



भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
पूर्वी क्षेत्रीय विद्युत समिति

Eastern Regional Power Committee

14, गोल्फ क्लब रोड, टॉलीगंज, कोलकाता-700033
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संयुक्त राष्ट्र
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सं./NO. पू.क्षे.वि.स./PROTECTION/2023/738

दिनांक /DATE: 24.08.2023

सेवा में / To,

संलग्न सूची के अनुसार / As per list enclosed.

विषय : दिनांक – 20.07.2023 को आयोजित 128 वीं पीसीसी बैठक का कार्यवृत्त ।

Sub: Minutes of the 128th PCC meeting held on 20.07.2023

महोदय/ Sir,

20.07.2023 को आयोजित 128 वीं 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 128th PCC meeting of ERPC held on 20.07.2023 available at ERPC website (<http://www.erpc.gov.in/>).

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

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

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

This issues with approval of Member Secretary, ERPC.

भवदीय / Yours faithfully,

P.P. Jena

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

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Minutes of 128th PCC Meeting

Date: 25/08/2023
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 128th PROTECTION COORDINATION SUB-COMMITTEE MEETING HELD ON 20.07.2023 AT 10:30 HRS THROUGH MS TEAMS

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

PART – A

ITEM NO. A.1: Confirmation of Minutes of 127th Protection Coordination sub-Committee Meeting held on 22nd June 2023 through MS Teams online platform.

The minutes of 127th Protection Coordination sub-Committee meeting held on 22.06.2023 was circulated vide letter dated 10.07.2023.

Members may confirm.

Deliberation in the meeting

Members confirmed the minutes of the meeting.

PART – B

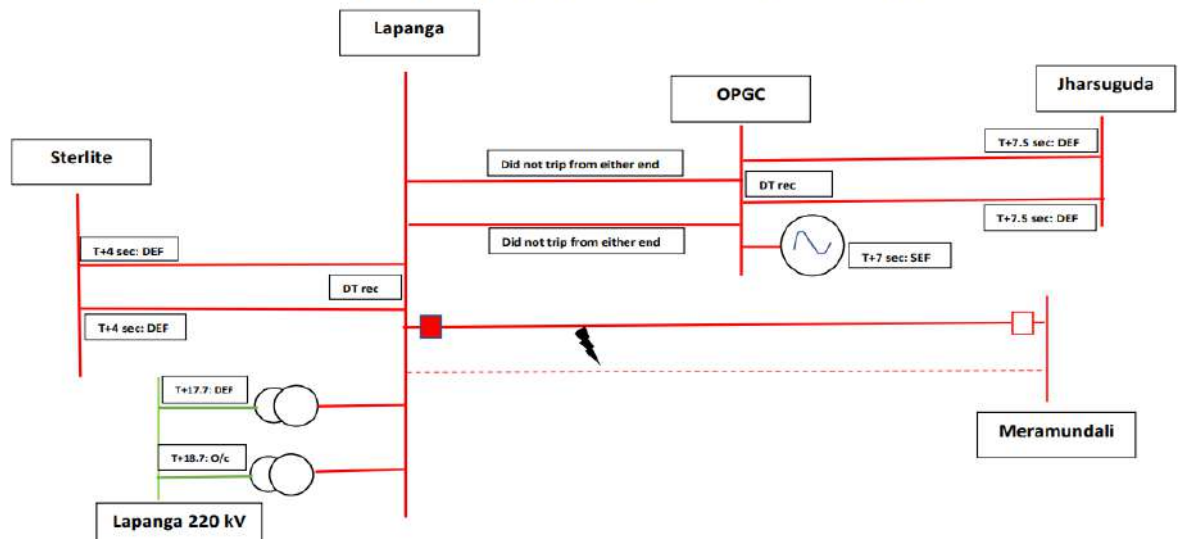
ITEM NO. B.1: Disturbance at 400 kV Lapanga (OPTCL) S/s and 400 kV OPGC S/s on 10.06.2023 at 17:27 Hrs

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

In 127th PCC Meeting, The event is explained as below:

- Due to due to bad weather conditions and localized storm, tower collapse occurred for 400 kV Meramundali-Lapanga D/C line at 16:21 hrs.
- At 17:26 Hrs, while charging attempt was made for 400 kV Meramundali-Lapanga-1 from Meramundali end, line got tripped in distance protection instead of SOTF protection. Subsequently after 1-minute charging attempt was again done from Lapanga end however line tripped after persistence of fault for 17-18 second.
- As fault was persisted for 17-18 seconds, other feeders also at 400 kV Lapanga S/s got tripped which led to total power failure at 400 kV Lapanga and OPGC S/s.

Disturbance at Lapanga, OPGC at 17:27 hrs on 10.06.2023



ERLDC representative enquired OPTCL about reason for taking charging attempt of line from Lapanga end even after failed attempt from Meramundali end to which OPTCL representative informed that due to communication gap between the two S/s, charging attempt was repeated for line.

PCC advised SLDC Odisha to ensure proper coordination between substations during charging of the line and advised OPTCL to sensitize the substation personnel for adhering the standard procedure during the charging of the line. This would avoid unwanted tripping and disturbance in the system which may affect reliability and security of the grid.

It was observed that instead of sufficient fault current, neither distance protection nor DEF operated for 400 kV Meramundali-Lapanga-1 at Lapanga end due to which fault got persisted for 17-18 seconds and led to tripping of other feeders from remote end.

GT of unit 4 at OPGC tripped in SEF protection in T+7 second. Further due to non- tripping of 400 kV OPGC -Lapanga-d/c from both ends, 400 kV OPGC – Jharsuguda d/c tripped in DEF from Jharsuguda end in T+7.5 second with DT sent to OPGC end. This led to total power failure at 400 kV OPGC S/s.

PCC advised OPTCL for root cause analysis of the event and a report along with DR/EL shall be submitted to ERPC/ERLDC. The issue would be discussed in next PCC Meeting.

Gen. Loss: 580 MW

Outage Duration: 01:42 Hrs

OPTCL and OPGC may update.

Deliberation in the meeting

The following discrepancies were observed during the disturbance:

- *During tripping of 400 kV Meramundali- Lapanga-1 at 16:21 Hrs, instead of open status of Y phase breaker from Lapanga end, 108 A current was available in Y phase.*
- *Further no auto-recloser attempt was made by main CB and single-phase tripping was observed for tie CB even after failed auto reclose attempt instead of three phase tripping.*

- At 16:25 hrs, 400 kV Meramundali- Lapanga -2 line got tripped from Meramundali end within 100 ms however it tripped after 400 ms in zone 2 from Lapanga end even after receipt of carrier which shows delayed tripping from Lapanga end.
- At 17: 25 hrs, while charging 400 kV Meramundali- Lapanga -1 from Meramundali end, line got tripped in distance protection instead of SOTF protection and further just after 58 seconds charging attempt was again made from Lapanga end even after failed charging attempt from Meramundali end. This led to operation of DEF relay at adjacent S/s due to persistence fault for 18 seconds ultimately leading to total power failure at 400 k V Lapanga and OPGC S/s.

At Lapanga/OPGC end, the following protection issues were observed:

- *In forward direction of fault, no protection attempt was seen from Lapanga end*
- *Tripping of 400/220 kV ICT-2 at Lapanga after 1 second delay of tripping of ICT 1 which shows that there might be issue of CT saturation as different current is seen by both ICTs.*
- *Non-tripping of 400 kV Lapanga – OPGC d/c from OPGC end which justifies fact that DEF settings at OPGC end need to be reviewed*
- *Tripping of unit 4 at OPGC due to improper SEF settings.*

OPTCL replied as follows:

At Meramundali end, SOTF protection had operated during the tripping of the line at 17:25 hrs and details in this regard will be shared to ERPC/ERLDC.

Regarding no auto-recloser attempt was made by main CB and single-phase tripping observed for tie CB after failed auto reclose attempt instead of three phase tripping, they replied due to BCU logic problem, the issue has been observed recently. They have disabled auto recloser function for main CB (M/s GE make) and are planning test the A/R scheme. PCC advised to test auto-reclose and CB at the earliest.

At Lapanga end, they suspected that main breaker of 400 kV Meramundali- Lapanga -1 is faulty and therefore instead of open status of Y phase breaker from Lapanga end, 108 A current was available in Y phase. They are planning to test it during line shutdown. PCC advised OPTCL to take emergency shutdown and test the breaker at earliest.

Regarding no protection attempt taken from Lapanga end in forward direction, OPTCL representative replied that main 1 and main 2 distance protection had not picked up during the disturbance however DEF protection had picked. PCC advised OPTCL to test both main-1 & main-2 relay at Lapanga end for Meramundali line.

Regarding tripping of 400 kV Meramundali- Lapanga -2 in zone 2 from Lapanga end even after receipt of carrier, OPTCL representative replied that no discrepancy was found and earlier there was no such issue reported. PCC advised that the carried aided tripping scheme may be checked.

Regarding tripping of 400/220 kV ICT-2 after 1 second delay of tripping of ICT 1, OPTCL representative replied that 880 A current was seen by ICT 1 and 620 A current was seen by ICT 2 resulting in delayed tripping. PCC advised OPTCL representative to review O/C and DEF protection settings of ICTs.

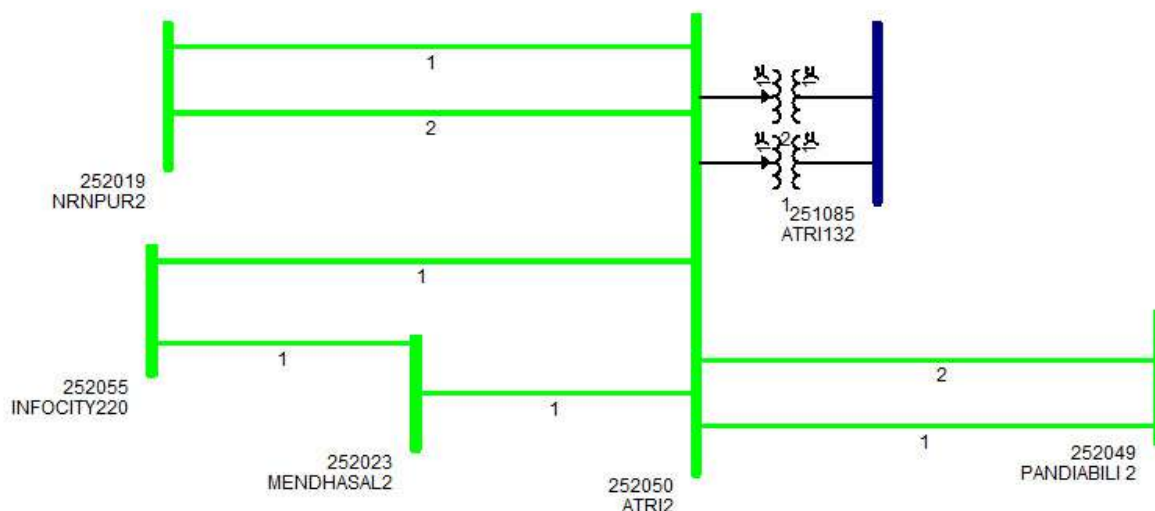
Regarding Non-tripping of 400 k V Lapanga – OPGC D/C from OPGC end in DEF protection, OPGC representative replied that as per the present setting in relay, pickup is at 400 A for both circuits however during disturbance pick up was observed for only one circuit for a very small time as current was around 270 A. PCC advised OPGC to review DEF settings and it need to be

coordinated with Jharsuguda(Powergrid) as well as Lapanga end. OPGC was also a to review SEF settings at unit 4.

ERLDC opined that as per operational procedure SLDC must ensure that after failed charging attempt of line from one end, next attempt should be done after proper testing and patrolling. And charging attempt instruction should be clearly directed by SLDC mentioning the end from which charging attempt should be taken as this is responsibility of SLDCs to ensure proper coordination between all connected S/s in their control area. PCC advised SLDC Odisha to prepare a SOP regarding charging of the transmission lines and the same shall be followed to avoid this type of incidents in future.

ITEM NO. B.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.

On 16.06.2023 at 10:02 Hrs, HVDC Talcher-Kolar Pole-1 got blocked leading to high loading of 400 kV TSTPP-Meramundali D/c and 400 kV Meramundali-Mendhasal D/c. To control loading of these lines, load reconfiguration was being done in downstream at Narendrapur and Atri. Load of Aska, New Aska and Purushottampur which were fed from Bhanjnagar was shifted to Narendrapur. Entire load of Narendrapur and Atri was put on single line i.e., 220 kV Therubali-Narendrapur. This line got overloaded and tripped, leading to total supply failure at Narendrapur and Atri S/s.



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

Load Loss: 244 MW

Outage Duration: 00:31 Hrs

OPTCL may explain.

Deliberation in the meeting

OPTCL representative informed that on 16.06.2023 at 10:40 Hrs, 220 kV Narendrapur- Gunupur- Therubali got tripped due to fault in the line. Thereafter, the entire load of Atri and Narendrapur was fed through single line (600A Current) i.e., 220 kV Therubali-Narendrapur.

He added that pick up by overcurrent protection relay was not observed for either end for 220 kV Therubali-Narendrapur, however line got tripped from Therubali end in zone 1 distance protection due to maloperation of relay. The DR could not be extracted due to communication issue with relay. He appraised that they are [planning to replace the faulty relay at the earliest.

ERLDC representative informed that as per PMU observation at Indravati end, there was no fault in system at that time so it is expected that relay might have mal-operated therefore he advised OPTCL representative to test the relay for its healthiness.

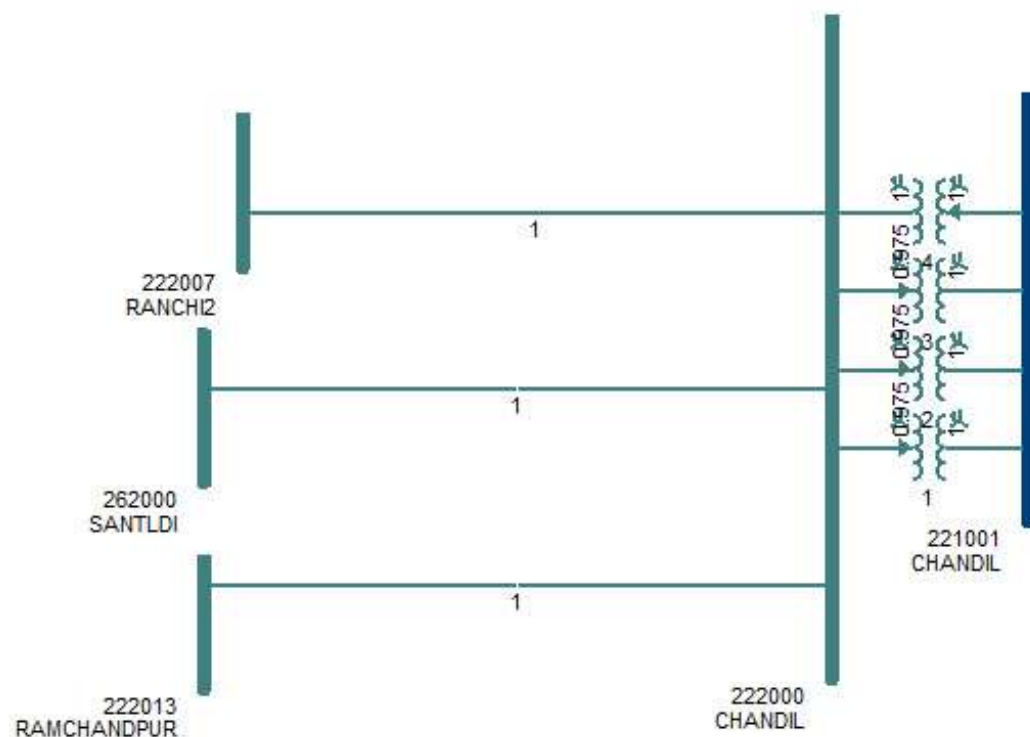
Regarding timeline of replacement of relay, OPTCL representative replied that it is expected that relay will be replaced by August 2023.

On a separate query on o/c settings kept at Therubali end for the 220 kV Therubali-Narendrapur line, OPTCL representative replied that pickup setting was 125 % (750 A) along with IDMT time settings. ERLDC representative submitted that as per the report, 777 A phase current was observed during the incident, so overcurrent protection should have picked up during the incident. PCC advised to test the Overcurrent Protection at Therubali end as well. Further PCC recommended that two main protection (main-1 & main-2) shall be implemented in 220 kV lines as per the CEA standard.

ITEM NO. B.3: Total Power failure at 220 kV Chandil (JUSNL) S/s on 10.06.2023 at 17:00 Hrs.

220 kV Ranchi-Chandil was under breakdown and 220 kV Santaldih-Chandil was switched off to limit loading of 220 kV Ramchandrapur-Chandil. 220 kV Ramchandrapur-Chandil was the only source during the disturbance. 220 kV Ramchandrapur-Chandil line got tripped due to operation of LBB at Chandil S/s leading to total supply failure at Chandil S/s.

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



Load Loss: 170 MW
Outage Duration: 00:29 Hrs

JUSNL may explain.

Deliberation in the meeting

The disturbance occurred as follows:

- 220 kV Ranchi-Chandil was under shutdown for testing of insulation resistance of CT. During the testing, DC supply was kept off in the panel and secondary of CT was also opened.
- 220 kV Santaldih-Chandil was switched off during the testing to limit loading of 220 kV Ramchandrapur-Chandil. 220 kV Ramchandrapur-Chandil was the only source during the disturbance and 170 MW load flow was observed for this line prior to incident.
- At 17:00 hrs, 220 kV Ramchandrapur-Chandil line got tripped due to operation of LBB at Chandil S/s leading to total supply failure at Chandil S/s.

Regarding operation of LBB protection at Chandil end, JUSNL representative replied that DR was not generated in any of the relay during the tripping due to which the disturbance could not be analyzed.

On enquiry from ERLDC representative regarding status of balancing of DC system, JUSNL representative replied that DC system was found unbalanced and details will be shared to ERPC/ERLDC.

PCC observed that JUSNL have neither submitted event details, SOE, report etc. to ERLDC/ERPC nor they have carried out any disturbance analysis on their own even after passing of one month from the incident. 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.

ITEM NO. B.4: Disturbance at 400 kV Teesta III S/s and 400 kV Dikchu S/s on 28.06.2023 at 02:28 Hrs

On 28.06.2023 at 02:28 Hrs, Resistive fault struck at 400 kV Rangpo-Teesta 3 and 400 kV Rangpo-Dikchu and both lines got tripped. 400 kV Teesta 3-Dikchu also got tripped at the same time. All six units at Teesta 3 and two units at Dikchu also tripped during the incident.

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

Gen. Loss: 1410 MW
Outage Duration: 00:28 Hrs

TUL, Dikchu HEP & Powergrid may explain.

Deliberation in the meeting

Based on the DR analysis, ERLDC representative informed following:

- A resistive fault struck 400 kV Rangpo-Dikchu in Y_B phase. Subsequently 400/132 kV ICT got tripped at Dikchu end before tripping of line.

- Further 400 kV Rangpo-Teesta-3 also sensed the fault in Y_B phase and later on changed to R_B fault.
- Meanwhile 400 kV Teesta 3-Dikchu line tripped from Teesta-3 on DEF, O/c protection and DT was received at Dikchu resulting in tripping of line from both ends without any fault in line which was caused due to enabling definite time of 1.5 second for O/C E/F protection at Teesta III end.
- After tripping of this line and transformer or unit at Dikchu end, there was no source at Dikchu end to feed the fault in Dikchu- Rangpo line.
- B-phase current got increased from Rangpo end and 400 kV Rangpo-Dikchu tripped from Rangpo end on Zone-2 protection.
- Y phase of 400 kV Teesta-3-Rangpo tripped from Teesta 3 in Zone-1 with sending of carrier to remote end, however, Rangpo end sensed the fault in zone 2 for this line. He further informed that meanwhile, for 400 kV Teesta-3-Rangpo line as only Y phase was opened from Teesta III end and simultaneously R and B phase current was increasing that resulted in zero sequence mutual coupling causing ultimately overvoltage in Y phase at Teesta III end leading to operation of O/V stage 2 at Teesta-3 end and DT was sent to remote end.

On enquiry from PCC regarding physical location of fault, TPTL representative informed that patrolling was done after the incident, however they did not find any fault location physically and line was also charged within 20 min only. He further informed that on day of incident, weather condition was extremely vulnerable so it might had caused in development of temporary fault as it is lightning prone area.

ERLDC representative enquired PRDC representative whether pickup settings for DEF can be reduced to 10 % (from 20 % at present) to which they replied that as per the guidelines, it can be kept in between 10% to 20 % so there is no issue in revising it to 10 % with IDMT time characteristics.

After detailed deliberation, the following was decided;

- Dikchu HEP to coordinate relay time settings of 400/132 k V 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.
- 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.

ITEM NO. B.5: Repeated tripping of 400 kV Meramundali-Mendhasal d/c on 12.06.2023

400 kV Meramundali-Mendhasal D/c got tripped thrice on 13.06.2023. As reported, 400 kV Meramundali-Mendhasal-2 got tripped due to R phase fault and other circuit got tripped on back Up O/c. It is observed that line loading was around 600 MW in each circuit.

In 123rd PCC, the issue of sag was already highlighted, and these lines were included for proactively taking up preventive maintenance, however the issue is persisting.

Reply for following issues are required from concerned utility:

- Nature of the fault and remedial measures taken for such tripping.
- Tripping of other parallel circuit in Back Up O/c.
- Enabling of Back Up O/c protection for any other lines in OPTCL system owing to transmission constraint.

In 127th PCC Meeting, ERLDC representative explained the incident with help of report which is attached at **Annexure B.5**. It was informed that 400 kV Meramundali-Mendhasal-2 got tripped due to R phase fault and subsequently other circuit got tripped on back up O/C protection. It was reported that circuit 2 had tripped due to clearance and sag issues in the line. It was highlighted that though O/C protection is not recommended for 400 kV lines, Meramundali-Mendhasal circuit-1 tripped on the O/C protection.

The reason keeping O/C protection in 400 kV line could not be explained by OPTCL in the meeting. It was decided that the issue would be discussed in next PCC meeting. OPTCL was advised to share the list of lines in their network where overcurrent protection has been implemented owing to transmission constraints and further the reason for enabling overcurrent protection in 400 kV Meramundali-Mendhasal line.

OPTCL may update.

Deliberation in the meeting

OPTCL representative informed that prior to the grid disturbance around 1300 MW was flowing through 400 kV Meramundali-Mendhasal D/c and 400 kV Meramundali- New Duburi D/c cumulatively. However due to tower collapse at New Duburi, the entire power started to flow through 400 kV Meramundali-Mendhasal D/c. Meanwhile 400 kV Meramundali-Mendhasal circuit 1 got tripped in zone 3 due to sag issue which lead to picking of directional o/c relay for 400 kV Meramundali-Mendhasal circuit 2 and line got tripped as per IDMT characteristics.

On enquiry from ERLDC regarding provision of keeping the o/c protection for the line, OPTCL representative replied that after protection audit by CPRI in 2014, it was recommended by them to implement directional o/c protection subsequently it was implemented.

PCC opined that incase of such conditions where N-1 conditions is getting failed it is better to do load shedding or subsequently hand tripping of line if required instead of keeping overcurrent protection. OPTCL was advised to disable the overcurrent protection from all 400 k V lines in their system. Further it was opined that incase frequent tripping of line due to not meeting N-1 criteria, then matter may be placed in PCC Meeting so that decision can be taken regarding implementing SPS scheme for the line.

PCC further advised OPTCL to take necessary actions to address clearance and vegetation issues in the line.

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

Bus tripping occurred in Eastern Region during June 2023

Element Name	Tripping Date	Reason	Utility
400 kV Main Bus-1 at Durgapur	05.06.2023 at 00:08 Hrs	Bus bar protection operated	PG ER-2
400 kV Main Bus-2 at Jharsuguda	20.06.2023 at 20:26 Hrs	Bus bar protection operated due to failure of Y_ph CT of 407 bay	PG Odisha

Report from PG Odisha for Bus tripping at Jharsuguda is attached at **Annexure B.6**.

Concerned utilities may explain.

Deliberation in the meeting

- ***Tripping of 400 kV Main Bus-1 at Durgapur on 05.06.2023 at 00:08 Hrs***

Powergrid representative informed that on 05.06.2023 at 00:08 Hrs, bus bar protection had mal operated due to faulty bus bar relay. The faulty relay had already been replaced for both 400 kV Main 1 bus and Main 2 bus at Durgapur.

- ***Tripping of 400 kV Main Bus-2 at Jharsuguda/ Sundargarh on 20.06.2023 at 20:26 Hrs***

*Powergrid representative explained the event with help of report which is attached at **Annexure B.6.1**. He informed that due to adverse weather condition, 02 Nos. SIEMENS make CT got failed in 400 kV Switchyard leading to tripping of 400 kV Busbar 2, ICT-1 and 400 kV Sundargarh-Raigarh circuit 1 and 2.*

Y Phase CT of Main Bay of 400 kV Sundargarh-Raigarh circuit 1 and B Phase CT of Tie Bay of ICT-1 and 400 kV Sundargarh-Raigarh circuit 2 got failed. Due to failure of Y Ph-CT, 400 kV Busbar 2 got tripped.

ITEM NO. B.7: Repeated Tripping of 400 kV FSTPP-Sagardighi-1

400 kV FSTPP-Sagardighi-1 had tripped thrice in the month of June without any fault. It is observed that both ends received DT signal.

On Investigation it was found that Sagardighi end had echo logic for direct trip signal and whenever it receives DT, it will echo it back to remote S/s. It is informed by concerned utility that PLCC channel-2 of the line is malfunctioning and is sending DT and thereafter Channel-2 was disabled.

WBPDC/NTPC may update.

Deliberation in the meeting

WBPDC representative informed that relay at Sagardighi end had echo logic for direct trip signal and whenever it receives DT, it will echo it back to remote S/s. NTPC representative informed that PLCC channel-2 of the line is malfunctioning and is sending DT and thereafter Channel-2 had been disabled.

Powergrid representative informed that issue had been reported to M/s ABB and it is expected that issue will be resolved by Aug-23.

On enquiry from PCC regarding issue of echo logic at Sagardighi end, WBPDC representative replied that issue will be resolved by disabling echo logic once line shutdown is available.

ITEM NO. B.8: Review of existing islanding schemes in Eastern Region

In 127th PCC Meeting, SLDC Odisha representative informed that most of islanding schemes as listed are from Odisha system therefore a separate meeting may be convened in this regard with all the CPPs to review status of these islanding schemes.

Regarding islanding schemes in West Bengal, PCC advised WB SLDC to review status of these islanding schemes in consultation with the concerned utilities.

Members may discuss.

Deliberation in the meeting

ERLDC representative informed that as islanding is last mechanism to prevent complete collapse of the grid so all islanding schemes in eastern regions even for CPPs need to be reviewed so that in case of emergency this last defense mechanism can make eastern region grid survive.

DVC representative informed that new islanding scheme at CTPS is going to be implemented and will be in service by first week of Aug 2023.

It was decided that state wise islanding schemes would be reviewed in coming PCC Meetings.

ITEM NO. B.9: Tripping Incidence in month of June-2023

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

Members may discuss.

Deliberation in the meeting

*Explanation from constituents of either end for single line tripping incidents in the month of May-2023 is attached at **Annexure B.9.***

PART- C :: OTHER ITEMS

ITEM NO. C.1: 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.

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

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

In 127th PCC Meeting, ERPC representative informed that scheme details received from TPTL had been shared to Powergrid. The same is enclosed at **Annexure C.1**.

PCC advised Powergrid representative to share observations on the scheme submitted by TPTL.

Further, TPTL has intimated that M/s GE is going to present the scheme in 127th PCC Meeting.

TPTL may update.

Deliberation in the 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.1.1**. 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.

ITEM NO. C.2: Discussion on Protection Code of IEGC 2023

IEGC 2023 has been published by CERC and it is expected to be notified soon. As per Protection Code of IEGC 2023, several additional works have been assigned to each entity to ensure resilient system operation.

Members may discuss.

Deliberation in the meeting

ERLDC representative informed that IEGC 2023 has been published by CERC and it is expected to be notified soon. As per Protection Code of IEGC 2023, several additional works have been

assigned to each entity like internal protection audit and its compliance, third party protection audit, submission of protection performance indices on mothy basis etc. to ensure resilient system operation.

PCC advised all utilities to go through protection code of IEGC 2023 and take necessary preparatory measures for implementation of the assigned tasks.

ITEM NO. C.3: 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 May 2023 is given at **Annexure C.3**.

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 concerned utilities to share pending relay settings in desired format to erpc-protection@gov.in or upload the relay settings in PDMS by using DMNS portal

ITEM NO. C.4: 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 decision of previous PCC meetings is attached at **Annexure C.4**.*

Name	First Join	Email
Akash Kumar Modi	7/20/23, 10:20:13 AM	akmodi@erldc.onmicrosoft.com
Alok Pratap Singh	7/20/23, 10:18:54 AM	apsingh@erldc.onmicrosoft.com
E&MR Division , OPTCL, Burla (Guest)	7/20/23, 10:19:12 AM	
ERPC Kolkata	7/20/23, 10:19:12 AM	ERPC@KolkataMST.onmicrosoft.com
ABAKASH ADHIKARY	7/20/23, 10:19:12 AM	abakash.adhikary@dvc.gov.in
Jyotirmaya Das	7/20/23, 10:19:13 AM	
OPTCL MERAMUNDALI	7/20/23, 10:19:14 AM	
suryakanta pradhan	7/20/23, 10:19:24 AM	
DGM ,EMR ,(OPTCL) Berhampur	7/20/23, 10:19:45 AM	
Sankhadeep Choudhury	7/20/23, 10:20:08 AM	
P MONDAL	7/20/23, 10:21:26 AM	
SLDC,ODISHA	7/20/23, 10:22:16 AM	
Hareesh Puthiyadath	7/20/23, 10:26:55 AM	hareesh.p@greenkogroup.com
Aarif M Dikchu (Guest)	7/20/23, 10:26:55 AM	
Debdas Mukherjee, WBPCL (Guest)	7/20/23, 10:27:53 AM	
NIRMAL MONDAL (WBSETCL) (Guest)	7/20/23, 10:27:55 AM	
shanker	7/20/23, 10:27:58 AM	
SMS SAHOO, DGM(ELECTRICAL), OPTCL, BHUNESWAR	7/20/23, 10:28:18 AM	
Somnath Chatterjee	7/20/23, 10:28:19 AM	schatterjee@tatapower.com
Agniva Chatterjee ERPC (Guest)	7/20/23, 10:28:26 AM	
Bilash Achari	7/20/23, 10:28:48 AM	bilash.achari@erldc.onmicrosoft.com
lapanga division	7/20/23, 10:28:50 AM	
Mithun Gayen {मिथुन गायेन}	7/20/23, 10:29:57 AM	mithun.gayen@powergrid.in
arindam bsptcl	7/20/23, 10:30:17 AM	
Shyamal Konar	7/20/23, 10:30:22 AM	konar_s@erldc.onmicrosoft.com
N S MONDAL (Guest)	7/20/23, 10:30:41 AM	
Aman	7/20/23, 10:32:56 AM	an@sikkimurjalimited.in
VIJAY CHANDRA TEESTA-III (Guest)	7/20/23, 10:32:59 AM	
prabhat kumar (TPTL)	7/20/23, 10:33:31 AM	
Dilip kant jha EEE CRITL	7/20/23, 10:33:45 AM	
Chandan kumar	7/20/23, 10:34:18 AM	chandan@erldc.onmicrosoft.com
CE,CRITL (Guest)	7/20/23, 10:34:41 AM	

Yamana Ayyappa	7/20/23, 10:34:49 AM	ya@sikkimurjalimited.in
Kritika Debnath, Grid-India (Guest)	7/20/23, 10:34:49 AM	
Rahul Anand	7/20/23, 10:34:49 AM	RAHULANAND@NTPC.CO.IN
Shabari Pramanick	7/20/23, 10:34:53 AM	shabari.pramanick@erldc.onmicrosoft.com
Amresh Prusti	7/20/23, 10:35:29 AM	amresh.prusti@opgc.co.in
Saurav Kr Sahay	7/20/23, 10:35:30 AM	saurav.sahay@erldc.onmicrosoft.com
Suraj gupta	7/20/23, 10:35:31 AM	
SOURABH JOSHI	7/20/23, 10:35:41 AM	
Saugato , Grid-India (Guest)	7/20/23, 10:35:41 AM	
ADWAIT KALYAN	7/20/23, 10:35:55 AM	ADWAITKALYAN@NTPC.CO.IN
EMR BBSR (Guest)	7/20/23, 10:35:55 AM	
SANTANU KUMAR BAHALI	7/20/23, 10:36:36 AM	SANTANUBAHALI@NTPC.CO.IN
OPTCL ATRI GRID (Guest)	7/20/23, 10:36:44 AM	
Pritam Goswami	7/20/23, 10:37:21 AM	pg@sikkimurjalimited.in
Mingma Lepcha	7/20/23, 10:37:45 AM	ml@sikkimurjalimited.in
Dilshad Alam BSPTCL	7/20/23, 10:39:24 AM	
Critl (Guest)	7/20/23, 10:39:50 AM	
PRDC PSS-Team	7/20/23, 10:39:52 AM	AyanMiddey@PRDCkolkata.onmicrosoft.com
Teesta-V Power Station (Guest)	7/20/23, 10:40:15 AM	
DEEPAK SINGH (Guest)	7/20/23, 10:40:39 AM	
P MONDAL(PRDC)	7/20/23, 10:41:08 AM	
NISAR HUSAIN	7/20/23, 10:42:49 AM	
Bablu Kumar Singh	7/20/23, 10:42:56 AM	bablu.singh@opgc.co.in
anil nanda	7/20/23, 10:43:44 AM	
pravin ram	7/20/23, 10:44:55 AM	
Pandi Krishnan N {पाण्डी कृष्णन एन.}	7/20/23, 10:44:56 AM	pandikrishnan.n@powergrid.in
Chilakalapalli Mohana Rao {सी एच मोहन राव}	7/20/23, 10:45:51 AM	mohan.rao@powergrid.in
Mihira	7/20/23, 10:46:36 AM	
GM, CRITL, JUSNL (Guest)	7/20/23, 10:47:17 AM	
S P Ramakrishnan	7/20/23, 10:54:39 AM	Ramakrishnan.SP@andritz.com
SPR	7/20/23, 10:56:18 AM	
A Basu AEE (Guest)	7/20/23, 10:59:27 AM	
BISWA RANJAN MOHANTY, SLDC ODISHA (Guest)	7/20/23, 10:59:38 AM	
V Anil Krishna (Guest)	7/20/23, 11:03:26 AM	

Shuvadeep Mitra PRDC (Guest)	7/20/23, 11:04:22 AM	
ashish	7/20/23, 11:06:25 AM	
Critl Bsptcl	7/20/23, 11:08:14 AM	
sudhir kumar/AEE/Chatra	7/20/23, 11:10:57 AM	
Ashok Kumar Sharma	7/20/23, 11:14:10 AM	
aditya jha	7/20/23, 11:14:57 AM	
Rakesh Ranjan Bsptcl	7/20/23, 11:19:09 AM	
Sayan (Guest)	7/20/23, 11:19:46 AM	
rp	7/20/23, 11:19:55 AM	
A, Gokulakrishnan (GE Vernova)	7/20/23, 11:24:38 AM	gokulakrishnan.a@ge.com
Nishant Kumar Shankwar	7/20/23, 11:27:38 AM	Nishant.Kumar@energy-sel.com
PATRALI MONDAL (Guest)	7/20/23, 11:28:17 AM	
Lapanga grid	7/20/23, 11:29:56 AM	
Sr. Manager , Daltonganj (Guest)	7/20/23, 11:32:06 AM	
BISWA RANJAN MOHANTY, SLDC ODISHA (Guest)	7/20/23, 11:32:42 AM	
Ayyappa	7/20/23, 11:41:29 AM	
Swapan Kumar Bhowmick	7/20/23, 11:46:01 AM	skb@sikkimurjalimited.in
mihira	7/20/23, 11:50:46 AM	
Anil Krishna	7/20/23, 11:58:57 AM	
Prasanta kumar Prusty	7/20/23, 12:12:14 PM	
sudhir kumar/AEE/Chatra	7/20/23, 12:22:37 PM	
Susil Barik	7/20/23, 12:33:05 PM	
SUMEET NARANG	7/20/23, 12:36:42 PM	SUMEETNARANG@NTPC.CO.IN
Jyotirmaya Das	7/20/23, 12:45:12 PM	
suraj (Guest)	7/20/23, 12:52:30 PM	
Premkant Kumar Singh	7/20/23, 1:25:20 PM	premkant@erldc.onmicrosoft.com
emr bbsr (Guest)	7/20/23, 1:30:02 PM	
Pritam Mukherjee	7/20/23, 1:31:08 PM	pritam@erldc.onmicrosoft.com
Raman Bharmauria	7/20/23, 1:35:48 PM	raman.bharmauria@opgc.co.in
Saibal Ghosh	7/20/23, 1:41:21 PM	saibal@erldc.onmicrosoft.com
Abakash Adhikary (DVC)	7/20/23, 1:42:09 PM	
Prasanta kumar Prusty	7/20/23, 1:55:32 PM	
arindam bsptcl	7/20/23, 2:02:34 PM	
Kritika Debnath, Grid-India (Guest)	7/20/23, 2:19:42 PM	

DHARMADAS TRIPATHI
RTAMC (Guest)
bsptcl
Ayyappa
Santosh Ghodekar, DEPL (Guest)
Critl
P k Prusty
Lily Choudhury
VALLAMSETTY ANIL KRISHNA {वेलमसेठी अनिल कृष्णा}

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7/20/23, 3:09:07 PM

dharmadas.tripathi@dvc.gov.in

LILYCHOWDHURY@NTPC.CO.IN
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घटना संख्या: 10-06-2023/2

दिनांक: 15-06-2023

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

Summary of the event (घटना का सारांश):

At 16:21 Hrs, 400 kV Meramundali-Lapanga-1 tripped due to Y_N fault. Subsequently, at 16:25 hrs, 400 kV Meramundali-Lapanga-2 tripped due to R_B_N fault. While taking charging attempt of 400 kV Meramundali-Lapanga 1 at 17:27 Hrs, 400 kV Side of Lapanga S/s and 400 kV OPGC S/s became dead. U#4 at OPGC also tripped due to loss of evacuation path. Generation loss of around 585 MW occurred at OPGC.

- **Date / Time of disturbance:** 10-06-2023 at 17:27 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 400 kV OPGC, 400/220 kV Lapanga S/s
- **Load and Generation loss.**
 - 585 MW generation loss occurred during the event at OPGC.
 - No load loss occurred during the event.

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

- NIL

Major elements tripped (प्रमुख ट्रिपिंग):

- 400 kV Meramundali-Lapanga D/c
- 400 kV Lapanga-Sterlite D/c
- 400 kV Jharsuguda-OPGC D/c
- 400/220 kV ICT-1&2 at Lapanga
- 660MW U#4 at OPGC

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

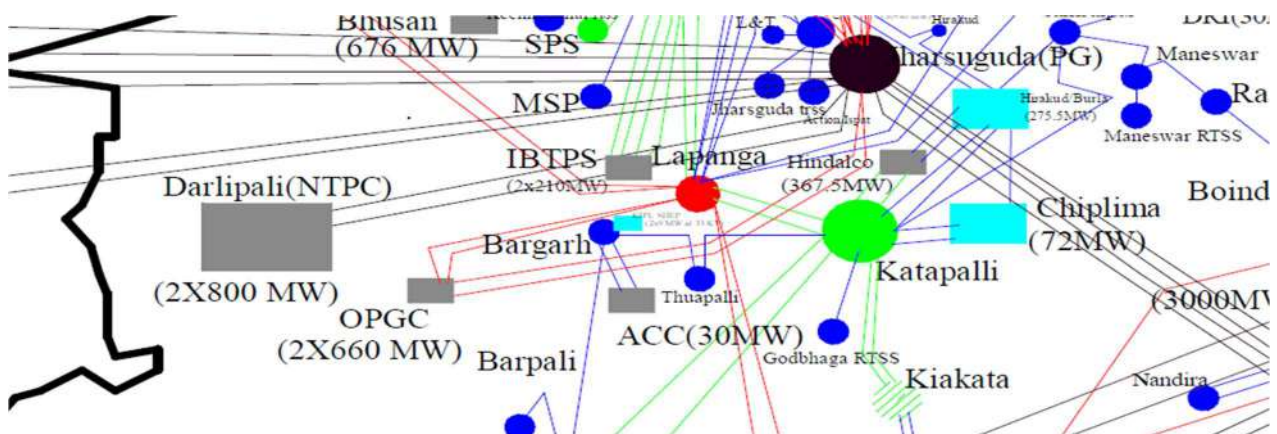


Figure 1: Network across the affected area

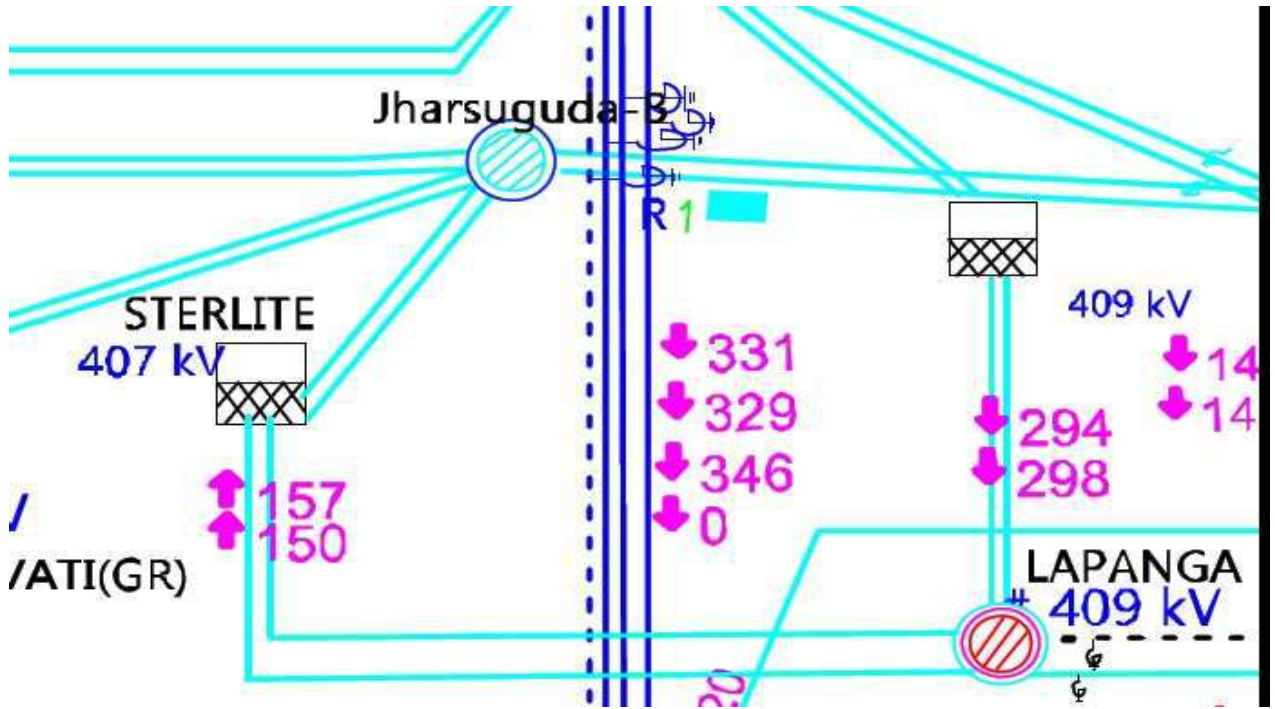


Figure 2: SCADA snapshot of the system

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
16:21	400 kV Meramundali-Lapanga-1	Meramundali: Y_N (Tripped at 16:25 Hrs)	Lapanga: Y_N, 1.09 kA	Fault in Y_ph
16:25	400 kV Meramundali-Lapanga-2	-	Lapanga: R_B, Zone-2, Ir=Ib=2.83 kA	Fault in R and B phase, cleared within 100 msec
17:27	400 kV Lapanga-Sterlite D/c	Lapanga: DT received	Sterlite: DEF operated	Fault in Y and B phase persisting for around 18 seconds
	400 kV Jharsuguda-OPGC D/c	Jharsuguda: DEF operated	OPGC: DT received	
	660 MW U#4 at OPGC	SEF operated		
	400/220 kV ICT-1&2 at Lapanga	Back Up O/c, E/f operated		

R_Y_B Currents

10/06 16:25 - 11/07 1

R Y B Phase Current

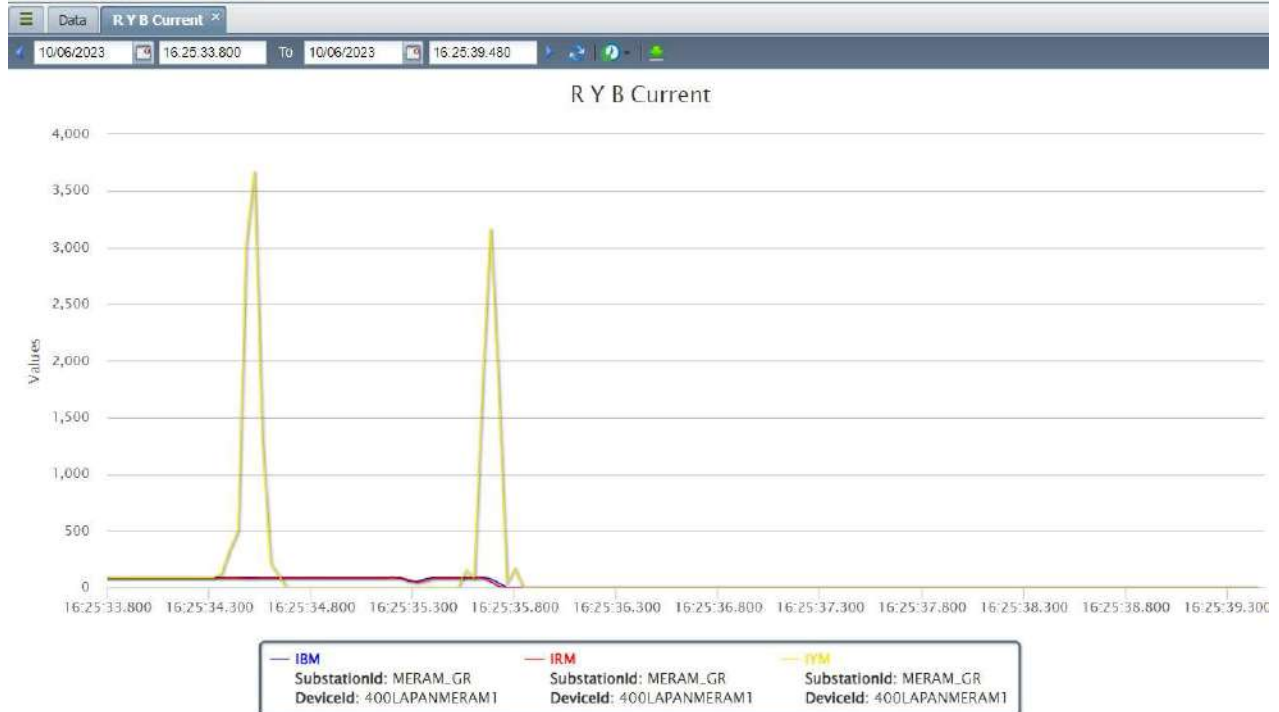


Figure 3: PMU Current snapshot of 400 kV Meramundali-Lapanga-1 @ Meramundali (16:25)

R_Y_B Currents

10/06 16:24 -

R Y B Phase Current

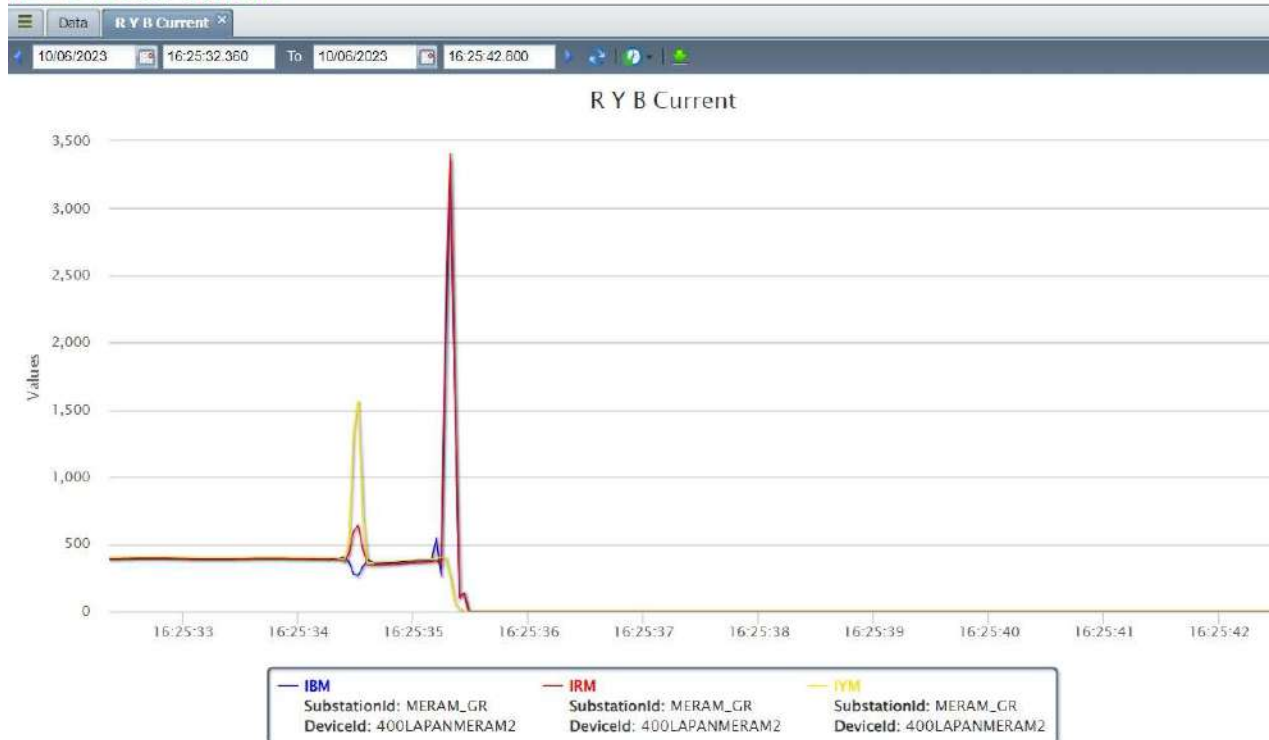


Figure 4: PMU Current snapshot of 400 kV Meramundali-Lapanga-2 @ Meramundali(16:25)

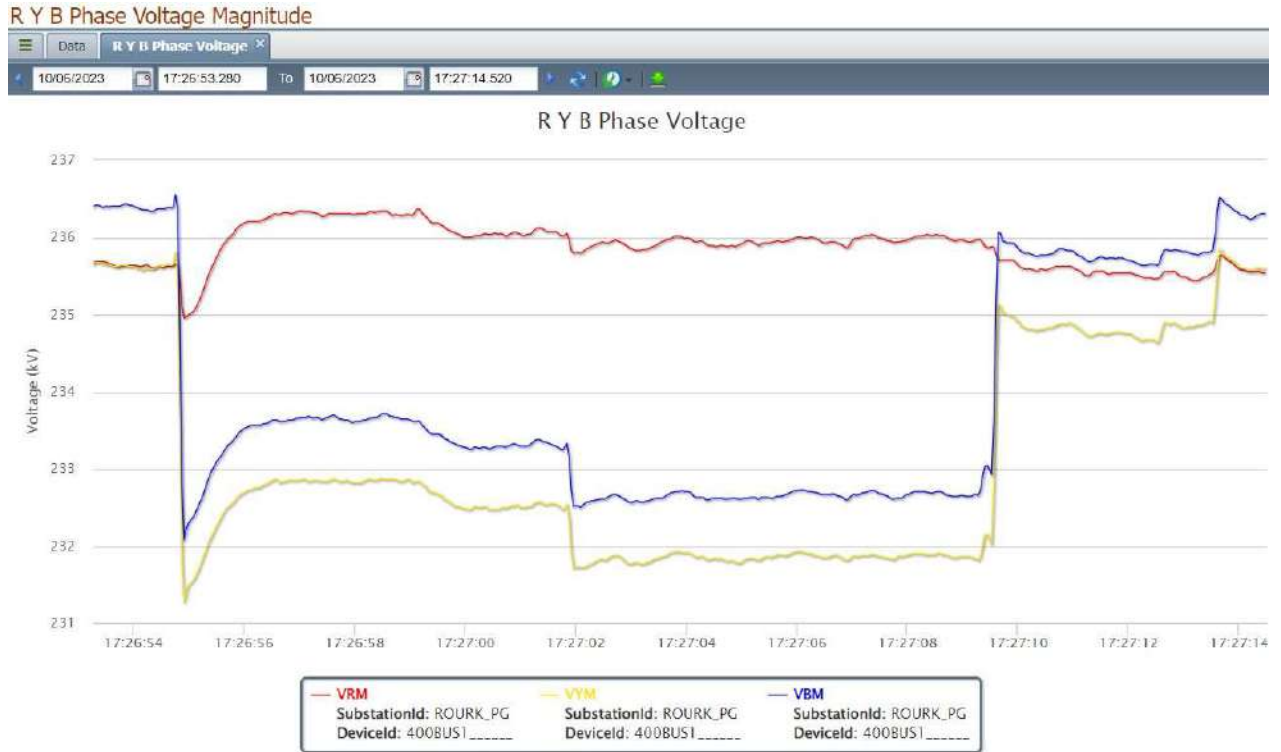


Figure 5: PMU Voltage snapshot of 400/220 kV Rourkela S/s (17:26)

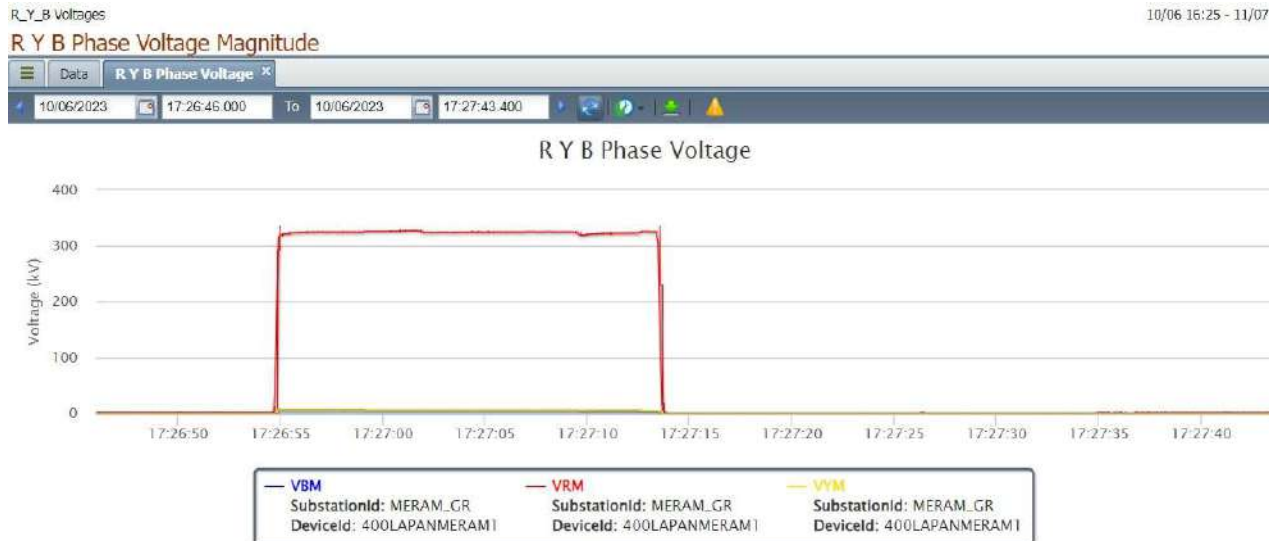


Figure 6: PMU Voltage snapshot of 400/220 kV Meramundali S/s (Charging attempt @ 17:26)

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Meramundali-Lapanga-1	03:15 (19.06.23)
400 kV Meramundali-Lapanga-2	03:28 (19.06.23)
400 kV Lapanga-Sterlite D/c	06:54/06:55 (11.06.23)
400 kV Jharsuguda-OPGC D/c	18:12/18:19
660 MW U#4 at OPGC	08:46 (11.06.23)
400/220 kV ICT-1&2 at Lapanga	-

Analysis of the event (घटना का विश्लेषण):

1. Tripping of 400 kV Meramundali-Lapanga 1 @ 16:21 Hrs

- Y_N fault struck the line, however line tripped from Lapanga end only.

At Lapanga:

- Y_ph breaker status is showing open for both main bay and tie bay, however, around 108 A current is available in Y_ph.
- After 1 second, tie bay Y_ph CB A/r attempted but failed current increase at the instant of A/R attempt was very less, at the failed A/R attempt, 3 phase tripping should have occurred but no distance Zones picked in DR and three phases also did not trip.
- At T+1.9 seconds, other two phase of only tie CB opened. R and B ph CB of main bay remained closed.
- As observed from SoE data, at T+3.2 seconds main bay R and B phase opened.

Issues: No A/r attempt by Main CB, single phase tripping by tie CB during failed AR attempt. Current in Y ph even after opening of CB.

At Meramundali (Tripped at 16:25 Hrs):

- Y_N fault struck the line, A/r attempt taken after 1 second which failed, and all three-phase tripped.

2. Tripping of 400 kV Meramundali-Lapanga 2 @ 16:25 Hrs

- During failed A/r attempt of 400 kV Meramundali-Lapanga-1 from Meramundali, R_B fault struck line-2.
- 400 kV Meramundali-2 tripped immediately from Meramundali within 100 msec, however it tripped after 400 msec in Zone-2 from Lapanga despite carrier receipt.

Issue: Delayed tripping from Lapanga despite carrier receipt.

3. Charging attempt of 400 kV Meramundali-Lapanga-1 from Meramundali @ 17:25 Hrs

Charging attempt of 400 kV Meramundali-Lapanga-1 was taken from Meramundali at 17:25 Hrs and line tripped on distance protection (Y_B_N fault) instead of SOTF.

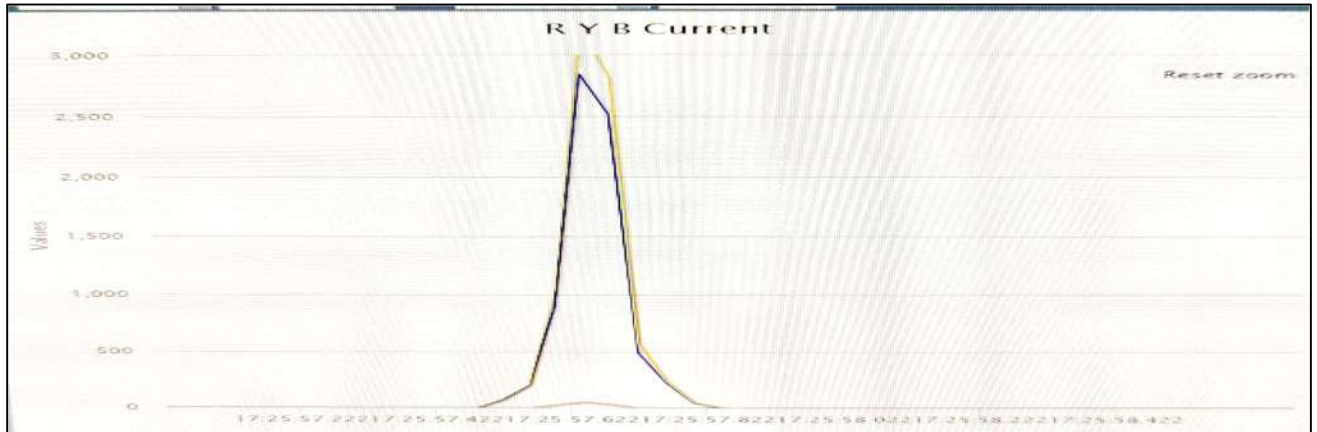
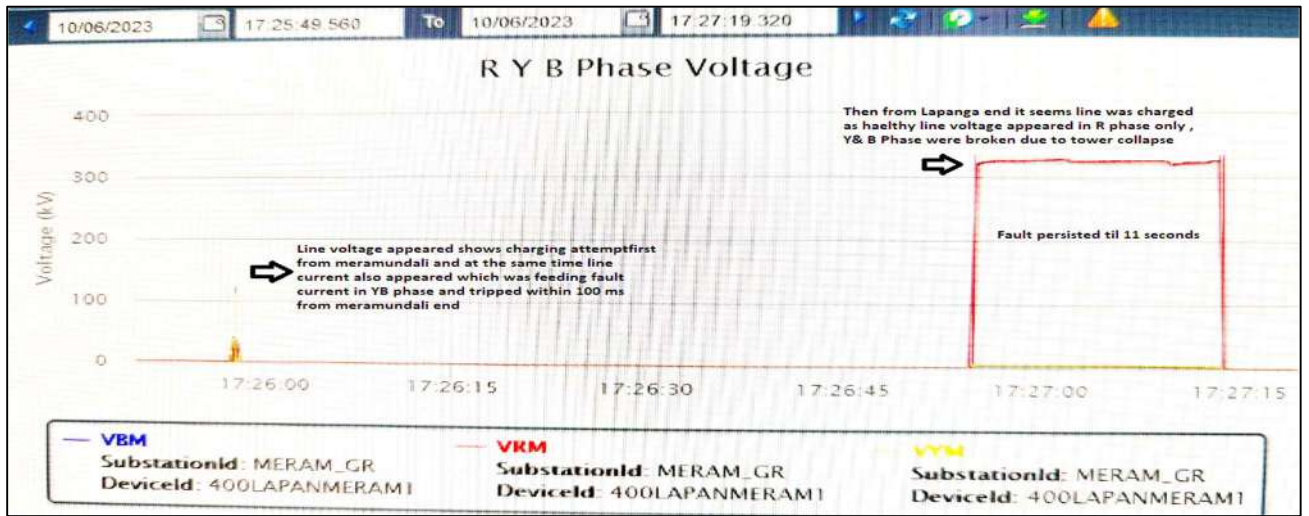
4. Charging attempt of 400 kV Meramundali-Lapanga-1 from Lapanga @ 17:27 Hrs

Just after 58 second from failed charging attempt of the line from Meramundali end, another charging attempt of the line taken from Lapanga and this time fault persisted for around 18 seconds till operation of DEF at adjacent S/s Sterlite, OPGC and Jharsuguda which led to total power failure at OPGC and 400 kV side of Lapanga S/s.

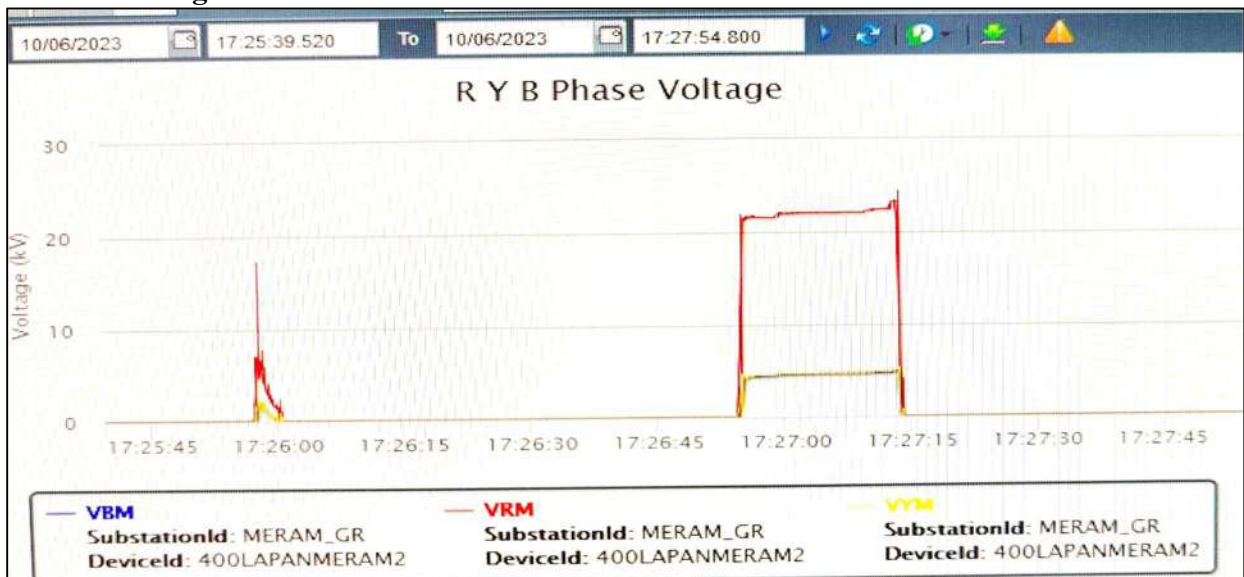
Below is the Line voltage & current plot at Meramundali end:

- Line voltage appeared shows charging attempt first from meramundali and at the same time, line current also appeared which was feeding fault current in YB phase and tripped within 100 msec from meramundali end.
- Then after 1 minute at 17:27 Hrs from lapanga end line was charged as healthy R phase line voltage appeared as Y&B Phase were already broken due to tower collapse and may

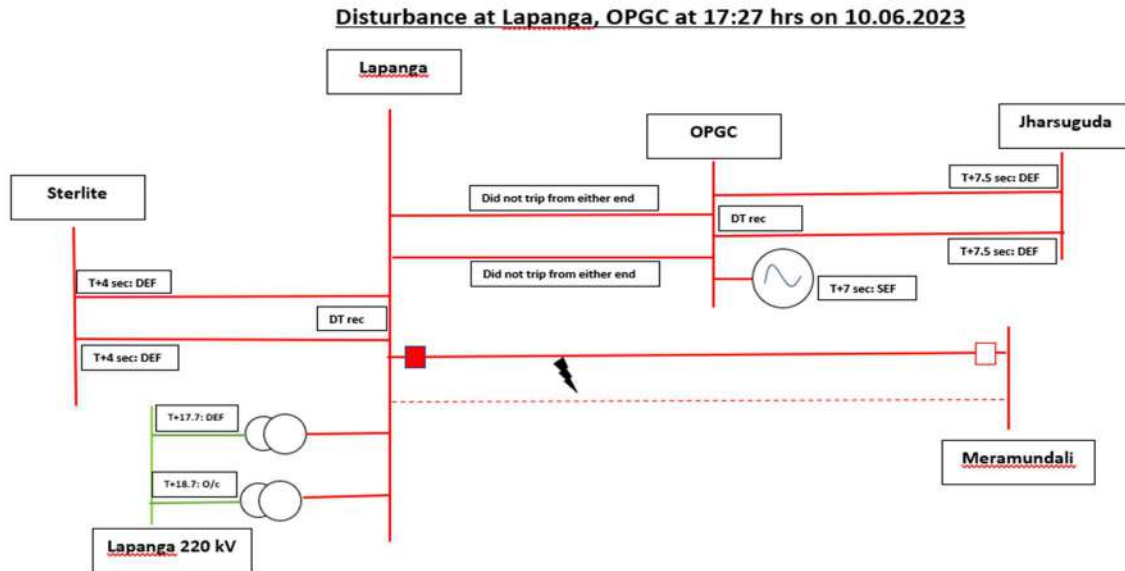
be only R phase was through. At this instant line current at Meramundali end was zero also indicating charging was done from Lapanga.



Induced voltage in circuit -2 as shown below also indicates the same .

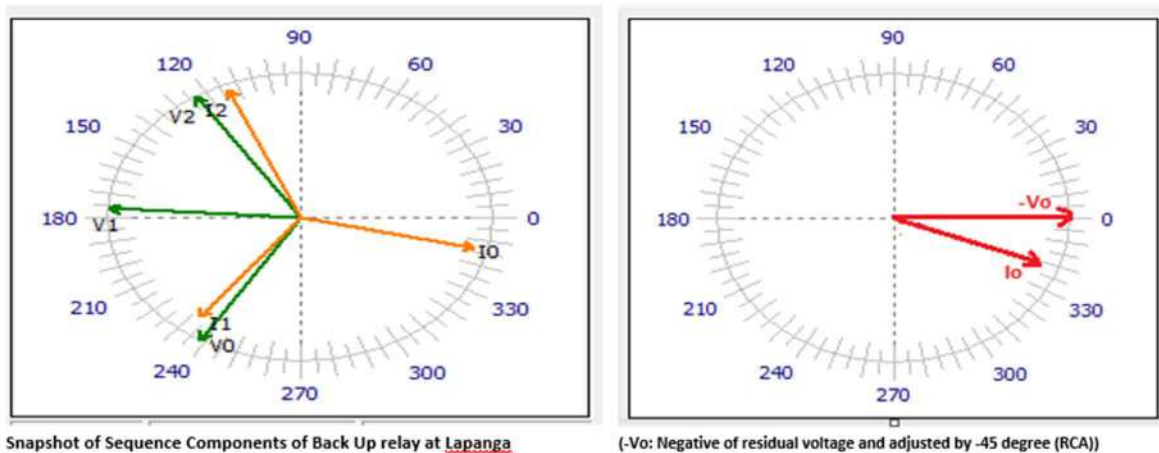


Sequence of events outlined as below snapshot:



- T+4 seconds: 400 kV Lapanga-Sterlite D/c tripped from Sterlite end on Directional Earth Fault and DT sent to Lapanga.
- T+7 seconds: U#4 at OPGC tripped on SEF. SEF setting should be co-ordinated with outgoing lines at OPGC. 400 kV Lapanga-OPGC D/c did not trip from either end.
- T+7.5 seconds: 400 kV Jharsuguda-Lapanga D/c tripped from Jharsuguda on Directional Earth fault and DT sent to OPGC.
- T+17.7 seconds: 400/220 kV ICT-1 at Lapanga tripped on Directional Earth Fault.
- T+18.7 seconds: 400/220 kV ICT-2 at Lapanga tripped on Back Up O/c protection. Both ICTs tripped at different time.

Sequence components of voltage and current for 400 kV Meramundali-Lapanga-1 at Lapanga during charging attempt indicating fault seen in forward direction.



Protection issues (सुरक्षा समस्या):

400 kV Meramundali-Lapanga-1

- Current in Y_ph at Lapanga to the tune of 100 A in 400 kV Meramundali-Lapanga-1 even after opening of breaker during 1st tripping.
- No A/r attempt by main CB at Lapanga.
- Single phase tripping by tie CB at Lapanga during failed A/r attempt.
- No SOTF operation at Meramundali end during charging attempt at 17:26 Hrs.
- No protection operation during charging attempt from Lapanga at 17:27 hrs despite fault seen in forward direction.

400 kV Meramundali-Lapanga-2

- Tripping in Zone-2 from Lapanga despite carrier receipt.

400 kV Lapanga-OPGC D/c

- No tripping from OPGC end. Directional Earth fault setting may be reviewed.

U#4 at OPGC

- SEF setting may be reviewed.

400/220 kV ICT-1&2 at Lapanga

- ICT-2 tripped after 1 second of tripping of ICT-1 at Lapanga. There might be issue of CT saturation as different current are being seen by two ICTs.

Operational Issues (परिचालन समस्या):

- Charging attempt instruction should be clearly directed by SLDC mentioning the end from which the charging attempt should be taken.
- Back-to-back charging attempts to be avoided when one charging attempt already failed, which resulted into disturbance in this case.
- Substations should co-ordinate and consult SLDC/RLDC before taking random charging attempts under stressed conditions.

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

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

Status of Reporting (रिपोर्टिंग की स्थिति):

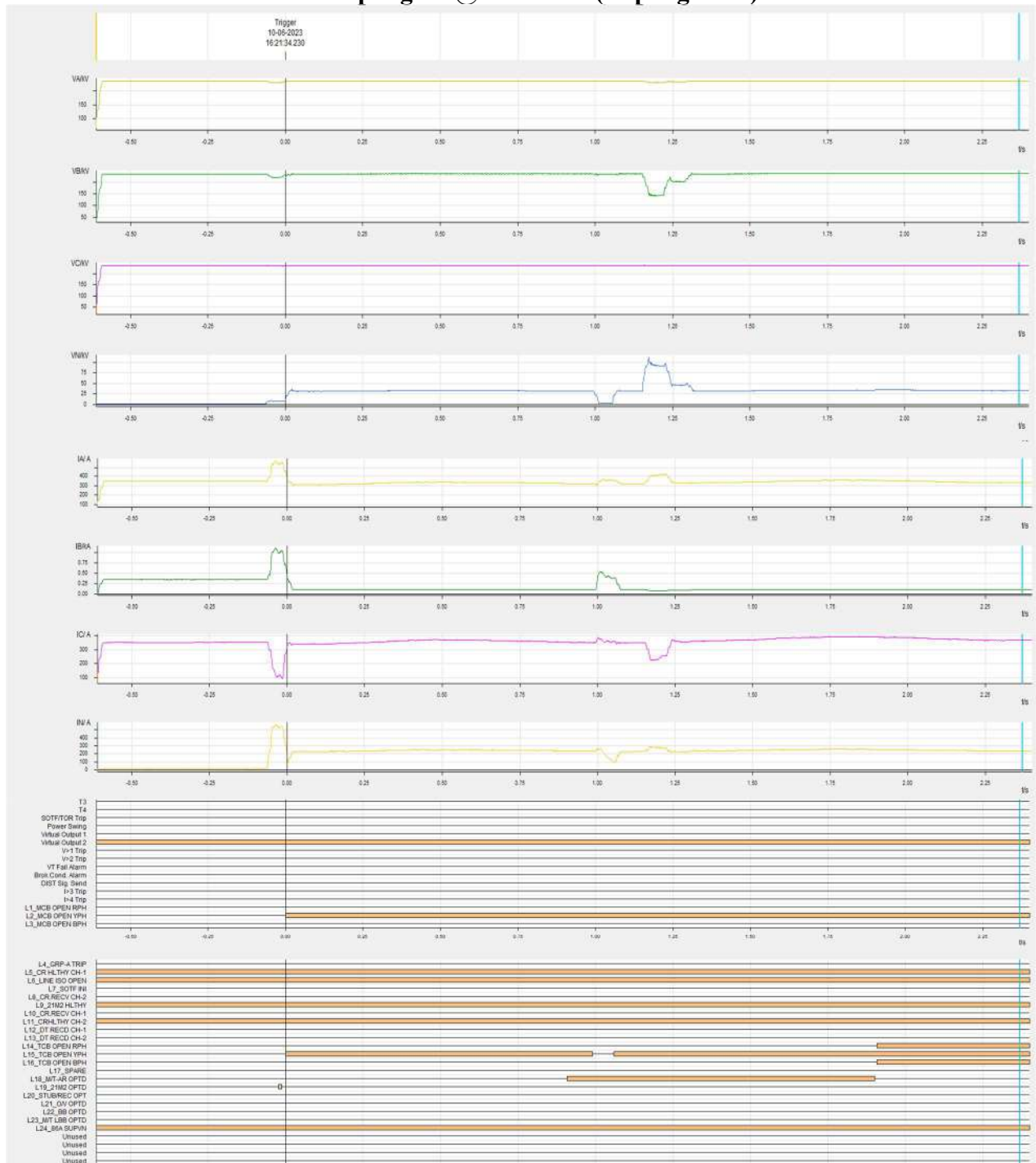
- DR/EL received from OPTCL, OPGC, Sterlite, PG Odisha.

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

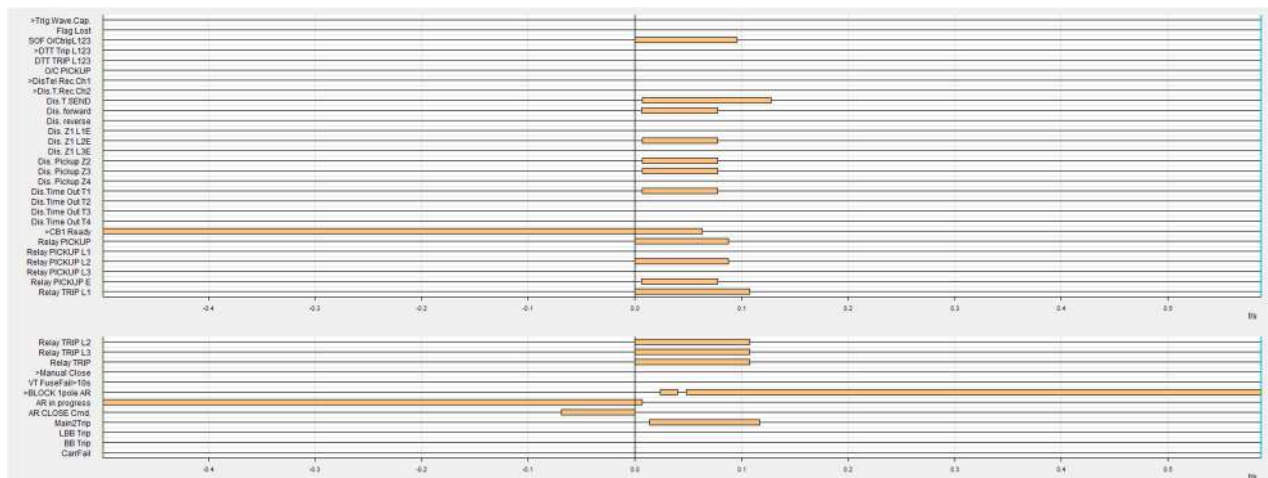
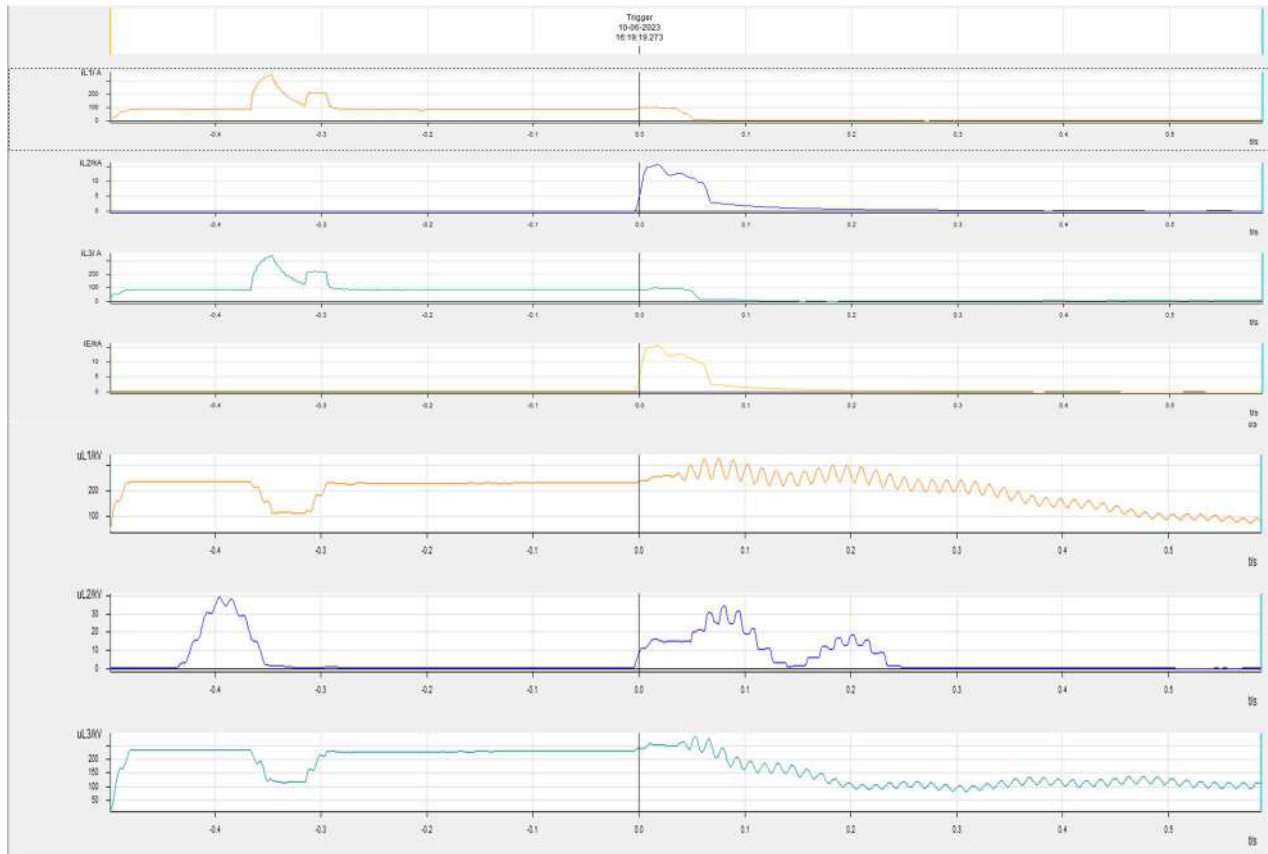
Sequence of event not recorded at time of event.

Annexure 2: DR recorded

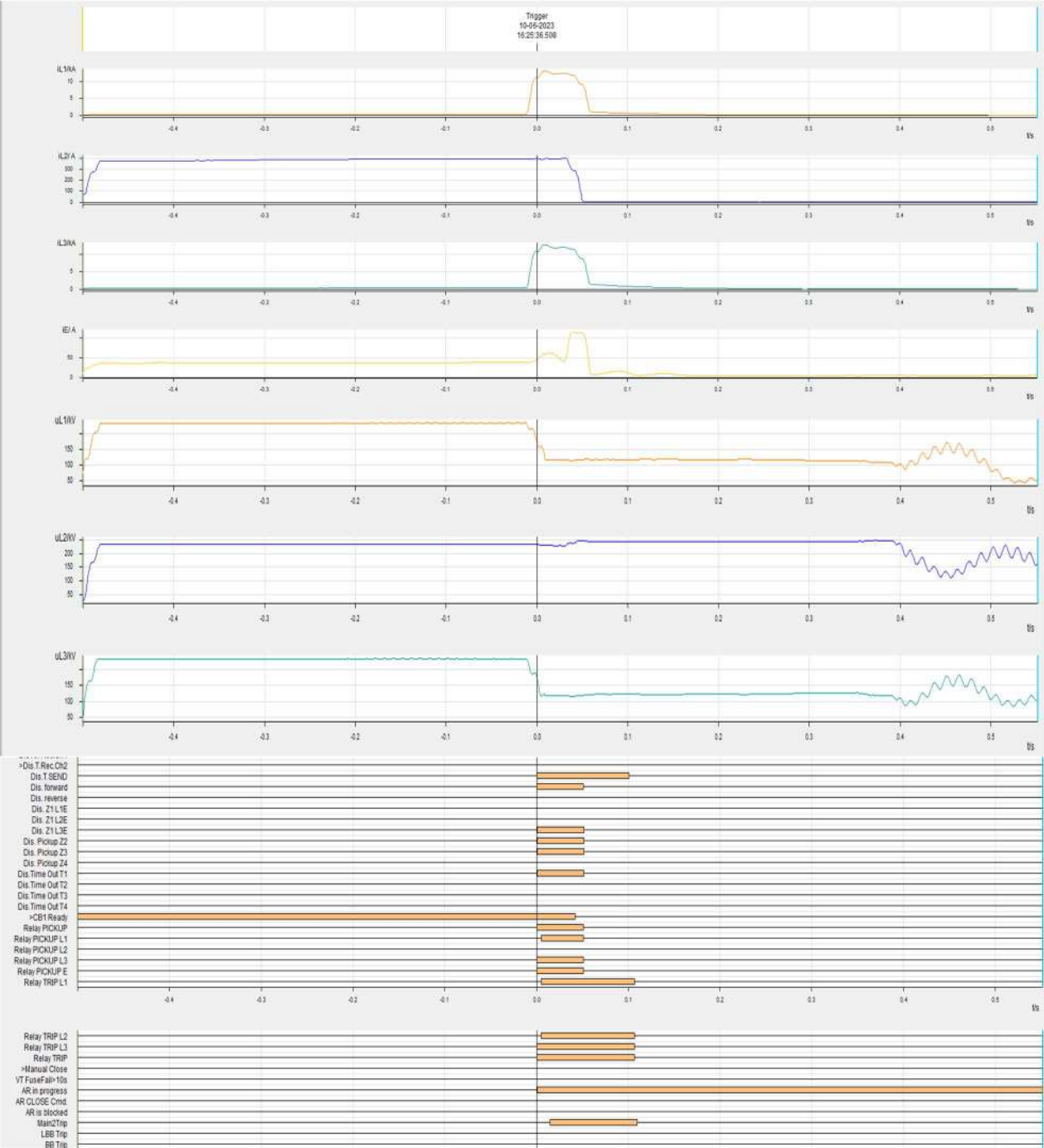
DR of 400 kV Meramundali-Lapanga-1 @ 16:21 hrs (Lapanga end)



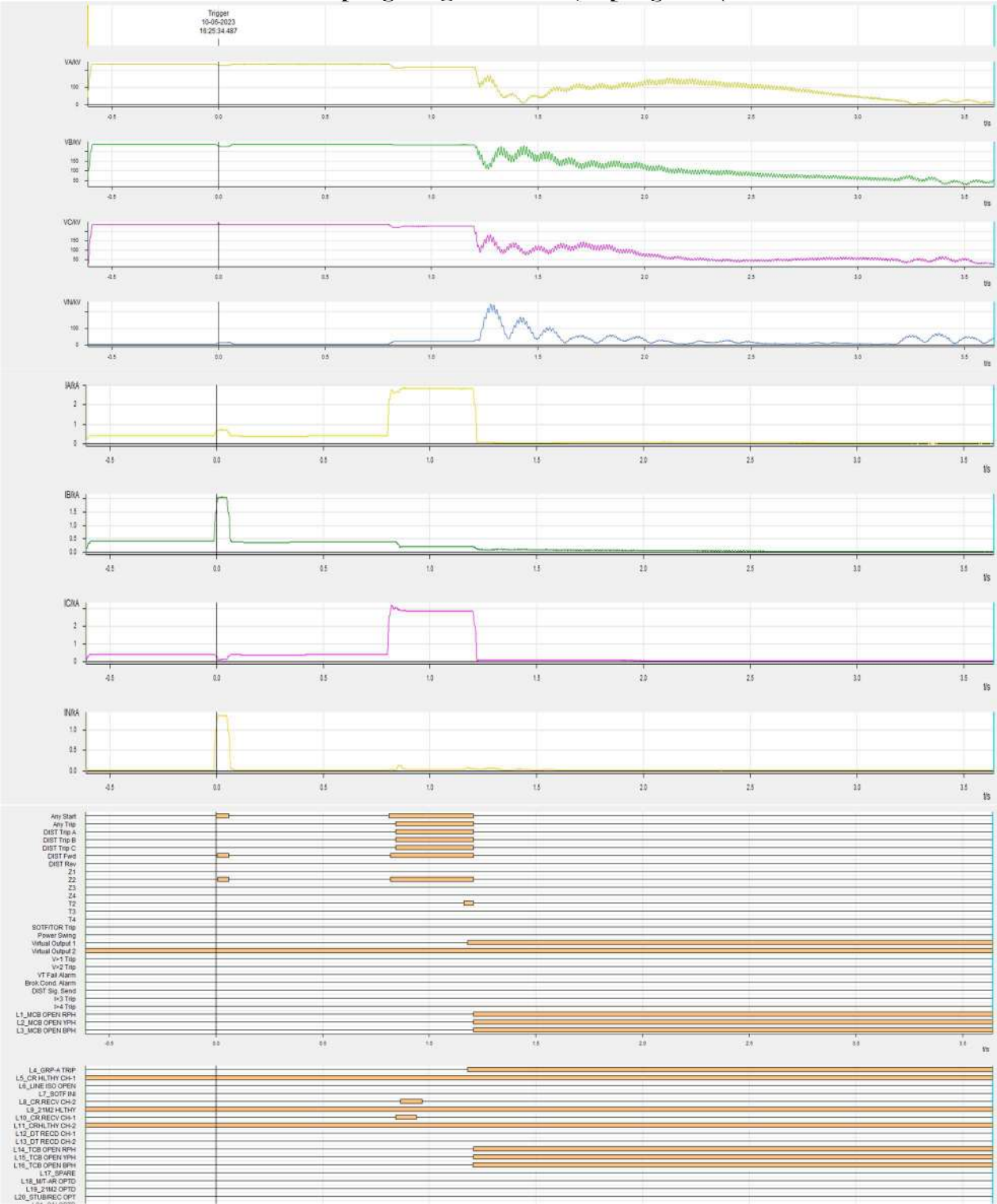
DR of 400 kV Meramundali-Lapanga-1 @ 16:25 hrs (Meramundali end)



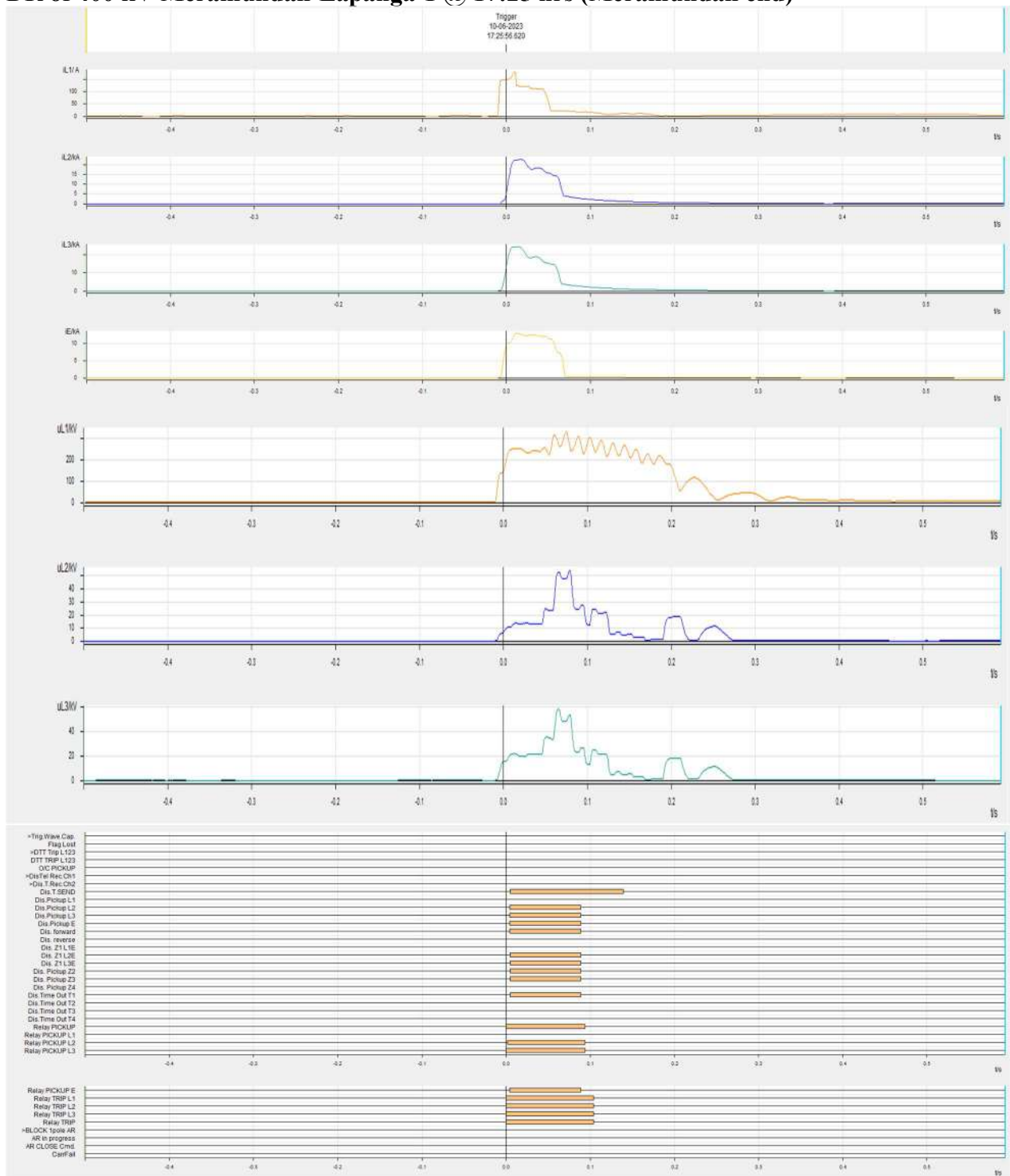
DR of 400 kV Meramundali-Lapanga-2 @ 16:25 hrs (Meramundali end)



DR of 400 kV Meramundali-Lapanga-2 @ 16:25 hrs (Lapanga end)



DR of 400 kV Meramundali-Lapanga-1 @ 17:25 hrs (Meramundali end)



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ग्रिड-इंडिया
GRID-INDIA

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
 (भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
 (A Government of India Enterprise)
 [formerly Power System Operation Corporation Limited (POSOCO)]

पूर्वी क्षेत्रीय भार प्रेषण केन्द्र / Eastern Regional Load Despatch Centre

कार्यालय : 14, गोल्फ क्लब रोड, टॉलीगंज, कोलकाता - 700033
 Office : 14, Golf Club Road, Tollygunge, Kolkata - 700033
 CIN : U40105DL2009GOI188682, Website : www.erldc.in, E-mail : erldcinfo@grid-india.in, Tel.: 033 23890060/0061

घटना संख्या: 16-06-2023/1

दिनांक: 07-07-2023

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

Summary of the event (घटना का सारांश):

At 10:02 Hrs, HVDC Talcher-Kolar Pole-1 blocked, leading to high loading of 400 kV TSTPP-Meramundali D/c and 400 kV Meramundali-Mendhasal D/c. To control loading of these lines, load reconfiguration was being done in downstream at Narendrapur and Atri. Load of Aska, New Aska and Purushottampur which were fed from Bhanjnagar was shifted to Narendrapur. Entire load of Narendrapur and Atri was put on single line i.e., 220 kV Therubali-Narendrapur. This line got overloaded and tripped at 10:40 Hrs, leading to total supply failure at Narendrapur and Atri S/s. Total 244 MW load loss occurred at Narendrapur and Atri.

- **Date / Time of disturbance:** 16-06-2023 at 10:40 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 220/132 kV Narendrapur, Atri S/s
- **Load and Generation loss.**
 - No generation loss occurred during the event
 - 244 MW load loss reported during the event

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

- 220 kV Therubali-Gunupur-Narendrapur
- 220 kV Atri-Pandiabili D/c

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Therubali-Narendrapur

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

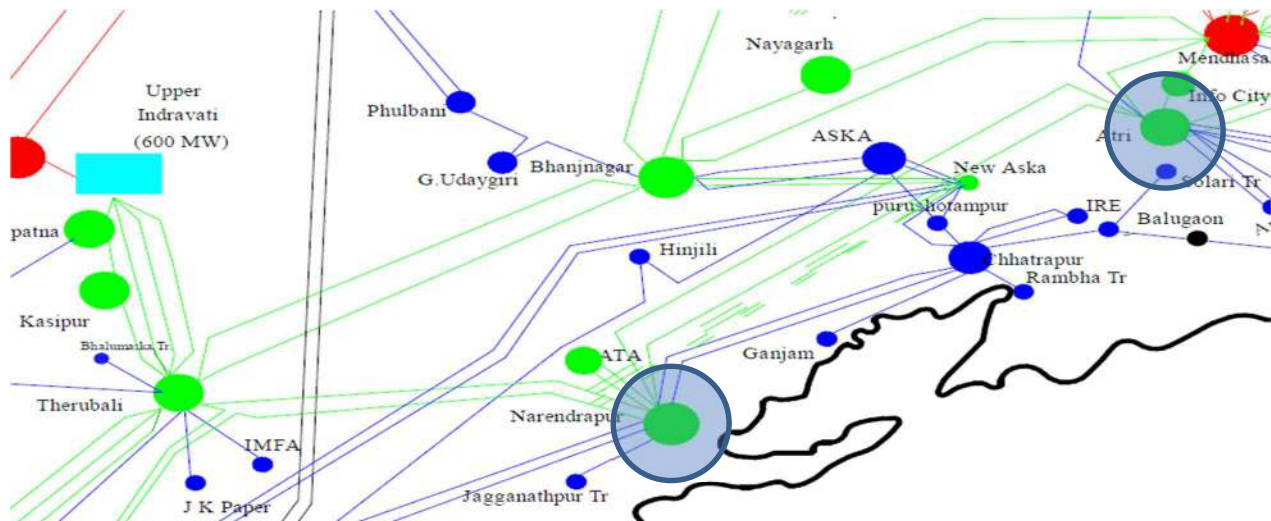


Figure 1: Network across affected area

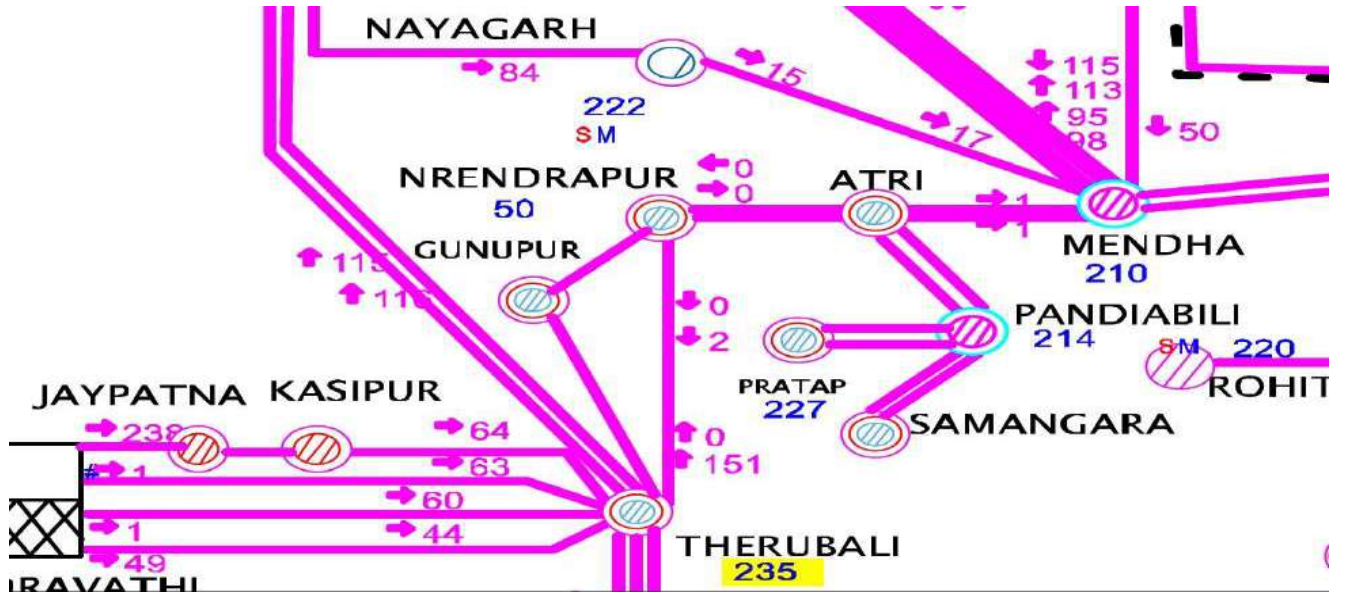


Figure 2: SCADA snapshot of the system

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
10:40	220 kV Therubali-Narendrapur	-	-	No fault observed from PMU.



Figure 3: PMU voltage snapshot of 400 kV Indravati S/s

Restoration (पूर्वावस्था की प्रप्ति):

Sl. No.	Name of the Element	Restoration Time
1	220 kV Therubali-Narendrapur	11:11

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

- As reported, around 244 MW load was shifted on 220 kV Narendrapur-Therubali line, which later tripped due to overloading. OPTCL to share O/c settings. As per CEA guidelines, O/c settings not to be enabled when Main-1 & Main-2 distance protection are provided. OPTCL may explain.
- SLDC Odisha may explain why around 244 MW load was shifted to one single 220 kV line, which is more than its thermal rating.

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

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

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL yet to be received from OPTCL

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

Sequence of Events not recorded during the event.

Annexure 2: DR Recorded

DR/EL yet to be received from OPTCL.


ग्रिड-इंडिया
GRID-INDIA

ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
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 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: 10-06-2023/1

दिनांक: 07-07-2023

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

Summary of the event (घटना का सारांश):

At 17:00 Hrs, 220 KV Ramchandrapur-Chandil tripped due to operation of LBB at Chandil S/s leading to total supply failure at Chandil S/s as 220 kV Ranchi-Chandil was under breakdown and 220 kV Santaldih-Chandil was switched off to limit loading of 220 kV Ramchandrapur-Chandil, which remained as the only source for Chandil. Around 170 MW load loss occurred at Chandil.

- **Date / Time of disturbance:** 10-06-2023 at 17:00 hrs
- **Event type:** GD-1
- **Systems/ Subsystems affected:** 220/132 kV Chandil S/s
- **Load and Generation loss.**
 - No generation loss was reported during the event.
 - Around 170 MW load loss reported during the event at Rajkhasrawan, Chakradharpur, Jadugoda, Dalbhumgarh, Golmuri, Kendposi, Tamar, Khunti, Adityapur. (Including Railway) by Jharkhand SLDC.

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

- 220 kV Ranchi-Chandil
- 220 kV Santaldih-Chandil

Major elements tripped (प्रमुख ट्रिपिंग):

- 220 kV Ramchandrapur-Chandil

Network across the affected area (प्रभावित क्षेत्र का नक्शा)

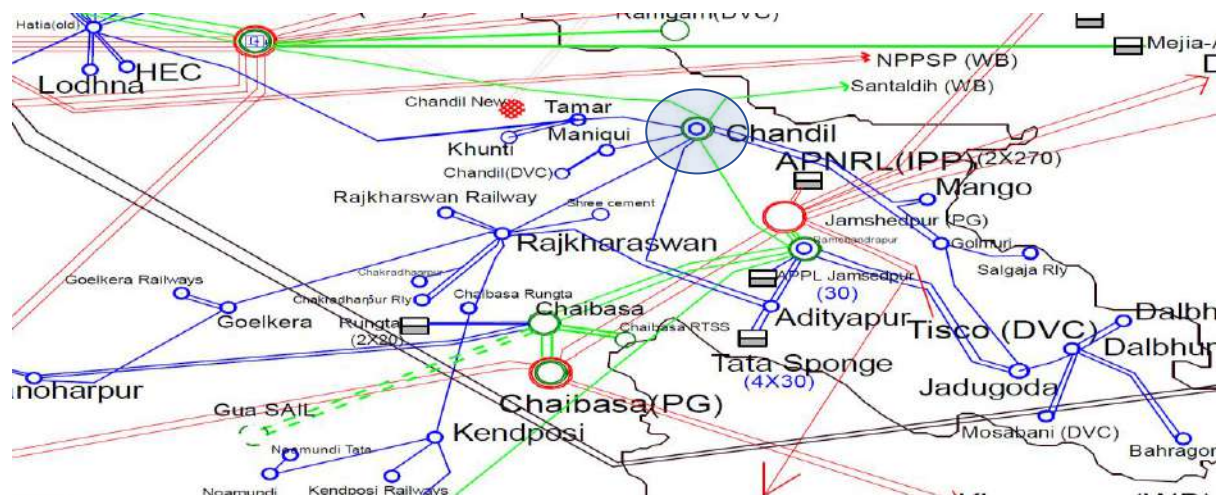


Figure 1: Network across the affected area

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

समय	नाम	उप केंद्र 1 रिले संकेत	उप केंद्र 2 रिले संकेत	पीएमयू पर्यवेक्षण
17:00	220 kV Ramchandrapur-Chandil	-	Chandil: LBB operated	No fault observed from PMU.

R Y B Phase Voltage Magnitude

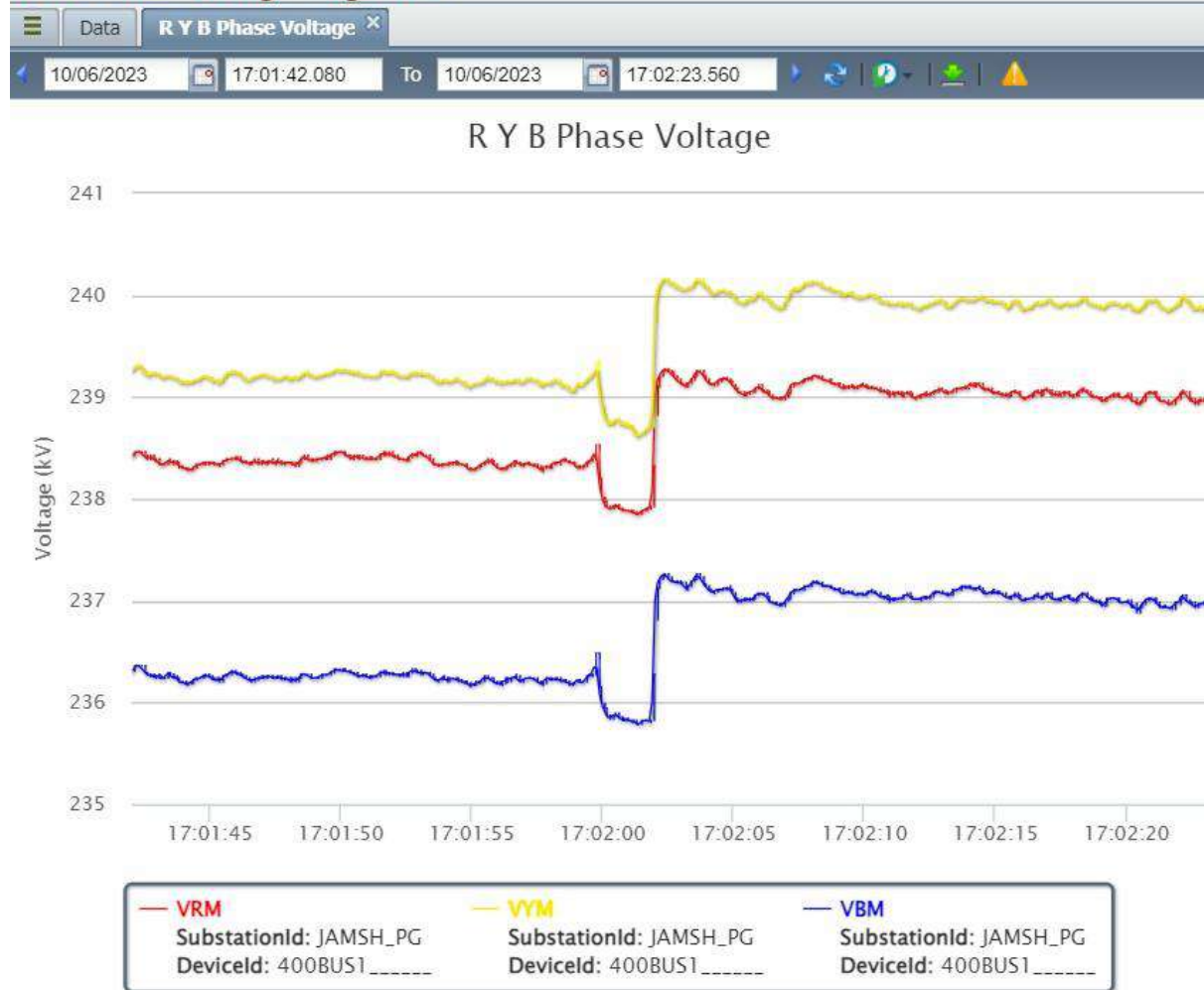


Figure 2: PMU snapshot of 400/220 kV Jamshedpur S/s

Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
220 kV Ramchandrapur-Chandil	17:29

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

- Entire load of Chandil S/s was being fed through 220 kV Ramchandrapur-Chandil only. As informed, some shutdown activity was going on at Chandil S/s during which LBB of one 220/132 kV ATR operated and 220 kV Ramchandrapur-Chandil tripped.
- JUSNL may explain the reason of LBB operation. No fault observed from PMU.
- Since entire load was being fed through one line only, any testing or shutdown activity should be avoided as any maloperation would lead to total supply failure, as in the current case.

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

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

Status of Reporting (रिपोर्टिंग की स्थिति):

- DR/EL received yet to be received from JUSNL.

Annexure 1: Sequence of events recorded at ERLDC SCADA data at the time of the event
Sequence of Events not recorded at the time of event.

Annexure 2: DR recorded

DR/EL yet to be received from JUSNL.



घटना संख्या: 28-06-2023/1

दिनांक: 07-07-2023

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

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

At 02:28 Hrs, Resistive fault struck 400 kV Rangpo-Teesta 3 and 400 kV Rangpo-Dikchu and both lines tripped. 400 kV Teesta 3-Dikchu also tripped at the same time. All six units at Teesta 3 and two units at Dikchu tripped leading to generation loss of around 1410 MW (Teesta 3: 1304 MW, Dikchu-106 MW).

- **Date / Time of disturbance:** 28-06-2023 at 02:28 hrs.
- **Event type:** GD - 1
- **Systems/ Subsystems affected:** 400 kV Teesta-3, Dikchu S/s
- **Load and Generation loss.**
 - Total 1410 MW generation loss reported at Teesta-3, Dikchu.
 - No load loss occurred during the event.

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

- NIL

3. Major elements tripped (प्रमुख ट्रिपिंग)

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

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

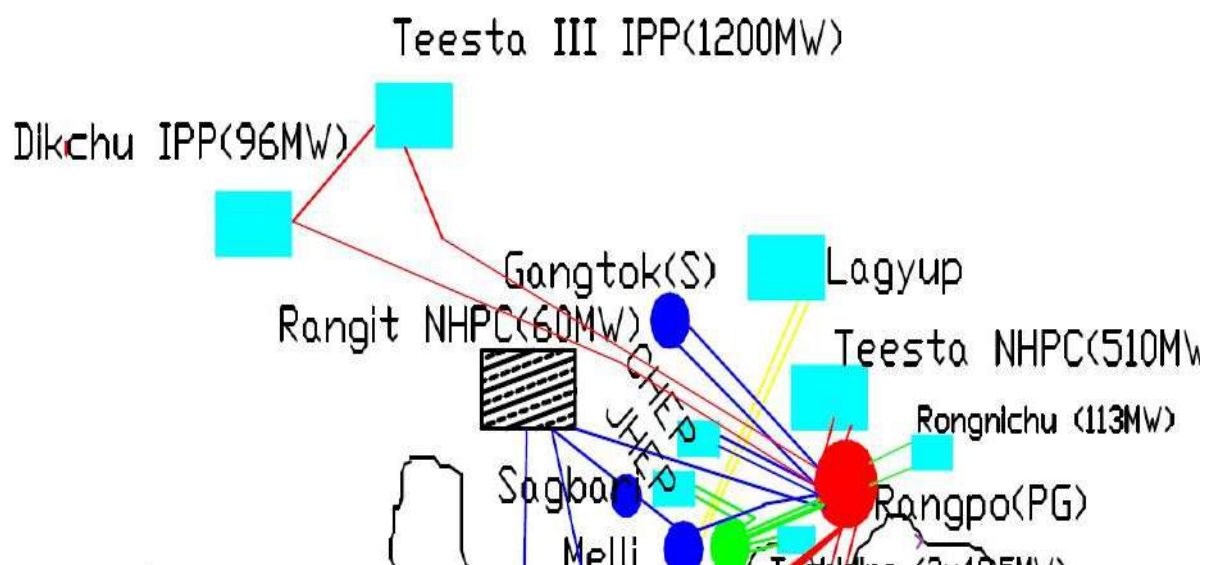


Figure 1: Network across the affected area

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
02:28	400 kV Teesta 3-Dikchu	Teesta 3: O/C, DEF	Dikchu: DT received	Gradually evolving resistive fault which persisted for around 3.2 seconds.
	400 kV Rangpo-Dikchu	Rangpo: Y_B_N, Iy: 12.9 kA, Ib: 11.9 kA	Dikchu: Didn't trip	
	400 kV Teesta 3-Rangpo	Teesta-3: Y_N, Zone-1, O/V St.2	Rangpo: DT received	
	6*200 MW Units at Teesta-3	Loss of evacuation path		
	2*48 MW units at Dikchu	-		

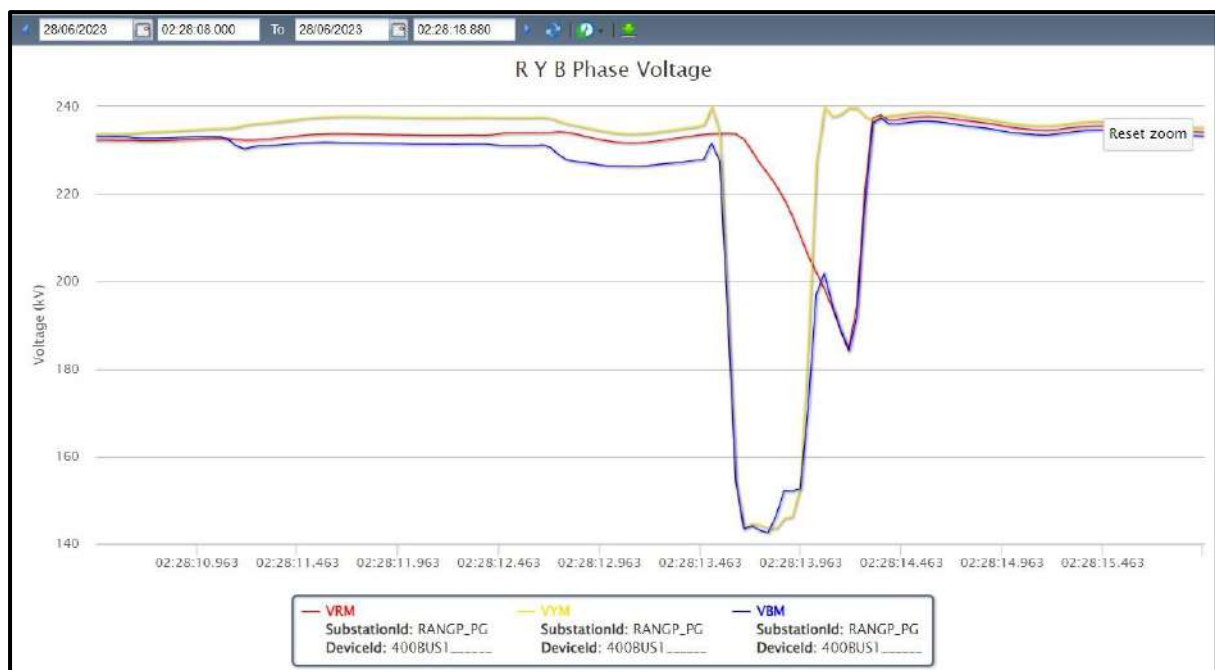
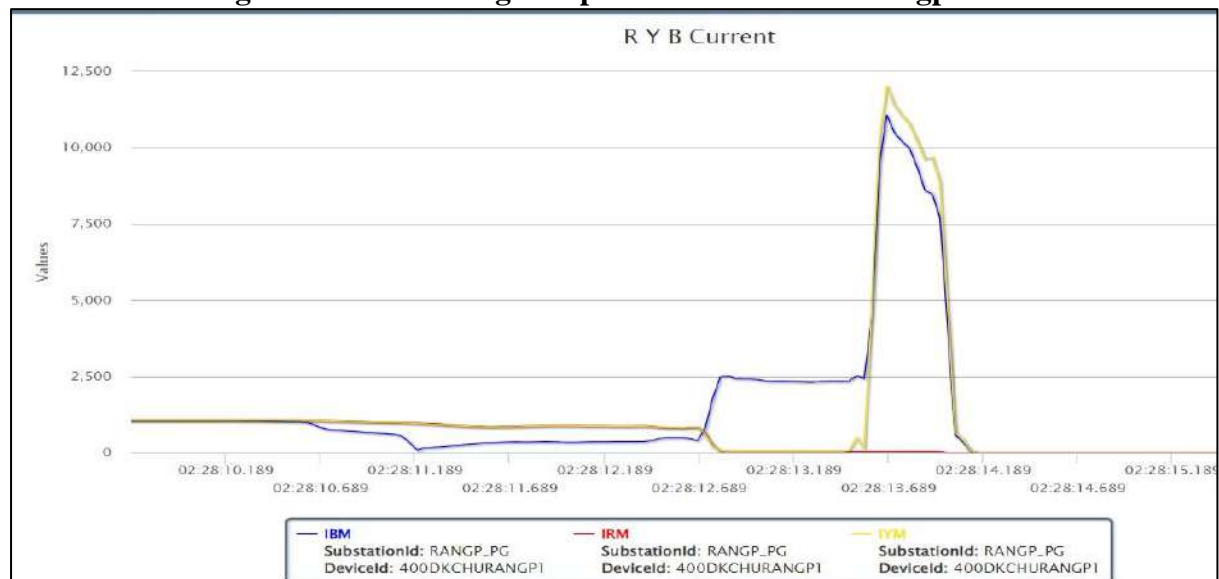


Figure 2: PMU Voltage snapshot of 400/220 kV Rangpo S/s



Line current plot of Dikchu -Rangpo line at Rangpo end shown above .

From above plot, it can be seen that B phase current reduced first at Rangpo end indicating high resistive fault started there first, if we will see current at dikchu end it will be increasing . Then after approx 1.6 sec, from dikchu end fault was isolated as Y-B became zero but fault was persisting and started getting fed from Rangpo end so B phase current increased and after some time got converted to Y-B phase fault and line tripped from Rangpo end in Phase to phase fault .

6. Restoration (पूर्वावस्था की प्रप्ति)

Transmission/Generation element name	Restoration time
400 kV Teesta 3-Dikchu	03:04
400 kV Rangpo-Dikchu	02:56
400 kV Teesta 3-Rangpo	02:51
6*200 MW Units at Teesta 3	All restored by 02:58 Hrs
2*48 MW Unit at Dikchu	03:46/03:47

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

A resistive fault struck 400 kV Rangpo-Dikchu in Y_B phase, and 400 kV Rangpo-Teesta-3 also sensed the fault in Y_B phase later and changed subsequently to R_B fault.

Sequence of Events as below (Corroborated from PMU and DR data):

- 02:28:11.250-Resistive Fault initiated in 400 kV Dikchu-Rangpo line.
- 02:28:12.460-U#1 & U#2 at Dikchu tripped.
As per DR of 400 kV Rangpo-Dikchu at Dikchu end, it seems units already tripped before tripping of line. Dikchu may explain the reason of unit tripping.
- 02:28:12.750-400 kV Teesta 3-Dikchu tripped from Teesta-3 on DEF, O/c and DT received at Dikchu.
400 kV Teesta 3-Dikchu should not have tripped as fault was not in this line. As informed, Definite time of 1.5 seconds for O/c and DEF was kept enabled at Teesta-3 end besides IDMT for DEF. Definite time may be disabled immediately and O/c settings may also be disabled. TUL may explain.
- 02:28:14.000-400 kV Rangpo-Dikchu tripped from Rangpo end on Zone-2.
- 02:28:14.050-Y_ph of 400 kV Teesta-3-Rangpo tripped from Teesta 3 in Zone-1 and carrier sent to remote end, however, Rangpo did not sense the fault in any Zone yet.
- 02:28:14.255-Rangpo sensed the fault in Zone-2 in Teesta 3 line.

- 02:28:14.490- O/V St.2 operated at Teesta-3 for Rangpo and DT sent to remote end.
- ❖ TVTPL may explain the nature of fault and findings, if any.
- ❖ Further, Pick-up settings of DEF at Teesta-3 and Dikchu needs to be reviewed as they are set at 600 A which led to delayed pick up of fault around 1.5 seconds after fault initiation.

8. Status of Reporting (रिपोर्टिंग की स्थिति):

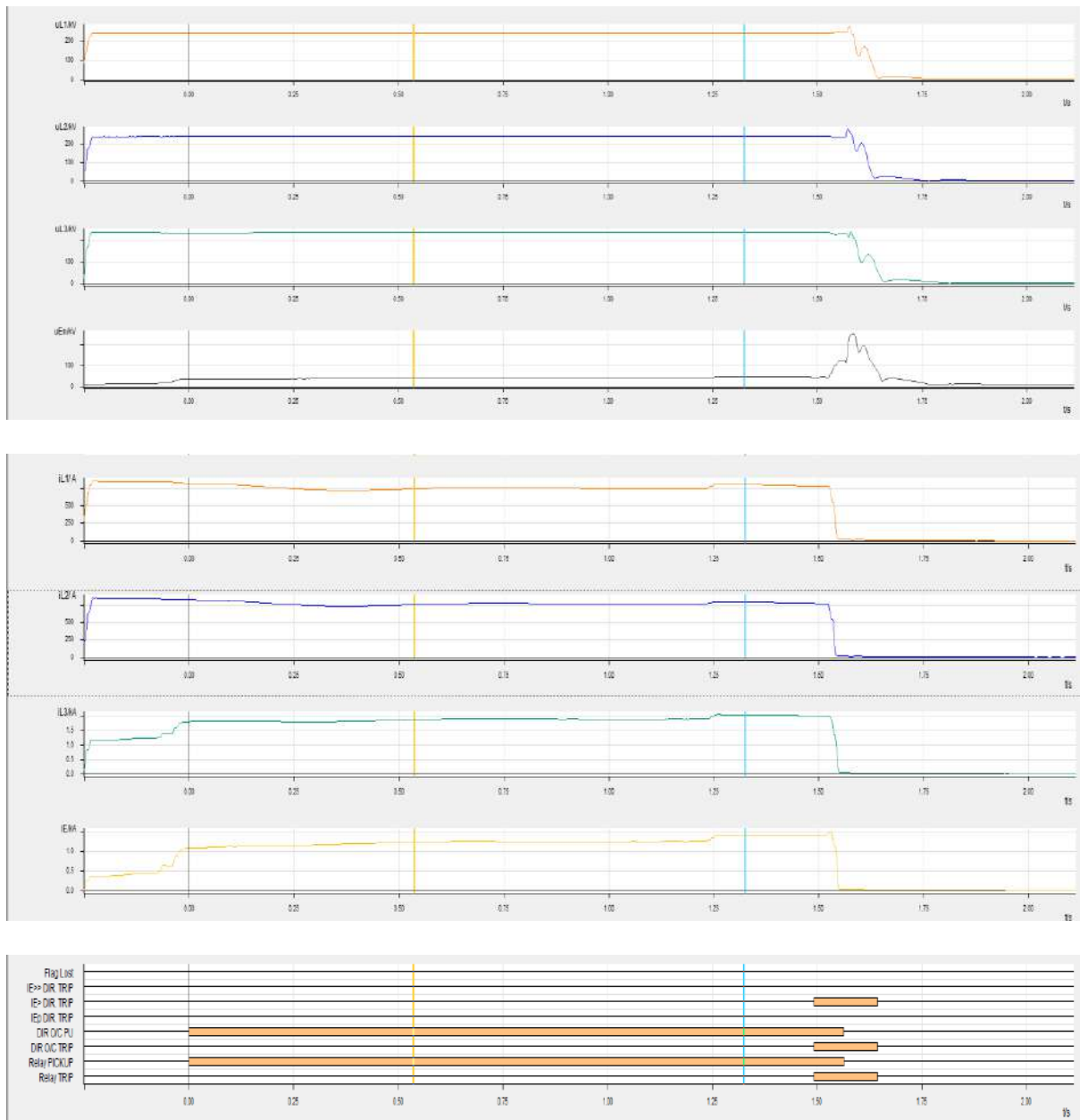
- DR/EL received from Teesta 3, Dikchu, PG ER-2

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

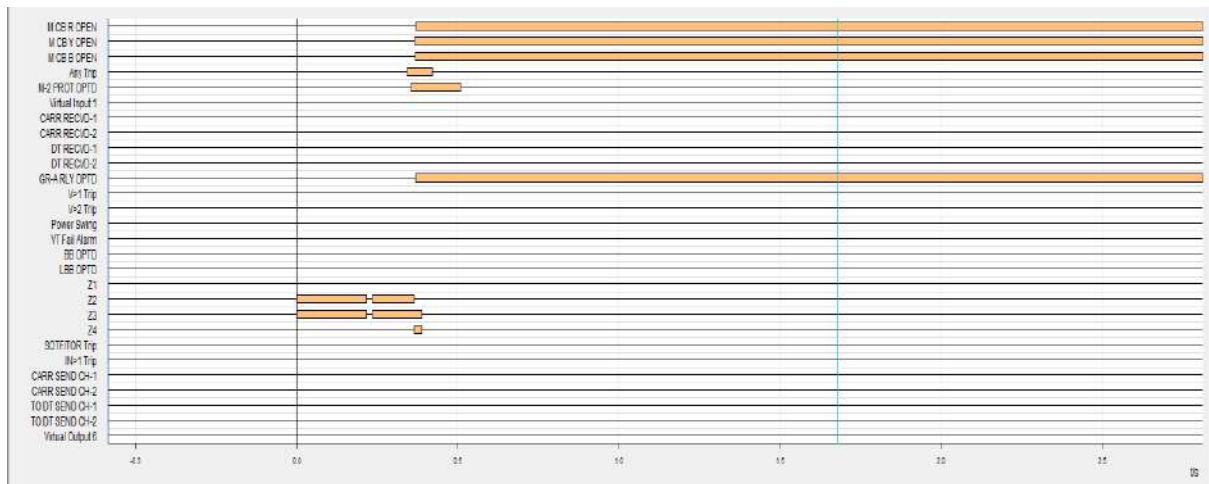
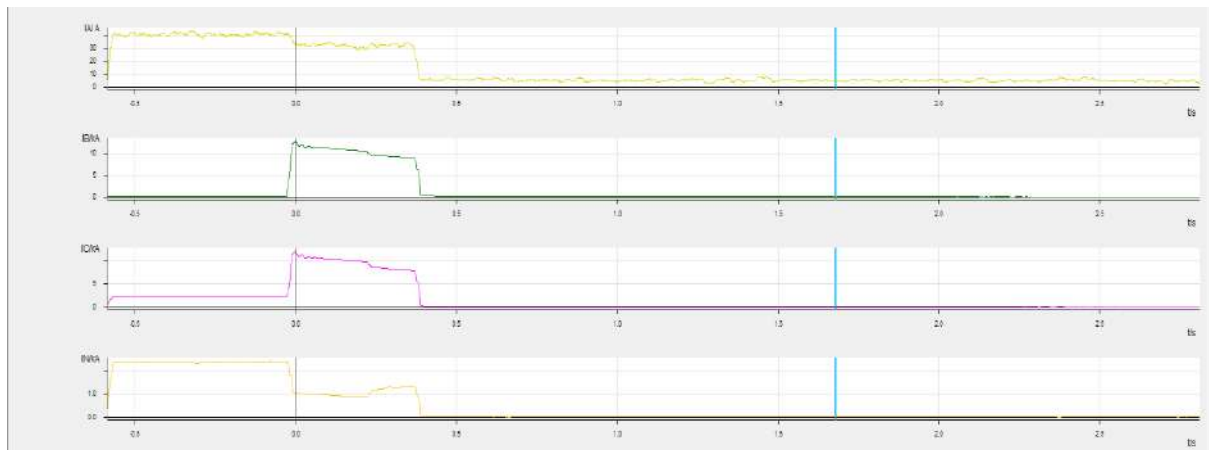
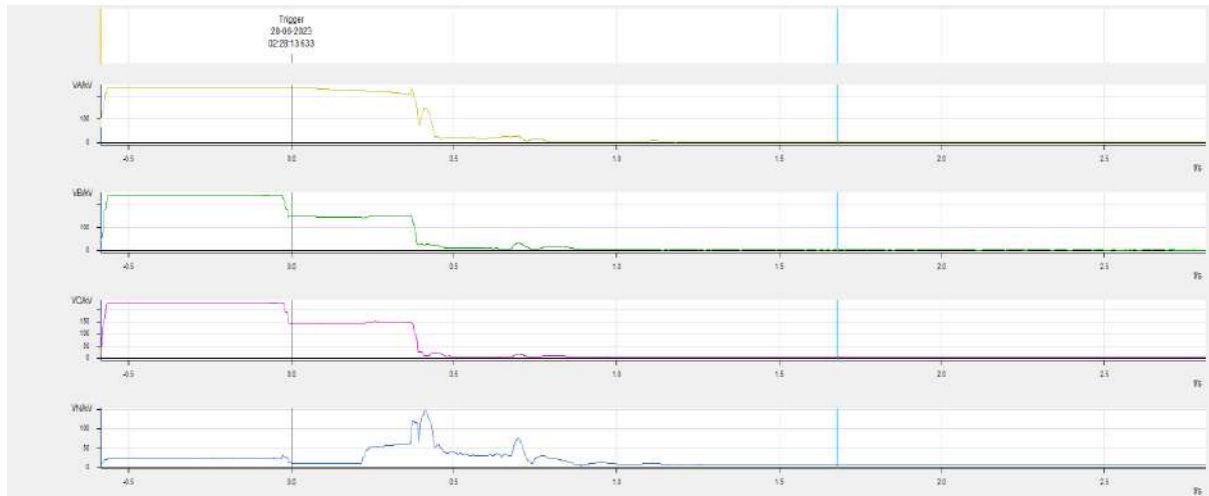
Sequence of Event not recorded at the time of event.

Annexure 2: DR recorded

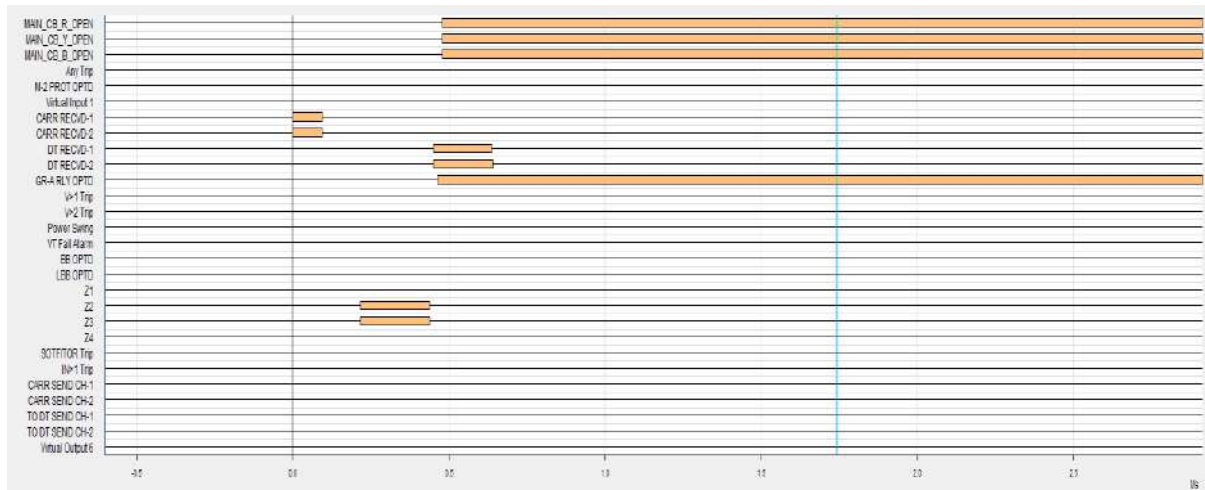
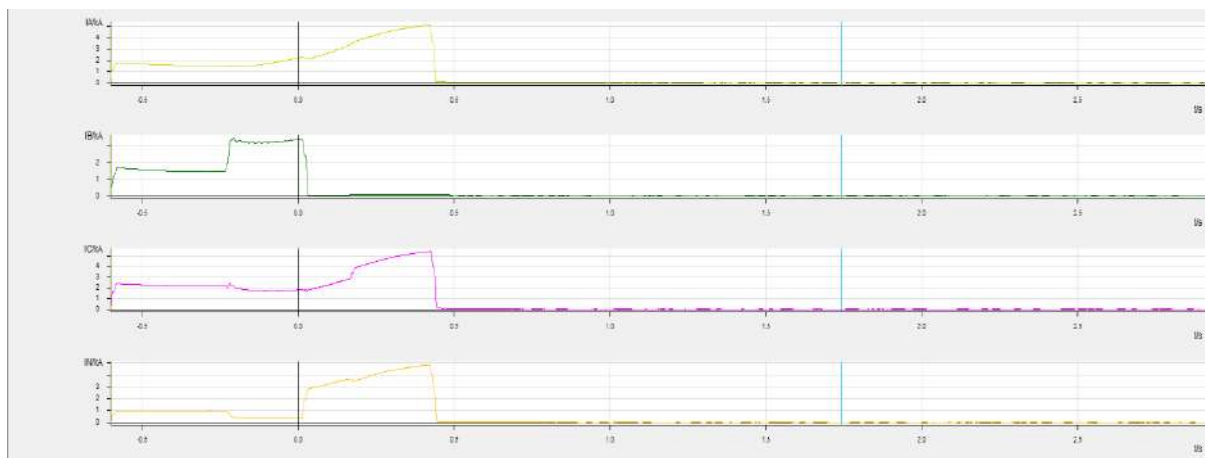
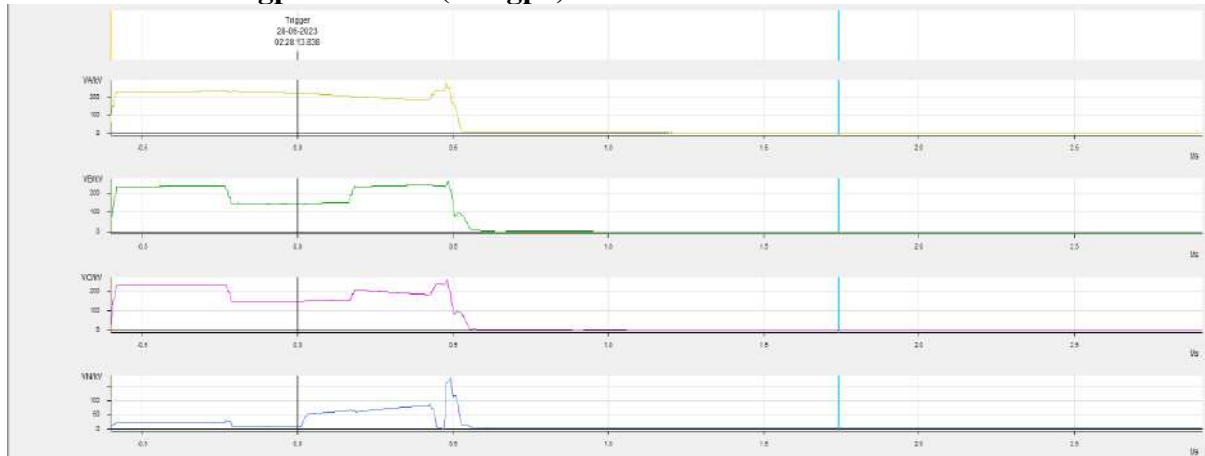
DR of 400 kV Teesta 3-Dikchu (Teesta 3)



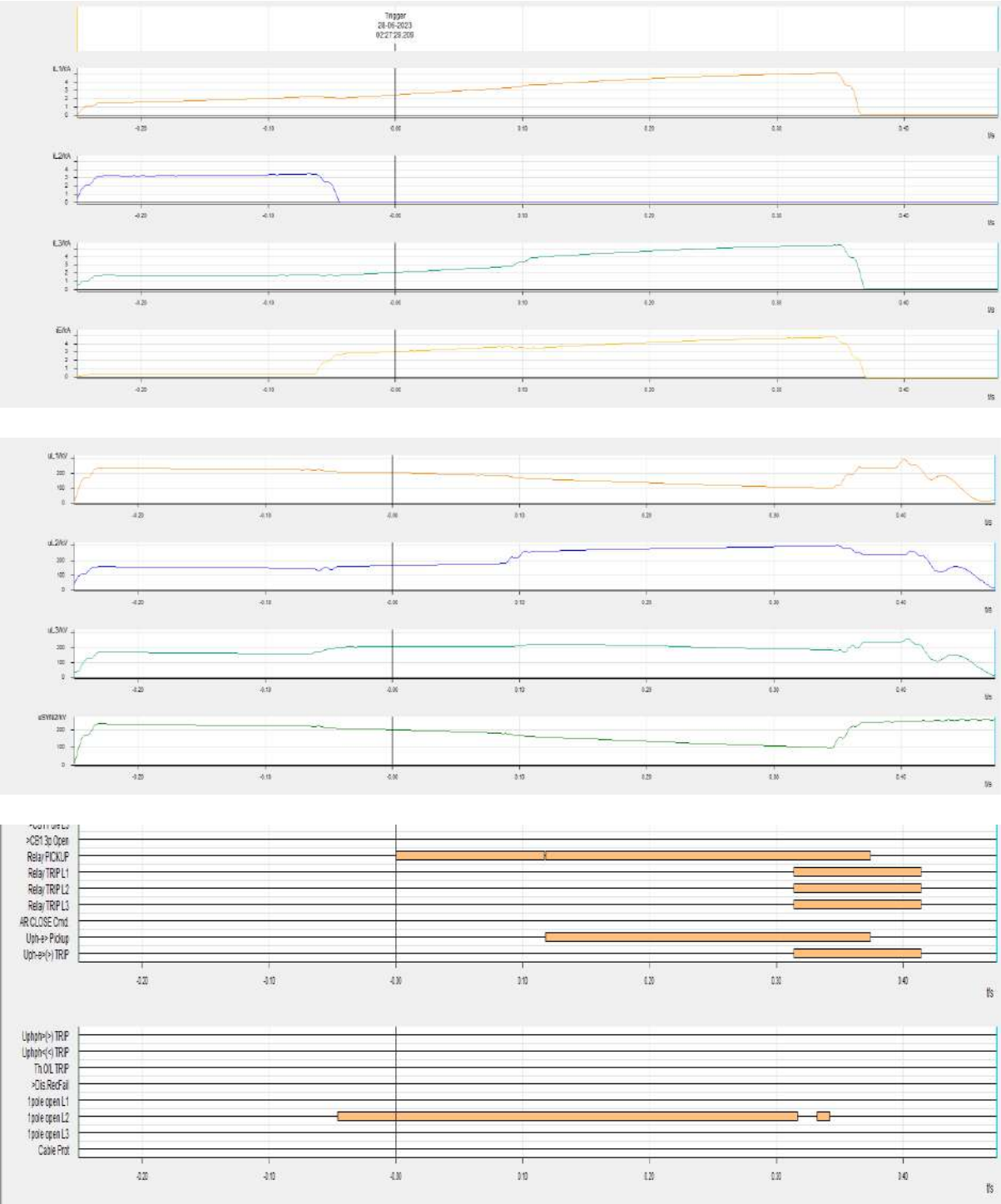
DR of 400 kV Rangpo-Dikchu (Rangpo)



DR of 400 kV Rangpo-Teesta 3 (Rangpo)



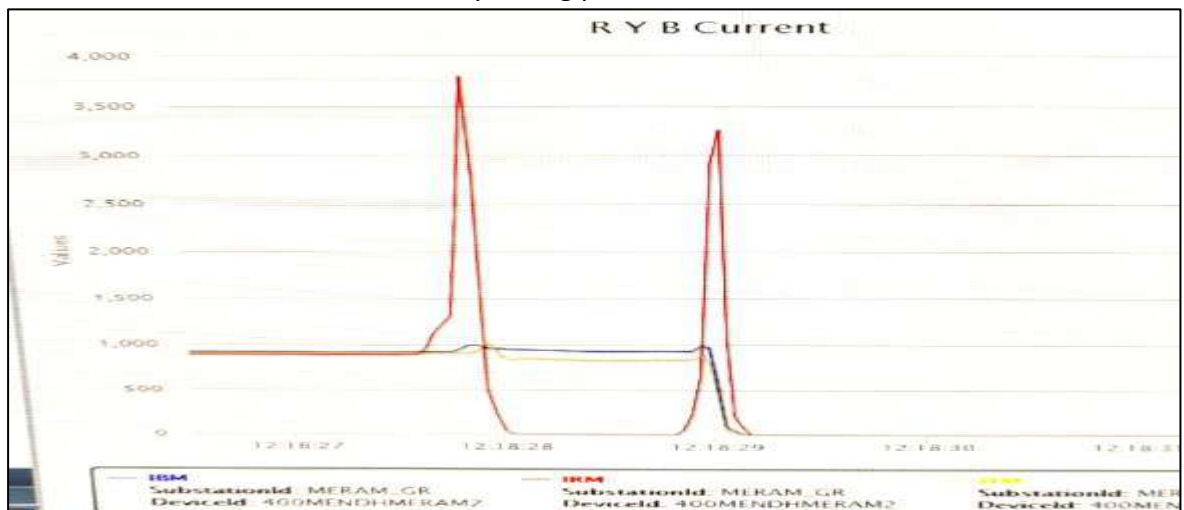
DR of 400 kV Rangpo-Teesta 3 (Teesta 3)

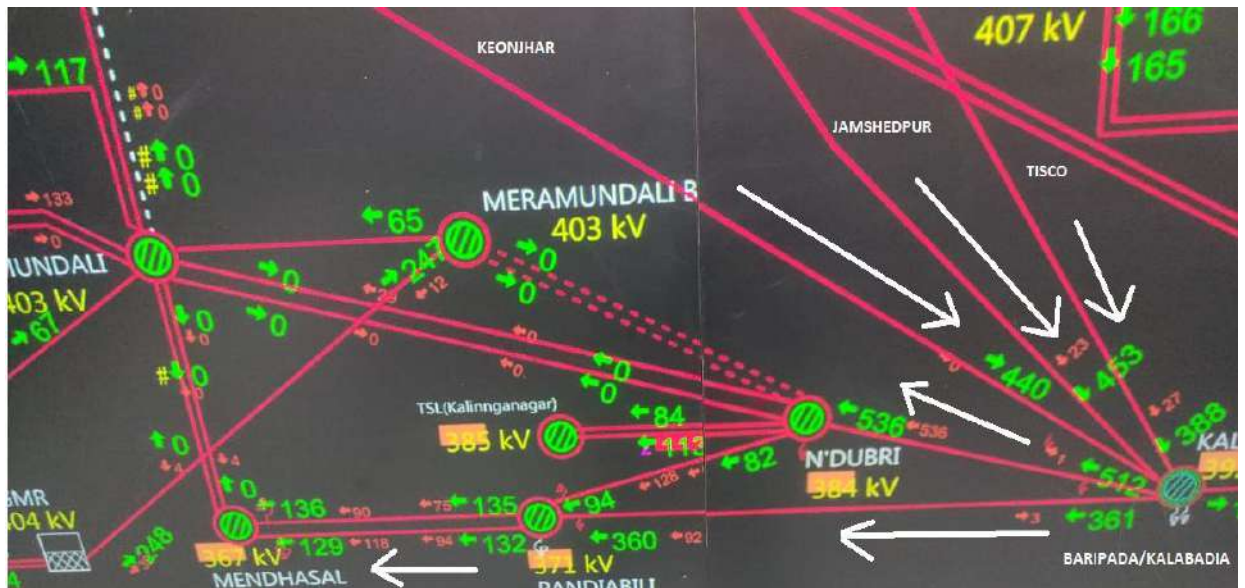


400 KV Meramundali – Mendhasal D/C multiple tripping Event

Event 1: 12:18 Hrs , Tripping of 400 KV Meramundali – Mendhsal D/C

- Mendhasal ckt-2 tripped on R-n fault at 34 km from Mendhasal , Pre tripping flow was 640MW Each it is suspected that fault was due to sag and clearance issue .ckt-1 tripped on overload, setting at 1200 Amps.
- Bus voltage dipped down to 340 Kv due to huge long haulage of power and low fault level of Mendhasal. Some of the induction and AC loads also got stalled leading to low voltage scenario.
- load shedding of around 500 MW near cuttak , bhadrak , balsore , paradeep was done to improve the voltage , which later was restored slowly.
- With Meramundali -Mendhasal D/C tripping only power source at 400 Kv was Baripada(Kalabadia) which was feeding the load of New dubri , Pandialbali , Mendhasal .
- Baripada was getting power from Keonjhar & Jamshedpur and Keonjhar to baripda flow increased to 650 MW.
- Power which was coming to baripda was going from baripda to pandiabali and baripada to new dubri to feed the load of New dubri , Pandialbali , Mendhasal. Hence loading of Baripada to pandiabali and Baripada to new dubri also increased significantly .
- Baripada -New dubri increased to 650 MW and baripad pandiaballi increased to 550 MW .
- Pandiabali -Mendhasal reversed flow from Pandibali to mendhasal to feed mendhasal load.250 MW Each which was intially taking power from Mendhasal.



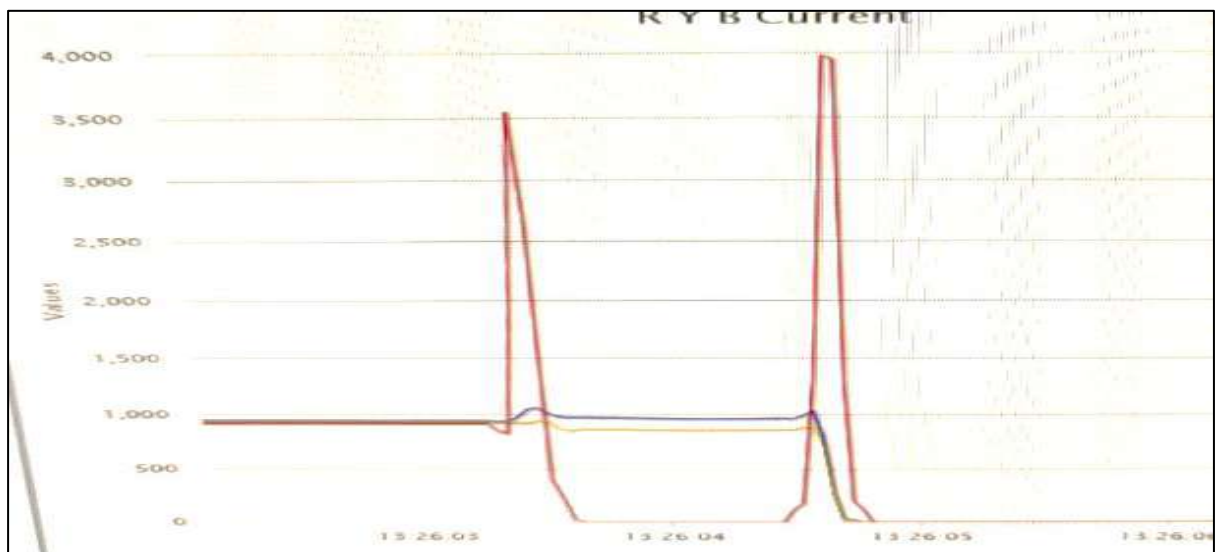


Event 2: 12:50 Hrs , restoration of Both circuits

- Meramundali -Mendhasal ckt 1 was tripped from only Meramundali end and was charged from mendhasal end so Bckup overcurrent setting was bypassed and later charging attempted and line charged and flow of line was 950 MW, after 5 minutes Line -1 also charged and line charged successfully with flow of 600 MW each.
- After charging again Backup O/C was enabled .

EVENT 3: 13:26 HRs ,Again Tripping of Meramundali -Mendhasal D/C

- Mendhasal ckt-2 again tripped on R-n fault at 34 km from Mendhasal , same relay indication this time also.
- Pre tripping flow was 640MW Each it is suspected that fault was due to sag and clearance issue .ckt-1 tripped on overload, setting at 1200 Amps.
- Similar power flow happened again and voltage variations at Mendhsal ,hovering near 360 KV .

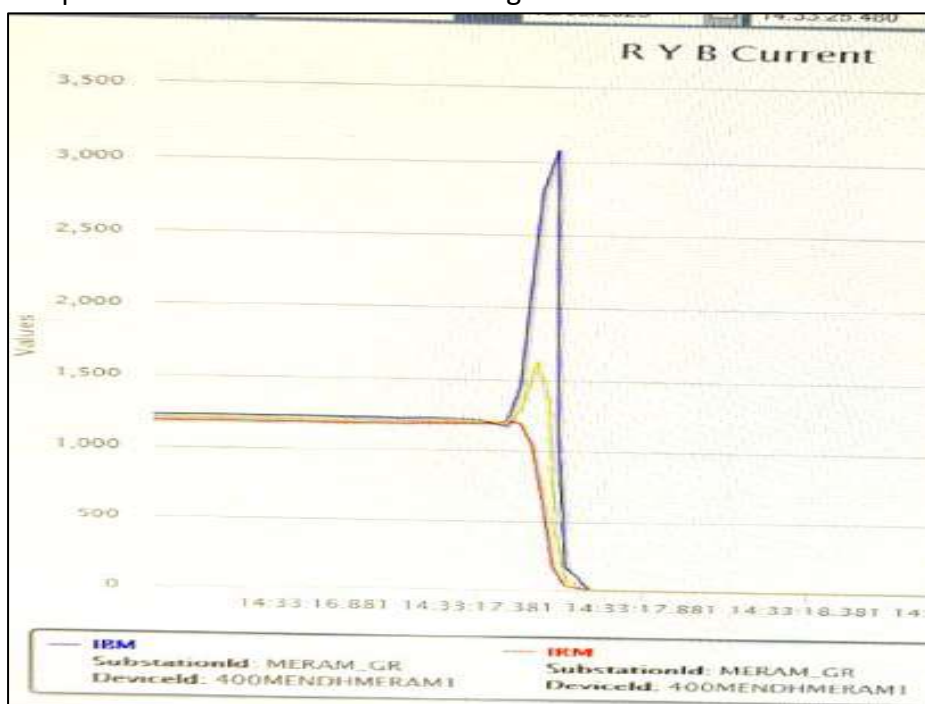


EVENT-4 , 13:52 Hrs ,Charging of Meramundali-Mendhasal -1

- SLDC Odisha charged the Line -1 by increasing Backup over current to 1500 Amps - 1040 MW .
- But as the line was charged flow was more than 1040 MW and it tripped within 2 Minutes.

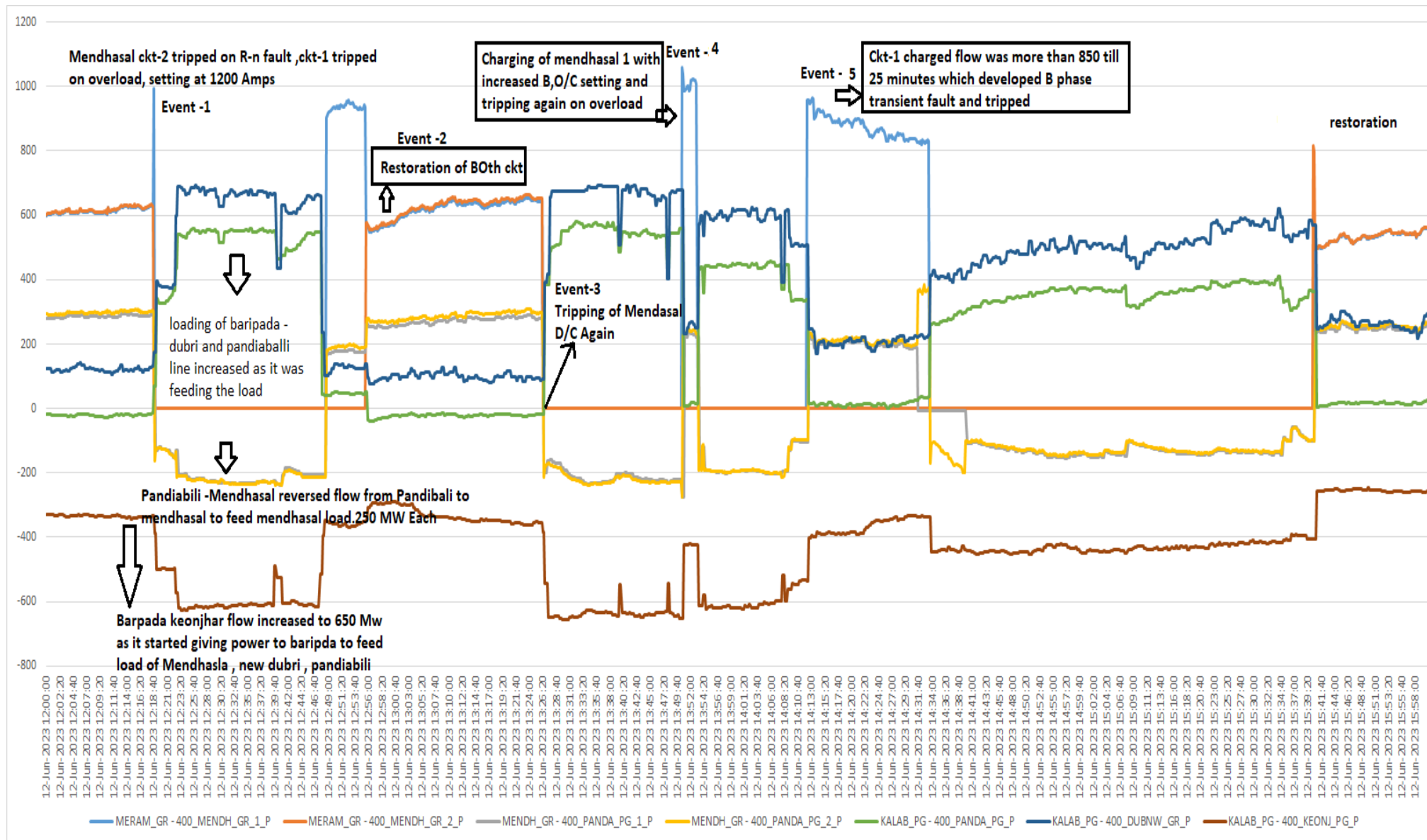
Event 5: at 14:13 Hrs Charging of Mendhasal-Meramundali -1 Again

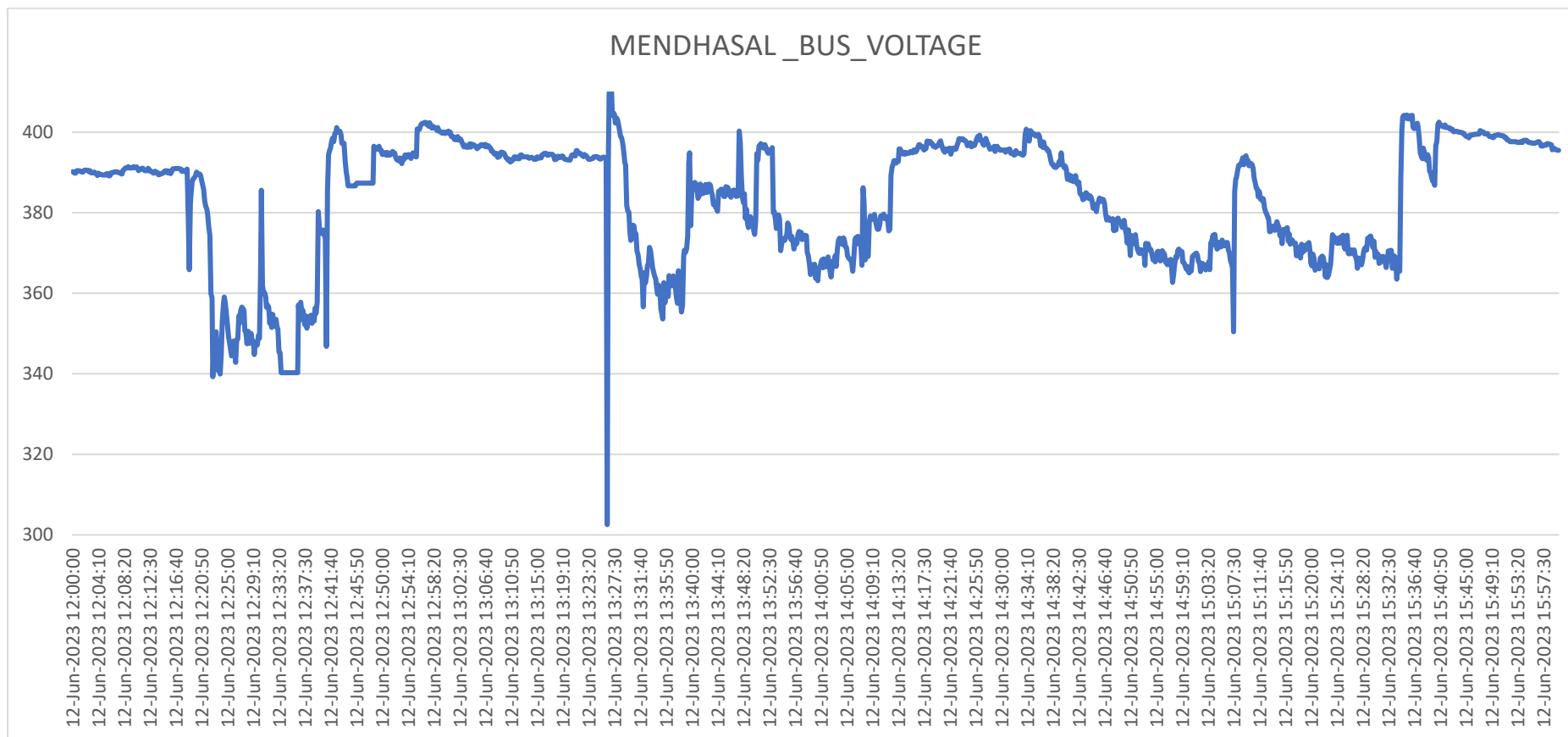
- SLDC Odisha charged the Line -1 and flow touched to 940 MW and some load re-arrangement done at 220 KV level, which reduced loading upto 820 MW also Talcher kolar increased to 1000 MW .
- Flow was more than 850 MW till 25 minutes ,But now ckt-1 developed a transient fault in B phase seems to be due to same sag issue .



Event 6: 15:40 Hrs , Final restoration of both circuits

- Meanwhile some load rearrangement and 220 Kv Network re-configuration was done , so that while charging Meramundali mendasal it do not cause overloading .
- Such as closing of Bhanjanagr-mendhasal and nayagarh-mendhasal loop .
- Shifting of some new dubri load to meramundali .
- In patrolling they have not found any fault so Meramundali Mendhasal D/C charged from Meramundali end and both line was holding and seems to be healthy and finally one by one both lines were charged .





Report on Tripping of various elements of Sundargarh SS on Dt. 20.06.2023

Background:

At the evening of Dt. 20.06.23 around 08:15 PM, severe thunderstorm and lightening started along with heavy run at Sundargarh SS and continued for 2-3 hours. During this adverse weather condition, 02 Nos. SIEMENS make CT failed in 400 kV Switchyard leading to tripping of 400 kV Busbar#2, ICT-1 and 400 kV Sundargarh-Raigarh Circuit#1&2

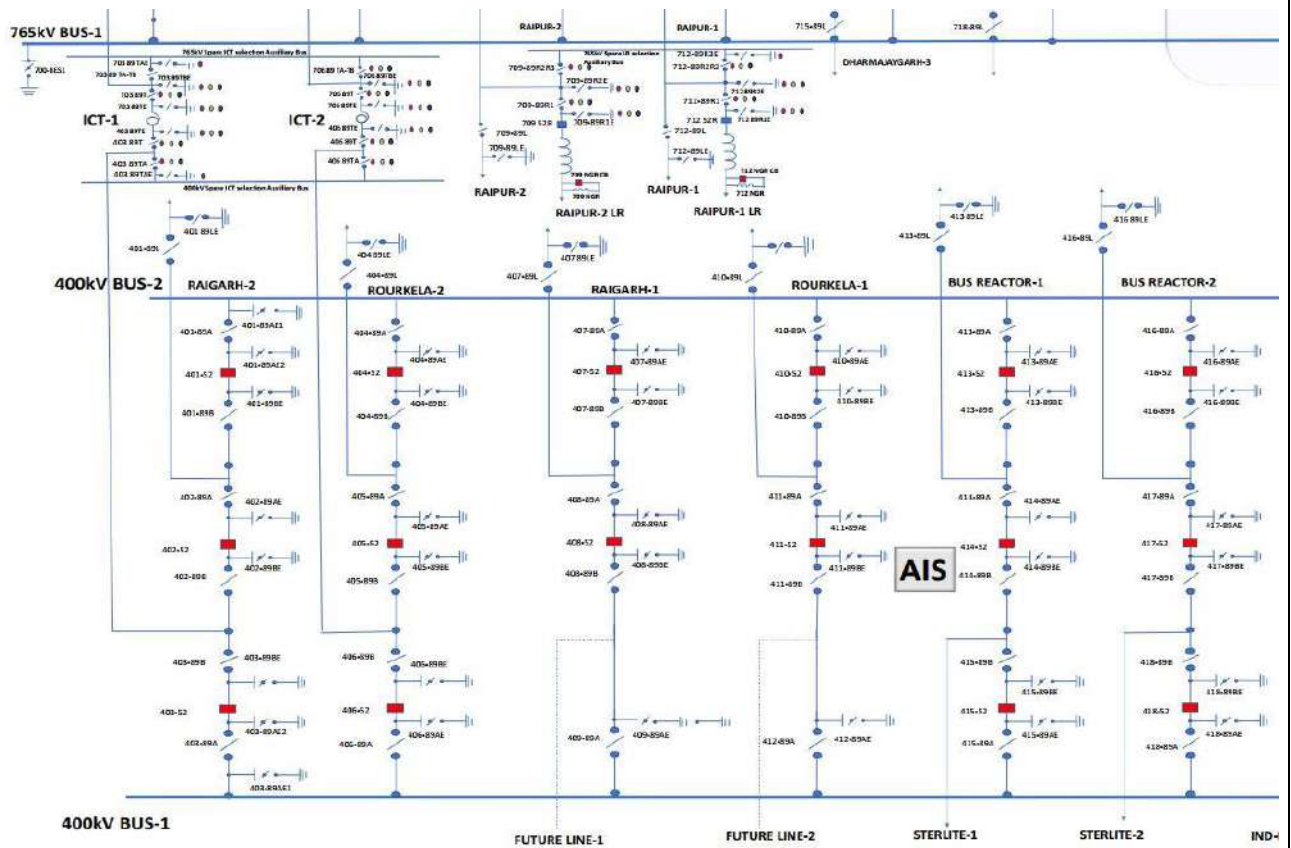
Sequenece of Events:

08:26:39:514 BN fault appeared in Raigarh Line#2 at a distance of 4.7 km from Sundargarh SS with fault current of 33 kA. B-Pole of both Main(401) & Tie Bay(402) opened and dead time started.

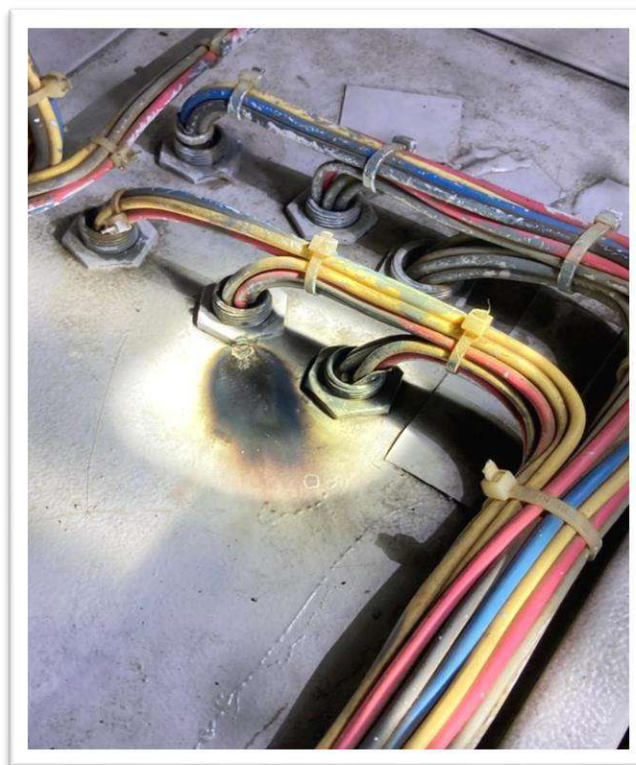
20:26:39:792 After nearly 300 ms of B-Pole opening, Y-Ph CT of Main Bay of Raigarh Line#1(407) and B-Ph CT of Tie Bay of ICT-1/Raigarh Line#2(402) Failed. Due to failure of 407-Y Ph-CT, 400 kV Busbar#2 tripped by tripping 401CB, 404CB, 407CB, 410CB, 413CB and 416 CB.

20:26:39:802 Due to failure of 402-B Ph-CT, fault feed continued through Main bay (403) of ICT#1 & HV side of ICT#1. Hence Tie LBB of 402 Bay sensed current in B-Phase though the B-Pole was already in open state for Raigarh-2 Line fault. Therefore Tie LBB operated and tripped ICT#1 & Raigarh#2 as per protection scheme.

20:26:39:911 Due to failure of 407-Y Ph-CT, YB-N fault appeared in 400 kV Raigarh Line-1 and the line tripped immediately



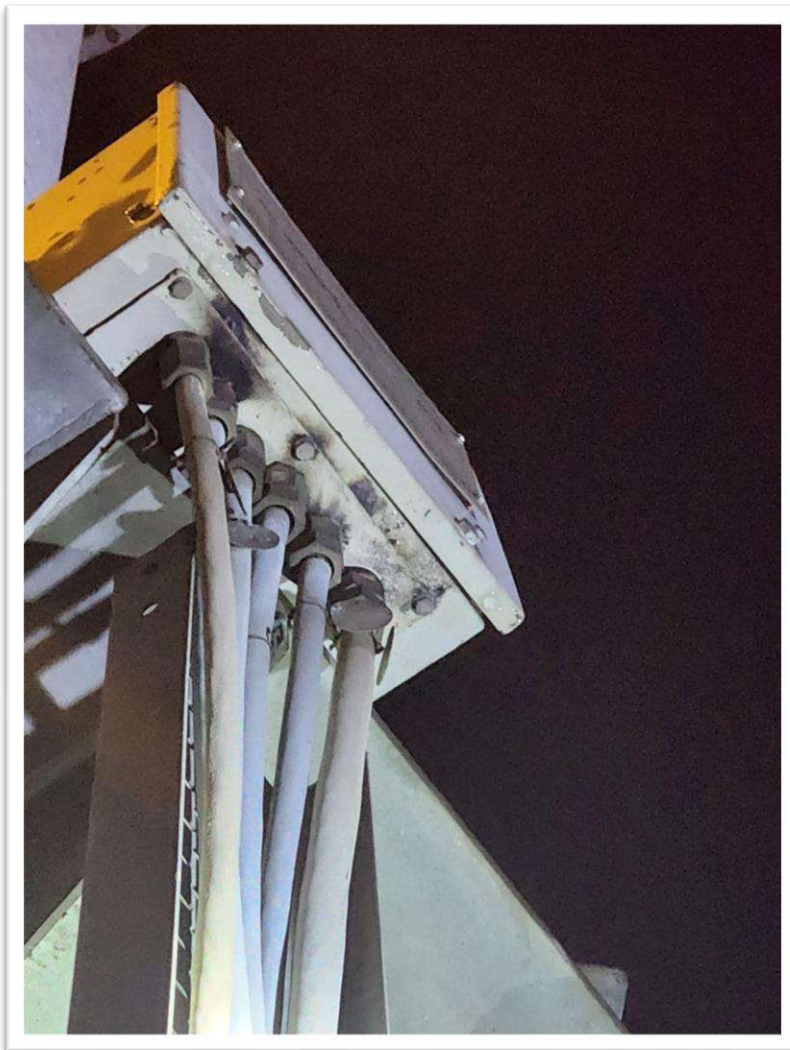
(SLD of 400 kV Switchyard)



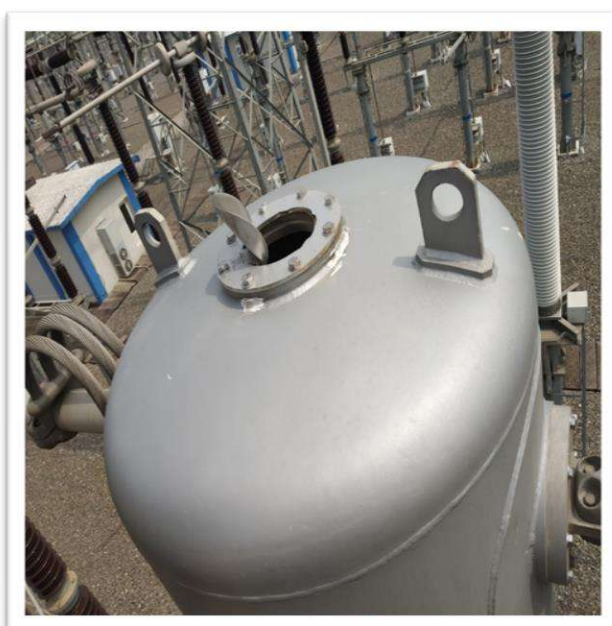
(Flashover mark near Cable gland in CTJB)



(Junction Box deformed due to CT Failure)



(Flash Over mark in Junction Box)



(Rupture Disc Operated)

Observation:

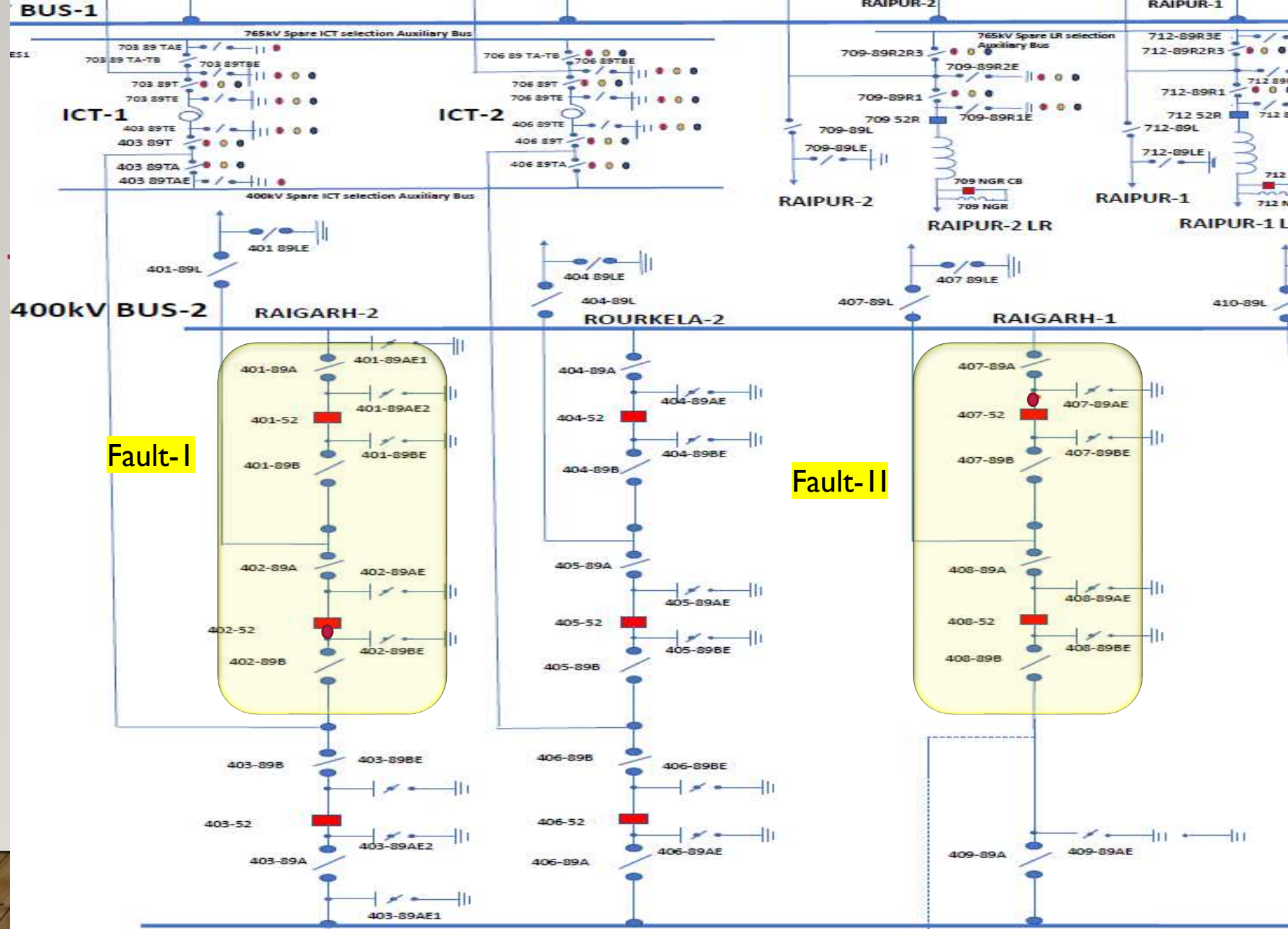
From the pictures of CT Failure, it is observed that some portion of the fault current travelled to ground through JB(top), Cable Gland and CT-JB in both cases. This fault current might have induced some current in secondary cable & Raigarh Line#1 sensed YB-N fault though the fault was in Y-Ph CT of 407 Bay.

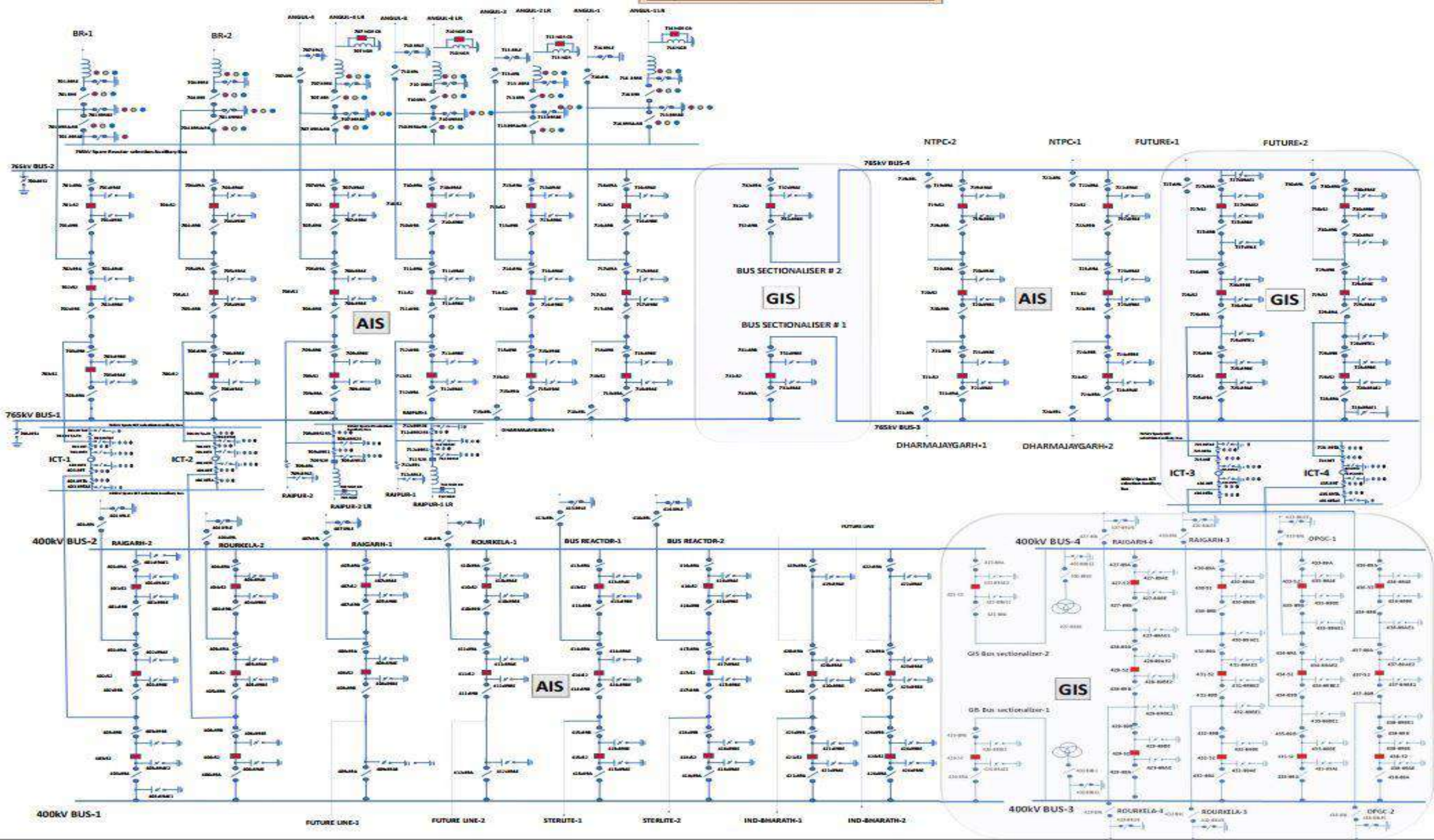
TRIPPINGS AT SUNDARGARH ON 20.06.2023

Annexure B.6.1

SI No.	Name of Equipment /Line	Fault time	Type of Fault	Fault Current	Fault Distance	Restoration Time
1	400kV Sundargarh-Raigarh # 2	20:26:39:514 Hrs	B-G	33.62KA	4.7KM	00:08 hrs
2	400 kV Busbar#2	20:26: 39:792 Hrs	Y-ph optd	Y Phase:60 kA		23:59 Hrs
3.	765/400 kV ICT#1	20:26:39:802 Hrs	Intertrip due to IV_Tie LBB OPTD	----	---	22:22 Hrs
4.	400kV Sundargarh-Raigarh # 1	20:26:39:911 Hrs	YB-G Fault	Y-Ph:18 kA B-Ph:0.6 kA	0.7KM	23:55 Hrs

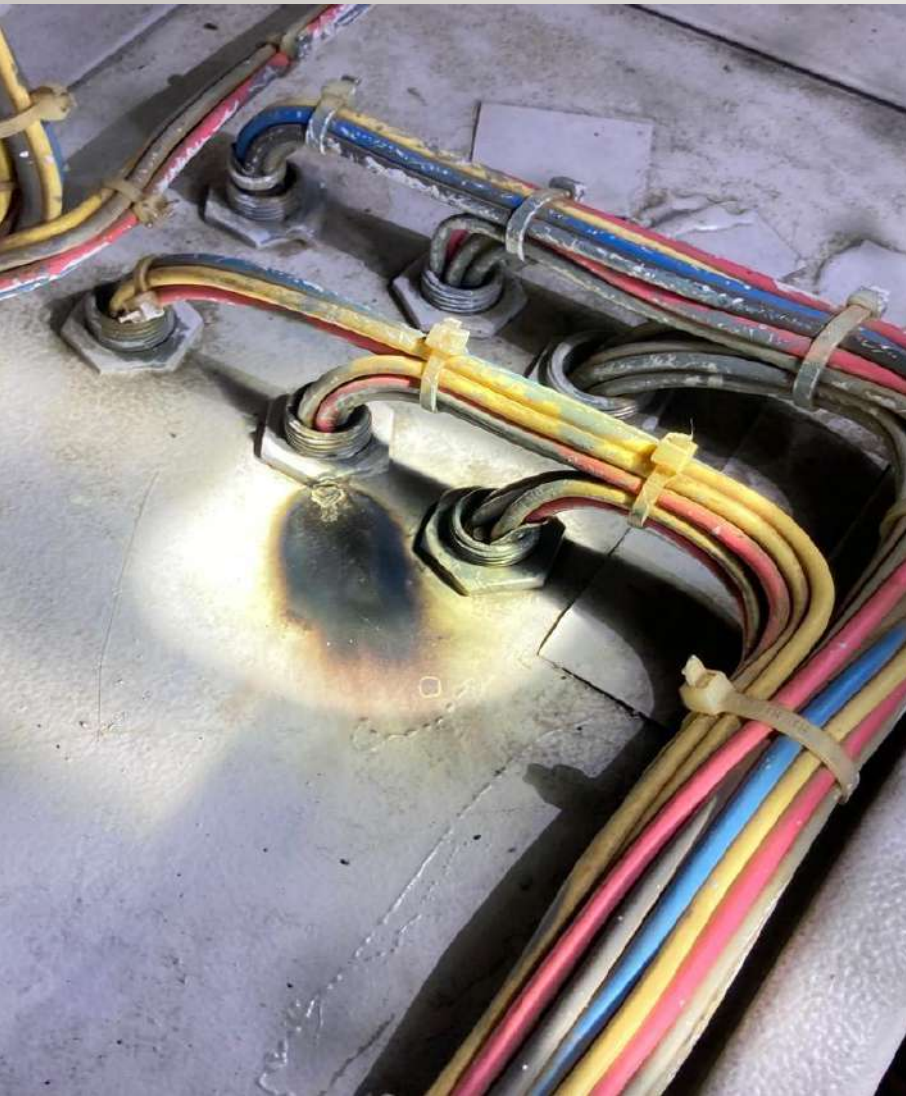
During above tripping, severe lightening and thunderstorm with heavy rain persisting at site for 2-3 Hrs.

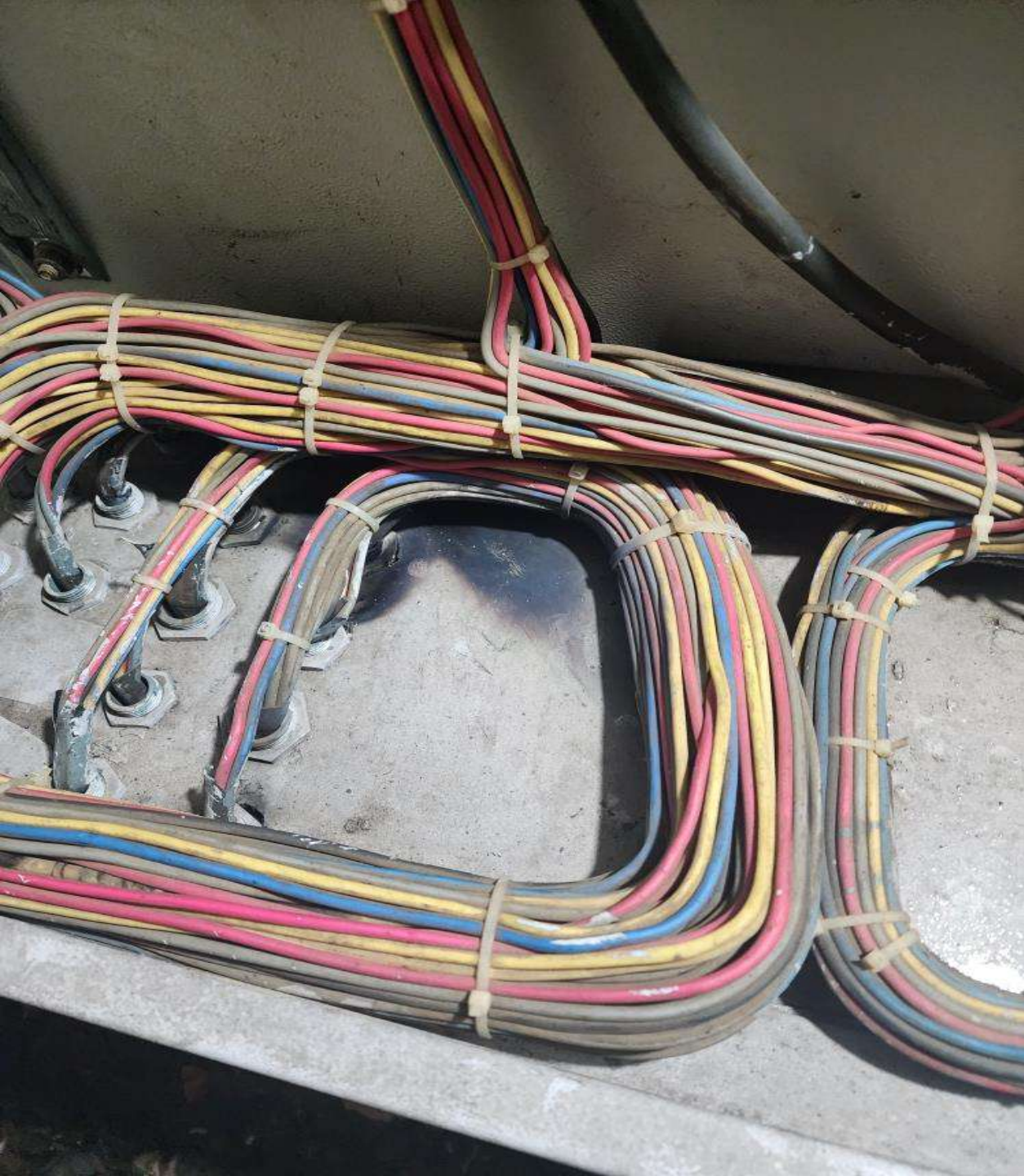




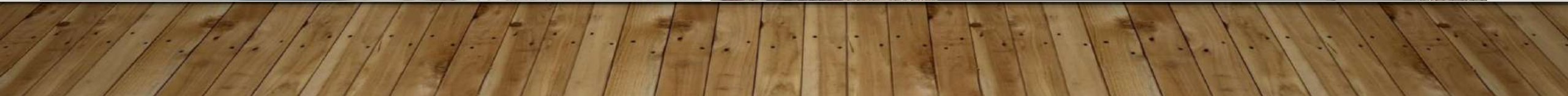
CT Failure Of 402-B Ph and 407- Y Ph

Year of MFG.:2013 CT Type:SAS420 CT Make:SIEMENS Date of Commissioning:31.03.2013









- Busbar Diff. current in Y-Ph : 60KA
- Fault current through 401 Bay: 10 KA
- Fault current through 407 Bay: 33 KA
- Other Bays 404,410,413 and 416 contributed 3 kA each

THANK YOU

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

Sl. No.	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION DATE	RESTORATION TIME	Relay Indication on LOCAL END	Relay Indication on REMOTE END	Result Clearance time in seconds	Remarks	DR Configuration Discrepancy	DR/EL RECOVERED FROM LOCAL END	DR/EL RECOVERED FROM REMOTE END	UTILITY RESPONSE
1	400KV JEERAT-SAGARDIGHI-2	05-06-2023	15:25	06-06-2023	00:20	Jeerat: R_N, 177 km, 3 kA	Sagardighi: R_N, 15 km	R-Earth 500	Tripped in Zone-2 time from Jeerat		Yes	No	Faulty PLCC panel, belongs to PGCIL.
2	400KV MEERAMUNDALI-MENDHASAL-1	12-06-2023	12:18	12-06-2023	12:47	Meramundali: O/c	Mendhasal: Didn't trip	No fault	Tripped on O/c from Meramundali only. OPTCL may explain.		Yes	Yes	O/c Setting to be reviewed

3	220KV DARBHANGA(DMTCL)- LAUKAHI-1	13-06-2023	05:38	13-06-2023	05:52	DMTCL: R_N, 71.38 km, 1.7 kA	Laukahi: R_N, 7.33 kA	R- E ar th	100	A/r couldn't be ascertained from PMU data. BSPTCL/D MTCL may confirm.	DR lengt h less at Lauk ahi	No	Yes	PLCC Channel-1 defective
4	400KV ARAMBAGH- BAKRESWAR- 1	13-06-2023	14:24	13-06-2023	18:00	Arambagh: R_N, Zone-2, 120 km, 3 kA	Bakreswar: R_N, Zone-1, 21.80 km, 5.9 kA	R- E ar th	400	Tripped in Zone-2 time from Arambag and DT sent to Bakreshwar. WBSETCL		Yes	No	ZIV make PLCC faulty. Expected to be replaced with DPC by the end of July'23.
5	220KV KATAPALLI- BOLANGIR(P G)-1	14-06-2023	16:44	14-06-2023	17:10	Katapalli: Distance protection operated	Bolangir: Didn't trip	N o fa ul t	NA	No fault in line however three phase tripping occurred with Zone-1		Yes	NA	PT selection relay faulty
6	220KV SAHARSA- BEGUSARAI-2	17-06-2023	12:15	17-06-2023	12:58	Saharsa: Didn't trip		N o fa ul t	NA	BSPTCL may explain.		No	No	Tripped due to switching off DC supply
7	220KV MAITHON- DUMKA-1	18-06-2023	15:15	18-06-2023	15:55	Maithon: B_N, Zone-1, 54 km, 2.4 kA	Dumka: Tripped	B- E ar th	100	A/r successful from Maithon only		Yes	No	DPC faulty at Dumka
8	220KV CHANDIL- RANCHI-1	19-06-2023	15:20	19-Jun	15:38	Chandil: B_N, 2.20 kA		B- E ar th	100	Three phase tripping for single phase fault at Chandil		Yes	Yes	Spurious DT sent

9	220KV CHANDIL- RANCHI-1	19-06-2023	15:51	20-06-2023	16:47	Chandil: B_E, 76.1 km, 1.08 kA	Ranchi: B_E, 77 km, 2.7 kA	B- E ar th	100	Three phase tripping for single phase fault at Chandil		Yes	Yes	Spurious DT sent
10	220KV RANCHI- RAMGARH-1	20-06-2023	16:22	20-06-2023	20:24	Ranchi:R_N, 21.18 km, 7.03 kA	Ramgarh: R_N, Zone-2, 78 km, 1.8 kA	E ar th	100	tripping at Ramgarh for single phase		Yes	Yes	A/r not working. S/d to be availed to rectify the issue
11	400KV GAYA- KODERMA-1	22-06-2023	18:49	22-06-2023	19:10	Gaya: Y_N, 47.2 km, 6.615 kA, A/r successful	Koderma: Y_N, Zone-1, 116.64 km, 4.05 kA	Y- E ar th	100	A/r successful from Gaya only. DVC may explain.	DR lengt h less at Kod erma	Yes	Yes	A/r in non-auto mode for shutdown. Line tripped before taking A/r in service at Koderma
12	220KV NEW MELLI- TASHIDING-2	23-06-2023	13:39	23-06-2023	15:38	New Melli: B_N, Zone-2, 15.63 km, 3.49 kA	Tashiding: B_N, Zone-1	B- E ar th	100	Three phase tripping for single phase fault. DT sent from Tashiding. THEP may explain.		Yes	Yes	A/r kept off at Tashiding
13	400KV LAPANGA- OPGC (IB THERMAL)-1	25-06-2023	04:40	25-06-2023	05:39	Lapanga: R_N, 13.95 km, 13.3 kA	OPGC: R_N, Zone-1, 8.9 km, 13.01 kA	R- E ar th	100	A/r successful from Lapanga only		Yes	No	Open ple detection logic was disabled at OPGC.

14	400KV NABINAGAR (NPGC)- JAKKANPUR(BH)-1	30-06-2023	02:09	30-06-2023	03:41	NPGC: B_N 10.7 kA	Jakkanpur: B_N, 75 km, 4.66 kA	B- E ar th	100	Three phase tripping at Nabinagar. A/r successful at Jakkanpur	Yes	No	PLCC channels not healthy at NPGC. Issue at Jakkanpur end. Rectified.
----	--	------------	-------	------------	-------	----------------------	--------------------------------------	---------------------	-----	---	-----	----	--

Configuration of Single pole tripping and Auto reclose for Aided DEF Function

CB Control Configuration

CB CONTROL				
CB Control by	Disabled	07.01		
A/R Single Pole	Enabled	07.07		
A/R Three Pole	Disabled	07.08		

Distance & DEF Function Enable

CONFIGURATION				
Restore Defaults	No Operation	09.01		
Setting Group	Select via Menu	09.02		
Active Settings	Group 1	09.03		
Save Changes	No Operation	09.04		
Copy From	Group 1	09.05		
Copy To	No Operation	09.06		
Setting Group 1	Enabled	09.07		
Setting Group 2	Disabled	09.08		
Setting Group 3	Disabled	09.09		
Setting Group 4	Disabled	09.0A		
Dist. Protection	Enabled	09.0D		
Power-Swing	Disabled	09.10		
Back-up I>	Disabled	09.11		
Neg Sequence O/C	Disabled	09.12		
Broken Conductor	Disabled	09.13		
Earth Fault PROT	Disabled	09.14		
Aided D.E.F	Enabled	09.15		

Distance & PLCC Configuration

GROUP 1				
GROUP 1 DISTANCE EL...				
GROUP 1 DISTANCE SC...				
Program Mode	Standard Scheme	31.01		
Standard Mode	P.U.P Z2	31.02		
Fault Type	Both enabled	31.03		
Trip Mode	1P, Z1 & CR	31.04		
Aid Dist Dly	20.00 ms	31.07		
tReversal Guard	20.00 ms	31.08		
Unblocking Logic	None	31.09		
SOTF/TOR Mode	100000000110000	31.0A		
SOTF Delay	110.0 s	31.0B		
Z1Ext Fail	Disabled	31.0C		
GROUP 1 Weak Infeed		31.0D		
WI:Mode Status	Disabled	31.0E		
tOT Window	40.00 ms	31.0F		

DEF Setting (Default Setting)

GROUP 1		
GROUP 1 DISTANCE EL...		
GROUP 1 DISTANCE SC...		
GROUP 1 AIDED D.E.F		
Aided ch. Status	Enabled	39.01
Polarisation	Neg sequence	39.02
V> Voltage Set	1.000 V	39.03
IN Forward	100.0 mA	39.04
Time Delay	0 s	39.05
Scheme Logic	Permissive	39.06
Tripping	Any phase	39.07
IN Rev Factor	600.0e-3	39.09
Block. Time Add.	150.0 ms	39.0A

AR Configuration:

In Block A/R, '**OC Aided DEF Trip**' function should be untick.

Block A/R

To change the value of a setting, enter a new value and press OK.

Current Value:
1111111111111111101111111111111111

New Value:
1111111111111111101111111111111111

Values:

- ☒ 09 V>2 Trip
- ☒ 0A IN>1 Trip
- ☒ 0B IN>2 Trip
- ☐ 0C Aided DEF Trip
- ☒ 0D ZSP Trip
- ☒ 0E IN>3 Trip
- ☒ 0F IN>4 Trip
- ☒ 10 PAP Trip

OK Cancel

DEF Channel Received logic:

4.8.3 Aided Directional Earth Fault (DEF) protection schemes

The option of using separate channels for Directional Earth Fault (DEF) aided tripping, and distance protection schemes, is offered in the P442 and P444 relays.

When a separate channel for DEF is used, the DEF scheme is independently selectable. When a common signalling channel is employed, the distance and DEF must **share** a common scheme. In this case a permissive overreach or blocking distance scheme must be used. The aided tripping schemes can perform single pole tripping.

✓/EN AP/Hb6

Application Notes

5-106

MiCOM P40 Agile P442, P444

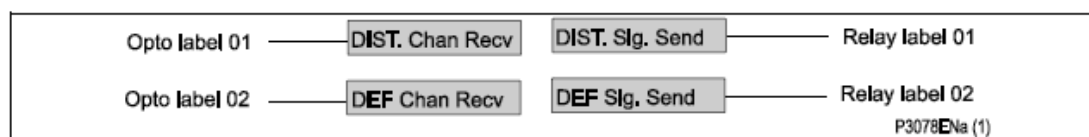


Figure 76: PSL required to activate DEF logic with an independant channel

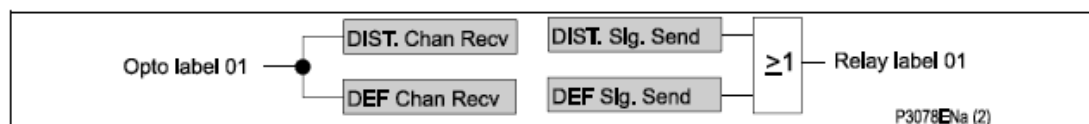


Figure 77: PSL required to activate DEF logic with **shared** channel

Note:

Aided Permission scheme will operate based on Independent and Shared Channel logic in PSL.

4.8.3.2 Aided DEF Schemes

4.8.3.2.1 Aided DEF Permissive Overreach Scheme

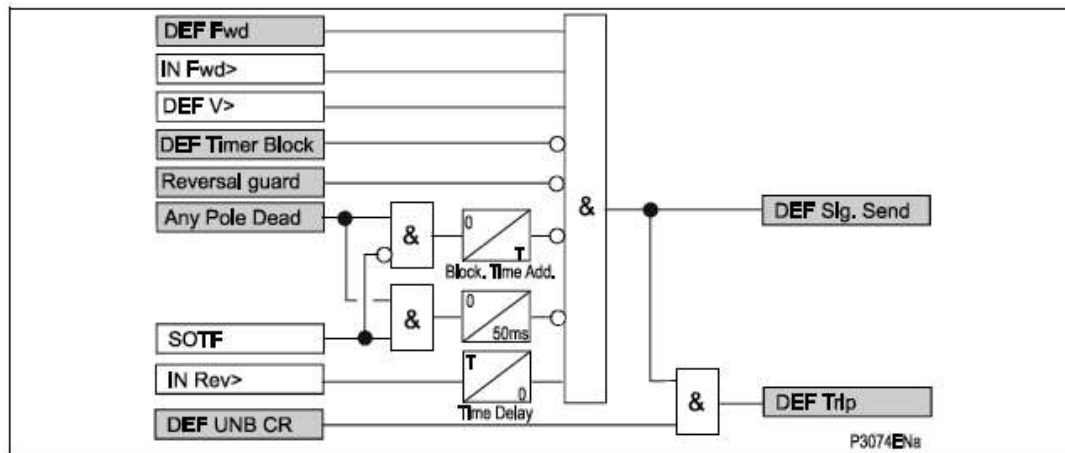


Figure 80: Independent channel – permissive scheme

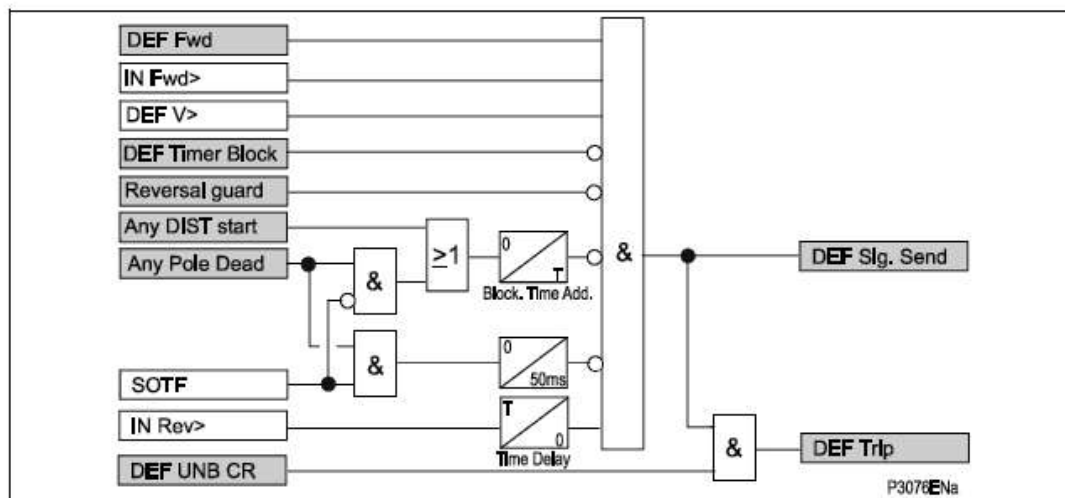
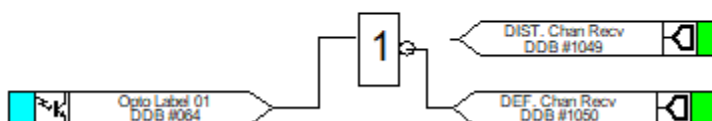


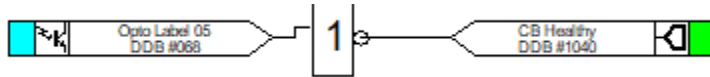
Figure 81: Shared channel – permissive scheme

In PSL logic (the opto input is inverted For testing purpose only)



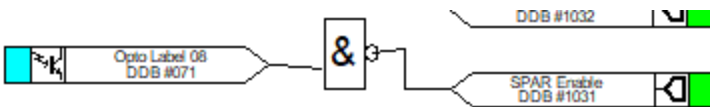
CB Healthy:

In PSL logic (the opto input is inverted For testing purpose only)



Single Pole AR:

In PSL logic (the opto input is inverted for testing purpose only)



AIDED DEF PROTECTION

An overview

A.Gokulakrishnan

20.7.2023

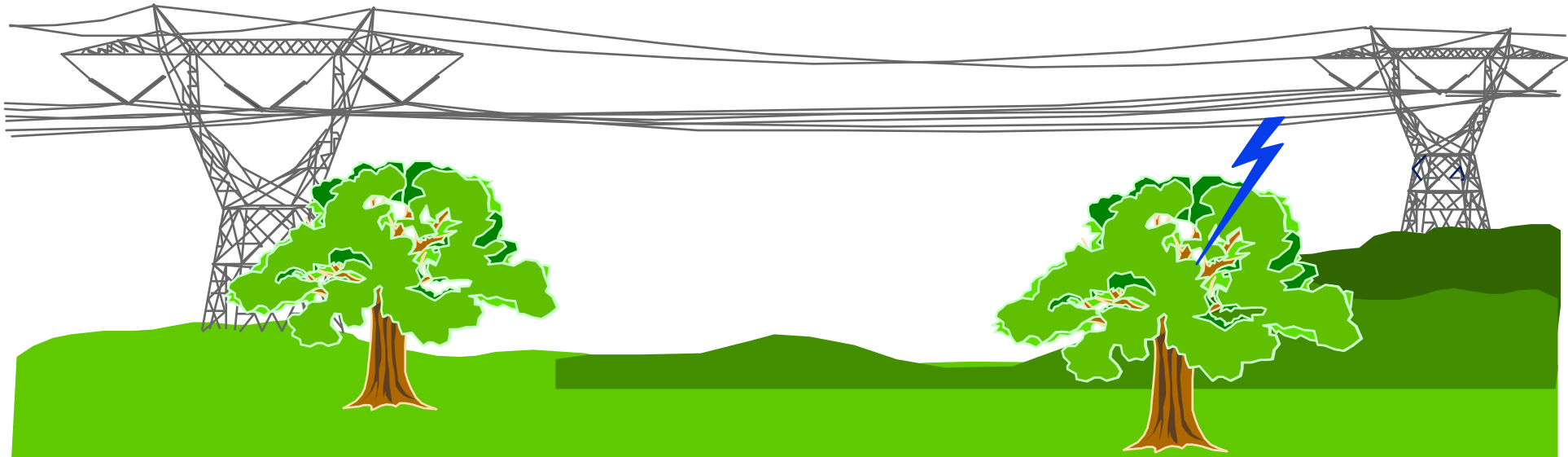
Contents

- Introduction
- Overview
- Algorithm
- Settings

Directional Earth Fault Protection (DEF)



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



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

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.

High Resistance Earth Fault Detection

A high resistance fault is detected when residual or zero sequence voltage ($3V_0$) and current thresholds are exceeded or using the high speed algorithms:

- $\Delta I \geq 0.05 I_n$
- $\Delta V \geq 0.1 V_n$ (Ph-N)

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

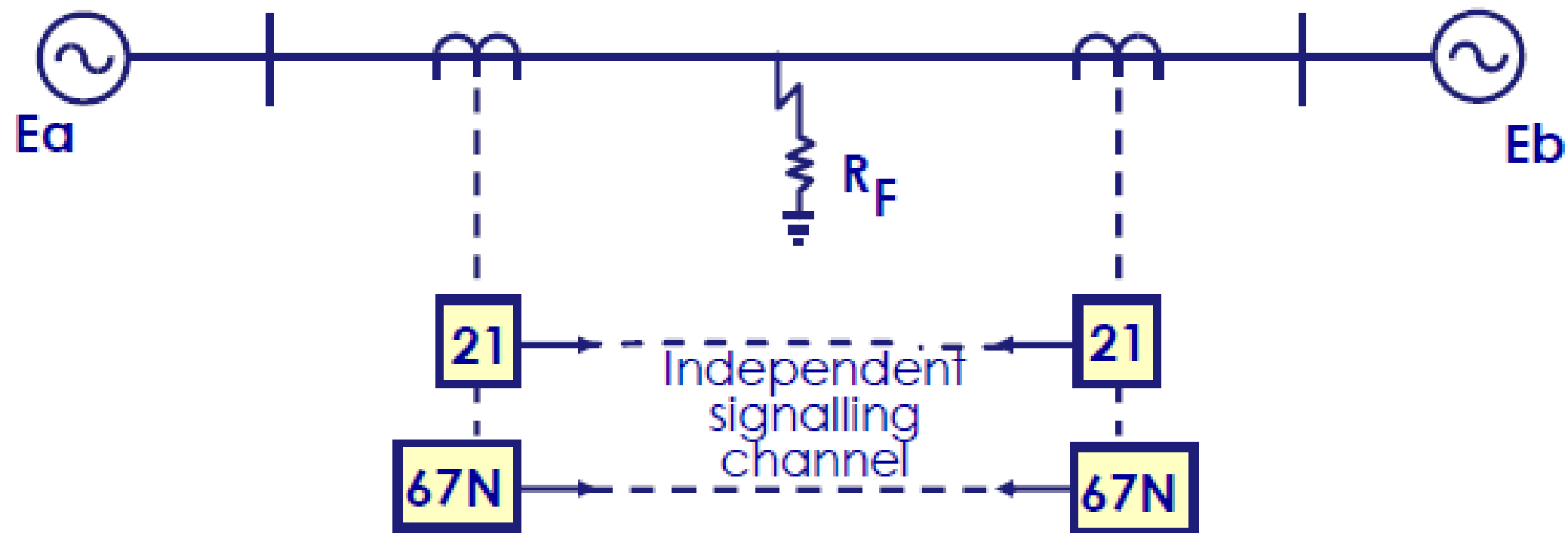
Directional determination

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 $+166^\circ$. A negative or zero-sequence polarisation is selectable to determinate the earth fault direction.

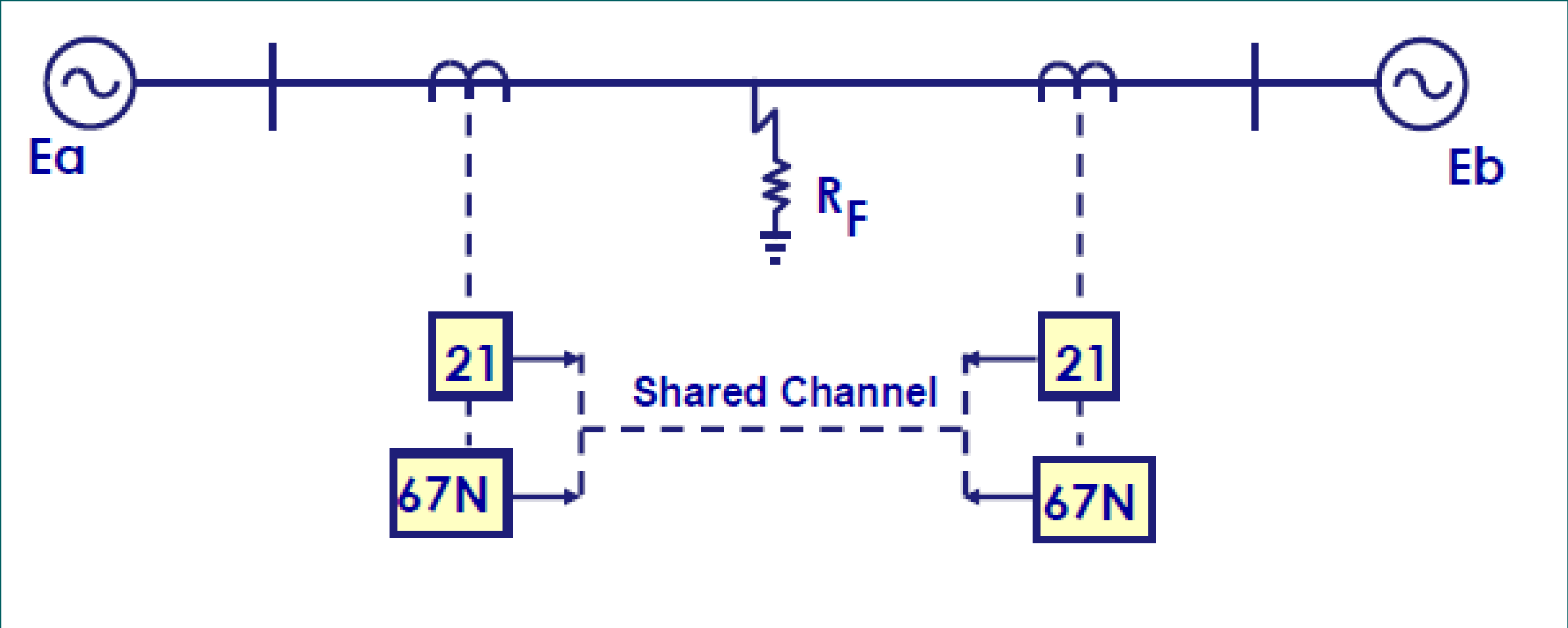
Phase selection

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

Permissive scheme



Shared scheme



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

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

Annexure C.3

SL NO	MONTH	UTILITY	ELEMENT	DETAILS OF ELEMENT	REMARKS
1	OCC_NOV_2022	NTPC (North Karanpura)		660MW New Generating Unit charged a Tandwa,Jharkhand	DATA REQUIRED
2	OCC_NOV_2022	NTPC (North Karanpura)	ICT	400KV MAIN BAY OF 400KV/11.50KV 315 MVA ST-3 AT NORTH KARANPURA	PDMS AND PSCT DONE
3	OCC_NOV_2022	NTPC (North Karanpura)	GT-1	400KV MAIN BAY OF 400KV/21KV 265 MVA GT-1 AT NORTH KARANPURA	PDMS AND PSCT DONE
4	OCC_NOV_2022	NKTL	T/L	400 kV North Karanpura(NTPC)- Chandwa(PG) Transmission Line -1	PDMS AND PSCT DONE AT NORTH KARANPURA END AND DATA REQUIRED CHANDWA END
5	OCC_NOV_2022	NKTL	T/L	400 kV North Karanpura(NTPC)- Chandwa(PG) Transmission Line 2	PDMS AND PSCT DONE AT NORTH KARANPURA END AND DATA REQUIRED CHANDWA END
6	OCC_NOV_2022	JUSNL	T/L	400KV MAIN BAY OF LATEHAR(JUSNL)-1 AT CHANDWA(PG)	PDMS AND PSCT DONE AT CHANDWA END AND DATA REQUIRED AT LATEHAR END
7	OCC_NOV_2022	JUSNL	T/L	400KV MAIN BAY OF LATEHAR(JUSNL)-2 AT CHANDWA(PG)	PDMS AND PSCT DONE AT CHANDWA END AND DATA REQUIRED AT LATEHAR END
8	OCC_DEC_2022	BGCL	ICT	400KV MAIN BAY OF 400KV/220KV/132kv/33kv 500 MVA ICT 2 AT JAKKANPUR JIS	PDMS AND PSCT DONE
9	OCC_DEC_2022	PGCIL	ICT	400KV MAIN BAY OF 400KV/220KV/33kv 315 MVA ICT 2 AT DURGAPUR SS	PDMS AND PSCT DONE
10	OCC_JAN_2023	JUSNL	T/L	400 kV Chandwa (PG) - Latehar (JUSNL) D/C Line	PDMS AND PSCT DONE AT CHANDWA END AND LATEHAR END DATA REQUIRED
11	OCC_JAN_2023	BSPTCL	T/L	220 kV Patna (PG) - Sipara (BSPTCL) D/C Line after reconducting	PDMS AND PSCT DONE
12	OCC_JAN_2023	OPTCL	B/R	400 kV 125 MVA Bus Reactor at Mendhasal GSS	PDMS AND PSCT DONE
13	OCC_JAN_2023	NTPC	T/L	Main Bays of 400 kV Gaya D/C Line at NTPC sitchyard	NOT CHARGED
14	OCC_JAN_2023	BSPTCL	T/L	132kV Ganwara-Pandaul line(reconducting)	PDMS AND PSCT DONE AT GANGWARA END
15	OCC_JAN_2023	BSPTCL	T/L	132kV Darbhanga-samastipur line(reconducting)	PDMS AND PSCT DONE AT DARBHANGA END
16	OCC_JAN_2023	PGCIL	T/L	PG-Patna-Gaurichak TL CKT-2(reconducting)	DATA REQUIRED
17	OCC_JAN_2023	PGCIL	T/L	PG-Patna-Gaurichak TL CKT-1(reconducting)	DATA REQUIRED
18	OCC_JAN_2023	BGCL	T/L	220kV JAKKANPUR NEW(BGCL)-KHAGAUL(BSPTCL)	PDMS AND PSCT DONE AT JAKKANPUR END AND DATA REQUIRED KHAGAUL END
19	OCC_JAN_2023	BGCL	T/L	220kV JAKKANPUR NEW(BGCL)-SIPARA(BSPTCL)	PDMS AND PSCT DONE AT JAKKANPUR END AND DATA REQUIRED KHAGAUL END
20	OCC_JAN_2023	BSPTCL	T/L	132kV Dumraon-Bikramganj line(reconducting)	In 132kV Dumraon Bikramganj line reconductoring has been done by panther equivalent HTLS conductor. In Distance relay, setting has been kept unchanged as data of both conductor (Panther and HTLS) are almost same.
21	OCC_JAN_2023	OPTCL	B/R	125kva bus reactorat Mendhasal	PDMS AND PSCT DONE

22	OCC_JAN_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT Lapanga	PDMS AND PSCT DONE
23	OCC_JAN_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-II ATGIS Hinjili	PDMS AND PSCT DONE
24	OCC_FEB_2023	PGCIL	T/L	220 kV Pusauli (PG) - Durgauti (IR) D/C Line	Data required in both end
25	OCC_FEB_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT ASKA NEW	PDMS AND PSCT DONE
26	OCC_FEB_2023	OPTCL	ICT	132kV Barbil-Kamanda line	Data required in both end
27	OCC_FEB_2023	OPTCL	T/L	132kV Switching station kutra 132Kv along with LILO of kuchinda rajgangpur s/c line to kutra	PDMS AND PSCT DONE
28	OCC_FEB_2023	OPTCL	T/L	132kV Kutra m/s shiva cement s/c line	Data required
29	OCC_FEB_2023	OPTCL	ICT	132/33kV 20MVA Power TRF-1 AT 132/33 kV,GSS,CHANDIPUR	Data Recived
30	OCC_FEB_2023	OPTCL	T/L	132kV Switching station near M/s Ultrateh Cement ltd at Khamarnuagaon,Khuntuni,132kV LILO arrangement from Arati steel - TS alloys line	Data required
31	OCC_FEB_2023	OPTCL	T/L	12.5 MW Solar power plant at 33kV Level in 132/33kV witchyard M/S ARBEL having connectivity at 132kV With LILO switching station SAINTALA	Data required
32	OCC_FEB_2023	OPTCL	T/L	220kV Switchyard at 220/132/33kV GSS,BAMRA having LILO connectivity 220kV Budhipadar-Tarkera ckt-II	Data required
33	OCC_FEB_2023	OPTCL	ICT	220/132kV160MVA Power Auto TRF-1 AT 220/132/33 kV,GSS,BAMRA	PDMS AND PSCT DONE
34	OCC_FEB_2023	OPTCL	ICT	220/132kV160MVA Power Auto TRF-2 AT 220/132/33 kV,GSS,KURAMUNDA	PDMS AND PSCT DONE
35	OCC_FEB_2023	OPTCL	ICT	220/132kV 40MVA Power Auto TRF-1 AT 220/132/33 kV,GSS,KURAMUNDA	PDMS AND PSCT DONE
36	OCC_MAR_2023	NTPC		NTPC Barh Stage Unit #2, 24 kV, 660 MW is yet to be synchronized	Data required
37	OCC_MAR_2023	NTPC	GT(3* 260M VA)	400kV GT#2 of NTPC Barh	Data required
38	OCC_MAR_2023	BGCL	ICT-1	400/220/33kV ICT 1 500MVA at Naubatpur SS	Data required
39	OCC_MAR_2023	OPTCL	T/L	400 kV GMR - Meramundali-B S/C Line after LILO work of 400 kV GMR - Meramundali-A Line at Meramundali-B SS	DATA RECEIVED
40	OCC_MAR_2023	OPTCL	T/L	132kV 2 PH S/C LINE,132kV GSS,KAMAKHYANAGAR FOR EXTENTION OF P/S TO RTSS KAMAKHYANAGAR	Data required

41	OCC_MAR_2023	OPTCL	T/L	400kV GMR-MERAMUNDALI-B SC LINE & MERAMUNDALI-B TO MERAMUNDALI-A LINE AFTER LILO OF GMR-MERAMUNDALI-A SC LINE MERAMUNDALI-B GIS	DATA RECEIVED
42	OCC_MAR_2023	OPTCL	ICT	132/33kV 20MVA POWER TR NO-2 AND 1 132kV FEEDER BAY GSS BIRMAHARAJPUR	Data required
43	OCC_MAR_2023	BSPTCL	T/L	220kV BIHARSARIFF-TTPS S/C(RECONDUCTING)	Data required
44	OCC_MAR_2023	BSPTCL	T/L	132kV SONENAGAR(OLD)-NAGARUNTARI TSS,SCTL(RECONDUCTING)	Data required
45	OCC_MAR_2023	BGCL	ICT	500MVA ICT-1 400/220/132/33kV ,NAUBATPUR	Data required
46	OCC_MAR_2023	BGCL	T/L	132kV KHAGAU-BIHITA NEW(BGCL) S/L	PDMS AND PSCT DONE
47	OCC_MAR_2023	BGCL	T/L	132kVBIHITA NEW(BGCL)-DIGHA(BSPTCL)	PDMS AND PSCT DONE
48	OCC_MAR_2023	BSPTCL	T/L	132kV RAJGIR ASTHAWAN CKT1&2	Data required
49	OCC_APR_2023	NTPC	GT	NTPC Barh Stage 1 Unit #2 660MW	DATA REQUIRED
50	OCC_APR_2023	OPTCL	ICT	400KV MAIN BAY OF 400KV/220kV 315 MVA ICT-3 AT KALINGANAGAR	DATA REQUIRED
51	OCC_APR_2023	BSPTCL	T/L	220 kV Sitamarhi (PMTL) - Raxaul Line 1 along with associated bays at Raxaul end	DATA REQUIRED
52	OCC_APR_2023	BSPTCL	T/L	220 kV Sitamarhi (PMTL) - Raxaul Line 2 along with associated bays at Raxaul end	DATA REQUIRED
53	OCC_APR_2023	POWERGRID	T/L	132 kV Ranpo (PG) - Samardong (EPD, Sikkim) Line 1	PDMS AND PSCT DONE AT RANGPO END
54	OCC_APR_2023	POWERGRID	T/L	133 kV Ranpo (PG) - Samardong (EPD, Sikkim) Line 2	PDMS AND PSCT DONE AT RANGPO END
55	OCC_MAY_2023	BSPTCL	T/L	220 kV Muzzafarpur (PG) - Amnour (BSPTCL) Line 2 as anti-theft measure from Muzzafarpur end	Data required
56	OCC_MAY_2023	OPTCL	T/L	SYNCHRONIZATION OF 2MW GEDCOL SOLAR PV PLANT HAVING 33kV CONNECTIVITY AT 220/132/33kV,GSS BOLANGIR NEW FOR 2MW SOLAR PV PLANT	Data required
57	OCC_MAY_2023	OPTCL	T/L	220kV LILO LINE LOC NO 227 OF EXITING 220kV NEW DUBURI-BALASORE LINE UPTO GANTRY OF 220/132/33kV GRID S/S DHARMA	Data required
58	OCC_MAY_2023	OPTCL	T/L	SYNCHRONIZATION OF 3.64MW SOLAR PV PLANT HAVING 11kV LEVEL CONNECTIVITY AT 132/33kV,SWITCHYARD OF M/S SHREE CEMENT LTD CONNECTED WITH KHUNTUNI-SHREE CEMENT FEEDER	Data required
59	OCC_MAY_2023	OPTCL	ICT	220/33kV GSS,KANTABADA LILO CONNECTIVITY FROM LOC NO 453 AND 455 OF 220kV CHANDAKA-MENDASHAL CKT-III ALONG WITH 02 NOS OF 220/33 Kv 63mva power trf	Data required
60	OCC_MAY_2023	OPTCL	T/L	SYNCHRONIZATION OF 30MW THERMAL UNIT OF M/S JAGANNATH STEEL AND POWER KEONJHAR WITH OPTCL SYSTEM	Data required

SI No.	Name of the incidence	PCC Recommendation	Latest status
126th PCC Meeting			
1.	Total Power Failure at 220 kV Chandil S/s on 27.04.2023 at 07:12 Hrs	<p>PCC observed that the O/C settings of ICTs at RCP end is set with a conservative value and advised to review the o/c settings of 220/132 kV ICTs at Chandil and RCP S/s with proper coordination.</p> <p>Regarding tripping of 132 kV Chandil – Adityapur in zone-3 from Adityapur end, PCC advised JUSNL to review reach settings of zone 3 distance relay at Adityapur end.</p> <p>JUSNL was advised to review O/C settings of feeders and ICTs at each S/s as per present fault level data available with SLDC Jharkhand</p>	<p><i>JUSNL representative informed that settings had been revised.</i></p> <p><i>PCC advised JUSNL to share revised settings to ERPC.</i></p>
2.	Disturbance at 220 kV Tenughat S/s on 18.04.2023 at 13:19 Hrs	<p>PCC advised TVNL to check time delay set for electrical based over frequency relay and it may be kept disabled if required in order to avoid unnecessary tripping of unit as occurred in this event.</p> <p>PCC advised to review(increase) the high set overcurrent settings (delay and pickup whichever possible) for unit-2 till numerical protection is implemented for that relay.</p>	<p><i>TVNL representttave was not available in the meeting.</i></p>
3.	Repeated Tripping of 400 kV Teesta III-Dikchu line	<p>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.</p>	<p><i>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</i></p>

			<i>implement O/V settings(stage-2) for line to 120% with delay of 100 ms.</i>
4.	Tripping of 400 kV Barh-Kahalgaon-2 at 08:21 Hrs on 15.04.2023	<p>PCC advised NTPC to test the relay healthiness at Barh end for 400 kV Barh-Kahalgaon-2 feeder.</p> <p>PCC advised NTPC Barh following:</p> <ul style="list-style-type: none"> to share detailed SOP adopted for operation of isolators along with modified scheme of interlocking to ERPC/ERLDC. to share DR/EL and report for future events in timely manner so that proper analysis regarding such incident can be carried out. to test interlinking scheme for other feeders also along with implementing hardware logic if needed. 	<p><i>NTPC representative informed that detailed SOP, DR/EL had been shared to ERPC.</i></p> <p><i>Regarding testing of interlinkig scheme , he informed that testing had been done for 400 kV Barh-Kahalgaon-2.</i></p> <p><i>PCC advised NTPC to test interlinking scheme for other feeders also along with implementing hardware logic if needed.</i></p>
125th PCC Meeting			
5.	Repeated Line tripping of 220 kV Ramchandrapur - Joda in April 2023	Regarding status of commissioning of DTPC in the line, PCC advised the matter may be taken with their telecom wing for early commissioning of the same.	<i>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.</i>