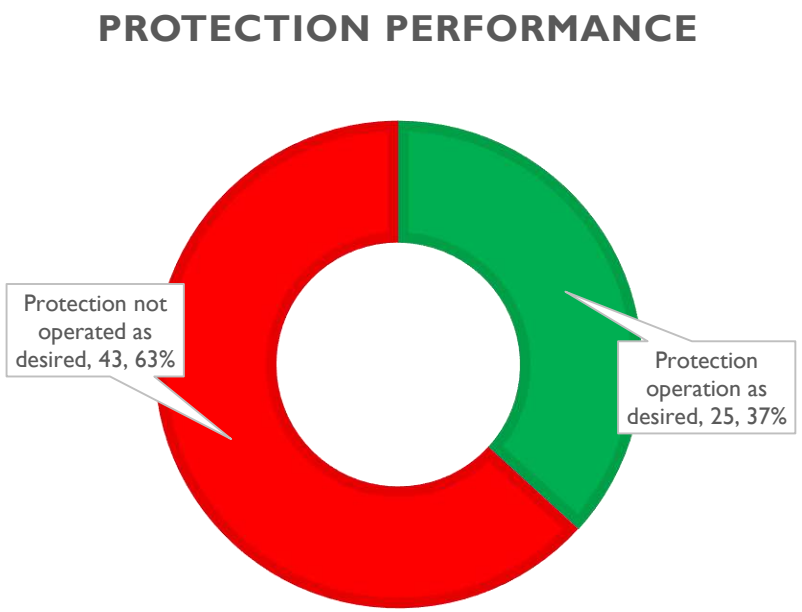


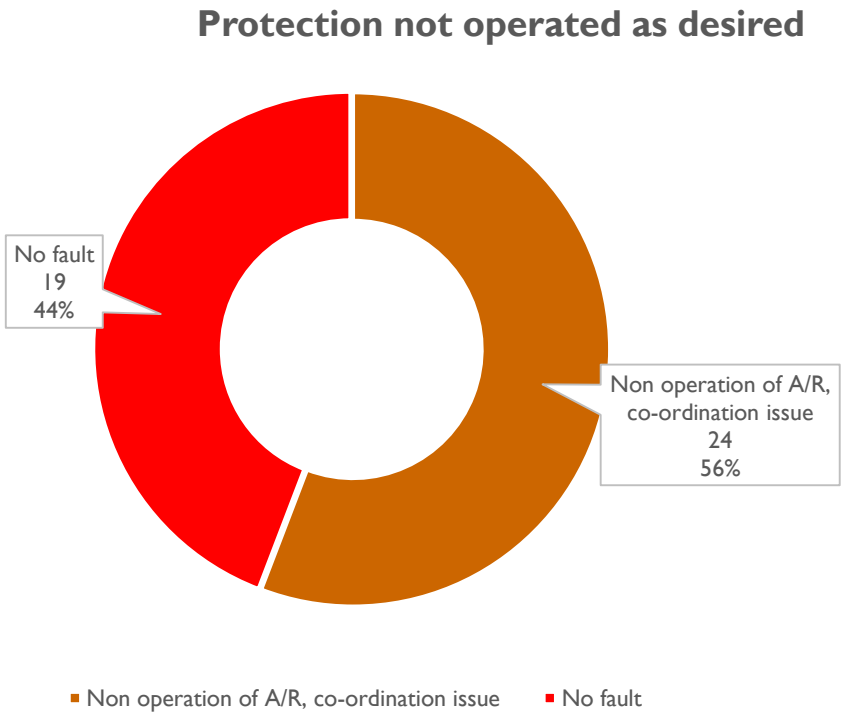
PROTECTION PERFORMANCE (JULY'23)



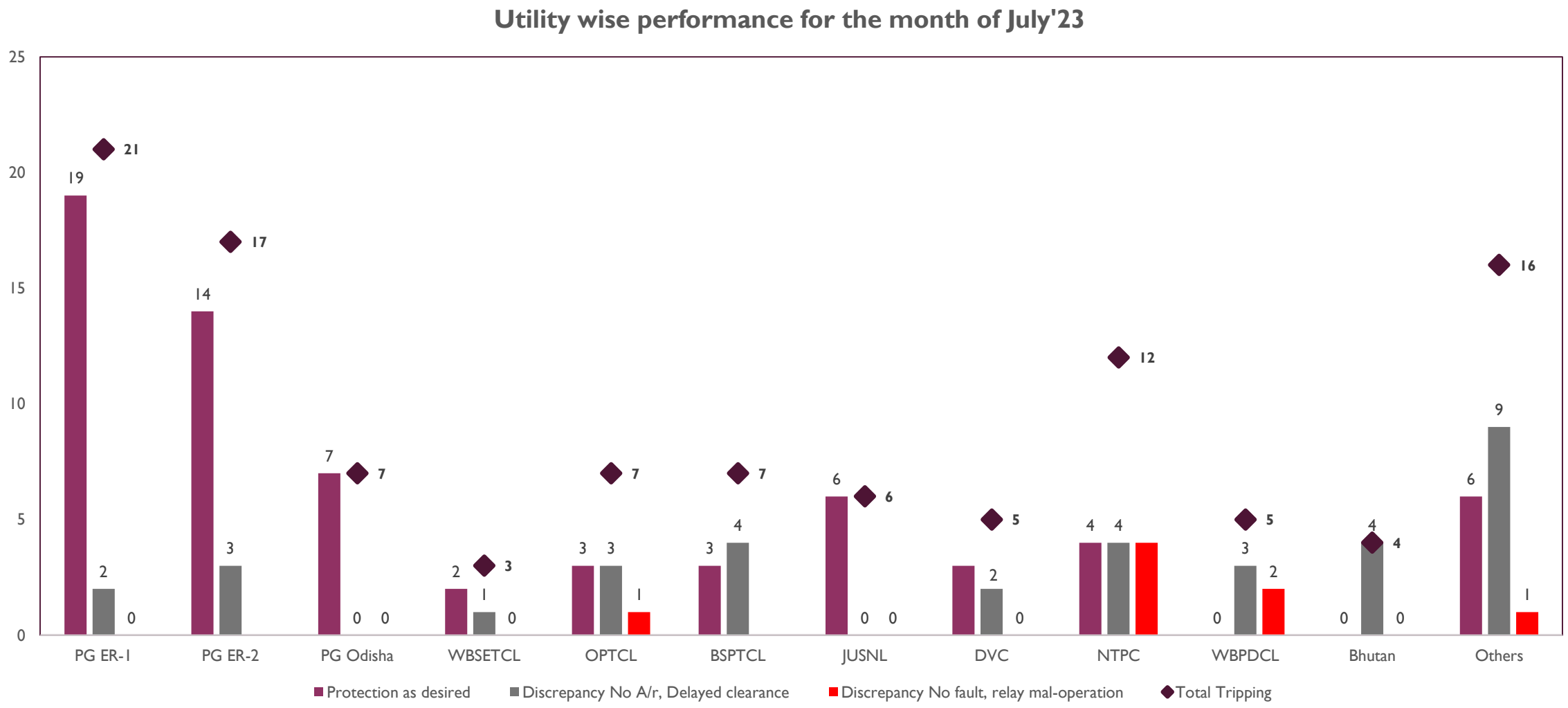


PROTECTION PERFORMANCE (AUGUST'23)

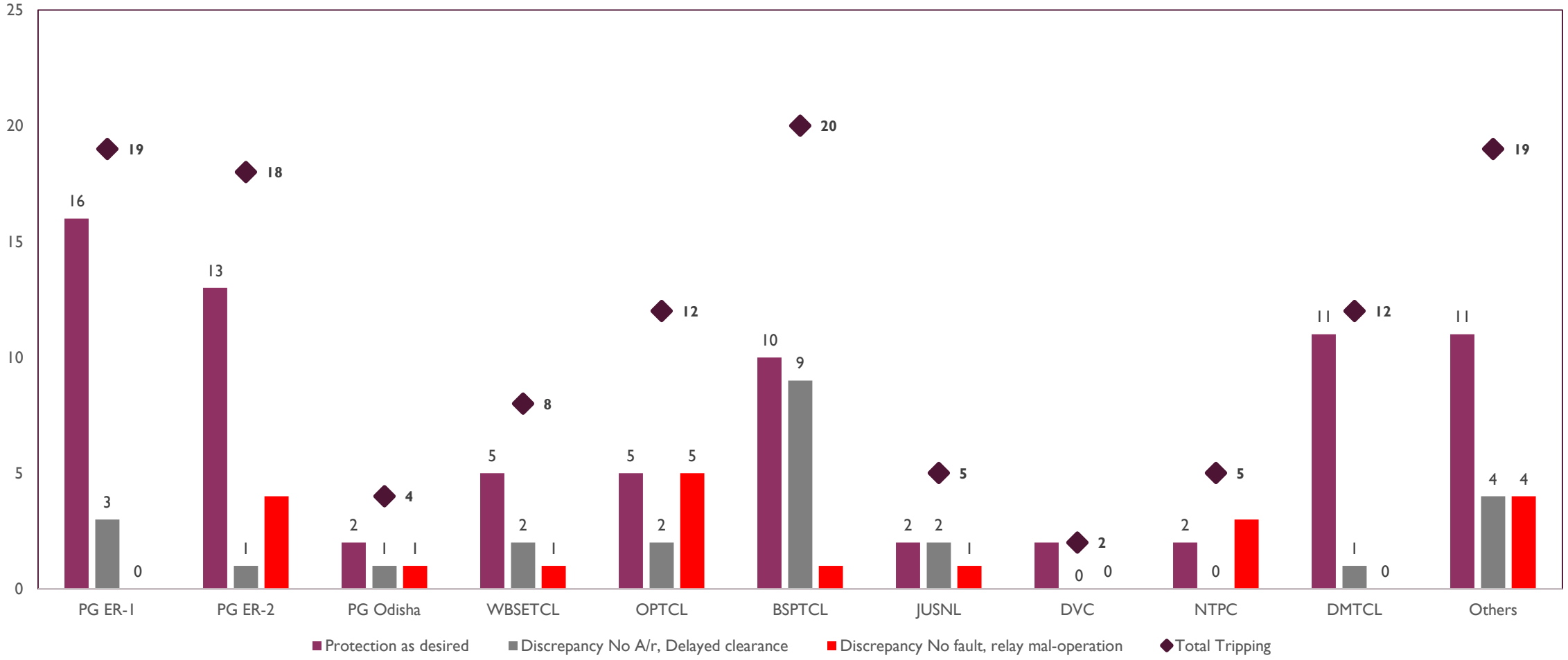




UTILITY WISE PERFORMANCE



Utility wise performance for the month of August'23



THANK YOU

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

घटना संख्या: **01-07-2023/1** दिनांक: **08-08-2023**

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

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

At 02:17 Hrs. FSTPP Unit-4 (500 MW) tripped on Low Vacuum and other remaining four units of FSTPP St I & II went off Bar on low vacuum within next 45 Mins one by one. Around 1420 MW generation loss occurred.

- **Date / Time of disturbance:** 01-07-2023 at 02:17 hrs.
- **Event type:** GI-2
- **Systems/ Subsystems affected:** 400 kV Farakka STPS
- **Load and Generation loss**.
  - 1420 MW generation loss occurred at Farakka.
  - No load loss occurred during the event.

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

- NIL

3. Major elements tripped (प्रमुख ट्रिपिंग)

- 500 MW U#4 at FSTPP
- 200 MW U#2 at FSTPP
- 200 MW U#3 at FSTPP
- 200 MW U#1 at FSTPP
- 500 MW U#5 at FSTPP

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

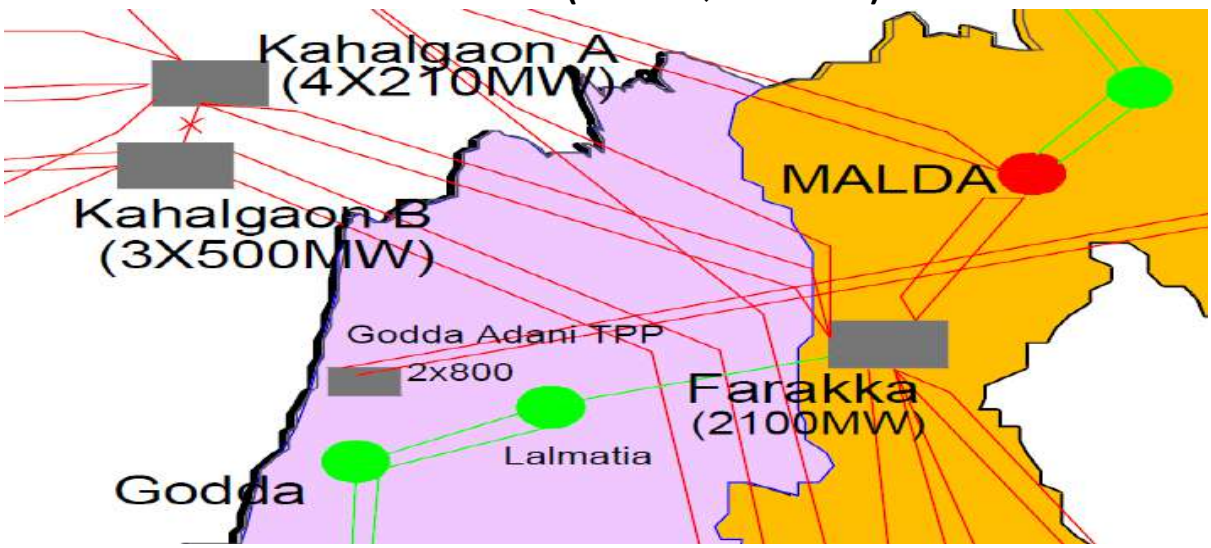


Figure 1: Network across the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
02:17	500 MW U#4 at FSTPP	Condenser vacuum low protection		All units tripped consecutively due to low vacuum pressure. There was no electrical fault thus no fault observed from PMU.
02:31	200 MW U#2 at FSTPP	CW tripped on Lube water low pressure		
	200 MW U#3 at FSTPP	CW tripped on Lube water low pressure		
02:35	200 MW U#1 at FSTPP	CW tripped on Lube water low pressure		
03:00	500 MW U#5 at FSTPP	Condenser vacuum low protection		

Figure 2: PMU Voltage snapshot of 400 kV Farakka S/s

6. Restoration (पूर्वावस्था की प्राप्ति)

Transmission/Generation element name	Restoration time
200 MW U#1 at FSTPP	07:05
200 MW U#2 at FSTPP	09:08
200 MW U#3 at FSTPP	10:17
500 MW U#4 at FSTPP	13:42
500 MW U#5 at FSTPP	05:28

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

- All units of Farakka St.1 & 2 tripped one by one within a span of 45 minutes on low vacuum pressure.
- There are four raw water pumps which supplies raw water to pre-treatment plant for clarified and service water production, which in turn is used by CW system and compressors.
- As reported at 00:10 Hrs, Raw Water Pump-1 was brought back into service after cable termination works. Trial run of the pump was taken and then stopped. It is suspected that at this time, NRV of raw water Pump-1 got stuck in open condition and raw water supply short circuited to canal.
- Gradually clarified/service water tank level reduced to minimum level which resulted in tripping of instrument air compressor of stage-2 and CW pumps of stage-1. All units tripped on low vacuum pressure.
- Report received from NTPC FSTPP is attached at Annexure-1.
- NTPC may explain the event and necessary measures taken to avoid such incident in future.

8. Status of Reporting (रिपोर्टिंग की स्थिति):

- Report received from NTPC FSTPP.

Incident Report of Multiple Unit Tripping at NTPC Farakka

Due to Raw water supply Failure

Date of occurrence: 1st July 2023

Presently Stg 1 CW system lub water, compressors cooling water are supplied from clarified water p/p located in Stage 1 DM plant (3 clarified pumps are available taking suction from st1 clarified tank).

Stg 2 CW system lub water, compressors cooling water are supplied from service water pumps located in Stage 2 DM plant (3 service water p/p available, taking suction from Stg 2 service water tank)

Both clarified and service water production source is RAW WATER supplied from Stg1 Raw Water Pump(4 nos. of raw water p/p)

Incident: At 00:10 hrs on 01/07/23, Stg 1 RW pump -1 PTW cancelled after Cable termination, Pump Trial run taken and stopped, after that RW header Pressure dropped to 0.33 ksc from 0.95 ksc, this resulted in interruption of Raw water supply to clarified/service water system and clarified/service water tank, Both tank level gradually dropped to its minimum level, Connected clarified/Service water pumps failed to discharge to various facilities Like CW Lube water Tank, IAC, PAC Cooling water supply etc.

Loss of Service water resulted in tripping of Stg-2 IAC, PAC. Due to tripping of Instrument air compressors IA header pressure dropped up to 1.5 ksc, Unit-4 (500 MW) tripped on Low vacuum protection as Running vacuum pump suction valve closed due to low IA pressure. Similar incident happened to unit-5(500 MW) also.

Loss of Lube water supply from clarifier system resulted in Tripping of Stg-1 all CW pumps, St-1 all units of 200 MW each (Unit 1,2 &3) got tripped on Low vacuum protection.

P. SARKAR V. Rangopal C Skaileven K. Premanth

Sequence of Events is as below:

Sl No	Equipment	Reason of tripping	Time	Remarks
1	Stg-1 RW pump-1	nil	**00:10**	Trial run taken and stopped
2	Stg-2 IAC PAC	**Cooling water pressure Low**	**2:08**	Due to loss of cooling water supply(service water)
3	Stg-1 CW pumps	**Lube water pressure Low**	**2:33**	Due to loss of lube water supply(clarified water)
4	Stg-2 Unit 4	Low vacuum protection	**2:17**	Due to closing of vacuum pump Suction Solenoid Valve
5	Stg-1 Unit-1,2,3	Low vacuum protection	**2:33**	Due to Tripping of CW pumps
5	St-2 Unit-5	Low vacuum protection	**3:00**	Due to closing of vacuum pump Suction Solenoid Valve

Analysis: RW flow to clarified/service water tank interrupted due to suspected stuck of RW pump-1 NRV in open condition as shown in fig-1. Raw water supply short circuited to canal and Discharge flow to supply header failed and this resulted in reduction of Clarified/service water tank level. This resulted in loss of cooling water to st-2 IAC & PAC and Loss of Lub water of Stg-1 CW Overhead tanks Causing Multiple unit tripping (unit-1-5) at FSTPS during Night hours of 01.07.2023.

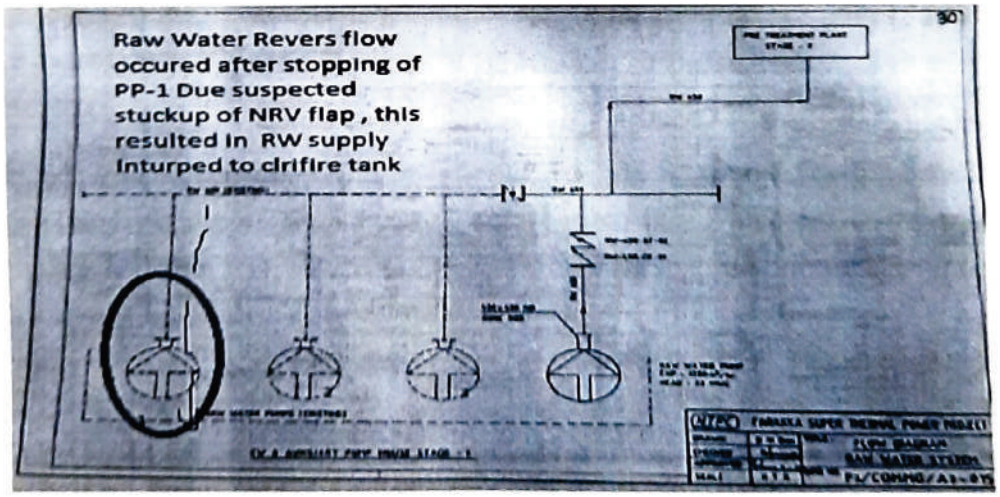


Fig-1

P. SARKAR

V. Rangopal

C. Sreeleela

R. Prasad

UNIT TRIPPING ON 01.07.2023

SL NO	Time	UNIT	REASON
1	02.17.00 HRS	4	CONDENSOR VACUUM LOW PROTECTION- Vacuum PP Suction valve closed as per loss of IA
2	02.33.00 HRS	1	TRIPPED DUE TO VACUUM PROBLEM- CW tripped on Lube water low Pressure
3	02.33.00 HRS	2	TRIPPED DUE TO VACUUM PROBLEM- CW tripped on Lube water low Pressure
4	02.33.00 HRS	3	TRIPPED DUE TO VACUUM PROBLEM- CW tripped on Lube water low Pressure
5	03.00.00 HRS	5	CONDENSOR VACUUM LOW PROTECTION- Vacuum PP Suction valve closed as per loss of IA

Restoration:

RW pumps Normalized with taking pump1,2,& 3 in service, Clarifier/service water system charged , Unit-5 Synchronized at 5:30 hrs, Unit-1 synch at 6:55 hrs, Unit-2 Synch at 9:06 hrs, Unit-3 synch at 10:17 hrs and Unit -4 Synchronized 13:46 hrs.

Detailed and in depth analysis of system has been done while taking input from all stakeholders and all possible types of future emergency scenarios considered.

Based on due diligence, Following improvements and additional system strengthening measures are being put forward for implementation to avoid such type of incidents:

P.SARKAR V.Ramgopal (Shailesh) K. Kumar

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

घटना संख्या: **31-07-2023/1** दिनांक: **08-08-2023**

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

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

At 16:29 Hrs, 400 kV GMR-Meramundali B tripped due to B_N fault. Consequently, 350 MW U#3 of GMR tripped due to loss of evacuation path. 262 MW generation loss occurred.

- **Date / Time of disturbance:** 31-07-2023 at 16:29 hrs.
- **Event type:** GI-2
- **Systems/ Subsystems affected:** 400 kV GMR S/s
- **Load and Generation loss**.
  - 262 MW generation loss occurred at GMR.
  - No load loss occurred during the event.

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

- NIL

3. Major elements tripped (प्रमुख ट्रिपिंग)

- 400 KV GMR-Meramundali B-1
- 350 MW U#3 at GMR

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

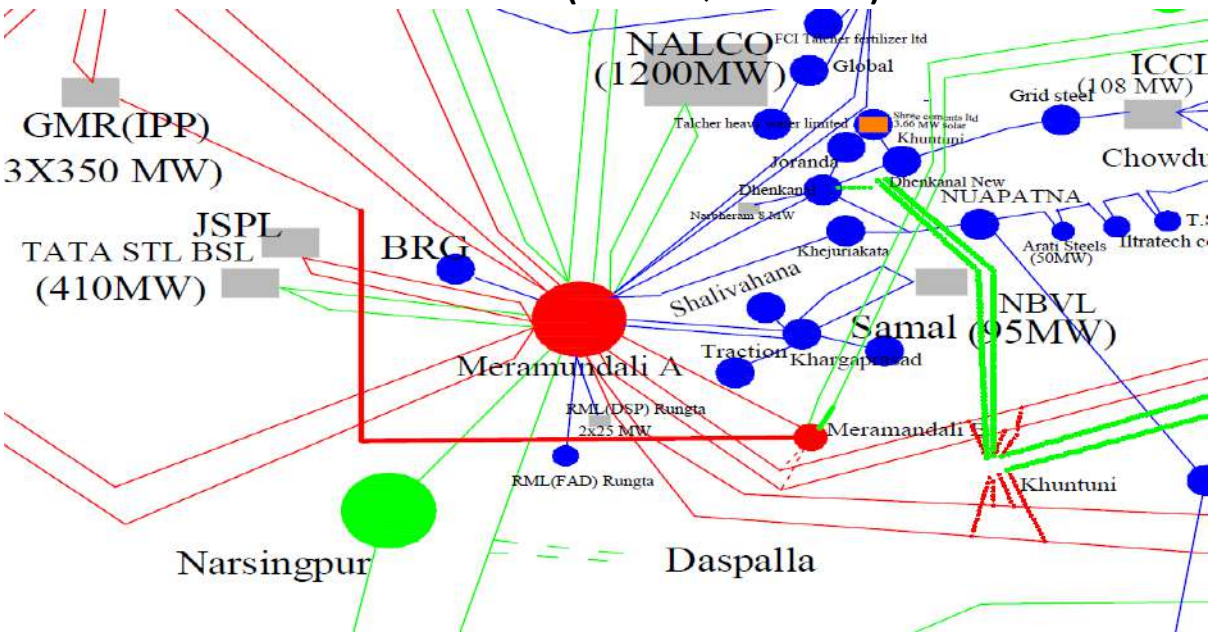


Figure 1: Network across the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
16:29	400 kV GMR-Meramundali B	GMR: B_N, Zone-1	Meramundali: B_N, 22 kA	68 kV dip in B_ph and 37 kV dip in Y_ph voltage at Meramundali. A/r failed after 1 second.
	350 MW U#3 at GMR	Loss of evacuation path		

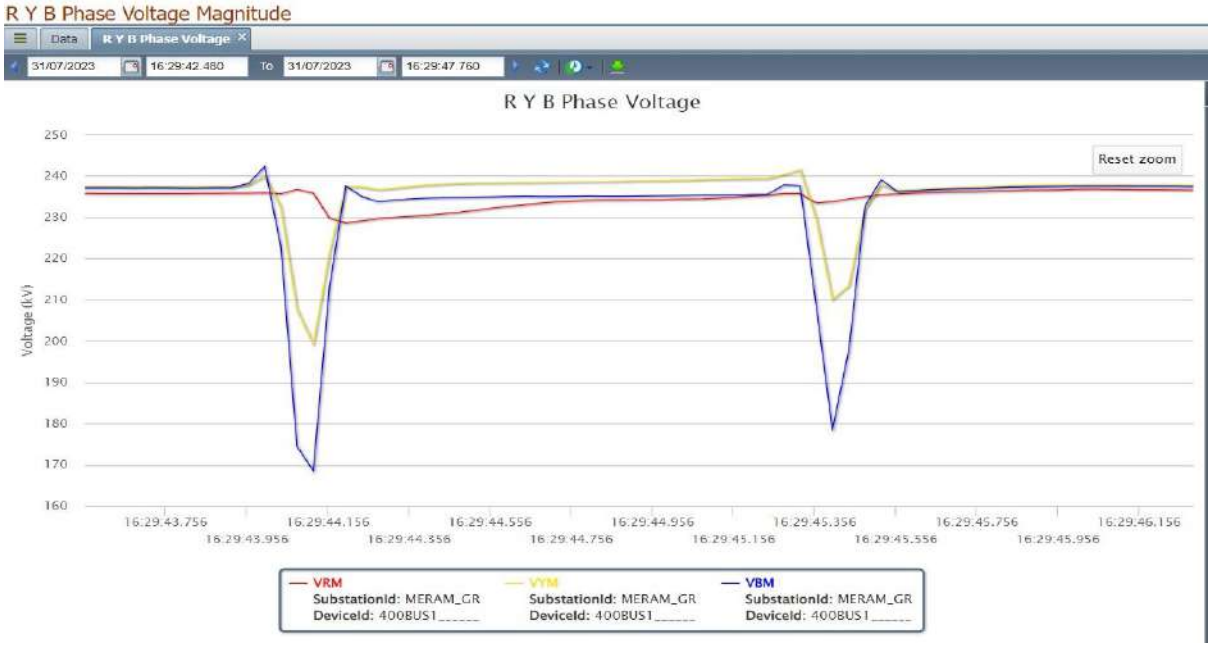


Figure 2: PMU Voltage snapshot of 400/220 kV Meramundali S/s

6. Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV GMR-Meramundali B	16:40 (01.08.23)
350 MW U#3 at GMR	19:11 (01.08.23)

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

- 400 kV GMR-Mermundali B tripped due to persisting B_N fault. Power of 350 U#3 of GMR (STU unit) is evacuated through this line only.
- As reported, earth wire snapped b/w tower loc. 6 & 7 inside GMR plant.
- A/r attempt was unsuccessful from both ends after 1 second. Tripping of the line led to loss of evacuation path and consequently, U#3 tripped.

8. Status of Reporting (रिपोर्टिंग की स्थिति):

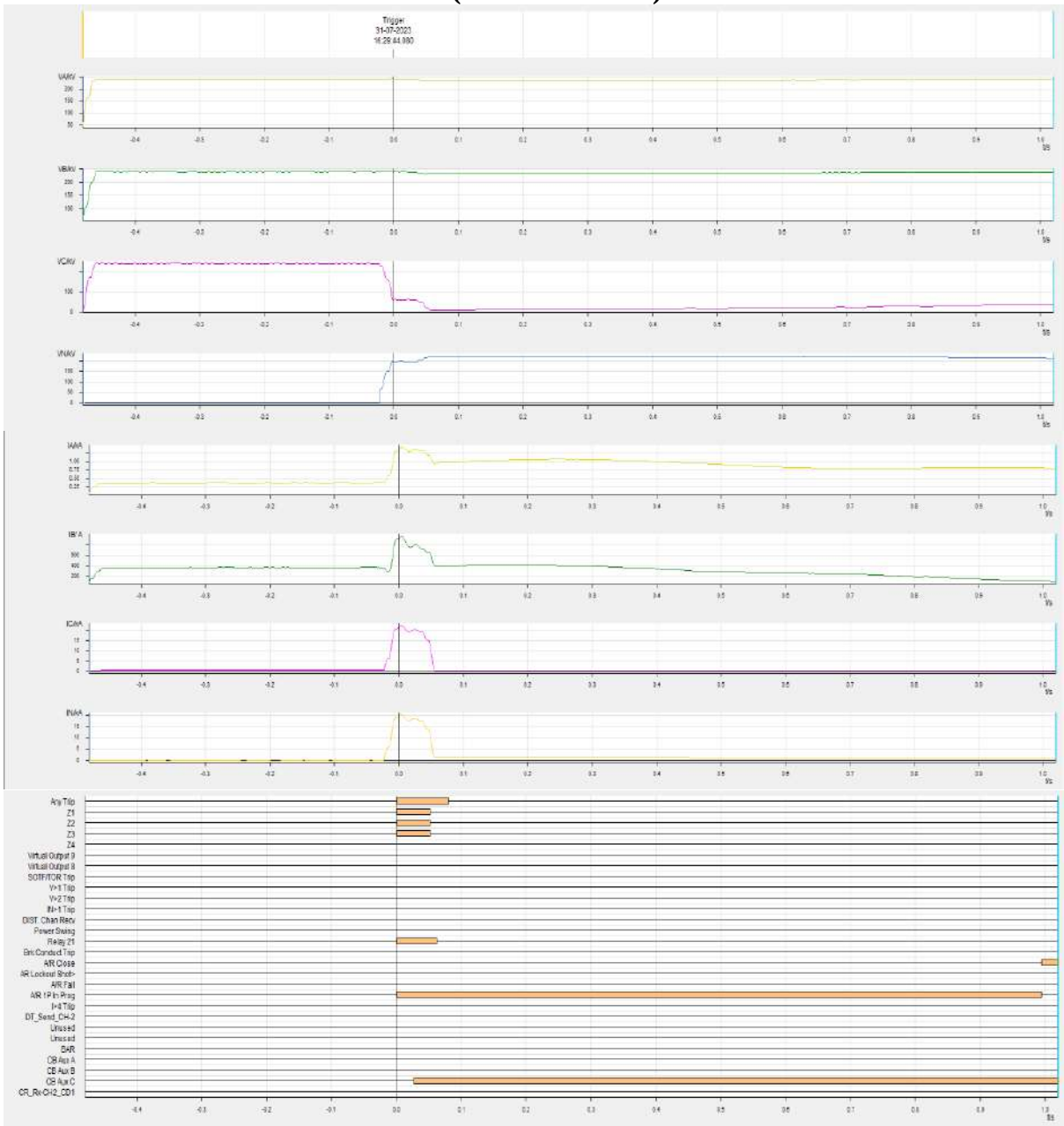
- DR/EL yet to be received from GMR.

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

Sequence of Event not recorded at the time of event.

Annexure 2: DR recorded

DR of 400 kV GMR-Meramundali B (Meramundali B)



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

घटना संख्या: **15-08-2023/1** दिनांक: **24-08-2023**

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

Summary of the event (घटना का सारांश):

At 14:31 Hrs, 220 kV Motipur-MTPS-2 tripped due to B-Earth fault, however, breaker at Motipur didn't open and LBB operated. As reported, isolator status of 220 kV Darbhanga (DMTCL)-Motipur-1 at Motipur end was showing connected to both buses. Consequently, both 220 kV Bus at Motipur tripped and Motipur S/s became dead. 121 MW load loss reported at Motipur, Muzaffarpur, Chakia.

- **Date / Time of disturbance:** 15-08-2023 at 14:31 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 220/132 kV Motipur S/s
- **Load and Generation loss**.
  - No generation loss occurred during the event.
  - 121 MW load loss reported during the event.

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

- Nil

Major elements tripped (प्रमुख ट्रिपिंग)

- 220 kV Motipur-MTPS D/c
- 220 kV Motipur-Darbhanga (DMTCL) D/c
- 220 kV Motipur-Mushari D/c
- 220 kV Motipur-Sitamarhi D/c

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

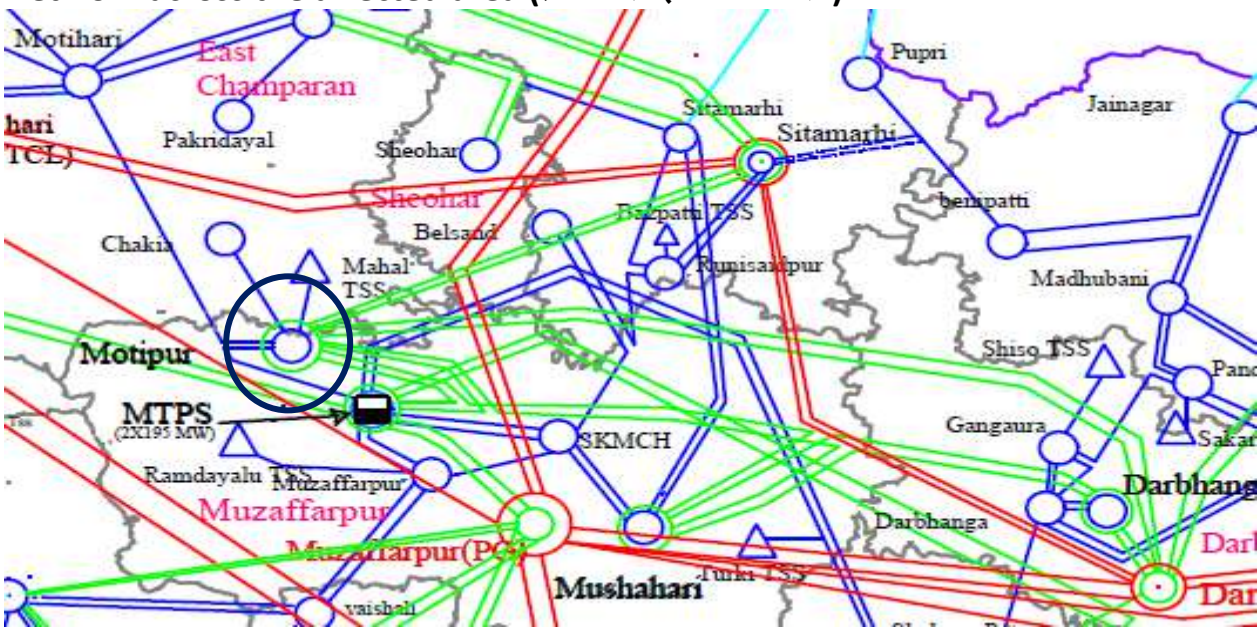


Figure 2: Network across the affected area

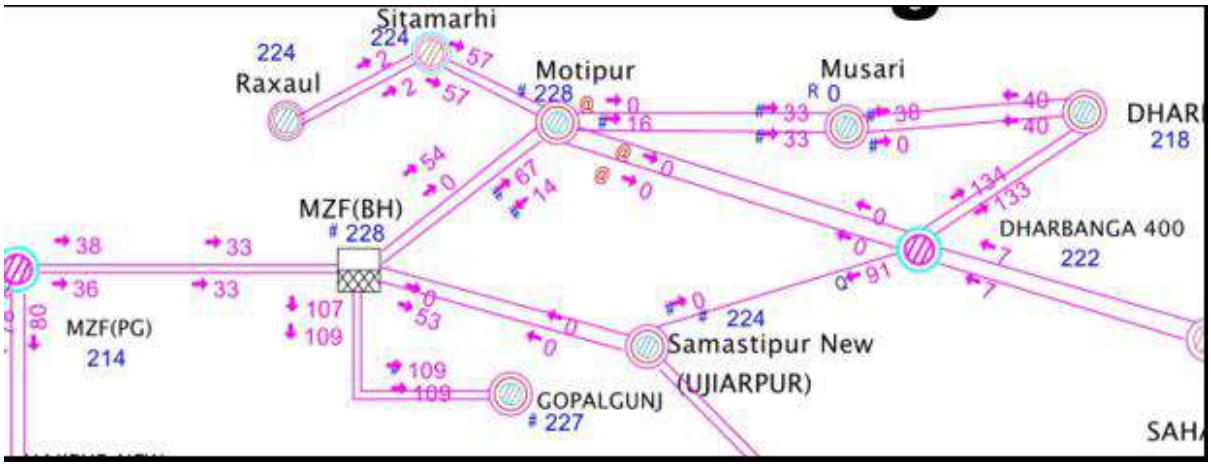


Figure 3: SCADA snapshot of the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
14:31	220 kV Motipur-MTPS-1	Motipur: LBB operated		Around 23 kV dip in B_ph voltage at Muzaffarpur which recovered gradually in around 700 msec.
	220 kV Motipur-MTPS-2	Motipur: B_N, 4.38 kA		
	220 kV Motipur-Darbhanga (DMTCL)-1	Motipur: LBB operated		
	220 kV Motipur-Darbhanga (DMTCL)-2	Motipur: LBB operated		
	220 kV Motipur-Mushari-1			
	220 kV Motipur-Mushari-2	Motipur: LBB operated		
	220 kV Motipur-Sitamarhi-1	Motipur: LBB operated	Sitamarhi: DT received	
	220 kV Motipur-Sitamarhi-2	Motipur: LBB operated	Sitamarhi: DT received	

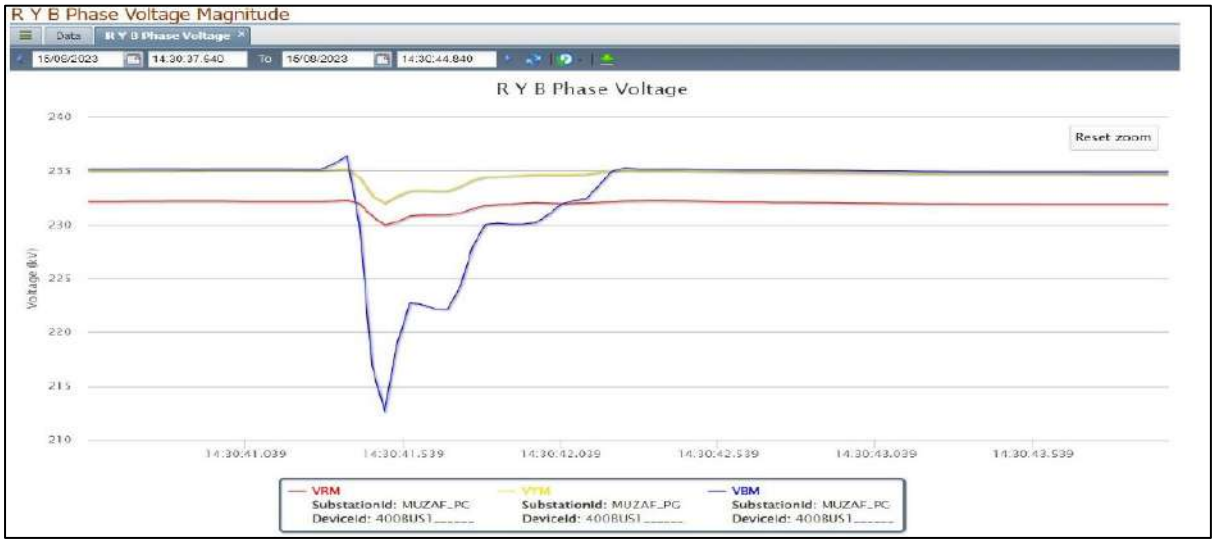


Figure 1: PMU Voltage snapshot of 400/220 kV Muzaffarpur S/s

Restoration (पूर्वावस्था की प्राप्ति)

Transmission/Generation element name	Restoration time
220 kV Motipur-MTPS D/c	14:55/- Hrs
220 kV Motipur-Darbhanga (DMTCL) D/c	18:04/18:05 Hrs
220 kV Motipur-Mushari D/c	-/14:46 Hrs
220 KV Motipur-Sitamarhi D/c	18:05/18:06 Hrs

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

- There was a B-Earth fault in 220 kV Motipur-MTPS-2 line which was not cleared from Motipur end due to stuck breaker. LBB operated at Motipur but tripping command given to all elements connected to both bus as isolator status of 220 kV Darbhanga (DMTCL)-Motipur-1 was sensed as closed with both bus.
- **Modification in the logic to be explored to avoid such instances so that** when there is floating Isolator status or when it is showing connection with both buses last known status or current measurements may be used to ascertain just like Check zone to be used to ensure any Bus fault, etc.
- **Triggering criteria for Breaker tripping** may be included to get DR for al lines.

Status of Reporting (रिपोर्टिंग की स्थिति):

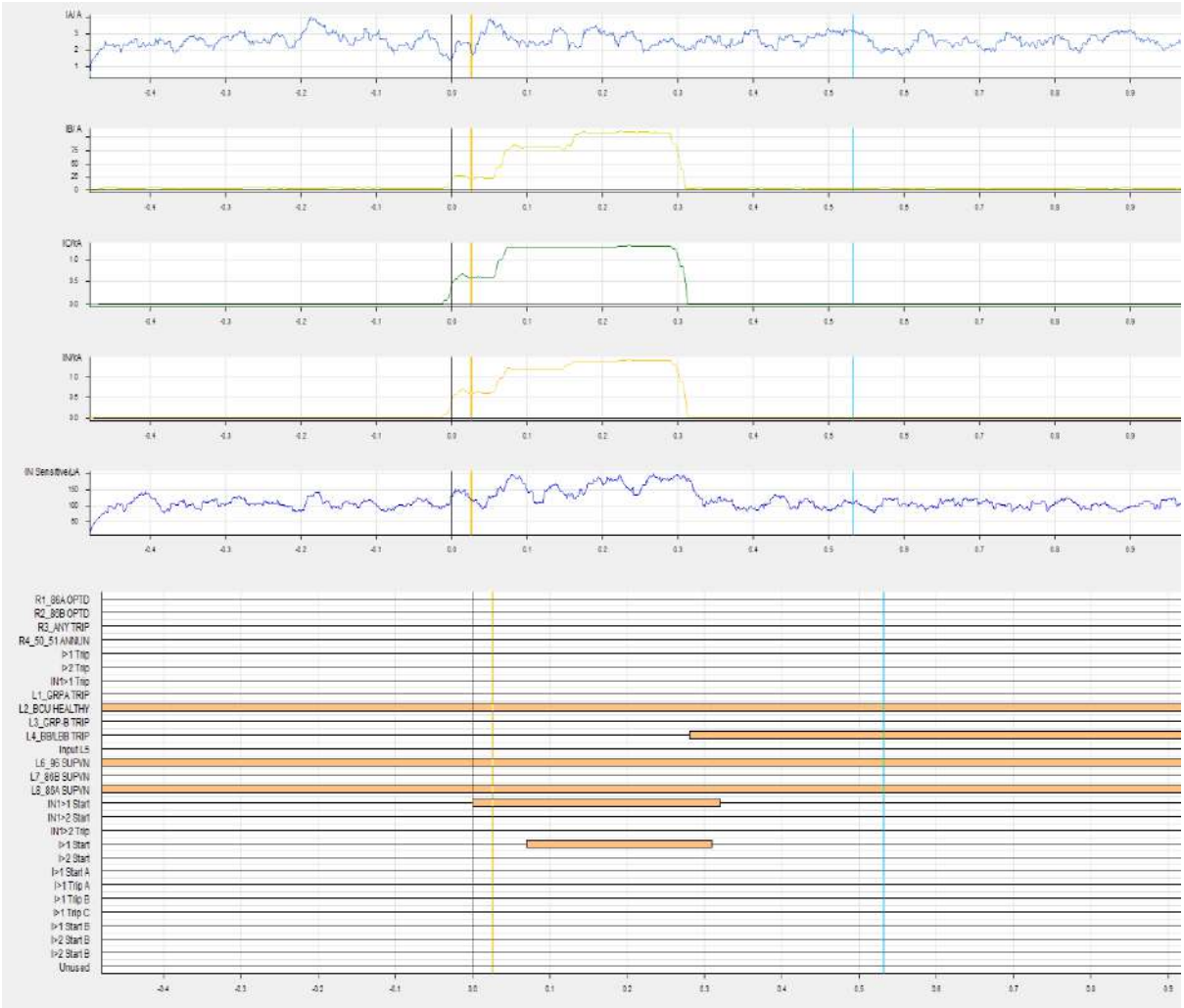
- DR/EL received for BUSBAR and MTPS Line only.

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

Sequence of Event not recorded at the time of event.

Annexure 2: DR recorded

BUSBAR



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

घटना संख्या: 17-08-2023/1 **दिनांक: 23-08-2023**

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

Summary of the event (घटना का सारांश):

At 12:18 Hrs on 17.08.2023, 2*270 MW U#1 & U#2 at APNRL tripped, leading to load loss of around 490 MW. As reported, GT of both units tripped on E/f. There was a resistive fault in 400 kV Chaibasa-Kharagpur line which persisted for around 2.5 seconds. Both units at APNRL tripped during this instance.

- **Date / Time of disturbance:** 17-08-2023 at 12:18 hrs.
- **Event type:** GI - 2
- **Systems/ Subsystems affected:** 400 kV APNRL S/s
- **Load and Generation loss**.
  - 490 MW generation loss reported during the event.
  - No load loss occurred during the event.

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

- Nil

Major elements tripped (प्रमुख ट्रिपिंग)

- 2*270 MW U#1 & U#2 at APNRL
- 400 kV Chaibasa-Kharagpur-1

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

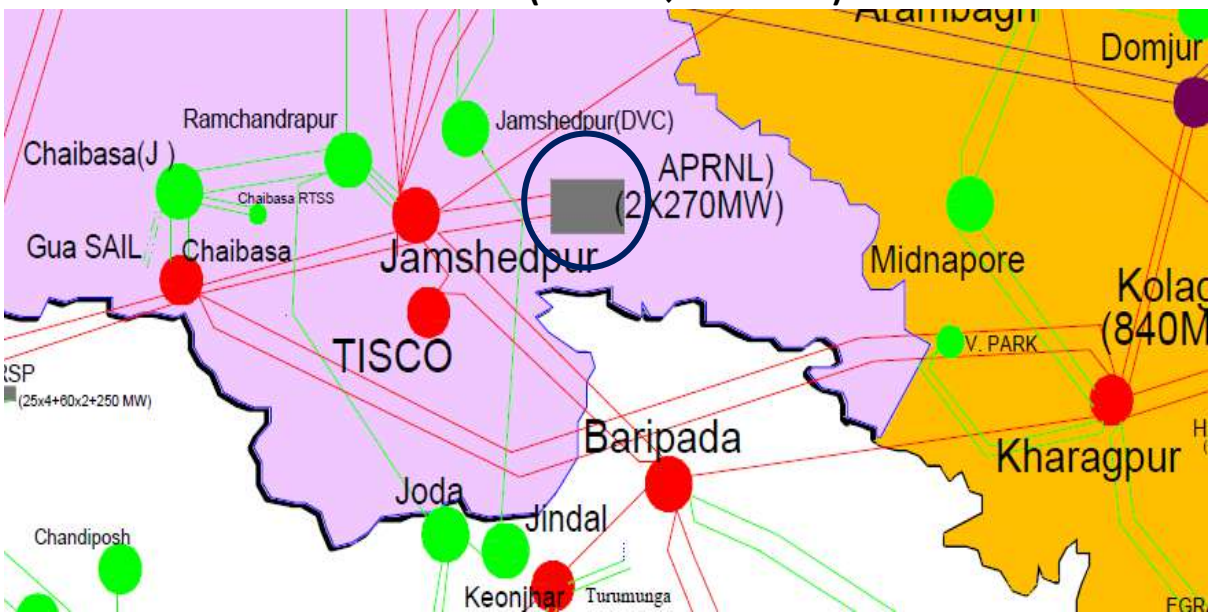


Figure 2: Network across the affected area

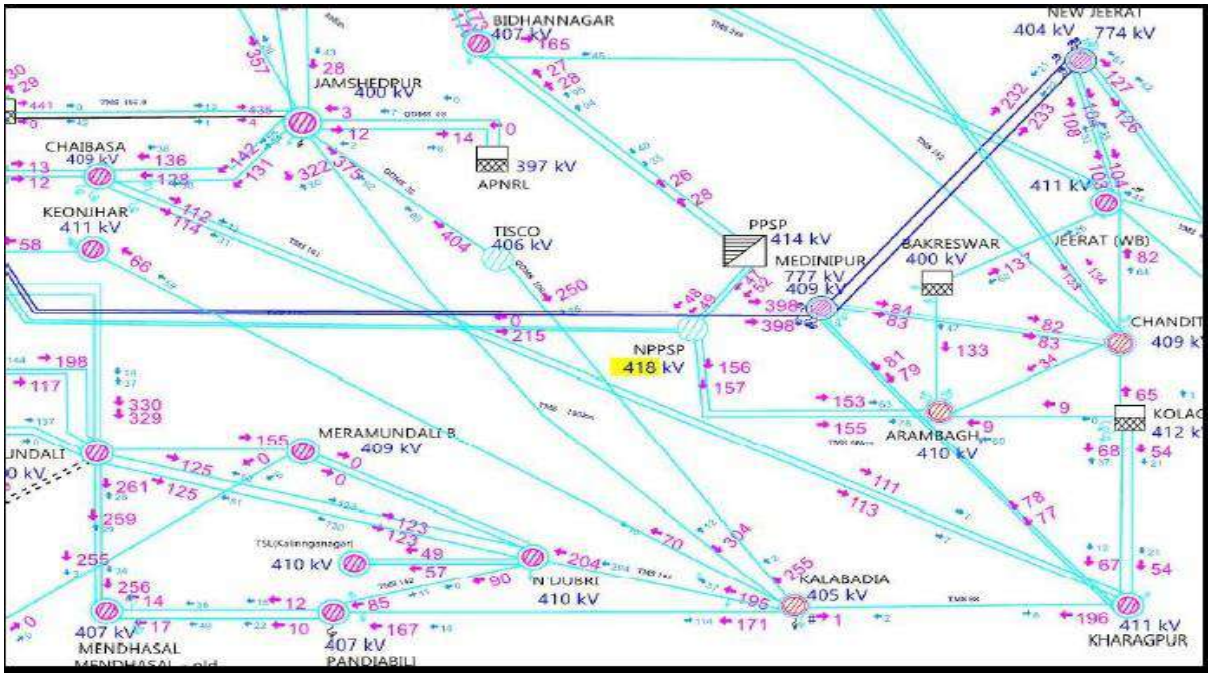


Figure 3: SCADA snapshot of the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
12:18	2*270 MW U#1 & U#2 at APNRL	APNRL: Oc E/f of GT of both units operated		Around 7 kV dip in R_ph voltage at Jamshedpur S/s. Fault clearance time: 2.5 seconds.
	400 kV Chaibasa-Kharagpur-1	Chaibasa: DEF, Ib: 1.6 kA	-	

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

Restoration (पूर्वावस्था की प्राप्ति)

Transmission/Generation element name	Restoration time
400 kV Chaibasa-Kharagpur-1	13:53
270 MW U#1 at APNRL	20:04
270 MW U#2 at APNRL	18:43

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

- There was a resistive fault in 400 kV Kharagpur-Chaibasa-1 line which was cleared in around 2.5 seconds.
- GT of both units at APRNL which is connected with the grid through 400 kV APRNL-Jamshedpur D/c line, tripped due to improper GT earth fault protectionsetting at APNRL(Definite time setting with low pickup). **APNRL may explain and update the revised settings implemented**.
- In this case, 400 kV APNRL-Jamshedpur D/c should trip first before tripping of units if fault would not have been cleared in time by the faulty line.
- **There is no provision for DEF protection in 400 kV APNRL-Jamshedpur D/c at APNRL** end with differential protection being the primary protection for the D/c line. APNRL may explain. As with Differential protection it will not pickup for the adjacent line fault hence DEF to be enables **with co-ordinated setting at APNRL end.**

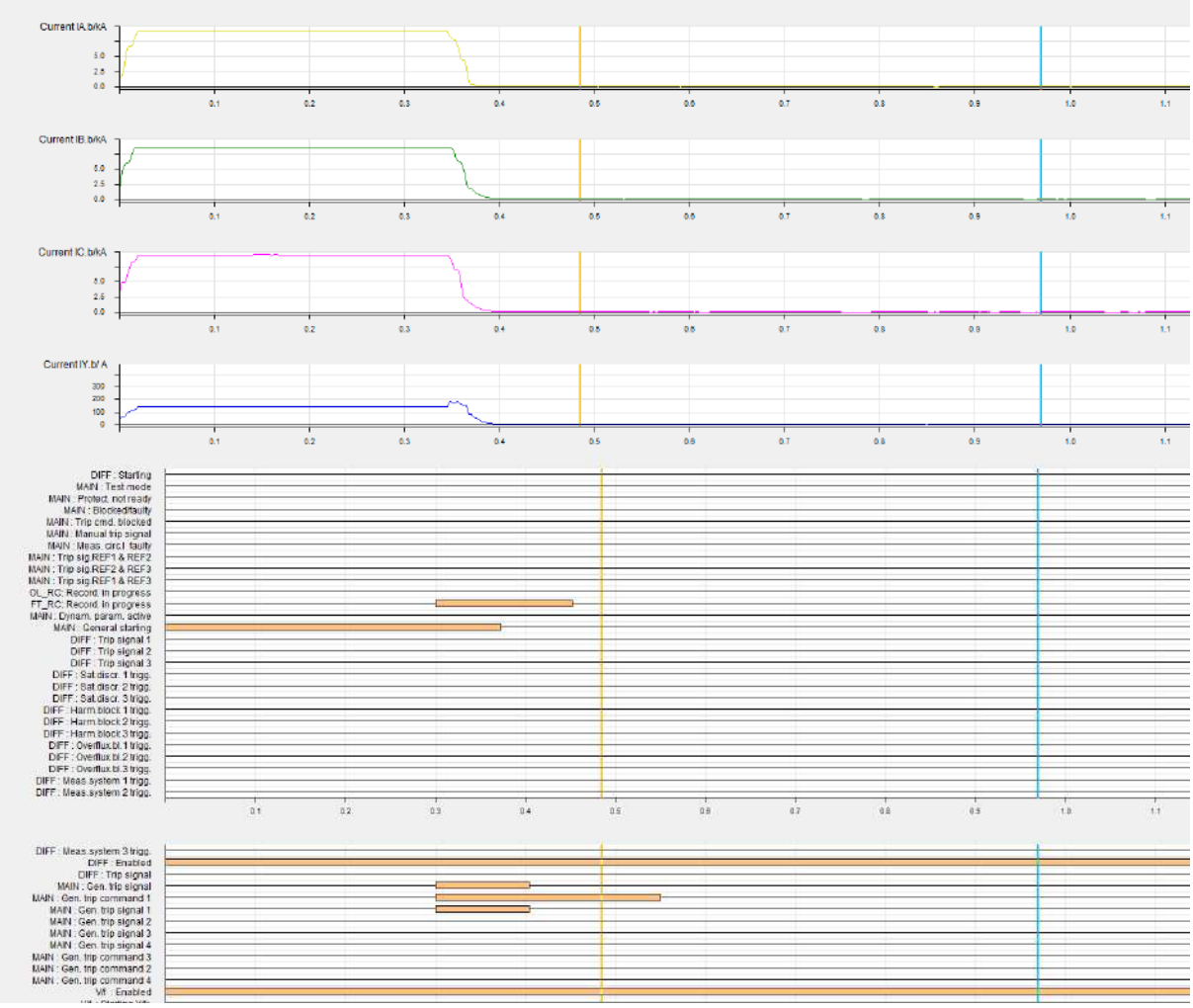
Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL received from APNRL.

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

Sequence of Event not recorded at the time of event.

Annexure 2: DR recorded



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

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	DR Configuration Discrepancy	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	UTILITY RESPONSE
1	220KV DARBHANGA(DMTCL)-LAUKAHI-2	02-07-2023	06:58	02-07-2023	08:02	Darbhanga: R_N, Zone-1, 60.8 km, 2.43 kA, A/r successful		R-Earth	100	A/r successful from Darbhanga only		No	Yes	PLCC issue at Laukahi
2	220KV RENGALI(PH)-TSTPP-1	03-07-2023	12:53	03-07-2023	20:13	Rengali: R_N, 23 km	Talcher: R_N, Zone-1, 0.6 km, 17 kA	R-Earth	350	Tripped in Zone-2 time from Rengali (PH).		No	No	PLCC not available

3	400KV CHANDWA-NORTH KARANPURA-2	03-07-2023	15:45	03-07-2023	17:16	Chandawa: R_N, Zone-1, 12 km, 9.74 kA		R-Earth	100	A/r successful from North karnpura only. Other two phase at Chandwa tripped on PD later		Yes	No	Hydraulic Pressure of CB dropped to AR Block level (which was in margin after First AR). The issue has been attended and rectified.
4	220KV TTPS-TSTPP-1	11-07-2023	16:07	11-07-2023	19:20	TTPS: B_N, 41.3 km, 5.15 kA, SOTF operated	TSTPP: B_N, Zone-1, 6.7 km, 11.25 kA	B-Earth	100	Three phase tripping for single phase fault		No	No	PLCC not available

5	400KV MUZAFFARPUR(PG)-DHALKEBAR-1	13-07-2023	15:38	13-07-2023	16:54	Muzaffarpur: DEF operated		Y-Earth	3000	Y_ph current less than other two phase. DEF operated at Muzaffarpur. PG ER-1 may explain.		Yes	NA	CT Wiring fault found at Muzaffarpur and rectified.However, there was a fault in system and voltage was dropped during the fault. Hence DEF got picked.
6	400KV MERAMUNDALI-LAPANGA-2	21-07-2023	12:27	21-07-2023	14:08	Meramundali: DT received	Lapanga: DEF operated	No fault	NA	Direcional earth fault operated at Lapanga due to high		Yes	Yes	Double point earthing at Lapnga end
7	220KV SILIGURI-KISHANGANJ(PG)-1	29-07-2023	02:20	29-07-2023	03:03	Siliguri:Y_N, 56.23 km, 2.91 kA	Kishanganj: Y_N, 3.66 kA	Y-Earth	100	A/r successful from Kishanganj only.		No	Yes	CB unhealthy signal appeared before A/r

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

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	DR Configuration Discrepancy	DR/EL RECEIVED FROM LOCAL END	DR/EL RECEIVED FROM REMOTE END	UTILITY RESPONSE
1	400KV BIHARSARIFF (PG)-MUZAFFARPUR(PG)-2	01-08-2023	22:13	01-08-2023	23:03	Biharsariff:Y_N, Zone-1, 55.7 km, 5.384 kA	Muzaffarpur: Y_N, 70.9 km, 4.4 kA	Y-Earth	100	Single phase fault. DT sent from Muzaffarpur and three phase tripped. PG ER-1 may explain.		Yes	Yes	DT sent due to OV Stg-2 Operated at Muzaffarpur by M2 Relay. Matter has been reffered to OEM for malfunction of BO Contact.

2	220KV RENGALI(PH)-TSTPP-1	02-08-2023	03:24	03-08-2023	19:15	Rengali: R_N, Zone-2, 23.82 km, 4.398 kA	Talcher: R_N, Zone-1, 0.9 km, 16.46 kA	R-Earth	100	A/r could not be ascertained from PMU data	unable to open DR file	No	Yes	PLCC/OPGW not available
3	400KV ARAMBAGH-NEW CHANDITALA-1	02-08-2023	04:10	02-08-2023	04:46		New Chanditala: DT received	No fault	NA	No fault in line. WBSETCL may explain.		No	Yes	Spurious DT sent from Arambagh
4	400KV ALIPURDUAR (PG)-BINAGURI-4	02-08-2023	04:55	02-08-2023	06:34	Alipurduar: O/V St.1		No fault	NA	As per Alipurduar DR, Y_ph voltage was 10 kV higher than other two phase. As per PMU data, voltage didn't reach above 110%. PG ER-2 may explain.		Yes	Yes	Issue with MiCOM relay only. Referred to OEM

5	400KV ARAMBAGH-BAKRESWAR-1	02-08-2023	07:25	02-08-2023	08:27	Arambag: Y_N, Zone-1, 87.21 km, 3.995 kA	Bakreswar: Y_N, Zone-2, 687.7 km, 3.28 kA	Y-Earth	100	A/r successful at Bakreshwar. Other two phase at Arambag tripped on PD after 3 seconds		Yes	No	A/r relay contact burnt
6	400KV ALIPURDUAR (PG)-BINAGURI-3	02-08-2023	15:08	02-08-2023	15:27	Alipurduar: DT received		No fault	NA	No fault in line. PG ER-2 may explain.		Yes	No	Issue with MiCOM relay only. Referred to OEM
7	220KV BUDHIPADAR-KORBA-2	02-08-2023	23:46	03-08-2023	02:49	Budhipadar: CB PD operated with SF6 pressure low and CB AC/DC fail indications	Korba: Didn't trip	No fault	NA	No fault in line. OPTCL may explain.		Yes	No	PD relay maloperated.
8	220KV JAYNAGAR-JEYPORE-1	03-08-2023	03:10	03-08-2023	03:46	Jaynagar: Tripped due to pole discrepancy	Jeypore: Didn't trip	No fault	NA	As informed, DC leakage in tripping circuit of one pole during rainfaull. OPTCL may		No	NA	PD relay maloperated.

9	220KV-TALCHER-MERAMUNDALI-1	05-08-2023	11:08	07-08-2023	18:13		Meramundali:R_N, Zone-2, 38.38 km, 4.314 kA	R-Earth	350	Tripped in Zone-2 from Meramundali. Three phase A/r enabled at Meramundali end for Zone-2 also which failed		No	Yes	Bus fault at Talcher. Delayed carrier received at Meramundali instead of DT.
10	220KV-RENGALI(PH)-TSTPP-1	05-08-2023	11:08	05-08-2023	20:40	Tripped due to tripping of 220 kV Bus-2 at TSTPP		No fault	NA	No fault in line. 220 kV Bus-2 at TSTPP tripped. NTPC may explain.		No	No	Bus fault at Talcher.
11	400KV-ROURKELA-CHAIBASA-1	06-08-2023	13:27	06-08-2023	14:03	Rourkela: DT received	Chaibasa: Didn't trip	No fault	NA	PG may explain		No	No	ZIV PLCC card failed.
12	220KV-BINAGURI-NJP-1	09-08-2023	13:33	09-08-2023	14:08		Tripped due to tripping of 220 kV Main Bus-I at NJP as During ongoing testing by Siliguri Testing Area Office, CB at PGCIL end i.r.o. above mentioned line has been tripped	No fault	NA	PG ER-2/WBSETCL may explain		No	No	Bus bar operated during checking of DC earth fault
13	220KV-KISHANGANJ(PG)-KISHANGANJ(BSPTCL)-2	11-08-2023	11:35	11-08-2023	14:57		Malfunctioning of Main -1 protection relay contact (distance protection-1) at BSPTCL end	No fault	NA	No fault in line. BSPTCL may explain		NA	No	Cable insulation damaged at BSPTCL end
14	220KV-DARBHANGA(DMTCL)-MOTIPUR-2	13-08-2023	19:38	13-08-2023	20:19	Darbhanga: R_N, Zone-1, 33.39 km, 3.90 kA	Motipur: A/r successful	R-Earth	100	A/R was successful from both ends whether tripped in reclaim		No	Yes	PLCC faulty

15	220KV-JODA-RAMCHANDRAPUR-1	16-08-2023	13:34	16-08-2023	14:03	Joda:Y_N, Zone-1, 72.17 km, 0.99 kA	Ramchandarpur: Y_N, Zone-1, 55.8 km, 1.92 kA	Y-Earth	100	Tripping in reclaim time from Joda but from RCP end again A/R occurred seems no provision of recalim time at RCP may be checked?		Yes	Yes	Reclaim time was set at 1 econd. Revised to 25 seconds
16	400KV-NEW PPSP-NEW RANCHI-1	17-08-2023	13:19	18-08-2023	00:53		New Ranchi: B_N, 89.3 km, 5.5 kA	B-Earth	100	DT received at New Ranchi just before A/r attempt. WBSETCL may explain.		No	Yes	DT sent from New PPSP after failed A/r attempt
17	220KV-PATNA-KHAGAUL-1	18-08-2023	11:14	18-08-2023	12:01	Patna: B_N, 10.25 km, 9.9 kA	Khagaul: B_N, 7.93 kA, A/r successful	B-Earth	100	A/r successful at Khagaul. Other two phase at Patna tripped on PD	DR not time synchronized at Khagaul	Yes	Yes	Electromechanical Relay Malfunction and A/R close contacts failed to operate. A/R fuction is planned to implement in BCU.

18	400KV NEW DUBURI-TSL-1	26-08-2023	21:08	26-08-2023	22:02			No fault	NA	OPTCL/TSL may explain		No	No	DT received at New TSL

Annexure C.1

Standard Operating Procedure for Protection System Audit

A protection system audit is a review and evaluation of the protection systems of a substation with an objective to verify whether required protection systems have been put in place at station by the concerned utility, and to recommend suitable measures to provide for the same.

Ministry of Power, had constituted a Committee under the Chairmanship of Chairperson CEA to examine the grid disturbances on the 30th and the 31st July 2012. One of important recommendation of the committee was conducting of extensive audit of protection system. List of sub-stations where protection audit is to be undertaken on priority basis was prepared and audited across the country. This was the beginning of protection audit across the country and large number of important 400 and 220kV substations were audited.

Keeping in view the importance of Protection System Audit, Standard Operating Procedure has been prepared in consultation with RPCs. It will provides a step-by-step guide for RPCs to follow during the audit process.

1. All users shall conduct third party protection audit of each sub-station at 220 kV and above (132 kV and above in NER) once in five years or earlier as advised by the respective RPC.
2. After analysis of any event, each RPC shall identify a list of substations / and generating stations where third-party protection audit is required to be carried out and accordingly advise the respective users to complete third party audit within three months.
3. The third-party protection audit report shall contain information sought in the format as per IEGC 2023 and its further amendments.
4. 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.

5. Criteria for choosing substations for third party protection audit:

The following criteria are generally applied during choosing a substation for protection audit.

i. Substations/ Generating (SS/ GS) stations with frequent grid incidences or frequent maloperations or any grid occurrence in any substation which affected supply to large number of substations and caused significant load loss. In this case, third-party protection audit may be carried out semi-annually.
ii. Based on request received from utilities for arranging protection audit in certain stations (e.g. for availing PSDF funding for Renovation and Upgradation of Protection system). In this case, third-party protection audit may be carried out within three months.
iii. Important 400kV and 765kV substations (SS) / Generating stations (GS) including newly commissioned SS/ GS. In this case, third-party protection audit may be carried out semi-annually.

6. Protection audit Procedure:

i. After identification of stations for protection audit, the same is communicated to the owner utility seeking nomination of one nodal officer for each Station.
ii. The nodal officer shall provide the details of substation for preparation of protection audit format (in accordance with IEGC and subsequent amendment).
iii. Meanwhile nominations shall be sought from all utilities to form regional teams for audit. Regional teams comprising of engineers from various utilities of the region shall be formed based on the no. of SS to be audited. (Each team may consists of 3 or 4 engineers from utilities other than the host utility and at the maximum a team will be able to audit 3 to 4 stations in 5 days or so)
iv. Once the team details and list of stations to be audited is finalised the details of nodal officers, team members , list of stations to be audited by each team is shared to all for further coordination regarding planning and conduction of audit.
v. Based on the inputs received from nodal officer regarding the list of elements in the substation to be audited, protection audit formats shall be prepared by RPC (in accordance with IEGC and subsequent amendment) and circulated to nodal officer. The nodal officer along-with the substation engineers shall fill the audit format and furnish the same along-with various attachments sought as part of the audit format within a week or so. List of attachments shall be given in the covering page of audit format.
vi. The filled in audit format along-with the received annexures shall then forwarded to the audit team and any further clarification regarding the format or attachments shall be taken up by the audit team with the nodal officer under intimation to RPC.
vii. The SS/ GS shall be audited based on the data filled in audit format checking for compliance of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007 & CEA (Measures relating to Safety and Electric Supply) Regulations, 2010, CERC regulations and amendments to the same, approved guidelines of RPC, best practices in industry etc.
viii. After conduct of audit, the shortcomings observed in the audit shall be discussed in detail with the nodal officer and substation engineers and recommendations are finalised.
ix. The filled in audit format along-with the recommendations and attachments shall be finalised and final protection audit report RPC (in accordance with IEGC and subsequent amendment) shall be compiled.
x. Final protection audit report shall be discussed in Protection Coordination Committee and recommendations may be accepted/deleted/modified as per the scope of audit and compliance of various regulations/guidelines etc.
xi. The recommendations of all SS audited shall be inserted into audit recommendations database and update regarding recommendations shall be sought from respective utilities.
xii. Action plan for rectification of deficiencies detected, if any, shall be submitted to the respective RPC and RLDC and monthly progress will be submitted.
xiii. The travel expense from place of duty to Substation/Generating Station to be audited shall be borne by respective Auditor (Parent Organisation). The expense for boarding, lodging any travel of the team during the audit period shall be borne by the organisation owning the Substation/Generating Station.

*****

GE VERNOVA

AIDED DEF PROTECTION

An overview

A.Gokulakrishnan

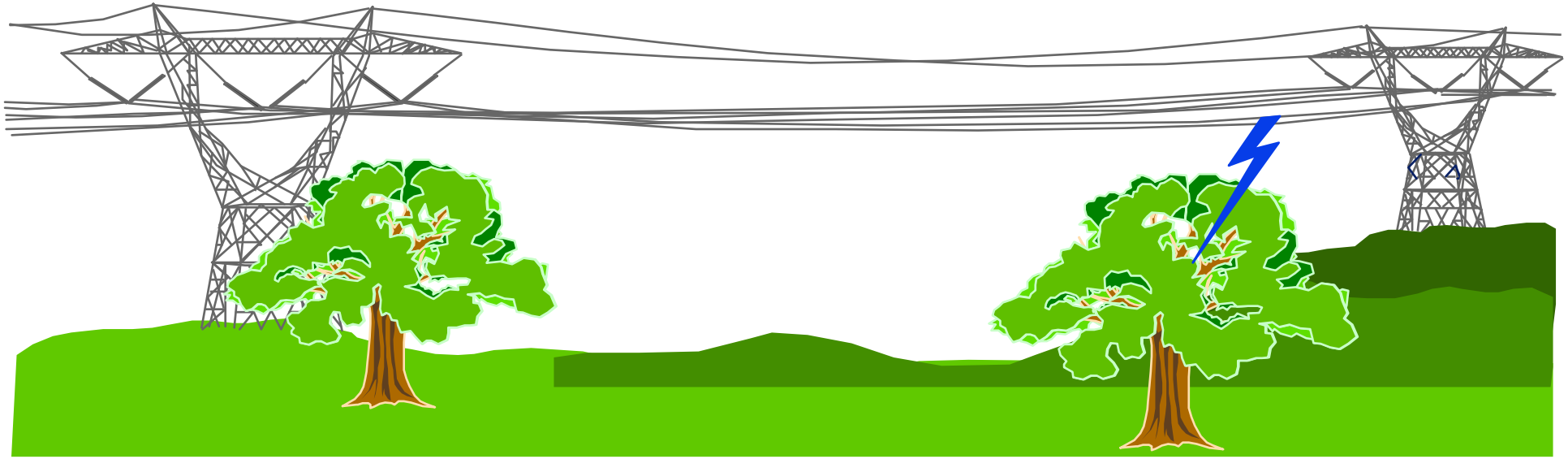
20.7.2023

Contents

Directional Earth Fault Protection (DEF)

GE VERNOVA

- High resistance ground faults
- Instantaneous or time delayed
- IEC and IEEE curves
- Single or shared signalling channel



Overview

GE VERNOVA

DEF schemes are identical to Distance schemes

- DEF Forward replaces Zone 2, DEF Reverse replaces Zone 4 Reverse
- No equivalent to Zone 1 as the DEF elements can not have a defined reach, hence no schemes using Zone 1 can be replicated (Z1 ext, PUR)
- DEF More sensitive than Distance for Earth Faults

Overview

GE VERNOVA

Aided Directional Earth Fault (DEF)

DEF Protection Against High Resistance Earth Faults

Protection against high-resistance earth faults, also called DEF (Directional Earth Fault), is used to protect the network against highly resistive faults. High resistance faults may not be detected by distance protection. DEF Protection can be applied in one of the two following modes: faults using the following:

- The main operating mode, directional comparison protection uses the signalling channel and is a communication-aided scheme.
- In backup-operating mode SBEF (Stand-By Earth Fault), an inverse/definite time earth overcurrent element with 4 stages is selectable.

Both the main and backup mode can use different methods for fault detection and directional determination (negative or zero sequence polarisation, RCA angle settable for backup SBEF protection, etc.)

The use of Aided-Trip logic in conjunction with the DEF element allows faster trip times, and can facilitate single-phase tripping if single-phase tripping is applied to the breaker.

The DEF directional comparison protection may be applied on the same signal channel as the distance protection, or it may be applied on an independent channel (ability to use two different aided-trip logics for the distance and DEF elements).

When used on the same signalling channel (shared scheme selected by MiCOM S1 Agile) as the distance protection, if the distance protection picks up, it has priority (the output from the DEF element is blocked from asserting the Carrier Send common output).

The use of directional comparison protection with an independent signalling channel allows the distance functions and DEF function to operate in parallel. Each function is routed to its own Carrier Send output. If an earth fault is present where both the distance and DEF elements pick up, the faster of the two functions will perform the trip.

Algorithm

GE VERNOVA

High Resistance Earth Fault Detection

A high resistance fault is detected when residual or zero sequence voltage (3V0) and current thresholds are exceeded or using the high speed algorithms:

- $\Delta I \geq 0.05$ In
- $\Delta V \geq 0.1$ Vn (Ph-N)

A fault is confirmed if these thresholds are exceeded for more than 1 ½ cycles.

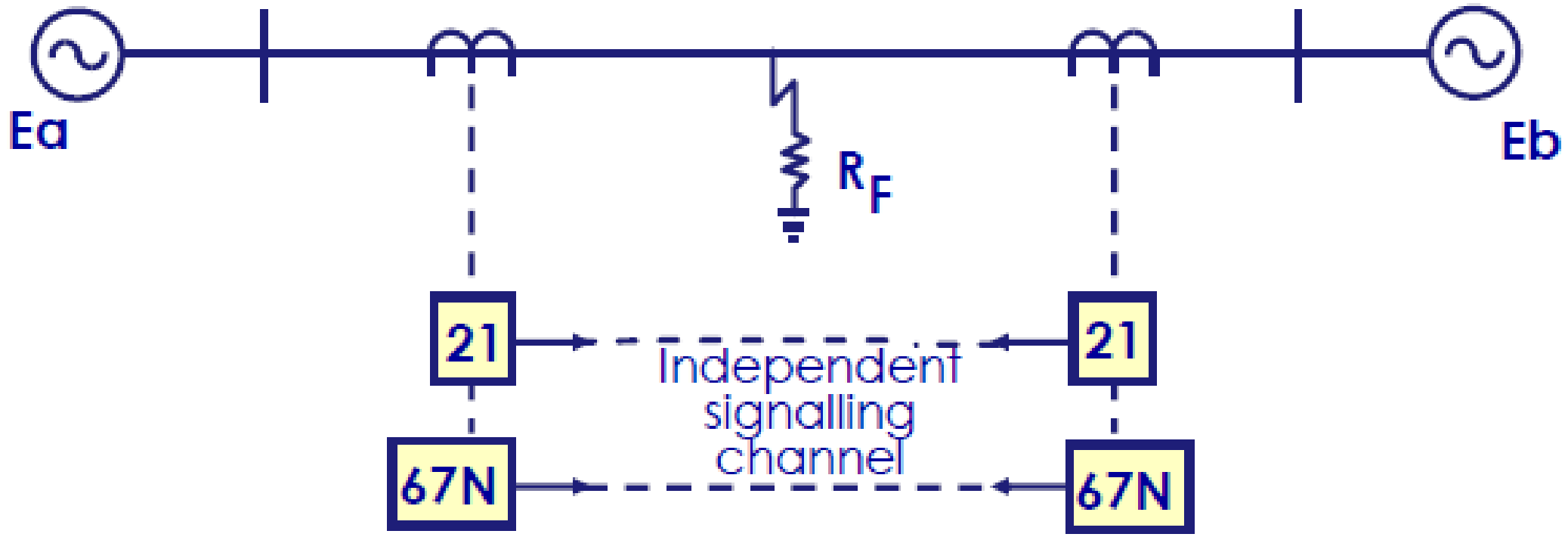
Directional determination

The fault direction is determined by measuring the angle between the residual voltage and the residual current derivative. The fault is forward if the angle is between –14° and +166°. A negative or zero-sequence polarisation is selectable to determinate the earth fault direction.

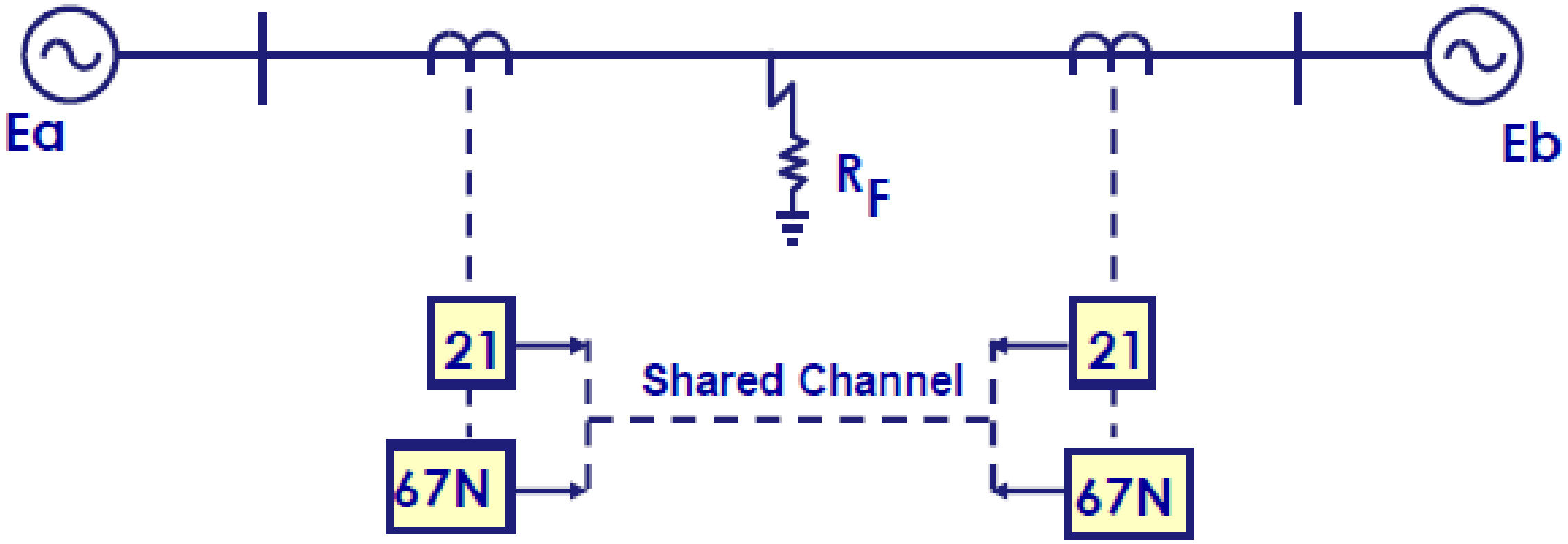
Phase selection

The phase is selected in the same way as for distance protection except that the current threshold is reduced ($\Delta I \geq 0.05$ x In and $\Delta V \geq 0.1$ x Vn)

Permissive scheme



Shared scheme



Settings

Aided Directional Earth Fault (DEF) protection schemes ("Aided D.E.F" menu)

The relay has aided scheme settings as shown in the following table:

Menu text	Default setting	Setting range		Step size
		Min	Max	
GROUP 1 – AIDED D.E.F.				
Aided DEF Status	Enabled	Disabled, Enabled		
To enable (activate) or disable (turn off) the Directional Earth Fault Element that is used in an aided scheme.				
Polarisation	Zero Sequence	Zero Sequence, Negative Sequence		
Setting that defines the method of DEF polarisation. Either zero, or negative sequence voltage can be taken as the directional reference. The applications of zero sequence and negative sequence polarisation are described in chapter P44x/EN AP, section Directional Directional and non directional Earth Fault Protection).				
V> Voltage Set	1 V	0.5 V	20 V	0.01 V
The V> threshold defines the minimum residual voltage required to enable the aided DEF directional decision. A residual voltage measured below this setting would block the directional decision, and so there would be no tripping from the scheme.				
IN Forward	0.1 × In	0.05 × In	4 × In	0.01 × In
Time Delay	0 s	0 s	10 s	0.1 s
Scheme Logic	Shared	Shared, Blocking, Permissive		
To select shared, blocking or permissive scheme logic.				
Tripping	Three Phase	Three Phase, Single Phase		
Tp	2 ms	0 ms	1s	2 ms
Aid Dist Delay (if blocking scheme not shared) Transmission time in blocking scheme. The Aided distribution time-delay (in the case of a blocking scheme covering the transmission time) settings will appear in the relay menu. Further customising of distance schemes can be achieved using the Programmable Scheme Logic to condition send and receive logic.				
IN Rev Factor	0,6	0	1	0.1
'IN Rev Factor' enhances the sensitivity for the residual current in case of reverse fault (for instance to create a faster blocking logic scheme).				
Block. Time Add.	0	0	10s	0.15s
"Block. Time Add." is an additional time-delay, set to extend a pole dead or convergence detection.				

Settings need to be checked

bit	setting	DDB
Autoreclose lockout / Block A/R		
00	At T2	T2
01	At T3	T3
02	At Tzp	tZp
03	LoL Trip	Loss. Load Trip
04	I>1 Trip	I>1 Trip
05	I>2 Trip	I>2 Trip
06	V<1 Trip	V<1 Trip
07	V<2 Trip	V<2 Trip
08	V>1 Trip	V>1 Trip
09	V>2 trip	V>2 Trip
0A	IN>1 Trip	IN>1 Trip
0B	IN>2 Trip	IN>2 Trip
0C	Aided D.E.F Trip	DEF Trip A C OR DEF Trip B OR DEF Trip C
0D	Zero. Seq. Power Trip	ZSP Trip
0E	IN>3 Trip	IN>3 Trip
0F	IN>4 Trip	IN>4 Trip
10	PAP Trip	PAP Trip A OR PAP Trip B OR PAP Trip C

bit	setting	DDB
11	Thermal Trip	Trip Thermal
12	I2>1 Trip	I2> Trip
13	I2>2 Trip	I2>2 Trip
14	I2>3 Trip	I2>3 Trip
15	I2>4 Trip	I2>4 Trip
16	VN>1 Trip	VN>1 Trip
17	VN>2 Trip	VN>2 Trip
18	At Tzq	tZq
19	V<3 Trip	V<3 Trip
1A	V<4 Trip	V<4 Trip
1B	V>3 Trip	V>3 Trip
1C	V>4 trip	V>4 trip
1D	I<1 Trip	I<1 Block
1E	I<2 Trip	I<2 Block
Autoreclose lockout / Block A/R 2		
00	F<1 Trip	F<1 Trip
01	F<2 Trip	F<2 Trip
02	F<3 Trip	F<3 Trip
03	F<4 Trip	F<4 Trip
05	F>2 Trip	F>2 Trip

Figure 119: Block autoreclose logic

GE VERNOVA

OCC TRACK SHEET FROM NOVEMBER 2021 TO SEPTEMBER 2022

JUSNL

`SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_DEC_2021	JUSNL	ICT	220KV MAIN BAY OF 400KV/220KV 250 MVA ICT 1 AT TENUGHAT	DATA NOT RECEIVED
2	OCC_DEC_2021	JUSNL	T/L	400KV TIE BAY OF NEW RANCHI -2 AND FUTURE AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
3	OCC_DEC_2021	JUSNL	T/L	400KV MAIN BUS - 1 AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
4	OCC_DEC_2021	JUSNL	ICT	400kV MAIN BAY OF 400/220KV 315MVA ICT-2 AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
5	OCC_DEC_2021	JUSNL	ICT	220kV MAIN BAY OF 400/220KV 315MVA ICT-2 AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
6	OCC_DEC_2021	JUSNL	T/L	400KV-NEW RANCHI- PATRATU-1	PDMS AND PSCT DONE AT PATRATU END
7	OCC_DEC_2021	JUSNL	T/L	400KV-NEW RANCHI- PATRATU-2	PDMS AND PSCT DONE AT PATRATU END
8	OCC_DEC_2021	JUSNL	T/L	400KV MAIN BUS-2 AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
9	OCC_DEC_2021	JUSNL	T/L	400KV MAIN BAY OF NEW RANCHI -2 AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
10	OCC_JAN_2022	JUSNL	T/L	400KV TIE BAY OF NEW RANCHI -1 AND FUTURE AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
11	OCC_FEB_2022	JUSNL	ICT	400KV MAIN BAY OF 400KV/220KV 315MVA ICT1 AT PATRATU	PDMS AND PSCT DONE AT PATRATU END
12	OCC_MAR_2022	JUSNL	ICT	400KV MAIN BAY OF 400KV/220KV 315 MVA ICT 1 AT PATRATU	PDMS AND PSCT DONE AT PATRATU END

OPTCL

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_JAN_2022	OPTCL	B/R	125MVAR 400KV B/R-1 AT MEERAMUNDALI	DATA NOT RECEIVED
2	OCC_JAN_2022	OPTCL	T/L	220KV-BOLANGIR (PG)- KESINGA-1	DATA NOT RECEIVED
3	OCC_JAN_2022	OPTCL	ICT	400KV MAIN BAY OF 400KV/220KV 500 MVA ICT 2 AT MERAMUNDALI B	PDMS AND PSCT DONE
4	OCC_MAY_2022	OPTCL	T/L	220KV-PANDIABILI PRATAPSASAN-1	DATA NOT RECEIVED
5	OCC_MAY_2022	OPTCL	T/L	220KV-PANDIABILI PRATAPSASAN-2	DATA NOT RECEIVED
6	OCC_JUNE_2022	OPTCL	T/L	400KV MAIN BAY OF MERAMUNDALI-A AT MERAMUNDALI B	PDMS AND PSCT DONE AT MERAMUNDALI B END
7	OCC_JUNE_2022	OPTCL	T/L	400KV MAIN BAY OF GMR1 AT MERAMUNDALI B	PDMS AND PSCT DONE AT MERAMUNDALI B END
8	OCC_JUNE_2022	OPTCL	T/L	400KV MAIN BAY OF NEW DUBURI- 2 AT MERAMUNDALI B	PDMS AND PSCT DONE AT MERAMUNDALI B END
9	OCC_JUNE_2022	OPTCL	T/L	400KV MAIN BAY OF NEW DUBURI- 1 AT MERAMUNDALI B	PDMS AND PSCT DONE AT MERAMUNDALI B END
5	OCC_JAN_2022	PGCIL	ICT	400/220KV 500MVA ICT-2 AT MERAMUNDALI B	DATA NOT RECEIVED
10	OCC_JUNE_2022	OPTCL	T/L	400KV MAIN BAY OF 400KV FUTURE LINE-7 AT MERAMUNDALI B	PDMS AND PSCT DONE AT MERAMUNDALI B END
11	OCC_AUGUST_2022	OPTCL	B/R	400 kV, 125 MVAr Bus Reactor 1 at New Dubri along with the associated bays (Bay No. 401)	DATA NOT RECEIVED

SIKKIM

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_MAR_2022	SIKKIM	T/L	220KV--NEW MELLI-TASHIDING-2	DATA NOT RECEIVED

WBSETCL

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_MAY_2022	WBSETCL	T/L	400KV-GOKARNA NEW CHANDITALA-1	PDMS AND PSCT DONE AT GOKARNA END
2	OCC_MAY_2022	WBSETCL	T/L	400KV-GOKARNA NEW CHANDITALA-2	PDMS AND PSCT DONE AT GOKARNA END
3	OCC_MAY_2022	WBSETCL	T/L	220 KV RAJARHAT (PG)-BARASAT (WB)-1	PDMS AND PSCT DONE AT BARASAT END
4	OCC_MAY_2022	WBSETCL	T/L	220 KV RAJARHAT (PG)-BARASAT (WB)-2	PDMS AND PSCT DONE AT BARASAT END

TVNL

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_DEC_2021	TVNL	ICT	400KV MAIN BAY OF 400KV/220KV 250 MVA ICT 1 AT TENUGHAT	DATA NOT RECEIVED
2	OCC_DEC_2021	TVNL	ICT	220KV MAIN BAY OF 400KV/220KV 250 MVA ICT 1 AT TENUGHAT	DATA NOT RECEIVED

POWERGRID

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_OCT_2021	PGCIL	ICT	400/220kV 315MVA ICT-4 AT JEYPORE	DATA NOT RECEIVED
2	OCC_DEC_2021	PGCIL	T/L	400KV DURGAPUR KAHALGAON 2	PDMS DONE AT DURGAPUR END
3	OCC_DEC_2021	PGCIL	T/L	400KV DURGAPUR KAHALGAON 1	PDMS DONE AT DURGAPUR END
4	OCC_JAN_2022	PGCIL	T/L	LILO of 400 kV Teesta III Kishanganj S/C at Rangpo SS (400KV-RANGPO-TEESTA- III 1)	PDMS AND PSCT DONE AT RANGPO END
6	OCC_FEB_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV 315 MVA ICT 3 AT BINAGURI	PDMS DONE
7	OCC_FEB_2022	PGCIL	ICT	220KV MAIN BAY OF 400KV/220KV 315 MVA ICT 3 AT BINAGURI	PDMS DONE
8	OCC_FEB_2022	PGCIL	ICT	220KV MAIN BAY OF 400KV/220KV 500MVA ICT5 AT MALDA (PG)	PDMS DONE
9	OCC_FEB_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV 500MVA ICT5 AT MALDA (PG)	PDMS DONE
10	OCC_FEB_2022	PGCIL	ICT	220KV MAIN BAY OF 220KV/132KV 100MVA ICT4 AT RANGPO	PDMS DONE
11	OCC_FEB_2022	PGCIL	ICT	132KV MAIN BAY OF 220KV/132KV 100MVA ICT4 AT RANGPO	PDMS DONE
12	OCC_FEB_2022	PGCIL	T/L	LILO OF 400 KV TEESTA III-KISHANGANJ S/C AT RANGPO SS(400KV KISHANGANJ(PG)-RANGPO-2)	PDMS DONE AT RANGPO END
13	OCC_MAR_2022	PGCIL	ICT	220KV MAIN BAY OF 400KV/220KV 315 MVA ICT 1 AT PATRATU	PDMS DONE
14	OCC_APR_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV 315 MVA ICT 2 AT FARAKKA(NTPC)	DATA NOT RECEIVED

15	OCC_APR_2022	PGCIL	ICT	200KV MAIN BAY OF 400KV/220KV 315 MVA ICT 2 AT FARAKKA(NTPC)	DATA NOT RECEIVED
16	OCC_APR_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV500 MVA ICT 4 AT MUZAFFARPUR	DATA NOT RECEIVED
17	OCC_APR_2022	PGCIL	ICT	200KV MAIN BAY OF 400KV/220KV500 MVA ICT 4 AT MUZAFFARPUR	DATA NOT RECEIVED
18	OCC_APR_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV500 MVA ICT 1 AT JAKKANPUR	DATA NOT RECEIVED
19	OCC_APR_2022	PGCIL	T/L	LILO of 400 KV KISHANGANJ- DARBHANGA(DMTCL)-1 AT SAHARSA(PMTL) (400KV-SAHARSA-DARBHANGA (DMTCL)-1)	DATA NOT RECEIVED
20	OCC_APR_2022	PGCIL	T/L	LILO of 400 KV KISHANGANJ-DARBHANGA(DMTCL)-1 AT SAHARSA (PMTL) 400KV-SAHARSA-KISHANGANJ-3)	DATA NOT RECEIVED
21	OCC_APR_2022	PGCIL	T/L	LILO of 400 KV KISHANGANJ- DARBHANGA(DMTCL)-1 AT SAHARSA(PMTL) (400KV-SAHARSA-DARBHANGA (DMTCL)-1)	DATA NOT RECEIVED
22	OCC_APR_2022	PGCIL	T/L	LILO of 400 KV KISHANGANJ- DARBHANGA(DMTCL)-2AT SAHARSA(PMTL) (400KV-SAHARSA-DARBHANGA (DMTCL)-2)	DATA NOT RECEIVED
23	OCC_APR_2022	PGCIL	T/L	220KV-RANGPO-NEW MELLI-2	PDMS DONE

DVC

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_MAY_2022	DVC	ICT	400KV MAIN BAY OF 400KV/220KV 315 MVA ICT 2 AT MTPS-B	DATA NOT RECEIVED
2	OCC_JUNE_2022	DVC	T/L	220KV-RANCHI-MTPS(DVC)-1	PDMS AND PSCT DONE AT RANCHI END

PMTL

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_OCT_2021	PMTL	T/L	400 KV-SAHARSA KISHANGANJ-1 (LILO OF 400 kV Patna-Kishanganj-1 at Saharsa)	PDMS AND PSCT DONE AT SAHARSA END
2	OCC_OCT_2021	PMTL	T/L	400KV-PATNA SAHARSA-1 (LILO OF 400 kV Patna Kishanganj-1 at Saharsa)	PDMS AND PSCT DONE AT SAHARSA END
3	OCC_OCT_2021	PMTL	ICT	220KV MAIN BAY OF 400KV/220KV 500 MVA ICT 1 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
4	OCC_OCT_2021	PMTL	T/L	220KV MAIN BAY OF KHAGARIA-1 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
5	OCC_OCT_2021	PMTL	T/L	220KV MAIN BAY OF KHAGARIA-2 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
6	OCC_OCT_2021	PMTL	T/L	220KV MAIN BAY OF BEGUSARAI-1 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
7	OCC_OCT_2021	PMTL	T/L	220KV MAIN BAY OF BEGUSARAI-2 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
8	OCC_OCT_2021	PMTL	T/L	132KV MAIN BAY OF SONEBARSA (BH) -1 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
9	OCC_OCT_2021	PMTL	T/L	132KV MAIN BAY OF MADHEPURA (BH) -1 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
10	OCC_DEC_2021	PMTL	T/L	400KV MAIN BAY OF PATNA -1 AT SAHARSA	PDMS AND PSCT DONE AT SAHARSA END
11	OCC_JUNE_2022	PMTL	ICT	400KV MAIN BAY OF 400KV/132kV 315MVA ICT1 AT MOTIHARI(DMTCL)	PDMS DONE AT LV SIDE AND PSCT DONE BOTH SIDE

BSPTCL

`SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_OCT_2021	BSPTCL	T/L	220KV-BEGUSARAI KHAGARIA-1	DATA NOT RECEIVED
2	OCC_OCT_2021	BSPTCL	T/L	220KV-KHAGARIA NEW PURNEA	DATA NOT RECEIVED
3	OCC_OCT_2021	BSPTCL	T/L	132KV MADHEPURA (BH)- SAHARSA(PMTL)-1	PDMS ANS PSCT DONE AT SAHARSA END
4	OCC_OCT_2021	BSPTCL	T/L	132KV SONEBARSA (BH)- SAHARSA(PMTL)-1	PDMS ANS PSCT DONE AT SAHARSA END
5	OCC_JAN_2022	BSPTCL	T/L	220KV-RAXAUL-SITAMARHI-1	PDMS ANS PSCT DONE AT SITAMARHI END
6	OCC_JAN_2022	BSPTCL	T/L	220KV-RAXAUL-SITAMARHI-2	PDMS ANS PSCT DONE AT SITAMARHI END
7	OCC_JAN_2022	BSPTCL	T/L	CI-I AT KARAMNASHA(NEW) (220KV KARAMNASHA (NEW)- SAHUPURI-1)	PDMS ANS PSCT DONE AT KARAMNASA END
8	OCC_JAN_2022	BSPTCL	T/L	LILO of 220 KV PUSAULI SAHUPURI-I AT KARAMNASHA(NEW) (220KV KARAMNASHA (NEW)- PUSAULI-1)	PDMS ANS PSCT DONE AT KARAMNASA END
9	OCC_JAN_2022	BSPTCL	T/L	'LILO of 220 KV Gaya Chandauti D/C LILO at Bodhgaya(220KV-CHANDAUTI (PMTL)-BODHGAYA-1)	DATA NOT RECEIVED
10	OCC_JAN_2022	BSPTCL	T/L	'LILO of 220 KV Gaya Chandauti D/C LILO at Bodhgaya(220KV-CHANDAUTI (PMTL)-BODHGAYA-2)	DATA NOT RECEIVED
11	OCC_FEB_2022	BSPTCL	T/L	LILO of 132 KV RAFIGUNJ CHANDAUTI(BH)-I AT CHANDAUTI(PMTL) (132KV-CHANDAUTI (PMTL)- CHANDAUTI (BH)-2)	DATA NOT RECEIVED
12	OCC_FEB_2022	BSPTCL	T/L	LILO of 132 KV RAFIGUNJ CHANDAUTI(BH)-I AT CHANDAUTI(PMTL) (132KV-CHANDAUTI (PMTL)-RAFIGANJ (BH)-1)	DATA NOT RECEIVED
13	OCC_JULY_2022	BSPTCL	T/L	220 kV-Saharsa(PMTL)-Begusarai (BSPTCL) D/C	PDMS ANS PSCT DONE

ADANI

`SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_NOV_2021	ADANI	T/L	220KV MAIN BAY OF GOVINDPUR -1 AT DHANBAD (NKTL)	PDMS ANS PSCT DONE
2	OCC_NOV_2021	ADANI	T/L	220KV MAIN BAY OF GOVINDPUR -2 AT DHANBAD (NKTL)	PDMS ANS PSCT DONE
3	OCC_NOV_2021	ADANI	T/L	220KV MAIN BAY OF JAINAMORE -2 AT DHANBAD (NKTL)	PDMS ANS PSCT DONE
4	OCC_NOV_2021	ADANI	T/L	220KV MAIN BAY OF JAINAMORE -1 AT DHANBAD (NKTL)	PDMS ANS PSCT DONE

BGCL

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_MAR_2022	BGCL	T/L	LILO of 400 KV PATNA BALIA-3 AT NAUBATPUR(BGCL) (400KV NAUBATPUR(BH)- BALIA-1)	PDMS ANS PSCT DONE AT NAUBATPUR END
2	OCC_MAR_2022	BGCL	T/L	LILO of 400 KV PATNA BALIA-3 AT NAUBATPUR(BGCL) (400KV-PATNA NAUBATPUR(BH)-1	PDMS ANS PSCT DONE AT NAUBATPUR END
3	OCC_MAR_2022	BGCL	T/L	LILO of 400 KV PATNA BALIA-4 AT NAUBATPUR(BGCL) (400KV NAUBATPUR(BH)- BALIA-2)	PDMS ANS PSCT DONE AT NAUBATPUR END
4	OCC_MAR_2022	BGCL	T/L	LILO of 400 KV PATNA BALIA-4 AT NAUBATPUR(BGCL) (400KV-PATNA NAUBATPUR(BH)-2)	PDMS ANS PSCT DONE AT NAUBATPUR END
5	OCC_MAR_2022	BGCL	T/L	400KV MAIN BAY OF PATNA -1 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
6	OCC_MAR_2022	BGCL	T/L	400KV MAIN BAY OF PATNA -2 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
7	OCC_MAR_2022	BGCL	T/L	400KV MAIN BAY OF BALIA-1 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
8	OCC_MAR_2022	BGCL	T/L	400KV TIE BAY OF BALIA-1 AND PATNA-2 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
9	OCC_MAR_2022	BGCL	T/L	400KV MAIN BAY OF BALIA-2 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
10	OCC_MAR_2022	BGCL	ICT	400KV MAIN BAY OF 500 MVA ICT-2 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
11	OCC_MAR_2022	BGCL	ICT	400KV TIE BAY OF BALIA -2 AND 500 MVA ICT-2 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END

12	OCC_MAR_2022	BGCL	T/L	400KV MAIN BUS - 2 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
13	OCC_MAR_2022	BGCL	T/L	400KV MAIN BUS - 1 AT NAUBATPUR(BH)	PDMS ANS PSCT DONE AT NAUBATPUR END
14	OCC_APR_2022	BGCL	T/L	220KV-ARRAH (PG)-NAUBATPUR(BH)-2	PDMS ANS PSCT DONE
15	OCC_APR_2022	BGCL	T/L	LILO of 400 KV PATNA- NABINAGAR(NPGC)-1 AT JAKKANPUR(BGCL)400KV-JAKKANPUR(BH)-PATNA-1)	PDMS ANS PSCT DONE
16	OCC_APR_2022	BGCL	T/L	LILO of 400 KV PATNA -NABINAGAR(NPGC)-1 AT JAKKANPUR(BGCL) (400KV-NABINAGAR(NPGC)-JAKKANPUR(BH)-1	PDMS ANS PSCT DONE
17	OCC_APR_2022	BGCL	T/L	LILO of 400 KV PATNA- NABINAGAR(NPGC)-2 AT JAKKANPUR(BGCL) (400KV-JAKKANPUR(BH)-PATNA-2)	PDMS ANS PSCT DONE
18	OCC_APR_2022	BGCL	T/L	LILO of 400 KV PATNA -NABINAGAR(NPGC)-2 AT JAKKANPUR(BGCL) (400KV-JAKKANPUR(BH)-PATNA-2) JAKKANPUR(BGCL)(400KV-NABINAGAR(NPGC)-JAKKANPUR(BH)-2)	PDMS ANS PSCT DONE
19	OCC_MAY_2022	BGCL	T/L	220KV-ARRAH (PG)- NAUBATPUR(BH)-1	PDMS ANS PSCT DONE AT NAUBATPUR END

PMJTL

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_AUGUST_2022	PMJTL	T/L	400 kV Subhashgram-New Jeerat Transmission Line-1	PDMS ANS PSCT DONE AT NEW JEERAT END
2	OCC_AUGUST_2022	PMJTL	T/L	400 kV Subhashgram-New Jeerat Transmission Line-2	PDMS ANS PSCT DONE AT NEW JEERAT END

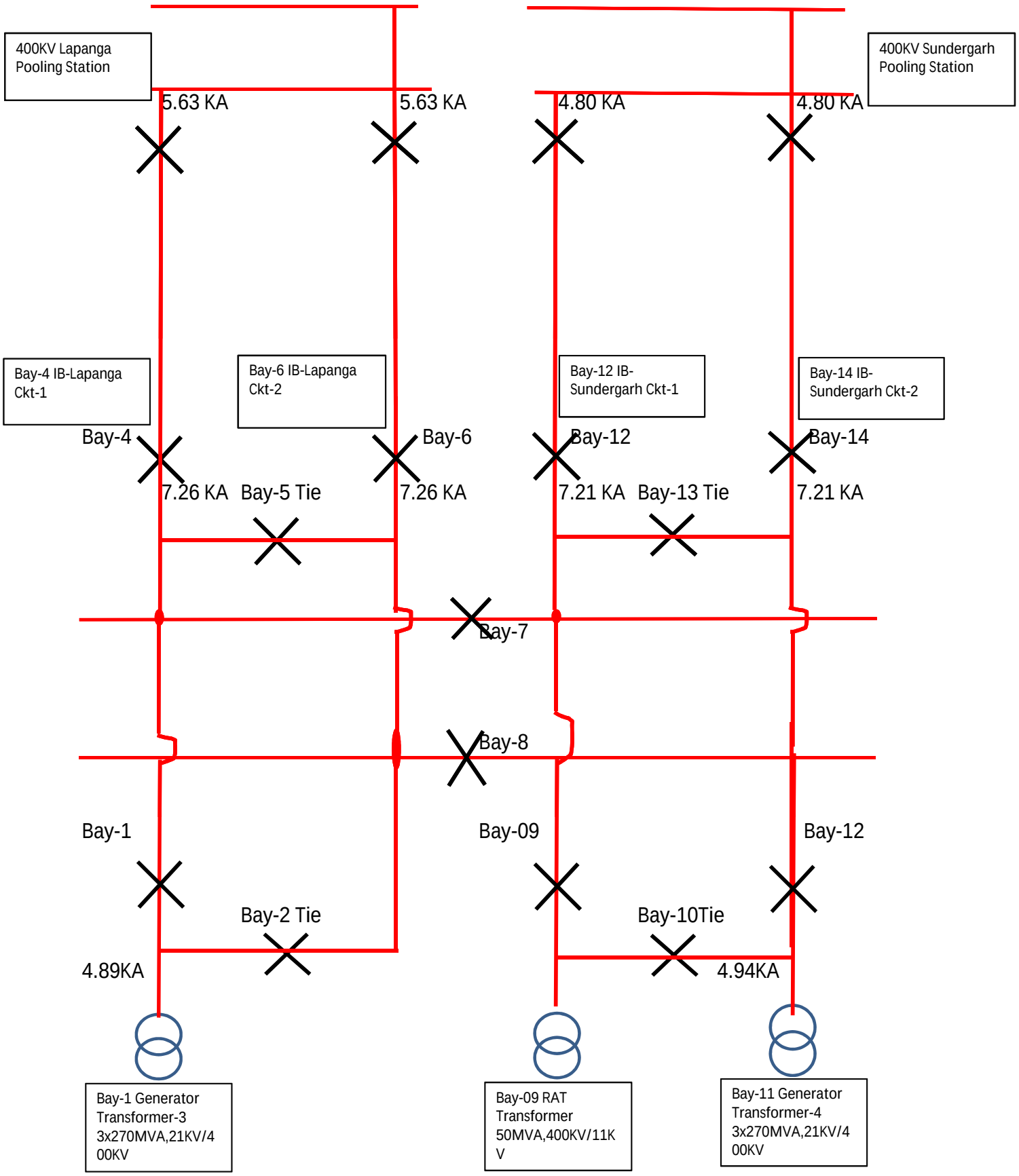
Sl No.	Name of the incidence	PCC Recommendation	Latest status
128th PCC Meeting			
1.	Disturbance at 400 kV Lapanga (OPTCL) S/s and 400 kV OPGC S/s on 10.06.2023 at 17:27 Hrs	PCC advised OPTCL following: ➢ to test auto-reclose and CB at Lapanga end for 400 kV Meramundali- Lapanga-1 the earliest. ➢ to test both main-1 & main-2 relay at Lapanga end for Meramundali line. ➢ the carried aided tripping scheme of 400 kV Meramundali-Lapanga -2 at Lapanga end may be checked. ➢ to review O/C and DEF protection settings of ICTs at Lapanga end. PCC advised OPGC to review DEF settings and it need to be coordinated with Jharsuguda (Powergrid) as well as Lapanga end. OPGC was also to review SEF settings at unit 4. OPGC vide email dated 12th Aug 2023 had shared proposed settings for neutral earth fault protection which is attached at **Annexure C.6.1.**	*OPTCL representative informed that auto-reclose and CB had been checked for 400 kV Meramundali-Lapanga-1 and 2 during which BCU of main breaker is found to be faulty therefore BCU contact with main breaker had been disabled and it has been kept direct with relay at present.* *He also informed that PLCC and carrier had been checked and found healthy.* *Regarding review of O/C and DEF protection setting of ICTs, OPTCL representative replied that settings was checked and found to be in order. PCC advised to carry out CT saturation testing.* *PCC informed that proposed settings from OPGC is in order for neutral earth fault protection and the same may be implemented after getting necessary feedback from Powergrid.*
2.	Total Power Failure at 220 kV Narendrapur (OPTCL) S/s and 220 kV Atri (OPTCL) S/s on 16.06.2023 at 10:40 Hrs.	PCC advised OPTCL representative to test the relay at Therubali end for its healthiness. PCC advised to test the Overcurrent Protection at Therubali end as well. Further PCC recommended that two main protection (main-1 & main-2)	*OPTCL representative replied that testing of relays at Therubali end had been completed and relays are found to be in healthy condition. He further added that since no additional spare distance*

		shall be implemented in 220 kV lines as per the CEA standard.	*relay is present at Therubali end , so only main 1 protection is implemented at site along with backup protection, However they are planning to implement main 2 protection at earliest.*
3.	Total Power failure at 220 kV Chandil (JUSNL) S/s on 10.06.2023 at 17:00 Hrs	PCC expressed serious concern in this regard and advised JUSNL to take appropriate measures for reporting and analysis of the grid events as per the IEGC. PCC further advised JUSNL to check healthiness of DC system earthing at Chandil S/s and to check the LBB scheme as well as wiring in the relay. DR/EL configuration shall be done as per the guidelines of PCC. PCC recommended for replacement of electromechanical protection relay with numerical relay for both main 1 and main 2 protection.	*JUSNL representative informed that while checking, DC earth fault was found in a 132 k V feeder for which cable had been laid however connection is going to be done soon. Regarding LBB scheme, he informed that the scheme is in order as per drawing (i e LBB command will be extended to feeders having connection to isolator status of main 1 bus).* *Regarding replacement of relay, JUSNL representtaive informed that either new relay panel will be installed or retrofitting of existing relay will be done. The proposal have been forwared to their higher management.*
4.	Disturbance at 400 kV Teesta III S/s and 400 kV Dikchu S/s on 28.06.2023 at 02:28 Hrs	After detailed deliberation, the following was decided; ➢ Dikchu HEP to coordinate relay time settings of 400/132 kV ICT with IDMT time settings of line in consultation with ERPC/ERLDC so that in case of any fault in line, ICT and units should not trip before line. ➢ SUL to disable overcurrent protection in outgoing lines at Teesta-III end.	*<u>129th PCC:</u>* *PRDC representative informed that they had kept pickup of 10 % settings for lines that are acting as evacution path for units however for other lines not acting as evacution path to units, settings had been kept at pickup of 20 % only. She*

		➢ PRDC to review settings for DEF relay in Sikkim complex with reduced pick-up settings of 300 A or any suitable value and the report need to be submitted before next PCC meeting	*enquired views of Powergrid regarding same for which Powergrid representative replied that pickup settings of 10% can be kept for DEF protection.* *PCC advised PRDC that reduced DEF settings at 10% might be kept for other feeders also and revised study may be shared to ERPC/ERLDC.*
126th PCC Meeting			
5.	Repeated Tripping of 400 kV Teesta III-Dikchu line	Teesta III representative informed that as per their internal discussion held after these incidents, proposed O/V settings(stage-2) is 125% with delay of 100 ms which will be implemented after confirmation from ERPC/ERLDC. He further intimated that distance protection settings had also been also reviewed and proposed settings will be shared to ERPC/ERLDC shortly.	*Teesta III representative informed that O/V settings(stage-2) for unit is 120% with delay of 100 ms and OEM is not allowing to increase settings further so implementation of proposed O/V settings of 125% for line is not possible due to coordination issue of settings with unit. PCC advised Teesta III to implement O/V settings(stage-2) for line to 120% with delay of 100 ms.* *In 129th PCC Meeting, Teesta III confirmed that proposed O/V settings had been implemented by them.*
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.	*JUSNL representative informed that work order for commissioning of DTPC in the line will be issued shortly and it is expected that work will be completed by July 2023.*

			In 129th PCC meeting, JUSNL representative informed that there is no further update to this however they are planning to implement DTPC at earliest.

Short circuit study for Single line to earth fault



Neutral Earth fault setting of Line feeder based on fault contribution to remote end SLG fault case

1 OPGC Lapanga Feeder
Maximum fault current contribution by OPGC feeder is 5.63 KA for SLG fault at Lapanga Bus
TMS of Neutral earth fault setting should be selected such that operating time will be more then Zone-3 time + 100ms
PMS =0.1
Operating time 1.1 sec
Operating Charactersitic -SI
Fault current = 5.63 KA
Calculated TMS =0.5424

2 OPGC Sundergarh Feeder
Maximum fault current contribution by OPGC feeder is 4.8 KA for SLG fault at Sundergarh PGCIL Bus
TMS of Neutral earth fault setting should be selected such that operating time will be more then Zone-3 time + 100ms
PMS =0.1
Operating time 1.1 sec
Operating Charactersitic -SI
Fault current = 4.80 KA
Calculated TMS = 0.5157

3 Lapanga OPGC Feeder
Maximum fault current contribution by Lapanga feeder is 7.26 KA for SLG fault at OPGC Bus
TMS of Neutral earth fault setting should be selected such that operating time will be more then Zone-3 time + 100ms
PMS =0.1
Operating time 1.1 sec
Operating Charactersitic -SI
Fault current = 7.26 KA
Calculated TMS = 0.5854

4 Sundergarh PGCIL OPGC Feeder
Maximum fault current contribution by OPGC feeder is 7.21 KA for SLG fault at OPGC Bus
TMS of Neutral earth fault setting should be selected such that operating time will be more then Zone-3 time + 100ms
PMS =0.1
Operating time 1.1 sec
Operating Charactersitic -SI
Fault current = 7.21 KA
Calculated TMS = 0.5841

Present Setting	**PMS**	**TMS**	**Curve**	**CTR**
OPGC Lapanga feeder	0.2	0.25	SI	2000/1
OPGC PGCIL feeder	0.2	0.25	SI	2000/1
PGCIL End	0.1	0.51	SI	2000/1
Lapanga End	0.2	0.38	SI	2000/1
GT Standby EF	0.1	7	Def	1250/1
Proposed Setting	**PMS**	**TMS**	**Curve**	**CTR**
OPGC Lapanga feeder	0.1	0.54	SI	2000/1
OPGC PGCIL feeder	0.1	0.51	SI	2000/1
PGCIL End	0.1	0.58	SI	2000/1
Lapanga End	0.1	0.58	SI	2000/1
GT Standby EF	0.16	1	SI	1250/1