



भारत सरकार  
Government of India  
विद्युत मंत्रालय  
Ministry of Power  
उत्तर क्षेत्रीय विद्युत समिति  
Northern Regional Power Committee

दिनांक: 11.04.2025

सेवा में

As per attached list of Members and Other invitees

**विषय: संरक्षण उप-समिति की 58 वीं बैठक की कार्यवृत्त |**

**Subject: Minutes for 58<sup>th</sup> Protection Sub-Committee Meeting.**

संरक्षण उप-समिति की 58 वीं बैठक, दिनांक 26.03.2025 को 10:30 बजे से एनआरपीसी सचिवालय, कटवारिया सराय, नई दिल्ली में आयोजित की गयी थी | उक्त बैठक की कार्यवृत्त संलग्न है | यह उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट (<http://164.100.60.165/>) पर भी उपलब्ध है |

The 58<sup>th</sup> meeting of Protection Sub-Committee was held on 26.03.2025 at 10:30 Hrs at NRPC Secretariat, Katwaria Sarai, New Delhi. The minutes of the meeting is attached herewith. The same is also available on NRPC website (<http://164.100.60.165/>).

Signed by Dharmendra  
Kumar Meena

Date: 11-04-2025 17:28:20

(डी.के. मीना)  
(D.K. Meena)  
निदेशक (संरक्षण)

## **58<sup>th</sup> Protection Sub-Committee Meeting (26<sup>th</sup> March, 2025)-MoM**

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**Minutes of**  
**58<sup>th</sup> Meeting of Protection Sub-Committee (PSC) of**  
**Northern Regional Power Committee**

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**Date and time of meeting** : 26.03.2025 10.30 Hrs.

**Venue** : **NRPC Secretariat, Katwaria Sarai, New Delhi**

MS, NRPC welcomed all the participants. List of participants is attached as **Annexure-P**.

**Part-A: NRPC**

**A.1. Confirmation of minutes of 57<sup>th</sup> meeting of Protection Sub-Committee**

A.1.1 EE (P), NRPC apprised that 57<sup>th</sup> PSC meeting was held on 20.02.2024. Minutes of the meeting were issued vide letter dtd. 21.03.2025. Comments were received from THDC vide mail dated 21.03.2025 and NRSS- XXXI (B) Transmission Limited (Sekura Energy Limited) vide letter dated 24.03.2025.

A.1.2 Based on request of THDC, correction of MoM is as below:

Agenda item	Issued MoM	Amended Text as per comment of THDC
B.1 Status of remedial actions recommended during previous PSC meeting (agenda by NRLDC)	<b>B.1.1.(Vi) Multiple elements tripping at Koteswar(PG) on 17th May 2024,17:21 hrs:</b>  <i>During 57<sup>th</sup> PSC meeting, POWERGID(NR-1) representative informed that work is completed.</i>	<b>B.1.1.(Vi) Multiple elements tripping at Koteswar(PG) on 17th May 2024,17:21 hrs:</b>  <i>During 57<sup>th</sup> PSC meeting, POWERGID(NR-1) representative informed that work is completed for Koteswar (PG)-Koteswar</i>



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		(THDC) Ckt-1 & 2. However, differential protection scheme on 400KV Koteswar (PG)-Tehri Ckt-1 & 2 has not been implemented yet.
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A.1.3 Based on request of NRSS- XXXI (B) Transmission Limited (Sekura Energy Limited), vide letter dated 24.03.2025 i.e. PGCIL is the owner of all three substations located at Kurukshetra, Malerkotla and Amritsar. Therefore, the compliance requirement in terms of performance indices and protection audit to be submitted by PGCIL (attached as **Annexure-A.0**). Hence, remove the name of Sekura Energy Limited from A.3.4, A.4.3, A.5.3 & A.6.3. The correction of MoM is as below:

A.1.4 Forum approved to remove the name of Sekura Energy Limited from A.3.4, A.4.3, A.5.3 & A.6.3.

**Decision taken by Forum:**

*Forum approved the minutes of 57<sup>th</sup> PSC meeting with above corrections.*

## **A.2. Status of action taken on decisions of 57<sup>th</sup> Protection Sub-Committee meeting (agenda NRPC Secretariat)**

A.2.1 Status of action taken on the decisions of 57<sup>th</sup> PSC meeting was informed to the Forum.

A.2.2 Concerned utilities submitted the status of action taken. Forum noted the same.

A.2.3 *Updated status of action taken is attached as **Annexure-A.1**.*

**Decision taken by Forum**

*Forum instructed concerned utilities to take necessary action on pending issues.*

## **A.3. Submission of protection performance indices along with reason and corrective action taken for indices less than unity to NRPC Secretariat on monthly basis (agenda by NRPC Secretariat)**

A.3.1 AEE (P), NRPC apprised that as per clause 15 (6) of IEGC 2023;

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

a) The **Dependability Index** defined as  $D = N_c / (N_c + N_f)$

b) The **Security Index** defined as  $S = N_c / (N_c + N_u)$

c) The **Reliability Index** defined as  $R = N_c / (N_c + N_i)$

where,

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

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

$N_u$  is the number of unwanted operations,

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

Further, as per clause 15 (7) of IEGC 2023;

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

A.3.1 In earlier PSC meeting, it was decided that each utility shall submit the **performance indices of previous month by 7<sup>th</sup> day of next month.**

A.3.2 Accordingly, the status of the indices reported for the month of **February-2025** was presented before Forum as attached as **Annexure-A.II. Utilities from where, indices were pending, were asked to submit it timely in future.**

A.3.3 Following issues were highlighted by AEE (P):

- Some Utilities have not submitted data for February-2025.
- Utilities have submitted data for some plants but not all.
- Utilities have not mentioned corrective action taken for indices less than unity.
- Some utilities have sent data after cut-off date of 7<sup>th</sup>.

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- A.3.4 Following utilities were found non-compliant as indices were not received even on date of meeting:
- i. NTPC (Anta, Auriya, Koldam, Rihand, Singrauli, Unchahar)
  - ii. NPCIL (RAP-C)
  - iii. PSTCL
  - iv. NTPC Green Energy Limited
  - v. Azure Power India Pvt. Ltd.
  - vi. Avaada Energy Private Limited
  - vii. Adani Green Energy Limited
  - viii. UT of J&K
  - ix. UT of Ladakh
  - x. UT of Chandigarh
  - xi. IndiGrid
  - xii. POWERLINK
  - xiii. NRSS 36 (Tata Power)
  - xiv. Elements of JSW, Adani, NLC in Rajasthan as mentioned in Annexure-A.II
  - xv. RE plants mentioned in Annexure-A.II
- A.3.5 It was highlighted that PSTCL has not submitted the performance indices of January, 2025 and February 2025.
- A.3.6 MS, NRPC stated that agenda may be discussed in the RE Sub-Committee meeting.
- A.3.7 Incidents causing indices less than one, were discussed. Concerned officials apprised the cause and corrective action undertaken/ planned. Summary of such incidents is attached as **Annexure-A.III**.
- A.3.8 Regarding, tripping of 220kV Panchkula \_PG - Pinjore Ckt-2 on PLCC Maloperation, HVPN representative informed that OEM has been contacted to rectify the issue. However, as of now the links of DT command were made out of circuit to avoid unnecessary tripping. Forum requested HVPN to expedite the rectification of issue of PLCC.
- A.3.9 RVPN representative informed that they have been replacing the electromechanical relays with Numerical relays to avoid relay maloperation.
- A.3.10 AEE (P), NRPC mentioned that HPPCL has not shared the reason of unwanted operation of Sainj. HPPCL representative ensured to submit the same after the

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meeting.

- A.3.11 EE (P), NRPC highlighted that reason and corrective action taken for event caused indices less than unity, should be mentioned along with submission of indices.
- A.3.12 SLDCs were directed to share the compiled data of all utilities (GENCOs, & TRANSCOs) under their jurisdiction. They may take regular follow ups with other utilities who are not members of NRPC and arrange the protection performance indices.
- A.3.13 Subsequently, MS, NRPC highlighted that utilities may submit the performance indices of previous month by 7<sup>th</sup> day of next month element wise along with the reason for indices less than unity and corrective action taken. He also requested RE Plants to comply the IEGC with respect to protection chapter added newly in the IEGC.
- A.3.14 Further, it was also highlighted that IEGC 2023 has given responsibility to RPCs for receiving indices from all utilities however, all utilities are not members of NRPC. SLDCs have been requested in earlier PSC meetings to follow up with concerned utilities of states which are not NRPC members and to send compiled indices to NRPC.

**Decision of the Forum:**

*Non-compliant utilities were asked to submit the Protection performance indices timely by 7<sup>th</sup> day of month element wise along with corrective action taken for indices less than unity.*

**A.4. Annual protection audit plan for FY 2024-25 (agenda by NRPC Secretariat)**

- A.4.1 AEE (P), NRPC apprised that as per clause 15 of IEGC 2023;
  - *Annual audit plan for the next financial year shall be submitted by the users to their respective **RPC by 31st October**. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC.*
- A.4.2 Starting from 48<sup>th</sup> PSC and in every PSC meeting, all utilities were requested to

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submit the annual protection audit plan.

- A.4.3 Audit plan submitted by utilities were presented and it was observed that following utilities had not submitted their plans and thus are non-compliant:
- i. NPCIL
  - ii. MEJA Urja Nigam Ltd
  - iii. HPPCL
  - iv. UT of J&K
  - v. UT of Ladakh
  - vi. UT of Chandigarh
  - vii. RE plants except TATA POWER RENEWABLE
- A.4.4 It was gathered that all above-mentioned organizations are non-compliant of IEGC 2023.
- A.4.5 RVPN and RVUN representative informed that internal audit has been completed. POWERGRID representative mentioned that reports have not been shared due to format issue. SJVN representative informed that internal audits have been completed. DTL representative conveyed that internal audit of substations is in process and will be completed by March, 2025 end. UPPTCL representative added that internal audit report will be shared in next month. HPPCL representative submitted that they will share the settings checked before the next meeting.
- A.4.6 Further, it was highlighted that most of the organizations have submitted the audit plan but have not shared audit reports.
- A.4.7 Status of annual audit plans is enclosed as **Annexure- A.IV**. Further, who have submitted the audit plan may submit the audit report and compliance status.

**Decision of the Forum:**

*Non-compliant utilities were asked to complete audit by 31<sup>st</sup> March 2025. Utilities other than non-compliant were asked to submit report and compliance status within one month of completion of audit.*

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A.5.1 AEE (P), NRPC apprised that as per clause 15 of IEGC 2023;

- *Annual audit plan for the next financial year shall be submitted by the users to their respective RPC by 31st October. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC.*

A.5.2 In view of above, all utilities were requested to submit the annual protection audit plan for FY-2025-26 latest by 31<sup>st</sup> October 2024 in the 53<sup>rd</sup> PSC meeting. Further, concerned utilities were requested to submit the same at the earliest in the 54<sup>th</sup>, 55<sup>th</sup>, 56<sup>th</sup> & 57<sup>th</sup> PSC meeting.

A.5.3 Audit plan submitted by utilities were presented and it was observed that following utilities had not submitted their plans and thus are non-compliant:

- i. NPCIL
- ii. POWERGRID (NR-3)
- iii. THDC (Koteshwar)
- iv. PTCUL
- v. PSTCL
- vi. HPGCL
- vii. Aravali Power Company Pvt. Ltd
- viii. MEJA Urja Nigam Ltd.
- ix. Adani Power Rajasthan Limited
- x. Adani Energy Solution Limited
- xi. Tata Power Renewable Energy Ltd.
- xii. UT of J&K
- xiii. UT of Ladakh
- xiv. UT of Chandigarh
- xv. ADHPL
- xvi. UPJVNL
- xvii. RE plants

A.5.4 POWERGRID NR-3 representative conveyed that audit plan will be submitted soon.

A.5.5 Status of submitted annual audit plans is enclosed as **Annexure- A.V.**

**Decision of the Forum:**

*Non-compliant utilities were asked to submit annual audit plan without any further delay. Other utilities were asked to submit report and compliance status within one*

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*month of completion of audit.*

**A.6. Third-party protection audit plan (agenda by NRPC Secretariat)**

A.6.1 AEE (P), NRPC apprised that as clause 15 of IEGC 2023:

*All users shall also conduct third party protection audit of each sub-station at 220 kV and above (132 kV and above in NER) once in five years or earlier as advised by the respective RPC.*

A.6.2 In view of above, some utilities have submitted their third-party protection audit plans (enclosed as **Annexure-A.VI**).

A.6.3 It was observed that audit plan has not been received from following:

- i. HVPNL
- ii. RVPNL
- iii. PSTCL
- iv. HPGCL
- v. HPSEBL
- vi. Aravali Power Company Pvt. Ltd
- vii. Tata Power Renewable Energy Ltd.
- viii. UT of J&K
- ix. UT of Ladakh
- x. UT of Chandigarh

A.6.4 RVPN representative mentioned that RVPN and HVPNL are going to discuss about the mutual third-party audit with higher authorities and will submit the third-party protection audit plan accordingly. HVPN representative also apprised the same.

A.6.5 RVPNL asked that RVUNL and RVPNL may be allowed to conduct third-party protection audit mutually as the management of RVPN and RVUNL is different

A.6.6 Adani representative also asked that Adani may be allowed for mutual third party

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protection audit mutually of various wings.

- A.6.7 MS, NRPC supported the suggestion as RVPN and RVUNL have different management.
- A.6.8 However, Forum did not take decision on the proposal and allowed that two different states may do mutual third party audit as RVPNL and HVPNL are exploring to do.
- A.6.9 Further, Utilities expressed concerns regarding the quality of third-party protection audits conducted by the currently available vendors, stating that the audits are not meeting the standards and are not up to par. Additionally, the cost associated with these third-party audits is high. There had also been questions raised about the eligibility criteria of the experts conducting these audits.
- A.6.10 Members requested to establish a uniform set of minimum eligibility credentials for experts performing third-party protection audits.
- A.6.11 EE (P), NRPC stated that there is need for certification of protection auditors in the country. Like energy auditors are certified by BEE, protection auditors shall also be certified.
- A.6.12 He added that the National Power Training Institute (NPTI), a national-level institute responsible for conducting various power sector-related training programs, may be considered suitable for this task.
- A.6.13 Forum agreed that a system may be established to certify the competency of protection auditors.
- A.6.14 MS, NRPC supported and added that NPC Division may co-ordinate with NPTI for conducting examination and issuance of protection auditor certificate. Accordingly, agenda may be placed in next NPC meeting.

***Decision of the Forum:***

*Forum directed utilities to submit audit plan. Subsequently, the audit reports along with compliance status may be submitted to NRPC Secretariat within one month of completion of audit. Letter may be sent by NRPC Secretariat to NPC Division, CEA*



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*for taking up matter of protection auditor certification with NPTI.*

**A.7. Compliance of recommendations of protection audit (agenda by NRPC Secretariat)**

A.7.1 AEE (P), NRPC apprised that as per clause 15 of IEGC 2023;

- *All users shall conduct internal audit of their protection systems annually, **and any shortcomings identified shall be rectified and informed to their respective RPC.** The audit report along with action plan for rectification of deficiencies detected, if any, shall be shared with respective RPC for users connected at 220 kV and above (132 kV and above in NER).*

A.7.2 As per clause 15 (4) of IEGC 2023;

- *The third-party protection audit report shall contain information sought in the format enclosed as Annexure–1 (IEGC). The protection audit reports, along with **action plan for rectification of deficiencies detected, if any, shall be submitted to the respective RPC and RLDC or SLDC, as the case may be, within a month of submission of third-party audit report.** The necessary compliance to such protection audit report shall be followed up regularly in the respective RPC.*

A.7.3 Following utilities have submitted the internal audit report based on the audit done at their substations:

S.N.	Utility	Stations
1	RVPN	220kV Substations - Ratangarh, Badnu, Bikaner, Chhatargarh, Gajner, Halasar, Nokha, Goner, NPH, Sanganer, SEZ, VKIA, Shri Dungarhgarh, Sujangarh, Tehendesar  400kV substations- Chittorgarh, Akal

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2	THDC	Tehri
3	Tata Power	300MW Bhanipura, 225MW, NOORSAR 150MW MSEDCL
4	RVUN	400kV CSCTPP, Chhabra, 220kV DCCPP, Dholpur, Suratgarh Super Thermal Power Station, Suratgarh
5	UPRVUNL	Parichha-BTPS, CTPS
6	UJVNL	220kV Dharasu
7	HPGCL	RGTPP, Khedar
8	HVPNL	220kV S/s Mohana
9	Others	ADHPL

A.7.4 Following utilities have submitted reports of 3rd Party audit:

S.N.	Utility	Stations
1	UJVNL	220kV Dharasu

A.7.5 Compliance/ action plan on recommendation of audit has been submitted by following:

S.N.	Utility	Stations
1	HVPNL	220kV S/s Mohana (internal audit)
2	UJVNL	220kV Dharasu (external audit)
3	LPGCL	Updated action taken for Internal audit done in Nov'24
4	LPGCL	Updated action taken for External audit done in Oct'24

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- A.7.6 The above submitted reports were made available at NRPC website: <http://164.100.60.165/meetings/prsub.html>
- A.7.7 In the meeting, above reports were discussed and concerned utilities were asked to submit compliance report of the issues highlighted by audit.
- A.7.8 AEE (P), NRPC highlighted that in audit report of RVPN, Pole Discrepancy relay setting of many transmission lines of audited substations is not in line with finalized philosophy. RVPN representative informed that settings have been kept as per the possible operability of relay.
- A.7.9 AEE (P), NRPC highlighted that auto reclosure, PSB are not enabled on 220kV Bikaner Badnu line. He added that SOTF is disabled in the substations. Transformer over flux settings are not as per finalized protection philosophy for eg. 220/132kV, 160 MVA Transformer-1 & 220/132kV, 100 MVA Transformer-2 do not over flux protection. 220/132kV, 100 MVA Transformer-3, time setting of over flux protection is required to be reviewed.
- A.7.10 AEE (P), NRPC highlighted that zone-4, time setting is 160msec. in most of the lines at 400kV substation Akal which may be reviewed as RVPN representative informed that Bus Bar protection is operational at Akal currently.
- A.7.11 AEE (P), NRPC mentioned that Protection settings are not included in the internal audit report of ADHPL, THDC, UJVNL, RVUNL (400kV CSCTPP, Chhabra, 220kV DCCPP, Dholpur)
- A.7.12 AEE (P), NRPC highlighted that HPGCL may review the over flux protection setting of Station Transformers considering finalized protection philosophy.
- A.7.13 Further, it was conveyed that external audit report of 220kV Dharasu, UJVNL has already been discussed in 56<sup>th</sup> PSC meeting.
- A.7.14 NLDC representative highlighted that internal as well external audit must be done effectively in order to find out shortcomings so that any undesired operation may be stopped.

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### **Decision of the Forum:**

*Forum noted the audit report and directed utilities to submit compliance report. Further, other utilities were directed to submit the protection audit report (for audited S/s as per submitted plan) to NRPC Secretariat and to update the compliance status regularly.*

### **A.8. Tripping of Type-3 filters (5/27) on overload protections at HVDC Rihand & Dadri terminals (agenda by POWERGRID, NR-3)**

- A.8.1 POWERGRID NR-3 representative apprised that HVDC Rihand and Dadri are experiencing tripping of Type-3 filters (Z13, Z23, & Z33) due to overload protections. There are three Type-3 Filter Banks, named Z13, Z23, and Z33, installed at each terminal to prevent the 5<sup>th</sup> and 27<sup>th</sup> order harmonics.
- A.8.2 It has been observed that whenever any of the Type-3 Filter Banks (5/27) are charged either from RPC or manually, they trip on resistive or reactive overload protections, all three Type-3 filter banks (Z13, Z23, and Z33) are currently isolated at both HVDC Rihand and Dadri terminals.
- A.8.3 The analysis concluded that the converter-generated harmonics are within the design limits, but external 5<sup>th</sup> harmonics present in the Grid are causing the Type-3 Filters to trip on Resistor and Reactor Overload Protection.
- A.8.4 The same agenda was discussed in the 57<sup>th</sup> PSC meeting wherein POWERGRID proposed to review the 5<sup>th</sup> harmonics in the Grid and resolve the issue. Forum decided that the *agenda may be discussed with detailed analysis and study report in the next PSC meeting. POWERGRID may approach to OEM and may also take expert opinion from expert or third-party audit vendor to analyse and find out the root cause.*
- A.8.5 Accordingly, POWERGRID submitted the agenda with detailed report on analysis of the issue, including harmonic measurements, findings attached as **Annexure-A.VII**.
- A.8.6 The analysis of the harmonic measurements revealed the following key observations:
  - A. Elevated 5<sup>th</sup> Order Harmonics: The 5<sup>th</sup> order harmonic levels were significantly

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higher than the harmonic data recorded at the time of commissioning. At the time of commissioning 5<sup>th</sup> harmonic Current was in the range of 1.25 amps, which elevated up to 3.021 amps at the Power flow of 1000 MW.

B. External Source: The elevated 5<sup>th</sup> order harmonics may be attributed from external sources within the grid, which exceed the limit of harmonic settings of the Type-3 filter banks (Z13, Z23, and Z33) and finally trips the filter banks (Z13, Z23, and Z33).

- A.8.7 POWERGRID representative conveyed that POWERGRID has not been using the filter banks for 3-4 years due to tripping of these whenever they are made back in use.
- A.8.8 In view of above, POWERGRID requested Forum that matter of the 5<sup>th</sup> harmonics infusion in the Grid may be reviewed and provide needful solution to resolve the issue.
- A.8.9 POWERGRID representative added that matter has been taken up with OEM also for reviewing of setting parameters based on recent 5<sup>th</sup> harmonics measurement, but OEM denied to accept the requirement of any changes and suggested to adapt mitigation technique to overcome the issue.
- A.8.10 He also mentioned that 5<sup>th</sup> harmonics generation are preferably due to 6 pulse rectifier units used in cement factory, electrical traction system etc.
- A.8.11 CGM (SO), NRLDC advised POWERGRID NR-3 to conduct power quality measurement of connected incoming feeders to identify the source of harmonic injection. He also suggested to review whether similar issues are there in other POWERGRID HVDC stations in India.
- A.8.12 POWERGRID representative expressed that other utility would not allow POWERGRID to measure the harmonics. Two Lines are emanating from NTPC plant to POWERGRID HVDC station but there are other lines which are connected to NTPC plant also. It is not easy to identify to find out the source responsible to infuse the harmonics.
- A.8.13 EE (P), NRPC suggested that a letter may be sent by POWERGRID to NTPC, and nearby connected plants in order to provide data of power quality measurement at their end.
- A.8.14 MS, NRPC stated that there are other plants also in that area viz. Hindalco

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- A.8.15 Forum noted the concern raised by POWERGRID of infusion of 5<sup>th</sup> harmonics from external AC source. However, before arriving any conclusion, the measurement of power quality is required at ends of other utilities.
- A.8.16 Accordingly, Forum decided POWERGRID to issue letter to NTPC, Hindalco and other connected utilities for arranging the measurement of power quality.

**Decision of the Forum:**

*Forum decided that POWERGRID may issue letter to NTPC, Hindalco and other utilities for arranging the measurement of power quality i.e. 5<sup>th</sup> Harmonics on HVAC network and submit the reports with in 2 months from issuance of letter.*

**A.9. Study for implementation of 3ph-auto RECLOSING in 400 kV Bareilly PG - Moradabad transmission line (In case of L-L Fault) (agenda by POWERGRID NR-3)**

- A.9.1 AEE (P), NRPC apprised that during 51<sup>st</sup> PSC (agenda point A.13), POWERGRID has raised the concern for 3-Phase A/R of Transmission lines due to intermittent L-L fault under the Bareilly-PG jurisdiction due to kite threads and majorly in 400kV Bareilly- Moradabad Transmission line.
- A.9.2 In 51<sup>st</sup> PSC meeting, Forum requested POWERGRID to perform protection simulation studies and then put up the matter again in upcoming meetings. POWERGRID may perform simulation study itself or may approach/engage any expert/consultant for same.
- A.9.3 Accordingly, POWERGRID representative apprised that POWERGRID has done a Study (attached as **Annexure-A.VIII**) for implementation of 3ph-Auto Reclosing in 400 kV Bareilly PG - Moradabad Transmission Line. A simulation was conducted using PSS-E software to analyse the system's behaviour, focusing on bus voltages and the angle response during three-phase auto-reclosing due to a phase-to-phase fault.
- A.9.4 Simulation study has been examined for the following scenarios:
- o Three Phase Auto reclosing for temporary line to line fault

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- o Three Phase Auto reclosing for permanent line to line fault
- o Three Phase Auto reclosing for temporary line to line fault under line contingencies
- o Three Phase Auto reclosing for permanent line to line fault under line contingencies

A.9.5 He added that Simulation study has been submitted to NRLDC vide mail dated-14<sup>th</sup> feb'2025 for review and further clearance for implementation. POWERGRID has plan to implement adaptive 3-Phase A/R in this line firstly A/R close from Moradabad end (due to lower fault level) and if succeeded then attempted from Bareilly PG end.

A.9.6 This study invites that transient nature fault type L-L due to kite threads, and another foreign material will be mitigating, and consequently reliability of Grid is increased.

A.9.7 The study done by POWERGRID was presented. The same is attached as **Annexure-A.VIII (a)**.

A.9.8 NRLDC representative shared simulation study conducted on PSCAD by System Studies team with following observations:

- i. In case of Three phase permanent fault near Moradabad end with 3ph auto-reclosure, it is observed that after SOTF, the maximum instantaneous fault current is reaching around 60kA in first cycle of SOTF fault (LLL-G) at Moradabad end.
- ii. In case of Three phase permanent fault near Bareilly end with 3ph auto-reclosure, it is observed that after SOTF, the maximum instantaneous fault current is reaching >100kA in first cycle of SOTF fault (LLL-G) at Bareilly end.
- iii. The current fault level at 400kV Bareilly (PG) is observed to be around 49 kA, which is on the higher side. Traditionally, CB ratings are of the order of 40 kA. This needs to be confirmed with POWERGRID. If the CB ratings are indeed 40 kA, an unsuccessful 3-phase auto-reclosure (SOTF) could result in undue higher stress on the CB, potentially leading to its failure in a worst-case scenario.
- iv. Further to supplement the result with LL-G fault, following are the result with breaker reclosure at permanent LL-G fault: The fault current is reaching ~106kA in the first cycle in a worst case scenario.

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- A.9.9 NRLDC representative further requested POWERGRID to share DR of some events with L-L and L-L-G fault to examine the maximum value of fault current in such instances. Further deliberation needed in subsequent PSC.
- A.9.10 POWERGRID representative stated that equipment is designed for that sub transient and steady state current.
- A.9.11 RVPN representative asked about syn check for three phase auto reclosing. POWERGRID representative replied that voltage and angular separation are within limits as our network is meshed. 3 phase auto reclosing may be done safely.
- A.9.12 Further, POWERGRID representative proposed to implement adaptive 3-Phase A/R in this line firstly A/R close from Moradabad end (due to lower fault level) and if succeeded then attempted from Bareilly PG end.
- A.9.13 RVPN representative was of view that logic may be set in protection settings based on fault severity. There might be chances that fault is of permanent nature with large fault current leading to stress. POWERGRID representative mentioned that studies have been carried out considering worst conditions with different fault locations.
- A.9.14 UPSLDC representative raised concern on POWERGRID proposal. He highlighted that there have been 16 trippings in span of 3 years on the 400 kV Bareilly PG - Moradabad transmission line. Moreover, there is no contingency to take measure of 3 phase auto reclosure. He added that attempting auto recloser firstly from Moradabad end will create stress on the assets of UPPTCL. Therefore, he conveyed that higher authorities of UPSLDC are not of view to approve the proposal of POWERGRID.
- A.9.15 HVPN representative stated that earlier in 54<sup>th</sup> PSC meeting, POWERGRID proposed for keeping auto reclose off for lines tripping frequently on single phase. However, POWERGRID is now proposing for 3 phase auto recloser which reflects that POWERGRID is having two diverse point of view. POWERGRID representative replied that there are instances where faults have occurred at the same location and same phase many times in the downstream feeders of state utilities connected at POWERGRID suggesting that state utilities are not taking necessary actions to identify and resolve transmission line defects. Therefore, in 54<sup>th</sup> PSC meeting that adaptive auto recloser scheme were also proposed along with said proposal.
- A.9.16 CGM, NRLDC asked alternative suggestions to avoid line interruptions.



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POWERGRID representative highlighted that POWERGRID is trying its level best to avoid such tripping due to kite thread by making people aware, increasing patrolling frequency of such lines.

- A.9.17 MS, NRPC was of view that UPSLDC and POWERGRID may jointly examine as consensus has not arrived in this meeting.

**Decision of the Forum:**

*Forum directed that POWERGRID and UPSLDC may do joint examination to explore the feasibility of implementation of 3ph-auto RECLOSING in 400 kV Bareilly PG - Moradabad transmission line (In case of L-L Fault).*

**A.10. Suggestion on remedial measures to prevent power swings in the Grid causing unwanted tripping (agenda by RVUNL)**

- A.10.1 RVUNL representative apprised that the load/power swings in the range of 65-80 MW are being observed in 2x660MW Unit-7 & 8 of SSCTPS, RVUN, Suratgarh. These swings are normally observed during the time of RE injection i.e 10:30 AM to 11:30 AM. Sometimes when the swings are higher, it results in operation of Load Shedding logic, on which Turbine control valves closes (HPCV & IPCV) and unit trips on Low forward power. On this phenomenon, Unit-8 of SSCTPS, Suratgarh (660 MW) tripped 5 times in past 3 months.

- A.10.2 Tripping details of Unit#8 are as detailed below: -

Sr. No.	Date	Time
1	29/11/2024	10:48 Hrs
2	05/12/2024	10:31 Hrs
3	08/12/2024	10:59 Hrs
4	29/01/2025	10:37 Hrs
5	19/02/2025	10:39 Hrs

- A.10.3 RVUNL requested to look into the matter and suggest some remedial measures to prevent power swings in the power grid so that such unwanted trippings may be avoided.

- A.10.4 RVUNL representative highlighted that these issues have now started to experience in Suratgarh after KTPS.

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- A.10.5 NRLDC representative presented the PMU plots for all the 5 instances with tripping of Unit-8 of SSCTPS, Suratgarh (660 MW). However, in only one instance (08.12.2024) oscillation is observed and in other 4 instances no oscillation is observed during RE injection period. It was also highlighted that only Unit-8 of SSCTPS, Suratgarh (660 MW) tripped during these instances whereas Unit-7 of SSCTPS, Suratgarh did not trip. Hence, RVUNL was requested to further analyse its internal network and review the protection settings of Unit-8 of SSCTPS, Suratgarh.
- A.10.6 RVPN representative also mentioned that it has been observed that there is not much load variation.
- A.10.7 MS, NRPC stated that required data may be shared by RVUNL to NRLDC for further analysis.
- A.10.8 AESL representative stated that only Unit -8 is tripping which may be noted. The same was also highlighted by RVUNL.

**Decision of the Forum:**

*Forum requested RVUNL to further analyse its internal network and review the protection settings of Unit-8 of SSCTPS, Suratgarh. DR data of concerned events may be shared by RVUNL to NRLDC.*

**A.11. Revised SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Merta & 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Ajmer (agenda by RVPN)**

- A.11.1 RVPN vide letter dated 18.03.2025 submitted that SPS for the 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Merta and SPS for the 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Ajmer approved in the 194<sup>th</sup> OCC meeting (held on 20.04.2022) was based on taking the trip command from the 86 relay installed on 220kV side of both the 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Merta and 400 kV GSS Ajmer.
- A.11.2 Hence, the existing SPS gives the relief in the event of tripping of the transformers and it does not take care of the ICT overloading. Hence, a generalized SPS was required which can take care of the tripping of the ICTs and overloading of the ICTs.
- A.11.3 In this regard, revised SPS for the 2x315 MVA, 400/220 kV ICTs at 400 kV GSS

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Merta was discussed in the 229<sup>th</sup> OCC meeting held on dated 12.03.2025 and OCC Forum has directed to discuss the revised SPS in 58<sup>th</sup> Meeting of Protection Sub-Committee.

- A.11.4 The revised SPS of 2x315MVA, 400/220 kV ICTs at 400 kV GSS Merta & revised SPS of the 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Ajmer along with revised logics have been submitted by RVPN for approval. (Proposed revised SPS schemes are attached as **Annexure-A.IX**.)
- A.11.5 NRLDC representative agreed with the revised SPS of 2x315MVA, 400/220 kV ICTs at 400 kV GSS Merta & revised SPS of the 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Ajmer for approval.
- A.11.6 NRLDC representative further highlighted that RVPNL shall review availability and healthiness of the identified load feeders of the SPS scheme in view of recent tripping at 400/220kV Bikaner (RS) and Merta(RS) on 10.03.2025.

#### **Decision of the Forum**

*Forum approved the proposal of RVPN regarding revised SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Merta & 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Ajmer.*

#### **A.12. Provisions of line differential relays at BBMB substations (agenda by BBMB)**

- A.12.1 BBMB representative submitted that the following lines belonging to state utilities i.e. PSTCL, HVPNL, provision of line differential relays may be considered on account of the fact that problem is faced for clearance of faults on such lines by Distance protection schemes.

Sr. no.	Name of Line	Line length	Ownership	Remarks
1	220kV Jamalpur-Dhandari Ckt. I & II at 220kV BBMB Jamalpur	3.75 kms (for both cks)	PSTCL	<ul style="list-style-type: none"> <li>Line differential relay provided on 220kV Jamalpur-Dhandari Ckt. II. But</li> </ul>

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	S/s			<p>not commissioned.</p> <ul style="list-style-type: none"> <li>Due to proposed LILO of 220kV Jamalpur Dhandari Ckt-I at PSTCL Sherpur S/s, Line differential relay to be provided (new line length approx. 2kms.)</li> </ul>
2	220kV Hisar IA Ckt. I & II at 220kV BBMB Hisar S/s	3.2 & 3.7 kms.	HVPNL	Line differential relays required to be provided on such circuits as DPRs are not able to discriminate zones during faults.
3	66kV Railway Ckt. I & II and 66kV Hyderabad feeder at 220kV BBMB Ballabgarh S/s	2.0 kms. (Railway Ckt. I & II) and 1.1 kms. (Hyderabad feeder)	HVPNL	Provisions of line differential relay required as faults on these circuits are cleaned by upstream transformers and not cleared by respective DPRs.

A.12.2 BBMB representative requested that concerned Power Utilities may be impressed upon for expeditious action in the matter.

A.12.3 PSTCL representative informed that contract has been awarded for differential relay installation on proposed LILO of 220kV Jamalpur Dhandari Ckt-I at PSTCL Sherpur S/s and work is in progress.

A.12.4 HVPNL representative informed that line differential relay implementation work for 220kV Hisar IA Ckt. I & II is under process with design wing.

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- A.12.5 Further, he added that Railway is going to upgrade its 66kV substation to 220kV Substation which will result in less utilization of these 66kV Railway Ckt. I & II and 66kV Hyderabad feeder. Therefore, requirement of differential relay on these feeders may be avoided. BBMB representative also agreed with the same. Forum directed that distance protection settings may be reviewed based on protection philosophy.

**Decision of the Forum:**

*Forum directed PSTCL to expedite the implementation of differential relay on 220kV Jamalpur-Dhandari Ckt. I & II and & HVPNL to expedite the implementation of differential relay on 220kV Hisar IA Ckt. I & II. Further, in line with mutual agreement of BBMB and HVPN, Forum asked HVPN and BBMB to review distance protection settings of 66kV Railway Ckt. I & II and 66kV Hyderabad feeder instead of opting differential relay implementation.*

**A.13. Expedited Completion of Temporary Arrangement for 400kV STPS(O&M) – Ratangarh Line and 400kV Suratgarh Supercritical-Babai D/C line and Provide Status Update (agenda by RVUNL)**

- A.13.1 AEE (P), NRPC apprised that RVUNL has invited the reference to the discussions held in the meeting regarding bilateral issues between state power utilities of Rajasthan held on 19.10.2024, it was decided that RRVPNL will conduct a field survey by 15.11.2024 for the feasibility of a temporary arrangement to connect one circuit of the 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line. This work includes the erection of two new towers to facilitate the rearrangement, ensuring the reduction of high loading on the 400kV Switchyard STPS, Suratgarh and 400kV STPS-Ratangarh lines.
- A.13.2 During the meeting, RRVPNL had assured that the said work would be completed by December 2024. However, considering the anticipated high load conditions at the 400kV Switchyard of STPS Suratgarh during the upcoming summer season due to increased solar power generation, it is crucial to complete this work at the earliest to avoid any operational challenges and overloading issues.

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- A.13.3 Regarding expedite the execution of the proposed arrangement and provide the latest status of work progress a letter (attached as **Annexure-A.X**) was also written on dated 07/02/2025 by Chief Engineer (O&M), STPS, RVUN, Suratgarh to The Zonal Chief Engineer (T&C), RVPN, Jodhpur but no update provided till now.
- A.13.4 Accordingly, RVUNL representative requested Forum to arrange the expeditious execution of the proposed arrangement and latest status of work progress. He raised concern that there is high loading on the 400kV Switchyard STPS, Suratgarh and 400kV STPS-Ratangarh lines.
- A.13.5 RVPN representative informed that 400kV Suratgarh Supercritical-Babai D/C line will come by 15<sup>th</sup> June, 2025 tentatively.
- A.13.6 RVPN representative also added that one circuit of the 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line may be connected by jumpering only.
- A.13.7 MS, NRPC suggested that if there is need of tower erection to connect 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line as earlier proposed, then both the circuits should not be connected as 400kV Suratgarh Supercritical-Babai D/C line is about to come. However, if only jumpering is required, then one circuit of 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line may be connected.
- A.13.8 Members were also of the same view.

**Decision of the Forum:**

*Forum decided that one circuit of 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line may be connected if feasible to achieve by jumpering else connection may be skipped if erection of two towers is needed.*

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**A.14. Proposed settings of 765 kv lines in Northern Region by committee constituted to review the Overvoltage Protection settings of 400kV and 765kV transmission lines in Northern Region (agenda by NRPC Secretariat)**

A.14.1 In 52<sup>nd</sup> Protection Sub-Committee (PSC) meeting, held on 20.09.2024, it was decided to constitute a committee to review the Overvoltage Protection settings of 400kV and 765kV transmission lines in Northern Region.

A.14.2 The committee has discussed the settings in 4 meetings held virtually. Settings has been finalized for 400 kV and 765 kV level. Settings of 400 kV may be found at below link:

<https://docs.google.com/spreadsheets/d/1j5uY4m2W26X-1mJ9IQRxQyQU1Y7yr09uQHt6Nr5JZ1Y/edit?usp=sharing>

A.14.3 Settings of 765 kV may be found at **Annexure-A.XI**.

A.14.4 The agenda was discussed in the 57<sup>th</sup> PSC meeting wherein it was highlighted that the above committee has no members from some states, therefore, settings may be examined for any issue.

A.14.5 Subsequently, Forum decided that the settings, finalized by the Committee may be shared with all states of NR and concerned transmission utilities. Forum referred the agenda to the next PSC meeting for final approval.

A.14.6 Accordingly, agenda was taken for final approval.

A.14.7 Members approved the proposed settings and directed utilities to implement these recommended settings.

**Decision of the Forum:**

*The settings, finalized by the Committee was approved by the Forum and directed utilities to implement the same.*

**A.15. Un-necessary Trippings on 220KV ANTA-LALSOT Line (agenda by RVPN)**

A.15.1 AEE (P), NRPC apprised that the agenda was discussed in the 57<sup>th</sup> PSC meeting wherein RVPN submitted that 220 kV GSS Lalsot has two sources of supply, (i) 220

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kV Anta line (NTPC) and (ii) 220kV Dausa line (RVPN), out of which, CB of 220 kV Dausa line normally remains open at Dausa end. Practically, 220 kV Anta line is generally the only source of supply to 220 kV Lalsot GSS.

A.15.2 Abnormal trippings have occurred in recent past on 220 kV Anta- Lalsot line at Anta end. Some of these interruptions are detailed below: -

(i) On dated 09.08.2024 a fault occurred on 132 kV Main Bus at 220 kV GSS Lalsot and 220 kV Anta- Lalsot line tripped from Anta end. Although, both 220 kV transformers tripped at 220 kV GSS Lalsot and the fault was cleared, there should be no tripping on 220 kV Anta Lalsot line.

(ii) On dated 23.08.2024 and 05.09.2024 Auto reclose operated at Lalsot end but 220 kV Anta- Lalsot line remained tripped from Anta end.

(iii) On dated 10.10.2024 a CT of 132 kV feeder burst at 220 kV GSS Lalsot and Bus Bar protection operated at Anta end.

(iv) On dated 01.11.2024 and 14.01.2025 a fault occurred on 220 kV Dausa line, which is charged from 220 kV Lalsot and CB open at Dausa end. The CB at 220kV GSS Lalsot cleared the fault in Z1 time but simultaneously 220 kV Lalsot- Anta line also tripped from Anta end.

(v) On dated 17.01.2025 a fault occurred on 132kV feeder and 220 kV Lalsot- Anta line also tripped from Anta end with this fault.

A.15.3 RVPN engineers are regularly contacting the engineers at Anta (NTPC) and it was appraised by Anta (NTPC) engineers that Bus Bar protection PU of 220 kV Anta- Lalsot line is defective and the supply to 220 kV GSS is given through transfer bus. This defective PU causes the operation of Bus Bar protection with external faults of low intensity.

A.15.4 Even after pursuance several times **NTPC is neither blocking the defective PU nor revising the settings to avoid such unnecessary interruptions.**

A.15.5 In 57<sup>th</sup> PSC meeting, RVPN representative suggested that the reflected fault current on 220 kV Anta NTPC - Lalsot line due to fault on 132 kV side comes around 4 kA. He also proposed that the setting of Bus Bar Differential current shall be 4kA instead of 1.8 kA to stop such unwanted tripping as the PU is lying defective since long.



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- A.15.6 During 57<sup>th</sup> PSC meeting, Forum decided to deliberate the agenda in the next PSC meeting. NTPC was requested to submit comment on proposal of RVPN in writing before next PSC.
- A.15.7 Accordingly, agenda was taken for discussion based on submission of comment by NTPC on the proposal of RVPN.
- A.15.8 NTPC representative was not present in the meeting. However, NTPC submitted the reply vide letter date 10.03.2025 attached as **Annexure-A.XII**.
- A.15.9 RVPN highlighted that in case of PU defective, bus bar protection must be kept block until bus bar replacement is completed in order to avoid unwanted trippings.
- A.15.10 Forum agreed with the above and directed NTPC to block the transfer zone of bus bar protection at anta substation and keep the zone 4 time setting as 160msec for 220kV Anta-Lalsot line until bus bar replacement is completed

**Decision of the Forum:**

*Forum directed NTPC to block the transfer zone of bus bar protection at anta substation and keep the zone 4 time setting as 160msec for 220kV Anta-Lalsot line until bus bar replacement is completed.*

**Part-B: Agenda by NRLDC**

**B.1 Status of remedial actions recommended during previous PSC meeting (agenda by NRLDC)**

- B.1.1 As per the discussion in pervious PSC meetings, necessary remedial actions were recommended based on the analysis and discussion of the grid events. It is expected that necessary actions would have taken place. In view of the same, constituents were requested to share the status of remedial actions taken. List of points discussed in 57<sup>th</sup> PSC meeting is attached as **Annexure-B.I**. During the meeting constituents were requested to apprise the status of the same. Discussion during the meeting were as follows:

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**i. Frequent multiple elements tripping at 220kV Kunihar, Baddi, Upperla Nangal complex and load loss event in HP control area**

**PSC (51, 52 & 53) recommendations:** PSC Forum requested HP to complete the protection audit as per mentioned timelines (protection audit of 220kV Kunihar has been awarded and it would be completed within next 15-20 days. In next phase, by 15th September, protection audit of substations in downstream and upstream of 220kV Kunihar S/s would be completed.) and resolve the protection related issues. HP was also requested to share the reports of protection audit to NRPC & NRLDC after completion of audits.

During 54<sup>th</sup> PSC meeting, HPSEBL informed that Protection audit of 220kV Kunihar was conducted by POWERGRID on 19th October 2024. Protection audit of rest of the stations (Bhabha, Upperla Nangal, Baddi etc.) shall be conducted in near future and will be completed by December 2024. HPSEBL also submitted protection audit and its compliance report.

During 55<sup>th</sup> PSC meeting, compliance report submitted by HPSEBL was discussed. NRLDC representative highlighted protection related non-compliance mentioned in 3rd party protection audit report. HPSEBL representatives were not present in the meeting. SLDC-HP was requested to further follow-up with HPSEBL for expedited corrective actions at their end.

During 56<sup>th</sup> PSC meeting, HPSEBL representative stated that they have applied for the PSDF for rectification of issues in this complex. Some observation have come from PSDF. They will again submit the application by incorporating the observations.

During 57<sup>th</sup> PSC meeting, HPSEBL representatives were not present in the meeting.

*During 58<sup>th</sup> PSC meeting, HPSEBL representative stated that protection audit at Baddi and Upperla Nangal is completed on 20<sup>th</sup> March 2025 by POWERGRID. Audit reports are awaited.*

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*NRLDC representative highlighted that it is necessary to complete the work before summer in view of increase in tripping.*

*HPSEBL replied that as major work is of relay replacement, they will need PSDF fund for rectification of issues.*

**Decision of the Forum:**

*PSC Forum asked HPSEBL to take expeditious actions at their end and ensure the healthiness of protection system in this complex.*

**ii. Multiple elements tripping at 220kV Hissar(BBMB) 07th May 2024, 11:16 hrs**

**PSC (51 & 52) recommendations:** Expedite the implementation of differential protection in short lines to avoid undesired operation of distance protection.

During 53<sup>rd</sup> PSC meeting, HVPNL representative stated that matter has been taken up with HVPNL and is pending at their end. HVPNL representative informed that design team has compiled all such requirements in Haryana control area and is now working on the further process.

During 54<sup>th</sup> PSC meeting, HVPNL representative informed that existing earth wire is normal earth wire which is to be replaced with OPGW. Process of the same has been started. After this, process of implementation of differential protection will be started.

During 55<sup>th</sup> PSC meeting, HVPNL representative informed that availability of OPGW has been confirmed. Design team of HVPNL is taking further actions in this regard.

During 56<sup>th</sup> PSC meeting, HVPNL representative informed that status is same, HVPNL design team is following up this case. They are compiling all such cases and then purchase order will be placed for complete package.

During 57<sup>th</sup> PSC meeting, HVPNL representative informed that status is same and estimated timeline will be 6 months to complete the work.

*During 58<sup>th</sup> PSC meeting, HVPNL representative informed that no further update is there in this regard and matter is pending at Head Office level.*

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*NRLDC representative requested HVPNL to expedite the process at their end.*

***Decision of the Forum:***

*PSC Forum recommended HVPNL to expedite the implementation of differential protection in short lines and also share the expected timeline.*

**iii. Multiple elements tripping at 400kV Sainj(HP), 400kV Parbati2 & Parbati3 (NHPC) Stations on 07th May 2024, 16:17 hrs:**

**PSC 51 recommendations:**

- NHPC shall follow up with the relay engineer and taken necessary remedial actions to ensure proper operation of A/R scheme at Parbati2 end.
- NHPC and HPPTCL shall review the healthiness of PLCC at Parbati3 and Sainj end and take necessary actions to ensure their proper operation.
- Expedite the implementation of differential protection in 400kV Parbati2-Sainj line.
- Standardisation of recording instruments (DR/EL) need to be ensured.

NHPC representative informed following during 52nd PSC meeting:

- Shutdown has been planned in 1st week of November 2024, testing of A/R scheme and implementation of differential protection will be done during that period.
- PLCC card at Parabti3 end will be replaced by the end of September 2024. For dual test of PLCC operation, PLCC at Sainj end also need to be healthy. Sainj HEP representative was not present in the meeting. HPPTCL was requested to intimate concerned person of HPPCL to taken necessary corrective actions and ensure healthiness of PLCC at Sainj end.

Further in 53<sup>rd</sup> PSC meeting, NHPC representative informed following:

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- Due to unavailability of OEM, shutdown plan has been now rescheduled in last week of November or 1st week of December. Testing of A/R scheme and implementation of differential protection will be done during that period.
- PLCC card at Parabti3 end has been replaced and made functional. However, for dual test, PLCC at Sainj end also need to be functional.

During 54<sup>th</sup> PSC meeting, NHPC representative informed that status is same. Implementation of differential protection & testing of A/R in 400kV Parbati2-Sainj line will be completed by December end. Further, PLCC at Sainj HEP end also need to be healthy for testing of PLCC at Parbati3 end and proper operation of carrier communication in line.

During 55<sup>th</sup> PSC meeting, NHPC representative informed that they will receive differential relay in January 2025 and laying of OPGW on 400kV Parbati2-Sainj line (length 700-800m) will take ~2 months. Visit of GE engineer is also scheduled in January 2025. Representatives of Sainj HEP were not present in the meeting.

During 56<sup>th</sup> PSC meeting, NHPC representative informed that Visit of GE engineer is scheduled in February 2025. Implementation of differential protection and testing of A/R operation will be done during that time only.

Representative from HPPCL informed that they will take remedial action to ensure healthiness of PLCC at their end and will also conduct loop test of PLCC in coordination with NHPC.

NRLDC representative requested NHPC and HPPCL to complete the work as per mentioned timeline.

During 57<sup>th</sup> PSC meeting, NHPC representative informed that OPGW laying is ongoing. GE engineers are yet to visit and the work is expected to get completed by March 2025.

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*During 58<sup>th</sup> PSC meeting, NHPC representatives were not present due to ongoing commissioning activity in Parbati-II Project, as communicated. However, vide mail dt. 26.03.2025, NHPC informed that as per LOA, OPGW work shall be completed by Dec'2025. GE engineer visited Parbati-II site, however it is observed during commissioning that there is communication issue with the supplied line differential relay. The relay has been sent to OEM's premisses for rectification. After rectification of the same, the relay can be installed. The same is expected to be completed by May'2025.*

**Decision of the Forum:**

*PSC Forum recommended NHPC & HPPCL to take expeditious action at their end and ensure healthiness of protection system.*

**iv. Multiple elements tripping at 220kV Sarna (PS) on 04th May 2024, 07:10 hrs****PSC 51 recommendations:**

- Punjab shall expedite the commissioning of new bus scheme.
- POWERGRID shall revise the Z-4 time delay setting of Kishenpur lines at Sarna (PS) end as 160msec till bus bar get operational.

During 52<sup>nd</sup> PSC meeting, Punjab representative informed that tender of bus bar protection has been processed, bus bar protection at 220kV Sarna will be commissioned within 4-5 months tentatively.

During 53<sup>rd</sup> PSC meeting, PSTCL representative informed that tender of bus bar scheme is in process and POWERGRID(NR-2) representative informed that Z-4 time delay setting of lines of their control area has been revised.

During 54<sup>th</sup> PSC meeting, PSTCL representative stated that process is still at the tender stage. It will be commissioned in next 3 months.

During 55<sup>th</sup> PSC meeting, PSTCL representatives were not present in the meeting.

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During 56<sup>th</sup> PSC meeting, PSTCL representative informed that bus bar protection at 220kV Sarna will be commissioned by the end of March 2025.

During 57<sup>th</sup> PSC meeting, PSTCL representative informed that there is delay in tender stage and bus bar protection at 220kV Sarna will be commissioned by June 2025. Materials are under inspection.

*During 58<sup>th</sup> PSC meeting, PSTCL representative informed that status is same and materials are under inspection.*

*NRLDC representative requested PSTCL for expeditious remedial actions and ensure implementation of bus bar protection as per mentioned timeline.*

***Decision of the Forum:***

*PSC Forum asked PSTCL to expedite the work related to implementation of bus bar protection at Sarna S/s.*

**v. Multiple elements tripping at 400/132kV Masoli(UP) on 29th May 2024, 15:57 hrs**

**PSC 51 recommendations:** UP shall implement the bus bar protection at 132kV level at 400/132kV Masoli S/s.

During 52<sup>nd</sup> & 53<sup>rd</sup> PSC meeting, UP representative informed that this case has been communicated to design team. Design team is compiling all such requirements and further process will be initiated within 1-2 months.

During 54<sup>th</sup> PSC meeting, UPPTCL representative informed that process is still at the design team stage. Continuous follow ups are being done for expeditious implementation of bus bar protection at such stations.

During 55<sup>th</sup> PSC meeting, UPPTCL representative informed that bus bar protection has been arranged for Masoli(UP) station. Shutdown has been planned after 24th February (after Kumbh Mela) and it is expected that bus bar commissioning at 132kV Masoli(UP) will get completed by the end of March 2025.

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During 56<sup>th</sup> PSC meeting, UPPTCL representative stated that status is same. Bus bar commissioning at 132kV Masoli(UP) will get completed by the end of March 2025.

During 57<sup>th</sup> PSC meeting, UPPTCL representative stated that status is same. Shutdown has been planned after 25<sup>th</sup> February 2025 and bus bar commissioning at 132kV Masoli(UP) will get completed by March 2025.

*During 58<sup>th</sup> PSC meeting, UPPTCL representative stated that bus bar commissioning at 132kV Masoli(UP) is completed on 10<sup>th</sup> March 2025.*

**vi. Multiple elements tripping at 220kV KTPS (RVUN) on 21st June 2024, 11:37 hrs**

**PSC 51 recommendations:** Commissioning of bus coupler between 220kV Bus-3 & 5 need to be expedited.

During 52<sup>nd</sup> PSC meeting, RVUNL representative informed that informed that tender for the same has been floated.

During 53<sup>rd</sup> PSC meeting RVUNL representative informed that process is at same stage. It will take around 01 year to complete all the process and implementation of bus coupler.

During 54<sup>th</sup> PSC meeting, RVUNL representative stated that whole process will take time. Tender process is completed, and review meeting is scheduled on 25<sup>th</sup> December 2024.

During 55<sup>th</sup> PSC meeting, RVUNL representatives were not present in the meeting.

During 56<sup>th</sup> PSC meeting, RVUNL representative stated that work is at stage of tender processing. Necessary follow up actions are being taken.

During 57<sup>th</sup> PSC meeting, RVUNL representative stated that status is same and work is at stage of tender processing.



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*During 58<sup>th</sup> PSC meeting, RVUNL representative stated that status is same and work is at stage of tender processing (administrative process delay).*

*NRLDC representative requested RVPNL to expedite the tender and other followed action.*

***Decision of the Forum:***

*PSC Forum requested RVUNL for expeditious actions at their end.*

**vii. Frequent tripping of 220 KV Anta(NT)-Sakatpura(RS) (RS) Ckt-1: Non operation of A/R in line**

**PSC 52 recommendations:** RVPN was requested to expedite the process of relay replacement and rectification of issues related to A/R operation.

During 53<sup>rd</sup> PSC meeting, RVPNL representative informed that request of relay panel has been floated however DI of the same is yet to be issued.

During 54<sup>th</sup> PSC meeting, RVPNL representative informed that existing panels are of simplex type which have to be replaced with duplex panels. Panels have been issued however civil work is required for installation of the same. Delay is due to civil work.

During 55<sup>th</sup> PSC meeting, RVPNL representative informed that civil work has not been completed yet. Implementation of duplex panels will be started after completion of civil work.

During 56<sup>th</sup> PSC meeting, RVPNL representative informed that major part of the civil work has been completed at Sakatpura S/s. Work of panel replacement will be completed by the end of February 2025.

During 57<sup>th</sup> PSC meeting, RVPNL representative informed that there is delay in panel replacement. If the work is delayed further, A/R will be enabled in the old panel during shutdown on 27<sup>th</sup> and 28<sup>th</sup> February 2025.

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*During 58<sup>th</sup> PSC meeting, RVPNL representative informed that work is delayed due to unavailability of shutdown on 27<sup>th</sup> and 28<sup>th</sup> February 2025, next shutdown is planned during May 2025.*

*NRLDC representative requested RVPNL to take necessary follow-up actions to ensure expeditious completion of work.*

**Decision of the Forum:**

*PSC Forum asked RVPNL to expedite the actions at their end.*

**viii. Frequent tripping of 220 KV Khara(UP)-Saharanpur(PG) (UP) Ckt-1****PSC 52 recommendations:**

- UP was requested to expedite the process of relay replacement at Khara end.
- POWERGRID shall review and ensure the A/R operation at their end.

Discussion during 53<sup>rd</sup> PSC meeting:

UPPTCL representative informed that status is same and follow up is being done to ensure the relay replacement in Nov-Dec 2024.

NRLDC representative highlighted the issue of non-operation of A/R in this line also at Saharanpur end and requested POWERGRID(NR-1) to review the healthiness of A/R operation in all the lines at Saharanpur(PG). Issue in A/R operation at Khara end in case of Y-ph fault is observed. 2\*ph A/R is occurring in this scenario. UPPTCL may review the same.

UPPTCL representative stated that remedial actions are been taken to rectify the cause of faults such as replacement of old insulators etc. Further necessary actions will also be initiated to minimise the occurrence of faults in line.

During 54<sup>th</sup> PSC meeting, POWERGRID(NR-1) representative informed that, A/R function in the line has been reviewed and it is healthy and operational. He further raised concern over frequent faults in line. Further, UPPTCL representative informed that all the line protection relays at Khara(UP) are of

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electromechanical type. Relays will be replaced with numerical relays by the end of December 2024.

During 55<sup>th</sup> PSC meeting, UPPTCL representative informed that work of relay replacement has been started and all the line protection electromechanical relays at Khara(UP) will be replaced with numerical relays by the end of December 2024.

During 56<sup>th</sup> PSC meeting, UPPTCL representative informed that continuous shutdown is going on for work of relay replacement at Khara S/s. Relay replacement in Saharanpur line will get completed within next 07 days. It is expected that complete work i.e., relay replacement and their testing will get completed by the end of March 2025.

During 57<sup>th</sup> PSC meeting, UPPTCL representative informed that relay replacement in Saharanpur line is completed and that in Beas line will be completed by 22<sup>nd</sup> February 2025. It is expected that relay replacement in unit-1 will get completed by the end of March 2025 followed by unit-2 & 3.

*During 58<sup>th</sup> PSC meeting, UPPTCL representative informed that relay replacement in unit-1 will get completed on 30<sup>th</sup> March 2025 followed by unit-2 & 3 within next 6 months.*

*NRLDC representative requested UPPTCL for expeditious completion of work.*

***Decision of the Forum:***

*PSC Forum asked UPPTCL to expedite the replacement of relay at Khara(UP) end.*

**ix. Multiple elements tripping event at Patiala(PG)**

**PSC 52 recommendation:** Implementation of new bus bar relay at Patial(PG).

During 54<sup>th</sup> PSC meeting, POWERGRID(NR-2) representative informed that materials have been arrived. Presently, team is working at Nallagarh(PG) S/s, thereafter work will start at Patiala(PG). Implementation of new bus bar protection

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at Patiala(PG) will be completed by the end of January 2025.

During 55<sup>th</sup> PSC meeting, POWERGRID(NR-2) representative informed that status is same and implementation of new bus bar protection at Patiala(PG) will be completed by the end of January 2025.

During 56<sup>th</sup> PSC meeting, POWERGRID(NR-2) representative informed that work at Nallagarh S/s hasn't completed yet. Therefore, it is expected that implementation of bus bar protection at Patiala(PG) will be completed by the end of March 2025.

During 57<sup>th</sup> PSC meeting, POWERGRID(NR-2) representative informed that status is same.

*During 58<sup>th</sup> PSC meeting, POWERGRID(NR-2) representatives were not present.*

***Decision of the Forum:***

*PSC Forum directed POWERGRID(NR-2) to expedite the process.*

**x. Multiple elements tripping at 220kV Khodri HEP & Chibro HEP on 5<sup>th</sup>, 11<sup>th</sup> & 19<sup>th</sup> September 2024**

**PSC 53 recommendation:**

- Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured. As per IEGC clause 37.2 (c), Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within 24 hrs of the event.
- HPPTCL shall take necessary actions to rectify the protection related issue in 220kV Khodri-Majri ckt-2.
- OV protection needs to be disabled in 220kV lines at the earliest.
- Over frequency and over current protection operation in units at Khodri HEP need to be reviewed.
- A/R should be made operational in Sarsawan line at the earliest.

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- UJVNL shall share the CPRI audit report and details of remedial action taken within one week.
- Replacement of Units breakers need to be expedited.

During 54<sup>th</sup> PSC meeting, UJVUNL representative informed following during the meeting:

- Timely submission of DR/EL & tripping reports for the tripping incidents are being ensured.
- Overvoltage setting in all the lines at Khodri HEP has been disabled. However, 220kV Khodri-Mazri ckt-2 is in jurisdiction of HPSEBL.
- Over frequency & overcurrent protection in generating units have been proposed to review.
- Audit report of the CPRI conducted in October 2023 has already been submitted by mail.
- A/R operation in Sarsawan line and replacement of Unit breakers has been proposed. Follow ups are being done with OEM.
- Time delay setting of Z-4 in distance protection in all the lines at Khodri has been revised from 1sec to 160msec.

During 55<sup>th</sup> PSC meeting, HPSEBL representatives were not present in the meeting and UJVUNL representative informed following during the meeting:

- Over frequency & overcurrent protection in generating units are yet to be reviewed. It will be done at the earliest.
- There are wiring related issues which have to be corrected to enable the A/R operation in Sarsawan line. Visit of OEM is being planned as per shutdown availability.
- Replacement of Unit breakers is also planned. Follow ups are being done with OEM.
- Isolator selection relay is also planned to be replaced within next 2 months. After this, bus bar protection will be made operational.

During 56<sup>th</sup> PSC meeting, UJVUNL representative informed following during the meeting:

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- Over frequency & overcurrent protection has been reviewed and found in order.
- Visit of GE team has been planned. A/R operation related issue will be resolved during that time.
- Bus bar protection relay is of electromechanical type. Tender has been floated for replacement of some component. Commissioning of numerical relay will take long time therefore we are planning to make existing electromechanical relay healthy.
- Maintenance and testing of Unit breakers was done on 10.12.2024. Thereafter, breakers are working smoothly. Apart from this, tender process for commissioning of new unit breakers has also been planned and same has been shared by mail.

NRLDC representative stated that unit breakers at Khodri HEP have to be replaced on priority because their improper operation is leading to loss of generation of two hydro generating stations (Khodri & Chibro HEP). UJVUNL was requested to expedite the necessary remedial action and also to share the action plan.

Further, NRLDC representative requested HPSEBL to review the protection settings of 220kV Khodri-Majri line-II specifically overvoltage protection. Ensure protection setting in line as per approved protection philosophy.

HPSEBL representatives agreed to review the protection settings in 220kV Khodri-Majri line-II.

During 57<sup>th</sup> PSC meeting, UJVUNL representative informed that GE team is already contacted to resolve the A/R issue in relay, but there is delay from GE end. Further, tender is under process regarding replacement of bus bar protection relay. Action plan is prepared and shared for attending the issue in unit/line breaker.

*During 58<sup>th</sup> PSC meeting, UJVUNL representative informed that GE team has denied the scope of work. Hence open tender will be issued to resolve the A/R issue in relay.*

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#### ***Decision of the Forum:***

*PSC Forum asked UJVUNL & HPSEBL to take necessary remedial action at their end and ensure proper operation of protection system. UJVUNL shall expedite the action plan and HPSEBL shall review the protection setting of 220kV Khodri-Majri line-II.*

#### **xi. Multiple elements tripping at 220kV Obra\_A(UP) on 9th October 2024**

##### **PSC 54 recommendation:**

- I. UPPTCL & Obra\_A(UP) shall ensure the implementation of LBB protection at the earliest at 220kV side.
- II. GPS scheme shall be implemented at Obra\_B(UP) by the end of January 2025 and time sync of recording devices will be ensured.

During 55<sup>th</sup> PSC meeting, UPPTCL representative informed that Bus bar protection relay is of electromechanical type, and it has to be replaced with numerical relay. Around 6-month (till June 2025) time will be required for this work. Issue of time sync will be resolved by the end of January 2025.

During 56<sup>th</sup> PSC meeting, UPPTCL representative informed that status is same.

During 57<sup>th</sup> PSC meeting, UPPTCL representative informed that time sync issue will be resolved by March 2025 (delay in visit by ABB engineers). Further, bus bar relay replacement will be done within 1 year.

*During 58<sup>th</sup> PSC meeting, UPPTCL representative informed that time sync issue and bus bar relay replacement both the works will be addressed by ABB engineers and work is further delayed due to delay in visit.*

*NRLDC representative requested UPPTCL to take necessary follow up actions for expeditious completion of work.*

#### ***Decision of the Forum:***

*PSC forum asked UPPTCL for expedited corrective actions.*

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**xii. Multiple elements tripping at 220/132kV Obra\_A(UP) on 9th October 2024**

**PSC 54 recommendation:** Commissioning and Implementation of numerical relays in 132kV ICT-1&2 at Obra\_A(UP) need to be expedited. Timely commissioning of the same need to be ensured.

During 55<sup>th</sup> PSC meeting, UPPTCL representative informed that Commissioning and Implementation of numerical relays in 132kV ICT-1&2 at Obra\_A(UP) is expected to get completed by 1st week of February 2025.

During 56<sup>th</sup> PSC meeting, UPPTCL representative informed that status is same.

During 57<sup>th</sup> PSC meeting, UPPTCL representative informed that Commissioning and Implementation of numerical relays in 132kV ICT-1&2 at Obra\_A(UP) will be completed by March 2025 (delay in visit by ABB engineers).

*During 58<sup>th</sup> PSC meeting, UPPTCL representative informed that Commissioning and Implementation of numerical relays in 132kV ICT-1&2 at Obra\_A(UP) will be addressed by ABB engineers and work is further delayed due to delay in visit.*

*NRLDC representative requested UPPTCL to take necessary follow up actions for expeditious completion of work.*

**Decision of the Forum:**

*PSC Forum asked UPPTCL for expedited corrective actions.*

**xiii. Multiple elements tripping at 400/220kV Kashipur(Utt) on 10th October 2024**

**PSC 54 recommendation:**

- i. PTCUL shall review the SPS scheme at 400/220kV Kashipur S/s.
- ii. Overcurrent protection setting (IDMT) need to be revised in line with the approved protection philosophy.



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During 55<sup>th</sup> PSC meeting, PTCUL representatives were not present in the meeting.

During 56<sup>th</sup> PSC meeting, PTCUL representative informed that some correction in protection setting / protection coordination has been done.

NRLDC representative asked whether any review of SPS logic has been done or not. Because, during the grid event occurred on 10<sup>th</sup> October, despite of operation of SPS, remaining ICT got tripped. PTCUL was requested to review the existing SPS scheme and propose changes if any required to avoid blackout of S/s.

PTCUL agreed to review the SPS scheme at Kashipur S/s.

During 57<sup>th</sup> PSC meeting, PTCUL representatives were not present in the meeting.

*During 58<sup>th</sup> PSC meeting, PTCUL representative informed that SPS scheme at Kashipur S/s has been reviewed and there is no need to change the SPS scheme. Communication links healthiness will be checked during mock testing of SPS.*

**xiv. Multiple elements tripping at 220kV Dausa(RS) on 21st October 2024****PSC 54 recommendation:**

- i. RVPNL will expedite the replacement of all the static relays at 220kV Dausa S/s with numerical relays.
- ii. Time synchronization of all the recording instruments need to be ensured.

During 55<sup>th</sup> PSC meeting, RVPNL representative informed that total 5 electromechanical have to be replaced with numerical relays. 3 no. of relays have been allotted, remaining 2 relays will get allotted in next phase. It is expected that work of relay replacement will get completed by the end of January 2025.

During 56<sup>th</sup> PSC meeting, RVPNL representative informed that one relay is planned to be replaced within next 2-3 days. Bassi-I & II line is of POWERGRID

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and their shutdown is planned in February 2025. Remaining two relays shall be replaced during bulk relay replacement. Further time sync issue is not resolved yet same. Resolution of time sync issue has also been taken up in parallel.

During 57<sup>th</sup> PSC meeting, RVPNL representative informed that 3 relays will be replaced during shutdown available on 21<sup>st</sup>, 22<sup>nd</sup> and 28<sup>th</sup> February 2025. Rest 2 relays are under procurement stage.

*During 57<sup>th</sup> PSC meeting, RVPNL representative informed that one relay is already replaced on 27<sup>th</sup> February 2025. One relay will be replaced on 28<sup>th</sup> March 2025 and other one will be replaced during shutdown in April 2025. Rest 2 relays are under procurement stage.*

*NRLDC representative requested RVPNL to take necessary follow up actions for expeditious completion of work.*

#### ***Decision of the Forum:***

*PSC Forum asked RVPNL for expedited corrective actions.*

#### **xv. Frequent tripping of 220 KV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-1 &2**

**PSC 55 recommendation:** Expeditious corrective actions to minimise frequent faults in line.

(Rajasthan representative informed that Installation of bird guard throughout the line, replacement of earth wire throughout the line and replacement of damaged disc insulators are being done in lines evacuating from Sakatpura(RS). Work is almost completed in line connected to RAPP\_A and in line connected to RAPP\_B, it will get completed within next 35-40 days)

During 56<sup>th</sup> PSC meeting, RVPNL representative informed that work has been completed in one of the lines connected to RAPP\_A and in other line and the line connected to RAPP\_B, it will get completed by the end of January 2025.

During 57<sup>th</sup> PSC meeting, RVPNL representative informed that work is completed in 220kV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-1. For 220kV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-2 and 220kV RAPS\_B(NP)- Sakatpura (RS) (RS) Ckt, it

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will be completed by March 2025.

*During 58<sup>th</sup> PSC meeting, RVPNL representative informed that 6 bird-guards need to be installed and some broken earth wires need to be attended further in 220kV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-1. Work is almost completed in 220kV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-2, however, some newly installed insulators failed due to manufacturing defect which are being replaced. Work in 220kV RAPS\_B(NP)- Sakatpura (RS) (RS) Ckt will also be completed soon depending on shutdown availability.*

#### ***Decision of the Forum:***

*PSC Forum asked RVPNL for expedited corrective actions.*

- xvi. Frequent tripping of 400 KV Amritsar(PG)- Makhu(PS) (PSTCL) Ckt-1 & 400 KV Talwandi Saboo(PSG)-Nakodar (PSG) (PS) Ckt-1**

**PSC 55 recommendation:** PSTCL was requested to plan replacement of porcelain insulators with polymer type.

During 56<sup>th</sup> PSC meeting, PSTCL representative informed that replacement of insulators of these lines are planned in next financial year (2025-26).

NRLDC representative requested PSTCL for expedite the replacement of insulators in these lines to minimise the tripping events.

During 57<sup>th</sup> PSC meeting, PSTCL informed that status is same.

*During 58<sup>th</sup> PSC meeting, PSTCL representative informed that insulator replacement will be completed before next winter season 2025.*

*NRLDC representative requested PSTCL for expedite the replacement of insulators in these lines (by October 2025) to minimise the tripping events due to fog during next winter season. PSTCL agreed for the same.*

#### ***Decision of the Forum:***

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*PSC Forum directed PSTCL to for expeditious actions for insulators replacement.*

- xvii. Multiple element tripping event at 400kV Aligarh(UP) on 02nd November, 2024**

**PSC 55 recommendation:** UPPTCL shall ensure the healthiness of carrier communication and A/R operation at Muradnagar\_1(UP) end.

During 56<sup>th</sup> PSC meeting, UPPTCL representative stated that issue of carrier communication still persists there. ZIV is the OEM and they are not able receive OEM support. Further follow up is being done for corrective actions otherwise new carrier system will be implemented.

During 57<sup>th</sup> PSC meeting, UPPTCL representative informed that carrier communication issue exists in Aligarh(UP) end also. Hence communication upgradation will be done at both the ends. Work is expected to get completed by end of May 2025.

*During 58<sup>th</sup> PSC meeting, UPPTCL representative informed that allotment order is yet to get issued. Work will get completed after allotment is done.*

*NRLDC representative requested UPPTCL to take necessary follow up actions for expeditious rectification of carrier communication issue at Aligarh(UP) and Muradnagar\_1(UP) end.*

***Decision of the Forum:***

*PSC forum directed UPPTCL for expedited corrective actions.*

- xviii. Multiple element tripping event at 220kV Pong(BB) on 06th November, 2024**

**PSC 55 recommendation:** BBMB shall share the event analysis and details of remedial action taken within one week.

During 56<sup>th</sup> PSC meeting, BBMB representative couldn't able to share the tripping analysis and assured that they will share the details within 1-2 days.

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CGM SO, NRLDC suggested BBMB to share the tripping analysis details along with remedial action taken with NRLDC. Further, it can be discussed in next PSC meeting.

NRLDC representative requested BBMB to ensure timely submission of DR/EL & tripping report in line with the clause 37.2(c) of IEGC 2023 and clause 15.2 of CEA Grid Standard.

During 57<sup>th</sup> PSC meeting, Pong BBMB representative was not present.

NRLDC representative requested BBMB to present the detailed analysis of the event in next PSC meeting.

*During 58<sup>th</sup> PSC meeting, Pong BBMB representative informed that they have shared the detailed analysis of the event.*

**xix. *Multiple element tripping event at 400kV Jaisalmer(RS) at 12:13 hrs on 11<sup>th</sup> December, 2024***

**PSC 56 recommendation:**

a) RVPNL shall ensure the healthiness of protection system and their proper operation.

b) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured.

During 57<sup>th</sup> PSC meeting, RVPNL representative informed that during isolator changeover “LBB operated” signal was seen in BCU due to which all the elements connected to that bus tripped. There was no fault in system. Tripping occurred during isolator changeover as “LBB operated” signal was seen in BCU. Issue with LBB relay is not identified yet. OEM is present at site for commissioning of new 500MVA ICT which will be completed within 7-8 days. After that OEM will attend this issue in LBB relay. Temporarily busbar protection has been taken out of service and zone-4 settings of lines at Jaisalmer(RS) end

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is kept as 160ms.

*During 58<sup>th</sup> PSC meeting, RVPNL representative informed that issue in LBB relay at Jaisalmer end has been rectified and busbar protection is taken in service.*

- xx. *Multiple elements tripping at 220kV Mehalkalan(PS) on at 13:48 hrs on 27<sup>th</sup> November, 2024***

**PSC 56 recommendation:**

- a) PSTCL shall share the DR/EL & tripping details within one week.
- b) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured.

During 57<sup>th</sup> PSC meeting, PSTCL informed that they will be sharing the analysis shortly.

*During 58<sup>th</sup> PSC meeting, PSTCL informed that they have shared the analysis over mail dt. 18<sup>th</sup> February 2025.*

- xxi. *Frequent tripping of 220 KV Agra(PG)-Bharatpur(RS) (PG) Ckt-1***

**PSC 57 recommendation:**

Impedance measurement and distance relay settings of the line need to be reviewed before summer (high demand period).

*During 58<sup>th</sup> PSC meeting, RVPNL informed that anti-fog disc and bird-guard installation is in progress. POWERGRID (NR-3) informed that impedance measurement and distance relay settings review will be done in the next available shutdown.*

***Decision of the Forum:***

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*PSC Forum requested RVPNL and POWERGRID(NR-3) for expedited corrective actions.*

**xxii. Frequent tripping of 400 KV Anpara\_B(UPUN)-Sarnath(UP) (UP) Ckt-2**

**PSC 57 recommendation:**

Healthiness of carrier communication need to be reviewed.

*During 58<sup>th</sup> PSC meeting, UPPTCL informed that only one carrier cabinet is in working condition among the two MAIN-I and MAIN-II carrier cabinet, hence cross-wiring could not be done. Another carrier cabinet will be made healthy for redundancy.*

**Decision of the Forum:**

*PSC Forum asked UPPTCL for expedited corrective actions.*

**xxiii. Frequent tripping of 400 KV Noida Sec 148-Noida Sec 123 (UP) Ckt-1**

**PSC 57 recommendation:**

a) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured.

b) Time sync issue need to be addressed.

c) Issue in A/R non-operation need to be resolved.

*During 58<sup>th</sup> PSC meeting, UPPTCL representative informed time sync issue is attended. A/R non-operation issue is resolved at Noida Sec 148 end and it will be resolved at Noida Sec 123 end within 1.5 months.*

**Decision of the Forum:**

*PSC Forum asked UPPTCL to take necessary follow up actions for expeditious completion of work.*

**xxiv. Frequent tripping of 220 KV Sohawal(PG)-Barabanki(UP) (UP) Ckt-1**

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Status of A/R operation and PLCC issue at Sohawal end need to be reviewed.

*During 58<sup>th</sup> PSC meeting, POWERGRID representative informed that firmware issue was there in GE make DEF relay. Firmware upgradation has been done and issue is resolved now.*

**xxv. Frequent tripping of 400 KV Merta-Ratangarh (RS) Ckt-1****PSC 57 Recommendation:**

a) DR standardization need to be checked (DR time window of ~800ms is not as per standard).

b) Phase sequence issue need to be resolved.

c) Status of A/R operation at Ratangarh end need to be reviewed.

*During 58<sup>th</sup> PSC meeting, RVPNL informed that DR time window is made as per standard. Status of A/R operation at Ratangarh end couldn't be reviewed due to shutdown unavailability and will be attended in next available shutdown.*

**Decision of the Forum:**

*PSC Forum asked RVPNL for expedited corrective actions.*

**xxvi. Frequent tripping of 400 KV Mohanlalganj (PGYTL)-Unnao(UP) (PGYTL) Ckt-1****PSC 57 Recommendation:**

a) Issue in over-voltage relay need to be identified and resolved at the earliest.



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b) CVT error may be reviewed at Unnao end.

*During 58<sup>th</sup> PSC meeting, UPPTCL representative informed that CVT error has been reviewed and no issue is there. There may be issue in pickup to drop off ratio of relay in which over-voltage was implemented. Hence over-voltage implementation is reversed to static relay and issue is resolved for now.*

**xxvii. Multiple elements tripping at 220/132kV Ropar(PS) on 06th January, 2025****PSC 57 Recommendation:**

PSTCL need to share the DR/EL & tripping details within one week.

*During 58<sup>th</sup> PSC meeting, PSTCL representative informed that DR/EL could not be extracted due to software issue.*

**Decision of the Forum:**

*PSC Forum asked PSTCL to share detailed report along with observations and remedial action taken.*

**xxviii. Multiple elements tripping at 400/220KV Heerapura(RS) on 10th January, 2025****PSC 57 Recommendation:**

a) Instantaneous OC relay (High set) settings of ICTs at Heerapura(RS) may be reviewed.

b) Replacement of remaining electromechanical/ static relays & schemes with numerical relay need to be expedited at Heerapura(RS).

*During 58<sup>th</sup> PSC meeting, RVPNL representative informed that already 8 static/ electromechanical relays are replaced with numerical relays. Remaining relays*

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*are also being replaced in phased manner, but it will take time as relays of whole substation including busbar relay need to be replaced.*

***PSC Forum asked RVPNL to share the timeline of replacement of relays and take expedited corrective actions at their end.***

**xxix. Multiple element tripping at 220/132kV Agra Sikandra(UP) on 23rd January, 2025**

**PSC 57 Recommendation:**

- a) Carrier communication issue at Kirawali(UP) need to be resolved.
- b) Issue in isolator selection status at Agra Sikandra(UP) need to be addressed.
- c) Zone-2 and zone-3 settings of 220kV Kirawali- Agra Sikandra(UP) Ckt and 220kV Kirawali(UP)-Agra(PG) Ckt need to be reviewed at Kirawali end.

*During 58<sup>th</sup> PSC meeting, UPPTCL representative informed that Kirawali end sensed the fault in zone-3 only though fault was at 100%-line distance and zone-2 settings was as per Protection Philosophy. Hence it seems that fault was highly resistive in nature. Zone-2 and zone-3 settings of 220kV Kirawali- Agra Sikandra(UP) Ckt and 220kV Kirawali(UP)-Agra(PG) Ckt was reviewed at Kirawali end and found to be in order.*

**B.2 Multiple elements tripping events in Northern region in the month of February 2025 (agenda by NRLDC)**

**B.2.1** A total of 16 grid events occurred in the month of **February 2025** of which **06** are of GD-1 category, **05** are of GI-2 Category and **05** are of GI-1 Category. The tripping report of all the events have been issued from NRLDC. A list of all these events is attached at **Annexure-B.II**.

**B.2.2** Maximum delayed clearance of fault observed in event of multiple elements tripping at

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400/220kV Daulatabad(HS) at 08:11 hrs on 27<sup>th</sup> February, 2025 (As per PMU at Gurgaon(PG), B-N phase to earth fault with delayed fault clearing time of ~1080 msec is observed).

- B.2.3 Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **04** events out of **16** grid events occurred in the month. In 04 (no.) of grid event, there was no fault in the grid.
- B.2.4 NRLDC representative presented the reporting status of DR/EL & tripping reports w.r.t. grid events occurred in February 2025. It was highlighted that detailed report of majority of the tripping events have not received. Utilities were requested to start preparing the detailed report of the tripping events as per timeline mentioned in IEGC 2023 and share the report with NRLDC, NRPC and PSC forum. Remedial actions taken by constituents to avoid such multiple elements tripping may also be included in the detail report.
- B.2.5 Members stated that delay occurred due to non-submission of DR/EL & tripping details from site however they are taking continuous follow up actions to ensure timely completion of tripping analysis within stipulated timeline.

***As per IEGC clause 37.2 (c), Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within 24 hrs of the event and as per IEGC clause 37.2 (e), the user shall submit a detailed report in the case of grid disturbance or grid incidence within one (1) week of the occurrence of event to RLDC and RPC.***

***Decision of the Forum***

*Forum directed members to take necessary preventive measures to avoid such grid incidents / disturbances in future and report actions taken by respective utilities in OCC & PSC forum. Moreover, utilities may impress upon all concerned for providing the Preliminary Report, DR/EL & detailed report of the events to RLDC in line with the regulations.*

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**B.3 Analysis of the tripping events occurred during February-2025 and status of remedial action taken (agenda by NRLDC)**

**a) Frequent elements tripping during February 2025:**

B.3.1 The following transmission elements were frequently tripping during the month of **February'25**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-1	8	NPCIL/Raj
2	220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1	3	NPCIL/Raj
3	220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-3	3	BBMB/Delhi

B.3.2 List of tripping is attached as **Annexure-B.III**.

B.3.3 NRLDC representative highlighted that frequent tripping of transmission elements affects the reliability and security of the grid. In view of the same, utilities were requested to analyse the root cause of the tripping and share the remedial measures taken/being taken in this respect.

**Discussion during the meeting:**

- **220 KV RAPS\_A(NP)-Sakatpura(RS) (RS) Ckt-1:** *NRLDC representative raised concern over frequent incidents of faults and non-operation of A/R. It was further highlighted that the line tripped 8 number of times in February 2025 and DR/EL is also not received from RAPS\_A end for any of the event. RVPNL representative stated that this line passes through forest area due to which this line is prone to frequent faults and shutdown also get available for short period of time as forest is reserved forest area. However, remedial actions are being taken to avoid frequent tripping of line. Installation of bird guard throughout the line, replacement of earth wire throughout the line and replacement of damaged disc insulators are being done in lines evacuating from Sakatpura(RS). Work is completed in 220kV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-1, however 6 bird-guards need to be in-*

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*stalled and some broken earth wires need to be attended further in 220kV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-1. Work is almost completed in 220kV RAPS\_A(NP)- Sakatpura (RS) (RS) Ckt-2, however, some newly installed insulators failed due to manufacturing defect which are being replaced. Work in 220kV RAPS\_B(NP)- Sakatpura (RS) (RS) Ckt will also be completed soon depending on shutdown availability.*

- **220 KV Debari(RS)-RAPS\_A(NP) (RS) Ckt-1:** *NRLDC representative raised concern over issue in A/R operation. It was further highlighted that DR/EL is also not received from RAPS\_A end. RVPNL representative informed that this line is almost 200km long and total no. of location is 450. There is issue in almost 1300 string insulators and it will take at least 3-4 months to complete the whole work subject to shutdown availability. Some work has already been done during February 2025 and tripping has also reduced since then.*
- **220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-3:** *NRLDC representative raised concern over frequent incidents of faults with most of the faults of the nature of L-L fault. BBMB representative stated that tower no. 14 collapsed in one of the 3 events and kit thread tangled near tower no. 167 in another event. 3<sup>rd</sup> event was part of multiple elements tripping at 220/66kV Narela(DTL) on 15<sup>th</sup> Feb 2025.*

NRLDC representative emphasized that A/R (auto re-closer) issue was found in many of these tripping. All the utilities are sensitized to ensure healthiness/in service of A/R in 220 kV and above transmission lines in compliance to CEA Grid Standards. It was further informed that most of the tripping are of transient in nature but due to non-operation of A/R, it resulted into tripping of the transmission element thus reducing the reliability of the grid. All the utilities shall endeavour to keep auto re-closer in service and healthy condition of 220 kV and above voltage level transmission line. The issue of time syncing of DR/EL at many of the stations was highlighted, constituents were requested to ensure the time syncing of DR/EL. In addition, necessary actions also need to be taken to ensure the Right of Way and other operation & maintenance issues to minimize the frequent faults in the line. All utilities agreed for the same.

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***PSC Forum reiterated that frequent outages of such elements affect the reliability and security of the grid. Members were requested to investigate such frequent outages and share the suitable remedial measures taken/being taken in this respect.***

**b) Protection related issues in multiple elements tripping, detailed analysis of the events and status of remedial measures:**

- B.3.4 The list of major tripping events occurred during February 2025 is attached as **Annexure-B.IV**. Concerned constituents/utilities were requested to share the detailed analysis of the tripping elements along with status of remedial action taken/to be taken.
- B.3.5 Utilities were requested to prepare detailed analysis report and present the event details during 58<sup>th</sup> PSC meeting. Events involving more than one utility may be jointly prepared and presented.

**Discussion during the meeting:**

**Tripping Events**

**A. Multiple elements tripping at 400kV Sainj(HP) & Parbati3(NH) at 19:35 hrs on 03<sup>rd</sup> February, 2025**

Discussion during the meeting:

**i. Brief of the event shared by NRLDC representative based on detail available is as follows:**

- Total generated power of Sainj HEP(HP), Parbati\_2(NH) and Parbati\_3(NH) evacuates through 400 kV Parbati\_2(NH)- Banala(PG) (PKTCL) Ckt and 400 kV Parbati\_3(NH)- Banala(PG) (PKTCL) Ckt via 400 KV Parbati\_2(NH)-Sainj(HP) (PKTCL) Ckt and 400 KV Parbati\_3(NH)-Sainj(HP) (PKTCL) Ckt.
- During antecedent condition, only 50MW Unit-1 at Sainj HEP(HP) was running (generating approx. ~45MW) and 130MW Unit-4 at Parbati-3 HEP(NHPC) (generating approx. ~132MW).

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- As reported, at 19:35 hrs, R-N phase to earth fault occurred on 400 KV Parbati\_3(NH)-Sainj (HP) (PKTCL) Ckt-1 in Z-2 and fault current was 2.92 KA from Sainj end.
- As per DR of the line at Parabati\_3 end, fault was sensed in Z-1 and tripping command to R-ph CB was given. However, R-ph pole failed to open leading to operation of LBB protection. This led to tripping of all the elements connected to the Bus (Tripping details awaited) and complete blackout of 400KV Parbati-3 s/s occurred.
- As per PMU, R-N phase to earth fault with delayed fault clearing time of 400msec is observed.
- As per SCADA, approx. 132 MW hydro generation loss is observed at Parbati\_3 and 45 MW hydro generation loss is observed at Sainj.
- **Major observations:**
  - The reason for delayed fault clearance needs to be shared.
  - Details of protection operation and sequence of the tripping need to be shared.
  - DR/EL (dat/.cfg file) of all tripped elements along with detailed tripping report and remedial action taken report need to be shared.
  - Trippings at Sainj(HP) S/s are not recorded in SCADA SOE. Availability of SCADA SOE data needs to be ensured.

**ii. Due to ongoing commissioning activity in Parbati-II Project, NHPC representative was not present during the meeting. However, NHPC informed the following through mail dt. 26.03.2025:**

- From the DR of Parbati-III-Banala Line#1 it is evident that the R-Phase voltage reduced to 58.46 KV and R-Phase current increased to 1130 Amp. Accordingly relay sense the fault in Z2 at 19:26:47.386 Hrs but got resetted at 19:26:47.557 Hrs. However, R-Phase External Trip was received and Auto Reclose was blocked at 19:26:47.692 Hrs.
- In SCADA event, "Direct Trip-2 Receive" was recorded at 19:35:58.276 Hrs.

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- It is envisaged that, upon receiving of Direct trip signal, master trip relay got activated and subsequently, auto reclose block function activated in the Main-1 relay.
- Line CB of Parbati-III-Sainj Line remained in closed condition from Parbati-III end and tripped from Sainj end.
- Due to unavailability of power evacuation path, the running unit i.e. Unit#4 tripped on operation of over frequency protection.
- Special finding/ issues identified during restoration was that receiving of Direct Trip signal from remote end is not proper in the instant case.
- **As Remedial Action to be taken, end to end test of PLCC shall be carried out after getting approval for taking shutdown of line in forthcoming OCC.**
- Parbati-II-Sainj line CB was remained in closed condition from Parbati-II end.

**PSC Forum Recommendations:**

- *End to end test of PLCC shall be carried out for this hydro complex.*

**B. Multiple elements tripping at 220/66kV Narela(DTL) at 09:35 hrs on 15<sup>th</sup> February, 2025**

**Discussion during the meeting:**

**i. Brief of the event shared by NRLDC representative based on details available is as follows:**

- 220kV Narela(DTL) S/s has double main bus arrangement at 220kV level. 220/132kV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) are connected on the same extended Bus of 220KV Narela(DTL).
- During antecedent condition, 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3, 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1& 2 and 220/66kV 100 MVA ICT-1, 2 and 3 at Narela(DTL) were connected to 220kV Bus-1 at Narela(DTL) and 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 & 2, 220 KV DSIDC Bawana-Narela(DV) (DTL) Ckt-1 & 2 and



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220/132kV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) were connected to 220kV Bus-2 at Narela(DTL). 220kV Bus coupler at Narela(DTL) was in OFF position.

- As reported, sequence of event is as follows:
  - a. At 09:19 hrs, both CBs at 220kV side of 220/132kV 50MVA and 100 MVA ICT-1 & 2 at Narela(BB) were manually opened for 220kV Bus Isolator changeover operation from Bus-2 to Bus-1.
  - b. At 09:30 hrs, 89A Bus-1 Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) was closed.
  - c. Since the 220kV Bus Coupler CB at Narela(DTL) was already in OFF position since 08.09hrs, the said closure of 89A isolator with 89B Isolator already closed of 220/132kV 100MVA ICT-2 at Narela(BB) resulted in a position to function as a 220kV Bus Coupler.
  - d. At 09:34 hrs, 89B Bus-2 isolator of 220/132kV 100MVA ICT-2 at Narela(BB) was tried to open, but the operation could not be done completely due to 89B isolator struck in between and heavy arcing flames evolved due to said ON load 89B isolator opening operation.
  - e. It caused ionization in air around 89B isolator of 220/132kV 100MVA ICT-2 at Narela(BB) and R-B-N double phase to earth fault occurred due to arcing via isolator structure.
  - f. This resulted in zone-2 busbar protection operation (as confirmed from DR) and all the elements connected to 220kV Bus-2 at Narela(DTL) tripped.
  - g. Since 89B isolator opening operation was not complete, fault continued to be fed from Bus-1 through 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3 via 89A Bus-1 Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) to faulty 89B Bus-2 Isolator. This led to zone-1 busbar protection operation (as confirmed from DR) and all the elements connected to 220kV Bus-1 at Narela(DTL) also tripped and complete blackout occurred at 220kV Narela(DTL).
- As per DR at Narela(DTL), Zone 2 Bus Bar protection operated followed Zone 1 Bus Bar protection operation.

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- As per PMU at Maharani Bagh(PG), Y-N phase to earth fault followed by Y-B phase to phase fault with fault clearing time of 120msec and 80msec is observed.
- As per SCADA, change in demand of approx. 58 MW is observed in Delhi control area. However, SLDC-Delhi has reported load loss of approx. 194 MW.
- **Major observations:**
  - Exact location of fault need to be shared.
  - SCADA Data in Narela became unavailable after tripping. Availability and Healthiness of SCADA data needs to be ensured.
  - Remedial action taken report to be shared.

**ii. DTL representative informed the following:**

- Following the manual closure of 89A isolator by BBMB staff, 89B Bus-2 Isolator of BBMB Tx-2 was tried to open at 09.34Hrs but the operation could not be done completely due to 89B isolator struck in between and heavy arcing flames evolved due to said ON load 89B isolator opening operation by BBMB staff. It caused in ionization of air around 89B isolator of BBMB 100MVA Tx-2 and RB-Double Phase-Earth (R=6kA deg 0, B=4kA deg. -178 to Earth IN current=2kA deg.-3) fault occurred due to arcing via isolator structure.
- It resulted in operation of 220kV Bus Bar Protection Zone-B trip at 09.35Hrs. and all CB connected to Bus-2 (DSIIDC BAWANA-1&2, Mandola-1&2) got tripped immediately.
- Since 89B Isolator opening operation was not complete, fault continued to be fed from Bus-1 through Panipat-1,2,3 via BBMB 100MVA Tx-2 Isolator 89A to faulty 89B isolator, thereby causing 220kV Bus Bar Protection Zone-A also to trip immediately following Bus-Zone B trip and all 220kV CB connected to 220kV Bus-1 (Panipat-1,2,3, DTL 100MVA Tx-1,2&3, Rohtak Road-1&2) tripped as a consequence.
- Thus both 220kV Bus-1&2 at Narela DTL got isolated from power system network.

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- There was a requirement of shutdown at 400KV Mandola S/Stn(PGCIL). In view of this DTL informed BBMB to free 220KV Bus 2. Two Power Transformers i.e.100MVA T2 and 50MVA T1 were connected to 220KV Bus-2 at BBMB Narela end at the time of occurrence of fault.
- At this time 220KV Bus Coupler at DTL end was in OFF position but in the knowledge of BBMB shift staff the Bus coupler was in ON position which was confirmed by DTL shift staff at the time of conveying message to free Bus 2 at BBMB end.
- So, after discussion with DTL shift staff, BBMB shift staff tried to free BUS-2 firstly by closing of BUS 1 isolator no. 203 of 100MVA T2 T/F which they did successfully. Then they tried to open BUS-2 isolator no. 204 of this transformer which unfortunately could not be opened due to Isolator Control Mechanism Fault and as such the isolator stuck in between during operation.
- As practically the Bus Coupler was in open position so a heavy arc was formed between stucked male-female contacts of the isolator which led to operation of numerical Bus bar protection installed in DTL control room which resulted into tripping of all elements connected to 220KV Bus 1 & 2.
- Reason of blackout at 220KV Rohtak Road BBMB Delhi was tripping of 220KV only source from 220KV DTL Narela ( i.e. 220KV Narela —R/Rd Ckt 1&2).
- It took approximate 1 Hour to restore the system. Meanwhile the maintenance staff of BBMB set right the Isolator Mechanism Fault of Bus 2 Isolator No. 204 of 100MVA T2.

**PSC Forum Recommendations:**

- *There should not be any communication gap among members while doing any operation in order to avoid recurrence of such type of inadvertent wrong operations in future.*

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**C. Multiple elements tripping at 220/132KV Delina(JK) at 14:54 hrs on 17<sup>th</sup> February, 2025**

Discussion during the meeting:

**i. Brief of the event shared by NRLDC representative based on detail available is as follows:**

- 220/132kV Delina substation has Double main and transfer bus scheme.
- During antecedent condition, 220kV Amargarh (INDIGRID) –Delina(JK) D/C was carrying 106 MW each and feeding Delina load.
- As reported, at 14:54 hrs, 132KV Delina – Pattan line tripped due to broken jumper condition while returning the same line from shutdown (exact reason, nature and location of fault yet to be shared).
- During the same time, 220/132kV 160MVA ICT -1 at Delina(JK) tripped on earth fault (exact reason and nature of protection operated yet to be shared).
- Subsequently, this led to overloading of 220/132kV 160MVA ICT -2 & 3 at Delina(JK) and ICTs got tripped on over-current protection operation.
- As per PMU at Amargarh (INDIGRID), R-Y-B 3 phase to earth fault with fault clearing time of 80 msec is observed.
- As per SCADA, change in demand of approx. 210 MW is observed in J&K control area.
- **Major observations:**
  - Exact reason, nature & location of fault and nature of protection operated need to be shared.
  - Sequence of operation needs to be shared.
  - Bus wise arrangement of transmission elements needs to be shared for Delina(JK).
  - SCADA data of 220/132kV Delina (JK) S/s was not available during the event. Availability and healthiness of the same need to be ensured.
  - DR/EL (.dat/.cfg) file of all the tripped elements along with tripping report need to be shared from both the ends.
  - Remedial action taken report to be shared.

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J&K representative was not present during the meeting.

**PSC Forum Recommendations:**

- J&K shall share the DR/EL & tripping details within one week.

**D. Multiple elements tripping at 400/220/132KV Moradabad(UP) at 17:18 hrs on 22<sup>nd</sup> February, 2025**

Discussion during the meeting:

**i. Brief of the event shared by NRLDC representative based on detail available is as follows:**

- 400/220kV Moradabad(UP) has double main and transfer bus scheme in both 400KV and 220KV system. 220/132KV Moradabad-2(UP) was connected to the same 220kV bus as that of 400/220kV Moradabad(UP).
- During the antecedent condition, 400/220 KV 500 MVA ICT 1 at Moradabad(UP), 220/132 KV 160 MVA ICT 2 & ICT 3 at Moradabad-2(UP) were carrying 79MW, 20MW and 20MW. 400/220 KV 240 MVA ICT 3 at Moradabad(UP) was under shutdown.
- As reported, at 17:18hrs, fault occurred in 132KV Moradabad-2 – Golbari Ckt (Exact reason, nature and location of fault yet to be shared).
- Since the fault wasn't cleared at 132KV level, it propagated further into 220KV system which led to Bus Bar protection operation at both 220kV Bus-1 & 2 at Moradabad-2(UP) and all the elements connected to both the 220kV buses at Moradabad-2(UP) tripped.
- As per PMU at Bareilly(PG), Y-B phase to phase fault is observed with fault clearing time of 80ms.
- As per SCADA, change in demand of approx. 106MW is observed in UP control area.
- **Major observations:**
  - Exact reason, nature and location of fault need to be shared.
  - SCADA data of 220/132/33kV Moradabad-2(UP) was partially freezed during the event. Availability and healthiness of SCADA data need to be ensured.

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- DR/EL (dat/.cfg file) of all the tripped elements along with detailed tripping report need to be shared from both the ends.
- Remedial action taken report to be shared.

**ii. UPPTCL representative informed the following:**

- Phase Fault occurred on 132kV Moradabad-Gulabbari Line at 17:18 Hrs on 22.02.2025 at a distance of 2.5km. The fault on this line was timely cleared by it's distance protection in zone I.
- Inspite of timely clearance of line fault, 160MVA T/F II also tripped on High Set HV B/U O/C. However, Transformer HV Breaker failed to trip.
- Since the HV breaker of 160MVA T/F-II did not trip, and the load current to the tune of 0.24 A continued to flow on HV side of 160MVA T/F II , LBB protection for 220kV side CB operated resulting tripping of all elements of 220kV Bus B.
- Following elements connected to 220kV bus-B tripped: Bay-1 (220kV Bus Coupler), Bay-2 (220kV TBC), Bay-3 (220kV Amroha Line), Bay-4 (220kV Sambhal Line), Bay-6 (160MVA T/F-II), Bay-8 (160MVA T/F-I), Bay-10(500MVA ICT-II LV Side)
- HV Trip Circuit Control Cable of 160MVA T/F-II found damaged, due to which Transformer breaker did not operate.
- **As remedial action taken, damaged Trip Ckt. Control Cable replaced with New Cable.**

**PSC Forum Recommendations:**

- *Members may ensure regular checking and healthiness of protection system to avoid any unwanted tripping in future. Any trip circuit faulty alarm should be attended promptly.*

**E. Multiple elements tripping at 400/220kV Daulatabad(HS) at 08:11 hrs on 27<sup>th</sup> February, 2025**

**Discussion during the meeting:**

**58<sup>th</sup> Protection Sub-Committee Meeting (26<sup>th</sup> March, 2025)-MoM****i. Brief of the event shared by NRLDC representative based on detail available is as follows:**

- 400/220kV Daulatabad(HS) has one and half breaker bus scheme in 400KV and double main bus transfer for 220KV system.
- During the antecedent condition, 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1&2, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1 & 2 and 400kV DAULATABAD-DHANONDA CKT-1&2 were carrying 228MW (each circuit), 353MW (each circuit) and 138MW (each circuit) respectively.
- As reported, at 08:11hrs, B-N fault occurred on 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2. On this fault, line successfully auto-re-closed from Gurgaon(PG) end but CB at Daulatabad end failed to open. During patrolling, flag was found wrapped on phase conductor at tower location no. 54-55.
- During inspection, both trip coils of 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2 at Daulatabad end were found burnt.
- As CB at Daulatabad end failed to open, LBB of Gurgaon Bay should have operated. However, LBB protection also didn't operate. During the inspection, it was found that bus bar relay was in error mode.
- Further, all the 400kV lines i.e., 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1 & 2 and 400kV DAULATABAD-DHANONDA CKT-1&2 tripped on operation of distance protection in Z-2 from remote end.
- Further, 400/220kV 315MVA ICT-1, 2, 3 & 4 at Daulatabad(HR) tripped on non-directional O/C E/F protection operation and fault got cleared. Tripping of all the elements led to blackout of the 400/220kV Daulatabad(HS) S/s.
- As per PMU at Gurgaon(PG), B-N phase to earth fault with delayed clearance of ~1080 msec is observed.
- As per SCADA, change in demand of approx. 414MW is observed in Haryana control area.

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- As reported, fault trip coils have been replaced and bus bar relay was re-boot. Bus bar relay is working properly however it has been kept under observation and feedback has been given to relay OEM for review of relay.
- **Major observations:**
  - DR(.dat/.cfg) files of all the tripped elements (from both the ends) need to be shared.
  - SCADA data of 400/220 ICTs and all the 400KV Circuit Breakers were unavailable during the event. Availability and healthiness of SCADA data need to be ensured.
  - Reason for not attending fault in the trip coil and bus bar relay on time need to be justified.
  - Issue with the bus bar relay need to be rectified at the earliest.
  - Remedial action taken report to be shared.

**ii. HVPNL representative informed the following:**

- At Daultabad end of 400kV Daultabad-Sec 72 ckt-1 DPR sensed B-phase to earth fault at 08:11:57.882 Hrs but CB didn't trip due to contactor burnt. At PGCIL Sector 72 end; C-ph tripped, AR operated and line re-closed after AR dead time of 1 Sec & remains charged from Sector 72 PG end.
- It was reported that a kite thread & flag cloth were wrapped on conductors during bad weather conditions (Rain) between TL no. 54 & 55 of 400kV Daultabad-Sec 72 ckt-1 & ckt-2.
- Initially fault developed in ckt-1 and got cleared from PG end with opening of C-phase but remains being fed from Daultabad end. During AR dead time period of 1 Sec, C-ph remains open from PG Sector 72 end but fault remains fed from Daultabad end till clearance from all other sources i.e. 400 kV Jharli ckt-1 & 2 (from remote end), 400 kV Dhanonda ckt-1 & 2 (from remote end), 400/220 kV ICT-1, 2, 3 & 4. LBB relay of 400kV Daultabad-Sec 72 ckt-1 didn't trip due to error in PU relay of Bus-bar protection relay.



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- 400kV Daultabad-Sec 72 ckt-2 tripped at 08.11:58.362hrs on DT Received.
- 315 MVA, 400/220 kV ICT-1, 2, 3 & 4 tripped on operation of back-up O/C+E/F relay as fault gets fed from 220 kV side sources.
- As remedial action taken, tripping of 400 kV CB of Daultabad-Sector 72 PG Ckt-1 checked & made healthy after replacement of burnt contactor. Healthiness of LBB relay (inbuilt in PU) in 400 kV Daultabad-Sector 72 PG Ckt-1 checked & PU relay rebooted & made healthy.

#### **PSC Forum Recommendations:**

- *Members may ensure regular checking and healthiness of protection system to avoid any unwanted tripping in future. Any trip circuit faulty alarm should be attended promptly.*

#### **F. Multiple elements tripping at 220/132KV Ziankote(JK) at 03:30 hrs on 28<sup>th</sup> February, 2025**

##### **Discussion during the meeting:**

##### **i. Brief of the event shared by NRLDC representative based on detail available is as follows:**

- 220/132kV Ziankote S/s have two bus at 220kV side i.e., main bus & reserve bus. 220kV Amargarh-Ziankote ckt-1&2 are on the same tower (D/C tower) and line length is ~21.4km.
- During antecedent condition, 220kV Amargarh (INDIGRID) –Ziankote (JK) ckt-2 was carrying 139 MW and feeding Ziankote load. 220kV Amargarh (INDIGRID) –Ziankote (JK) ckt-1 was already tripped at 02:40 hrs on R-N fault.
- As reported, at 03:30 hrs 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2 also tripped on R-N fault (details of cause of fault and location of fault yet to be received).
- As per PMU at Amargarh (INDIGRID), no fault was observed in system.
- As per SCADA, change in demand of approx. 126 MW is observed in J&K control area.

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➤ **Major observations:**

- Exact location and nature of fault need to be shared.
- SCADA data of 220/132kV Ziankote(JK) S/s is not available. Availability and healthiness of the same need to be ensured.
- DR/EL (.dat/.cfg) file of all the tripped elements along with tripping report need to be shared from both the ends.
- Remedial action taken report to be shared.

***J&K representative was not present during the meeting.***

**PSC Forum Recommendations:**

- *J&K shall share the DR/EL & tripping details within one week.*

B.3.6 Grid event analysis details of all the aforementioned grid incidents is attached as **Annexure-B.IV (A)**.

**B.4 Details of tripping of Inter-Regional lines from Northern Region for February'25 (agenda by NRLDC)**

B.4.1 A total of 4 inter-regional lines tripping occurred in the month of February 2025. The list is attached at **Annexure-B.V**. The status of receipt of preliminary reports, DR/EL within 24hrs of the event and fault clearing time as per PMU data has also been mentioned in the table. The non-receipt of DR/EL & preliminary report within 24hrs of the event from SLDCs / ISTS licensees / ISGSs is in violation of regulation 37.2(c) of IEGC and regulation 15(3) of CEA Grid Standards. As per regulations, all the utilities shall furnish the DR/EL, flag details & preliminary report to RLDC/RPC within 24hrs of the event. They shall also furnish the detailed investigation report within 7 days of the event if fault clearance time is higher than that mandated by CEA (Grid Standard) Regulations.

B.4.2 NRLDC representative asked the reason for DT received at Jabalpur end of 765 KV Orai-Jabalpur (PG) Ckt-2. POWERGRID representative stated that this occurred due to a peculiar problem of frequency separation in PLCC which resulted in interference.

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Issue will be addressed in the next available shutdown.

- B.4.3 Regarding tripping of 220 KV Auraiya(NT)-Mehgaon(MP) (MPSEB) Ckt-1 and 220 KV Auraiya(NT)-Malanpur(MP) (PG) Ckt-1, NTPC representative was not present during the meeting.

**Decision of the Forum**

*Forum recommended members to take necessary actions to minimise the tripping on inter regional line and ensure proper operation of protection system.*

**B.5 Mock testing of System Protection Schemes (SPS) in Northern Region (agenda by NRLDC)**

- B.5.1 As per IEGC clause 16.2

*"For the operational SPS, RLDC or NLDC, as the case may be, in consultation with the concerned RPC(s) shall perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year. RLDC or NLDC shall share the report of such studies and mock testing including any short comings to respective RPC(s). The data for such studies shall be provided by CTU to the concerned RPC, RLDC and NLDC."*

- B.5.2 As per IEGC clause 16.3

*"The users and SLDCs shall report about the operation of SPS immediately and detailed report shall be submitted within three days of operation to the concerned RPC and RLDC in the format specified by the respective RPCs."*

- B.5.3 There are 56 numbers of System Protection Scheme (SPS) approved in Northern Region. These SPS are implemented at major generation complexes, important evacuating transmission lines and ICTs which are N-1 non-complaint. System Protection Scheme Document of Northern Region has been revised/updated on 31<sup>st</sup> January, 2025. Revised version of the document is available on the NRLDC website in Document section and can be accessed at below link: <https://newnr.nrlc.in/documents/Documents>

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- B.5.4 NRLDC representative stated that SPS is designed to detect abnormal system conditions and take predetermined, corrective action to preserve system integrity and provide acceptable system performance. Therefore, correct operation of SPS as per designed logic is important to serve its purpose. To ensure this, mock testing of SPS needs to be conducted at a regular period. Clause 16.2 of IEGC 2023 also mandates the mock testing of SPS for reviewing SPS parameters & functions, at least once a year.
- B.5.5 In view of the above, concerned constituents / utility were requested to share the tentative schedule plan for conducting mock testing of SPS in their respective control area during 2024-25 in format attached as **Annexure-B.VI**. In this regard, communication has already been sent to constituents through NRLDC letter dated 01.05.2024 and continuous follow up is being done in OCC & PSC meeting since May 2024.
- B.5.6 Update in this regard **received from Uttarakhand, Rajasthan & UP only**.
- B.5.7 NRLDC representative requested POWERGRID to review the SPS document and share the tentative schedule plan of mock testing of SPS of their control area.
- B.5.8 It was further requested to all the constituents to review the existing SPS schemes in their control area. At many of the stations, augmentation of ICTs has already done. So, review of requirement of SPS by taking consideration of load enhancement in near future may be done. In view of this, concerned members were requested to share their input for further discussion in this regard.

***Decision of the Forum***

*PSC Forum requested members to conduct the mock testing of SPS in their respective control area, share the tentative schedule of mock testing of SPS and share the report after conducting mock test.*

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**B.6 Implementation of Automatic load shedding scheme in SPS related to Safe evacuation of generation at Chhabra/ Chhabra Super Critical/ Kawai/ Kalisindh Complex (agenda by NRLDC)**

- B.6.1 As per “SPS related to Safe evacuation of generation at Chhabra/ Chhabra Super Critical/ Kawai/ Kalisindh Complex” as mentioned in System Protection Schemes Document of Northern Region 2025 (attached as **Annexure-B.VII**), with the loss of generation of about 2100 MW in the complex in case-3 (N-1-1/ N-2 of Anta-Phagi 1 & 2), equivalent load shedding need to take place in Rajasthan state control area to avoid overloading of WR-NR corridor as well as to avoid over drawl by Rajasthan. However, considering logistics etc. approx. 750 MW automatic load shedding in Rajasthan Control area would be required and rest could be manual (almost similar or slightly higher impact as tripping of one unit of 660 MW). RRVPNL was requested to identify the feeders for 750 MW and dovetail the Automatic Load shedding with logic of the SPS given above. For implementation of Automatic load shedding scheme target date provided by Rajasthan was 28.02.2018. Confirmation in this regard was sought from Rajasthan during request for shutdown of 765 kV Anta-Phagi Ckt-1. As intimated by Rajasthan, Automatic load shedding scheme is yet not implemented.
- B.6.2 NRLDC representative requested RVPNL to share the timeline for implementation of Automatic load shedding scheme with logic of the SPS given above. RVPNL representative replied that implementation will take approx. 6 months.

**Decision of the Forum**

*Forum directed RVPNL to expedite implementation of Automatic load shedding scheme with logic of the SPS given above.*

**B.7 Corrective action for healthiness of 500kV Mundra-Mahindergarh SPS (agenda by NRLDC)**

- B.7.1 On 17<sup>th</sup> May 2024 on outage of both pole (carrying total ~1500MW), SPS of 500kV

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HVDC Mundra-Mahindergarh inter regional link didn't operate. This issue was discussed during 51<sup>st</sup> PSC meeting and ADANI was requested to share the details w.r.t. SPS operation during the meeting.

- B.7.2 Further, NRLDC in coordination with NLDC conducted an online discussion meeting with concerned stakeholders (SLDCs, ADANI, POWERGRID) on 12<sup>th</sup> August 2024, for further remedial actions required to make this SPS healthy.

Following actions were decided during the meeting:

- i. POWERGRID, ADANI and concerned states were requested to identify the issue in communication links and take expeditious actions to make the all the communication link healthy. POWERGRID & ADANI shall review the healthiness of SPS system at different load centres and communication path between them in coordination with the SLDCs.
- ii. States were requested to go through the details of load feeders mentioned in SPS document and share the changes / modifications as per present scenario and share the inputs w.r.t. unavailability in identified load feeders and load shedding. SLDCs shall share the revised updated feeder details (radial) along with expected average/peak load relief through respective feeders.
- iii. SLDCs in coordination with their transmission and protection team shall share the status and healthiness of existing SPS system along with details of availability of communication path for incorporation of proposed revised/additional feeders.

- B.7.3 Load end details have been received from UP, Haryana, Punjab Rajasthan & Delhi. Details are attached as **Annexure-B.VIII**.

- B.7.4 ADANI has submitted the status of healthiness of communication network and hardware system at different locations on the basis of preliminary inspection. As per details submitted, counter status was found OFF at Alwar, Ratangarh, Gobindgarh, Malerkotla, Bamnauli, Shamli and Dhanonda.

- B.7.5 Details of nodal officer of different substation involved in SPS scheme has already been shared with ADANI team for coordination and further remedial actions.

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- B.7.6 During 53<sup>rd</sup> PSC meeting, ADANI was requested to coordinate with the respective states to rectify the issues in the SPS system and share the status of remedial action taken / planned to be taken. Desired remedial actions need to be expedited.
- B.7.7 ADANI agreed for the same and stated that update would be given within 01 week. However, no detail received yet from ADANI.
- B.7.8 During discussion in 54<sup>th</sup> PSC meeting also there was no further update received from ADANI team.
- B.7.9 During 55<sup>th</sup> PSC meeting, ADANI representative stated that there are basically communication related issues at various location involved in this scheme. OEM / vendor has been assigned and instructed to inspect all the stations and list out the different issues. After compilation of all the issues comprehensive action plan would be shared. Further, issue related to coordination & communication with the state nodal officers was highlighted by ADANI representative.
- B.7.10 NRLDC representative emphasized that ADANI shall take lead as this SPS scheme was commissioned by them and further stated that details of nodal officers will be provided. States were also requested to ensure proper coordination from their end. Further, states were also requested to ensure incorporation of revised decided feeders during work at their stations.
- B.7.11 States representative assured to provide all necessary coordination from their end.
- B.7.12 During 56<sup>th</sup> PSC meeting, ADANI was requested to apprise the forum about the present status of remedial actions.
- B.7.13 ADANI representative stated that they have raised service order to COMTEL (OEM) for approval. After approval of this service order, COMTEL engineers will visit all the sites in coordination with nodal officers from respective stations. It is expected that identification of issues and estimate hardware requirement will be completed by the end February 2025. Thereafter, after financial approval, rectification of issues will be done.
- B.7.14 NRLDC representative requested ADANI to ensure completion of whole work before

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summer 2025. State representatives were also requested to coordinate with the ADANI team and also ensure incorporation of identified revised feeders for load relief in SPS.

- B.7.15 During 57<sup>th</sup> PSC meeting, ADANI representative informed that visit by COMTEL engineers at all the sites is completed and COMTEL will submit the report within 10 days.
- B.7.16 NRLDC representative requested ADANI to share the report at the earliest and make Action Plan accordingly to ensure completion of whole work before summer 2025.
- B.7.17 During 58<sup>th</sup> PSC meeting, ADANI representative shared the observations made by COMTEL engineers and informed that it would at least require 6 months to complete the work.
- B.7.18 NRLDC CGM (SO) highlighted that in view of envisaged growth in demand in next summer season, it is important to ensure rectification of issues and healthiness of SPS.
- B.7.19 ADANI representative further informed that cost implication in this case is estimated as approx. Rs. 1.5 Cr. Till now they conducted technical assessment and made cost estimation. He submitted to allow the cost recovery of this under ADDCAP.
- B.7.20 MS, NRPC conveyed that Adani may bring the separate agenda for approval of cost recovery mode with proper justification.
- B.7.21 Adani representative mentioned that he will look into the regulatory aspect and will present accordingly.

***Decision of the Forum***

*Forum emphasized the importance of 500kV Mundra-Mahindergarh SPS and its healthiness is important to ensure rectification of issues in SPS system before summer 2025. State representatives were also requested to coordinate with the ADANI team and also ensure incorporation of identified revised feeders for load relief in SPS. Desired remedial actions need to be expedited.*



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**Part-C: Agenda for final approval of protection settings by PSC Forum for FTCs which have been provisionally allowed by NRLDC/SLDCs**

**C.1. First Time Charging of transmission lines/Bays/Transformer/Reactor etc. by NRLDC in month of February-2025**

- C.1.1 AEE (P), NRPC mentioned that NRLDC has submitted the list of FTCs allowed in month of Feb-2025. The same may be found on NRPC website: <http://164.100.60.165/meetings/prsub.html>
- C.1.2 As per approved procedure of NRPC, utilities have to put up agenda in PSC forum for final approval of settings.
- C.1.3 Following utilities have submitted agenda for approval of settings:
- i. POWERGRID
  - ii. PBTSL
- C.1.4 However, none of the settings have been put up by following utilities:
- i. UPRVUNL
  - ii. RSDCL
  - iii. RRVPNL
  - iv. Sh. Cement
  - v. Juniper Nirjara Energy Private Limited
  - vi. THDC
- C.1.5 UPSLDC representative submitted that there is issue of mail communication. He informed that agenda was sent 07.03.2025. However, mail was not received. Forum requested UPSLDC to share the agenda for approval in next PSC meeting.
- C.1.6 Further, it was highlighted that as per decisions of 54<sup>th</sup> PSC meeting:

*Quote*

***NRLDC shall give provisional protection clearance during FTC on conditional basis subject to submission of agenda in next Protection Sub-Committee meetings (not later than 2nd next PSC meeting). If utility does not put up the agenda within time, further FTC clearance would not be granted to the***

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**concerned.**

*Unquote*

- C.1.7 MS, NRPC stated that utilities should take approval as procedure has been approved by forum only and it is requirement of IEGC 2023.
- C.1.8 He stated that mail may be sent to all concerned members who have not sent the agenda for final approval of protection settings.
- C.1.9 Further, HVPN also submitted the settings for FTC allowed at Haryana SLDC level following elements as below-
- i. 160 MVA, 220/66kV T-1 T/F at 220kV S/Stn Sector-15 II Gurugram
  - ii. 220/66kV, 100 MVA T/F.-1 ( New) at 220kV S/Stn. Harfali
  - iii. 220/66kV, 100 MVA T/F.-2 ( New) at 220kV S/Stn. Harfali.
- C.1.10 The same may also be found on NRPC website: <http://164.100.60.165/meetings/prsub.html>

***Decision of the Forum:***

*After detailed deliberation, following was decided as below-*

- 1) Forum approved the proposed protection settings of POWERGRID, PBTSL & HVPN.*
- 2) Concerned members who have not submitted the agenda were requested to put up agenda timely for approval of settings.*

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### Members of Protection Sub-Committee (FY 24-25)

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6	NRLDC	CGM(SO)	<a href="mailto:somara.lakra@grid-india.in">somara.lakra@grid-india.in</a>
7	NTPC	DGM(OS-NR)	<a href="mailto:rameshsingh@ntpc.co.in">rameshsingh@ntpc.co.in</a> , <a href="mailto:asbhogal@ntpc.co.in">asbhogal@ntpc.co.in</a>
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12	NPCIL*	Director (Finance), SO/F, TSU(E&I)	<a href="mailto:df@npcil.co.in">df@npcil.co.in</a> <a href="mailto:rajeshsharma@npcil.co.in">rajeshsharma@npcil.co.in</a>
13	Delhi SLDC	General Manager	<a href="mailto:gmsldc@delhisldc.org">gmsldc@delhisldc.org</a>
14	Haryana SLDC	Chief Engineer (SO&C)	<a href="mailto:cesocommi@hvpn.org.in">cesocommi@hvpn.org.in</a>
15	Rajasthan SLDC	Chief Engineer (LD)	<a href="mailto:ce.ld@rvpn.co.in">ce.ld@rvpn.co.in</a>
16	Uttar Pradesh SLDC	Superintending Engineer (R&A)	<a href="mailto:sera@upslcd.org">sera@upslcd.org</a>
17	Uttarakhand SLDC	Chief Engineer	<a href="mailto:anupam_singh@ptcul.org">anupam_singh@ptcul.org</a>
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18	Adani Renewable Energy (RJ) limited Rawara	
19	Adani Solar Energy Jaisalmer One Pvt. Ltd._450MW (Solar)	
20	Adani Solar Energy Four Private Limited	
21	Adani Solar Energy Jaisalmer Two Private Limited	
22	Adani Solar Energy Jaisalmer Two Private Limited Project Two	
23	SB ENERGY FOUR PRIVATE LIMITED, Bhadla	
24	SB Energy Six Private Limited, Bhadla	
25	Adani Solar Energy Jodhpur Two Limited, Rawara	
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66	Renew Surya Partap Pvt. Ltd.	
67	Renew Surya Ravi Pvt. Ltd.	
68	Renew Surya Roshni Pvt. Ltd.	
69	Renew Surya Vihan Pvt. Ltd.	
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46	Er. Lalit Kumar	AE	HPPTCL	<a href="mailto:erlalit.tcl@hpmail.in">erlalit.tcl@hpmail.in</a>
47	Neeraj Kumar Verma	AVP	NRSS XXXI (B) Tr. Ltd. (Sekwa)	<a href="mailto:neeraj.verma@energy-sel.com">neeraj.verma@energy-sel.com</a>
48	Manas R. Chand	DGM	GRID INDIA	<a href="mailto:manas@grid-india.in">manas@grid-india.in</a>



# NRSS XXXI (B) Transmission Limited

**Date:** 24.03.2025

**Ref.:** NBTL.TRANS.EXM.025.00.24032025

To,  
The Member Secretary  
Northern Regional Power Committee (NRPC),  
Katwaria Sarai, New Delhi – 110016,

**Sub.:** NRSS XXXI(B) Transmission Ltd. clarification on Non-Compliance Recorded under Agenda item no- A.3.4, A.4.3, A.5.3 & A.6.3 in the 57<sup>th</sup> PCC Minutes of Meeting.

Dear Sir,

With reference to the minutes of the 57<sup>th</sup> PCC meeting held on 20.02.2025 at NRPC Secretariat, Katwaria Sarai, New Delhi via hybrid mode, where non-compliances were recorded against Sekura Energy Limited (Owner of NRSS XXXI(B) Transmission Ltd.) for Agenda item no- A.3.4, A.4.3, A.5.3 & A.6.3.

We would like to bring your attention to the fact that as per the scope of work awarded to NRSS XXXI (B) Transmission Ltd., it has been operating and maintaining below Inter-State transmission elements:

- **400 kV Double Circuit Kurukshetra – Malerkotla transmission line and**
- **400 kV Double Circuit Malerkotla – Amritsar transmission line**

These transmission lines connect to PGCIL Kurukshetra Substation to PGCIL Malerkotla Substation and from there to PGCIL Amritsar Substation respectively. While all line bay & its equipment's at these substations has been operated, maintained and under control of PGCIL.

As the agenda point clearly mentions that **it is applicable for each of the sub-stations at 220 kV and above (132 kV and above in NER) and here in present case PGCIL is the substation owner at all three locations at Kurukshetra, Malerkotla and Amritsar** and also controls all switching operations wherein our transmission lines connect. Therefore, the compliance requirement in terms of performance indices and protection audit etc. is not applicable on NRSS XXXI (B) transmission Ltd. being the owner of transmission lines only.

In terms of the explanation provided above, it is humbly requested to take a note and clarification on behalf of NRSS XXXI (B) Transmission Ltd. w.r.t. compliances sought under Agenda item no- A.3.4, A.4.3, A.5.3 & A.6.3.

If any further clarification is needed from our side, kindly let us know.  
Thanking you & assuring you of our best services always.

**Yours' Faithfully**

**For NRSS XXXI B Transmission Limited**



**Authorized Signatory**



**NRSS XXXI (B) Transmission Limited**

Corporate Identity Number: U40106MH2013PLC342540

Registered Office: 504 & 505, Windsor, 5<sup>th</sup> Floor, Off CST Road, Kalina, Santacruz (E),  
Mumbai - 400098

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Status of action taken on decisions of 57<sup>th</sup> PSC

S.N.	Agenda No.	Agenda	Decision of 57 <sup>th</sup> PSC	Status of action Taken
1	A.3	Submission of protection performance indices along with reason and corrective action taken for indices less than unity to NRPC Secretariat on monthly basis (agenda by NRPC Secretariat)	<p>i. Non-compliant utilities were asked to submit the Protection performance indices timely by 7th day of month element wise along with corrective action taken for indices less than unity.</p> <p>ii. A formal letter may be issued to all RE plants to seek nomination of nodal officer for compliance of protection related data as per IEGC.</p>	<p>i. Status of reporting of indices has been taken as an agenda.</p> <p>ii. Letter dated 26.03.2025 was sent to RE plants regarding nomination of officer related to protection domain.</p>
2	A.4	Annual protection audit plan for FY 2024-25 (agenda by NRPC Secretariat)	Managing Director of J&K, Ladakh may be added in the addressee list of PSC members.	MD, JKPTCL has been added in the addressee list.

## Status of action taken on decisions of 57<sup>th</sup> PSC

3	A.5	Annual protection audit plan for FY 2025-26 (agenda by NRPC Secretariat)	Non-compliant utilities were asked to submit annual audit plan 2025-26 without any further delay. Other utilities were asked to submit report and compliance status within one month of completion of audit.	Some utilities have submitted audit report. Same has been taken as agenda.
4	A.6	Third-party protection audit plan (agenda by NRPC Secretariat)	Forum directed utilities to submit the third-party protection audit plan. Subsequently, the audit reports along with compliance status may be submitted to NRPC Secretariat within one month of completion of audit.	Some utilities have submitted audit report. Same has been taken as agenda.
5	A.8	Tripping of Type-3 filters (5/27) on overload protections at HVDC Rihand & Dadri terminals (agenda by POWERGRID, NR-3)	Forum decided that the agenda may be discussed with detailed analysis and study report in the next PSC meeting. POWERGRID may approach to OEM and may also take expert	Agenda has been taken. POWERGRID has submitted the report.

## Status of action taken on decisions of 57<sup>th</sup> PSC

			opinion from expert or third-party audit vendor to analyse and find out the root cause.	
6	A.9	Un-necessary Trippings on 220KV ANTA-LALSOT Line (agenda by RVPN)	Forum decided to deliberate the agenda in the next PSC meeting. NTPC was requested to submit comment on proposal of RVPN in writing before next PSC.	Agenda was discussed.
7	A.11	Review of Distance Protection requirement Philosophy for Renewable plants having one evacuation line (agenda by Adani Green Energy Limited)	It was decided that protection philosophy may be prepared for RE plants based on deliberation. Accordingly, settings may be implemented after RE protection philosophy	Forum recommended for constitution of Committee under Chairmanship of SE (Protection), NRPC having members from NRLDC, NLDC, POWERGRID, Large RE Developers, RE rich states (Rajasthan & Uttar Pradesh) to prepare a draft protection philosophy for RE plants.
8	A.12	Review of protection setting of Thermal, Hydro, IBR based generations/HVDC and FACTS (agenda by NLDC)	Forum decided to constitute a committee under the chairmanship of SE (Protection), NRPC having members from NRLDC, NLDC, POWERGRID, Adani to	Nomination(s) of officer(s) for constitution of committee to prepare protection philosophy for the HVDC system was asked vide letter

## Status of action taken on decisions of 57<sup>th</sup> PSC

			prepare protection philosophy for the HVDC system.	dated 02.04.2025.
9	A.13	RE complex black start (agenda by NLDC)	Forum directed that a SOP may be prepared by NRPC Secretariat, NRLDC, NLDC, Rajasthan SLDC & Adani Green Energy Limited after having the studies.	Under process at NRPC Secretariat.
10	A.14	Proposed settings of 765 kv lines in Northern Region by committee constituted to review the Overvoltage Protection settings of 400kV and 765kV transmission lines in Northern Region (agenda by NRPC Secretariat)	The settings, finalized by the Committee may be shared with all states of NR and concerned transmission utilities. Forum referred the agenda to the next PSC meeting for final approval.	Agenda was discussed.
11	A.15.	Training on Electrical Protection of Power System for officials of NRPC Constituents (agenda by NRPC Secretariat)	Forum approved the proposal of training on Electrical Protection of Power System for approx. 135 officials of NRPC Constituent members with decided course curriculum. Forum recommended the same	The agenda was discussed in the 53 <sup>rd</sup> TCC and 78 <sup>th</sup> NRPC meeting (held on 16-17 march, 2025) wherein Forum approved the proposal.

## Status of action taken on decisions of 57<sup>th</sup> PSC

			for approval of NRPC Forum.	A letter may be sent to POWERGRID to share the schedule for training.
12	B.6	Corrective action for healthiness of 500kV Mundra-Mahindergarh SPS (agenda by NRLDC)	Forum emphasized the importance of 500kV Mundra-Mahindergarh SPS and its healthiness is important to ensure rectification of issue in SPS system before summer 2025. ADANI is requested to share the report submitted by COMTEL at the earliest. State representatives were also requested to coordinate with the ADANI team and also ensure incorporation of identified revised feeders for load relief in SPS. Desired remedial actions need to be expedited.	Visit by COMTEL engineers at all the sites is completed and COMTEL will submit the report within 10 days.  Agenda was discussed.

## Annexure-A.II

Status of performance indices report of Feb 2025 (Last date of submission 07.03.2025)							
S. No.	Member Utility		Received Status (Yes/No)	Vide mail dated	Remarks	Indices less than 1 (Yes/No)	Reason submitted and corrective action taken
1	PGCIL	Central Government owned Transmission Company	Yes	06.03.2025	NR-1	No	NA
			Yes	23.03.2025	NR-2	No	NA
			Yes	07.03.2025	NR-3	No	NA
2	NTPC	Central Generating Company			Anta		
					Auriya		
			Yes	08.03.2025	Dadri	No	NA
					Koldam		
					Rihand		
					Singrauli		
					Unchahar		
			Yes	03.03.2025	Tanda	No	NA
3	BBMB		Yes	20.03.2025		No	NA
4	THDC		Yes	06.03.2025	Tehri	No	NA
			Yes	24.03.2025	Koteshwar	No	NA
5	SJVN		Yes	04.03.2025	RHPS	No	NA
			Yes	07.03.2025	NJHPS	No	NA
6	NHPC		Yes	06.03.2025		Yes	Yes
7	NPCIL		Yes	11.03.2025	RAPS-A	NO	NA
			Yes	13.03.2025	RAPS-B	NO	NA
					RAPS-C(5&6)	NO	NA
			Yes	06.03.2025	NAPS-1&2	NO	NA
8	DTL	State Transmission Utility	Yes	07.03.2025		Yes	Yes
9	HVPNL		Yes	04.03.2025		Yes	NO
10	RRVNL		Yes	07.03.2025		Yes	Yes
11	UPPTCL		Yes	03.03.2025	Meerut Circle	No	NA
			Yes	07.03.2025	Agra Circle	Yes	Yes
			Yes	04.03.2025	Jhansi Circle	No	NA
			Yes	07.03.2025	Prayagraj Circle	No	NA
			Yes	07.03.2025	Gorakhpur Circle	No	NA
			Yes	07.03.2025	Lucknow Circle	Yes	Yes
			Yes	06.03.2025		No	NA
12	PTCUL	State Generating Company	Yes	06.03.2025		Yes	Yes
13	PSTCL		Yes	04.03.2025	PPS-I	No	NA
14	HPPTCL		Yes	04.03.2025	PPS-III, Bawana	No	NA
15	IPGCL		Yes	22.03.2025	RGTPP (Khedar)	No	NA
16	HPGCL		Yes	04.03.2025	KTPS	No	NA
17	RRVUNL		Yes	03.03.2025	CSCTPP Chhabra	No	NA
			Yes	03.03.2025	RGTPP, Ramgarh	No	NA
			Yes	01.03.2025	Ctpp, Chhabra	No	NA
			Yes	05.03.2025	DCCPP, Dholpur	No	NA
			Yes	07.03.2025	kATPP, Jhalawar	No	NA
			Yes	07.03.2025	STPS Suratgarh	No	NA
			Yes	07.03.2025	SSCTPS Suratgarh	No	NA
			Yes	07.03.2025	Parichha B (220 kV)	No	NA
18	UPRVUNL		Yes	03.03.2025	Parichha C (400 kV)	Yes	Yes
			Yes	04.03.2025	DTPS Anpara	No	NA
			Yes	07.03.2025	Obra B	No	NA
			Yes	07.03.2025	Obra C	No	NA
			Yes	07.03.2025	Harduaganj 400 kV	No	NA
			Yes	07.03.2025	Ghatampur 765 kV	No	NA
			Yes	07.03.2025	Anpara-A&B	No	NA
			Yes	07.03.2025	Panki TPS	No	NA
			Yes	07.03.2025	Jawaharpur	No	NA
19	UJVNL		YES	03.03.2025	Dharasu	No	NA
			YES	03.03.2025	Tiloth	No	NA
			YES	05.03.2025	Khodri	No	NA
			YES	05.03.2025	Chibro	No	NA
			YES	05.03.2025	Vyasi	No	NA
20	HPPCL		YES	07.03.2025	Kashang HEP	No	NA
			YES	05.03.2025	Sawara Kuddu	No	NA
			YES	07.03.2025	Sainj	Yes	No
21	PSPCL	State Generating Company & State owned Distribution Company	Yes	03.03.2025	RSD	No	NA
			Yes	19.03.2025	GGSTPS, Rupnagar	No	NA
			Yes	04.03.2025	GVK Power Goindwal Shahib Ltd.	No	NA
			Yes	06.03.2025	GHSTPS, Lehra Mohabbat	No	NA
22	HPSEBL	Distribution company having Transmission	Yes	05.03.2025	Hamirpur Circle	No	NA

**Status of performance indices report of Feb 2025 (Last date of submission 07.03.2025)**

S. No.	Member Utility		Received Status (Yes/No)	Vide mail dated	Remarks	Indices less than 1 (Yes/No)	Reason submitted and corrective action taken
		connectivity ownership	Yes	18.03.2025	Shimla Circle	No	NA
23	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Yes	01.03.2025		No	NA
24	Aravali Power Company Pvt. Ltd		Yes	05.03.2025		No	NA
25	Apraava Energy Private Limited		Yes	13.03.2025		No	NA
26	Talwandi Sabo Power Ltd.		YES	07.03.2025		No	NA
27	Nabha Power Limited		YES	03.03.2025		No	NA
28	MEIL Anpara Energy Ltd (Anpara-C)		YES	03.03.2025		No	NA
29	Rosa Power Supply Company Ltd		YES	07.03.2025		No	NA
30	Lalitpur Power Generation Company Ltd		YES	06.03.2025		No	NA
31	MEJA Urja Nigam Ltd.		YES	06.03.2025		No	NA
32	Adani Power Rajasthan Limited		YES	06.03.2025		No	NA
33	JSW Energy Ltd. (KWHEP)		YES	25.03.2025		No	NA
34	RENEW Power Pvt Ltd	RE Generating Company having more than 1000 MW installed capacity	YES	26.03.2025			
35	NTPC Green Energy Limited						
36	Azure Power India Pvt. Ltd.						
37	Avaada Energy Private Limited						
38	Adani Green Energy Limited						
39	Tata Power Renewable Energy Ltd.	IPP having less than 1000 MW installed capacity (alphabetical rotaional basis)	Yes	04.03.2025		No	NA
40	UT of J&K	UT of Northern Region					
41	UT of Ladakh						
42	UT of Chandigarh						
	<b>ISTS Transmission Utilities</b>						
43	INDIGRID						
44	POWERLINK						
45	ADHPL		Yes	06.03.2025		No	NA
46	NRSSXXXVI's Northern Region Transmission System	Tata Power					
47	Adani Transmission Limited	AESL	Yes	04.02.2025		No	NA
48	Bikaner Khetri Transmission Limited		Yes	07.03.2025		No	NA
49	Fatehgarh Bhadla Transmission Limited		Yes	07.03.2025		No	NA
50	Powergrid Sikar Transmission Limited	POWERGRID, NR-1	Yes	06.03.2025		No	NA
51	Powergrid Aligarh Sikar Transmission Limited		Yes	06.03.2025		No	NA
52	Powergrid Ajmer Phagi Transmission Limited		Yes	06.03.2025		No	NA
53	Powergrid Bikaner Transmission System Limited		Yes	06.03.2025		No	NA
54	Powergrid Khetri Transmission System Limited		Yes	06.03.2025		No	NA
55	Powergrid Ramgarh Transmission Limited		Yes	06.03.2025		No	NA
56	Powergrid Fatehgarh Transmission Limited		Yes	06.03.2025		No	NA
57	Powergrid Bhadla Transmission Limited		Yes	06.03.2025		No	NA
58	Powergrid Meerut Simbhavli Transmission Limited		Yes	06.03.2025		No	NA
59	Powergrid Kala Amb Transmission Limited		Yes	23.03.2025		No	NA
	<b>State Utilities</b>						
	<b>Uttar Pradesh</b>						
60	Vishnuprayag Hydro Electric Plant (J.P.)		YES	01.03.2025		No	NA
61	Alaknanda Hydro Electric Plant (GVK)		YES	05.03.2025		No	NA
62	Khara Power House (Khara)		YES	03.03.2025		No	NA
63	WUPPTCL		YES	03.03.2025		No	NA
64	SEUPPTCL		YES	07.03.2025		No	NA
65	ATSCL	ADANI	Yes	07.03.2025		No	NA
66	GTL	ADANI	Yes	03.03.2025		No	NA
67	HPTSL	ADANI	Yes	07.03.2025		No	NA
68	MTSCL	ADANI	Yes	07.03.2025		No	NA
69	OCBTL	ADANI	Yes	07.03.2025		No	NA
	<b>Rajasthan</b>						
70	220 KV Dhorimanna-Rajwest Line	JSW					
71	400 KV ANTA - CHABRA II	ADANI					
72	Barsingsar Plant	NLC					

**RE Utilities**

73	ABC Renewable Pvt. Ltd						
74	ACME Heeragarh powertech Pvt. Ltd						
75	ACME Chittorgarh Solar Energy Pvt Ltd						
76	Adani Hybrid Energy Jaisalmer One Ltd.						
77	Adani Hybrid Energy Jaisalmer Two Ltd.						
78	Adani Hybrid Energy Jaisalmer Three Ltd.						
79	Adani Hybrid Energy Jaisalmer Four Ltd.						
80	Adani Renewable Energy (RJ) limited Rawara						



**Status of performance indices report of Feb 2025 (Last date of submission 07.03.2025)**

S. No.	Member Utility		Received Status (Yes/No)	Vide mail dated	Remarks	Indices less than 1 (Yes/No)	Reason submitted and corrective action taken
81	Adani Solar Energy Jaisalmer One Pvt. Ltd._450MW (Solar)						
82	Adani Solar Enegry Four Private Limited						
83	Adani Solar Energy Jaisalmer Two Private Limited						
84	Project Two						
85	SB ENERGY FOUR PRIVATE LIMITED, Bhadla						
86	SB Energy Six Private Limited, Bhadla						
87	Adani Solar Enegry Jodhpur Two Limited, Rawara						
88	Adept Renewable Technologies Pvt. Ltd.						
89	Adani Solar Energy RJ Two Pvt. Ltd. (Devikot)						
90	Adani Solar Energy RJ Two Pvt. Ltd. (Phalodi)						
91	Adani Green Energy 19 Limited						
92	Altra Xergi Pvt. Ltd.						
93	AMP Energy Green Five Pvt. Ltd.						
94	AMP Energy Green Six Pvt. Ltd.						
95	Amplus Ages Private Limited						
96	Avaada RJHN_ 240MW	Avaada	yes	07.03.2025		No	NA
97	Avaada sunce energy Pvt limited		yes	07.03.2025		No	NA
98	Avaada Sunrays Pvt. Ltd.		yes	07.03.2025		No	NA
99	Avaada Sustainable RJ Pvt. Ltd.		yes	07.03.2025		No	NA
100	Ayana Renewable Power Three Private Limited						
101	Ayaana Renewable Power One Pvt. Ltd.						
102	Azure Power Forty One Pvt limited						
103	Azure Power Forty Three Pvt. Ltd._ RSS						
104	Azure Maple Pvt. Ltd.						
105	AZURE POWER INDIA Pvt. Ltd., Bhadla						
106	Azure Power Thirty Four Pvt. Ltd.						
107	Clean Solar Power (Jodhpur) Pvt. Ltd.						
108	Clean Solar Power (Bhadla) Pvt. Ltd						
109	Eden Renewable Cite Private Limited						
110	Grian Energy private limited						
111	Mahindra Renewable Private Limited						
112	Mega Surya Urja Pvt. Ltd. (MSUPL)						
113	AURAIYA Solar						
114	DADRI SOLAR						
115	SINGRAULI SOLAR						
116	Anta Solar						
117	Unchahar Solar						
118	NTPC Devikot Solar plant_240MW						
119	NTPC Kolayat_400kV						
120	Nedan Solar NTPC						
121	NTPC Nokhra_300MW						
122	One Volt energy Pvt. Ltd.						
123	ReNew Solar Energy (Jharkhand Three) Private Limited						
124	RENEW SOLAR POWER Pvt. Ltd. Bhadla						
125	ReNew Solar Urja Private Limited						
126	Renew Sun Bright Pvt. Ltd. (RSBPL)						
127	Renew Sun Waves Private Limited (RSEJ4L)						
128	Renew Surya Partap Pvt. Ltd.						
129	Renew Surya Ravi Pvt. Ltd.						
130	Renew Surya Roshni Pvt. Ltd.						
131	Renew Surya Vihan Pvt. Ltd.						
132	Renew Surya Ayaan Pvt. Ltd.						
133	RENEW SOLAR POWER Pvt. Ltd. Bikaner						
134	Rising Sun Energy-K Pvt. Ltd.						
135	Serentica Renewables India 4 Private Limited						
136	Tata Power Green Energy Ltd. (TPGEL)						
137	Tata Power Renewable Energy Ltd. (TPREL)						
138	Thar Surya Pvt. Ltd.						
139	TP Surya Pvt. Ltd.						
140	Banderwala Solar Plant TP Surya Ltd.						
141	TRANSITION ENERGY SERVICES PRIVATE LIMITED						
142	Transition Green Energy Private Limited						
143	Transition Sustainable Energy Services Private Limited						

**Format No.-PI-01**  
**Reporting of performance indices for protection system**  
**(for elements connected at 220 kV and above)**  
**Name of Utility:** Delhi Transco Ltd  
**Month:** February 2025

S. No.	Substation	Unit (SPS/Line/ICT/GT etc)	Nc	Nf	Nu	Ni	Dependability Index ( $D=Nc/(Nc+Nf)$ )	Security Index ( $S=Nc/(Nc+Nu)$ )	Reliability Index ( $R=Nc/(Nc+Ni)$ )	Remedial Action Taken (if applicable)
1	400kV Mundka	160MVA Transformer-II (220/66kV)	1	0	0	0	1	1	1	
2	220kV Rohini-II	160MVA Transformer-II (220/66kV)	0	0	1	1	0	0	0	Tripping occurred on differential protection. While analysing the fault, insulation resistance value of CT control cable was found poor. So, CT control cable was replaced and fault was rectified.
		220kV Bawana-2 Ckt-2	1	0	0	0	1	1	1	
3	220kV Sarita Vihar	220kV BTPS Ckt-1	1	0	0	0	1	1	1	
4	220kV Okhla	100MVA Transformer-III (220/33kV)	1	0	0	0	1	1	1	
		100MVA Transformer-IV (220/33kV)	1	0	0	0	1	1	1	
		100MVA Transformer-V (220/33kV)	1	0	0	0	1	1	1	
		220kV Tuglakabad Ckt-1	1	0	0	0	1	1	1	
		220kV Tuglakabad Ckt-2	1	0	0	0	1	1	1	
5	220kV Narela	100MVA Transformer-I (220/66kV)	1	0	0	0	1	1	1	
		100MVA Transformer-II (220/66kV)	1	0	0	0	1	1	1	
		100MVA Transformer-III (220/66kV)	1	0	0	0	1	1	1	
		220kV DSIDC Ckt-1	1	0	0	0	1	1	1	
		220kV DSIDC Ckt-2	1	0	0	0	1	1	1	
		220kV Mandola Ckt-1	1	0	0	0	1	1	1	
		220kV Mandola Ckt-2	1	0	0	0	1	1	1	
		220kV Panipat Ckt-1	1	0	0	0	1	1	1	
		220kV Panipat Ckt-2	1	0	0	0	1	1	1	
		220kV Panipat Ckt-3	3	0	0	0	1	1	1	
		220kV Rohtak Road Ckt-1	1	0	0	0	1	1	1	
		220kV Rohtak Road Ckt-2	1	0	0	0	1	1	1	
6	400kV Harsh Vihar	315MVA ICT-1	1	0	0	0	1	1	1	
7	400kV Bawana	220kV Rohini-II Ckt-2	1	0	0	0	1	1	1	

S. No.	Substation	Unit (SPS/Line/ICT/GT etc)	Nc	Nf	Nu	Ni	Dependability Index ( $D=Nc/(Nc+Nf)$ )	Security Index ( $S=Nc/(Nc+Nu)$ )	Reliability Index ( $R=Nc/(Nc+Ni)$ )	Remedial Action Taken (if applicable)
8	220kV Patparganj	220kV Geeta Colony Ckt-1	1	0	0	0	1	1	1	
		220kV Geeta Colony Ckt-2	1	0	0	0	1	1	1	
9	220kV Geeta Colony	220kV Patparganj Ckt-2	1	0	0	0	1	1	1	
10	220kV BTPS	220kV Sarita Vihar Ckt-1	1	0	0	0	1	1	1	
		220kV Ballabgarh Ckt-2	1	0	0	0	1	1	1	
11	220kV Gopalpur	220kV Mandola Ckt-2	1	0	0	0	1	1	1	
12	220kV South of Wazirabad	220kV Geeta Colony Ckt-II	1	0	0	0	1	1	1	
13	220kV Rajghat	100MVA Transformer-I (220/33kV)	1	0	0	0	1	1	1	

*Justification for less than one index may be attached separately.*

*Nc is the number of correct operations at internal power system faults*

*Nf is the number of failures to operate at internal power system faults*

*Nu is the number of unwanted operations*

*Ni is the number of incorrect operations and is the sum of Nf and Nu*



**H P POWER TRANSMISSION CORPORATION LIMITED.**  
(A State Government Undertaking)  
DGM (Protection & Communication), Chowki-Jamwalan, Hamirpur (HP).  
Email: [dgmprot.tel@hpmail.in](mailto:dgmprot.tel@hpmail.in)

No: HPPTCL/DGM (P&C)/NRPC/2024-25- **786-88**

Dated:- **06-03-2025**

To

**The Superintending Engineer (Operation),  
Northern Regional Power Committee,  
18-A, Shaheed Jeet Singh Marg,  
Katwaria Sarai, New Delhi-110016.  
Email: [seo-nrpc@nic.in](mailto:seo-nrpc@nic.in)**


**Subject: Performance indices for protection system of HPPTCL Substations and Lines for the month of February, 2025.**

Sir,

With reference to the subject cited above, as per 48<sup>th</sup> protection sub-committee meeting, performance indices for protection system of HPPTCL for elements connected at 220 kV and above voltage level for the month of February, 2025 is enclosed herewith for your reference please.


Yours faithfully,

DA: As above

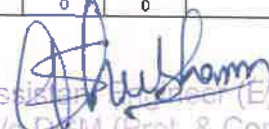
  
**Sr. Manager (E)  
O/o DGM (Prot. & Comm.),  
HPPTCL, Chowki Jamwalan,  
Hamirpur (HP).**

Copy to:

1. The General Manager (Projects), HPPTCL, Himfed Bhawan, Shimla-05.
2. The Superintending Engineer, HPSLDC, Totu, Shimla-04.

  
**Sr. Manager (E)  
O/o DGM (Prot. & Comm.),  
HPPTCL, Chowki Jamwalan,  
Hamirpur (HP).**


Report of performance indices for protection System for Feb, 2025 (for elements connected at 220 kV and above)											
Sr. No.	Name of Sub-Station	Unit (SPS/Line/ICT/GT/ etc.)	Nc	Nf	Nu	Ni	Dependability Index (D) D= Nc/Nc+Nf	Security Index (S) S=Nc/Nc+ Nu	Reliability Index (R) R=Nc/Nc+N i	Brief Description of Tripping	
1	400/220/66 KV Wangtoo Substation	400 kV Wangtoo - karcham Ckt I	0	0	0	0	0	0	0	Nil	
		400 kV Wangtoo - karcham Ckt II	0	0	0	0	0	0	0		0
		400 kV Wangtoo - kala Amb Ckt	2	0	0	0	1	1	1	1	1) Dated :14.02.2025 Tripped due to Phase to Ground fault 2) Dated :18.02.2025 Trpping on wangtoo-Kala Amb ckt occurred due to transient fault on Wangtoo-shorang ckt (which autoreclosed Itself as fault was of transient category) Wangtoo Kala Amb main breaker is faulty and is out of service since long.This ckt is enrgised by bus -2 through tie breaker and main breaker of wangtoo-Shorang ckt.
		400 kV Wangtoo - Sorang Ckt	0	0	0	0	0	0	0	0	Nil
		ICT I (315 MVA, 400/220/33 kV)	0	0	0	0	0	0	0	0	
		ICT II (315 MVA, 400/220/33 kV)	0	0	0	0	0	0	0	0	
		220 kV Wangtoo - Bhaba - Kunihar Ckt	1	0	0	0	1	1	1	1	Triped due to Phase to Ground Fault
		220 kV Wangtoo - Kashang Ckt	0	0	0	0	0	0	0	0	Nil
		220 kV Wangtoo-Bhoktoo	0	0	0	0	0	0	0	0	
		Trafo I (80/100 MVA, 220/66/33 kV)	0	0	0	0	0	0	0	0	
		Trafo II (80/100 MVA, 220/66/33 kV)	0	0	0	0	0	0	0	0	
2	400/220/33kV GIS Lahal, Distt Chamba	400 kV Lahal Rajera ckt. 1	0	0	0	0	0	0	0	Nil	
		400 kV Lahal Rajera ckt. II	0	0	0	0	0	0	0		0
		ICT -I (315 MVA, 400/220/33 kV )	0	0	0	0	0	0	0		0
		ICT -2(315 MVA, 400/220/33 kV )	0	0	0	0	0	0	0		0
		105 MVA Spare Transformer (400/220/33 kV)	0	0	0	0	0	0	0		0
		220 kV Lahal -Budhil Ckt. 1	0	0	0	0	0	0	0		0
		220 kV Lahal Bajoli Holi Ckt. 1	0	0	0	0	0	0	0		0
		220 kV Lahal Bajoli Holi Ckt. 2	0	0	0	0	0	0	0		0
		220/33 kV Transformer	0	0	0	0	0	0	0		0
		ICT-1 (315 MVA, 400/220/33 kV)	0	0	0	0	0	0	0		0
ICT-2 (315 MVA, 400/220/33 kV)	0	0	0	0	0	0	0	0			
3	400/220/66kV GIS S/Stn GUMMA	400kV Bus-1	0	0	0	0	0	0	0	Nil	
		400kV Bus-2	0	0	0	0	0	0	0		0
		400kV Gumma-Panchkula Ckt-I	0	0	0	0	0	0	0		0
		400kV Gumma-Panchkula Ckt-II	0	0	0	0	0	0	0		0
		400kV Gumma-Jhakri Ckt-I	0	0	0	0	0	0	0		0
		400kV Gumma-Jhakri Ckt-II	0	0	0	0	0	0	0		0
		220kV Gumma-Hatkoti Ckt-I	0	0	0	0	0	0	0		0
		220kV Gumma-Hatkoti Ckt-II	0	0	0	0	0	0	0		0

  
 Assistant Engineer (E)  
 O/o DGM (Prot. & Comm.)  
 HPPTCL, Hamirpur (H.P.)

4	220kV Switching S/Stn Hatkoti	220kV Hatkoti-Gumma Ckt-I	0	0	0	0	0	0	0	Nil
		220kV Hatkoti-Gumma Ckt-II	0	0	0	0	0	0	0	
		220kV Hatkoti-Narwar Mori Ckt-I	0	0	0	0	0	0	0	
		220kV Hatkoti-Snail Ckt	0	0	0	0	0	0	0	
		220kV Hatkoti-Sunda Ckt-I	0	0	0	0	0	0	0	
		220kV Hatkoti-Sunda Ckt-II	0	0	0	0	0	0	0	
5	220/132/66 kV, GIS Substation Sunda	220 kV Sunda-Hatkoti Ckt-1	0	0	0	0	0	0	0	Nil
		220 kV Sunda-Hatkoti Ckt-2	0	0	0	0	0	0	0	
		220/132 kV, ICT-1	0	0	0	0	0	0	0	
		220/132 kV, ICT-2	0	0	0	0	0	0	0	
		220/66 kV Transformer	0	0	0	0	0	0	0	
6	220/33 kV GIS S/Stn. Phozal	220 kV Phojal to Nalagarh(Bay 205)	2	0	0	0	1	1	1	1. Tripped due to Phase to Phase Fault(Y-B Phase) 2. Tripped due to Three Phase Fault
		220 kV Phojal to ADHPL(Bay 201)	0	0	0	0	0	0	0	Nil
		220/33kV, 80/100 MVA Transformer Bank	0	0	0	0	0	0	0	Nil
7	220/132/33kV Charor Substation	ICT - 220/132 kV Transformer	0	0	0	0	0	0	0	Nil
		220/33 kV Power Transformer	0	0	0	0	0	0	0	
		220 kV Charor-Banala Ckt-1	0	0	0	0	0	0	0	
		220 kV Charor-Banala Ckt-2	0	0	0	0	0	0	0	
8	220/33 kV GIS S/Stn. Karian	220 KV Karian - Rajera Transmission Line	1	0	0	0	1	1	1	Tripped due to Ph-Ph fault (Y-B)
		220 kV Karian-Mazra Ckt.	0	0	0	0	0	0	0	Nil
		220/33 kV Power Transformer	0	0	0	0	0	0	0	
9	220/132 kV GIS S/Stn. Mazra	220/132/33 kV, 80/100 MVA ICT-1	0	0	1	1	0	0	0	There was a Single line to ground fault (Y-N) on 220KV Mazra-Rajera Line& initiated tripping to Y-ph only and LBB initiation signal to LBB relay (REB670). AR cycle started in BCU. In the meantime, fault loop got changed from Y-N fault to YB-N Fault. The fault current of B-phase and LBB initiation from Y-phase lead to operation of LBB relay.
		220/132/33 kV, 80/100 MVA ICT-2	0	0	1	1	0	0	0	
		220 kV Mazra - Rajera Ckt.	1	0	0	0	1	1	1	
		220 kV Mazra-Karian Ckt.	0	0	1	1	0	0	0	
10	220/132 kV GIS S/stn. Dehan	220 kV Dehan-Tikkar Ckt. 1	1	0	0	0	1	1	1	Tripped due to Overvoltage. Overvoltage tripping was enabled in Main 2 Relay. As a corrective action, the same is disabled now.
		220 kV Dehan- Tikkar Ckt. 2	0	0	0	0	0	0	0	Nil
		220/132/33 kV, 60/80/100 MVA ICT-1	0	0	0	0	0	0	0	Nil
		220/132/33 kV, 60/80/100 MVA ICT-2	0	0	0	0	0	0	0	Nil

  
 Associate Engineer (E)  
 O&VDGM (Prot. & Comm.)  
 HPPTCL, Hamirpur (H.P.)

11	220/66/22 kV GIS S/stn. Bhoktoo	220/66 kV, 25/31.5 MVA Transformer	0	0	0	0	0	0	0	Nil
		220 kV Bhoktoo-Kasheng-Ckt.	1	0	0	0	1	1	1	Line Tripped due to Three Phase fault
		220 kV Bhoktoo-Wangtoo Ckt.	0	0	0	0	0	0	0	Nil
12	220/132/33 kV AIS S/stn. Kale Amb	220 kV Andheri-PKATL Ckt.1	0	0	0	0	0	0	0	Nil
		220 kV Andheri-PKATL Ckt.2	0	0	0	0	0	0	0	
		3x53.33/66.66 MVA (223/132/33 kV Auto Transformer	0	0	0	0	0	0	0	
13	220/66 kV GIS S/stn. Heiling	220/66 kV, 80/100 MVA Transformer	0	0	0	0	0	0	0	Nil
		220kV Heiling-Lahal Ckt.	1	0	0	0	1	1	1	220kV Heiling-Lahal transmission line (Bay-203) tripped due to CVT fuse failure of Y-phase at 4:37 hrs and supply restored at 14:30 hrs
		220 kV Heiling-Moli Ckt.	0	0	0	0	0	0	0	Nil

  
 Assistant Engineer (E)  
 O/o DGM (Prot. & Comm.)  
 HPPTCL, Hamirpur (H.P.)

## Format No.-PI-01

Reporting of performance indices for protection system  
(for elements connected at 220 kV and above)Name of Utility: **HVPNL**Month: **February 2025**

S.N.	Substation	Unit (SPS/Line/ICT/GT/ etc)	Nc	Nf	Nu	Ni	Dependability Index (D=Nc/Nc+Nf)	Security Index (S=Nc/Nc+Nu)	Reliability Index (R=Nc/Nc+Ni)
<b>M&amp;P Division, HVPNL, Hisar</b>									
<b>1</b>	220 KV S/Stn. IA Hisar	220 KV IA Hisar – PGCIL Ckt. 01	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2</b>	220 KV S/Stn. IA Hisar	220 KV IA Hisar – PGCIL Ckt. 02	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>3</b>	220 KV S/Stn. IA Hisar	220 KV IA Hisar – BBMB Ckt. 01	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>4</b>	220 KV S/Stn. IA Hisar	220 KV IA Hisar – BBMB Ckt. 02	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>M&amp;P Division, HVPNL, Gurugram</b>									
<b>1</b>	220 KV B/Pur	220 KV B/Pur-Palli Ckt-1	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2</b>	220KV Sector-107 Gurugram	220/33KV 100MVA T-1	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>3</b>	220KV Sector-107 Gurugram	220/33KV 100MVA T-2	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>4</b>	400KV Daultabad	400KV Daultabad-Sector-72 Gurugram PG Ckt-1	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
<b>5</b>	400KV Daultabad	400KV Daultabad-Sec-72 Gurugram PG Ckt-1	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>6</b>	400KV Daultabad	400KV Daultabad-Sec-72 Gurugram_PG Ckt-2	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>7</b>	400KV Daultabad	400KV Daultabad- Jhajjar (APCL) Ckt-1	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>8</b>	400KV Daultabad	400KV Daultabad- Jhajjar (APCL) Ckt-2	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>9</b>	400KV Daultabad	400/220KV 315MVA ICT-1	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>10</b>	400KV Daultabad	400/220KV 315MVA ICT-2	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>11</b>	400KV Daultabad	400/220KV 315MVA ICT-3	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>



<b>12</b>	400KV Daultabad	400/220KV 315MVA ICT-4	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>M&amp;P Division, HVPNL, Dhulkote</b>									
<b>1</b>	220 KV Sector-32 Panchkula	220 KV Sector-32 Panchkula-PKL_PG Ckt-2	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2</b>	220 KV Pinjore	220 KV Panchkula_ PG- Pinjore Ckt-2 (23.02.2025 & 25.02.2025)	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>M&amp;P Division, HVPNL, Rohtak</b>									
<b>1</b>	220KV GIS Rai. XEN TS Panipat	220kv Sonapat_PG - GIS Rai Ckt.-2	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>2</b>	220KV PTPS Panipat XEN TS Panipat	220kv BBMB Sewah Panipat - Panipat Ckt.-2	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
<b>3</b>	220kv PTPS XEN TS Panipat	220kv BBMB Sewah - PTPS Ckt.-3	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>

**Note: Justification for less than one index may be attached separately.**

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


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

Nu is the number of unwanted operations

Ni is the number of incorrect operations and is the sum of Nf and Nu.

Sr. No.	Dated	Divn.	Name of sub/station	Tripping /Break down element	Length of line	Duration of Tripping /Break down			Relays Operated along with Relay Data		Reasons of Tripping /break-down	Area Affected if any	Analysis of Tripping/Break down by designated committee.	Remarks if any.
						From (Hrs.)	To (Hrs.)	Total (Hrs.)	This end (Reporting Substation)	Other end (in case of line)				
1	21.02.25	XEN 400KV Daultabad	400KV Daultabad	400KV Daultabad-Sector-72 Gurugram_PG Ckt-1	20.2Km	21:32	22:52	01:20	DPR, Z-1, D=8.191 Km, Y-ph, Master 86 relay	Not tripped	Transient fault	NIL	A fault was reported on 400kV Daultabad-Sec 72 PG Gurugram ckt 1 line (Kite thread & flag cloth were wrapped on conductor during bad weather condition between TL 54 & 55)	

													A line tripped from Sector-72 Gurugram _PG end in Zone 1 C phase and AR operated successfully after 1 sec. But CB at Daultabad end didn't trip due to contractor burnt & all sources tripped from remote end including ICTs.	
2	23.02.25	XEN TS Madan pur	220kV Pinjore	220kV Panch kula _PG - Pinjore Ckt.-2	40.70 KM	19:19	20:1 3	00: 54	DT received	Not tripped	PLCC mal operation	Nil	1. The PLCC cabinet was checked found healthy. Checked the event logs and observed many noise alarms indicating noise signals in the frequency band which might be the reason for the generation of false DT command. 2. Carrier team advised the PGCIL 400 KV Barwala staff to change the frequency band for this circuit and for the time being the links of DT command were made out of circuit to avoid un-necessary tripping.	
3	25.02.25	XEN TS Madan pur	220kV Pinjore	220kV Panch kula _PG - Pinjore Ckt.-2	40.70 KM	11:33	12:1 0	00: 37	DT received	Not tripped	PLCC mal operation	Nil	1. The PLCC cabinet was checked found healthy. Checked the event logs and observed many noise alarms indicating noise signals in the frequency band which might be the reason for the generation of false DT command. 2. Carrier team advised the PGCIL 400 KV Barwala staff to change the frequency band for this circuit and for the time being the links of DT command were made out of circuit to avoid un-necessary tripping.	


OFFICE OF THE SUPERINTENDING ENGINEER ELECTRICITY TEST & COMMISSIONING CIRCLE UP POWER TRANSMISSION CORPORATION LTD. 3 <sup>RD</sup> FLOOR, PAARESHAN BHAWAN, VIBHUTI KHAND, LUCKNOW-226010 E-mail- setnclko@upptcl.org		कार्यालय अधीक्षण अभियन्ता विद्युत परीक्षण एवं परिचालन मण्डल, उ०प्र० पावर ट्रान्समिशन कारपोरेशन लिमिटेड, तृतीय तल, पारेषण भवन, विभूति खण्ड, लखनऊ-226010 E-mail- setnclko@upptcl.org
पत्रांक/No. : T- 54 वि०परी० एवं परि० मं०(ल०)/ETCC(L)/PPI /दिनांक/Dated: 01.03.2025		

**Subject: - Protection Performance Index FMO Feb '2025 Under Transmission Central.**

Director (Operation) , UPPTCL,  
Shakti Bhawan Extension ,  
Lucknow.

Kindly find enclosed herewith the Protection Performances Indices Index for the month of February '2025 & Annexure for Index less than one under Transmission Central for your kind information and necessary action.

**Encl: -As above.**


  
( Amrendra Kumar )  
SUPERINTENDING ENGINEER  
o/c

**NO: T-54 ET&CC (L)/PPI of date: 01.03.25**

Copy forwarded along with enclosure to the following for information and necessary action: -

- 1- Chief Engineer, PSO, SLDC , Lucknow.
- 2- Chief Engineer (TC), UPPTCL ,Pareshan Bhawan, Gomti Nagar, Lucknow.
- 3- Superintending Engineer, SERA, SLDC, Lucknow.

**Encl: -As above.**

  
( Amrendra Kumar )  
SUPERINTENDING ENGINEER  
o/c

**Reporting of performance indices for protection system**  
(for elements connected at 220 KV and above)  
**Name of Utility : ET&CC, UPPTCL LUCKNOW**  
**Month : Feb-2025**  
**ET&CD- SULTANPUR**

S.No.	Substation	Unit (SPS/Line/ICT/GT etc	Nc	Nf	Nu	Ni	Dependability Index (D)	Security Index(S)	Reliability Index(R)	Remarks
01	NIL	NIL	NA	NA	NA	NA	NA	NA	NA	

**ET&CD- SAROJINI NAGAR**

S.No.	Substation	Unit (SPS/Line/ICT/GT etc	Nc	Nf	Nu	Ni	Dependability Index (D)	Security Index(S)	Reliability Index(R)	Remarks
1	765KV S/s Unnao	765kv Unnao-Anpara C line	1	0	0	0	1	1	1	
2	400KV /s Unnao	400kv Unnao-Agra line	3	0	0	0	1	1	1	
3	400KV /s Unnao	400kv Unnao-Bareilly-I line	9	0	0	0	1	1	1	
4	400KV /s Unnao	400kv Unnao-Bareilly-2 line	4	0	0	0	1	1	1	
5	400KV /s Unnao	220kv Unnao-Phoolbagh-I line	2	0	0	0	1	1	1	
6	400KV S/s Sarojini Nagar, Lucknow	400kv Sarojini Nagar- Singrauli line	1	0	0	0	1	1	1	
7	220KV S/s Sarojini Nagar, Lucknow	220kv Sarojini Nagar- Gomti Nagar line	1	0	0	0	1	1	1	
8	220/33KV S/s Dahi Chauki, Unnao	60MVA Transformer-1	1	0	0	0	1	1	1	
9	220/33KV S/s Dahi Chauki, Unnao	60MVA Transformer-2	1	0	0	0	1	1	1	

**ET&CD- SHAHJAHANPUR**

S.No.	Substation	Unit (SPS/Line/ICT/GT etc	Nc	Nf	Nu	Ni	Dependability Index (D)	Security Index(S)	Reliability Index(R)	Remarks
01	220KV S/s Shahjahanpur	220KV Shahjahanpur to Faridpur Line	1	0	0	0	1.00	1.00	1.00	

**ET&CD- LUCKNOW**

S.No.	Substation	Unit (SPS/Line/ICT/GT etc	Nc	Nf	Nu	Ni	Dependability Index (D)	Security Index(S)	Reliability Index(R)	Remarks
1	220 KV S/S Gomti nagar, Lucknow	220 KV Gomti nagar-Sarojimin nagar line	1	0	0	0	1	1	1	
2	220 KV S/S Kanpur road, Lucknow	220/33 KV 60MVA T/F-1	1	0	0	0	1	1	1	
3		220/33 KV 60MVA T/F-2	1	0	0	0	1	1	1	



**ET&CD- BAREILLY**

S.N.	Sub station	Unit (SPS/LINE/ICT/GT etc)	Nc	Nf	Nu	Ni	Dependability index D	Security index S	Reliability index R	Remarks
1	400 KV Bareilly	400 KV Unnao Ckt-1	6	0	1	1	1	0.86	0.86	
		400 KV PGCIL Ckt-2	0	0	1	1	0	0	0	
		315 MVA ICT-1	0	0	1	1	0	0	0	
		400 KV Bus coupler	0	0	1	1	0	0	0	
		400 KV Unnao Ckt-2	4	0	0	0	1	1	1	
		220 KV CB Ganj-1	4	0	0	0	1	1	1	
		220 KV Pantnagar	2	0	0	0	1	1	1	
		220 KV Faridpur	1	0	0	0	1	1	1	
		220 KV Amariya-2	1	0	0	0	1	1	1	
		220 KV CB Ganj-2	2	0	0	0	1	1	1	
2	220 KV Amariya	220 KV Bareilly-2	1	0	0	0	1	1	1	
3	220KV C.B.GANJ	220KV BAREILLY I	3	0	0	0	1	1	1	
4	220KV C.B.GANJ	220KV BAREILLY II	1	0	0	0	1	1	1	
5	220KV Faridpur	220KV SHAJHANPUR	1	0	0	0	1	1	1	
6	220KV Faridpur	220KV BAREILLY	1	0	0	0	1	1	1	
7	220KV GIS BADAUN ROAD BLY	220 KV OCBTL	2	0	0	0	1	1	1	
8	220KV DATAGANJ	OCBTL II	1	0	0	0	1	1	1	

**ET&CD- GONDA**

S.No.	Substation	Unit (SPS/Line/ICT/GT etc)	Nc	Nf	Nu	Ni	Dependability Index (D)	Security Index(S)	Reliability Index(R)	Remarks
01	NIL	NIL	NA	NA	NA	NA	NA	NA	NA	
		<b>GRAND TOTAL</b>	<b>57</b>	<b>0</b>	<b>4</b>	<b>4</b>				

PERFORMANCE INDICES FORM TC ZONE UPPTCL	Dependability Index (D) $D = Nc / (Nc + Nf)$	1
	Security Index (S) $S = Nc / (Nc + Nu)$	0.93
	Reliability Index $R = Nc / (Nc + Ni)$	0.93

Nc is the number of correct operation at internal power system faults.

Nf is the number of failures of operation at internal power system faults.

Nu is the number of unwanted operations.

Ni is the number of incorrect operations and is the sum of Nf and Nu



(Amrendra Kumar)  
Superintending Engineer

S.No.	Substation	Element name	Date & Time of the tripping	Categorization (F/U) F = Failures to operate at internal power system faults U = Unwanted operations	Reason for failures/Unwanted operation	Corrective action taken/ to be taken
1	400 KV Bareilly	400 KV Bus coupler	19.02.2025 15:24	U		
	400 KV Bareilly	315 MVA ICT-1	19.02.2025 15:24	U	1) At 15:24 hrs LBB function of 315 MVA ICT-3 operated during testing of Backup relay and elements connected to Bus-1 tripped.	In future during testing Bus isolator open condition and LBB/ Bus Bar protection should be in disabled condition will be ensured.
	400 KV Bareilly	400 KV Unnao-1	19.02.2025 15:24	U	2) ICT-3 400 KV Bus-1 Isolator was closed. It could not be open during shutdown as it was stucked due to mechanical fault.	
	400 KV Bareilly	400 KV PGCIL-2	19.02.2025 15:24	U		



## Reporting of Performance Indices for NHPC Power Stations In NR-Region Month-FEB'25

[illegible]

S.No.	Substation	Element name	Date & Time of the tripping	Categorization (F/U) F = Failures to operate at internal power system faults U = Unwanted operations	Reason for failures/Unwanted operation	Corrective action taken/ to be taken
1	400KV PARICHHA	400KV PARICHHA-ORAI CIRCUIT 1	2/26/2025 2:35	U	During a single-phase transient fault, Auto reclose lockout shot recorded at Parichha end because of continuously persisting COS (carrier out of service) alarm.	1.Transmission T&C wing has checked carrier signal after emergency shutdown on 28/02/2025 & made healthy but COS alarm persisting at parichha end. 2.ETD orai has consulted OEM for resolution of teleprotection panel issue & planned to check and rectify the issue in their panel in co-ordination with microwave wing.



## **Reason for Performance Indices less than Unity- February 2025 (RVPN)**

### **Case-1 440/ 220 kV, 315 MVA ICT-I at 400KV GSS Jodhpur on 05.02.2025**

No. of Unwanted operation – 1

#### **Reason of unwanted operation –**

Wrong operation of differential relay.

#### **Corrective Action taken – Partial**

Differential relay defective and kept out of service, shall be replaced soon.

### **Case-2 400 KV 252B C.B. - Bikaner line & 50 MVAR Reactor III at 400 KV GSS Merta on 22.02.2025**

No. of Unwanted operation – 1

#### **Reason of unwanted operation –**

400KV Merta- Bikaner line & 50 MVAR Reactor III tripped during DC leakage detection of same dia of 400KV Main C.B. 252A relay panel. 400KV Bikaner line tripped only from Merta end, Line remained Charged from Bikaner end

#### **Corrective Action taken – YES**

Employees were asked to work carefully.

### **Case-3 400/220KV, 500MVA ICT-I Main CB Bay No. 415, 400/220KV, 500MVA ICT-III Main CB Bay No. 424, 400KV Renew-I line TIE CB Bay No. 432, 400KV Renew-II line TIE CB Bay No. 435, 400KV Jaisalmer-Barmer line TIE CB at 400 KV GSS Jaisalmer-2 (Bhensara) on 22.02.2025**

No. of Unwanted operation – 5

#### **Reason of unwanted operation –**

LBB operated during Testing & wiring work in C&R panel, command of LBB trip issued.

#### **Corrective Action taken – YES**

Employees were asked to work carefully.

### **Case- 40652A MAIN BAY - 125 MVAR BUS REACTOR NO 1 at 400KV MERTA on 26.02.2025**

No. of Unwanted operation – 1

#### **Reason of unwanted operation –**

Y- Phase pole of CB stuck.

#### **Corrective Action taken – YES**

CB problem rectified.

**Case-5 220KV Chhonkarwara -Mandawar Line at 220 KV GSS Chhonkarwara on 14.02.2025**

No. of Unwanted operation – 1

**Reason of unwanted operation –**

Dist. Protection Operated while revising setting of M1 and M2 Relays.

**Corrective Action taken – YES**

Employees were asked to work carefully.

**Case-6 220 KV Lalsot-ANTA LINE from ANTA (NTPC) on 19.02.2025**

No. of Unwanted operation – 1

**Reason of unwanted operation –**

Due to defective PU of Bus Bar protection scheme at ANTA (NTPC).

**Corrective Action taken – NO**

ANTA (NTPC) has been asked to replace the defective PU or revise the pickup setting according to fault MVA of Bus to prevent unwanted trippings.

**Case-7 220/132 KV, 100 MVA BHEL-II TR at 220 KV GSS NAGPUR on 07.02.2025**

No. of Unwanted operation – 1

**Reason of unwanted operation –**

REF relay defective.

**Corrective Action taken – YES**

Numerical REF relay replaced.

**Case-8 220/132 KV, 100 MVA, IMP Make X-mer No.1 at 220 KV DHOD on 19.02.2025**

No. of Unwanted operation – 1

**Reason of unwanted operation –**

LBB operation due to defective contact in 86 relay.

**Corrective Action taken –YES**

86 relay contact problem rectified.

**Case-9 220/132 KV, 160 MVA BHEL TRF- 01 at 220 KV GSS, BHADLA on 27 & 28.02.2025**

No. of Unwanted operation – 2

**Reason of unwanted operation –**

Defective relay setting, proper grading was not available.

**Corrective Action taken –YES**

Relay setting revised.

**Format No.PI-01**  
**Reporting of performance indices for protection system**  
**(for elements connected at 220 kV and above)**  
**Name of Utility: Sainj HEP**  
**Month: February' 2025**

S. N.	Sub-station	Unit (SPS/Line/ICT/GT/etc)	Nc	Nf	Nu	Ni	Dependability Index(D)	Security Index (S)	Reliability Index R
1	Sainj HEP	unit	4	0	1	0	1	0.8	1

Justification for less than one index may be attached separately.

Nc is the number of correct operations at internal power system faults.

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

Nu is the number of unwanted operations.

Ni is the number of incorrect operations and is the sum of Nf and Nu.



Sr. Manager (O&M)  
Sainj HEP

Status of Internal Protection Audit Plan for FY 2024 -25									
S. No.	NRPC Member	Category	Status	Schedule submitted as per utility	Present Status Completed (yes/no)	Audit Completed Date	Report Submission Date by audit party	Discussion held in PSC meeting number	Compliance status
1	PGCIL	Central Government owned Transmission Company	Received						
2	NTPC	Central Generating Company	Received						
3	BBMB		Received						
4	THDC		Received		Tehri	Feb-25	28.02.2025	58	
5	SJVN		Received						
6	NHPC		Received						
7	NPCIL	SLDC							
8	Delhi SLDC								
9	Haryana SLDC								
10	Rajasthan SLDC								
11	Uttar Pradesh SLDC		Vishnuprayag, WUPPTCL		Vishnuprayag, WUPPTCL ( Greater Noida)			57	Nothing to complied (WUPPTCL)
12	Uttarakhand SLDC								
13	Punjab SLDC								
14	Himachal Pradesh SLDC								
15	DTL		Received						
16	HVPNL		Received		Mohana	Jan-25	17.1.2025	58	complied
17	RRVNL	State Transmission Utility	Received						
					Ratnagarh, Badnu, Sikar, Chhatargarh, Gajner, Halasar, Goner, NPH, Sangner, SEZ, VKIA, Shri Dungargarh, Sujargarh, Tehendesar, Akal, Chittorgarh			58	
								57	Pending
					BARLI, NPH, TINWARI, ALWAR, BANSUR, BEHROR, BHARATPUR, BHIWADI, CHHONKARWADA, DHOLPUR, KG BAS, KHUSHKHERA, KOTPUTALI, MANDAWAR, MANOHARPUR, NADBAI, NEEMRANA, PHAGI, AJMER, DOONI, GGC, SIKRAI, HINDALUN, SWM, BHENSARA, ANTA, BHILWARA, RAMGARH, RATANGARH, LALSOT				
					220 kV Chaksu 220 kV Mansarovar 765 kV Anta 220 kv Mandalgarh 220 kV Pratapgarh			56	Pending
18	UPPTCL		Received for Jhansi, Lucknow, Meerut, Gorakhpur, Prayagraj, Agra zone)						
19	PTCUL		Received						
20	PSTCL		Received						
21	HPPTCL		Received		Gumma, Lahal, Phozal			56	Pending
22	IPGCL		Received (PPCL-1,III)						
23	HPGCL		Received		RGTPP (Khadar)	Jan-25	07.02.2025	58	
24	RRVUNL	State Generating Company	Received		CCTPP, Chhabra	Dec-24	19.02.2025	58	
					DCCPP, Dholpur	Nov-24	19.02.2025	58	
					SSTPS, Suratgarh	Jan-25	06.02.2025	58	
					Ramgarh Gas Sutargarh Supercritical			56	Pending
25	UPRVUNL		Received (obra -B, Anpara-B, D switch yard, Harduaganj- C, D, E)		Parichha BTPS Parichha CTPS Harduaganj, Anpara-B, C, D	Jan-25 Feb-25	08.03.2025 07.03.2025	58 58 57	Pending
26	UJVNL		Received (Khodri, Chibro, Vyasi, Dharasu, Tiloth)		Dharasu			58	
27	HPACL		Received (Salot)						
			Received (Kashang)	Feb-March 2025					
			Received (Swara Kuddu)	Feb-March 2025					
28	PSPCL	State Generating Company & State owned Distribution Company	Received (Ranjet sagar dam, GHTP, GGSSTP, GATP)						
29	HPSEBL	Distribution company having Transmission connectivity ownership	Received						
30	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Received		Yes			56	Pending
31	Aravali Power Company Pvt. Ltd		Received						
32	Aprava Energy Private Limited		Received						
33	Talwandi Sabo Power Ltd.		Completed		Nov'24 400 kV NPL Sub-station		Pending	56	Pending
34	Nabha Power Limited		Received						
35	MEIL Anpara Energy Ltd		Received						
36	Rosa Power Supply Company Ltd		Received						
37	Lalitpur Power Generation Company Ltd		Received		Yes			57	Pending
38	MEJA Uriq Nigam Ltd.		Received	28-29 March 2025					
39	Adani Power Rajasthan Limited		Received						
40	JSW Energy Ltd. (KWHEP)		Received						
41	AESL	Other transmission licensee	Received (ATIL -400kV Mohinderghar S/s, OBTL, FBTL, MTSL, ATSL, HPTSL, BKTL, GTL)						
42	Tata Power Renewable Energy Ltd.		Received (TPGEL, BTPSL)		300MW TPREL Chhayan 300MW TP Saurya Banderwala Solar Plant 225MW TPGEL and 110MW KSEB Solar Plant	28.02.2025 01.03.2025 28.02.2025	11.03.2025 11.03.2025 11.03.2025	58 58 58	
43	UT of J&K	UT of Northern Region							
44	UT of Ladakh								
45	UT of Chandigarh								
46	INDIGRID		Received						
47	ADHPL		Received		Completed	Mar-25	08.03.2025	58	

Status of Internal Protection Audit Plan for FY 2025 -26								
S. No.	NRPC Member	Category	Status	Schedule submitted as per utility	Present Status Completed (yes/no)	Report Submission Date by audit party	Discussion held in PSC meeting number	Compliance status
1	PGCIL	Central Government owned Transmission Company	Received (NR-1,2)					
2	NTPC	Central Generating Company	Received					
3	BBMB		Received					
4	THDC		Received (Tehri)					
5	SJVN		Received (NJHPS, RHPS)					
6	NHPC		Received					
7	NPCIL	SLDC						
8	Delhi SLDC							
9	Haryana SLDC							
10	Rajasthan SLDC							
11	Uttar Pradesh SLDC		Received (Jaypee Vishnuprayag, WUPPTCL, SEUPPTCL, Alaknanda )	Vishnuprayag -June 2025 WUPPTCL- Oct 2025 SEUPPTCL Jan 2026 Alaknanda - Dec'25 -Mar'26				
12	Uttarakhand SLDC	State Transmission Utility						
13	Punjab SLDC							
14	Himachal Pradesh SLDC							
15	DTL		Received					
16	HVPNL		Received					
17	RRVPNL	State Generating Company	Received					
18	UPPTCL		Received (All zones)	Jan-March 2026				
19	PTCUL							
20	PSTCL							
21	HPPTCL		Received					
22	IPGCL	State Generating Company	Received (PPS-III, I)					
23	HPGCL							
24	RRVUNL		Received					
25	UPRVUNL		Received (Anpara B)	Jun-25				
			Received (Obra A & B)	Jan - March 2026				
			Received (Anpara D)	May-25				
			Received (Harduaganj )	April -May 2025				
			Received (Harduaganj D)	April -May 2025				
			Received (Harduaganj E)	April -May 2025				
			Received (Parichha )	May-25				
			Received (Parichha Ext)	Feb-26				
			Received (Obra C)	Mar-26				
			Received (Jawaharpur )	Jul-25				
			Received (Dharashu, Tiloht)					
			Received (Kasheng HEP, Sawara Kuddu, Sainj)	Nov'25-Mar'26				
26	UJVNL	State Generating Company & State owned Distribution Company						
27	HPPCL							
28	PSPCL	Distribution company having Transmission connectivity ownership	Received (GHTP, GGSSTP, GATP, RSD)					
29	HPSEBL		Received					
30	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	Received	Aug'25				
31	Aravali Power Company Pvt. Ltd							
32	Apraava Energy Private Limited		Received	May'25				
33	Taiwandi Sabo Power Ltd.		Received	May'25				
34	Nabha Power Limited		Received	May'25				
35	MEIL Anpara Energy Ltd		Received	May'25				
36	Rosa Power Supply Company Ltd		Received	Jan'26				
37	Lalitpur Power Generation Company Ltd	Other transmission licensee	Received	Oct - Nov 2025				
38	MEJA Urja Nigam Ltd.							
39	Adani Power Rajasthan Limited							
40	JSW Energy Ltd. (KWHEP)		Received	Nov-25 to Feb 26				
41	AESL	UT of Northern Region	Received (OBTL)	Jan'26				
42	Tata Power Renewable Energy Ltd.							
43	UT of J&K							
44	UT of Ladakh							
45	UT of Chandigarh							
46	INDIGRID		Received	Aug-25 to March-26				
47	ADHPL							
48	UPJVNL		Khara					

Status of 3rd Party Protection Audit Plan								
S. No.	NRPC Member	Category	Status	Schedule submitted as per utility	Present Status Completed (yes/no)	Report Submission Date by audit party	Discussion held in PSC meeting number	Compliance status
1	PGCIL	Central Government owned Transmission Company	Received (7 S/s of NR-1, 1 S/s of NR-2, 4 S/s of Nr-3)	By Jan 2025				
2	NTPC	Central Generating Company	Received (Singrauli, Rihand, Unchahar, Dadri, Dadri Gas, Auraiya Gas, Faridabad Gas, Anta Gas Power Station)	By Oct 2028				
3	BBMB		Received (Tanda)	By 17.07.2025				
4	THDC		Received	Feb-27				
5	SJVN		Received	March 2026-Tehri, F.Y. 2025-26- Koteswar				
6	NHPC		Received	Nov-Dec 2025 for RHPS, Nov 24- March 25 for NJHPS				
7	NPCIL	SLDC	Completed (220kV) (NAPS)	Jan 25	Completed	18.01.2025	57	
8	Delhi SLDC							
9	Haryana SLDC							
10	Rajasthan SLDC							
11	Uttar Pradesh SLDC		Alaknanda	March 2025				
12	Uttarakhand SLDC		Received (Tanda extension)	17.07.2025				
13	Punjab SLDC		Received (Tanda)	17.07.2025				
14	Himachal Pradesh SLDC		SEUPPTCL	Conducted (Oct 2024)				
15	DTL							
16	HVPLN	State Transmission Utility	Received					
17	RRVPLN							
18	UPPTCL		Received	2025	Under tendering			
19	PTCUL		Received	By Jan 2025				
20	PSTCL							
21	HPPTCL	State Generating Company	Received	FY 25-26				
22	IPGCL		Received (PPS-III)	FY 25-26				
23	HPGCL							
24	RRVUNL		Received					
25	UPRVUNL		Received (Odra-B)	2026-27				
26	UJVNL		Anpara D	2025	Under tendering			
27	HPCL		Anpara B	2025	Under tendering			
28	PSPCL		Harduamni	2025	Under tendering			
29	HPSEBL		Harduamni D	2025	Under tendering			
30	Pravara Power Generation Co. Ltd.		Parichha	2025	Under tendering			
31	Aravali Power Company Pvt. Ltd		Parichha Ext	2025	Under tendering			
32	Agrava Energy Private Limited		Jawaharpur	2025	Under tendering			
33	Talwandi Sabo Power Ltd.		Paricha BTPS	2026				
34	Nabha Power Limited		Dharasu	FY 2025-26	Completed in Nov, 2024		56	submitted
35	MEIL Anpara Energy Ltd		Swara Kuddu	2026				
36	Rosa Power Supply Company Ltd		Kashang HEP	FY 2025-26				
37	Lalitpur Power Generation Company Ltd	Other Transmission Licensee	Received (GHTP)	Dec. 2025				
38	MEJA Uria Nigam Ltd.		Received (GATP)	May 2025				
39	Adani Power Rajasthan Limited		GGSTP	2026				
40	JSW Energy Ltd. (KWHEP)		RSD/ Sahapur Kandi					
41	AESL							
42	Tata Power Renewable Energy Ltd.	IPP having more than 1000 MW installed capacity	Received	Dec-24				
43	UT of J&K		Received	By May, 2025				
44	UT of Ladakh		Conducted	Dec'22		Pending		
45	UT of Chandigarh		Received	By December, 2025				
46	INDIGRID		Received	* Feb 2025				
47	ADHPL	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)	Conducted	By 30.09.2024	08.08.2024	13.01.2025	57	
			Conducted	26.03.2024				
			Conducted		Completed in Oct, 2024	22.03.2025		
			Conducted	November, 2024	Kawal		56	Pending
			Received	December 2024 to March 2025	Completed		57	Pending
		UT of Northern Region	Received (ATIL-400kV Mohindergarh S/s.)	400kV Mohindergarh SS- Q2, FY 2025-26				
			Received (OBTL)	OBTL-Q1, FY 2025-26				
			Received (FBTL)	FBTL-Q3, FY 2025-26				
			Received (MTSCL)	MTSCL-Q4, FY 2025-26				
			Received (ATSCL)	ATSCL-Q1, FY 2026-27				
		Other Transmission Licensee	Received (HPTSL)	HPTSL- Q2, FY 2026-27				
			Received (BKTL)	BKTL-Q3, FY 2026-27				
			Received (GTL)	GTL- Q3 & Q4, FY 2026-27				
		State Utilities	Received (NRSS 29)	FY 24-25				
			Received (PTCL)	FY 25-26				
			Received	* September 2026				
		Uttar Pradesh	Not received					
			Received	Mar-25				
			No schedule provided					
			Completed on Oct 2024					
			Q1, FY 2025-26					
		State Utilities	Q3 & Q4, FY 2026-27					

\* Revised Schedule

## DETAILED REPORT ON ANALYSIS OF 5TH ORDER HARMONICS IN REFERENCE TO SUBSEQUENT TRIPPING OF TYPE 3 FILTERS (5/27) AT HVDC RIHAND & DADRI TERMINALS

**Date of Report:** March 17, 2025

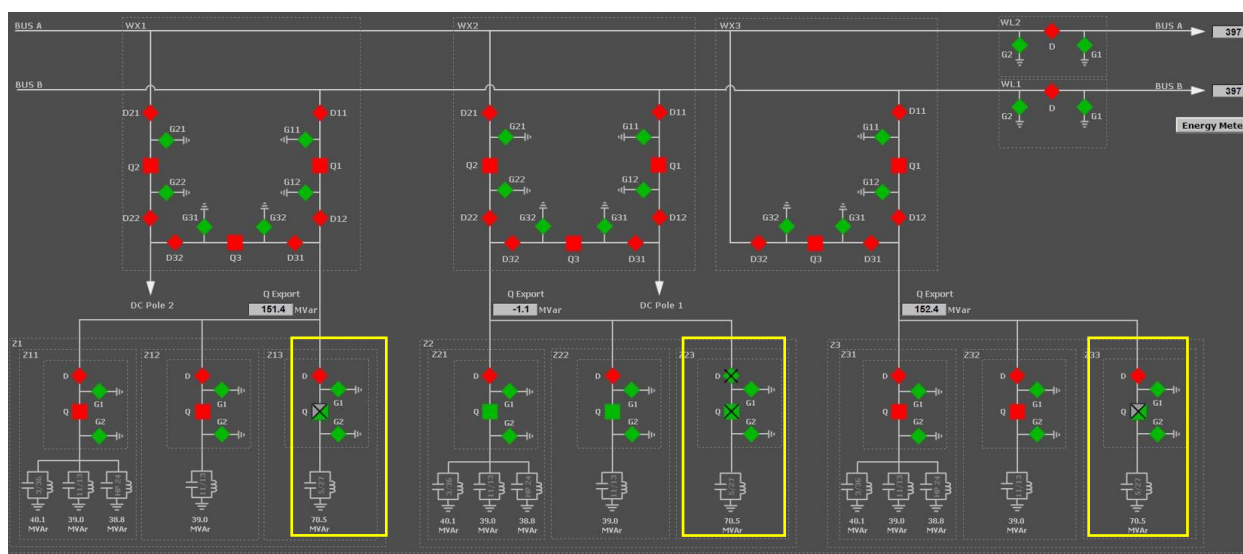
### 1. Introduction

The  $\pm 500$  kV, 1500 MW HVDC terminals at Rihand and Dadri have been experiencing a recurring issue involving the tripping of Type-3 filter banks (Z13, Z23, and Z33) on harmonic overload protections. These filter banks are designed to mitigate the 5th and 27th order harmonics generated by the converters at the terminals. This report presents a detailed analysis of the issue, including harmonic measurements, findings, and proposed actions to address the problem.

Each terminal is equipped with three Type-3 filter banks—namely Z13, Z23, and Z33—intended to ensure 5<sup>th</sup> and 27<sup>th</sup> level harmonic suppression within acceptable limits. However, due to higher side of 5<sup>th</sup> level harmonic in the system, Harmonic Overload protection have led to all three filter banks being in an isolated state at both Rihand and Dadri terminals leading to loss of 211.5 MVAR out of 685.2 MVAR as of the current date.

### 2. Agenda Point

It has been observed that whenever any of the Type-3 filter banks (5/27) are charged—either through Reactive Power Control (RPC) or manually—they trip on harmonic overload protections. This issue persists despite the converter-generated harmonics being within the design limits of the system. Preliminary analysis suggests the presence of external 5th order harmonics in the grid as the primary cause of the overload and subsequent tripping.



*Filter Configuration at HVDC Rihand and Dadri terminals*

### 3. Study

A detailed study of harmonic levels was conducted using the **Megger MPQ2000 Power Quality Analyzer Kit**. Harmonic Measurements were taken under two distinct operational conditions to assess the harmonic profile and its impact on the Type-3 filters:

Note:

- All the Readings are in Amps.
- Measurement data backup files shared separately with this report.

#### Case 1: Harmonic measurement with both poles of Rihand-Dadri in service condition.

To measure the **net current harmonic levels (net of harmonics generated in HVDC and harmonics available in grid) available in the system**, measurement done in case of both poles in service.

#### Measurement 1: 18.11.2023

- **Measurement Details:** Harmonic levels were recorded with both poles of the Rihand-Dadri HVDC link were in loaded condition.
- **Bipole Power Flow during measurement** = 1000 MW (500 MW each pole)

#### Results:

Date	Time	Harm 1	Harm 3	Harm 5	Harm 7	Harm 11	Harm 13	Harm 15	Harm 23	Harm 25	Harm 27
18-11-2023	8:20:54 PM	838.377	4.532	1.511	1.511	46.828	30.212	1.511	6.042	4.532	1.511
18-11-2023	8:30:54 PM	839.888	4.532	1.511	1.511	46.828	30.212	1.511	6.042	4.532	1.511
18-11-2023	8:40:54 PM	842.909	4.532	1.511	1.511	46.828	30.212	1.511	4.532	4.532	1.511
18-11-2023	8:50:54 PM	842.909	3.021	1.511	1.511	46.828	31.722	1.511	4.532	4.532	1.511
18-11-2023	9:00:54 PM	836.866	3.021	1.511	1.511	45.318	30.212	1.511	6.042	4.532	1.511
18-11-2023	9:10:54 PM	830.824	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	9:20:54 PM	832.335	3.021	3.021	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	9:30:54 PM	832.335	3.021	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	9:40:54 PM	832.335	4.532	3.021	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	9:50:54 PM	830.824	4.532	3.021	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	10:00:54 PM	829.313	3.021	3.021	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	10:10:54 PM	830.824	3.021	3.021	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	10:20:54 PM	830.824	4.532	3.021	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	10:30:54 PM	829.313	4.532	3.021	1.511	43.807	28.701	1.511	6.042	4.532	1.511
18-11-2023	10:40:54 PM	829.313	4.532	3.021	1.511	42.296	28.701	1.511	6.042	4.532	1.511
18-11-2023	10:50:54 PM	826.292	3.021	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
18-11-2023	11:00:54 PM	824.782	3.021	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
18-11-2023	11:10:54 PM	823.271	3.021	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
18-11-2023	11:20:54 PM	823.271	3.021	3.021	1.511	40.786	27.191	1.511	6.042	6.042	1.511
18-11-2023	11:30:54 PM	823.271	4.532	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
18-11-2023	11:40:54 PM	824.782	4.532	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
18-11-2023	11:50:54 PM	824.782	4.532	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
19-11-2023	12:00:54 AM	823.271	4.532	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
19-11-2023	12:10:54 AM	823.271	4.532	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
19-11-2023	12:20:54 AM	823.271	4.532	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
19-11-2023	12:30:54 AM	821.76	4.532	3.021	1.511	42.296	27.191	1.511	6.042	6.042	1.511
19-11-2023	12:40:54 AM	824.782	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
19-11-2023	12:50:54 AM	823.271	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
19-11-2023	1:00:54 AM	823.271	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
19-11-2023	1:10:54 AM	827.803	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
19-11-2023	1:20:54 AM	827.803	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
19-11-2023	1:30:54 AM	827.803	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
19-11-2023	1:40:54 AM	827.803	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511
19-11-2023	1:50:54 AM	827.803	4.532	1.511	1.511	43.807	28.701	1.511	6.042	4.532	1.511



### Measurement 2: 12.02.2024

- **Measurement Details:** Harmonic levels were recorded with both poles of the Rihand-Dadri HVDC link were in loaded condition.
- **Bipole Power Flow during measurement** = 1200 MW (600 MW each pole)

#### Results:

Date	Time	Harm 1	Harm 3	Harm 5	Harm 7	Harm 11	Harm 13	Harm 15	Harm 23	Harm 25	Harm 26	Harm 27
12-02-2024	12:29:11 PM	1000.01	3.021	1.511	1.511	42.296	30.212	1.511	9.064	9.064	0	1.511
12-02-2024	12:39:11 PM	1007.563	3.021	1.511	1.511	43.807	31.722	1.511	9.064	7.553	0	1.511
12-02-2024	12:49:11 PM	1007.563	3.021	1.511	1.511	43.807	30.212	1.511	9.064	7.553	0	1.511
12-02-2024	12:59:11 PM	1007.563	3.021	1.511	1.511	43.807	30.212	1.511	9.064	9.064	0	1.511
12-02-2024	1:09:11 PM	1006.052	3.021	1.511	1.511	42.296	30.212	1.511	9.064	9.064	0	1.511
12-02-2024	1:19:11 PM	1007.563	3.021	1.511	1.511	43.807	30.212	1.511	9.064	7.553	0	1.511
12-02-2024	1:29:11 PM	1003.031	3.021	1.511	1.511	42.296	30.212	1.511	9.064	9.064	0	1.511
12-02-2024	1:39:11 PM	1001.521	3.021	1.511	1.511	42.296	30.212	1.511	9.064	9.064	0	1.511
12-02-2024	1:49:11 PM	1000.01	3.021	1.511	1.511	42.296	28.701	1.511	9.064	9.064	0	1.511
12-02-2024	1:59:11 PM	998.499	3.021	1.511	1.511	42.296	28.701	1.511	9.064	9.064	0	1.511
12-02-2024	2:09:11 PM	993.968	3.021	1.511	1.511	40.786	28.701	1.511	9.064	9.064	0	1.511
12-02-2024	2:19:11 PM	993.968	3.021	1.511	1.511	40.786	28.701	1.511	9.064	9.064	0	1.511
12-02-2024	2:29:11 PM	993.968	3.021	1.511	1.511	40.786	28.701	1.511	9.064	9.064	0	1.511
12-02-2024	2:39:11 PM	996.989	3.021	1.511	1.511	42.296	28.701	1.511	9.064	7.553	0	1.511
12-02-2024	2:49:11 PM	998.499	3.021	1.511	1.511	42.296	28.701	1.511	9.064	7.553	0	1.511
12-02-2024	2:59:11 PM	998.499	3.021	1.511	1.511	42.296	28.701	1.511	9.064	7.553	0	1.511
12-02-2024	3:09:11 PM	992.457	3.021	1.511	1.511	40.786	27.191	1.511	9.064	7.553	0	1.511
12-02-2024	3:19:11 PM	996.989	3.021	1.511	1.511	43.807	31.722	1.511	9.064	7.553	0	1.511
12-02-2024	3:29:11 PM	998.499	3.021	1.511	1.511	43.807	31.722	1.511	9.064	7.553	0	1.511
12-02-2024	3:39:11 PM	998.499	3.021	1.511	1.511	43.807	31.722	1.511	9.064	7.553	0	1.511
12-02-2024	3:49:11 PM	1001.521	3.021	1.511	1.511	45.318	31.722	1.511	9.064	7.553	0	1.511
12-02-2024	3:59:11 PM	1001.521	3.021	1.511	1.511	45.318	31.722	1.511	9.064	7.553	0	1.511
12-02-2024	4:09:11 PM	998.499	3.021	1.511	1.511	43.807	30.212	1.511	9.064	7.553	0	1.511
12-02-2024	4:19:11 PM	1001.521	3.021	1.511	1.511	43.807	31.722	1.511	9.064	7.553	0	1.511
12-02-2024	4:29:11 PM	1003.031	3.021	1.511	1.511	45.318	31.722	1.511	9.064	7.553	0	1.511

### Case 2: Harmonic measurement with both poles of Rihand-Dadri in shutdown condition:

To measure the current harmonic levels available in the **Grid**, measurement done in case of both poles in service.

- **Date of Measurement:** 20.11.2023
- **Measurement Details:** Harmonic levels were recorded with both poles of the Rihand-Dadri HVDC link in a shutdown state.
- **Power Flow** = Nil
- **Measurement Location** : Type 3 filter sub-bank Bay CT

### Results:

Date	Time	Harm 1	Harm 3	Harm 5	Harm 7	Harm 11	Harm 13	Harm 15	Harm 23	Harm 25	Harm 27
20-11-2023	9:39:58 AM	104.231	0	7.553	0	3.021	0	0	1.511	0	0
20-11-2023	9:49:58 AM	104.231	0	7.553	0	3.021	0	0	1.511	0	0
20-11-2023	9:59:58 AM	104.231	0	7.553	0	3.021	0	0	1.511	0	0
20-11-2023	10:09:58 AM	104.231	0	7.553	0	3.021	1.511	0	1.511	0	0
20-11-2023	10:19:58 AM	104.231	0	7.553	0	3.021	0	0	1.511	0	0
20-11-2023	10:29:58 AM	104.231	0	7.553	0	3.021	1.511	0	1.511	0	0
20-11-2023	10:39:58 AM	104.231	0	7.553	0	3.021	1.511	0	1.511	0	0
20-11-2023	10:49:58 AM	104.231	0	7.553	0	3.021	0	0	1.511	0	0
20-11-2023	10:59:58 AM	104.231	0	6.042	0	3.021	0	0	1.511	0	0
20-11-2023	11:09:58 AM	104.231	0	7.553	0	3.021	1.511	0	1.511	0	0
20-11-2023	11:19:58 AM	104.231	0	7.553	0	3.021	1.511	0	1.511	0	0

### Maximum harmonic currents (A) data with both poles of Rihand-Dadri in service condition during commissioning

Table attached below contains the data of net harmonic levels measured as per performance calculation at the time of commissioning of HVDC Rihand – Dadri link-

Calculated maximum harmonic currents (A) generated by the Rihand converters at bipolar operation, normal d.c. voltage

Id (pu)	0.10	0.67	1.00	1.10	Id (pu)	0.10	0.67	1.00	1.10		
n	Pdc				n	Pdc					
har	MW	150	1000	1500	1650	har	MW	150	1000	1500	1650
order					order						
2	0.06	0.33	0.46	0.50	32	0.06	0.08	0.05	0.06		
3	0.24	4.62	8.20	9.43	33	0.19	0.92	1.15	1.30		
4	0.07	0.37	0.50	0.54	34	0.05	0.07	0.04	0.06		
5	0.10	1.25	2.29	2.65	35	5.57	9.77	9.03	10.66		
6	0.08	0.42	0.54	0.56	36	0.04	0.05	0.05	0.05		
7	0.09	1.18	2.07	2.36	37	5.17	8.08	8.97	9.66		
8	0.07	0.31	0.37	0.38	38	0.05	0.05	0.06	0.06		
9	0.24	3.44	5.15	5.60	39	0.17	0.73	1.07	1.18		
10	0.06	0.23	0.24	0.24	40	0.06	0.05	0.07	0.08		
#11	20.54	102.18	110.77	108.92	41	0.06	0.24	0.37	0.40		
12	0.06	0.21	0.18	0.16	42	0.07	0.05	0.08	0.08		
#13	17.27	71.79	63.74	57.89	43	0.06	0.22	0.34	0.39		
14	0.06	0.16	0.09	0.07	44	0.05	0.04	0.06	0.04		
15	0.23	2.31	2.87	2.99	45	0.16	0.63	0.87	0.95		
16	0.07	0.14	0.06	0.09	46	0.04	0.03	0.04	0.03		
17	0.07	0.63	0.83	0.88	#47	3.61	4.49	4.93	5.35		
18	0.08	0.11	0.11	0.13	48	0.05	0.04	0.03	0.04		
19	0.07	0.54	0.67	0.77	#49	3.37	4.43	4.38	5.32		
20	0.06	0.05	0.10	0.12	50	0.04	0.04	0.03	0.05		
21	0.22	1.25	1.88	2.12	51	0.14	0.59	0.79	0.89		
22	0.06	0.05	0.10	0.11	52	0.05	0.05	0.05	0.05		
#23	9.31	14.99	24.34	27.18	53	0.05	0.19	0.29	0.32		
24	0.06	0.06	0.11	0.12	54	0.06	0.06	0.06	0.06		
#25	8.46	14.40	22.33	22.96	55	0.05	0.18	0.28	0.30		
26	0.05	0.06	0.10	0.09	56	0.04	0.05	0.04	0.05		
27	0.20	1.05	1.60	1.68	57	0.13	0.50	0.72	0.75		
28	0.06	0.08	0.10	0.07	58	0.04	0.04	0.04	0.04		
29	0.06	0.31	0.51	0.57	#59	2.37	3.24	4.01	3.39		
30	0.07	0.10	0.08	0.07	60	0.04	0.04	0.04	0.03		
31	0.07	0.32	0.48	0.51	#61	2.21	2.63	3.61	3.21		

\* CHARACTERISTIC HARMONIC CURRENTS

## 5. Findings

The results of measurements carried out are compared against harmonic data recorded at the time of commissioning to identify deviations.

The analysis of the harmonic measurements revealed the following key observations:

1. **Elevated 5th Order Harmonics:** The 5th order harmonic levels were significantly higher than the harmonic data recorded at the time of commissioning.

At the time of commissioning 5<sup>th</sup> harmonic Current was in the range of 1.25 amps, which elevated up to 3.021 amps at the Power flow of 1000 MW.

2. **External Source:** The elevated 5th order harmonics may be attributed from external sources within the grid, which exceed the limit of harmonic settings of the Type-3 filter banks (Z13, Z23, and Z33) and finally trips the filter banks (Z13, Z23, and Z33).



# STUDY FOR IMPLEMENTATION OF 3PH-AUTO RECLOSING IN 400 KV BAREILLY PG - MORADABAD TRANSMISSION LINES

Technology Development  
Power Grid Corporation of India Ltd

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## 1. Introduction

A total of 76 numbers of phase-to-phase tripping incidents have been recorded on transmission lines in the NR-III Region over the past three years from May'21 to April'24 due to kite threads. Further, lines were successfully charged within a short duration of 1–2 hours during charging attempts, minimizing downtime.

Among these, the 400 kV Bareilly PG-Moradabad-I Line accounted for 16 of the 76 recorded incidents, highlighting it as a vulnerable section within the NR-III region. Given the frequency of such events in this line, implementation of three-phase auto-reclosing is being explored for this transmission line for line-to-line fault scenarios. Simulation study is undertaken to investigate the implications of the scheme to ensure the successful deployment of the three-phase auto-reclosing during line-to-line fault.

## 2. Simulation Study

The study examines the implementation of three-phase auto-reclosing in the 400kV Bareilly PG-Moradabad transmission line. A simulation was conducted using PSS-E software to analyse the system's behaviour, focusing on bus voltages and the angle response during three-phase auto-reclosing due to a phase-to-phase fault. A schematic diagram of the nearby network connected to the 400kV Bareilly PG and Moradabad bus systems is presented in Figure 1. The schematic diagram also includes above generators situated one or two buses away. NTPC Singrauli Super Thermal Power Station (SSTPS) has an installed capacity of 2,000 megawatts (MW) along with 15MW solar plant connected at 174923 Singral bus. Further, it is connected to 400kV Bareilly PG through 400kV Lucknow UPPPCL substation. The plant has five units of 200 MW each and two units of 500 MW each. Rosa Thermal Power Plant has installed capacity of 1200MW connected at 174471 ROSA-TP2 Bus & 172022 ROSA -TP1 Bus. The plant has four units of 300 MW each. ROSA TP plant is connected to 400kV Bareilly PG through 400kV Shahjahanpur substation. The Dhauliganga Hydroelectric Power Station (DHPS) has a capacity of 280 megawatts (MW) connected at 192237 Dhauri2 Bus. The plant has four units of 70 MW each. DHPS plant is connected to 400kV Bareilly PG through 400kV Jauljivi & 765kV Bareilly substation.

The network connectivity has been verified using the Single Line Diagram (SLD) of the 400kV Bareilly PG and 400kV Moradabad substations, with the SLDs provided in Appendix-I. The details of the 400kV Bareilly PG – Moradabad transmission line is as follows:

**Table 1: 400kV Bareilly PG -Moradabad Line Details**

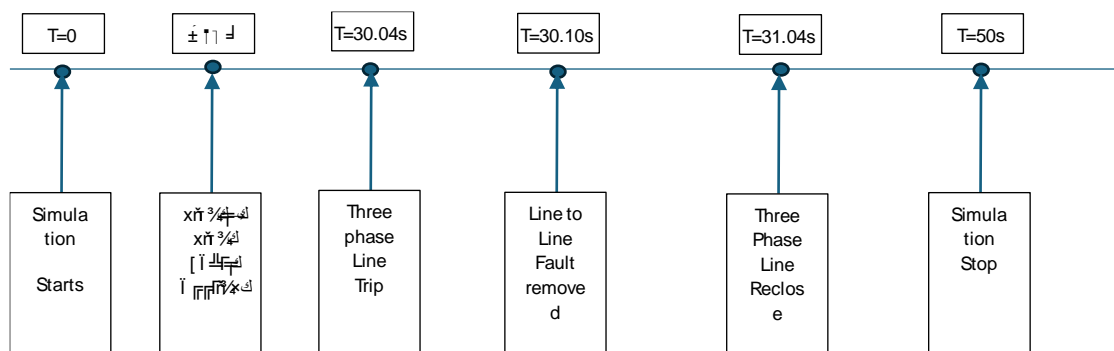
Line length	93 km
Conductor configuration	S/C Twin Moose
Line Reactors	Not available



were recorded for remote end buses and generator connected buses. The following cases have been analysed in the simulation.

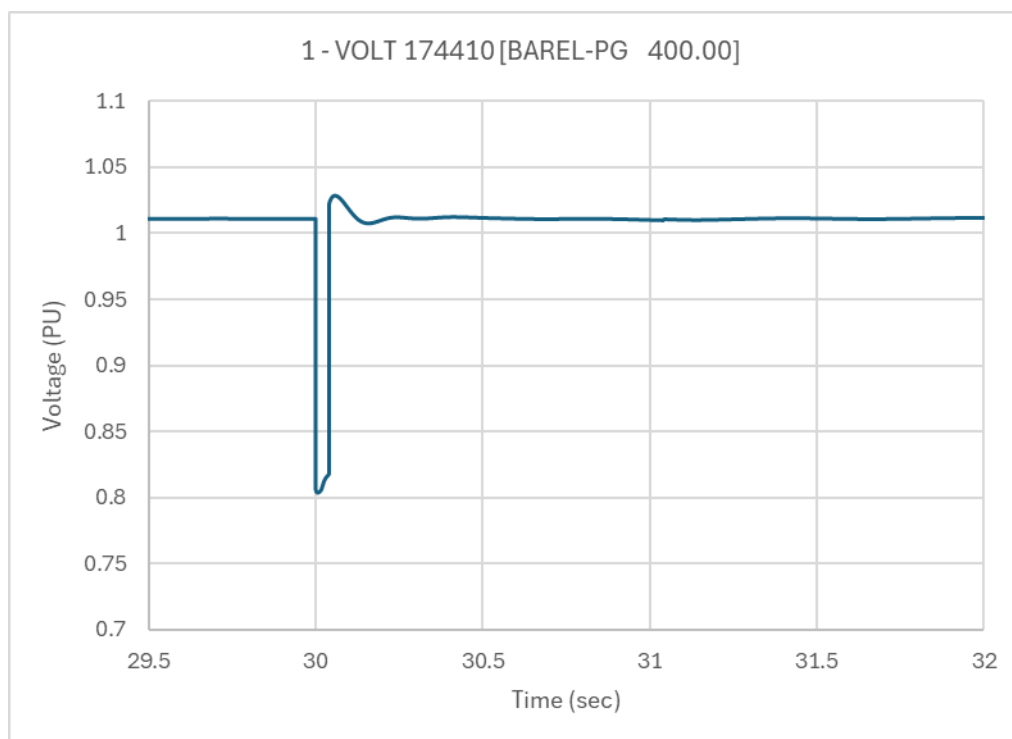
## 2.1 Three phase auto-reclosing for temporary line to line fault

In this case, a line-to-line fault is simulated on the 400kV Bareilly PG-Moradabad line, followed by three-phase auto-reclosing. The sequence of events used in the simulation study for successful three-phase auto-reclosing is detailed below in Figure 2.



**Figure 2: Sequence of the events for three-phase auto-reclosing for temporary fault**

Absolute bus voltages and angles with respect to the slack bus of 400kV Bareilly PG and 400kV Moradabad buses are plotted in the Figure 3, Figure 4, Figure 5 and Figure 6. Other remote buses and generator connected buses voltage & angles with respect to the slack bus are depicted Figure 7 and Figure 8.



**Figure 3: 400kV Bareilly PG Bus Voltage**



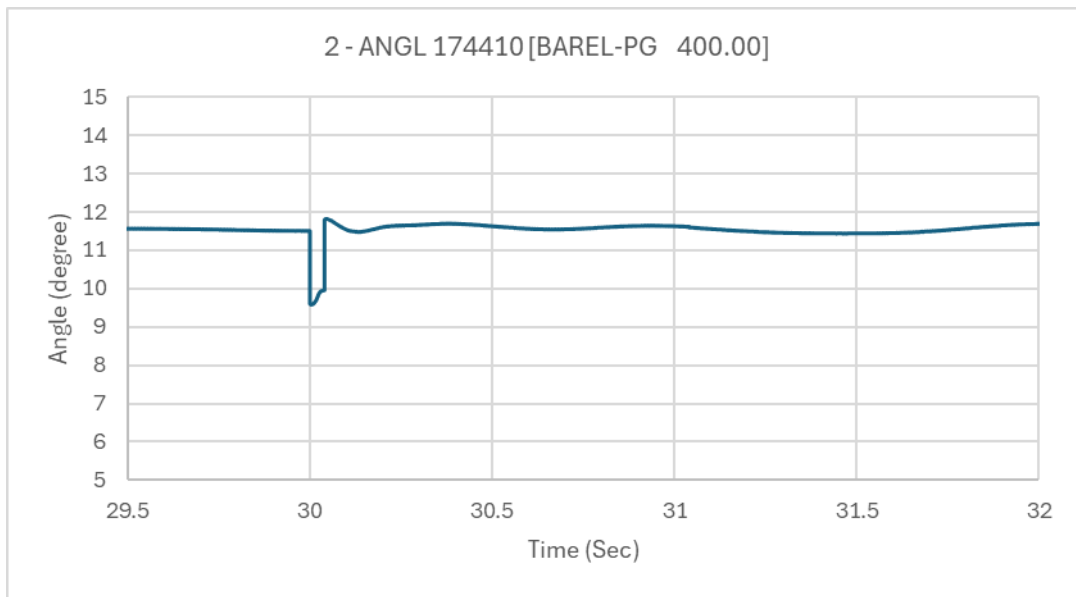


Figure 4: 400kV Bareilly PG Bus Angle

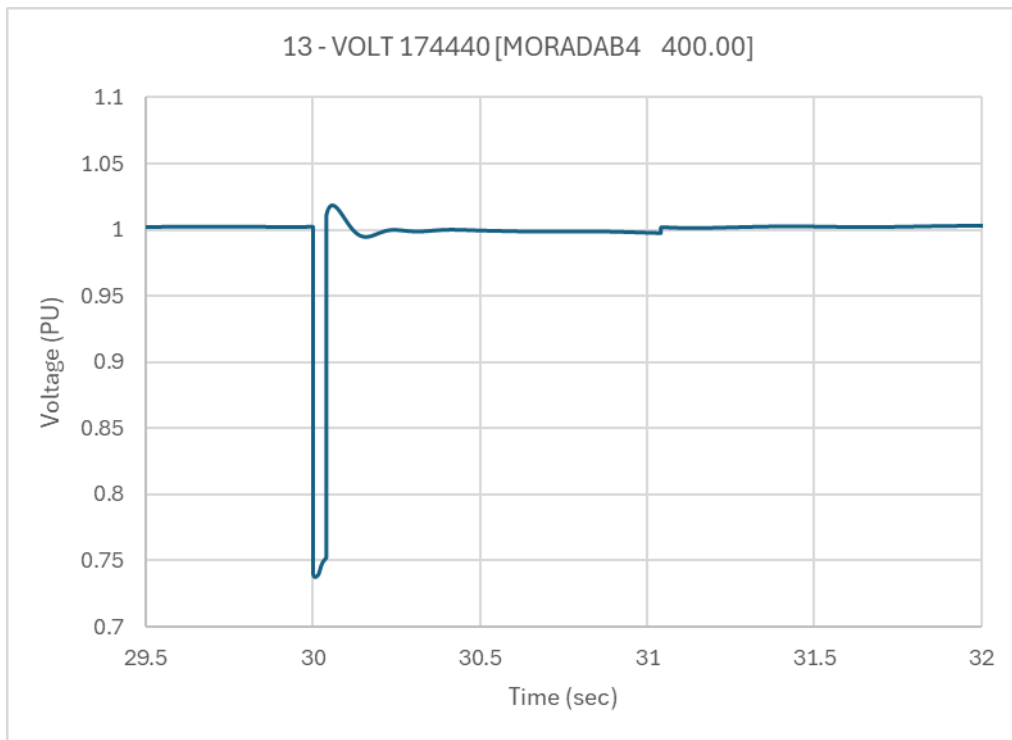
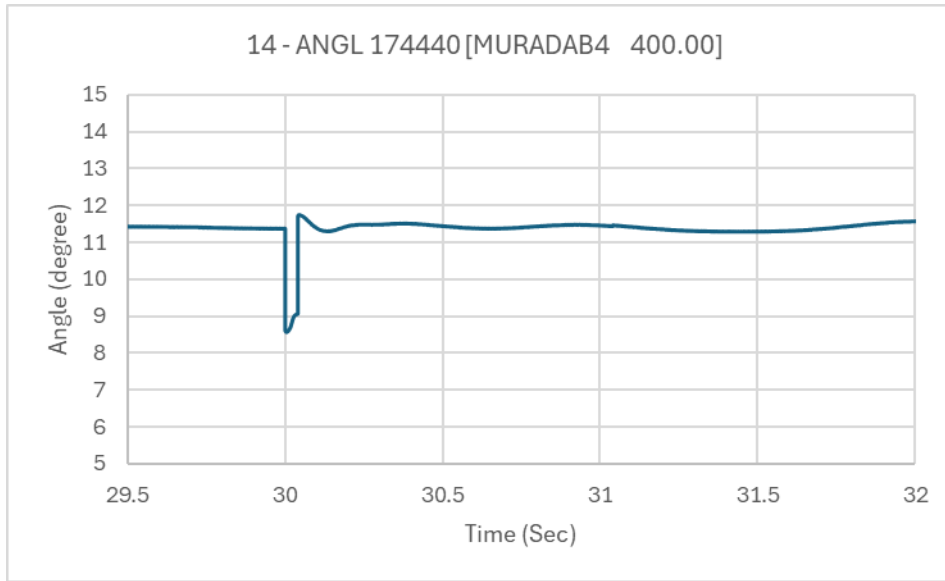
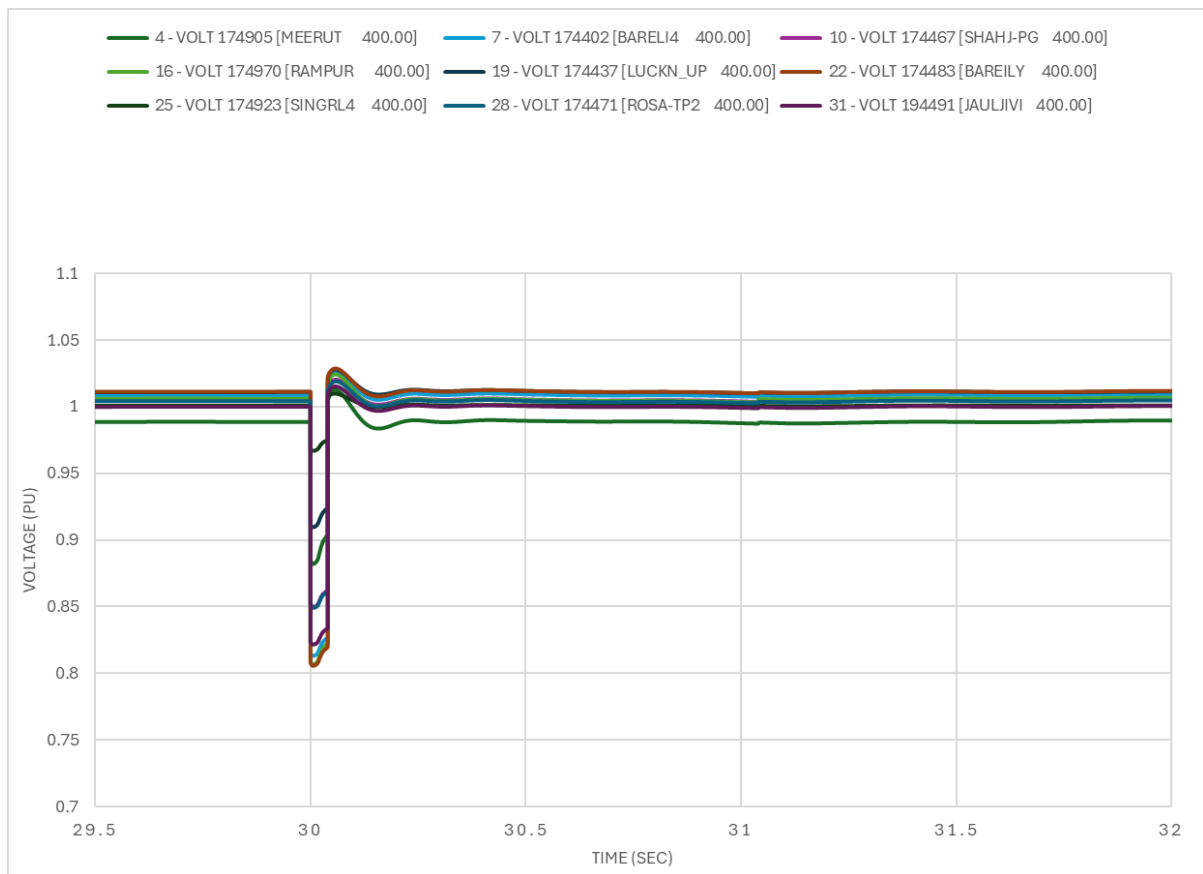


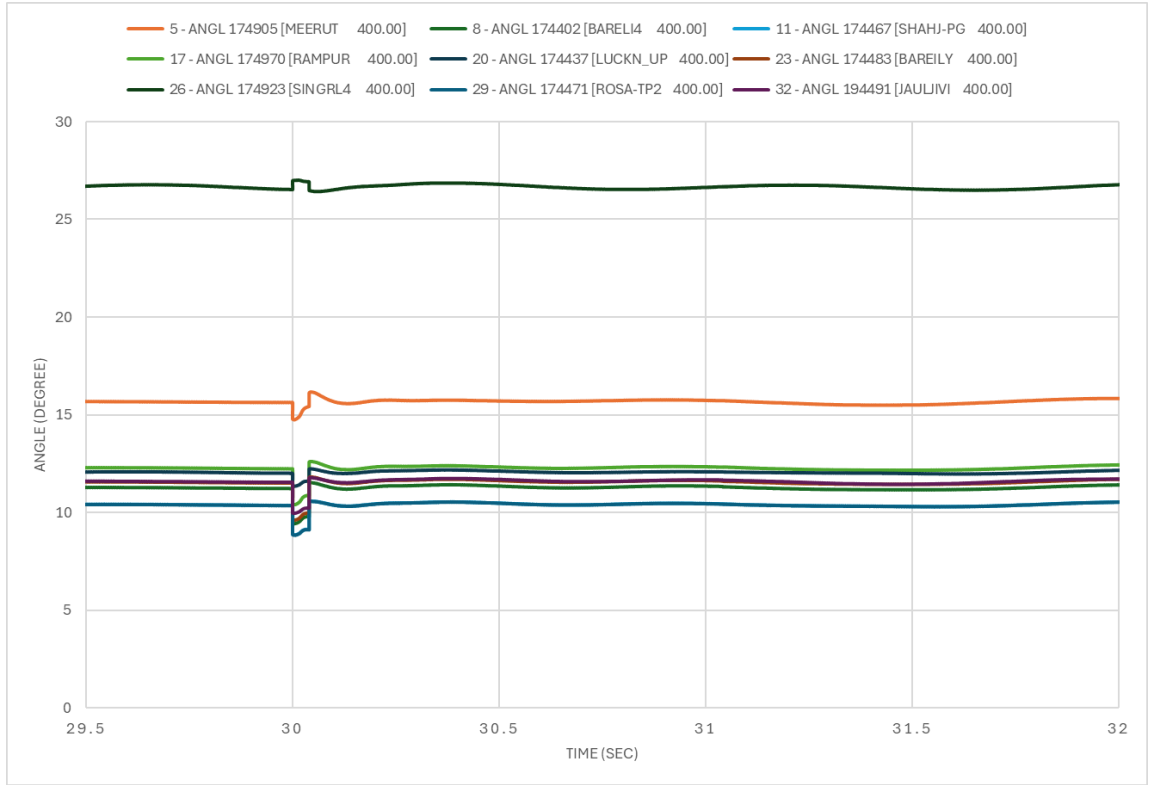
Figure 5: 400kV Moradabad Bus Voltage



**Figure 6: 400kV Moradabad Bus Angle**



**Figure 7: 400kV Remote end & Generator connected Buses Voltages**

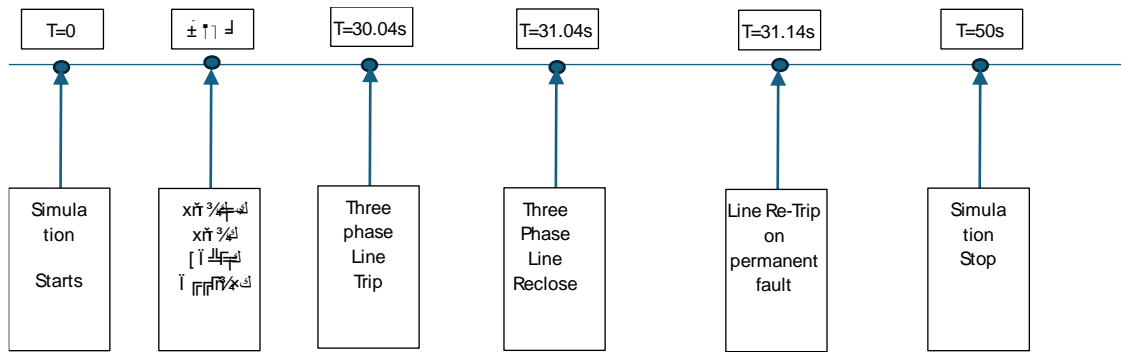


**Figure 8: 400kV Remote end & Generator connected Buses Angles**

From the figures above, the voltage at the 400kV Bareilly PG bus drops to 0.8 PU approximately but quickly recovers, rising by approximately 3–4% and stabilizing at its pre-fault value of around 1 PU after fault isolation. Similarly, the load angle at the 400kV Bareilly PG bus decreases by approximately 8.5 degrees but recovers quickly, rising by 3–4% and stabilizing at its pre-fault value of about 11.5 degrees after fault isolation. Other remote end and generator connected buses exhibited similar behaviour as shown in the Figure 7 and Figure 8. This demonstrates that the system remains stable when implementing three-phase auto-reclosing in response to a line-to-line fault.

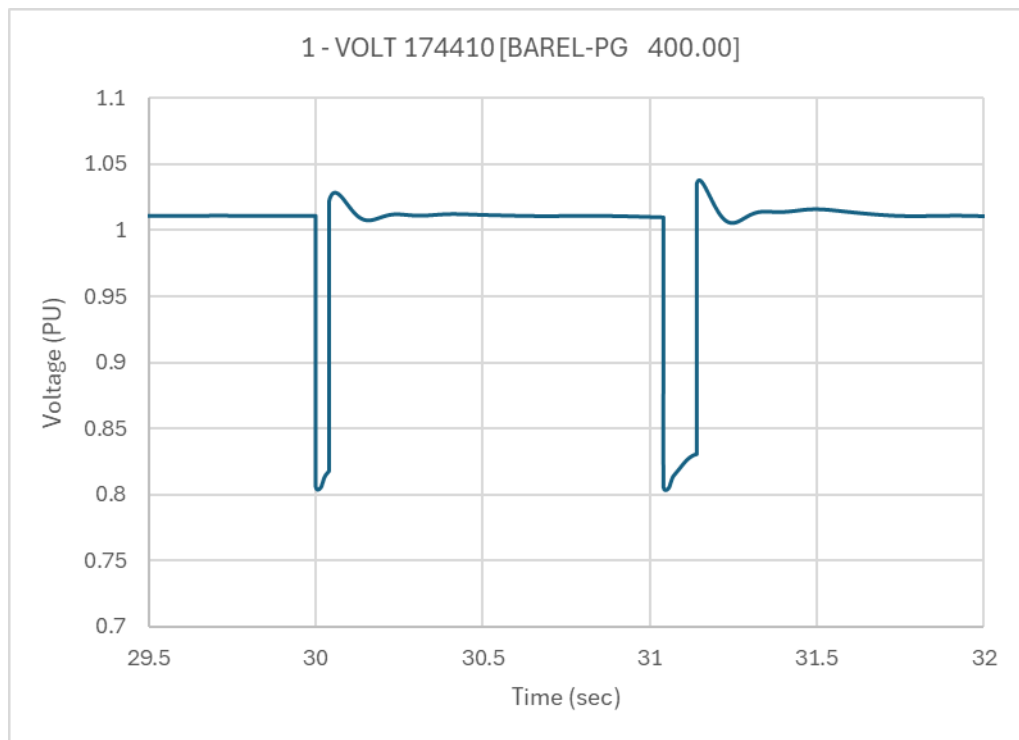
## 2.2 Three phase auto-reclosing for permanent line to line fault

In this case, a line-to-line fault is simulated on the 400kV Bareilly PG-Moradabad line, followed by three-phase auto-reclosing. The sequence of events used in the simulation study for three-phase auto-reclosing under permanent line to line fault is detailed below.

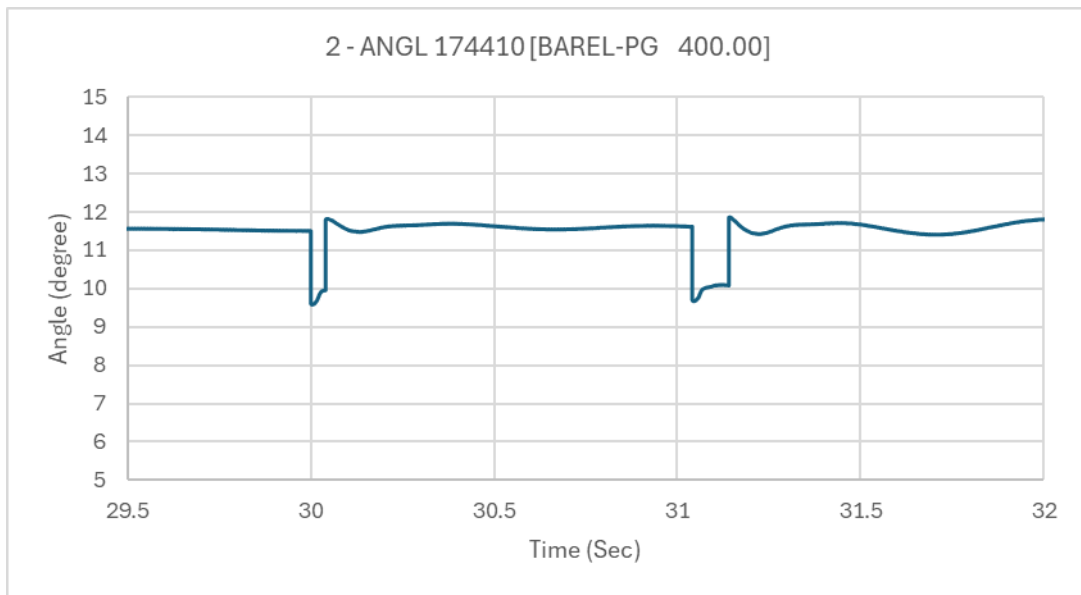


**Figure 9: Sequence of the events-three phase auto-reclosing for permanent fault**

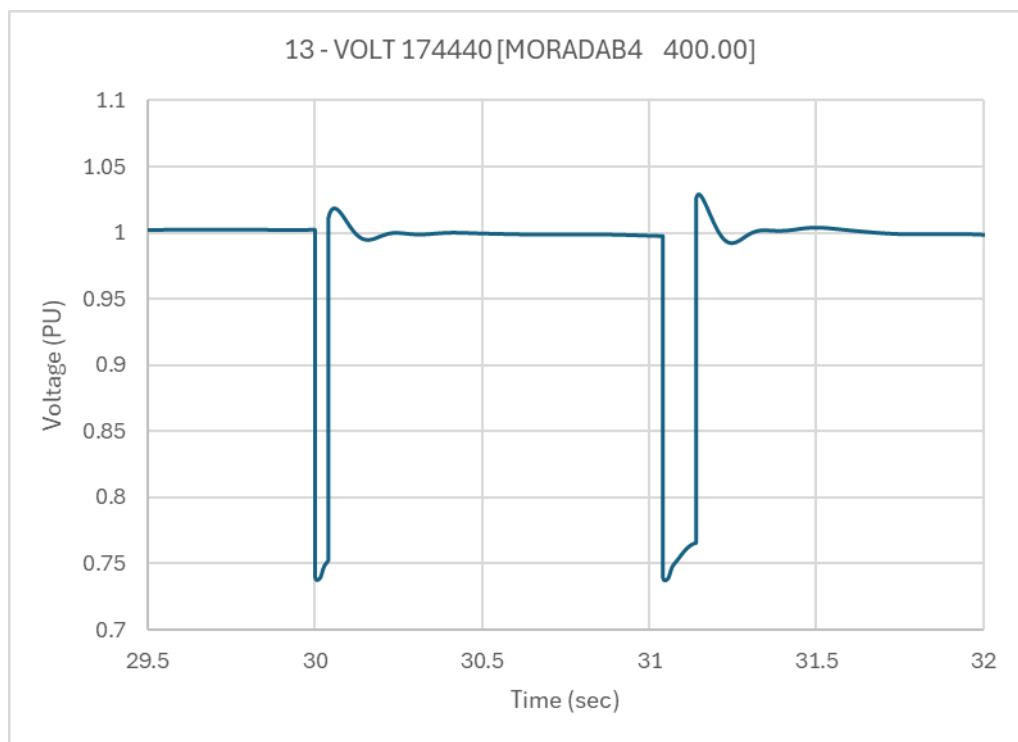
Absolute bus voltages and angles with respect to the slack bus of 400kV Bareilly PG and 400kV Moradabad buses are plotted in the Figure 10, Figure 11, Figure 12 and Figure 13. Other remote buses and generator connected buses voltage & angles with respect to the slack bus are depicted Figure 14 and Figure 15.



**Figure 10: 400kV Bareilly PG Bus Voltage**



**Figure 11: 400kV Bareilly PG Bus Angle**



**Figure 12: 400kV Moradabad Bus Voltage**

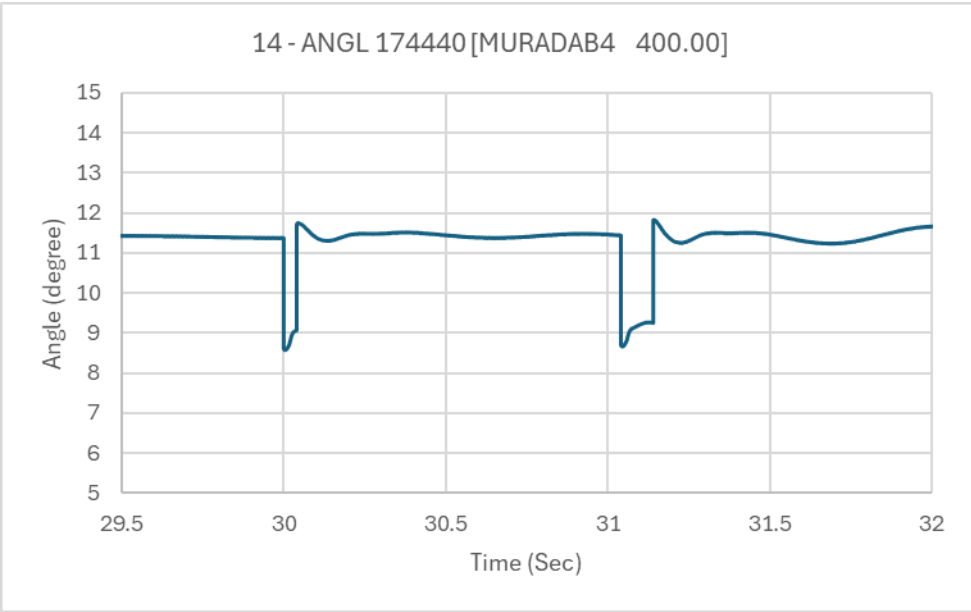
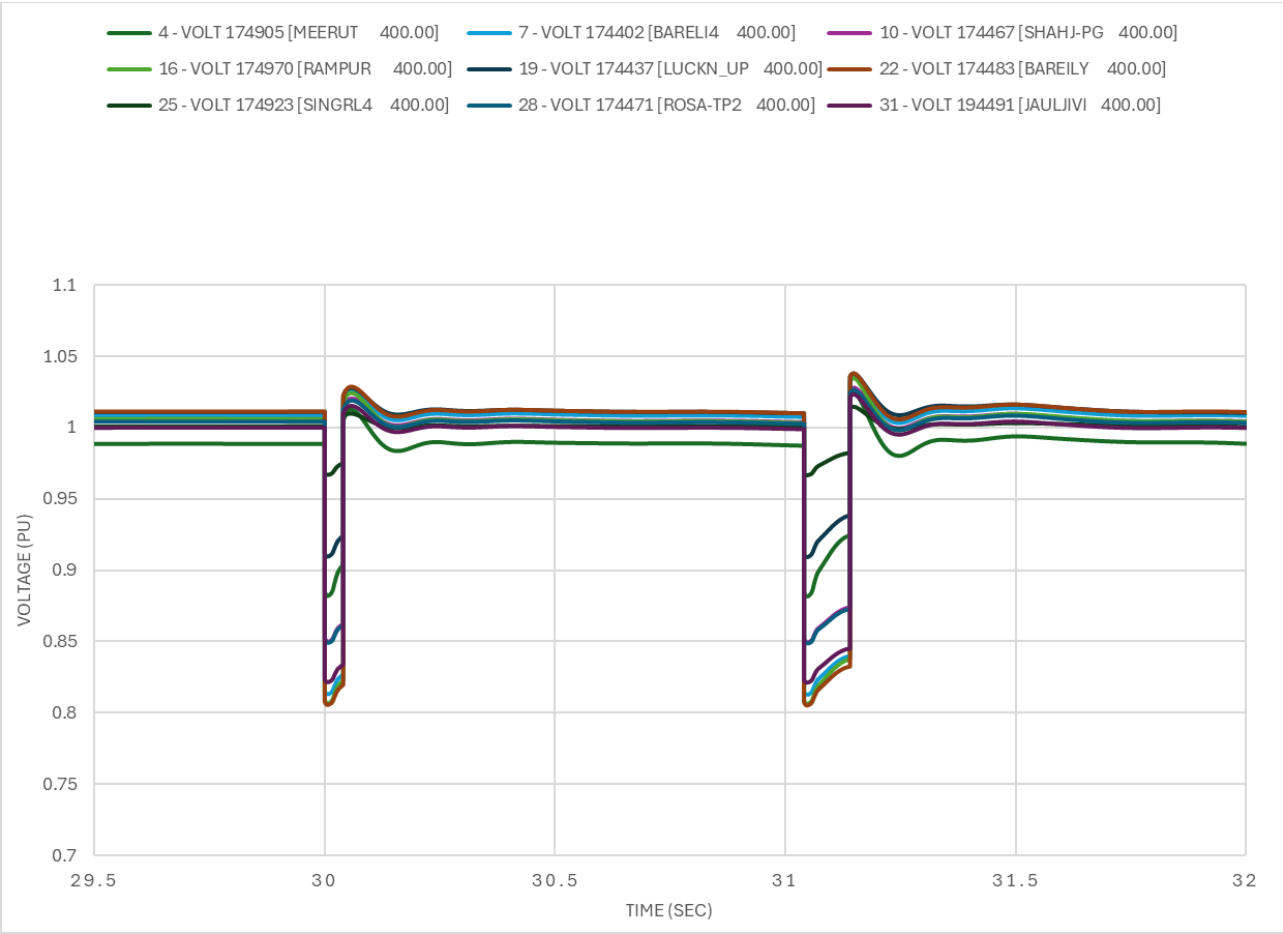
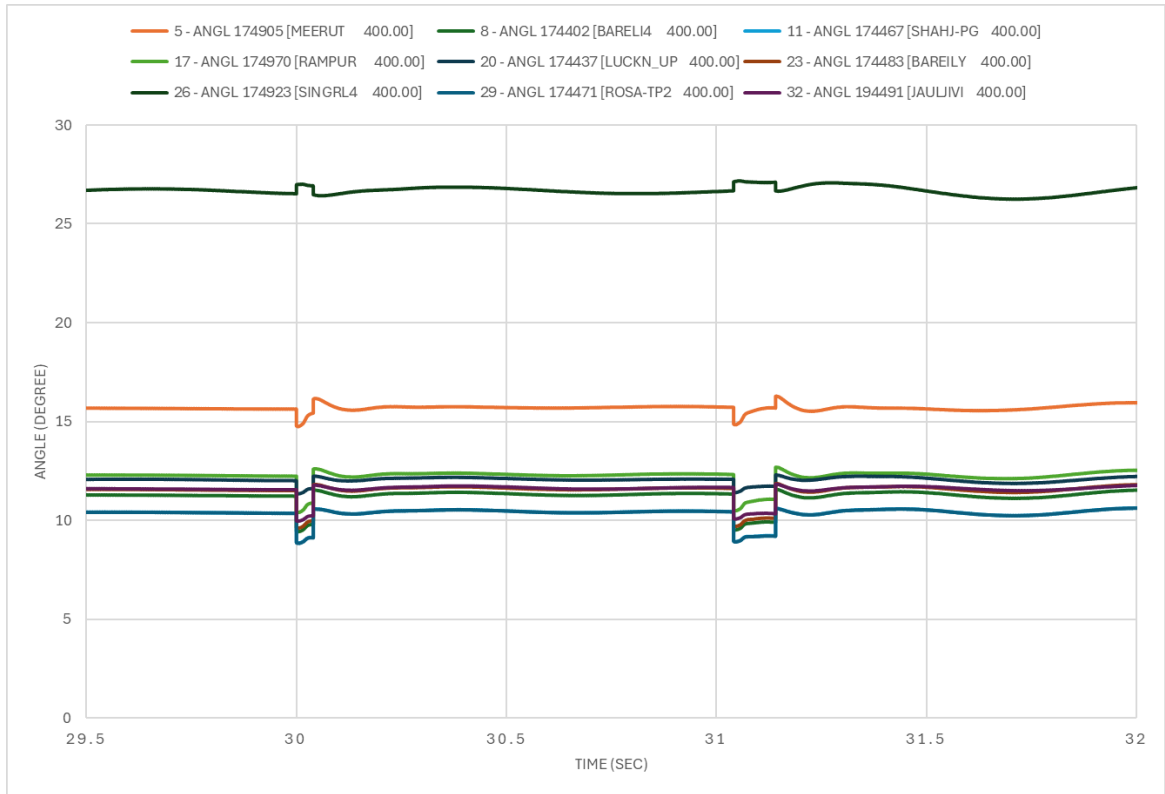


Figure 13: 400kV Moradabad Bus Angle



**Figure 14: 400kV Remote End & Generator connected Buses Voltages**



**Figure 15: 400kV Remote end & Generator connected Buses Angles**

Based on the figures above, the voltage at the 400kV Bareilly PG bus initially drops to approximately 0.8 PU but quickly recovers, rising by about 3–4% and stabilizing at its pre-fault value of around 1 PU during the dead time of the auto-reclosing process. Subsequently, the voltage drops by approximately 0.75 PU during the reclosing attempt of the line, which results in a re-trip due to a permanent fault. After isolating the fault with the line re-trip, the voltage rises by approximately 4% and stabilizes back to its pre-fault value of around 1 PU.

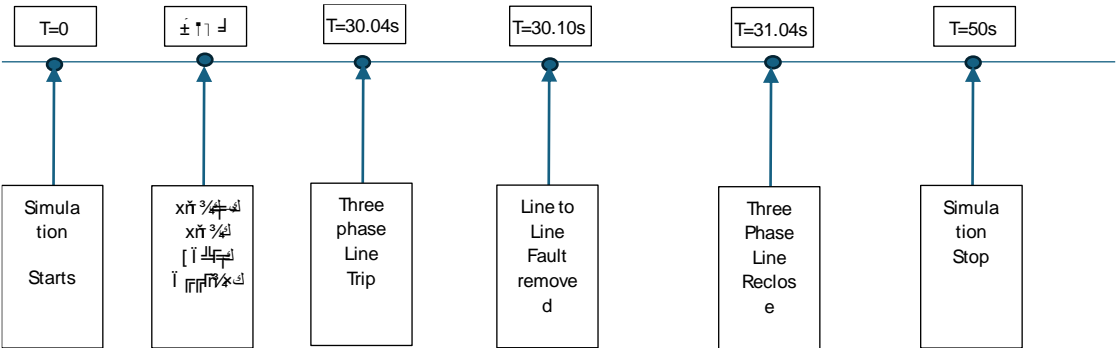
Angle at the 400kV Bareilly PG bus initially drops to approximately 8.5 degrees but quickly recovers, rising by about 3–4% and stabilizing at its pre-fault value of around 11.5 degrees during the dead time of the auto-reclosing process. Subsequently, the angle drops to approximately 8.5 degrees during the reclosing attempt of the line, which results in a re-trip due to a permanent fault. After isolating the fault with the line re-trip, angle rises by approximately 4% and stabilizes back to its pre-fault value of around 11.5 degrees.

This demonstrates that the system remains stable when implementing three-phase auto-reclosing in response to a permanent line-to-line fault as well.

### 2.3 Three phase auto-reclosing for temporary line to line fault under line contingencies

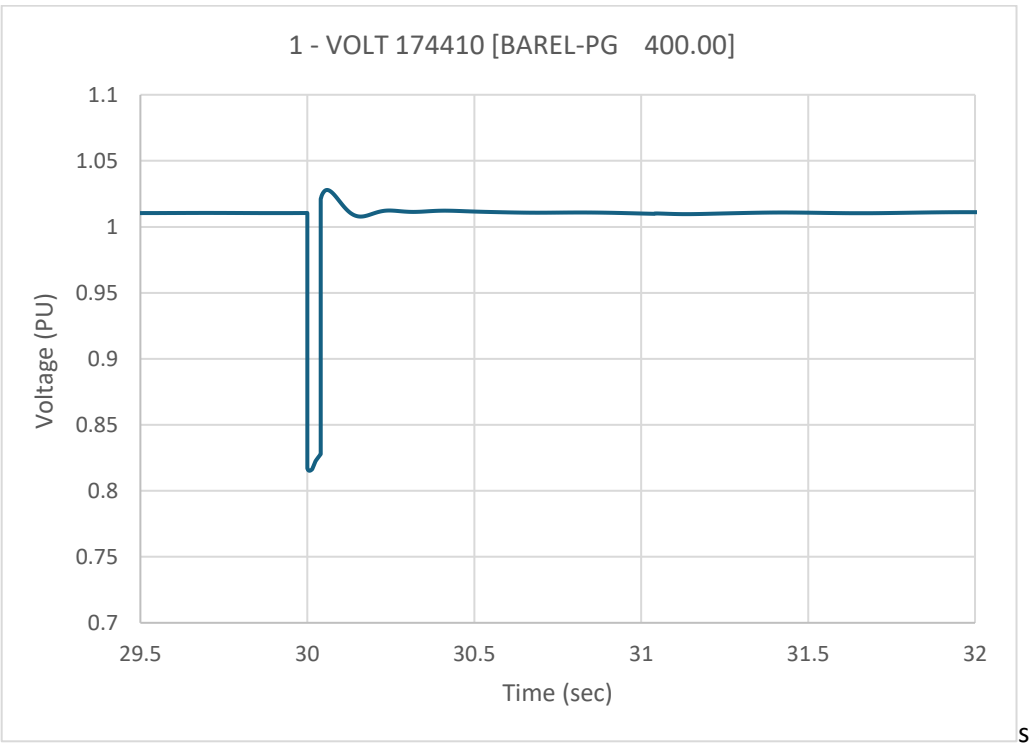
400kV Bareilly PG -Rampur and 400kV Rampur-Moradabad lines provide a parallel path to the 400kV Bareilly PG -Moradabad line. Therefore, dynamic study is also performed

with 400kV Rampur- Moradabad in out of service. In this case, a line-to-line fault is simulated on the 400kV Bareilly PG -Moradabad line, followed by three-phase auto-reclosing. Fault applied in the scenario is temporary with fault duration of 100ms. The sequence of events used in the simulation study is detailed below in Figure 16.



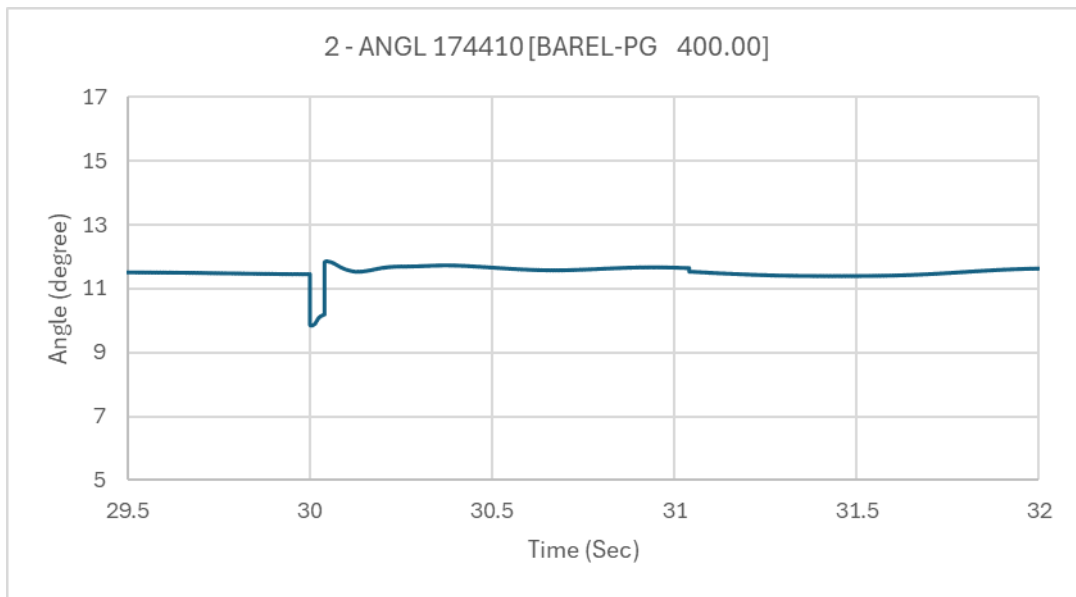
**Figure 16: Sequence of the events for three phase Auto reclosing for temporary fault under line contingency**

Absolute bus voltages and angles with respect to the slack bus of 400kV Bareilly PG and 400kV Moradabad buses are plotted in the Figure 17,Figure 18,Figure 19 and Figure 20. Other remote buses and generator connected buses voltage & angles with respect to the slack bus are depicted Figure 26 and Figure 27.

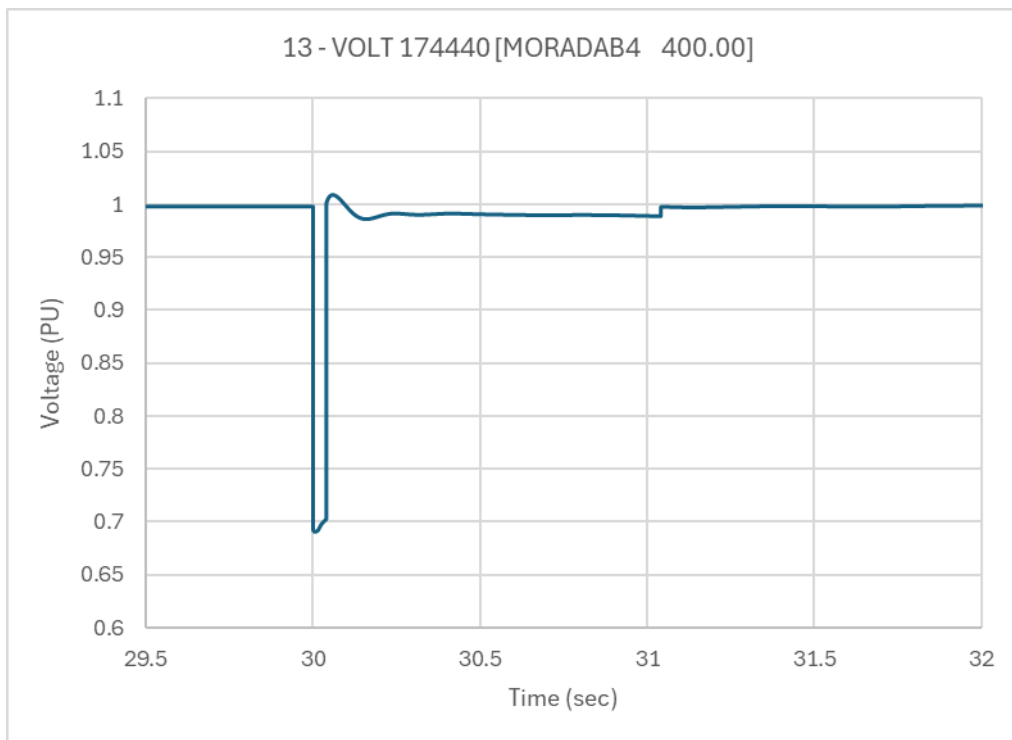


**Figure 17: 400kV Bareilly PG Bus Voltage**





**Figure 18: 400kV Bareilly PG Bus Angle**



**Figure 19: 400kV Moradabad Bus Voltage**

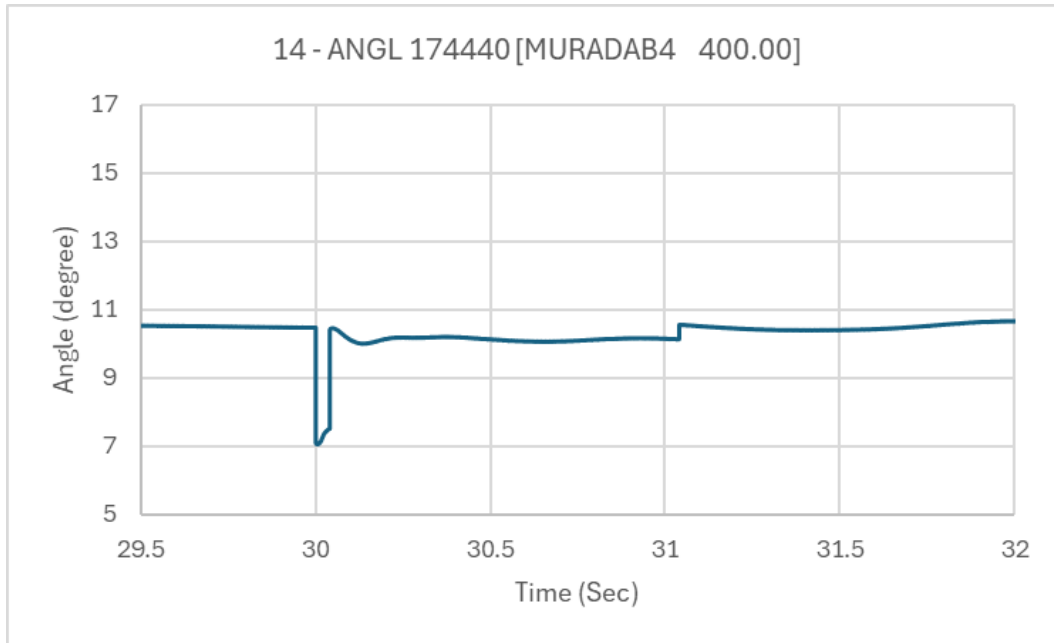


Figure 20: 400kV Moradabad Bus Angle

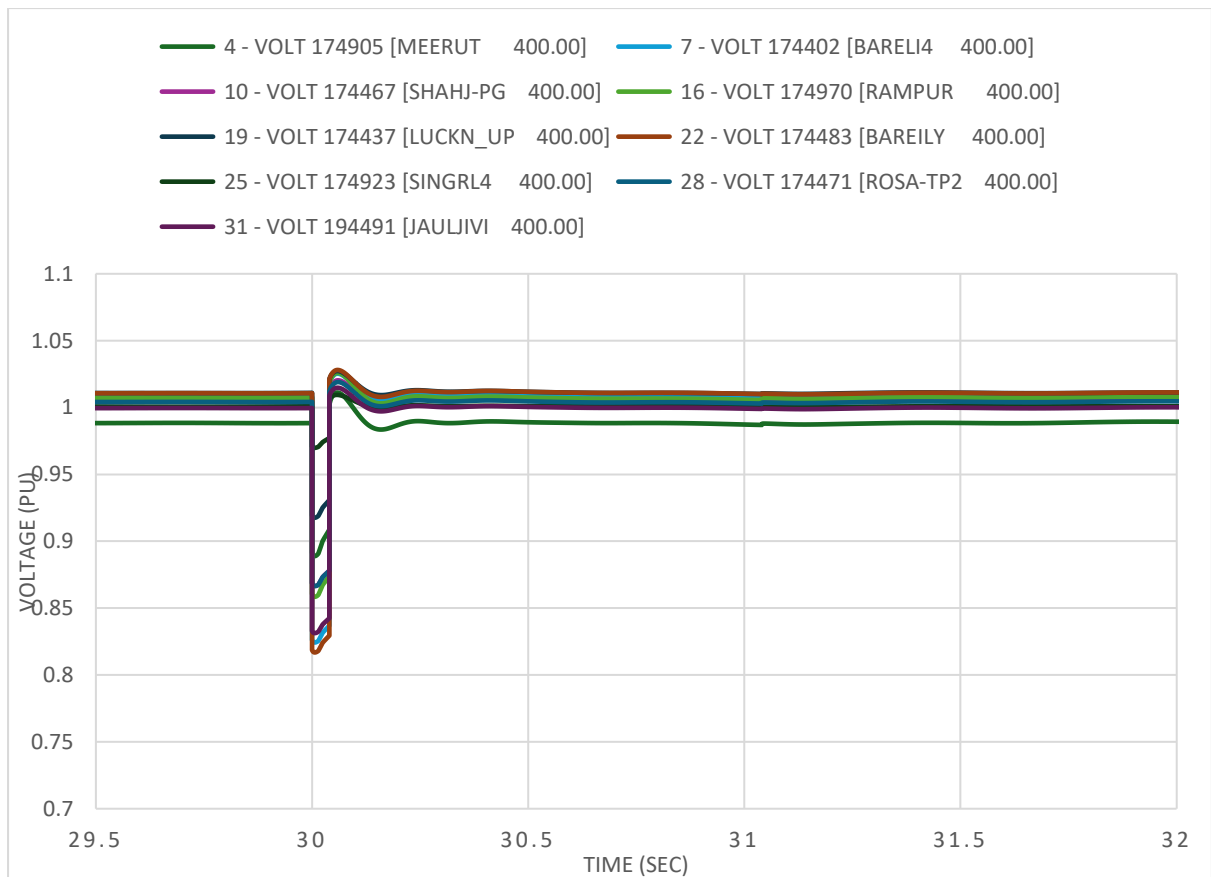
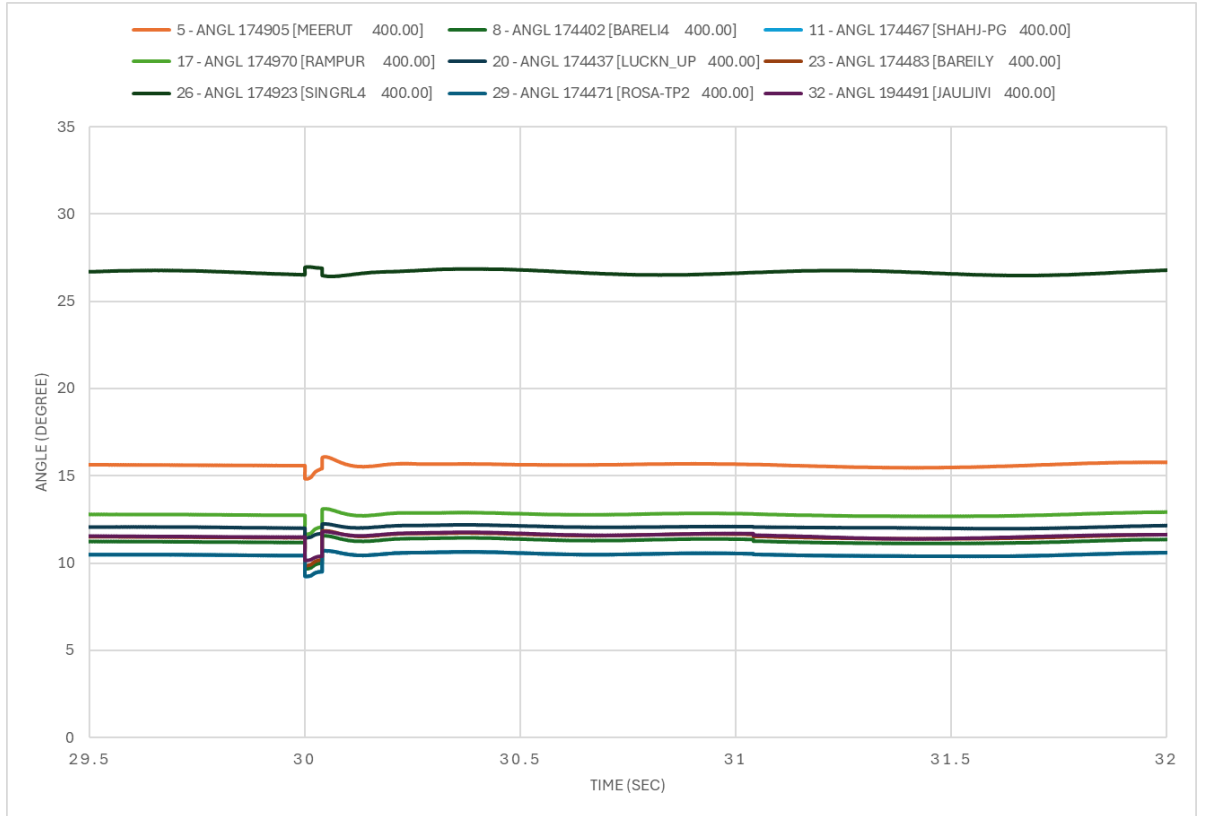


Figure 21: 400kV Remote end & Generator connected Buses Voltages

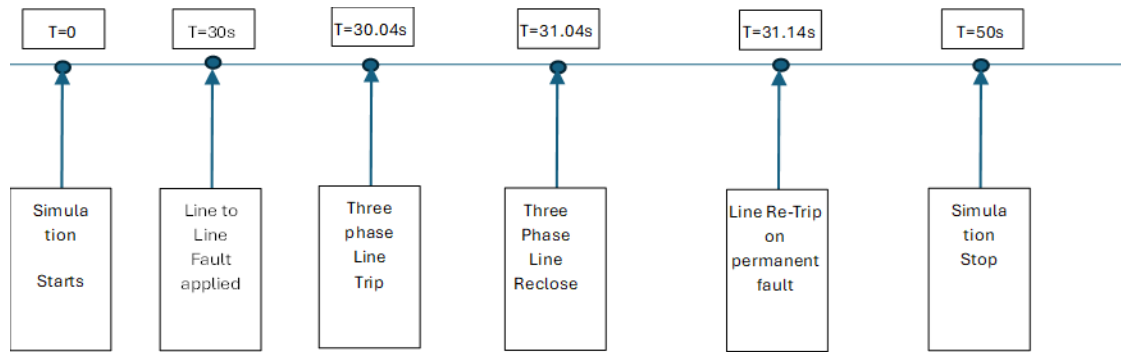


**Figure 22: 400kV Remote end & Generator connected Buses Angles**

From the figures above, the voltage at the 400kV Bareilly PG bus drops to 0.8 PU approximately but quickly recovers, rising by approximately 3–4% and stabilizing at its pre-fault value of around 1 PU after fault isolation. Similarly, the load angle at the 400kV Bareilly PG bus decreases by approximately 10 degrees but recovers quickly, rising by 3–4% and stabilizing at its pre-fault value of about 11.5 degrees after fault isolation. Other remote end and generator connected buses exhibited similar behaviour as shown in the Figure 21 and Figure 22. This demonstrates that the system remains stable when implementing three-phase auto-reclosing in response to a temporary line-to-line fault with contingency.

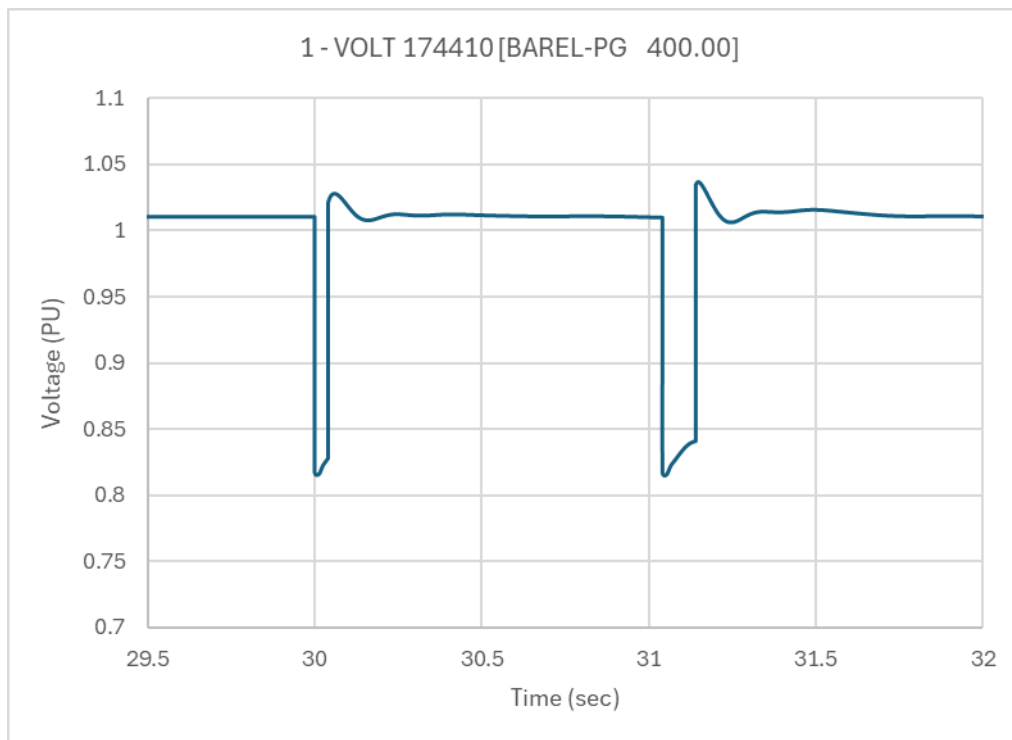
## 2.4 Three phase auto-reclosing for permanent line to line fault under contingencies

400kV Bareilly PG -Rampur and 400kV Rampur-Moradabad lines provide a parallel path to the 400kV Bareilly PG -Moradabad line. Therefore, dynamic study is also performed with 400kV Rampur- Moradabad in out of service. In this case, a line-to-line fault is simulated on the 400kV Bareilly PG -Moradabad line, followed by three-phase auto-reclosing. Fault applied in the scenario is permanent. The sequence of events used in the simulation study is detailed below.

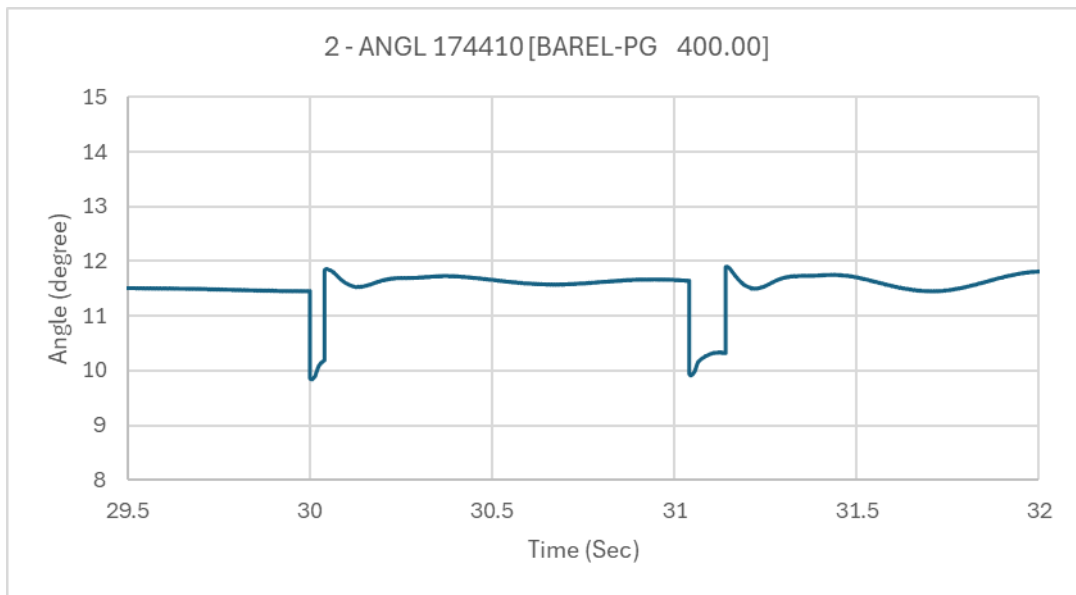


**Figure 23: Sequence of the events-three phase Auto reclosing for permanent fault**

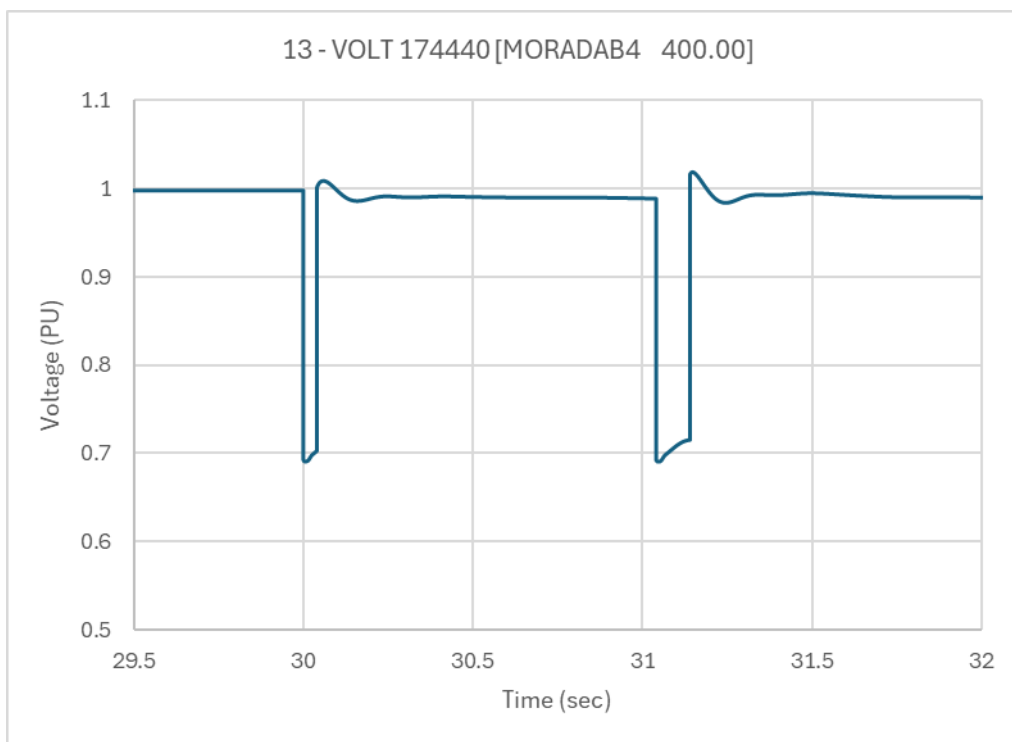
Absolute bus voltages and angles with respect to the slack bus of 400kV Bareilly PG and 400kV Moradabad buses are plotted in the Figure 24, Figure 25, Figure 26, and Figure 27. Other remote end buses and generator connected buses voltage & angles with respect to the slack bus are depicted in Figure 28 and Figure 29.



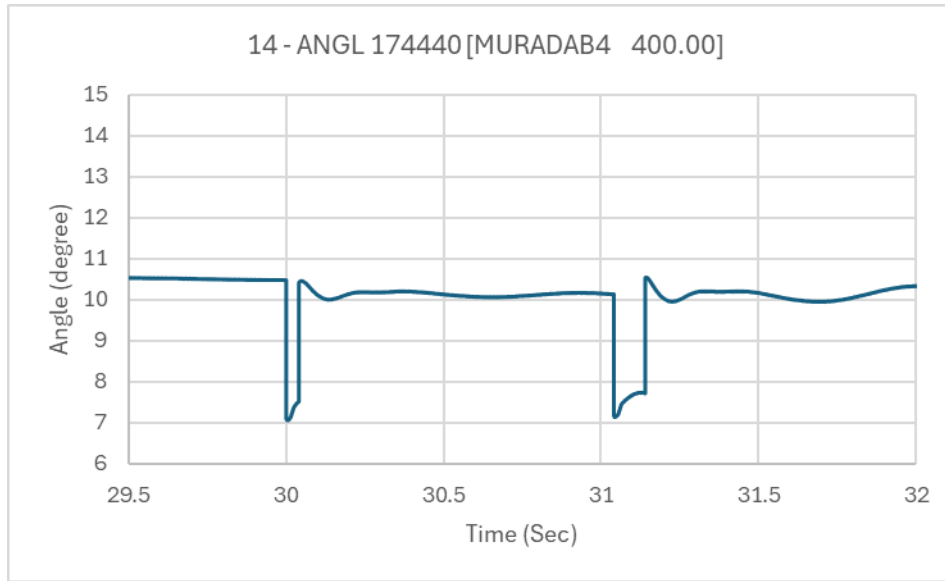
**Figure 24: 400kV Bareilly PG Bus Voltage**



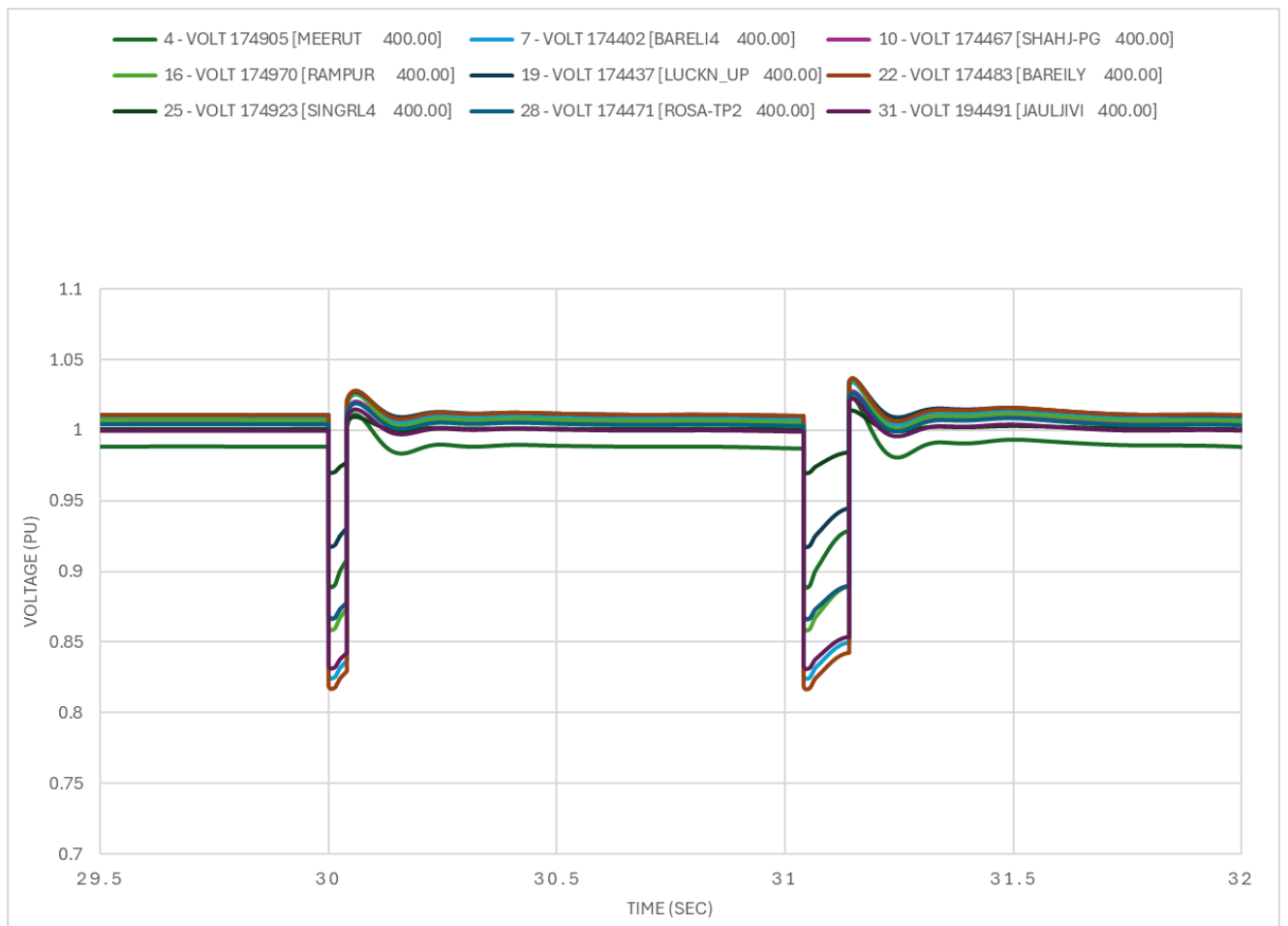
**Figure 25: 400kV Bareilly PG Bus Angle**



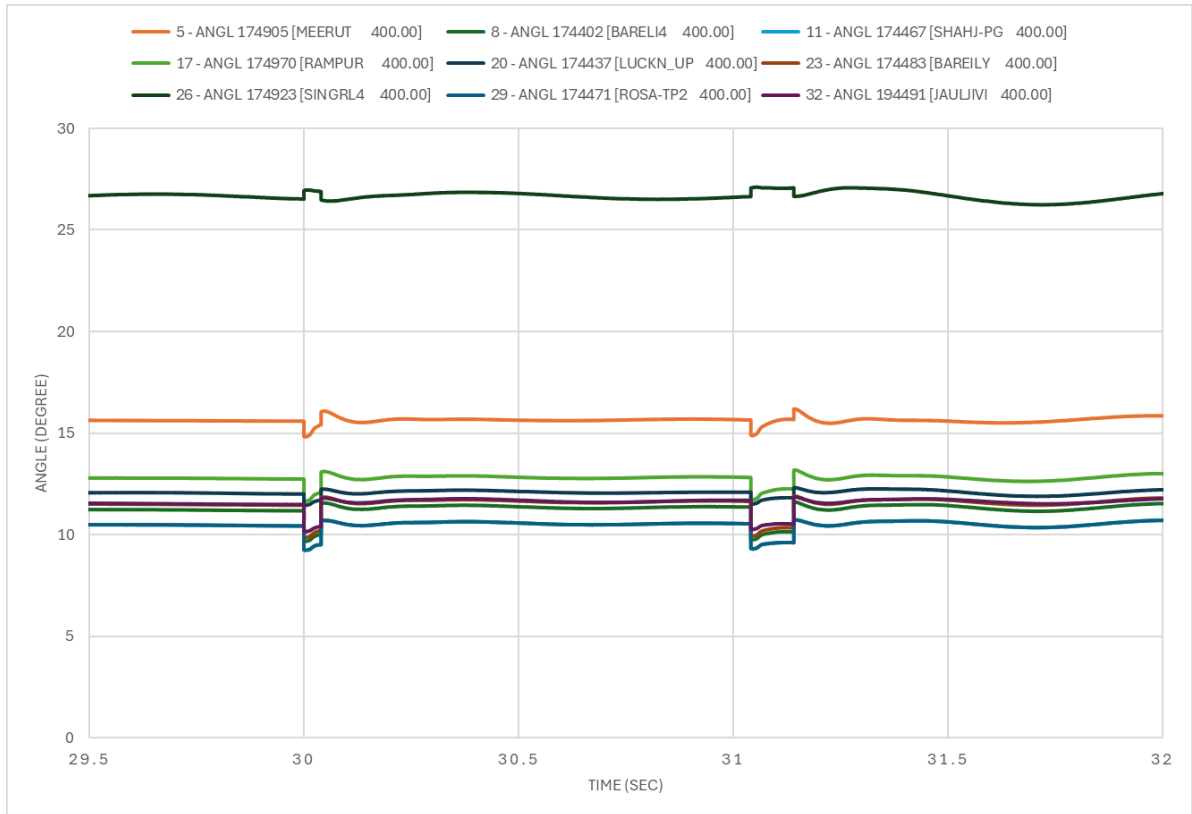
**Figure 26: 400kV Moradabad Bus Voltage**



**Figure 27: 400kV Moradabad Bus Angle**



**Figure 28: 400kV Remote end & Generator connected Buses Voltages**



**Figure 29: 400kV Remote end & Generator connected Buses Angles**

Based on the figures above, the voltage at the 400kV Bareilly PG bus initially drops to approximately 0.8 PU but quickly recovers, rising by about 3–4% and stabilizing at its pre-fault value of around 1 PU during the dead time of the auto-reclosing process. Subsequently, the voltage drops by approximately 0.8 PU during the reclosing attempt of the line, which results in a re-trip due to a permanent fault. After isolating the fault with the line re-trip, the voltage rises by approximately 4% and stabilizes back to its pre-fault value of around 1 PU.

Angle at the 400kV Bareilly PG bus initially drops to approximately 10 degrees but quickly recovers, rising by about 3–4% and stabilizing at its pre-fault value of around 11.5 degrees during the dead time of the auto-reclosing process. Subsequently, the angle drops by approximately 10 degrees during the reclosing attempt of the line, which results in a re-trip due to a permanent fault. After isolating the fault with the line re-trip, angle rises by approximately 4% and stabilizes back to its pre-fault value of around 11.5 degrees.

This demonstrates that the system remains stable when implementing three-phase auto-reclosing in response to a permanent line-to-line faults under contingency conditions as well.

## Conclusion

The dynamic study conducted to assess the feasibility of three-phase auto-reclosing on the 400kV Bareilly PG - Moradabad line.

Simulation findings indicate that voltage and angle deviations at both 400 kV Bareilly PG and Moradabad buses and at other remote buses & generator buses are within safe limits for 3 phases auto-reclosing. It showcases the system's robustness and feasibility of three phase auto-reclosing under temporary & permanent line to line fault conditions. Similar behaviour was observed during simulations with contingency conditions, such as the 400kV Moradabad-Rampur line being out of service.

Based on these observations, it is recommended to implement three-phase auto-reclosing for line-to-line faults on the 400kV Bareilly PG - Moradabad line to enhance system reliability and stability. It is to be noted that the line shall be tripped for any three phase faults on the line and auto reclose shall not be attempted for 3 phase faults.



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.....End of the Report .....

# 3-Phase Auto-Reclosing for 400 kV Bareilly PG-Moradabad Transmission Line

Presented by  
POWERGRID

# Introduction

## Background :

- 76 no. of phase-to-phase tripping incidents recorded in NR-III Region due to kite thread (May 2021 – April 2024).
- These type of faults are temporary in nature
- 400kV Bareilly PG-Moradabad line had 16 incidents, highlighting its vulnerability.
- In the 51st NRPC meeting, it was recommended to perform simulation studies for implementation of 3 ph Auto Reclose

## Objective :

- Explore three-phase auto-reclosing (3-Ph AR) to address line-to-line fault scenarios.

# International Practices of Three-Phase Auto-Reclosing

**United Kingdom (UK):** Three phase auto-reclosing employed.

**Sweden:** Prefers three-pole auto-reclosing due to lower costs for protection and control equipment compared to single-pole reclosing.

**Germany:** High-speed auto-reclosing (single-pole or three-pole) without synchronism checks at 400 kV and 220 kV levels as they have mesh network

**Japan:** Multi-pole reclosing is used only for double-circuit lines.

**Source-** *CIGRE 270 TB - Study Committee B5 Working Group 34.01*

# System details

400kV Bareilly PG-Moradabad Line configuration:

- Length : 93 km.
- Rectors : Not present.
- Conductor Configuration : S/C Twin Moose

Short circuit MVA

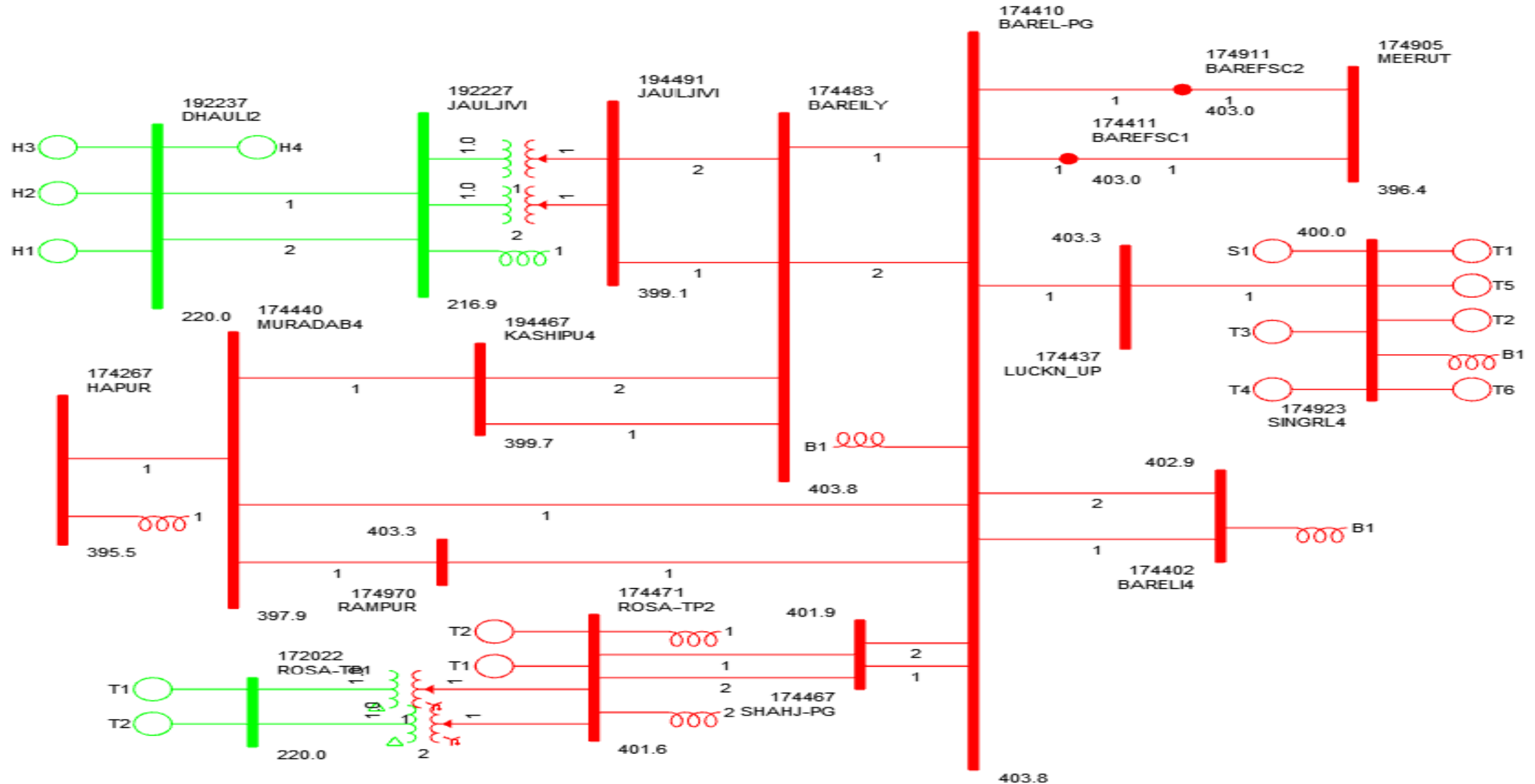
Substation (400kV)		Short Circuit MVA	Short Circuit Current(kA)
Bareilly PG	3ph	28995	41.85
Moradabad	3ph	18996	27.41

# System details

Nearby generation details -

- NTPC Singrauli Super Thermal Power Station (SSTPS) - 2,000 MW.
- Rosa Thermal Power Plant - 1200 MW.
- Dhauliganga Hydroelectric Power Station (DHPS) - 280 MW.

# Single Line Diagram (SLD)



# Simulation Study Overview

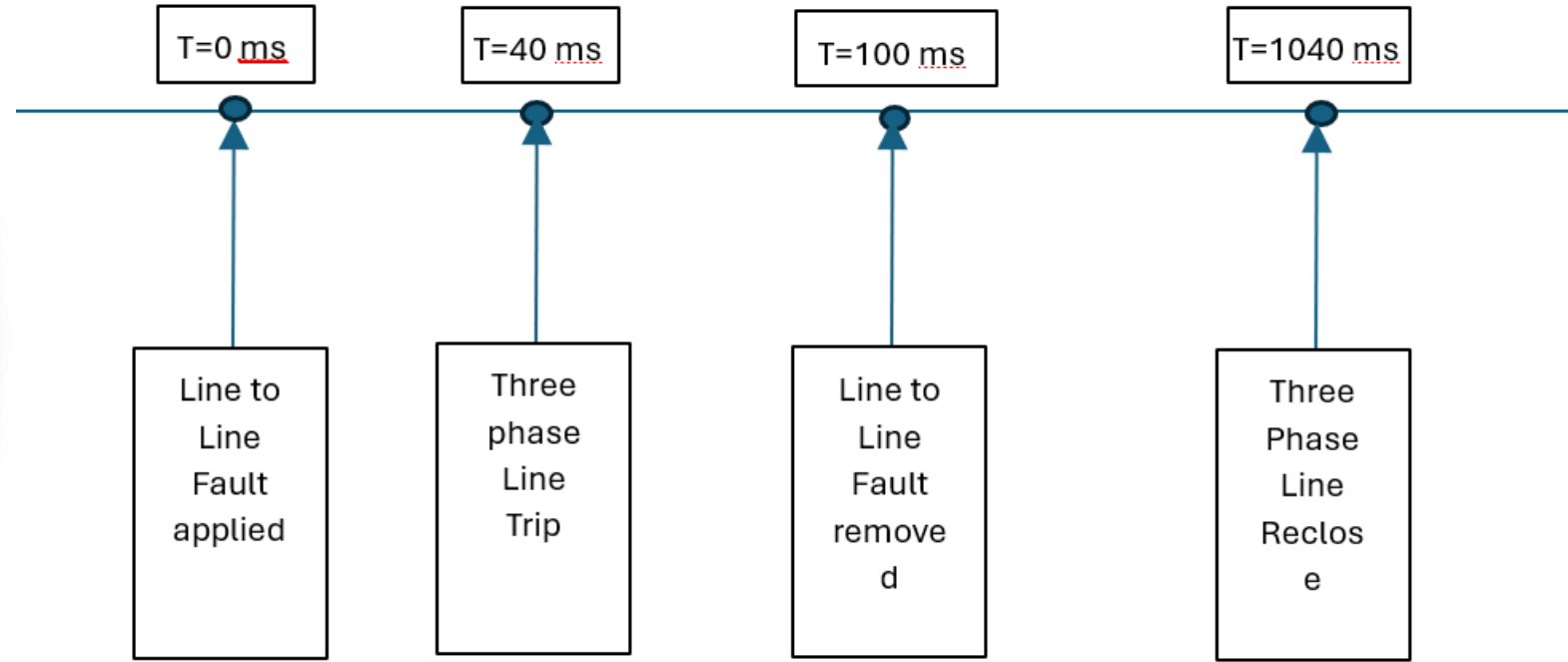
Dynamic study performed to assess the system behavior for 3-Ph Auto Reclosing (dead time 1 sec) under :

- Temporary line-to-line faults
- Permanent line-to-line faults
- Above faults with Line contingencies (N-1, N-2 & N-3)

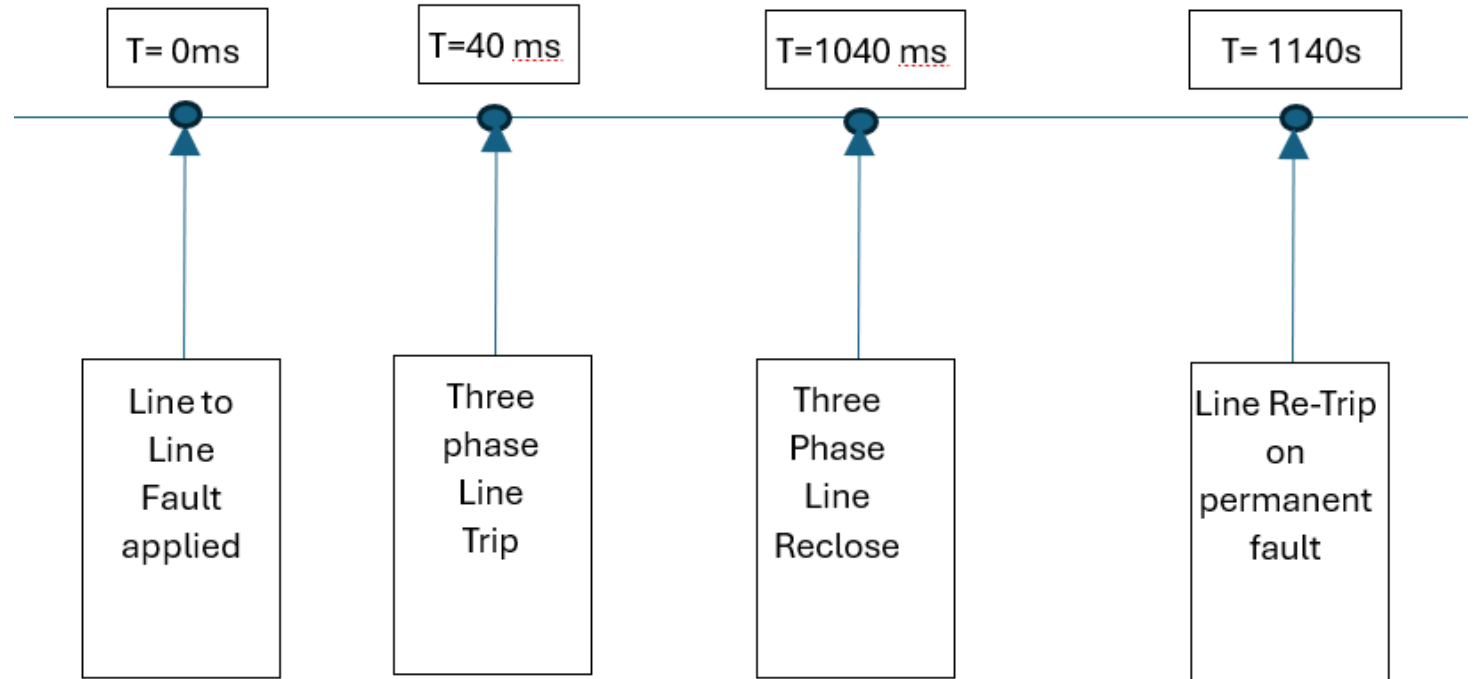
Voltage and Angular separation at Bareilly PG and Moradabad buses are measured



## Sequence of the events for three-phase auto-reclosing for temporary fault



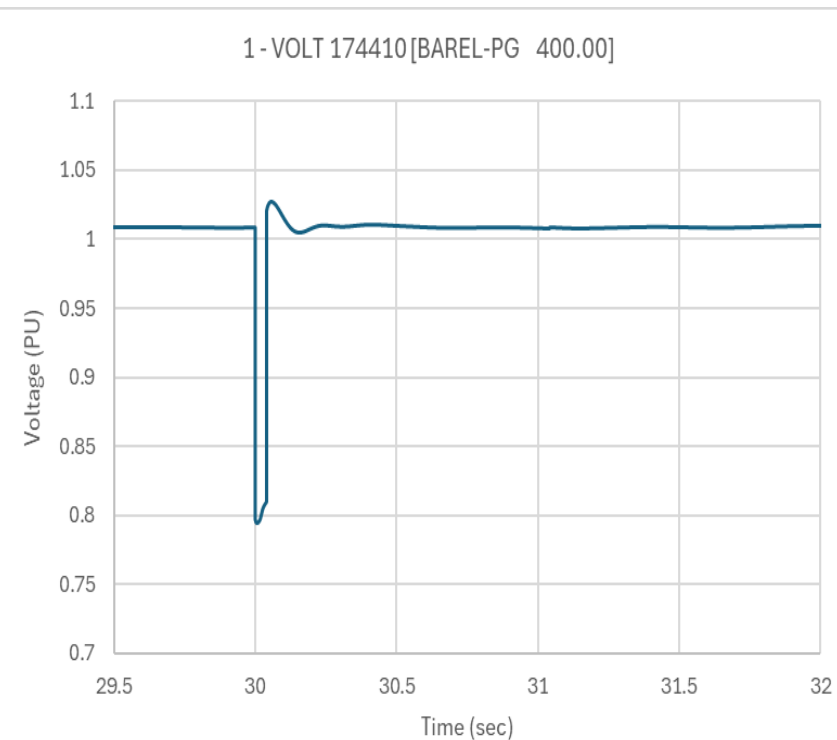
## Sequence of the events for three-phase auto-reclosing for Permanent fault



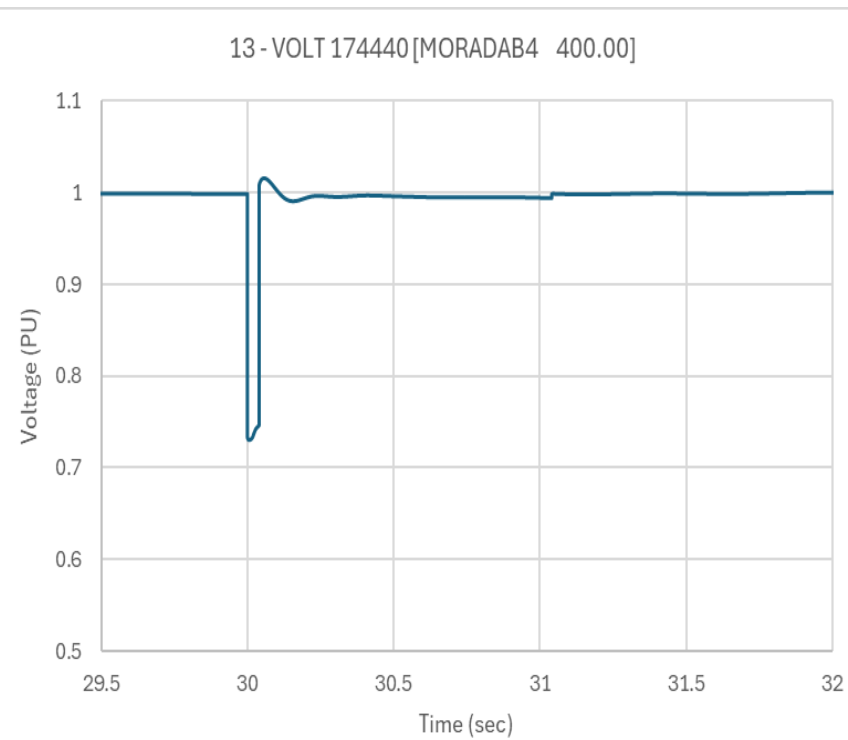
# Simulation Results - Base Case

**Case Scenario 1:** Temporary Line-to-line fault followed by successful 3-Ph AR.

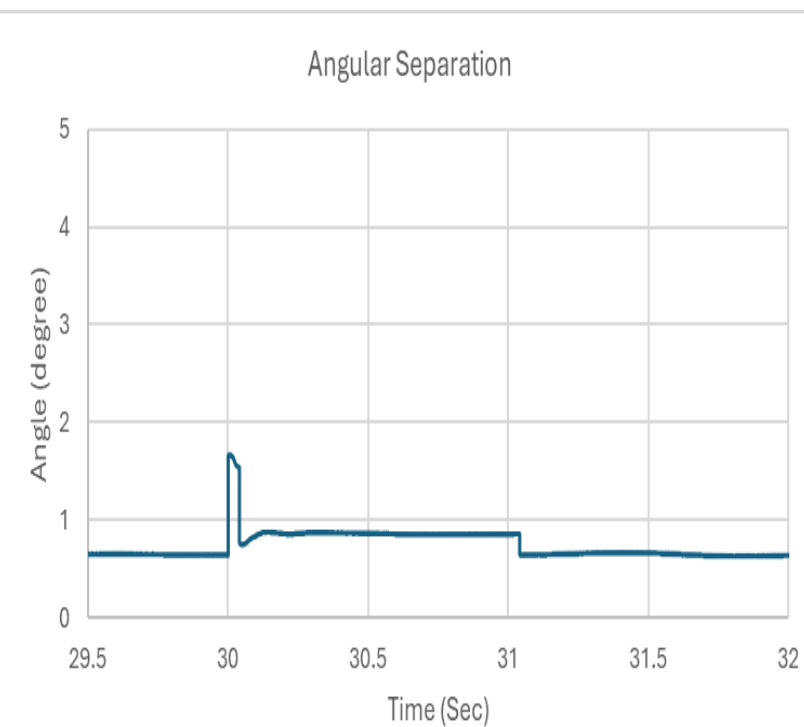
## Voltage@Bareilly PG



## Voltage@Moaradabad



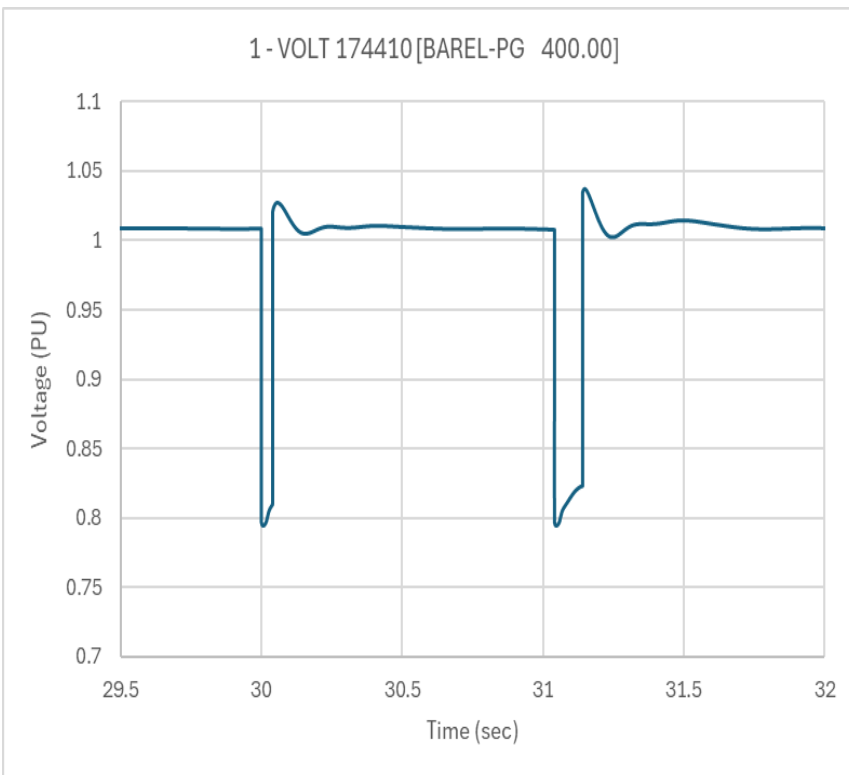
## Angular Separation



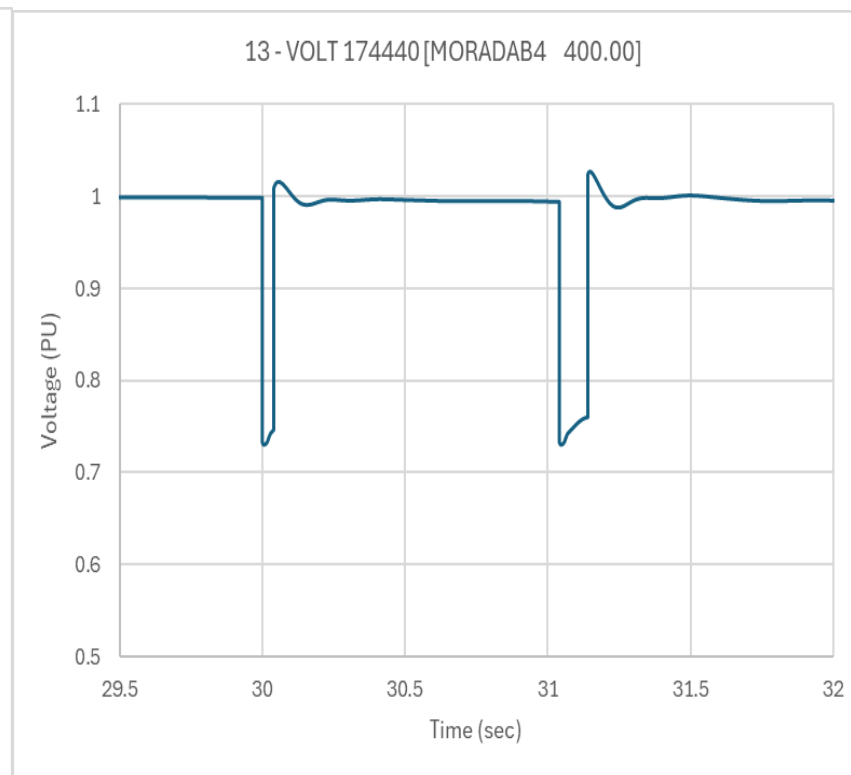
# Simulation Results - Base Case

**Case Scenario 2:** Permanent Line-to-line fault followed by Un-successful 3-Ph AR.

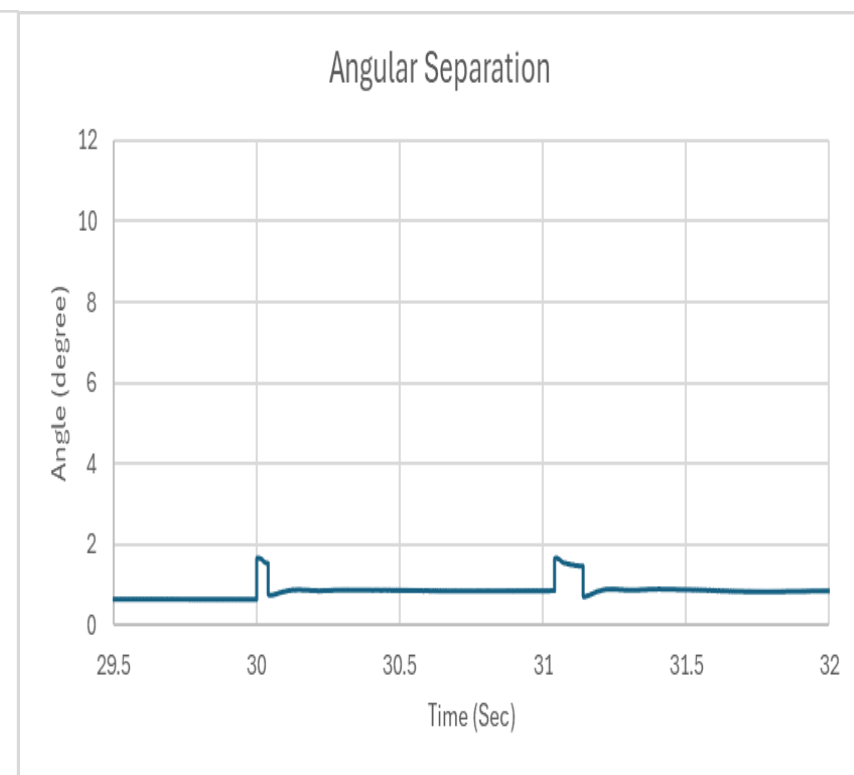
## Voltage@Bareilly PG



## Voltage@Moaradabad



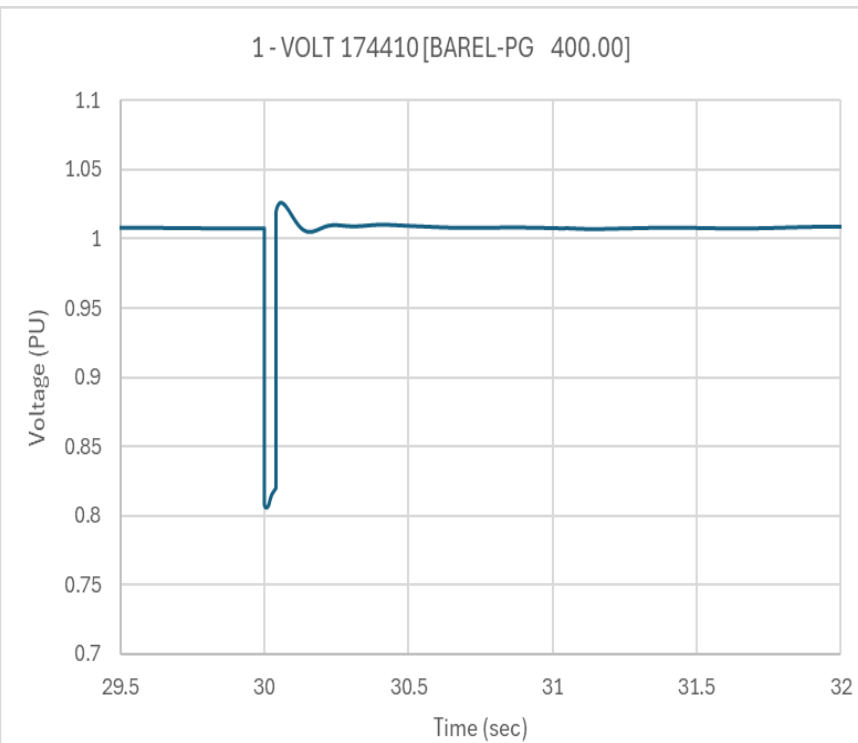
## Angular Separation



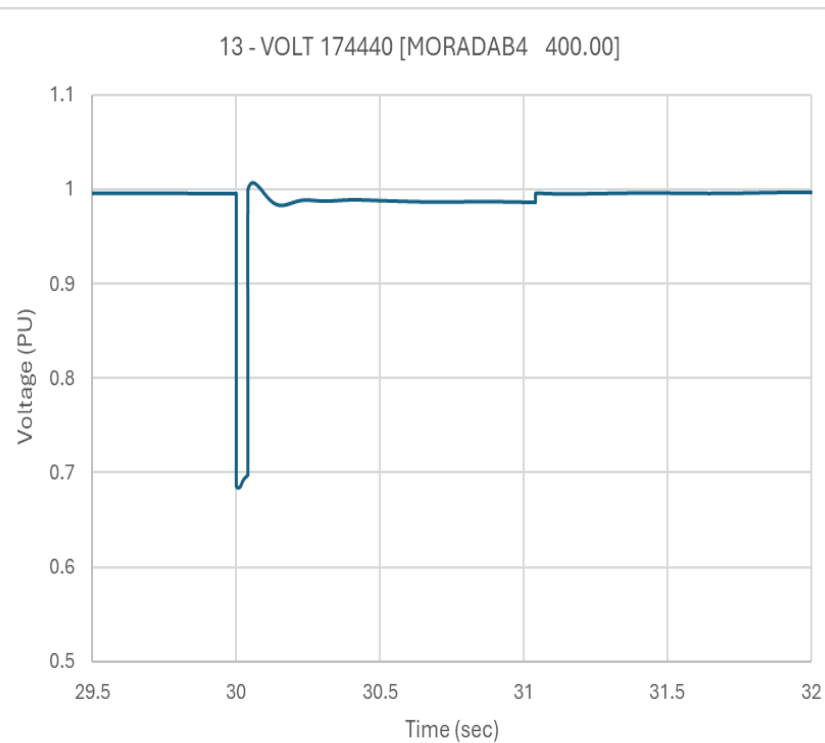
# Simulation Results – Contingency(N-1)

**Case Scenario 1:** Temporary Line-to-line fault followed by successful 3-Ph AR.

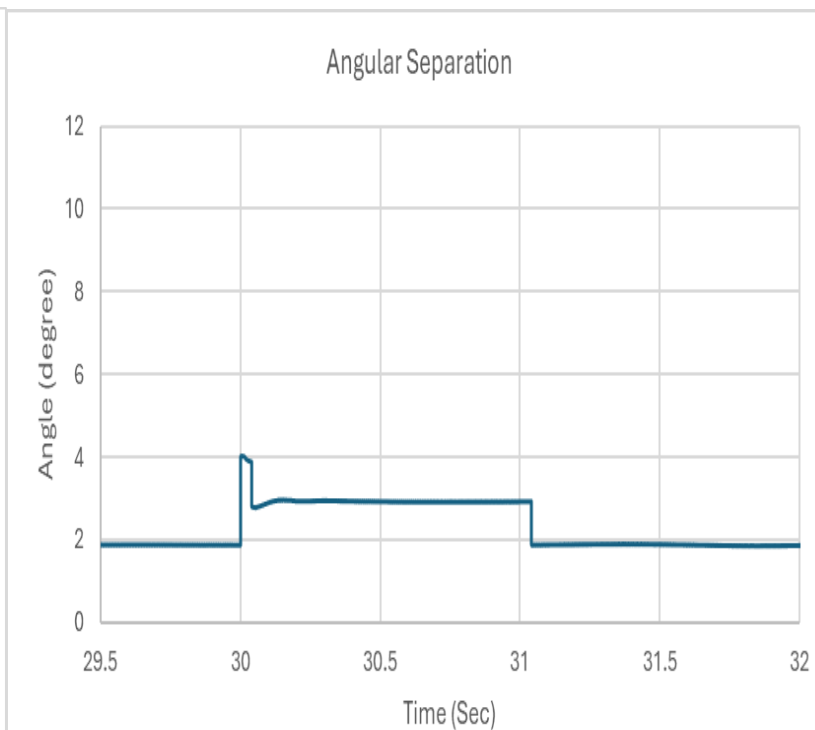
## Voltage@Bareilly PG



## Voltage@Moaradabad



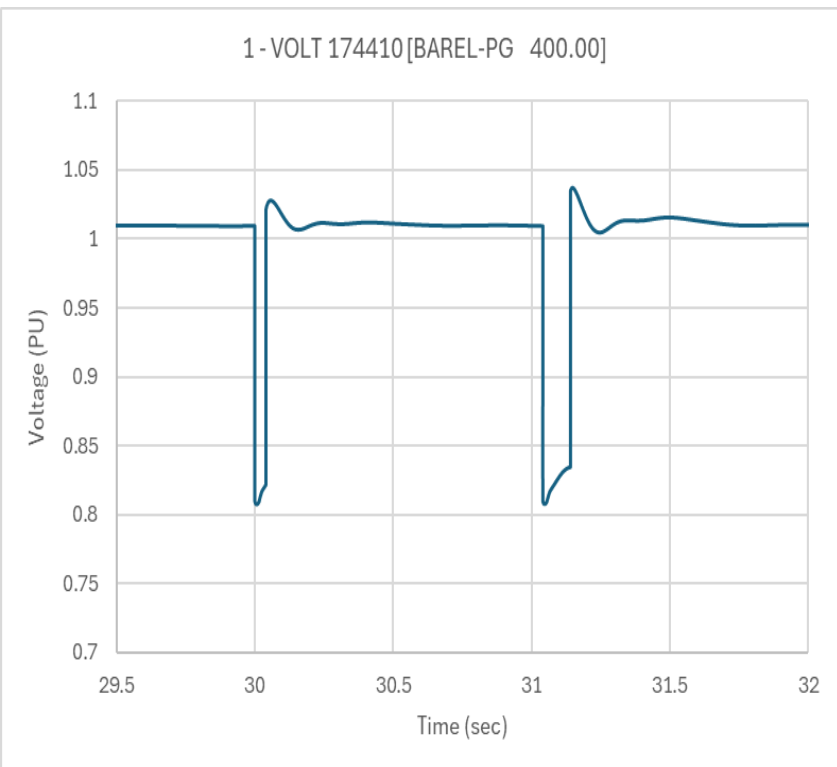
## Angular Separation



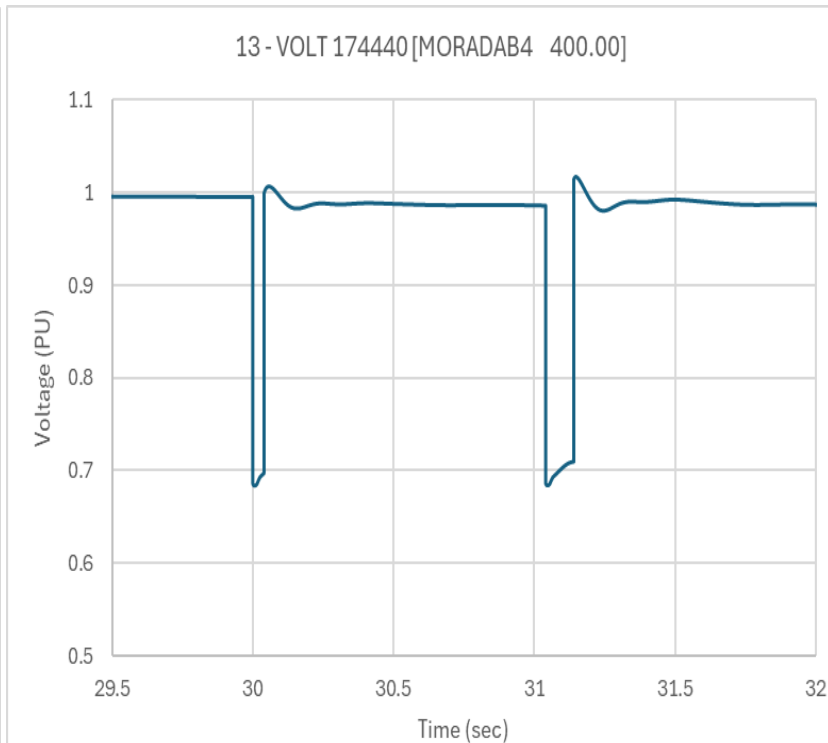
# Simulation Results - Contingency(N-1)

**Case Scenario 2:** Permanent Line-to-line fault followed by Un-successful 3-Ph AR.

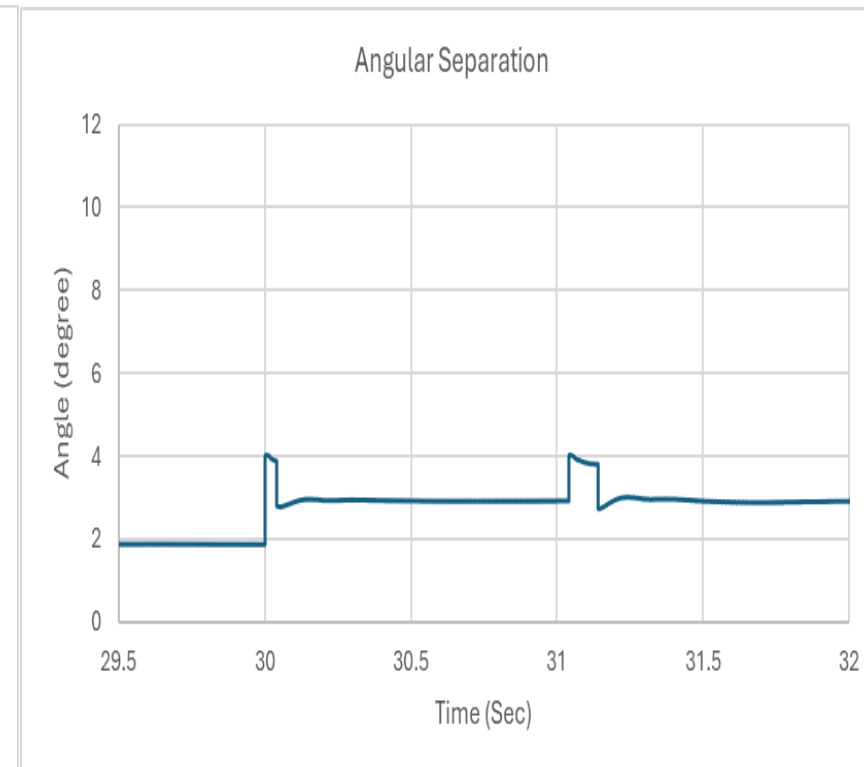
## Voltage@Bareilly PG



## Voltage@Moaradabad



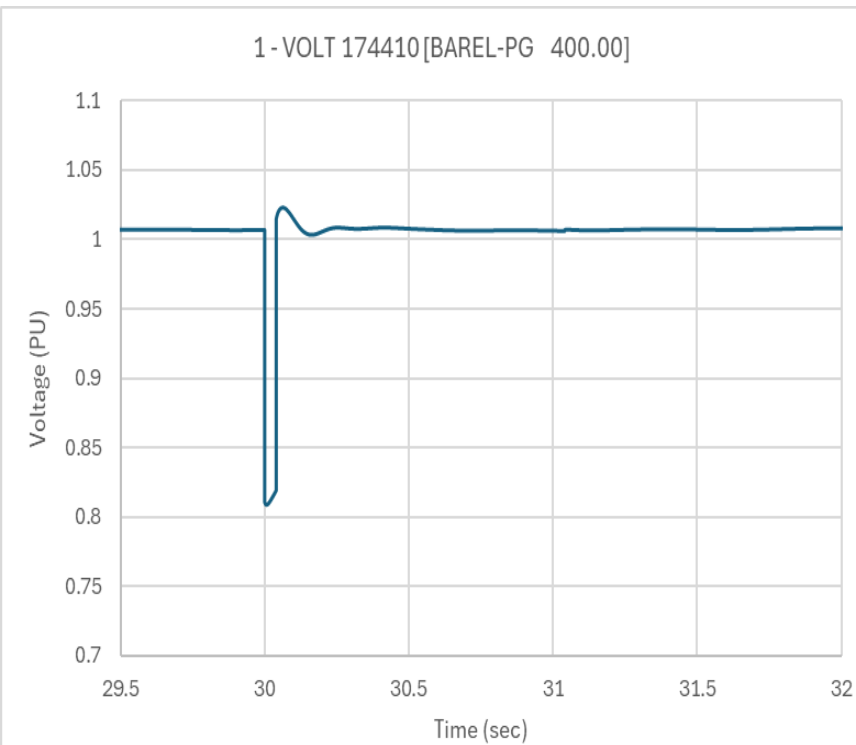
## Angular Separation



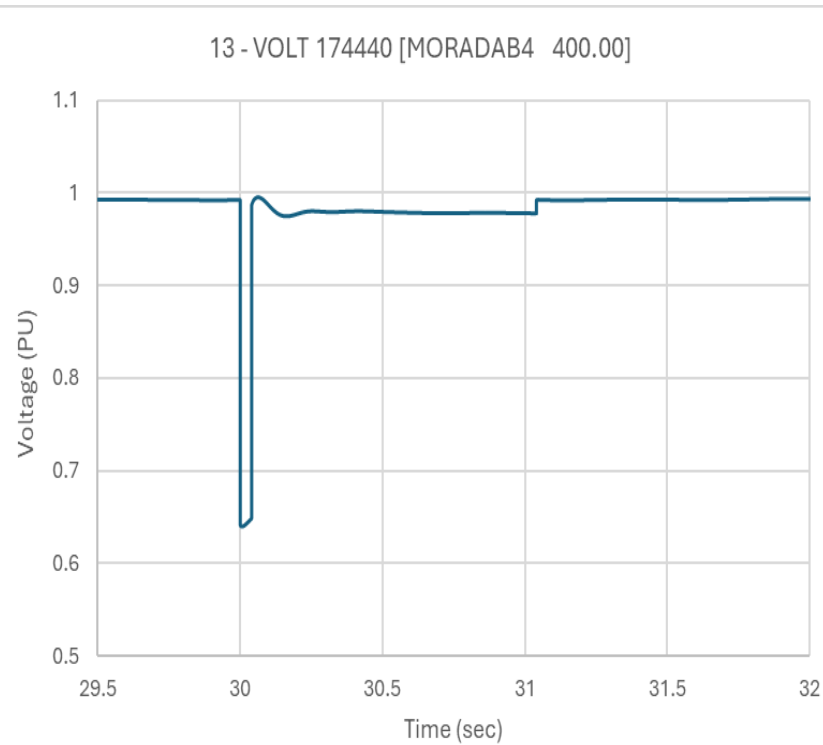
# Simulation Results – Contingency(N-2)

**Case Scenario 1:** Temporary Line-to-line fault followed by successful 3-Ph AR.

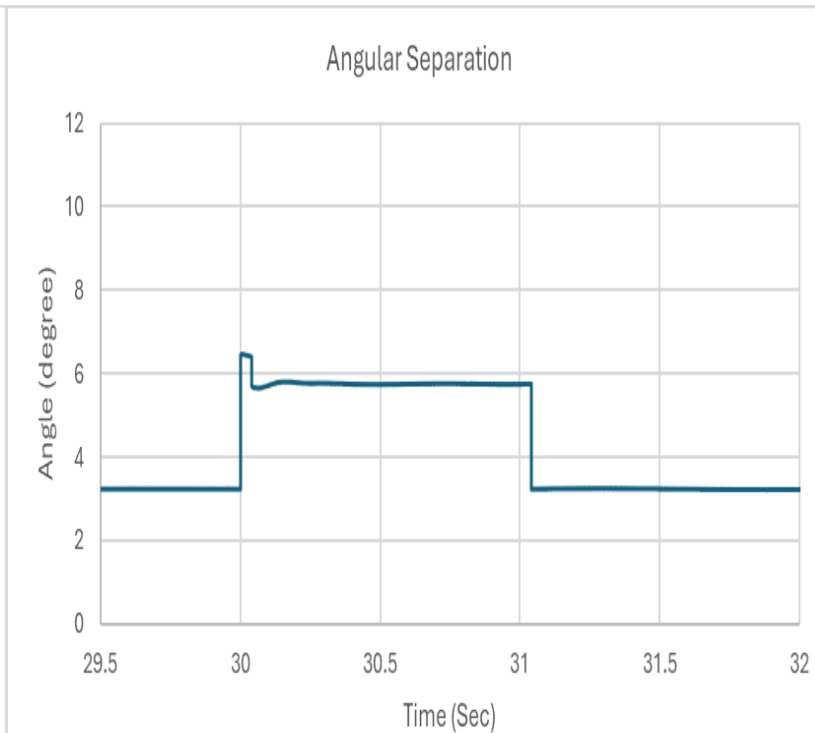
## Voltage@Bareilly PG



## Voltage@Moaradabad



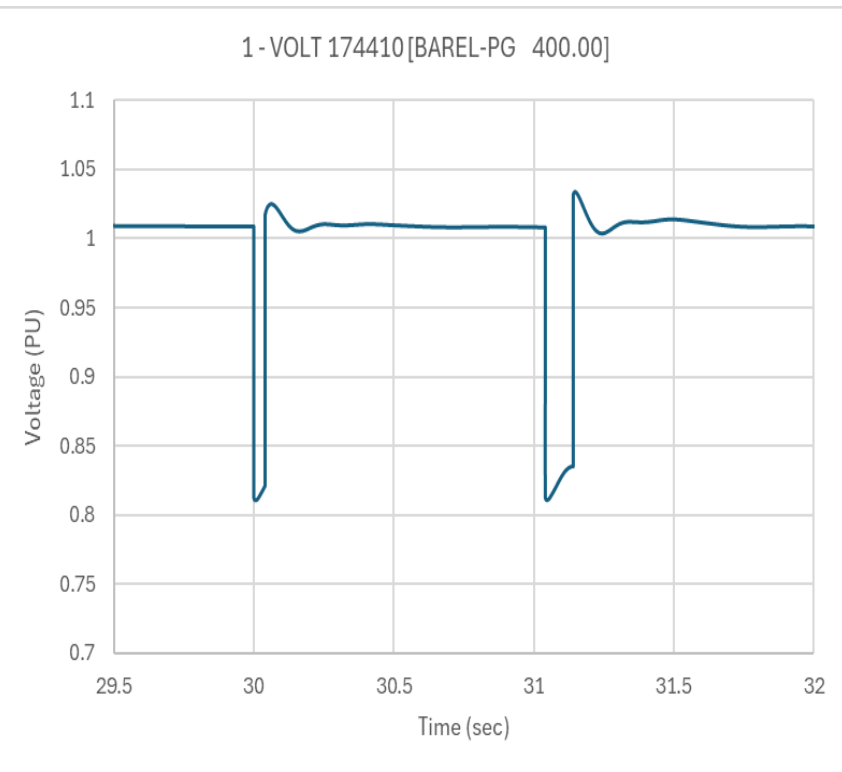
## Angular Separation



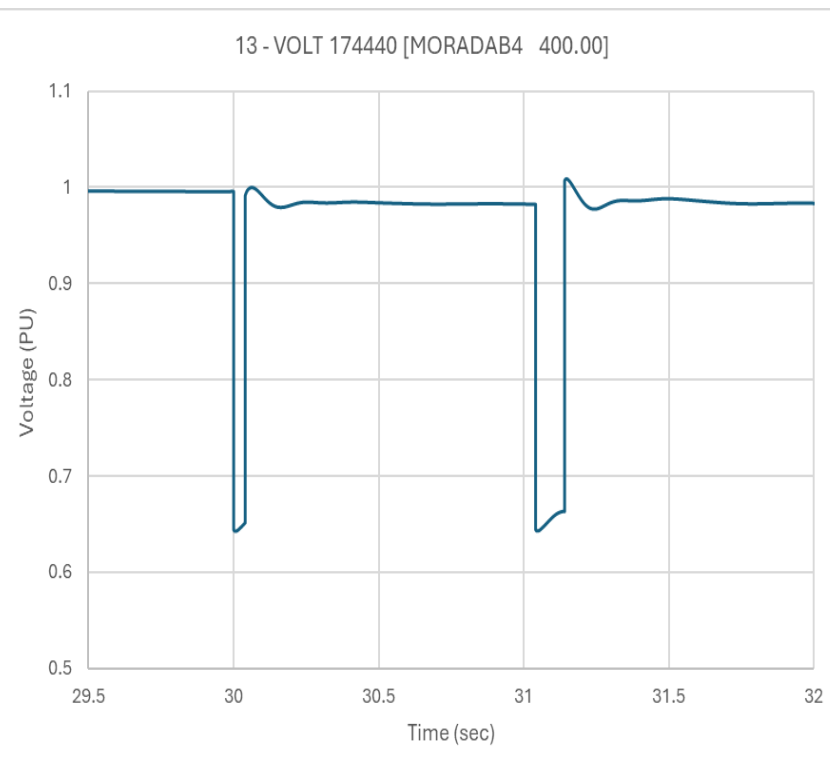
# Simulation Results - Contingency(N-2)

**Case Scenario 2:** Permanent Line-to-line fault followed by Un-successful 3-Ph AR.

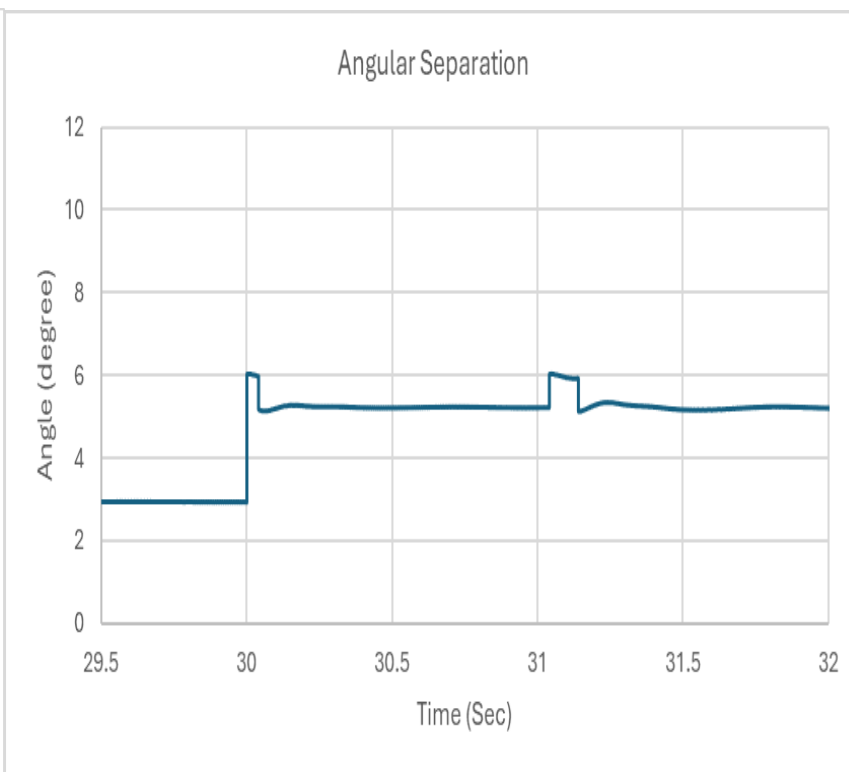
## Voltage@Bareilly PG



## Voltage@Moaradabad



## Angular Separation

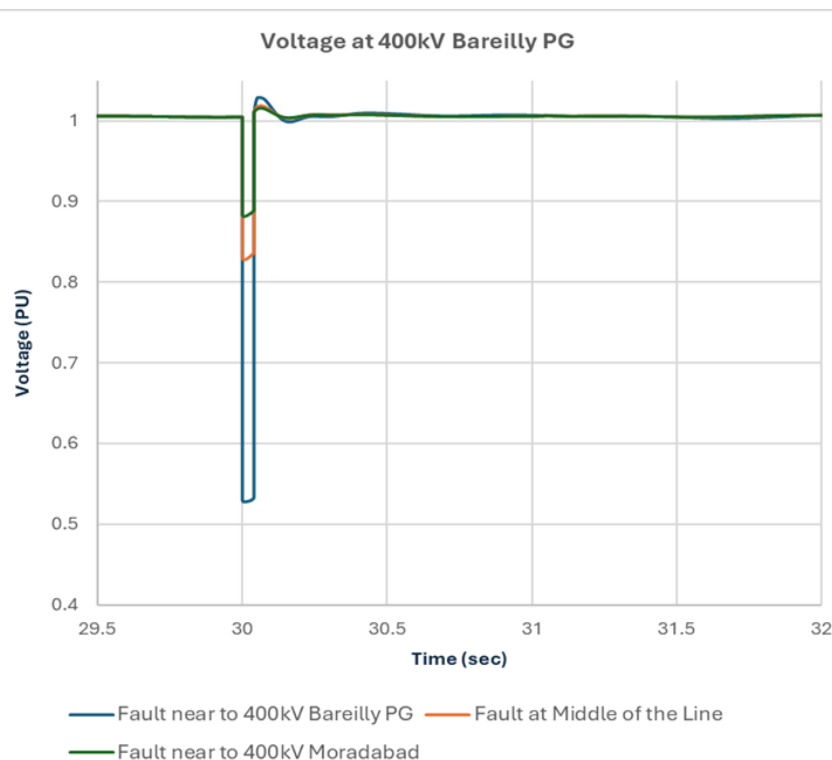




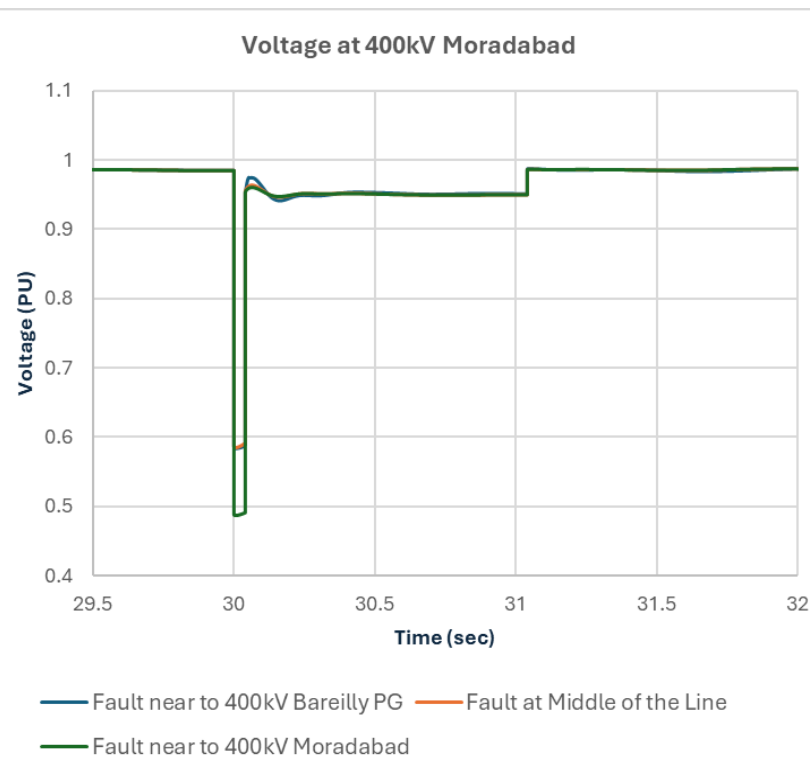
# Simulation Results – Contingency(N-3)

**Case Scenario 1:** Temporary Line-to-line fault followed by successful 3-Ph AR.

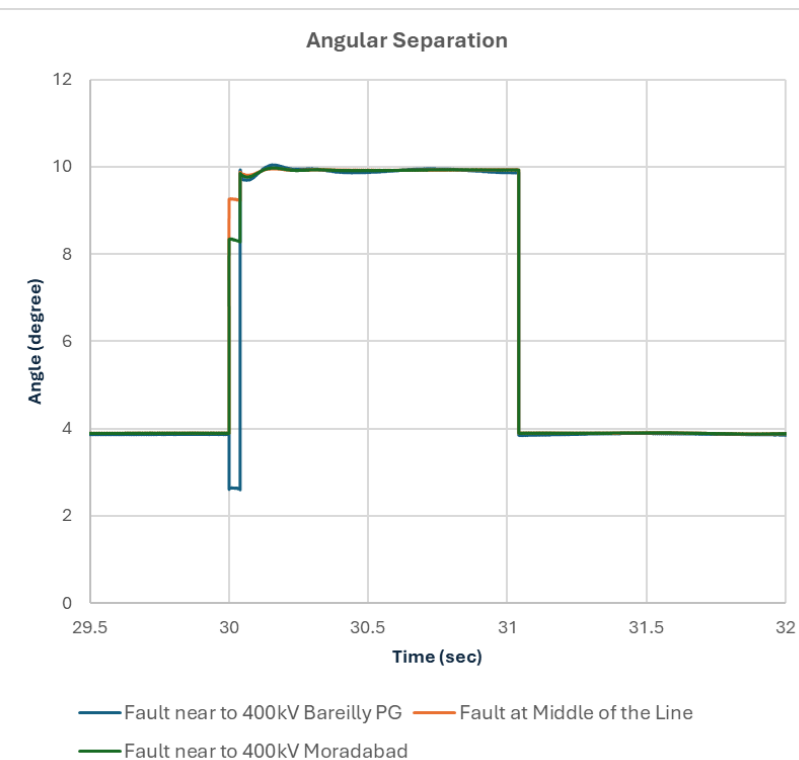
## Voltage@Bareilly PG



## Voltage@Moaradabad



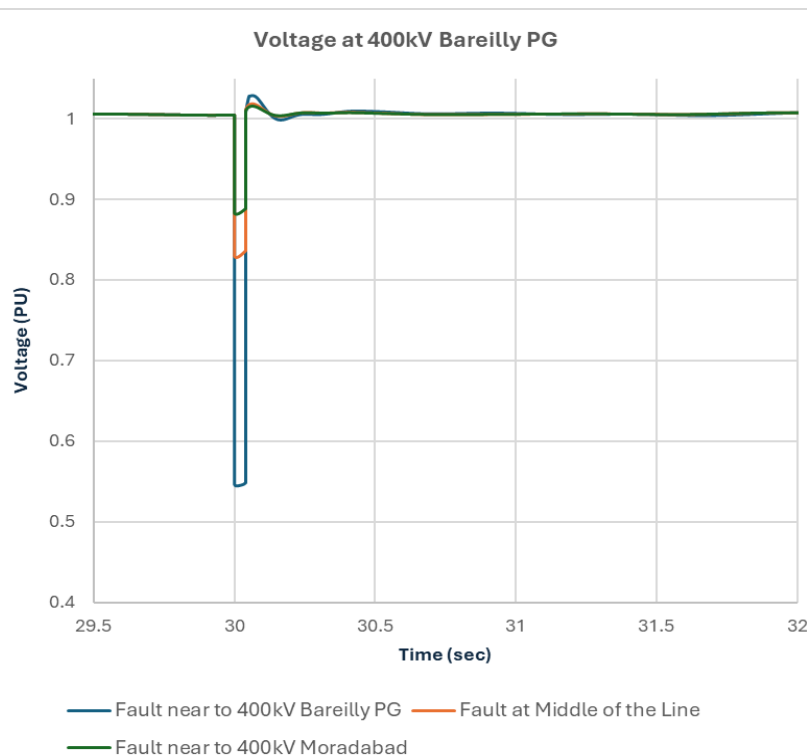
## Angular Separation



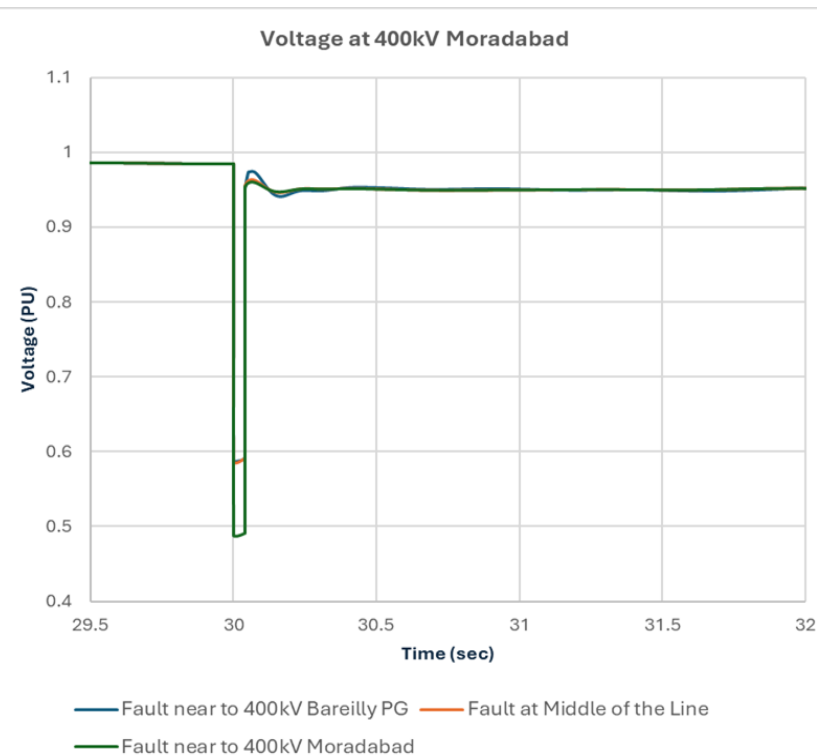
# Simulation Results - Contingency(N-3)

**Case Scenario 2:** Permanent Line-to-line fault followed by Un-successful 3-Ph AR.

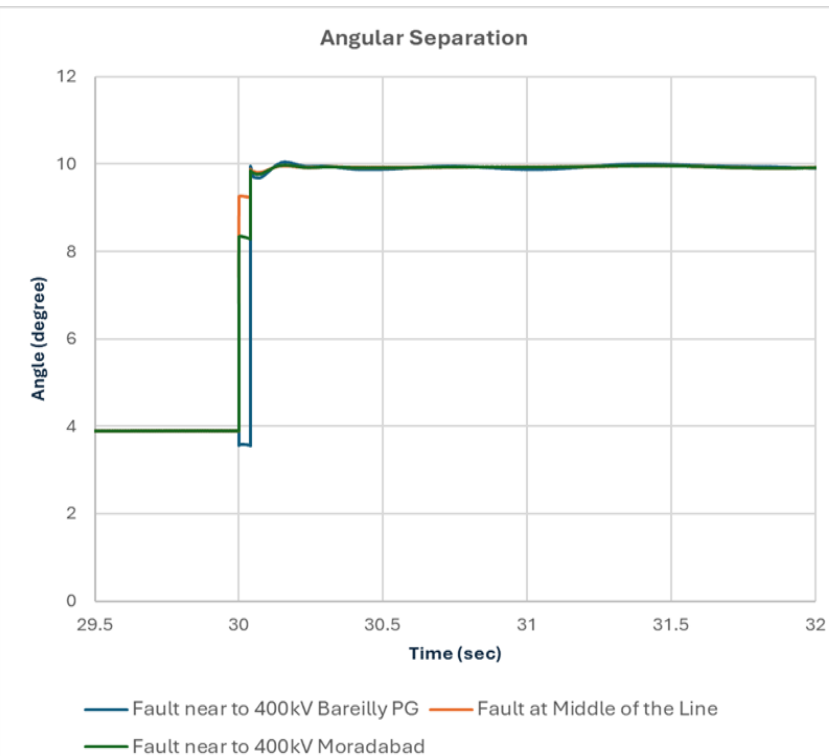
## Voltage@Bareilly PG



## Voltage@Moaradabad



## Angular Separation



# Recommendations

## Summary :

- Simulation results shows that System remains stable for temporary and permanent faults under different contingencies.
- Simulation validates the feasibility of 3-Ph AR under various fault scenarios.

## Recommendation:

- Based on the results of study, it is recommended to deploy 3-Ph AR for line-to-line faults on 400kV Bareilly PG-Moradabad line.

## Benefits:

- Enhanced system availability, reliability and stability.
- Minimized downtime for temporary faults due to kite thread.

Thanks

## **Proposed Revised SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS Merta**

### **A. Transmission Network Associated with 400 kV GSS Merta**

- There are two 400/220 kV ICTs at 400 kV GSS Merta each having capacity of 315 MVA.
- Percentage impedance of 315 MVA, 400/220 kV ICT-I is 11.82% (HV-LV) & 40.22% (HV-IV) & 20.08% (IV-LV) and Percentage impedance of 315 MVA, 400/220 kV ICT-II is 13.03% (HV-LV) & 40.50% (HV-IV) & 25.79% (IV-LV). Load sharing on both ICTs will be almost equal.
- 400 kV GSS Merta is connected to 400 kV GSS Jodhpur (Surpura), 400 kV GSS Bhadla, 400 kV GSS Bikaner, 400 kV GSS Kankani, 400 kV GSS Ratangarh, 400 kV GSS Kota (PGCIL) and 400 kV GSS Heerapura. There are following 220 kV and 132 kV lines emanating from 400 kV GSS Merta:-
  - 220 kV S/C Merta-Bhopalgarh line
  - 220 kV S/C Merta-Kuchera line
  - 220 kV S/C Merta-Jethana line
  - 220 kV S/C Merta-Makrana line
  - 3x100MVA, 220/132 kV Transformers at Merta
  - 132 kV Merta (400 kV GSS)-Merta (132 kV GSS) line
  - 132 kV Merta (400 kV GSS)-Roon line.
  - 132 kV Merta (400 kV GSS)-Merta Road line
  - 132 kV Merta (400 kV GSS)-Lamba Jatan line
  - 132 kV Merta (400 kV GSS)-Dhawa line
- 220 kV GSS Bhopalgarh is connected to the 220 kV GSS Bhawad through 220 kV D/C line and to 220 kV GSS Khinvsar through 220 kV S/C line. 220 kV GSS Bhawad is further connected to the 220 kV GSS Aau and 400 kV GSS Jodhpur through 220 kV D/C lines.
- 220 kV GSS Kuchera is connected to the 220 kV GSS Nagaur which is further connected to the 220 kV GSS Nokha and BLTPS through 220 kV S/C lines.
- 220 kV GSS Jethana is connected to the 400 kV GSS Ajmer through 220 kV D/C line and to the RAS LTPS through 220 kV S/C line.
- 220 kV GSS Makrana is connected to the 220 kV GSS Kuchaman and 220 kV GSS Phulera through 220 kV S/C lines.
- 132 kV S/C Merta (400 kV GSS)-Merta (132 kV GSS)-Riyabari-Jethana line is generally kept in ring system.
- 132 kV GSS Merta Road is connected radially to 400 kV GSS Merta and Biomass Generation of capacity 10 MW and solar power plant of 4 MW are connected to this GSS. Railway TSS is also connected to the 132 kV GSS Merta Road.
- 132 kV S/C Merta (400 kV GSS)-Lambajatan-Gotan line supplies power to 03 Nos. EHT consumers of continuous process cement plants.
- Power Map of Transmission System at 400kV GSS Merta is shown in Fig. 1.

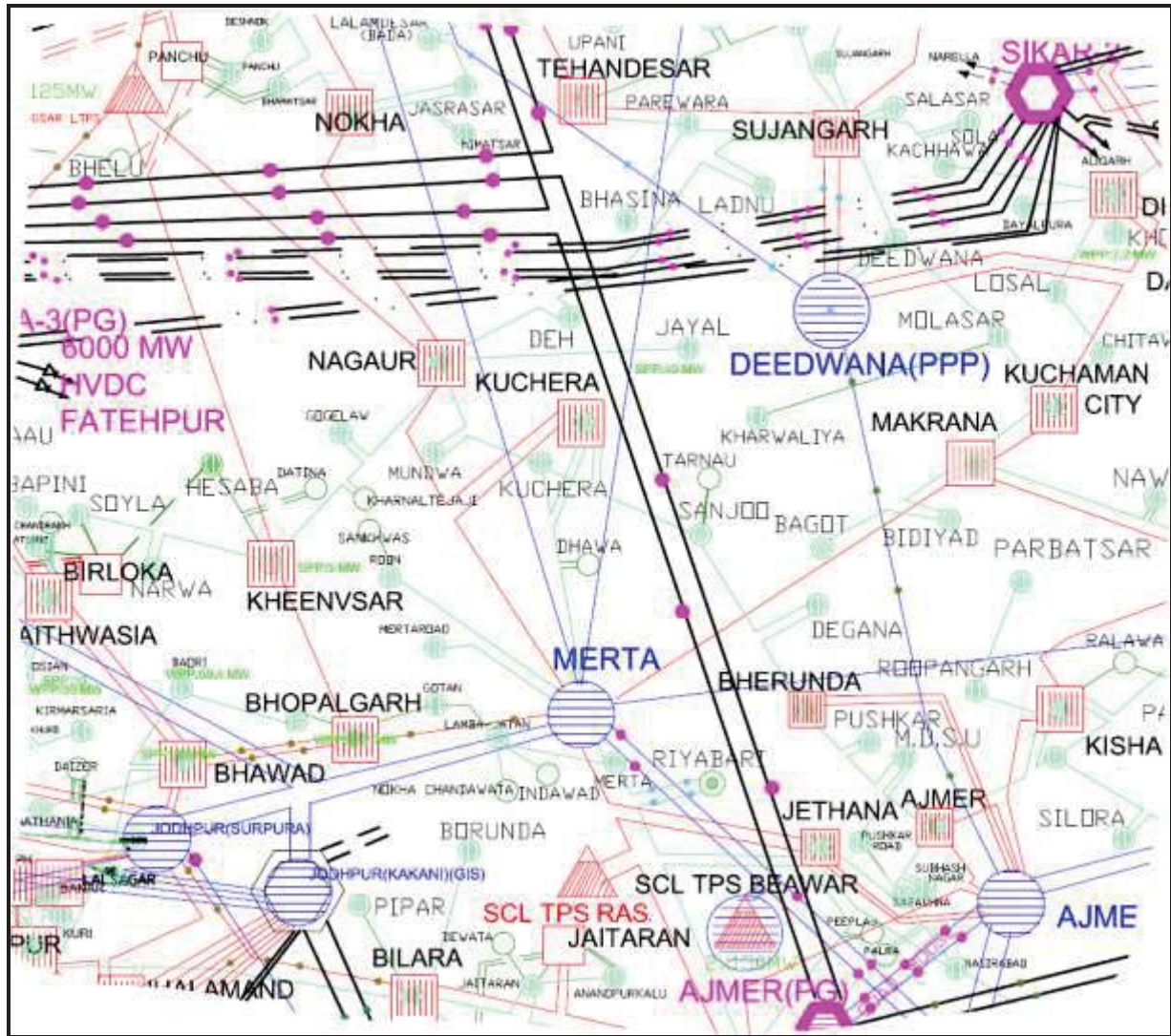


Fig. 1 Power map of merta region

#### B. Recorded Loads on the Transmission Elements

Recorded peak loads on the transmission lines and transformers are included in Table 1. Critical remarks are also included in the Table 1. 400 kV Bus-A and 400 kV Bus-B are kept integrated.

Table 1: Load Details of Peak and Average Loads on Transformers and Transmission Lines Associated with 400 kV GSS Merta

S. No.	Name of 220 kV line/ICTs	Peak Load	Average Load	Bus to Which connected	SPS Group/Remark
1	315 MVA, 400/220 kV ILT-I	348MVA	290 MVA	Bus-A	
2	315 MVA, 400/220 kV ILT-II	327 MVA	280 MVA	Bus-B	
3	220 kV Merta-Kuchera line	298 MVA	220 MVA	Bus-A	SPS Group-3
4	220 kV Merta-Jethana line	322 MVA	220 MVA	Bus-A	SPS Group-2
5	220 kV Merta-Makrana line	243 MVA	200 MVA	Bus-B	SPS Group-1
6	100MVA, 220/132 kV Transformer-I	85	75	Bus-A	Not included in SPS to ensure the uninterrupted supply in the Merta city, nearby area, and railway TSS connected at 132 kV
7	100MVA, 220/132 kV Transformer-II	85	75	Bus-A	
8	100MVA, 220/132 kV Transformer-III	86	80	Bus-B	

					GSS Merta Road
9	220 kV Merta-Bhopalgarh line	293	250	Bus-B	This line evacuates the RE power during solar generation hours to 400 kV GSS Merta from the Western Rajasthan. Hence, it is not considered for SPS.

### C. Approved SPS

The SPS for 2x315MVA, 400/220 kV ICTs at 400 kV GSS Merta was approved in the 194<sup>th</sup> OCC meeting held on dated 20.04.2022. Approved SPS is placed at **Annexure-A**.

### D. Installation of 3<sup>rd</sup> 500MVA, 400/220 kV ICT at 400 kV GSS Merta

Installation of 3<sup>rd</sup> 500MVA, 400/220 kV ICT at 400 kV GSS Merta was approved by RVPN and A&FS was issued on dated 27.04.2022 (**Annexure-B**). Work order for installation of this ICT was issued on dated 07.03.2024. Drawings/documents are under approval. Scheduled date of commissioning is September 2025.

### E. Need of Revision in the Approved SPS

- The SPS for the 2x315MVA, 400/220 kV ICTs at 400 kV GSS Merta approved in the 194<sup>th</sup> OCC meeting held on dated 20.04.2022 was based on taking the trip command from the 86 relay installed on 220kV side of both the 2x315MVA, 400/220 kV ICTs at Merta. Hence, the existing SPS give the relief in the event of tripping of the transformers and it does not take care of the ICT overloading. Hence, a generalized SPS is required which can take care of the tripping of the ICTs and overloading of the ICTs.
- Generalized SPS can be considered by taking reference from the overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Merta. This has been considered in the revised SPS.

### F. Revised SPS for 2x315MVA, 400/220 kV ILTs at 400 kV GSS Merta

- Tripping of 220 kV transmission lines has been considered from the 400 kV GSS Merta end.
- 220 kV S/C Merta-Bhopalgarh line has not been considered for the SPS as this line evacuates RE power from the western Rajasthan.
- 3x100MVA, 220/132 kV Transformers have not been considered for the SPS to ensure uninterrupted power supply in the Merta city and Railway TSS.
- 132 kV lines associated with the 400 kV GSS Merta have not been considered for the SPS to ensure the uninterrupted power supply in the Merta region.
- After detailed analysis of loading conditions, power injection, RE evacuation & grid interconnection issues, following universal logics are proposed for the 2x315MVA, 400/220 kV ICTs at 400 kV GSS Merta which will work for all the operating scenarios:-
  - SPS Group-1:** Trip commands are generated at time delay of 1.1 second to trip the following transmission line when 105% loading [105% current in all the three phases] on any one of the 2x315MVA, 400/220 kV Transformers at 400 kV GSS Merta is reached due to tripping of one of the transformer or any of the 220 kV lines associated with 400 kV GSS Merta or the overloading of transformers:-
    - 220 kV Merta-Makrana line



**Implementation of SPS Logic-1:** This logic will be implemented by taking reference from overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Merta. Trip command will be initiated at time delay of 1.1 second when current reached the 105% loading of the ICTs [105% current in all three phases]. This trip command will be used to trip the 220 kV S/C Merta-Makrana line from 400 kV GSS Merta.

2. **SPS Group-2:** Trip commands are generated at time delay of 1.30 second to trip the following transmission line when 105% loading [105% current in all the three phases] on any one of the 2x315MVA, 400/220 kV Transformers at 400 kV GSS Merta is reached due to tripping of one of the transformer or any of the 220 kV lines associated with 400 kV GSS Merta or the overloading of transformers:-

- 220 kV Merta- Jethana line

**Implementation of SPS Logic-2:** This logic will be implemented by taking reference from overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Merta. Trip command will be initiated at time delay of 1.30 second when current reached the 105% loading of the ICTs [105% current in all three phases]. This trip command will be used to trip the 220 kV S/C Merta- Jethana line from 400 kV GSS Merta.

3. **SPS Group-3:** Trip commands are generated at time delay of 1.50 second to trip the following transmission line when 105% loading [105% current in all the three phases] on any one of the 2x315MVA, 400/220 kV Transformers at 400 kV GSS Merta is reached due to tripping of one of the transformer or any of the 220 kV lines associated with 400 kV GSS Merta or the overloading of transformers:-

- 220 kV Merta-Kuchera line

**Implementation of SPS Logic-3:** This logic will be implemented by taking reference from overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Merta. Trip command will be initiated at time delay of 1.50 second when current reached the 105% loading of the ICTs [105% current in all three phases]. This trip command will be used to trip the 220 kV S/C Merta- Kuchera line from 400 kV GSS Merta.

- Schematic diagram of proposed SPS is shown in Fig. 2.



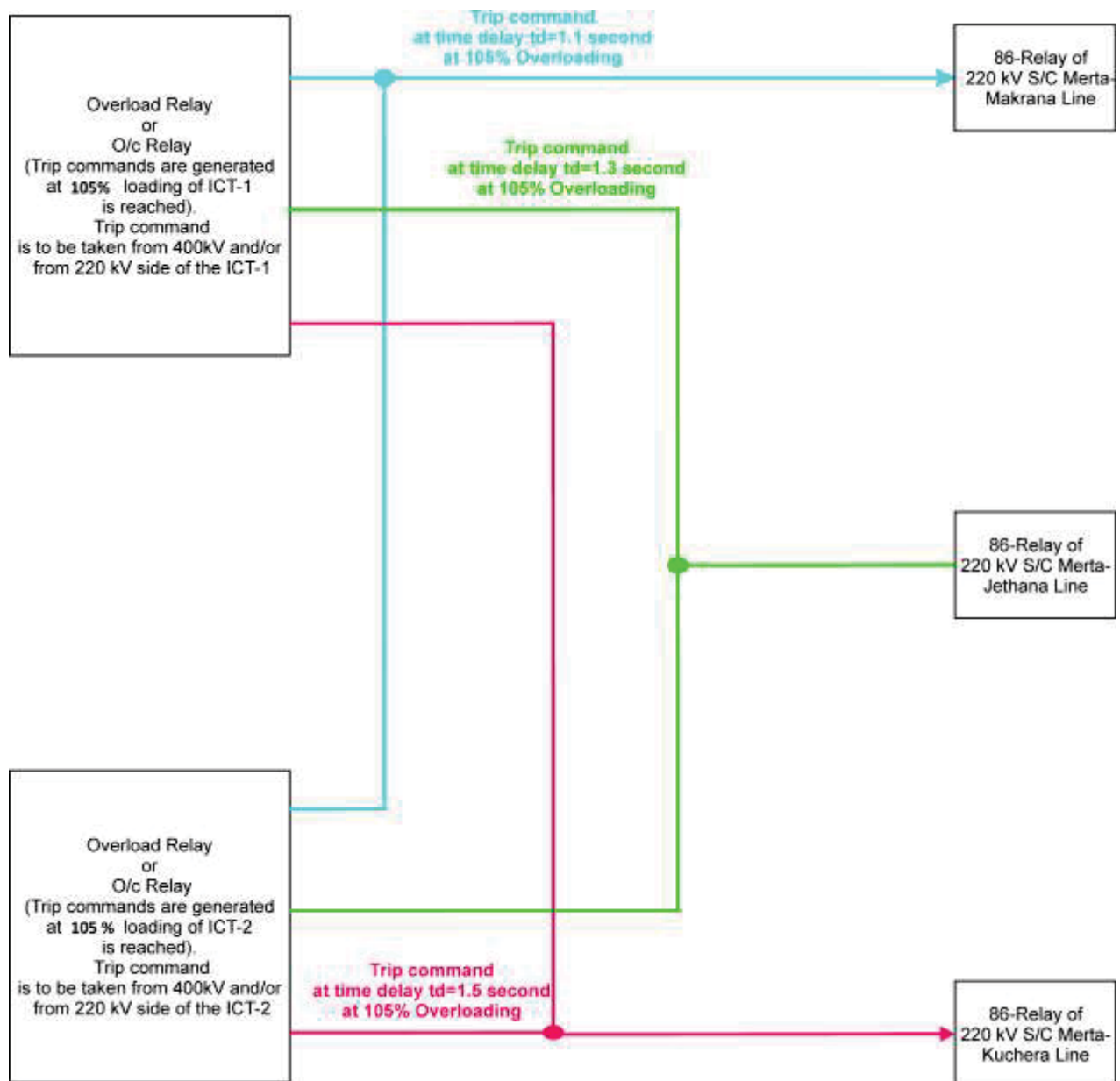


Fig. 2 Schematic diagram for implementation of proposed SPS Logics

- To maintain supply of critical loads connected to all the GSS in the region, tripped transformers and lines may be re-connected after applying load shedding on all the GSS in the region in such a quantum to maintain loadings on both the 315MVA, 400/220 kV ICTs or the healthy 315MVA, 400/220 kV ICT at 400 kV GSS Merta within permissible limits.

#### G. Requirement of Healthiness of the SPS

This SPS will function only if the present configuration of the transmission lines and transformers remain intact. Any change in configuration of lines and transformers will lead to mal-operation of the SPS. Further, LD Control room and SE (T&C), RVPN, Merta may ensure to take prior approval of NRLDC if any change is required in the configuration for which SPS is designed. Any change in configuration may be restored after the loading conditions are normalized.



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Ministry of Power

उत्तर क्षेत्रीय विद्युत समिति

Northern Regional Power Committee

संख्या: उ.क्षे.वि.स./ प्रचालन/106/01/2022/

दिनांक: 06.05.2022

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 194<sup>वीं</sup> बैठक का कार्यवृत्त।**Subject:** Minutes of 194<sup>th</sup> OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 194<sup>वीं</sup> बैठक दिनांक 20.04.2022 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट <http://164.100.60.165> पर उपलब्ध है। यदि कार्यवृत्त पर कोई टिप्पणी हो तो कार्यवृत्त जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजें।

194<sup>th</sup> meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 20.04.2022. The Minutes of this meeting has been uploaded on the NRPC website <http://164.100.60.165>. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि

*(सौमित्र मजूमदार)*  
06/05/2022

अधीक्षण अभियंता (प्रचालन)

सेवा में,

उ.क्षे.वि.स. के प्रचालन समन्वय उप-समिति के सभी सदस्य

UP SLDC had shared their assessment with NRLDC vide letter dated 31-03-2022.

Intra-State Generation(w/o Solar and Co-Gen)	TTC	RM	ATC
10000	15100	600	14500
11000	14400	600	13800
12000	13800	600	13200
13000	13300	600	12700

In 194 OCC meeting, it was discussed that:

- As per assessment done by NRLDC, the TTC computation pertaining to UP state control area seems to be in order. However, local load management would be required at Mau, Azamgarh, Nehtaur, Obra, Sarnath, Moradabad & Gorakhpur (UP) to arrive at these figures. Azamgarh ICTs should also be mentioned in the limiting constraints. Also, the actual load-generation scenario can change the TTC quantum based on the assumed local load distribution.
- UP SLDC was asked to share plan for load management at constrained ICTs and also update on progress of underlying network at new stations such as 400/220kV Sambhal, Rasra, Sahupuri, Rampur, Jaunpur etc.

UP SLDC representative stated that 400/220kV Rasra substation is expected to be commissioned shortly. Many constrained ICTs are likely to be relieved with commissioning of Rasra sub-station. Moreover, revised ATC/TTC assessments along with load management plan would be shared shortly. It was also agreed that mock testing of SPS may be carried out before summer season as most of the constrained ICTs have SPS. SPS for 400/220kV Obra and Nehtaur substation would also be planned and commissioned before summer season.

## Rajasthan

Rajasthan had shared ATC/TTC calculations with NRLDC on 22.10.2021. On 28.10.2021, NRLDC has shared their observations on basecase as well as simulation studies carried out by Rajasthan.

In 193 OCC meeting, Rajasthan SLDC representative informed there were some changes yet to be incorporated in basecase shared by NRLDC. NRLDC representative stated same may be carried out by Rajasthan before assessment of ATC in basecase shared. It was also informed by Rajasthan that proposal for SPS at constrained locations is under approval and would be brought for discussion in next OCC meeting. ICT Loadings observed above N-1 contingency limits were also discussed in the meeting.

Accordingly, Rajasthan SLDC has proposed SPS at 400/220kV Ajmer, Merta and Chittorgarh (Annexure-B.III of agenda).

In 194 OCC meeting, NRLDC representative stated following were comments from NRLDC side on the proposal:

- Ajmer: Proposed SPS seems to be in order in general as per NRLDC.
- Merta: 220/132kV Merta ICTs not shown in diagram.
- Chittorgarh: Other 220kV line may also need to be added as sought relief may not be provided.

Rajasthan representative agreed to look into the comments from NRLDC side. Rajasthan was given in-principle approval for implementation of SPS at 400/220kV Ajmer, Merta and Chittorgarh, expedite implementation of SPS, and share revised ATC/TTC assessment of Rajasthan state control area.

## **Delhi**

ATC is not being uploaded in website, only violation of ATC is being shown.

Delhi representative was not present in 192 OCC meeting for comments.

In 193 OCC meeting, Delhi SLDC was asked to implement SPS at Mundka and Bamnoli to save supercritical loads under N-1 contingency of one ICT. Delhi representative stated SPS at Mundka would be implemented before summer season. However, same is yet to be confirmed by DTL. NRLDC asked DTL and Delhi SLDC to coordinate and expedite shifting of ICT from Bamnoli to Mundka and implementation of SPS at 400/220kV Mundka. Delhi SLDC was asked to share the revised ATC/TTC limits for summer/monsoon 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest.

In 194 OCC meeting, it was informed that works for Mundka ICT are in place and ICT is expected before 30<sup>th</sup> April 2022. It was informed that SPS has been implemented at 400/220kV Mundka ICTs. NRLDC representative stated that SPS logic needs to be shared with NRLDC/ NRPC beforehand so that same can be discussed and approved in OCC/TCC/NRPC meeting before implementation. DTL was asked to share the logic and mock-testing exercise & ATC/TTC assessment with NRLDC/ NRPC at the earliest. Moreover, Delhi SLDC should immediately start uploading their ATC/TTC limits on their website.

## **Haryana**

In 194 OCC meeting, Haryana SLDC was once again asked to expedite implementation of SPS and ICT capacity augmentation at 400/220kV Deepalpur and Kurukshetra (PG) to enhance their ATC/TTC limits at the earliest. Haryana SLDC informed SPS works are in process and would be implemented at Deepalpur by May'2022. For Kurukshetra, they have taken up the matter with STU to further take up with POWERGRID.

Haryana SLDC was asked to share the revised ATC/TTC limits for summer/monsoon 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest. Network arrangement for managing loading at Kurukshetra also needs to be shared. Haryana was also asked to expedite utilisation of underlying network at Bhiwani.





# RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED.

[Corporate Identity Number (CIN): U40109RJ2000SGC016485]

(Regd. Office: Vidyut Bhawan, Jan Path, Jyoti Nagar, Jaipur - 302 005)

## OFFICE OF THE SUPERINTENDING ENGINEER (P&P)

Room No. 336, Vidyut Bhawan, Jaipur - 1 +91-141-2740623

e-mail: se.pp@rvpn.co.in WEBSITE: https://energy.rajasthan.gov.in/rvpnl

No. RVPN/CE (PP&D)/SE (P&P)/NEN-IAE-I/F

D 238 Jaipur. Dt.

27/4/22

The Chief Engineer (T&C/Civil/Procurement/Contracts/LD/Communication/IT),  
Rajasthan Rajya Vidyut Prasaran Nigam Ltd.,  
JAIPUR/ AJMER/ JODHPUR

**Sub: Administrative & financial sanction for installation of 500 MVA, 400/220kV transformer each at 400kV GSS Jodhpur(Surpura), Ajmer, Bikaner & Merta.**

The Whole Time Directors of RVPN on dated 26.04.2022 have accorded administrative and financial sanction for installation of 500 MVA, 400/220kV transformer each at 400kV GSS Jodhpur(Surpura), Ajmer, Bikaner & Merta as augmentation works as per the details given hereunder:

S. No.	Name of work	Estimated cost (in Lacs)	
		Without IDC	With IDC
1	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Jodhpur (Surpura)	4704.01	5043.64
2	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Ajmer	4664.86	4980.21
3	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Bikaner (Revised A&FS approval)	4683.47	5021.62
4	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Merta	4681.42	5019.42

It is also intimate that Revised administrative and financial sanction for installation of 3<sup>rd</sup> 1x500MVA, 400/220kV transformer at 400kV GSS Bikaner is in place of already approved cost of Rs 2051.005 lacs for installation of 1x315MVA transformer conveyed vide this office letter no. 1807 dated 4.1.2022.

Abstract of cost estimate and detailed estimates are enclosed herewith. The expenditure of these schemes shall be made from provision made under the head "Augmentation" in Annual plan 2022-23(proposed). Additional funds required (if any) under this head would be provided in Annual Plan 2022-23 at the time of revision. In view of the above, the execution of the aforesaid works may kindly be taken up accordingly.

Encl.: Estimates.

Superintending Engineer (P&P)

Copy to the following for information & necessary action:-

1. The Chief Controller of Accounts-I/II, RVPN, Jaipur.
2. The Superintending Engineer (Design), RVPN, Jaipur.
3. The Superintending Engineer (T&C), RVPN, Jodhpur/Ajmer/Bikaner/Merta.
4. The Superintending Engineer (Communication), RVPN, Jaipur/ Jodhpur.
5. The Superintending Engineer (QC., Insp. & Montg./ MIS), RVPN, Jaipur.
6. The Superintending Engineer (Procurement-I/ Procurement-II/ Contract-I/ Contract-II), RVPN, Jaipur.
7. The TA to Director (Technical/Operation), RVPN, Jaipur.
8. The Executive Engineer-1 & 2 (P&P), RVPN, Jaipur.
9. The Assistant Engineer-IV (Plan), O/o Executive Engineer-1 (P&P), RVPN, Jaipur.

Encl.: Estimates.

Superintending Engineer (P&P)



## **Proposed Revised SPS for 2x315 MVA, 400/220 kV ICTs at 400 kV GSS**

### **Ajmer**

#### **A. Transmission Network Associated with 400 kV GSS Ajmer**

- There are two 400/220 kV ICTs at 400 kV GSS Ajmer each having capacity of 315 MVA.
- Percentage impedance of 315 MVA, 400/220 kV ICT-I is 12.498% (HV-LV) & 39.27% (HV-IV) & 26.05% (IV-LV) and Percentage impedance of 315 MVA, 400/220 kV ICT-II is 12.02% (HV-LV) & 41.41% (HV-IV) & 27.66% (IV-LV). Load sharing on both ICTs will be almost equal.
- 400 kV GSS Ajmer is connected to 400 kV GSS Deedwana, 400 kV GSS Bhilwara, 765 kV GSS Phagi, and 765 kV GSS Ajmer (PGCIL). There are following 220 kV lines emanating from 400 kV GSS Ajmer:-
  - 220 kV S/C Ajmer-Kishangarh line
  - 220 kV D/C Ajmer-Bherunda line
  - 220 kV D/C Ajmer-Jethana line
  - 220 kV S/C Ajmer-Beawar line
  - 220 kV S/C Ajmer (400 kV GSS)-Aimer (220 kV GSS) line Ckt-I
  - 220 kV S/C Ajmer (400 kV GSS)-Aimer (220 kV GSS) line Ckt-II
- 220 kV D/C Ajmer-Jethana line has not been considered because tripping of this line will increase loading on ICTs at 400 kV GSS Merta.
- 220 kV 2xS/C Ajmer (400 kV GSS)-Aimer (220 kV GSS) lines have not been considered for the SPS because these lines feed power to Ajmer city.
- Power Map of Transmission System at 400kV GSS Ajmer is shown in Fig. 1.

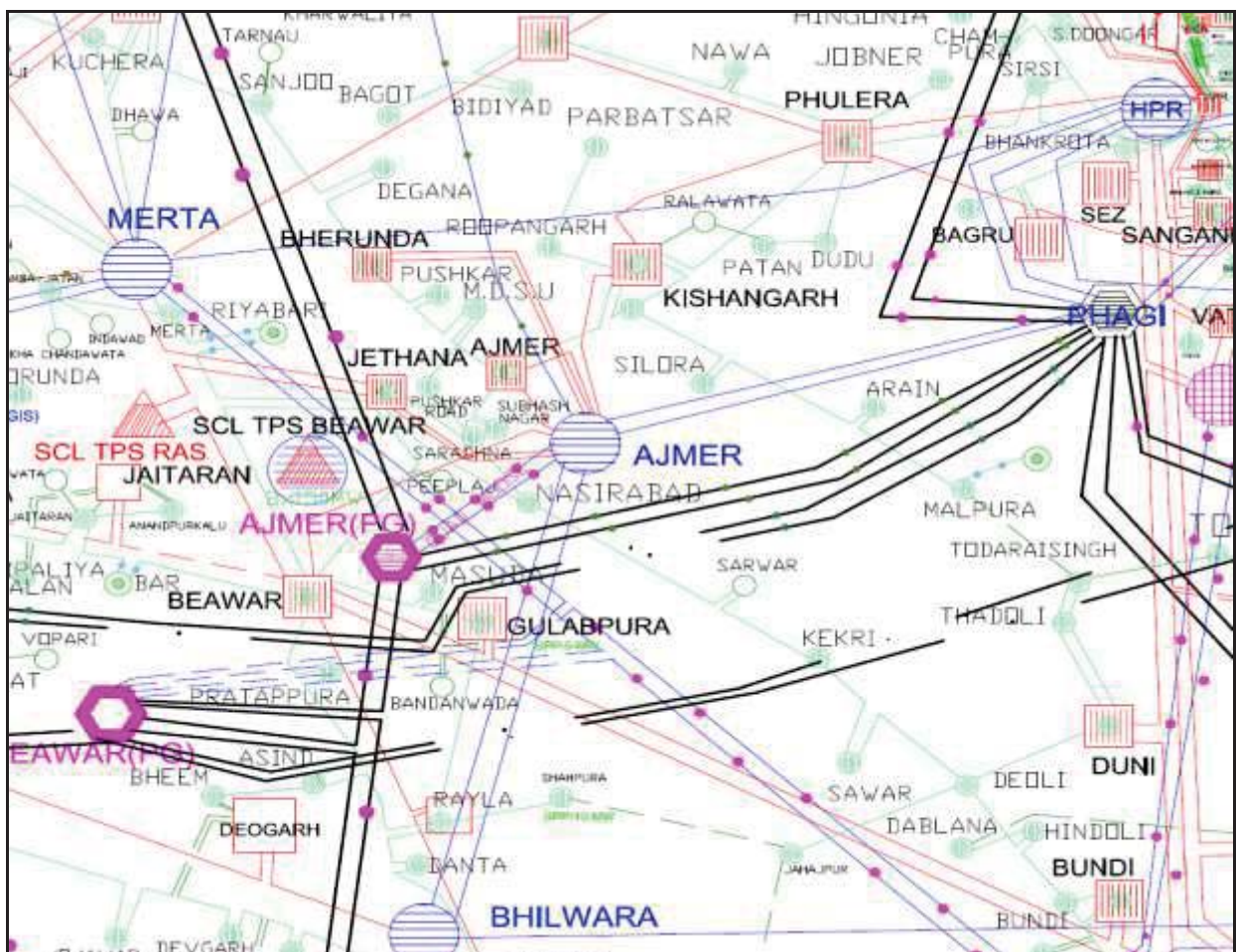


Fig. 1 Power map of Ajmer region

## B. Recorded Loads on the Transmission Elements

Recorded peak loads on the transmission lines and transformers are included in Table 1. Critical remarks are also included in the Table 1.

Table 1: Load Details of Peak and Average Loads on Transformers and Transmission Lines Associated with 400 kV GSS Ajmer

S.No.	Particular of Lines/Transformer	Voltage Level (kV)	Import/Export	Peak Load (MW)	Average Load (MW)	SPS Group/Remark
1	400/220/33kV, 315 MVA Transformer (ALSTOM)	400	Export	292	270.11	
2	400/220/33kV, 315 MVA Transformer (KANO HAR)	400	Export	304	281.11	
3	400kV Ajmer-Bhilwara-I	400	Export	265	212.77	
4	400kV Ajmer-Bhilwara-II	400	Import	284	229	
5	400kV Ajmer-Deedwana	400	Export	380	324.88	
6	400kV Ajmer-Phagi-I	400	Export	428	295.66	
7	400kV Ajmer-Phagi-II	400	Export	313	273.55	
8	400kV Ajmer-Ajmer (PGCIL)-I	400	Import	467	408.66	
9	400kV Ajmer-Ajmer (PGCIL)-II	400	Import	467	407.33	
10	220KV Jethana-I Line	220	Import	215	107.67	
11	220KV Jethana-II Line	220	Import	180	107.44	
12	220KV Beawar Line	220	Import	193	110.22	SPS Group-I
13	220KV Ajmer-I Line	220	Export	170	117.44	
14	220KV Ajmer-II Line	220	Export	149	121.44	
15	220KV Kishangarh Line	220	Export	227	178.00	SPS Group-III
16	220KV Bherunda-I Line	220	Export	90	62.33	SPS Group-II
17	220KV Bherunda-II Line	220	Export	91	59.89	SPS Group-II
18	220KV NWR Line	220	Export	20	16.44	

## C. Approved SPS

The SPS for 2x315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer was approved in the 194<sup>th</sup> OCC meeting held on dated 20.04.2022. Approved SPS is placed at **Annexure-A**.

## D. Installation of 3<sup>rd</sup> 500MVA, 400/220 kV ICT at 400 kV GSS Ajmer

Installation of 3<sup>rd</sup> 500MVA, 400/220 kV ICT at 400 kV GSS Ajmer was approved by RVPN and A&FS was issued on dated 27.04.2022 (**Annexure-B**). Work order for installation of this ICT was issued on dated 07.03.2024. Drawings/documents are under approval. Scheduled date of commissioning is September 2025.

## E. Need of Revision in the Approved SPS

- The SPS for the 2x315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer approved in the 194<sup>th</sup> OCC meeting held on dated 20.04.2022 was based on taking the trip command from the 86 relay installed on 220kV side of both the 2x315MVA, 400/220 kV ICTs at Ajmer. Hence, the existing SPS give the relief in the event of tripping of the transformers and it does not take care of the ICT overloading. Hence, a generalized SPS is required which can take care of the tripping of the ICTs and overloading of the ICTs.
- Generalized SPS can be considered by taking reference from the overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer. This has been considered in the revised SPS.

## F. Revised SPS for 2x315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer

- Tripping of 220 kV transmission lines has been considered from the 400 kV GSS Ajmer end.

- 220 kV D/C Ajmer-Jethana line has not been considered because tripping of this line will increase loading on ICTs at 400 kV GSS Merta.
- 220 kV 2xS/C Ajmer (400 kV GSS)-Aimer (220 kV GSS) lines have not been considered for the SPS because these lines feed power to Ajmer city.
- After detailed analysis of loading conditions, power injection, RE evacuation & grid interconnection issues, following universal logics are proposed for the 2x315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer which will work for all the operating scenarios:-

1. **SPS Group-1:** Trip commands are generated at time delay of 1.1 second to trip the following transmission line when 105% loading [105% current in all the three phases] on any one of the 2x315MVA, 400/220 kV Transformers at 400 kV GSS Ajmer is reached due to tripping of one of the transformer or any of the 220 kV lines associated with 400 kV GSS Ajmer or the overloading of transformers:-

- 220 kV S/C Ajmer-Beawer line

**Implementation of SPS Logic-1:** This logic will be implemented by taking reference from overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer. Trip command will be initiated at time delay of 1.1 second when current reached the 105% loading of the ICTs [105% current in all three phases]. This trip command will be used to trip the 220 kV S/C Ajmer-Beawer line from 400 kV GSS Ajmer.

2. **SPS Group-2:** Trip commands are generated at time delay of 1.30 second to trip the following transmission lines when 105% loading [105% current in all the three phases] on any one of the 2x315MVA, 400/220 kV Transformers at 400 kV GSS Ajmer is reached due to tripping of one of the transformer or any of the 220 kV lines associated with 400 kV GSS Ajmer or the overloading of transformers:-

- 220 kV Ajmer-Bherunda line Ckt-I
- 220 kV Ajmer-Bherunda line Ckt-II

**Implementation of SPS Logic-2:** This logic will be implemented by taking reference from overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer. Trip command will be initiated at time delay of 1.30 second when current reached the 105% loading of the ICTs [105% current in all three phases]. This trip command will be used to trip the following 220 kV lines from 400 kV GSS Ajmer:-

- 220 kV Ajmer-Bherunda line Ckt-I
- 220 kV Ajmer-Bherunda line Ckt-II

3. **SPS Group-3:** Trip commands are generated at time delay of 1.50 second to trip the following transmission line when 105% loading [105% current in all the three phases] on any one of the 2x315MVA, 400/220 kV Transformers at 400 kV GSS Ajmer is reached due to tripping of one of the transformer or any of the 220 kV lines associated with 400 kV GSS Ajmer or the overloading of transformers:-

- 220 kV S/C Ajmer-Kishangarh line

**Implementation of SPS Logic-3:** This logic will be implemented by taking reference from overcurrent relays of both 315MVA, 400/220 kV ICTs at 400 kV GSS Ajmer. Trip command will be initiated at time delay of 1.50 second when current reached the 105% loading of the ICTs [105% current in all three phases]. This trip command will be used to trip the 220 kV S/C Ajmer-Kishangarh line from 400 kV GSS Ajmer.

- Schematic diagram of proposed SPS is shown in Fig. 2.



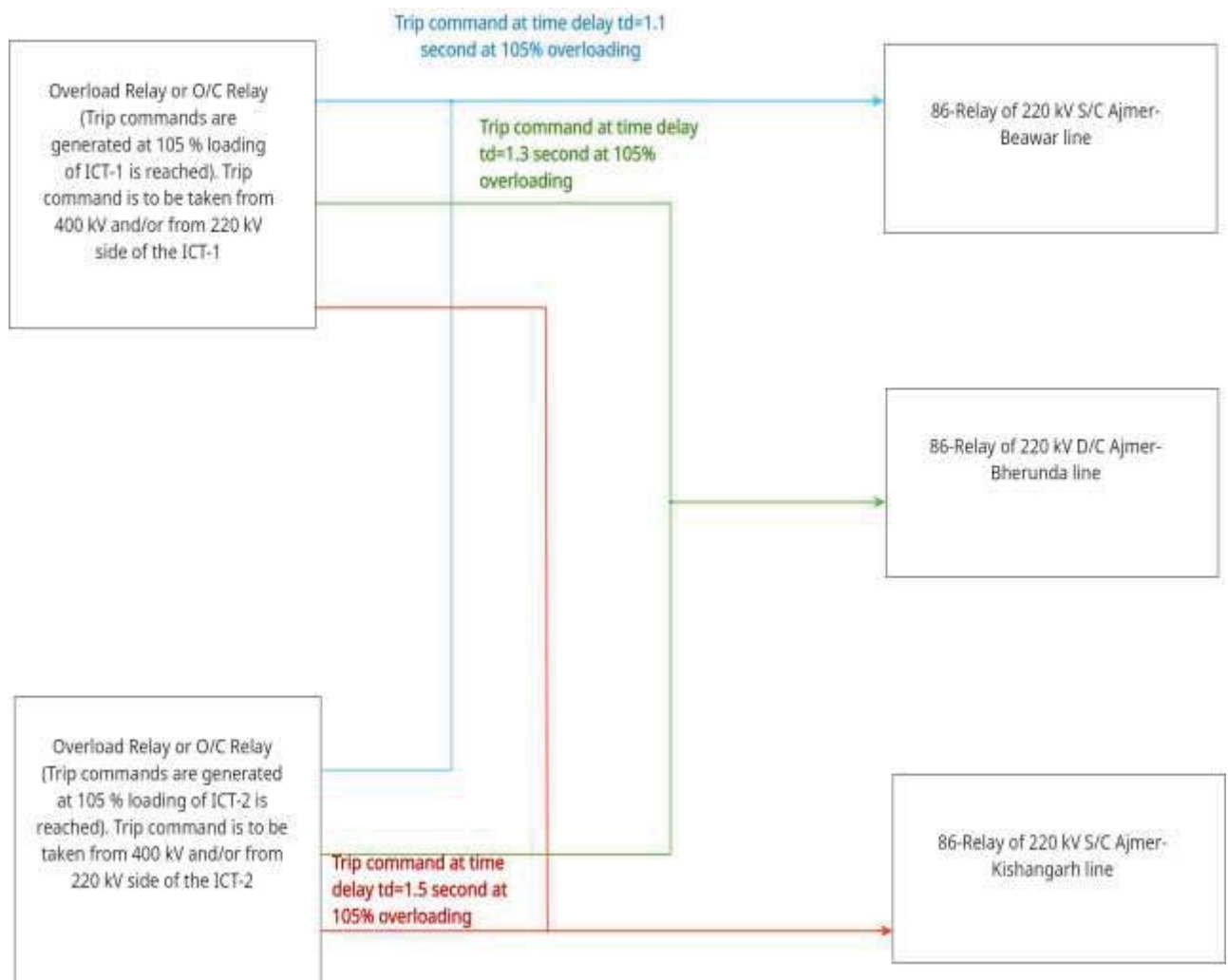


Fig. 2 Schematic diagram for implementation of proposed SPS Logics

- To maintain supply of critical loads connected to all the GSS in the region, tripped transformers and lines may be re-connected after applying load shedding on all the GSS in the region in such a quantum to maintain loadings on both the 315MVA, 400/220 kV ICTs or the healthy 315MVA, 400/220 kV ICT at 400 kV GSS Ajmer within permissible limits.

#### G. Requirement of Healthiness of the SPS

This SPS will function only if the present configuration of the transmission lines and transformers remain intact. Any change in configuration of lines and transformers will lead to mal-operation of the SPS. Further, LD Control room and SE (T&C), RVPN, Ajmer may ensure to take prior approval of NRLDC if any change is required in the configuration for which SPS is designed. Any change in configuration may be restored after the loading conditions are normalized.



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संख्या: उ.क्षे.वि.स./ प्रचालन/106/01/2022/

दिनांक: 06.05.2022

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 194<sup>वीं</sup> बैठक का कार्यवृत्त ।**Subject:** Minutes of 194<sup>th</sup> OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 194<sup>वीं</sup> बैठक दिनांक 20.04.2022 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट <http://164.100.60.165> पर उपलब्ध है। यदि कार्यवृत्त पर कोई टिप्पणी हो तो कार्यवृत्त जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजें ।

194<sup>th</sup> meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 20.04.2022. The Minutes of this meeting has been uploaded on the NRPC website <http://164.100.60.165>. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक: यथोपरि

*(सौमित्र मजूमदार)*  
06/05/2022

अधीक्षण अभियंता (प्रचालन)

सेवा में,

उ.क्षे.वि.स. के प्रचालन समन्वय उप-समिति के सभी सदस्य

UP SLDC had shared their assessment with NRLDC vide letter dated 31-03-2022.

Intra-State Generation(w/o Solar and Co-Gen)	TTC	RM	ATC
10000	15100	600	14500
11000	14400	600	13800
12000	13800	600	13200
13000	13300	600	12700

In 194 OCC meeting, it was discussed that:

- As per assessment done by NRLDC, the TTC computation pertaining to UP state control area seems to be in order. However, local load management would be required at Mau, Azamgarh, Nehtaur, Obra, Sarnath, Moradabad & Gorakhpur (UP) to arrive at these figures. Azamgarh ICTs should also be mentioned in the limiting constraints. Also, the actual load-generation scenario can change the TTC quantum based on the assumed local load distribution.
- UP SLDC was asked to share plan for load management at constrained ICTs and also update on progress of underlying network at new stations such as 400/220kV Sambhal, Rasra, Sahupuri, Rampur, Jaunpur etc.

UP SLDC representative stated that 400/220kV Rasra substation is expected to be commissioned shortly. Many constrained ICTs are likely to be relieved with commissioning of Rasra sub-station. Moreover, revised ATC/TTC assessments along with load management plan would be shared shortly. It was also agreed that mock testing of SPS may be carried out before summer season as most of the constrained ICTs have SPS. SPS for 400/220kV Obra and Nehtaur substation would also be planned and commissioned before summer season.

## Rajasthan

Rajasthan had shared ATC/TTC calculations with NRLDC on 22.10.2021. On 28.10.2021, NRLDC has shared their observations on basecase as well as simulation studies carried out by Rajasthan.

In 193 OCC meeting, Rajasthan SLDC representative informed there were some changes yet to be incorporated in basecase shared by NRLDC. NRLDC representative stated same may be carried out by Rajasthan before assessment of ATC in basecase shared. It was also informed by Rajasthan that proposal for SPS at constrained locations is under approval and would be brought for discussion in next OCC meeting. ICT Loadings observed above N-1 contingency limits were also discussed in the meeting.

Accordingly, Rajasthan SLDC has proposed SPS at 400/220kV Ajmer, Merta and Chittorgarh (Annexure-B.III of agenda).

In 194 OCC meeting, NRLDC representative stated following were comments from NRLDC side on the proposal:

- Ajmer: Proposed SPS seems to be in order in general as per NRLDC.
- Merta: 220/132kV Merta ICTs not shown in diagram.
- Chittorgarh: Other 220kV line may also need to be added as sought relief may not be provided.

Rajasthan representative agreed to look into the comments from NRLDC side. Rajasthan was given in-principle approval for implementation of SPS at 400/220kV Ajmer, Merta and Chittorgarh, expedite implementation of SPS, and share revised ATC/TTC assessment of Rajasthan state control area.

## **Delhi**

ATC is not being uploaded in website, only violation of ATC is being shown.

Delhi representative was not present in 192 OCC meeting for comments.

In 193 OCC meeting, Delhi SLDC was asked to implement SPS at Mundka and Bamnoli to save supercritical loads under N-1 contingency of one ICT. Delhi representative stated SPS at Mundka would be implemented before summer season. However, same is yet to be confirmed by DTL. NRLDC asked DTL and Delhi SLDC to coordinate and expedite shifting of ICT from Bamnoli to Mundka and implementation of SPS at 400/220kV Mundka. Delhi SLDC was asked to share the revised ATC/TTC limits for summer/monsoon 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest.

In 194 OCC meeting, it was informed that works for Mundka ICT are in place and ICT is expected before 30<sup>th</sup> April 2022. It was informed that SPS has been implemented at 400/220kV Mundka ICTs. NRLDC representative stated that SPS logic needs to be shared with NRLDC/ NRPC beforehand so that same can be discussed and approved in OCC/TCC/NRPC meeting before implementation. DTL was asked to share the logic and mock-testing exercise & ATC/TTC assessment with NRLDC/ NRPC at the earliest. Moreover, Delhi SLDC should immediately start uploading their ATC/TTC limits on their website.

## **Haryana**

In 194 OCC meeting, Haryana SLDC was once again asked to expedite implementation of SPS and ICT capacity augmentation at 400/220kV Deepalpur and Kurukshetra (PG) to enhance their ATC/TTC limits at the earliest. Haryana SLDC informed SPS works are in process and would be implemented at Deepalpur by May'2022. For Kurukshetra, they have taken up the matter with STU to further take up with POWERGRID.

Haryana SLDC was asked to share the revised ATC/TTC limits for summer/monsoon 2022 along with anticipated generation scenario, basecase and reports with NRLDC at the earliest. Network arrangement for managing loading at Kurukshetra also needs to be shared. Haryana was also asked to expedite utilisation of underlying network at Bhiwani.





# RAJASTHAN RAJYA VIDYUT PRASARAN NIGAM LIMITED.

[Corporate Identity Number (CIN): U40109RJ2000SGC016485]

(Regd. Office: Vidyut Bhawan, Jan Path, Jyoti Nagar, Jaipur - 302 005)

## OFFICE OF THE SUPERINTENDING ENGINEER (P&P)

Room No. 336, Vidyut Bhawan, Jaipur - 1 +91-141-2740623

e-mail: se.pp@rvpn.co.in WEBSITE: https://energy.rajasthan.gov.in/rvpnl

No. RVPN/CE (PP&D)/SE (P&P)/NEN-IAE-I/F

D 238 Jaipur. Dt.

27/4/22

The Chief Engineer (T&C/Civil/Procurement/Contracts/LD/Communication/IT),  
Rajasthan Rajya Vidyut Prasaran Nigam Ltd.,  
JAIPUR/ AJMER/ JODHPUR

**Sub: Administrative & financial sanction for installation of 500 MVA, 400/220kV transformer each at 400kV GSS Jodhpur(Surpura), Ajmer, Bikaner & Merta.**

The Whole Time Directors of RVPN on dated 26.04.2022 have accorded administrative and financial sanction for installation of 500 MVA, 400/220kV transformer each at 400kV GSS Jodhpur(Surpura), Ajmer, Bikaner & Merta as augmentation works as per the details given hereunder:

S. No.	Name of work	Estimated cost (in Lacs)	
		Without IDC	With IDC
1	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Jodhpur (Surpura)	4704.01	5043.64
2	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Ajmer	4664.86	4980.21
3	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Bikaner (Revised A&FS approval)	4683.47	5021.62
4	Installation of 3 <sup>rd</sup> 1x500 MVA, 400/220 kV transformer alongwith associated 400 kV & 220 kV bays at 400 kV GSS Merta	4681.42	5019.42

It is also intimate that Revised administrative and financial sanction for installation of 3<sup>rd</sup> 1x500MVA, 400/220kV transformer at 400kV GSS Bikaner is in place of already approved cost of Rs 2051.005 lacs for installation of 1x315MVA transformer conveyed vide this office letter no. 1807 dated 4.1.2022.

Abstract of cost estimate and detailed estimates are enclosed herewith. The expenditure of these schemes shall be made from provision made under the head "Augmentation" in Annual plan 2022-23(proposed). Additional funds required (if any) under this head would be provided in Annual Plan 2022-23 at the time of revision. In view of the above, the execution of the aforesaid works may kindly be taken up accordingly.

Encl.: Estimates.

Superintending Engineer (P&P)

Copy to the following for information & necessary action:-

1. The Chief Controller of Accounts-III, RVPN, Jaipur.
2. The Superintending Engineer (Design), RVPN, Jaipur.
3. The Superintending Engineer (T&C), RVPN, Jodhpur/Ajmer/Bikaner/Merta.
4. The Superintending Engineer (Communication), RVPN, Jaipur/ Jodhpur.
5. The Superintending Engineer (QC., Insp. & Montg./ MIS), RVPN, Jaipur.
6. The Superintending Engineer (Procurement-II/ Procurement-III/ Contract-II/ Contract-III), RVPN, Jaipur.
7. The TA to Director (Technical/Operation), RVPN, Jaipur.
8. The Executive Engineer-1 & 2 (P&P), RVPN, Jaipur.
9. The Assistant Engineer-IV (Plan), O/o Executive Engineer-1 (P&P), RVPN, Jaipur.

Encl.: Estimates.

Superintending Engineer (P&P)



No. RVUN/STPS/CE (O&M)/F. /D. 688

Date: 07/02/2025 Annexure-A.X

The Zonal Chief Engineer (T&C)  
RVPN, Jodhpur

**Sub:** To Expedite completion of temporary arrangement for 400kV Line and Status Update  
**Ref.:** NRPC Meeting held on 19.10.2024

With reference to the discussions held in the NRPC meeting on 19.10.2024, it was decided that RRVPNL will conduct a field survey by 15.11.2024 for the feasibility of a temporary arrangement to connect one circuit of the 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line. This work includes the erection of two new towers to facilitate the rearrangement, ensuring the reduction of high loading on the 400kV Switchyard STPS, Suratgarh and 400kV STPS-Ratangarh lines.

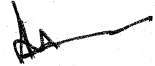
During the meeting, RRVPNL had assured that the said work would be completed by December 2024. However, considering the anticipated high load conditions at the 400kV Switchyard of STPS Suratgarh during the upcoming summer season due to increased solar power generation, it is crucial to complete this work at the earliest to avoid any operational challenges and overloading issues.

In view of the above, you are requested to kindly expedite the execution of the proposed arrangement and provide the latest status of work progress. This will help us in ensuring grid stability and smooth power evacuation during peak demand periods.

Your immediate attention to this matter will be highly appreciated. Kindly share an update on the present status of work at the earliest.

Thanking you.

Encl.: Minutes of the meeting held on 19.10.2024

  
(T. R. Soni)  
Chief Engineer (O&M)  
STPS, RVUN, Suratgarh

Copy submitted/ forwarded to the following for kind information and necessary action:

1. The Director (Project/ Technical), RVUN, Jaipur.
2. The Director (Operation), RVPN, Jaipur.
3. The Chief Engineer (SSCTPS), RVUN, Suratgarh
4. The Chief Engineer (PPMC & IT), RVUN, Jaipur.
5. The Chief Engineer (MPT &S/ LD), RVPN, Jaipur.
6. The TA to CMD, RVUN, Jaipur for kind perusal of the Hon'ble CMD.
7. The Superintending Engineer (M&P/SO&LD), RVPN, Jaipur
8. The Superintending Engineer (400 KV GSS), RVPN, Bikaner.

  
Chief Engineer (O&M)



भारत सरकार  
Government of India  
विद्युत मंत्रालय  
Ministry of Power  
उत्तर क्षेत्रीय विद्युत समिति  
Northern Regional Power Committee

**विषय:** Minutes of the meeting to discuss long pending bilateral issues between state power utilities of Rajasthan reg.

Kindly find attached minutes of the meeting held on **19.10.2024 (10:30 AM)** to discuss long pending bilateral issues between state power utilities of Rajasthan.

Signed by Dharmendra  
Kumar Meena  
Date: 06-11-2024 09:52:56

(डी. के. मीना)  
अधीक्षण अभियंता (प्रचालन)

सेवा में,

1. CMD, RRVUNL, ([cmd@rrvun.com](mailto:cmd@rrvun.com))
2. MD, RRVPNL ([md@rvpn.co.in](mailto:md@rvpn.co.in))
3. CGM(SO), NRLDC ([somara.lakra@grid-india.in](mailto:somara.lakra@grid-india.in))
4. Director (Operation), RRVPNL ([dir.oper@rvpn.co.in](mailto:dir.oper@rvpn.co.in))
5. Director (Technical), RRVUNL ([director.tech@rrvun.com](mailto:director.tech@rrvun.com))
6. Chief Engineer, SLDC Rajasthan ([ce.ld@rvpn.co.in](mailto:ce.ld@rvpn.co.in))

Copy for information to:

1. Member, GO&D, CEA

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**Minutes of the meeting held on 19.10.2024 (10:30 AM) to discuss long pending bilateral issues between state power utilities of Rajasthan.**

A meeting was held in Vidyut Bhawan, Jaipur, Rajasthan on 19.10.2024. List of participants is attached as **Annexure-I**.

Member Secretary, NRPC welcomed the representatives from NRPC, NRLDC, RRVPNL, Rajasthan SLDC, RRVUNL and JVVNL. He mentioned that during a recent meeting held in Ministry of Power, there was a review of the power supply situation in Northern Region, particularly for States of Rajasthan, Uttarakhand, and J&K. It was noted that Rajasthan was experiencing power shortages despite adequate availability in the grid, and constraints within the state's power system were identified. The Ministry inquired about potential measures to alleviate these constraints. Additionally, he emphasized that before considering any additional power allocation from the Central sector, the partial outages of units within Rajasthan's control area must be addressed. It was also mentioned that the overall power system needs to be viewed collectively, as a power shortage in one state can occur even when other states have a surplus. Further, all Northern states have been provided with a format regarding the partial outages prior to considering any additional allocations.

The representative of Suratgarh Super Critical TPS informed that after commissioning stage itself, the issues of partial outage have been observed it has been taken up with the OEM-BHEL. With support from OEM, the Forced Outages have now reduced. Unit Outage due to frequent Boiler tube leakages have come down significantly. It was also informed that NTPC has done technical audit of this plant.

Member Secretary, NRPC further mentioned that this special meeting has been called specially to discuss long-pending bilateral issues of Rajasthan, which was also discussed earlier in OCC meetings of NRPC but somehow could not be resolved fully.

Subsequently, deliberations on following agenda items were held;

**1. Delay in transmission lines affecting Grid operation adversely.**

NRLDC representative highlighted the following points:

- The commissioning of the 400 kV Suratgarh TPS – Babai (Jhunjhunu) D/C line has been delayed for 6-7 years, impacting grid operations and the constraints in evacuation of full generating capacity of 2820 MW at Suratgarh.
- Currently, only 45 km of the 230 km line has been constructed and energized against theft.

- This delay has led to evacuation challenges and overloading at the 400 kV Ratangarh GSS and Suratgarh TPS.
- There is a need to expedite the commissioning of the remaining line and to provide updates on progress along with a projected commissioning schedule.
- RRVPNL representative apprised that 123 km of the 400kV Suratgarh TPS – Babai (Jhunjhunu) D/C line is scheduled to be charged with anti-theft measures by November 15, 2024. Previously, 23 Nos. towers had collapsed due to theft incident, the 123 km line (60 km from SSCTPS and 63 km from SCTPS) will be energized after the erection of three number of new towers. The total length of the line is 245 Km, includes 743 towers and the completion of Line is expected by June 2025, with efforts underway to finish it even earlier, by March 2025. Additionally, it was also informed by RRVPNL that there are currently no Right of Way (ROW) issues affecting the construction of the line.
- Suratgarh TPS representative inquired whether a load flow study had been conducted on the loading pattern of the 400kV Suratgarh TPS – Babai (Jhunjhunu) D/C line after it was energized. He also stated that there is a significant flow of power from Suratgarh Supercritical to Suratgarh Thermal, while low power flow on the Bikaner lines from Suratgarh Thermal.
- CGM (SO) NRLDC replied that due to high RE generation in peak solar hours significant power flow from Surtagrah Thermal to Bikaner is not observed.
- SLDC Rajasthan informed that according to the load flow study conducted, the commissioning of the 400kV Suratgarh Super Critical TPS – Babai (Jhunjhunu) D/C line, the load on the Babai lines is expected to be 1190 MW. Additionally, the loading from 400kV Suratgarh Supercritical to Suratgarh Thermal lines will decrease significantly.
- SLDC Rajasthan proposed a temporary solution to alleviate the high loading on the Suratgarh and Babai lines until the commissioning of the 400kV Suratgarh Super Critical TPS – Babai (Jhunjhunu) D/C lines. SLDC Rajasthan informed according to verbal information received from the STU, both the 400kV Suratgarh Supercritical-Babai D/C lines and the 400kV Suratgarh Thermal-Ratangarh lines run parallel to each other. The proposal involves connecting one circuit of the 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line. It was informed that two new towers to be erected to facilitate this rearrangement and the line could be energized to reduce the high loading on the 400kV Suratgarh and 400kV Ratangarh lines. This change is expected to lower maintenance requirements at the 400kV Suratgarh. Additionally, RRVPNL confirmed that parallel work would continue for the commissioning of the 400kV Babai lines.
- MS, NRPC stated that since the line is intra-state, approval from the relevant state authorities will be necessary. SE (SOLD) mentioned that data available with them is based on verbal information and a load flow study has been carried out accordingly. However, this data needs to be revised based on the actual available information.
- MS, NRPC and CGM (SO), NRLDC asked to SLDC Rajasthan to share the study files & its results with NRPC and NRLDC for further examining at their end. It was also agreed in the meeting that FTC procedure for the rearrangement will be followed.

18-ए, शहीद जित सिंह मार्ग, कटवारियां सराय, नई दिल्ली दूरभाष: 011-26513265 ई-मेल: [seo-nrpc@nic.in](mailto:seo-nrpc@nic.in) वेबसाइट:

[www.nrpc.gov.in](http://www.nrpc.gov.in)

18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26513265 e-mail: [seo-nrpc@nic.in](mailto:seo-nrpc@nic.in) Website: [www.nrpc.gov.in](http://www.nrpc.gov.in)

- RRVPNL representative informed that the 400 kV Kenchiya and 400 kV Bikaner New lines are being planned in Rajasthan. The 400 kV Kenchiya line will be a LILO (line-in, line-out) of the 400 kV Suratgarh Thermal - Bikaner line, while the 400 kV Bikaner New line will be a LILO of the 400 kV Suratgarh Supercritical - Bikaner D/C line. It was also informed that the work of Bikaner New Project is proposed to be part of their joint venture with PGCIL with approximately 1190 MW of renewable energy generation planned for Bikaner New. Representatives from Suratgarh raised concerns about the increased loading on their switchyard due to the upcoming Kenchiya station and suggested that it should be a LILO of the 400 kV Suratgarh Supercritical - Bikaner D/C line.
- RRVPNL representative stated that if the 400 kV Babai - Suratgarh Supercritical line is commissioned first, there would be no loading issues for the Suratgarh Thermal switchyard. The SLDC Rajasthan representative added that the load flow will depend on grid conditions, and switchyard strengthening work should be undertaken at the generating stations in Suratgarh. During peak solar hours, load flow will be higher in the integrated network, requiring thermal generation to be backed down to a technical minimum. Therefore, RRVUNL will need to ensure their switchyard is maintained accordingly. The SLDC Rajasthan representative also highlighted the advantages of strengthening work at KTPS where connectivity with Kota PG was restored recently and benefiting KTPS with access to multiple evacuation lines.
- CGM (SO) NRLDC emphasized that RRVPNL should keep RRVUNL updated on the planning and execution of the upcoming network. He also mentioned that GRID-INDIA provides quarterly operational feedback to the CTU, and a similar process could be implemented at the state level.

**After detailed discussion following was decided:**

- a) Field survey to be conducted by RRVPNL by 15.11.2024 for the feasibility of the temporary arrangement and material requirement etc. for connecting one circuit of the 400kV Suratgarh Thermal-Ratangarh line to one circuit of the 400kV Suratgarh Supercritical-Babai D/C line. It was informed that two new towers to be erected to facilitate this rearrangement and the line could be energized to reduce the high loading on the 400kV Suratgarh and 400kV Ratangarh lines. This change is expected to lower maintenance requirements at the 400kV Suratgarh. **Additionally, parallel work would continue by RRVPNL for the early commissioning of the 400kV Babai lines.** (Approval from higher management of RRVPNL/RVUNL and concerned authorities to be taken).
- b) SLDC & RRVPNL will jointly study as per the revised/actual data to check the load flow/loading condition of lines if the new arrangement is carried out so that the benefits are visible explicitly.
- c) The study will be shared by RRVPNL/SLDC with NRPC & NRLDC and decision is to be conveyed by RRVPNL.

**2. Low voltage issues at Hindaun, Alwar**

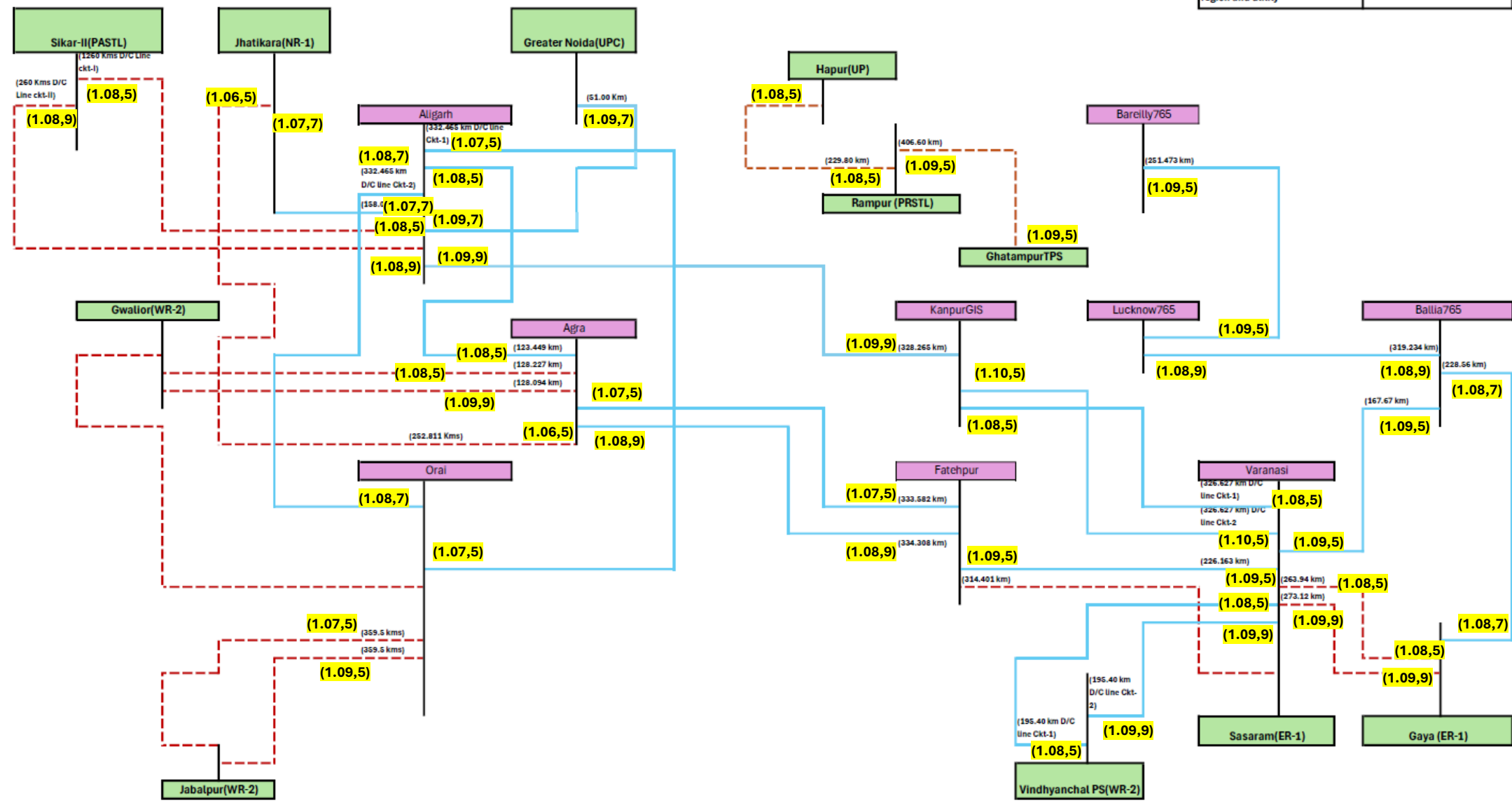
NRLDC representative stated the following:

- Persistent low voltage problems have been observed in Hindaun, Alwar, and Dholpur.

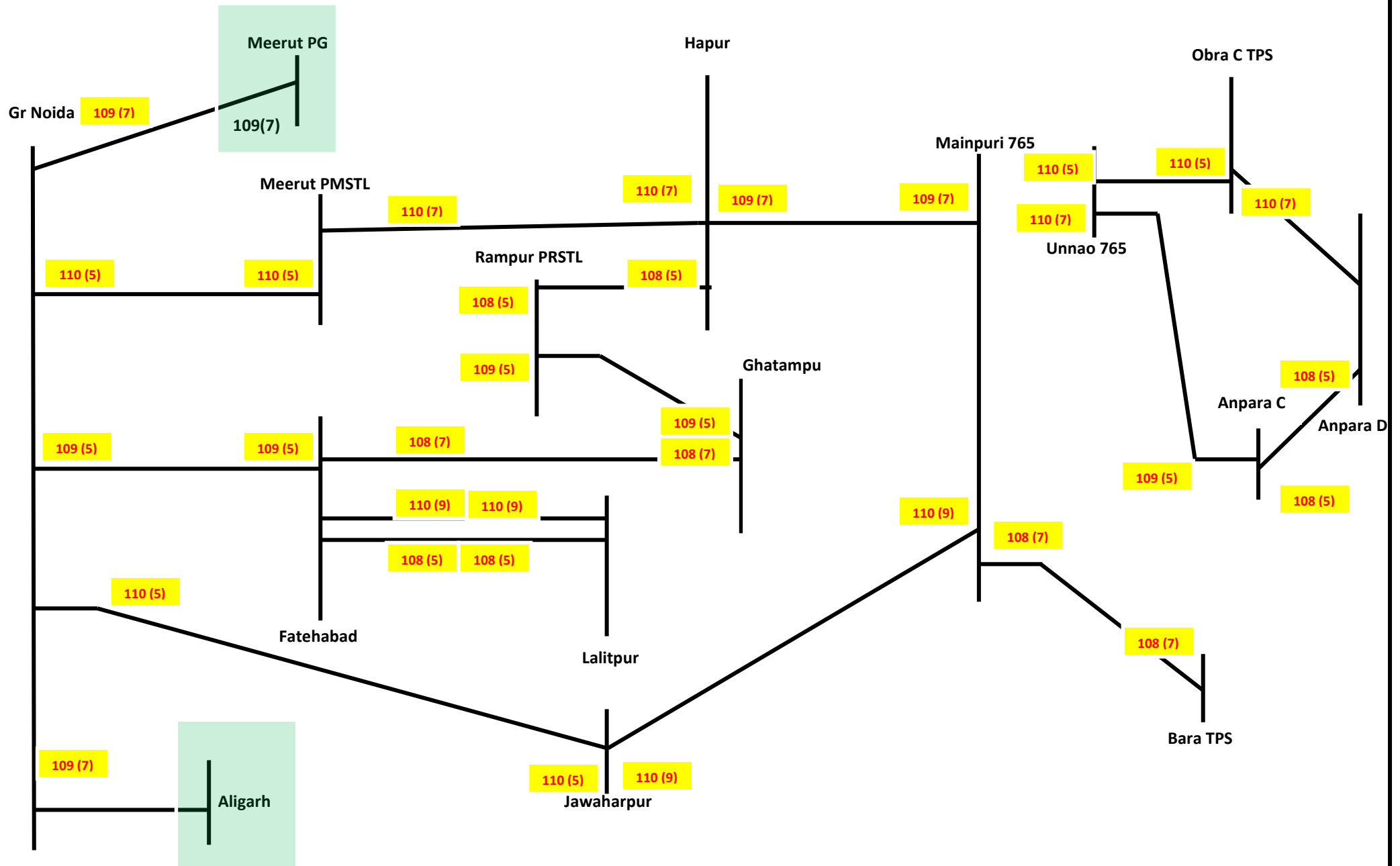
Settings for Inter-regional lines to be discussed with WRPC/ERPC/NLDC

Annexure-A.XI

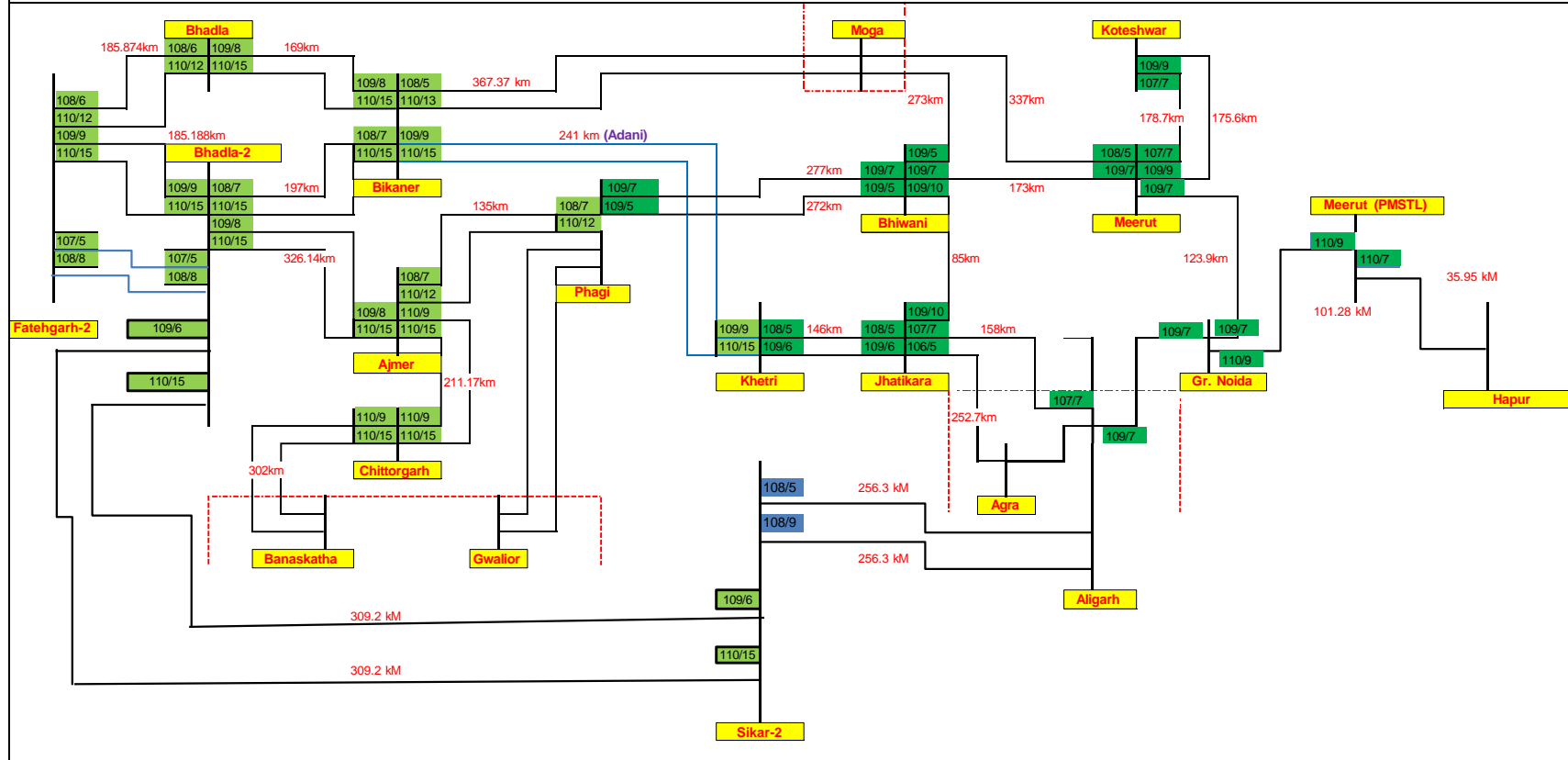
Description	Color coding
Power Grid NR-3 S/S	
Other region and other utility s/s	
Transmission Line under NR-3	
Transmission Line under Other region and utility	



# 765kV Network of UP with overvoltage stage-I setting



### OVER VOLTAGE RELAY SETTINGS (STAGE-I) OF 765kV SYSTEM OF NORTHERN REGION-I





At Anta Station, 220 kV switchyard has DMT (Double main and transfer) scheme, which consists of 13 nos Bays (4 nos of Gas unit generator bays, 1 solar generation bay, 6 nos of line bays, one bus coupler and Bus Transfer Bay).

At Anta Gas Station, ZIV make Numerical busbar protection installed and commissioned in 2006. The site was already facing the issue related to obsolescence of busbar protection since June'2022 and the matter already taken up on priority to restore healthy protection. Necessary budget approval and indent was raised itself in 2022 and PO awarded in 2023.

The OEM – M/s ZIV Automation India Private Limited submitted obsolescence letter of busbar system due to non-availability of compatible software as these relays are declared obsolete by their side. OEM submitted obsolescence letter for same relays, attached in Annexure-A.

In Feb'24, Lalsot bay peripheral unit got faulty and block the busbar protection, which is further shifted on transfer bus circuit due to faulty bay peripheral unit issue.

At Anta station, auto reclose feature is not in scheme of transfer bus circuit. Due to the same, AR didn't happen on single phase fault of Lalsot line.

After tripping of line on single phase fault, the bay is shifted to main breaker, but multiple 220kV element tripping incidence happened in oct-24 due CT bursted at lalsot end.

**Brief of incidence**—At 16:52Hrs on 10.10.2024, CT of 132 KV Lalsot-Nagal Pyariwas line at Lalsot end bursted. The current raised in R & Y phase, which was well above the busbar differential current setting, resulted in Main Bus -2 Bus Bar Protection operated at Anta and 6 nos. 220kV element got tripped.

To avoid this further, Lalsot line shifted on Transfer bus to avoid any main Busbar protection in case of similar kind of event.

After shifting of bay on transfer circuit, the lalsot line tripped on Bus#3 87 every time on every connecting 132kV/ 220kV feeder tripping on fault. The other side breaker never operates on these tripping. The differential pickup setting of the same for transfer bus circuit is raised further with slope and **false tripping did not happen after that**. But due to non-availability of auto-recloser in Transfer bus circuit, line can be trip even in single phase transient fault(in future, if happen).

Meanwhile, material for busbar replacement is already received at site. We are planning the replacement of complete system in upcoming months.

Agency mobilisation for busbar protection replacement is planned from 17<sup>th</sup> march tentatively. Transmission lines availability is required at high priority to export the power generation. We assure utmost care for healthy protection availability of lines from Anta end.

  
10/10/2024

AGM(Electrical Maintenance)  
NTPC Anta Gas Power Station





**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)]

**उत्तर क्षेत्रीय भार प्रेषण केन्द्र / Northern Regional Load Despatch Centre**

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संदर्भ संख्या/उ°क्षे°भा°प्रे°के/TS-15

दिनांक: 04 मार्च 2025

सेवा में,

General Manager (OS),  
NRHQ, NTPC Ltd  
TC-33/V-1, Vibhuti Khand,  
Gomti Nagar Lucknow-201301

Subject: Frequent unwanted tripping of 220kV Anta-Lalsot line leading to load loss at Lalsot(Rajasthan)

महोदय / महोदया,

It is to bring to your kind notice that frequent unwanted tripping of 220kV Anta-Lalsot line from Anta end has been observed in recent past. As reported by Rajasthan (RVPNL), 220kV Lalsot has two sources of supply, i.e., 220kV Anta and 220kV Dausa(Raj). Incidents of tripping of 220kV Anta-Lalsot line from Anta end have been observed on fault in downstream of Lalsot S/s. List of such tripping details is attached as **Annexure-I**. Complete loss of load at Lalsot has also been observed in case, Lalsot was only fed from 220kV Anta. As reported by Rajasthan (RVPNL), bus bar protection PU of 220kV Anta-Lalsot line is defective at Anta end and this defective PU causing the operation of Bus Bar protection with external faults of low intensity. During some of the incidents, when fault was on the 220kV Anta-Lalsot line, A/R successfully operated at Lalsot(Raj.) however it didn't operate at Anta(NTPC) end.

Rajasthan raised this issue in Protection Sub Committee (PSC) forum during 57<sup>th</sup> PSC meeting held on 20<sup>th</sup> February 2025. NTPC representative stated that they will resolve the issue related to bus bar protection by the end of March 2025. PSC forum requested NTPC to take expeditious action and resolve the protection related issues at the earliest to avoid any unwanted tripping in future.

Therefore, NTPC is requested to take necessary actions for expeditious rectification of protection related issues i.e., bus bar protection, A/R operation at 220kV Anta and avoid unwanted tripping of 220kV Anta-Lalsot line.

सादर धन्यवाद

*महावीर प्रसाद सिंह*  
04/03/2025

उप महाप्रबंधक (प्रणाली संचालन)  
उत्तरी क्षेत्र भार प्रेषण केंद्र, नई दिल्ली



**प्रतिलिपि विनम्र सूचनार्थः**

1. सदस्य सचिव, NRPC, -18ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली-110016 -
2. कार्यकारी निदेशक, उत्तर क्षेत्रीय भार प्रेषण केंद्र, ग्रिड इंडिया, -18ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016
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4. मुख्य अभियंता (एलडी), एसएलडीसी, राजस्थान राज्य विद्युत प्रसारण निगम लिमिटेड, अजमेर रोड, हीरापुरा, जयपुर -302024
5. मुख्य महाप्रबंधक (प्रणाली संचालन), उत्तर क्षेत्रीय भार प्रेषण केंद्र, ग्रिड इंडिया, -18ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली-110016

## Annexure-I

List of unwanted tripping of 220kV Anta-Lalsot Line from Anta end				
S. No	Name of the Line	Date	Time	Reason of the tripping
1	220 KV Anta(NT)- Lalsote(RS) (PG) Ckt- 1	09-Aug-24	10:38	Line tripped from Anta end only. Fault occurred on 132 kV Main Bus at 220 kV GSS Lalsot.
2		23-Aug-24	00:37	Line tripped from Anta end only. R-N fault, line successfully autoreclosed from Lalsot end. A/R issue at Anta end.
3		05-Sep-24	16:54	Line tripped from Anta end only. R-N fault, line successfully autoreclosed from Lalsot end. A/R issue at Anta end.
4		10-Oct-24	16:52	A CT of 132 kV feeder burst at 220 kV GSS Lalsot however Bus Bar protection at Anta end maloperated
5		01-Nov-24	03:55	Line tripped from Anta end only. R-N fault occurred on 220kV Lalsot-Dausa line, fault cleared in Z-1 from Lalsot end however 220kV Anta-Lalsot line also tripped from Anta end.
6		14-Jan-25	16:38	Line tripped from Anta end only. R-Y fault occurred on 220kV Lalsot-Dausa line, fault cleared in Z-1 from Lalsot end however 220kV Anta-Lalsot line also tripped from Anta end.
7		17-Jan-25	12:07	Line tripped from Anta end only. Fault occurred on 132 kV feeder at Lalsot.

## Status of actions points recommended during previous PSC meetings (to be discussed in 58th PSC meeting)

S. No	Agenda	Remdial actions recommended during PSC meeting	Status of remdial action taken	
			57th PSC (20.02.2025)	58th PSC (26.03.2025)
1	Frequent multiple elements tripping at 220kV Kunihar, Baddi, Upperla Nangal complex and load loss event in HP control area	<b>51 PSC:</b> PSC Forum requested HP to complete the protection audit as per mentioned timelines (protection audit of 220kV Kunihar has been awarded and it would be completed within next 15-20 days. In next phase, by 15th September, protection audit of substations in downstream and upstream of 220kV Kunihar S/s would be completed.) and resolve the protection related issues. HP was also requested to share the reports of protection audit to NRPC & NRLDC after completion of audits.	HPSEBL representatives were not present in the meeting.	
2	Multiple elements tripping at 220kV Hissar(BBMB) 07th May 2024, 11:16 hrs	<b>51 PSC:</b> a) Expedite the implementation of differential protection in short lines to avoid undesired operation of distance protection.	HVPNL representative informed that status is same and estimated timeline will be <b>6 months</b> to complete the work. <i>PSC forum recommended HVPNL to expedite the implementation of differential protection in short lines and also share the expected timeline.</i>	
3	Multiple elements tripping at 400kV Sainj (HP), 400kV Parbati2 & Parbati3 (NHPC) Stations on 07th May 2024, 16:17 hrs	<b>51 PSC:</b> a) NHPC shall follow up with the relay engineer and taken necessary remedial actions to ensure proper operation of A/R scheme at Parbati2 end. b) NHPC and HPPTCL shall review the healthiness of PLCC at Parbati3 and Sainj end and take necessary actions to ensure their proper operation. c) Expedite the implementation of differential protection in 400kV Parbati2-Sainj line. d) Standardisation of recording instruments (DR/EL) need to be ensured.	NHPC representative informed that OPGW laying is ongoing. GE engineers are yet to visit and the work is expected to get completed <b>by March 2025</b> . <i>PSC forum recommended NHPC &amp; HPPCL to take expeditious action at their end and ensure healthiness of protection system.</i>	
4	Multiple elements tripping at 220kV Sarna (PS) on 04th May 2024, 07:10 hrs	<b>51 PSC:</b> a) Punjab shall expedite the commissioning of new bus scheme. B) POWERGRID shall revise the Z-4 time delay setting of Kishenpur lines at Sarna (PS) end as 160msec till bus bar get operational.	PSTCL representative informed that there is delay in tender stage and <b>bus bar protection</b> at 220kV Sarna will be commissioned <b>by June 2025</b> . Materials are under inspection. <i>PSC forum requested PSTCL to expedite the work related to implementation of bus bar protection at Sarna S/s.</i>	
5	Multiple elements tripping at 400/132kV Masoli(UP) on 29th May 2024, 15:57 hrs	<b>51 PSC:</b> a) UP shall implement the bus bar protection at 132kv level at 400/132kV Masoli S/s.	UPPTCL representative stated that status is same. Shutdown has been planned after 25th February 2025 and <b>bus bar</b> commissioning at 132kV Masoli(UP) will get completed <b>by March 2025</b> . <i>PSC forum requested UPPTCL to expedite the process of bus bar protection implementation at 400/132kV Masoli(UP) and such other stations.</i>	
6	Multiple elements tripping at 220kV KTPS (RVUN) on 21st June 2024, 11:37 hrs	<b>51 PSC:</b> a) Commissioning of bus coupler between 220kV Bus-3 & 5 need to be expedited.	RVUNL representative stated that <b>status is same</b> and work is at stage of tender processing. <i>PSC forum requested RVUNL for expeditious actions at their end.</i>	
7	Frequent tripping of 220 KV Anta(NT)-Sakatpura(RS) (RS) Ckt-1	<b>52 &amp; 53 PSC:</b> RVPN was requested to expedite the process of relay replacement and rectification of issues related to A/R operation.	RVPNL representative informed that there is delay in panel replacement. If the work is delayed further, <b>A/R will be enabled in the old panel during shutdown on 27th and 28th February 2025</b> . <i>PSC forum requested RVPNL to expedite the actions at their end.</i>	
8	Frequent tripping of 220 KV Khara(UP)-Saharanpur(PG) (UP) Ckt-1	<b>52 &amp; 53 PSC:</b> UP was requested to expedite the process of relay replacement at Khara end. POWERGRID shall review and ensure the A/R operation at their end.	UPPTCL representative informed that relay replacement in Saharanpur line is completed and that in <b>Beas line will be completed by 22nd February 2025</b> . It is expected that relay replacement in <b>unit-1 will get completed by the end of March 2025 followed by unit-2 &amp; 3</b> . <i>PSC forum requested UPPTCL to expedite the replacement of relay at Khara(UP) end.</i>	
9	Multiple elements tripping event at Patiala(PG)	<b>52 &amp; 53 PSC:</b> POWERGRID was requested to expedite the process of commissioning of new bus bar scheme.	POWERGRID(NR-2) representative informed that status is same. <i>PSC forum requested POWERGRID(NR-2) to expedite the process.</i>	

10	Multiple elements tripping at 220kV Khodri HEP & Chibro HEP on 5th, 11th & 19th September 2024	<b>53 PSC:</b> a) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured. As per IEGC clause 37.2 (c), Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within 24 hrs of the event. b) HPPTCL shall taken necessary actions to rectify the protection related issue in 220kV Khodri-Majri ckt-2. c) JOV protection needs to be disabled in 220kV lines at the earliest. d) Over frequency and over current protection operation in units at Khodri HEP need to be reviewed. e) A/R should be made operational in Sarsawan line at the earliest. f) UJVNL shall share the CPRI audit report and details of remedial action taken within one week. g) Replacement of Units breakers need to be expedited.	UJVUNL representative informed that GE team is already contacted to resolve the <b>A/R issue</b> in relay, but there is <b>delay from GE end</b> . Further, <b>tender is under process regarding replacement of bus bar protection relay</b> . Action plan is prepared and shared for attending the issue in unit/line breaker. <i>PSC forum requested UJVUNL &amp; HPSEBL to take necessary remedial action at their end and ensure proper operation of protection system. UJVUNL shall expedite the action plan and HPSEBL shall review the protection setting of 220kV Khodri-Majri line-II.</i>	
11	Multiple elements tripping at 400/220kV Obra_A(UP) on 9th October 2024	<b>54 PSC Recommendations:</b> a) UPPTCL & Obra_A(UP) shall ensure the implementation of LBB protection at the earliest at 220kV side. b) GPS scheme shall be implemented at Obra_B(UP) by the <b>end of January 2025</b> and time sync of recording devices will be ensured.	UPPTCL representative informed that <b>time sync issue will be resolved by March 2025</b> (delay in visit by ABB engineers). Further, <b>bus bar relay replacement will be done within 1 year</b> . <i>PSC forum requested UPPTCL for expedited corrective actions.</i>	
12	Multiple elements tripping at 220/132kV Obra_A(UP) on 9th October 2024	<b>54 PSC Recommendations:</b> Commissioning and Implementation of numerical relays in 132kV ICT-1&2 at Obra_A(UP) need to be expedited. Timely commissioning of the same need to be ensured.	UPPTCL representative informed that <b>Commissioning and Implementation of numerical relays in 132kV ICT-1&amp;2 at Obra_A(UP) will be completed by March 2025</b> (delay in visit by ABB engineers). <i>PSC forum requested UPPTCL for expedited corrective actions.</i>	
13	Multiple elements tripping at 400/220kV Kashipur(Utt) on 10 <sup>th</sup> October 2024	<b>54 PSC Recommendations:</b> a) PTCUL shall review the SPS scheme at 400/220kV Kashipur S/s. b) Overcurrent protection setting (IDMT) need to be revised in line with the approved protection philosophy.	<b>PTCUL representatives were not present in the meeting.</b>	
14	Multiple elements tripping at 220kV Dausa(RS) on 21st October 2024 and on 29th December, 2024	<b>54 &amp; 56 PSC Recommendations:</b> a) RVPNL will expedite the replacement of all the static relays at 220kV Dausa S/s with numerical relays. b) Time synchronization of all the recording instruments need to be ensured. c) Healthiness of protection system and their proper operation need to be ensured. d) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured.	RVPNL representative informed that <b>3 relays will be replaced during shutdown available on 21st, 22nd and 28th February 2025</b> . Rest 2 relays are under procurement stage. <i>PSC forum requested RVPNL for expedited corrective actions.</i>	
15	Frequent tripping of 220 KV RAPS_A(NP)- Sakatpura (RS) (RS) Ckt-1 & 2	<b>55 PSC Recommendations:</b> Expeditious corrective actions to minimise frequent faults in line.	RVPNL representative informed that work is completed in 220kV RAPS_A(NP)- Sakatpura (RS) (RS) Ckt-1. <b>For 220kV RAPS_A(NP)- Sakatpura (RS) (RS) Ckt-2 and 220kV RAPS_B(NP)- Sakatpura (RS) (RS) Ckt, it will be completed by March 2025</b> . <i>PSC forum requested RVPNL for expedited corrective actions.</i>	
16	Frequent tripping of 400 KV Amritsar(PG)-Makhu(PS) (PSTCL) Ckt-1 & 400 KV Talwandi Saboo(PSG)-Nakodar (PSG) (PS) Ckt-1	<b>55 PSC Recommendations:</b> PSTCL was requested to plan replacement of porcelain insulators with polymer type.	PSTCL informed that <b>status is same</b> . <i>PSC forum requested PSTCL to for expeditious actions for insulators replacement.</i>	
17	Multiple element tripping event at 400kV Aligarh(UP) on 02nd November, 2024	<b>55 PSC Recommendations:</b> UPPTCL shall ensure the healthiness of carrier communication and A/R operation at Muradnagar_1(UP) end.	UPPTCL representative informed that carrier communication issue exists in Aligarh(UP) end also. Hence communication upgradation will be done at both the ends. <b>Work is expected to get completed by end of May 2025</b> . <i>PSC forum requested UPPTCL for expedited corrective actions.</i>	
18	Multiple element tripping event at 220kV Pong(BB) on 06th November, 2024	<b>55 PSC Recommendations:</b> BBMB shall share the event analysis and details of remedial action taken within one week.	<b>Pong BBMB representative was not present.</b> <i>PSC forum requested BBMB to ensure timely submission of DR/EL &amp; tripping report.</i>	
19	Multiple element tripping event at 400kV Jaisalmer(RS) on 11th December, 2024	<b>56 PSC Recommendations:</b> a) RVPNL shall ensure the healthiness of protection system and their proper operation. b) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured.	RVPNL representative informed that during isolator changeover "LBB operated" signal was seen in BCU due to which all the elements connected to that bus tripped. There was no fault in system. Tripping occurred during isolator changeover as "LBB operated" signal was seen in BCU. Issue with LBB relay is not identified yet. OEM is present at site for commissioning of new 500MVA ICT which will be completed within 7-8 days. After that <b>OEM will attend this issue in LBB relay. Temporarily busbar protection has been taken out of service and zone-4 settings of lines at Jaisalmer(RS) end is kept as 160ms</b> . <i>PSC forum requested RVPNL to rectify issue in LBB relay at Jaisalmer end and take the busbar protection in service at the earliest.</i>	
20	Multiple elements tripping at 220kV Mehalkalan(PS) on 27th November, 2024	<b>56 PSC Recommendations:</b> a) PSTCL shall share the DR/EL & tripping details within one week. b) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured.	<b>PSTCL informed that they will be sharing the analysis shortly.</b>	

21	Frequent tripping of 220 KV Agra(PG)-Bharatpur(RS) (PG) Ckt-1	<b>57 PSC Recommendations:</b> Impedance measurement and distance relay settings of the line need to be reviewed before summer (high demand period).	RVPNL representative informed that this line is radially connected, hence DR is insignificant at Bharatpur end. POWERGRID(NR-3) representative informed that most of the faults are occurring at the border of Rajasthan and Powergrid portion of the line. Patrolling is done in Powergrid portion of the line and nothing is observed at the fault location. <i>PSC forum requested Rajasthan and POWERGRID to complete review of impedance measurement and distance relay settings of the line this work before summer (high demand period).</i>	
22	Frequent tripping of 400 KV Anpara_B(UPUN)-Sarnath(UP) (UP) Ckt-2	<b>57 PSC Recommendations:</b> Healthiness of carrier communication need to be reviewed.	As per DR, there is delayed clearance of fault from Sarnath end (fault cleared in zone-2 from Sarnath end) in one of the events, hence carrier communication issue is suspected. <i>PSC forum requested UPPTCL to review healthiness of carrier communication in the line.</i>	
23	Frequent tripping of 400 KV Noida Sec 148- Noida Sec 123 (UP) Ckt-1	<b>57 PSC Recommendations:</b> a) Timely submission of disturbance recorder (DR) and event logger (EL) files need to be ensured. b) Time sync issue need to be addressed. c) Issue in A/R non-operation need to be resolved.	UPPTCL representative stated that A/R is implemented in BCU for this line and there is issue in A/R initiation in BCU. <i>PSC forum requested UPPTCL to resolve time sync issue and A/R non-operation issue at the earliest.</i>	
24	Frequent tripping of 220 KV Sohawal(PG)-Barabanki(UP) (UP) Ckt-1	<b>57 PSC Recommendations:</b> Status of A/R operation and PLCC issue at Sohawal end need to be reviewed.	As per DR, A/R is successful at Barabanki end in one of the 3 events and DT sent from Sohawal(PG) end for other two of the 3 events. <i>PSC forum requested POWERGRID NR-3 to review status of A/R operation and PLCC issue at Sohawal end.</i>	
25	Frequent tripping of 400 KV Merta-Ratangarh (RS) Ckt-1	<b>57 PSC Recommendations:</b> a) DR standardization need to be checked (DR time window of ~800ms is not as per standard). b) Phase sequence issue need to be resolved. c) Status of A/R operation at Ratangarh end need to be reviewed.	RVPNL representative stated that A/R was successful from Merta end in two of the events and status of A/R will be checked at Ratangarh end during shutdown along with the phase sequence issue. <i>PSC forum requested RVPNL to maintain DR uniformity for lines, resolve phase sequence issue and review status of A/R operation at Ratangarh end.</i>	
26	Frequent tripping of 400 KV Mohanlalgaonj (PGYTL)-Unnao(UP) (PGYTL) Ckt-1	<b>57 PSC Recommendations:</b> a) Issue in over-voltage relay need to be identified and resolved at the earliest. b) CVT error may be reviewed at Unnao end.	UPPTCL representative informed that there may be issue in relay in which over-voltage is implemented as voltage observed was ~1.05 pu only. <i>PSC forum suggested to review CVT error and attend the issue in relay at the earliest.</i>	
27	Multiple elements tripping at 220/132kV Ropar(PS) on 06th January, 2025	<b>57 PSC Recommendations:</b> PSTCL need to share the DR/EL & tripping details within one week	PSTCL representative was not present during the meeting. <i>PSC forum requested PSTCL to share the DR/EL &amp; tripping details within one week.</i>	
28	Multiple elements tripping at 400/220KV Heerapura(RS) on 10th January, 2025	<b>57 PSC Recommendations:</b> a) Instantaneous OC relay (High set) settings of ICTs at Heerapura(RS) may be reviewed. b) Replacement of remaining electromechanical/ static relays & schemes with numerical relay need to be expedited at Heerapura(RS).	RVPNL representative stated that there was fault due to falling of kite thread on 220 kV "E"-Bus at 400 kV GSS Heerapura. As it was a nearby fault. it was caused tripping on 400/132 kV ,250 MVA ICT-1 & 400/132 kV, 250 MVA ICT-2 on instantaneous OC relay (High set). As all relays were electromechanical type relay on 220 kV BUS Sectionalizer, Bus Bar protection Scheme, Bus Coupler and ICTs, no DR is available in relays. As remedial action taken, O/C & EF Electromechanical relays on all 03 Nos. 220 kV BUS Sectionalizer, 01 No. 220 kV Bus Coupler, 04 Nos. on 400 kV Side of all 400/220 kV ICTs have been retrofitted by Numerical Relays. <b>Remaining Electromechanical/ static relays &amp; schemes will be retrofitted in phased manner as per availability of relays and shutdown</b> at the earliest. <i>PSC forum requested RVPNL to review Instantaneous OC relay (High set) settings of ICTs and replace remaining electromechanical/ static relays &amp; schemes with numerical relay at Heerapura at the earliest.</i>	
29	Multiple element tripping at 220/132kV Agra Sikandra(UP) on 23rd January, 2025	<b>57 PSC Recommendations:</b> a) Carrier communication issue at Kirawali(UP) need to be resolved. b) Issue in isolator selection status at Agra Sikandra(UP) need to be addressed. c) Zone-2 and zone-3 settings of 220kV Kirawali- Agra Sikandra(UP) Ckt and 220kV Kirawali(UP)-Agra(PG) Ckt need to be reviewed at Kirawali end.	UPPTCL representative stated that shutdown was taken for replacement of damaged CT of 220kV Kirawali- Agra Sikandra(UP) Ckt and status of isolator of Bus A & Bus B busbar relay was thoroughly checked and & set right. POWERGRID(NR-3) representative informed that during the same time 220kV Kirawali(UP)-Agra(PG) Ckt also tripped and <b>fault was cleared in zone-3 from Agra(PG) end.</b> UPPTCL representative agreed that <b>time delay at Kirawali end in zone-2 settings of 220kV Kirawali- Agra Sikandra(UP) Ckt</b> was not correct, hence 220kV Kirawali(UP)-Agra(PG) Ckt tripped in zone-3 from Agra(PG) end. <i>PSC forum requested UPPTCL to resolve issues related to carrier communication at Kirawali(UP) and isolator selection status at Agra Sikandra(UP) and also to review zone-2 and zone-3 settings of 220kV Kirawali- Agra Sikandra(UP) Ckt and 220kV Kirawali(UP)-Agra(PG) Ckt at Kirawali end.</i>	

Grid Event summary for February 2025

S.No.	Category of Grid Incident/ Disturbance  ( GL-1 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Event (As reported)	Loss of generation / loss of load during the Grid Disturbance		Fault Clearance time (in ms)	Compliance of Protection Protocol/Standard		
					Date	Time		Generation Loss(MW)	Load Loss (MW)		Flash Report Submission (Y/N)	DR/EL Submission (Y/N)	Detail Tripping Report Submission (Y/N)
1	GI-1	i)220 KV Saharanpur(UP)-Khodri (UK) (UP) Ckt ii)220 KV Khodri(UK)-Majri(HP) (UK) Ckt-2 iii)220 KV Khodri - Chibro (UK) Ckt-2	Uttarakhand	PTCL, HPTCL & UPTCL	1-Feb-25	09:01	i)220KV Khodri(UK) generating station has 4 generating units of 30MW each and has double main bus scheme. The power is evacuated mainly through 220KV Khodri(UK)-Majri(HP) (UK) Ckt-1 & 2, 220KV Saharanpur(UP)-Khodri(UK) (UP) Ckt, 220KV Khodri – Sarsawan Ckt, 220KV Khodri – Jhajra Ckt and 220KV Khodri – Chibro Ckt-1 & 2. ii)As reported, at 09:01 hrs, while stopping of 30MW Unit-4 at Khodri(UK), its R-phase pole of CB stucked and the trip coil of R-phase burnt. Due to this, pole discrepancy operated which as per logic, led to LBB protection operation resulting in tripping of 220 KV Khodri(UK)-Majri(HP) (UK) Ckt-2, 220 KV Saharanpur(UP)-Khodri(UK) (UP) Ckt and 220 KV Khodri - Chibro (UK) Ckt-2. iii)As per PMU at Dehradun(PG), no fault was found in the system. iv)As per SCADA, no change in demand/generation in Uttarakhand control area was observed. v)As reported by SLDC-UK, testing of Generator CB of Unit -4 by expert service engineer has been carried out and fault has been rectified. As remedial action taken, the stuck pole of R-phase was opened manually and the control valve assembly was replaced with a new one. vi)220KV Bhakra(BBMB) generating station has 6 generating units of 157MW each. Unit-1, VI and VII were connected to Bus-1 of 220KV along with 220 KV Bhakra_R-Ganguwal (BB) Ckt-2 and 220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2.	0	0	NA	Y(d)	N (Partial detail received)	N (Partial detail received)
2	GI-1	i)220 KV Bhakra_R-Ganguwal (BB) Ckt-2 ii)220KV Bus-1 at Bhakra_R(BB) iii)220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2 iv)157 MW Bhakra HPS - UNIT 6	Himachal Pradesh	BBMB and PSTCL	3-Feb-25	03:57	i)During the antecedent condition only Bhakra HPS - UNIT 6 was operational and generating 157MW. 220 KV Bhakra_R-Ganguwal (BB) Ckt-2 and 220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2 were carrying 1 MW and 48MW of load respectively. ii)As reported, at 03:57 hrs, R-N phase to earth fault occurred in 220 KV Bhakra- Jamalpur Ckt-2. At the same time Bus Bar protection for 220KV Bus-1 operated. This led to tripping of 220KV Bus-1, 220 KV Bhakra_R-Ganguwal (BB) Ckt-2, 220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2 and 157 MW Bhakra HPS - UNIT 6 (Details Awaited) iii)As per PMU at Bhakra(BBMB), R-N phase to earth fault was found in the system. iv)As per SCADA, approx 157 MW hydro generation loss is observed at 220 KV Bhakra Dam S/S.	157	0	120	Y(d)	N	N
3	GI-2	i)400 KV Parbat_2(NH)-Sainj(HP) (PKTCL) Ckt-1 ii)400 KV Parbat_3(NH)-Parbat Pooling Banala(PG) (PKTCL) Ckt-1 iii)400 KV Parbat_3(NH)-Sainj(HP) (PKTCL) Ckt-1	Himachal Pradesh	NHPC, PGCL & PKTCL	3-Feb-25	19:35	i)Total generated power of Sainj HE(HP), Parbat_2(NH) and parbat_3(NH) evacuates through 400 KV Parbat_2(NH)- Banala(PG) (PKTCL) Ckt and 400 KV Parbat_3(NH)- Banala(PG) (PKTCL) Ckt via 400 KV Parbat_2(NH)-Sainj(HP) (PKTCL) Ckt and 400 KV Parbat_3(NH)-Sainj(HP) (PKTCL) Ckt. ii)During antecedent condition, only 200MW Unit-1 at Sainj HE(HP) was running (generating approx. ~45MW) and 130MW Unit-4 at Parbat-3 HE(NHPC) (generating approx. ~132MW). iii)As reported, at 06:31 hrs, R-N fault occurred on 400 KV Parbat_3(NH)-Sainj(HP) (PKTCL) Ckt-1 in-2-2 and fault current was 2.92 kA from Sainj end. iv)As per DR of the line of Parabat3 end, fault was sensed in 2-1 and tripping command to R-ph CB was given. However, R-ph pole failed to open leading to operation of LBB protection. This led to tripping of all the elements connected to the Bus (Tripping details awaited) and complete blackout of 400KV Parbat-3 s/n occurred. v)As per PMU, R-N fault with delayed clearance of fault in 400msec is observed. vi)During this event, Approx 132 MW hydro generation loss is observed at Parbat-3 and 45 MW hydro generation loss is observed at Sainj. (As per SCADA).	177	0	440	Y(d)	N (Partial detail received)	N (Partial detail received)
4	GI-1	i)220 KV Bhakra_R-Ganguwal (BB) Ckt-2 ii)220KV Bus-1 at Bhakra_R(BB) iii)220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2 iv)157 MW Bhakra HPS - UNIT 6 v)157 MW Bhakra HPS - UNIT 7	Himachal Pradesh	BBMB and PSTCL	5-Feb-25	18:45	i)220KV Bhakra(BBMB) generating station has 6 generating units of 157MW each. Unit-1, VI and VII were connected to Bus-1 of 220KV along with 220 KV Bhakra_R-Ganguwal (BB) Ckt-2 and 220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2. ii)During the antecedent condition only Bhakra HPS - UNIT 6 and 7 were operational and generating 156MW and 157MW respectively. 220 KV Bhakra_R-Ganguwal (BB) Ckt-2 and 220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2 were carrying 33 MW and 110MW of load respectively. iii)As reported, at 03:57 hrs, Bus Bar protection for 220KV Bus-1 operated. This led to tripping of 220KV Bus-1, 220 KV Bhakra_R-Ganguwal (BB) Ckt-2, 220 KV Bhakra_R(BB)-Mahlipur(P) (PS) Ckt-2 and 157 MW Bhakra HPS - UNIT 6 and 7(Details Awaited) iv)As per PMU at Bhakra(BBMB), Y-N phase to earth fault was found in the system. v)As per SCADA, approx 427 MW hydro generation loss is observed at 220 KV Bhakra Dam S/S.	427	0	120	N	N	N
5	GI-2	i)400/220 KV 315 MVA ICT 1 AT AJMER(RS) ii)400/220 KV 315 MVA ICT 3 AT AJMER(RS) iii)400 KV AJMER-BHILWARA (RS) Ckt-2	Rajasthan	RVPNL	8-Feb-25	20:54	i)400/220KV Ajmer substation has One and half breaker scheme in 400KV and Double Main & Transfer bus scheme in 220KV system. ii)During antecedent condition, 400 KV AJMER-BHILWARA (RS) Ckt-2 was carrying 23MW, 400/220 KV 315 MVA ICT 1 & 3 were loaded 214 and 223MW each. iii)As reported, at 20:54 hrs, B-N fault occurred on 400 KV AJMER-BHILWARA (RS) Ckt-2. As per DR/EL, two B-N faults occurred. The fault was detected in 21 and the fault current was 3.88KA. iv)However, at the same time 400/220KV ICT-1 and ICT-3 tripped. As per DR/EL of ICT-1 & 3, 50-N (High Set Overcurrent Earth fault) and 67-N (Directional Overcurrent earth fault) operated respectively. v)SLDC Rajasthan confirmed that due to low current relay settings of 50N and 67N on ICT 1 & 3, both elements picked up the current earth fault of 400 KV AJMER-BHILWARA (RS) Ckt-2 and tripped. RVPNL has confirmed that relay settings have been corrected. vi)During this event, approx 170 MW of demand change was observed in Rajasthan control area. (As per SCADA).	0	170	280	Y(d)	N (Partial detail received)	Y(d)
6	GI-2	i)400 KV MURADNAGAR_2-MATHURA (UP) Ckt-1 ii)400KV BUS 1 AT MURADNAGAR_2(UP)	Uttar Pradesh	UPTCL	9-Feb-25	00:54	i)400/220/132KV Muradnagar-New(UP) has one and half breaker scheme at 400KV level and double main and transfer bus scheme at 220KV level. ii)As reported, at 00:54 hrs, 400KV Muradnagar_2-Mathura (UP) Ckt tripped on Y-N phase to earth fault with fault current of 4.08kA from Muradnagar_2 end and fault clearing time of 287 ms; zone-1 distance protection operated (as per DR at Muradnagar_2 end) and DT received at Mathura end (as reported). iii)Due to delayed opening of CB at Muradnagar_2 end of 400KV Muradnagar_2-Mathura (UP) Ckt, LBB protection operated and both main and the CBs at Muradnagar_2 end of 400 KV MURADNAGAR_2-MATHURA (UP) Ckt-1 opened and all the 400KV CBs connected at 400KV Bus-1 of Muradnagar_2 tripped. DT received at remote ends (as reported). iv)As per PMU at Muradnagar(UP), Y-N phase to earth fault with delayed fault clearing time of 280ms is observed. v)As per SCADA, no change in demand is observed in UP control area.	0	0	280	Y	Y	Y
7	GI-1	i)220 KV Hissar(BB)-Hissar IA(HV) (BBMB) Ckt-2 ii)220 KV Hissar(BB)-Hissar IA(HV) (HVPNL) Ckt-1 iii)220 KV Hissar(PG)-Hissar IA(HV) (PG) Ckt-2 iv)220 KV Hissar(PG)-Hissar IA(HV) (PG) Ckt-1 v)220 KV Hissar IA(HV) Bus-2	Haryana	BBMB, PGCL and HVPNL	11-Feb-25	21:13	i)220KV Hissar Sub-station has double main bus system. ii)During antecedent condition, 220 KV Hissar IA(HV) – Narwana Ckt, 220 KV Hissar IA – Masudpur Ckt 1 & 2, 220/132 KV 100 MVA ICT-1 & 160 MVA ICT-2 were connected to 220KV Bus-1 at Hissar IA(HV) and 220 KV Hissar(PG)-Hissar IA(HV) (PG) Ckt-1 & 2 and 220 KV Hissar(BB)-Hissar IA(HV) (HVPNL) Ckt-1 & 2 were connected to 220KV Bus-2 at Hissar IA(HV). 220 KV Bus Coupler at Hissar IA(HV) was in open condition. iii)As reported, at 21:13hrs, Y-phase CT of 220 KV Hissar(BB)-Hissar IA(HV) (BBMB) Ckt-2 got damaged with a heavy blast which caused collateral damage to 220KV L&E Isolator. iv)220 KV Hissar(BB)-Hissar IA(HV) (BBMB) Ckt-2 tripped on distance protection operation (zone-1, fault distance=0-km from Hissar IA end; zone-2, fault current=5.18kA and fault distance=4.06km from Hissar(BB)). v)During the same time, busbar protection operated at 220KV Bus-2 at Hissar IA(HV) end and all the elements connected to Bus-2 tripped. vi)As per PMU at Hissar(PG), Y-N phase to earth fault with fault clearing time of 80ms is observed. vii)As per SCADA, change in demand of approx. 112MW was observed in Haryana control area.	0	112	80	Y	N (Partial details received)	Y
8	GD-1	i)220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3 ii)220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 & 2 iii)220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1& 2 iv)220 KV DSODC Bawana-Narela(DV) (DTL) Ckt-1 & 2 v)220 KV Bus-1 and Bus-2 at Narela(DTL) vi)220/66kV 100 MVA ICT-1, 2 and 3 at Narela(DTL)	Delhi	DTL, BBMB and PGCL	15-Feb-25	09:35	i)220KV Narela(DTL) S/s has double main bus arrangement at 220KV level. 220/132KV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) are connected on the same extended Bus of 220KV Narela(DTL). ii)During antecedent condition, 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3, 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1& 2 and 220/66kV 100 MVA ICT-1, 2 and 3 at Narela(DTL) were connected to 220KV Bus-1 at Narela(DTL) and 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 & 2, 220 KV DSODC Bawana-Narela(DV) (DTL) Ckt-1 & 2 and 220/132KV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) were connected to 220KV Bus-2 at Narela(DTL). 220KV Bus coupler at Narela(DTL) was in Off position. iii)As reported, sequence of event is as follows: a)At 09:19 hrs, both CBs at 220KV side of 220/132KV 50MVA and 100 MVA ICT-1 & 2 at Narela(BB) were manually opened for 220KV Bus Isolator changeover operation from Bus-2 to Bus-1. b)At 09:30 hrs, 89A Bus-1 Isolator of 220/132KV 100MVA ICT-2 at Narela(BB) was closed. c)Since the 220KV Bus Coupler CB at Narela(DTL) was already in Off position since 08:09hrs, the said closure of 89A Isolator with 89B Isolator already closed of 220/132KV 100MVA ICT-2 at Narela(BB) resulted in a position to function as a 220KV Bus Coupler. d)At 09:34 hrs, 89B Bus-2 Isolator of 220/132KV 100MVA ICT-2 at Narela(BB) was tried to open, but the operation could not be done completely due to 89B Isolator struck in between and heavy arcing flames evolved due to said ON load 89B Isolator opening operation. e)It caused ionization in air around 89B Isolator of 220/132KV 100MVA ICT-2 at Narela(BB) and R-B-N double phase to earth fault occurred due to arcing via isolator structure. f)This resulted in zone-2 busbar protection operation (as confirmed from DR) and all the elements connected to 220KV Bus-2 at Narela(DTL) tripped. g)Since 89B Isolator opening operation was not complete, fault continued to be fed from Bus-1 through 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3 via 89A Bus-1 Isolator of 220/132KV 100MVA ICT-2 at Narela(BB) to faulty 89B Bus-2 Isolator. This led to zone-1 busbar protection operation (as confirmed from DR) and all the elements connected to 220KV Bus-1 at Narela(DTL) also tripped and complete blackout occurred at 220KV Narela(DTL). iv)As per DR at Narela(DTL), Zone 2 Bus Bar protection operation followed Zone 1 Bus Bar protection operation. v)As per PMU at Mahanari Bagh(PG), Y-N phase to earth fault followed by Y-B phase to phase fault with fault clearing time of 120msec and 80msec is observed. vi)As per SCADA, change in demand of approx. 58 MW is observed in Delhi control area. However, SLDC-Delhi has reported load loss of approx. 194 MW.	0	194	120	N (Partial details received)	N (Partial details received)	N (Partial details received)
9	GD-1	i)220/33 KV 150 MVA ICT 1 at AHEJAL PSS 4 HB_FGRAH_FBTL (AHEJAL) ii)220/33 KV 150 MVA ICT 2 at AHEJAL PSS 4 HB_FGRAH_FBTL (AHEJAL)	Rajasthan	AHEJAL	15-Feb-25	06:55	i)Generation of 220KV AHEJAL(IP) station evacuates through 220 KV Adani Renew Park SL_FGAHR_FBTL (AREPRJ)-AHEJAL PSS 4 HB_FGRAH_FBTL (AHEJAL) (AREPRJ) Ckt. During antecedent condition, at 220KV AHEJAL PSS 4 station was generating approx. 228 MW (as per PMU). ii)As reported, at 06:55hrs, transient B-N phase to earth fault occurred at 220 KV Adani Renew Park SL_FGAHR_FBTL (AREPRJ)-AHEJAL PSS 4 HB_FGRAH_FBTL (AHEJAL) (AREPRJ) Ckt and line successfully auto-reclosed. iii)However, during the same time, 220/33 KV 150 MVA ICT 1 and 2 at AHEJAL PSS 4 HB_FGRAH_FBTL (AHEJAL) tripped (Exact reason and nature of protection operated yet to be shared) which led to complete blackout out of 220KV AHEJAL PSS4(IP) S/s. iv)As per PMU at Fatehgarh_2(PG), B-N phase to earth fault (voltage dipped upto 0.87 p.u.) is observed with fault clearing time of 120ms. v)As per PMU at AWP52(IP), wind generation loss of approx. 228 MW is observed at AHEJAL PSS4(IP).	228	0	120	Y	N	N
10	GD-1	i) 220 KV Bikaner_2 (PRTSL)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt	Rajasthan	JGCPL	16-Feb-25	14:27	i)Generation of 220KV JGCPL(IP) station evacuates through 220 KV Bikaner_2 (PRTSL)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt. During antecedent condition, 220KV JGCPL(IP) station was generating approx. 90 MW. ii)As reported, at 14:27hrs, 220 KV Bikaner_2 (PRTSL)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt tripped on B-N phase to earth fault due to differential protection operation (exact reason and location of fault yet to be shared). iii)Due to tripping of 220 KV Bikaner_2 (PRTSL)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt, JGCPL(IP) S/s lost its connectivity from grid and blackout occurred at 220KV JGCPL(IP)S/s. iv)As per PMU at Bikaner_2(PG), B-N phase to earth fault (voltage dipped upto 0.75 p.u.) with unsuccessful A/R is observed with fault clearing time of 80ms. After the fault clearance voltage increased upto 1.04 p.u. v)As per PMU, solar generation loss of approx. 90 MW is observed respectively at JGCPL(IP). vi)As per SCADA, dip in ISTS total solar generation of approx. 211 MW is observed.	90	0	80	N (Partial details received)	N (Partial details received)	N (Partial details received)
11	GI-1	i) 220/132kV 160MVA ICT -1 at Delina (JK) ii) 220/132kV 160MVA ICT -2 at Delina (JK) iii) 220/132kV 160MVA ICT -3 at Delina (JK)	J&K	POD-JK	17-Feb-25	14:54	i)220/132kV Delina substation has Double main and transfer bus scheme. ii)During antecedent condition, 220KV Amargah (INDIGRID) –Delina(JK) D/C was carrying 106 MW each and feeding Delina load. iii)As reported, at 14:54 hrs, 132KV Delina – Pattan line tripped due to broken jumper condition while returning the same line from shutdown (exact reason, nature and location of fault need to be shared). iv)During the same time, 220/132kV 160MVA ICT -1 at Delina(JK) tripped on earth fault (exact nature of protection operated need to be shared). v)Subsequently, this led to overloading of 220/132kV 160MVA ICT -2 & 3 at Delina(JK) and got tripped on over-current protection operation. vi)As per PMU at Amargah (INDIGRID), R-Y-B 3 phase to earth fault with fault clearing time of 80 msec is observed. vii)As per SCADA, change in demand of approx. 210 MW is observed in J&K control area.	0	210	80	N	N	N



S.No.	Category of Grid Incident/ Disturbance  ( GL-1 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Event (As reported)	Loss of generation / loss of load during the Grid Disturbance		Fault Clearance time (in ms)	Compliance of Protection Protocol/Standard		
					Date	Time		Generation Loss(MW)	Load Loss (MW)		Flash Report Submission (Y/N)	DR/EL Submission (Y/N)	Detail Tripping Report Submission (Y/N)
12	GI-2	i) 400/220 KV 500 MVA ICT 1 at Moradabad(UP) ii) 220/132 KV 160 MVA ICT 2 at Moradabad-2(UP) iii) 220/132 KV 160 MVA ICT 3 at Moradabad-2(UP) iv) 220KV Moradabad-2 – Amroha (UP) Ckt v) 220KV Moradabad-2 – Sambhal (UP) Ckt	UP	UPPTCL	22-Feb-25	17:18	i)400/220KV Moradabad(UP) has double main and transfer bus scheme in both 400KV and 220KV system. 220/132KV Moradabad-2(UP) was connected to the same 220KV bus as that of 400/220KV Moradabad(UP). ii)During the antecedent condition, 400/220 KV 500 MVA ICT 1 at Moradabad(UP), 220/132 KV 160 MVA ICT 2 & ICT 3 at Moradabad-2(UP) were carrying 79MW, 208MW and 20MW. 400/220 KV 240 MVA ICT 3 at Moradabad(UP) was under shutdown. iii)As reported, at 17:18hrs, fault occurred in 132KV Moradabad-2 – Golbari Ckt (Exact reason, nature and location of fault yet to be shared). iv)Since the fault wasn't cleared at 132KV level, it propagated further into 220KV system which led to Bus Bar protection operation at both 220KV Bus-1 & 2 at Moradabad-2(UP) and all the elements connected to both the 220KV buses at Moradabad-2(UP) tripped. v)As per PMU at Bareilly(PG), Y-B phase to phase fault is observed with fault clearing time of 80ms. vi)As per SCADA, change in demand of approx. 106MW is observed in UP control area.	0	106	80	N	N	N
13	GD-1	i) 400 KV Bikaner(PG)-AzureP543 SL_BKN_PG(Azure) (Azure) Ckt ii) 400 KV AzureP543 SL_BKN_PG-AzureR543 SL_BKN_PG (Azure) Ckt iii) 400/33 KV 150 MVA ICT 1 at AzureP543 SL_BKN_PG(Azure) iv) 400/33 KV 150 MVA ICT 2 at AzureP543 SL_BKN_PG(Azure) v) 400/33 KV 150 MVA ICT 1 at AzureR543 SL_BKN_PG(Azure) vi) 400/33 KV 150 MVA ICT 2 at AzureR543 SL_BKN_PG(Azure)	Rajasthan	Azure43(IP) & PGCL	23-Feb-25	18:05	i)Generation of 400KV Azure43(IP) (both PSS and RS) evacuates through 400 KV Bikaner(PG)-AzureP543 SL_BKN_PG(Azure) (Azure) Ckt. ii)During antecedent condition, Azure43(IP) was generating approx. 29 MW (as per PMU). iii)As reported, at 18:05hrs, 400 KV Bikaner(PG)-AzureP543 SL_BKN_PG(Azure) (Azure) Ckt tripped due to OT received at Bikaner(PG) end. (Exact reason yet to be shared) iv)During the same time, 400 KV AzureP543 SL_BKN_PG-AzureR543 SL_BKN_PG (Azure) Ckt, 400/33 KV 150 MVA ICT 1 & 2 at AzureP543 SL_BKN_PG(Azure) and 400/33 KV 150 MVA ICT 1 & 2 at AzureR543 SL_BKN_PG(Azure) also tripped due to loss of evacuation path (Exact reason and nature of protection operated yet to be shared). This led to complete blackout of 400KV Azure43(IP) S/s. v)As per PMU at Bikaner(PG), no fault was observed in the system. vi)As per PMU at Azure43(IP), solar generation loss of approx. 29 MW is observed.	29	0	NA	N	N	N
14	GD-1	i)400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2 ii)400/220 KV 315 MVA ICT 1 AT DAULATABAD(HV) iii)400/220 KV 315 MVA ICT 2 AT DAULATABAD(HV) iv)400/220 KV 315 MVA ICT 3 AT DAULATABAD(HV) v)400/220 KV 315 MVA ICT 4 AT DAULATABAD(HV) vi)400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-2 vii)400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1 viii)400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1	Haryana	Haryana, PGCL & APCL	27-Feb-25	08:11	i)400KV Daulatabad(HV) has one and half breaker bus scheme in 400KV and double main bus transfer for 220KV system. ii)During the antecedent condition, 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1&2, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1 & 2 and 400KV DAULATABAD-DHANONDA CKT-1&2 were carrying 228MW (each circuit), 553MW (each circuit) and 138MW (each circuit) respectively. iii)As reported, at 08:11hrs, B-N fault occurred on 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2. On this fault, line successfully autoreclosed from Gurgaon(PG) end but CB at Daulatabad end failed to open. During patrolling, flag was found wrapped on phase conductor at tower location no. 54-55. iv)During inspection, both trip coils of 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2 at Daulatabad end were found burnt. v)As CB at Daulatabad end failed to open, LBB of Gurgaon Bay should have operated. However, LBB protection also didn't operate. During the inspection, it was found that bus bar relay was in error mode. vi)Further, at the 400KV lines i.e., 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1 & 2 and 400KV DAULATABAD-DHANONDA CKT-1&2 tripped on operation of distance protection in 2-2. vii)Further, 400/220KV 315MVA ICT-1,2,3&4 at Daulatabad(HV) tripped on operation of non-directional Q/C E/F protection operation and fault got cleared. Tripping of all the elements led to blackout of the 400/220KV Daulatabad(HV) S/s. viii)As per PMU at Gurgaon(PG), B-N phase to earth fault with delayed clearance of ~1080 msec is observed. ix)As per SCADA, change in demand of approx. 414MW is observed in Haryana control area. x)As reported, fault trip coils have been replaced and bus bar relay was reboot. Bus bar relay is working properly however it has been kept under observation and feedback has been given to relay OEM for review of relay.	0	414	1080	N (Partial details received)	N (Partial details received)	N (Partial details received)
15	GD-1	220 KV Bikaner_2 (PBTSJ)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt-1	Rajasthan	PBTSJ & Juniper	28-Feb-25	11:52	i)Generation of 220KV JUNIPER GREEN COSMIC Pvt Ltd (JGCPL)(IP) evacuates through 220 KV Bikaner_2 (PBTSJ)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt-1 and 220KV JGCPL_SL_BIK2_PG (Juniper_NEPL) – MSEPL Ckt. ii)During antecedent condition, 220 KV Bikaner_2 (PBTSJ)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt-1 was carrying approx. 140 MW of load (as per PMU) and 220KV JGCPL_SL_BIK2_PG (Juniper_NEPL) – MSEPL Ckt was in shutdown. iii)As reported, at 11:52hrs, 220 KV Bikaner_2 (PBTSJ)-JGCPL_SL_BIK2_PG (Juniper_NEPL) Ckt tripped due to relay malfunctioning. (Exact reason yet to be shared) iv)Due to tripping of the line, complete RE generation of JGCPL(IP) got affected due to loss of evacuation path. v)As per PMU at JGCPL(IP), no fault was observed in the system. vi)As per PMU at JGCPL(IP), solar generation loss of approx. 140 MW is observed.	140	0	NA	N (Partial details received)	N (Partial details received)	N (Partial details received)
16	GI-1	i)220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-1 ii)220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2	J&K	INDIGRID & JKPD	28-Feb-25	03:30	i)220/132KV Ziankote S/s have two bus at 220KV side i.e., main bus & reserve bus. 220KV Amargarh-Ziankote ckt-1&2 are on the same tower (D/C tower) and line length is ~21.4km. ii)During antecedent condition, 220KV Amargarh (INDIGRID) –Ziankote (JK) Ckt-2 was carrying 139 MW and feeding Ziankote load. 220KV Amargarh (INDIGRID) –Ziankote (JK) ckt-1 was already tripped at 02:40 hrs on R-N fault. iii)As reported, at 03:30 hrs 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2 also tripped on R-N fault (details of cause of fault and location of fault yet to be received). iv)As per PMU at Amargarh (INDIGRID), no fault was observed in system. v)As per SCADA, change in demand of approx. 126 MW is observed in J&K control area.	0	126	NA	N	N	N

Sr No	Element Name	Outage Date	Outage Time	Reason
1	220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-1	06-Feb-25	01:29	Transient fault. As per PMU, B-N phase to earth fault occurred, no auto-reclosing is observed (delayed fault clearance 1560 ms).
		07-Feb-25	02:17	Phase to earth fault R-N. As per PMU, B-N phase to earth fault occurred, no auto-reclosing is observed.
		07-Feb-25	03:25	Transient fault. As per PMU, B-N phase to earth fault occurred, no auto-reclosing is observed.
		08-Feb-25	05:19	Phase to earth fault R-N. As per PMU, R-B fault is observed.
		11-Feb-25	04:13	Phase to earth fault R-N. As per PMU, B-N phase to earth fault occurred, no auto-reclosing is observed.
		13-Feb-25	04:14	Phase to earth fault R-N. As per PMU, B-N phase to earth fault occurred, no auto-reclosing is observed.
		21-Feb-25	05:07	Phase to Ground Fault R-N. As per PMU, R-B fault is observed.
2	220 KV Debari(RS)-RAPS_A(NP) (RS) Ckt-1	27-Feb-25	02:48	Transient fault. As per PMU, R-B fault is observed.
		04-Feb-25	04:05	Phase to earth fault R-N. As per PMU, R-N phase to earth fault occurred, no auto-reclosing is observed.
		17-Feb-25	02:05	Phase to earth fault Y-N. As per PMU, R-N phase to earth fault occurred, no auto-reclosing is observed (delayed fault clearance 880 ms).
3	220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-3	25-Feb-25	00:29	Transient fault. As per PMU, R-Y fault is observed.
		15-Feb-25	09:35	Bus Bar Protection Operated. As per PMU, Y-N fault followed by Y-B fault is observed.
		20-Feb-25	21:13	Phase to Phase Fault R-Y. As per PMU, B-N fault followed by R-B fault is observed.
		28-Feb-25	11:16	Phase to Phase Fault Y-B. As per PMU, R-Y fault is observed.



Grid Event to be discussed in 58th PSC Meeting

S.No.	Category of Grid Incident/ Disturbance  ( GL 4 to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Event (As reported)	Loss of generation / loss of load during the Grid Disturbance		Fault Clearance time (in ms)	Points of discussion
					Date	Time		Generation Loss(MW)	Load Loss (MW)		
1	GI-2	i)400 KV Parbati_2(NH)-Sainj(HP) (PKTCL) Ckt-1 ii)400 KV Parbati_3(NH)-Parbati Pooling Banala(PG) (PKTCL) Ckt-1 iii)400 KV Parbati_3(NH)-Sainj(HP) (PKTCL) Ckt-1	Himachal Pradesh	NHPC, PGCL & PKTCL	3-Feb-25	19:35	i)Total generated power of Sainj HEP(HP), Parbati_2(NH) and parbati_3(NH) evacuates through 400 KV Parbati_2(NH)- Banala(PG) (PKTCL) Ckt and 400 KV Parbati_3(NH)- Banala(PG) (PKTCL) Ckt via 400 KV Parbati_3(NH)-Sainj(HP) (PKTCL) Ckt and 400 KV Parbati_3(NH)-Sainj(HP) (PKTCL) Ckt. ii)During antecedent condition, only 50MW Unit-1 at Sainj HEP(HP) was running (generating approx. ~45MW) and 130MW Unit-4 at Parbati-3 HEP(NHPC) (generating approx. ~132MW). iii)As reported, at 06:31 Hrs, R-N fault occurred on 400 KV Parbati_3(NH)-Sainj (HP) (PKTCL) Ckt-1 in 2-2 and fault current was 2.92 KA From Sainj end. iv)As per DR of the line of Parbati-3 end, fault was sensed in 2-1 and tripping command to R-ph CB was given. However, R-ph pole failed to open leading to operation of LBB protection. This led to tripping of all the elements connected to the Bus (Tripping details awaited) and complete blackout of 400KV Parbati-3 s/sm occurred. v)As per PMU, R-N fault with delayed clearance of fault in 400msec is observed. vi)During this event, Approx 132 MW Hydro generation loss is observed at Parbati-III and 45 MW Hydro generation loss is observed at Sainj. (As per SCADA).	177	0	440	Details analysis of the event and remedial action taken details.
2	GD-1	i)220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3 ii)220 KV Mandla(PG)-Narela(DV) (DTL) Ckt-1 & 2 iii)220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1& 2 iv)220 KV DSOC Bawana-Narela(DV) (DTL) Ckt-1 & 2 v)220V Bus-1 and Bus-2 at Narela(DTL) vi)220/66kV 100 MVA ICT-1, 2 and 3 at Narela(DTL)	Delhi	DTL, BBMB and PGCL	15-Feb-25	09:35	i)220KV Narela(DTL) S/s has double main bus arrangement at 220kV level. 220/132kV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) are connected on the same extended Bus of 220KV Narela(DTL). ii)During antecedent condition, 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3, 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1& 2 and 220/66kV 100 MVA ICT-1, 2 and 3 at Narela(DTL) were connected to 220KV Bus-1 at Narela(DTL) and 220 KV Mandla(PG)-Narela(DV) (DTL) Ckt-1 & 2, 220 KV DSOC Bawana-Narela(DV) (DTL) Ckt-1 & 2 and 220/132kV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) were connected to 220KV Bus-2 at Narela(DTL). 220KV Bus coupler at Narela(DTL) was in OFF position. iii)As reported, sequence of event is as follows: a.At 09:19 hrs, both Ckt at 220kV side of 220/132kV 50MVA and 100 MVA ICT-1 & 2 at Narela(BB) were manually opened for 220KV Bus Isolator changeover operation from Bus-2 to Bus-1. b.At 09:30 hrs, 89A Bus-1 Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) was closed. c.Since the 220KV Bus Coupler CB at Narela(DTL) was already in OFF position since 08:09hrs, the said closure of 89A Isolator with 89B Isolator already closed of 220/132kV 100MVA ICT-2 at Narela(BB) resulted in a position to function as a 220KV Bus Coupler. d.At 09:34 hrs, 89B Bus-2 Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) was tried to open, but the operation could not be done completely due to 89B Isolator stuck in between and heavy arcing flames evolved due to said ON load 89B Isolator opening operation. e.It caused ionization in air around 89B Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) and R-B-N double phase to earth fault occurred due to arcing via Isolator structure. f.This resulted in zone-2 busbar protection operation (as confirmed from DR) and all the elements connected to 220KV Bus-2 at Narela(DTL) tripped. g.Since 89B Isolator opening operation was not complete, fault continued to be fed from Bus-1 through 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3 via 89A Bus-1 Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) to faulty 89B Bus-2 Isolator. This led to zone-1 busbar protection operation (as confirmed from DR) and all the elements connected to 220KV Bus-1 at Narela(DTL) also tripped and complete blackout occurred at 220KV Narela(DTL). iv)As per DR at Narela(DTL), Zone 2 Bus Bar protection operated followed Zone 1 Bus Bar protection operation. v)As per PMU at Maharani Bagh(PG), Y-N phase to earth fault followed by Y-B phase to phase fault with fault clearing time of 120msec and 80msec is observed. vi)As per SCADA, change in demand of approx. 58 MW is observed in Delhi control area. However, SDC-Delhi has reported load loss of approx. 194 MW.	0	194	120	Details analysis of the event and remedial action taken details.
3	GI-1	i) 220/132kV 160MVA ICT -1 at Delina (JK) ii) 220/132kV 160MVA ICT -2 at Delina (JK) iii) 220/132kV 160MVA ICT -3 at Delina (JK)	J&K	POD-JK	17-Feb-25	14:54	i)220/132kV Delina substation has Double main and transfer bus scheme. ii)During antecedent condition, 220kV Amargah (INDIGRID)-Delina(JK) D/C was carrying 106 MW each and feeding Delina load. iii)As reported, at 14:54 hrs, 132kV Delina – Pattan line tripped due to broken jumper condition while returning the same line from shutdown (exact reason, nature and location of fault need to be shared). iv)During the same time, 220/132kV 160MVA ICT -1 at Delina(JK) tripped on earth fault (exact nature of protection operated need to be shared). v)Subsequently, this led to overloading of 220/132kV 160MVA ICT -2 & 3 at Delina(JK) and got tripped on over-current protection operation. vi)As per PMU at Amargah (INDIGRID), R-Y-B 3 phase to earth fault with fault clearing time of 80 msec is observed. vii)As per SCADA, change in demand of approx. 210 MW is observed in J&K control area.	0	210	80	Details analysis of the event and remedial action taken details.
4	GI-2	i) 400/220 KV 500 MVA ICT 1 at Moradabad(UP) ii) 220/132 KV 160 MVA ICT 2 at Moradabad-2(UP) iii) 220/132 KV 160 MVA ICT 3 at Moradabad-2(UP) iv) 220KV Moradabad-2 – Amroha (UP) Ckt v) 220KV Moradabad-2 – Samthral (UP) Ckt	UP	UPPTCL	22-Feb-25	17:18	i)400/220KV Moradabad(UP) has double main and transfer bus scheme in both 400KV and 220KV system. 220/132KV Moradabad-2(UP) was connected to the same 220KV bus as that of 400/220KV Moradabad(UP). ii)During the antecedent condition, 400/220 KV 500 MVA ICT 1 at Moradabad(UP), 220/132 KV 160 MVA ICT 2 & ICT 3 at Moradabad-2(UP) were carrying 79MW, 20MW and 20MW. 400/220 KV 240 MVA ICT 3 at Moradabad(UP) was under shutdown. iii)As reported, at 17:18hrs, fault occurred in 132KV Moradabad-2 – Golbari Ckt (Exact reason, nature and location of fault yet to be shared). iv)Since the fault wasn't cleared at 132KV level, it propagated further into 220KV system which led to Bus Bar protection operation at both 220KV Bus-1 & 2 at Moradabad-2(UP) and all the elements connected to both the 220KV buses at Moradabad-2(UP) tripped. v)As per PMU at Bareilly(PG), Y-B phase to phase fault is observed with fault clearing time of 80ms. vi)As per SCADA, change in demand of approx. 108MW is observed in UP control area.	0	106	80	Details analysis of the event and remedial action taken details.
5	GD-1	i)400 KV GURGAON(PG)-DAULATABAD(HV) (HV) Ckt-2 ii)400/220 KV 315 MVA ICT 1 AT DAULATABAD(HV) iii)400/220 KV 315 MVA ICT 2 AT DAULATABAD(HV) iv)400/220 KV 315 MVA ICT 3 AT DAULATABAD(HV) v)400/220 KV 315 MVA ICT 4 AT DAULATABAD(HV) vi)400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) Ckt-2 vii)400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) Ckt-1 viii)400 KV GURGAON(PG)-DAULATABAD(HV) (HV) Ckt-1	Haryana	Haryana, PGCL & APCL	27-Feb-25	08:11	i)400KV Daulatabad(HV) has one and half breaker bus scheme in 400KV and double main bus transfer for 220KV system. ii)During the antecedent condition, 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) Ckt-1&2, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) Ckt-1 & 2 and 400KV DAULATABAD-DHANONDA Ckt-1&2 were carrying 228MW (each circuit), 353MW (each circuit) and 138MW (each circuit) respectively. iii)As reported, at 08:11hrs, B-N fault occurred on 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) Ckt-2. On this fault, line successfully autoreclosed from Gurgaon(PG) end but CB at Daulatabad end failed to open. During patrolling, flag was found wrapped on phase conductor at tower location no. 54-55. iv)During inspection, both trip coils of 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) Ckt-2 at Daulatabad end were found burnt. v)As CB at Daulatabad end failed to open, LBB of Gurgaon Bay should have operated. However, LBB protection also didn't operate. During the inspection, it was found that bus bar relay was in error mode. vi)Further, all the 400kV lines i.e., 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) Ckt-1, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) Ckt-1 & 2 and 400KV DAULATABAD-DHANONDA Ckt-1&2 tripped on operation of distance protection in 2-1. vii)Further, 400/220KV 315MVA ICT-1,2,3&4 at Daulatabad(HR) tripped on operation of non-directional O/C E/F protection operation and fault got cleared. Tripping of all the elements led to blackout of the 400/220KV Daulatabad(HR) S/s. viii)As per PMU at Gurgaon(PG), B-N phase to earth fault with delayed clearance of ~1080 msec is observed. ix)As per SCADA, change in demand of approx. 414MW is observed in Haryana control area. x)As reported, fault trip coils have been replaced and bus bar relay was reboot. Bus bar relay is working properly however it has been kept under observation and feedback has been given to relay OEM for review of relay.	0	414	1080	Details analysis of the event and remedial action taken details.
6	GI-1	i)220 KV Amargah (INDIGRID)-Ziankote(JK) (POD JK) Ckt-1 ii)220 KV Amargah (INDIGRID)-Ziankote(JK) (POD JK) Ckt-2	J&K	INDIGRID & JKPOD	28-Feb-25	03:30	i)220/132kV Ziankote S/s has two bus at 220kV side i.e., main bus & reserve bus. 220KV Amargah-Ziankote ckt-1&2 are on the same tower (D/C tower) and line length is ~21.4km. ii)During antecedent condition, 220KV Amargah (INDIGRID)-Ziankote(JK) ckt-2 was carrying 139 MW and feeding Ziankote load. 220KV Amargah (INDIGRID)-Ziankote(JK) ckt-1 was already tripped at 02:40 hrs on R-N fault. iii)As reported, at 03:30 hrs 220 KV Amargah (INDIGRID)-Ziankote(JK) (POD JK) Ckt-2 also tripped on R-N fault (details of cause of fault and location of fault yet to be received). iv)As per PMU at Amargah (INDIGRID), no fault was observed in system. v)As per SCADA, change in demand of approx. 126 MW is observed in J&K control area.	0	126	NA	Details analysis of the event and remedial action taken details.

Utilities are requested to prepare detailed analysis report and present the event details during 58th PSC meeting of following grid events (Events involving more than one utility may be jointly prepared and presented):

# Multiple element tripping event at 400kV Sainj(HP) & Parbati3(NH)

At 19:35 hrs on 03.02.2025

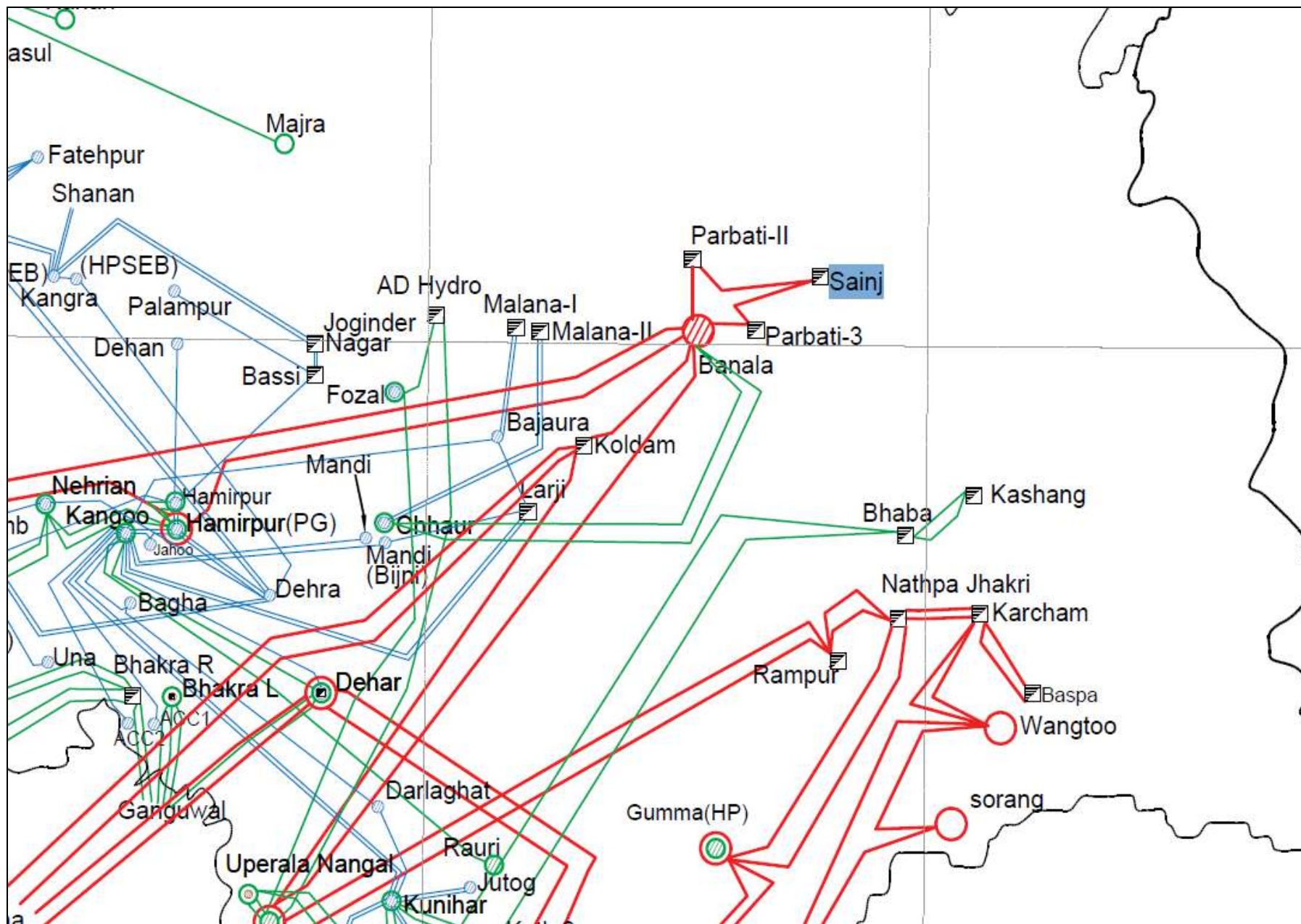
## Tripped Elements

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400 KV Parbati_2(NH)-Sainj(HP) (PKTCL) Ckt-1	19:35 hrs	00:09 (04.02.2025)	Details awaited
2.	400 KV Parbati_3(NH)-Parbati Pooling <u>Banala</u> (PG) (PKTCL) Ckt-1		23:24 hrs	
3.	400 KV Parbati_3(NH)-Sainj(HP) (PKTCL) Ckt-1		00:16 hrs (04.02.2025)	R-N fault, Z-2 and fault current = 2.92KA from Sainj end and Z-1 from Parbati3 end

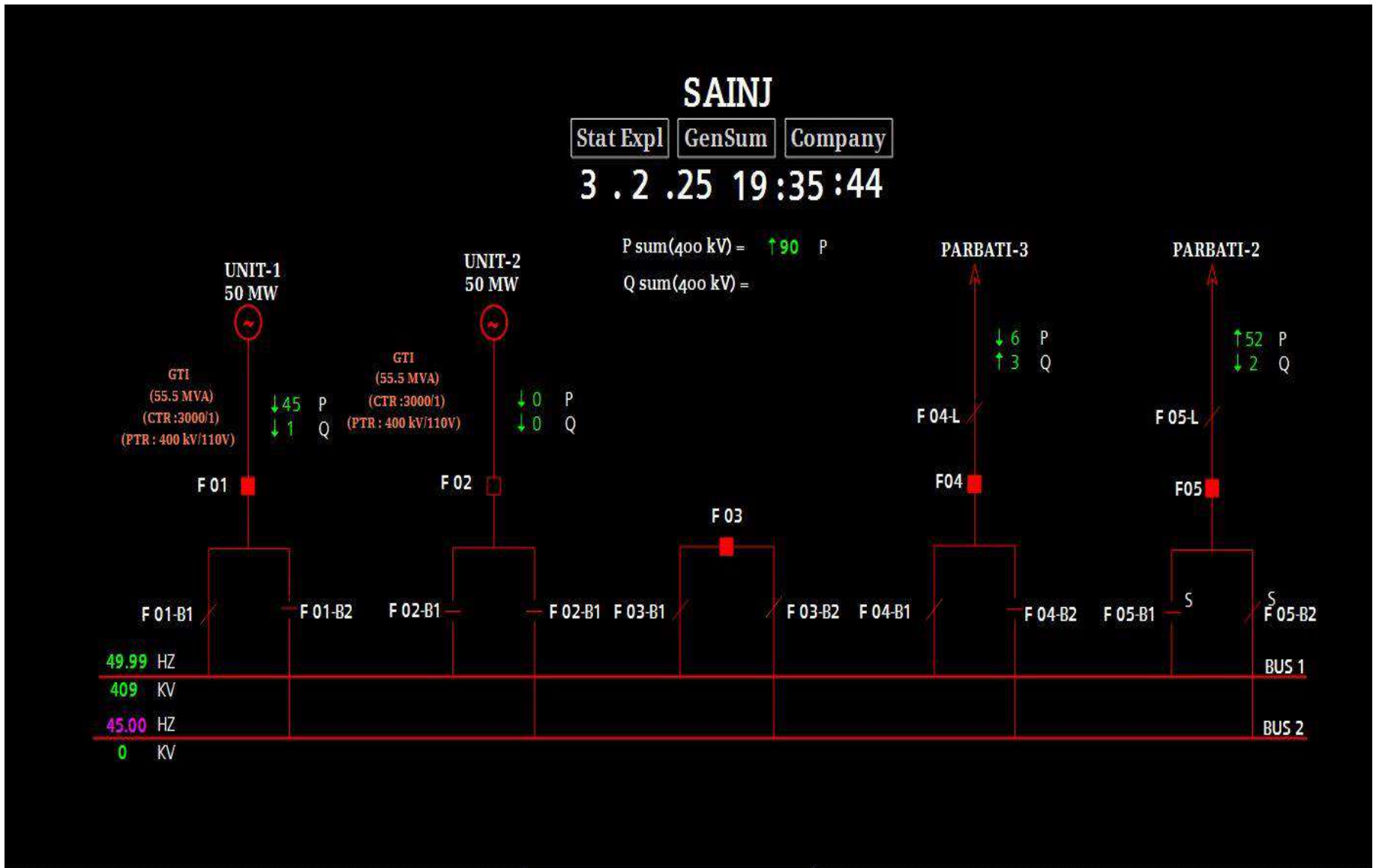
## **Brief details of the event**

- i) Total generated power of Sainj HEP(HP), Parbati\_2(NH) and Parbati\_3(NH) evacuates through 400 kV Parbati\_2(NH)- Banala(PG) (PKTCL) Ckt and 400 kV Parbati\_3(NH)- Banala(PG) (PKTCL) Ckt via 400 KV Parbati\_2(NH)-Sainj(HP) (PKTCL) Ckt and 400 KV Parbati\_3(NH)-Sainj(HP) (PKTCL) Ckt.
- ii) During antecedent condition, only 50MW Unit-1 at Sainj HEP(HP) was running (generating approx. ~45MW) and 130MW Unit-4 at Parbati-3 HEP(NHPC) (generating approx. ~132MW).
- iii) As reported, at 19:35 hrs, R-N phase to earth fault occurred on 400 KV Parbati\_3(NH)-Sainj (HP) (PKTCL) Ckt-1 in Z-2 and fault current was 2.92 KA from Sainj end.
- iv) As per DR of the line at Parabati\_3 end, fault was sensed in Z-1 and tripping command to R-ph CB was given. However, R-ph pole failed to open leading to operation of LBB protection. This led to tripping of all the elements connected to the Bus (Tripping details awaited) and complete blackout of 400KV Parbati-3 s/s occurred.
- v) As per PMU, R-N phase to earth fault with delayed fault clearing time of 400msec is observed.
- vi) As per SCADA, approx. 132 MW hydro generation loss is observed at Parbati-III and 45 MW hydro generation loss is observed at Sainj.

# Network Diagram



# SLD of 400kV Sainj(HP) before the event



# SLD of 400kV Sainj(HP) after the event

SAINJ

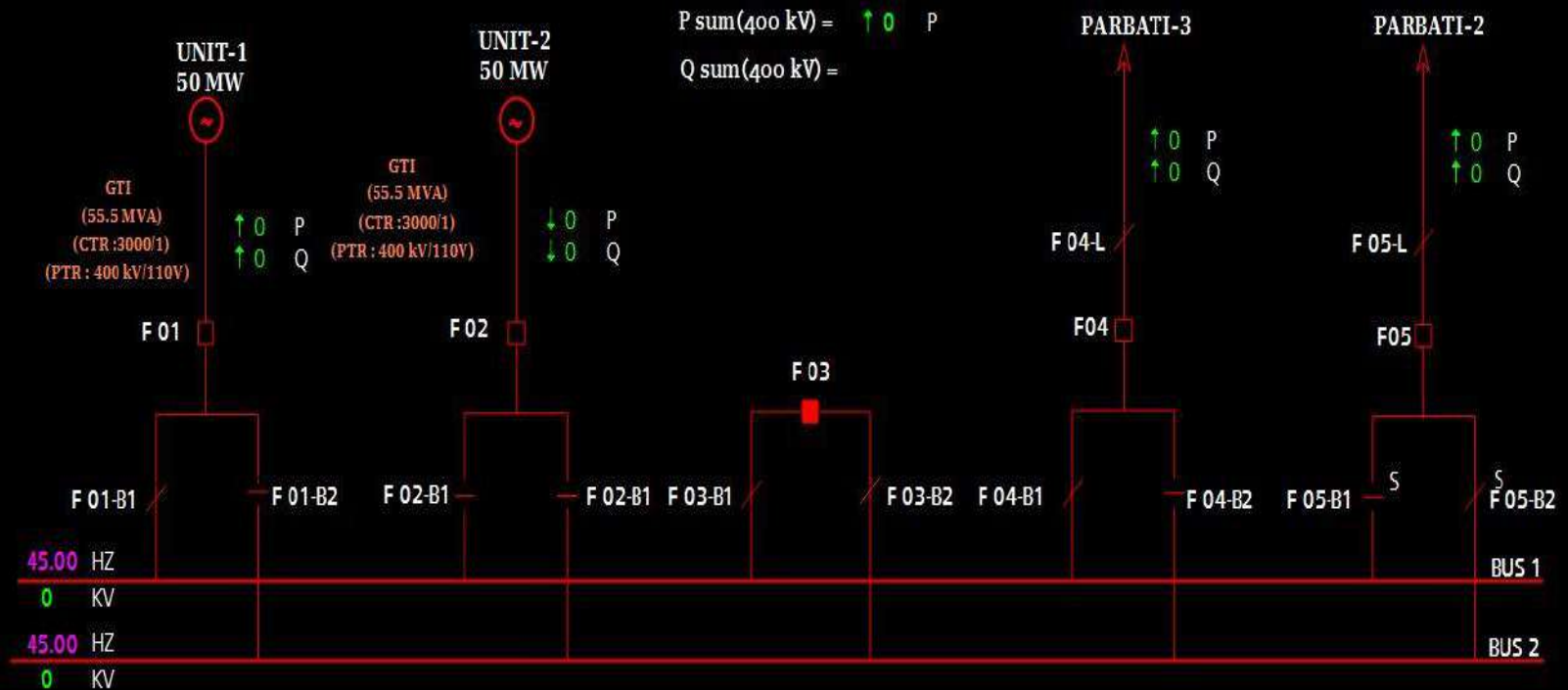
Stat Expl

GenSum

Company

3 . 2 . 25 19:36:14

400kV Sainj(HP) S/s blackout





# SLD of 400kV parbati-3(HP) before the event

## CONTACT DETAILS

EMAIL	pbt3operation@gmail.com
MOBILE	9816085391

## PARBATI-3 (GIS)

P sum(400 kV) = -26  
Q sum(400 kV) = \*\*\*\*\*

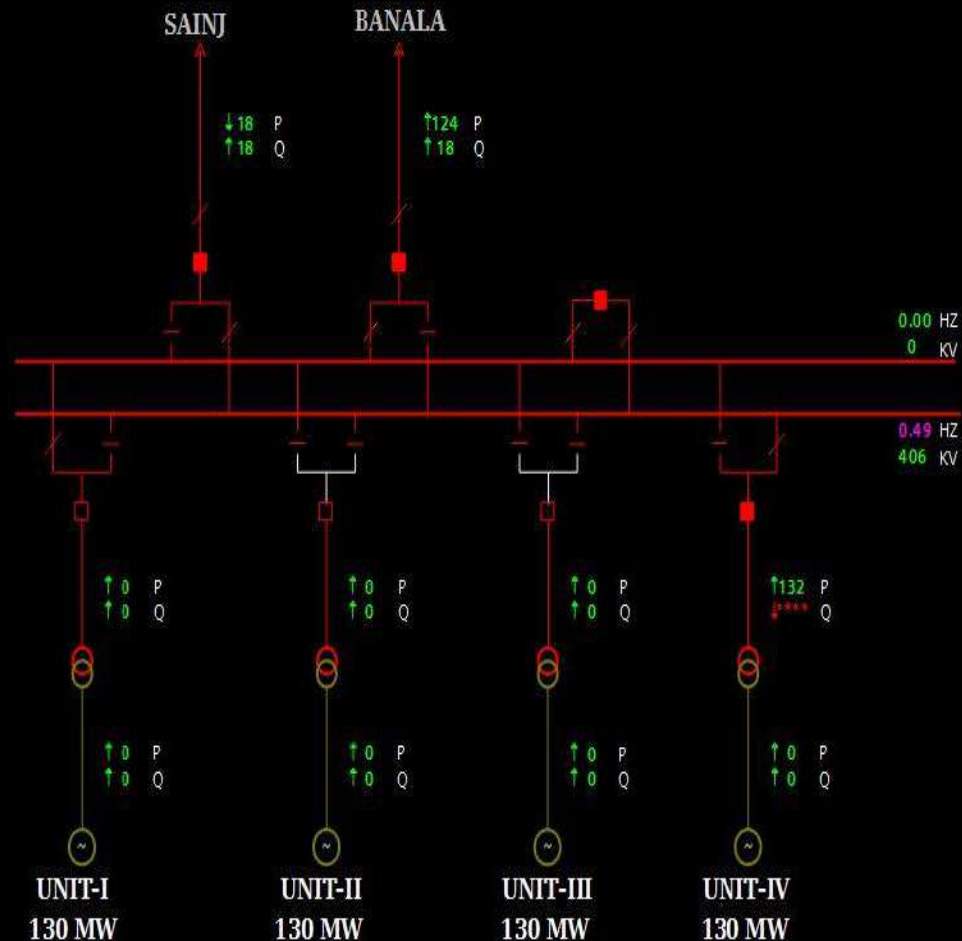
Stat Expl

GenSum

Company

PL = 106  
SENT = 132

3 . 2 25 19:35:44





# SLD of 400kV parbati-3(HP) after the event

## CONTACT DETAILS

EMAIL	pbt3operation@gmail.com
MOBILE	9816085391

P sum (400 kV) = -26  
Q sum (400 kV) = \*\*\*\*

Stat Expl

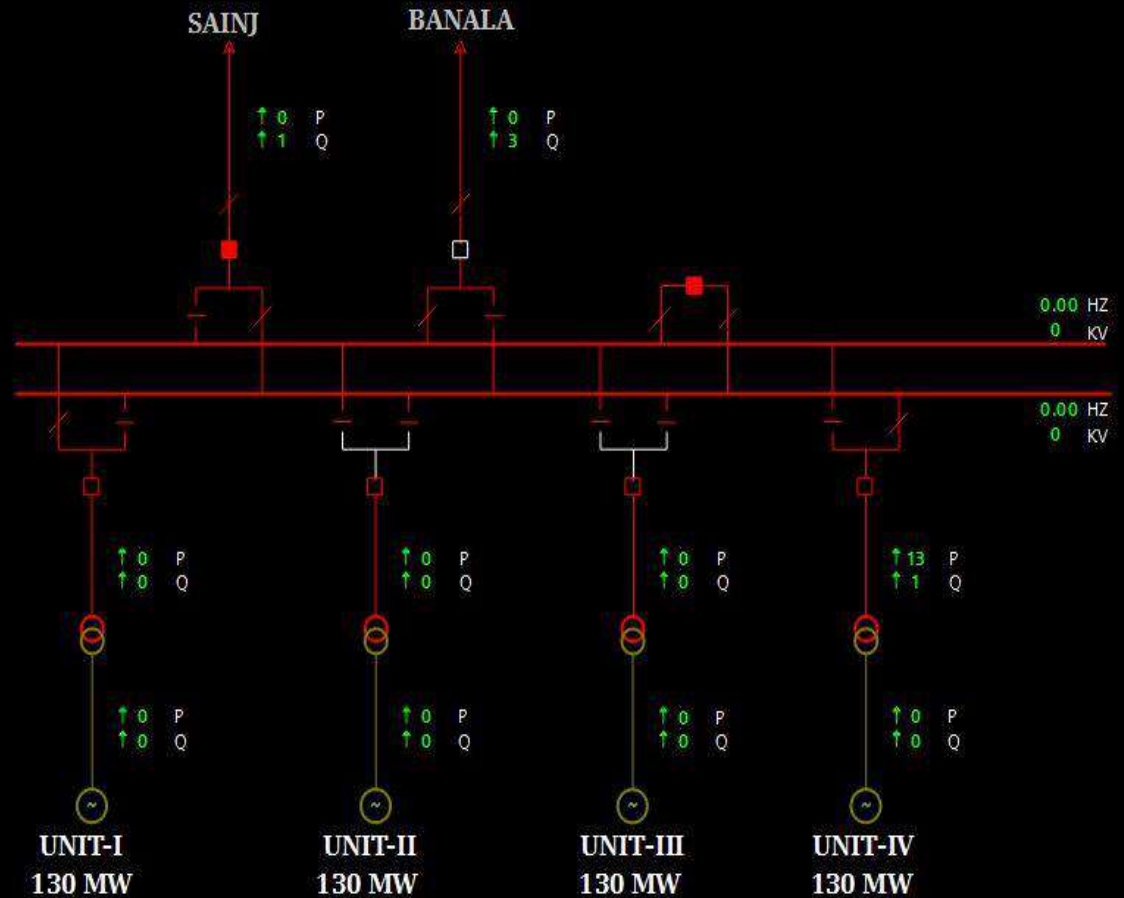
GenSum

Company

PL = 0  
SENT = 13

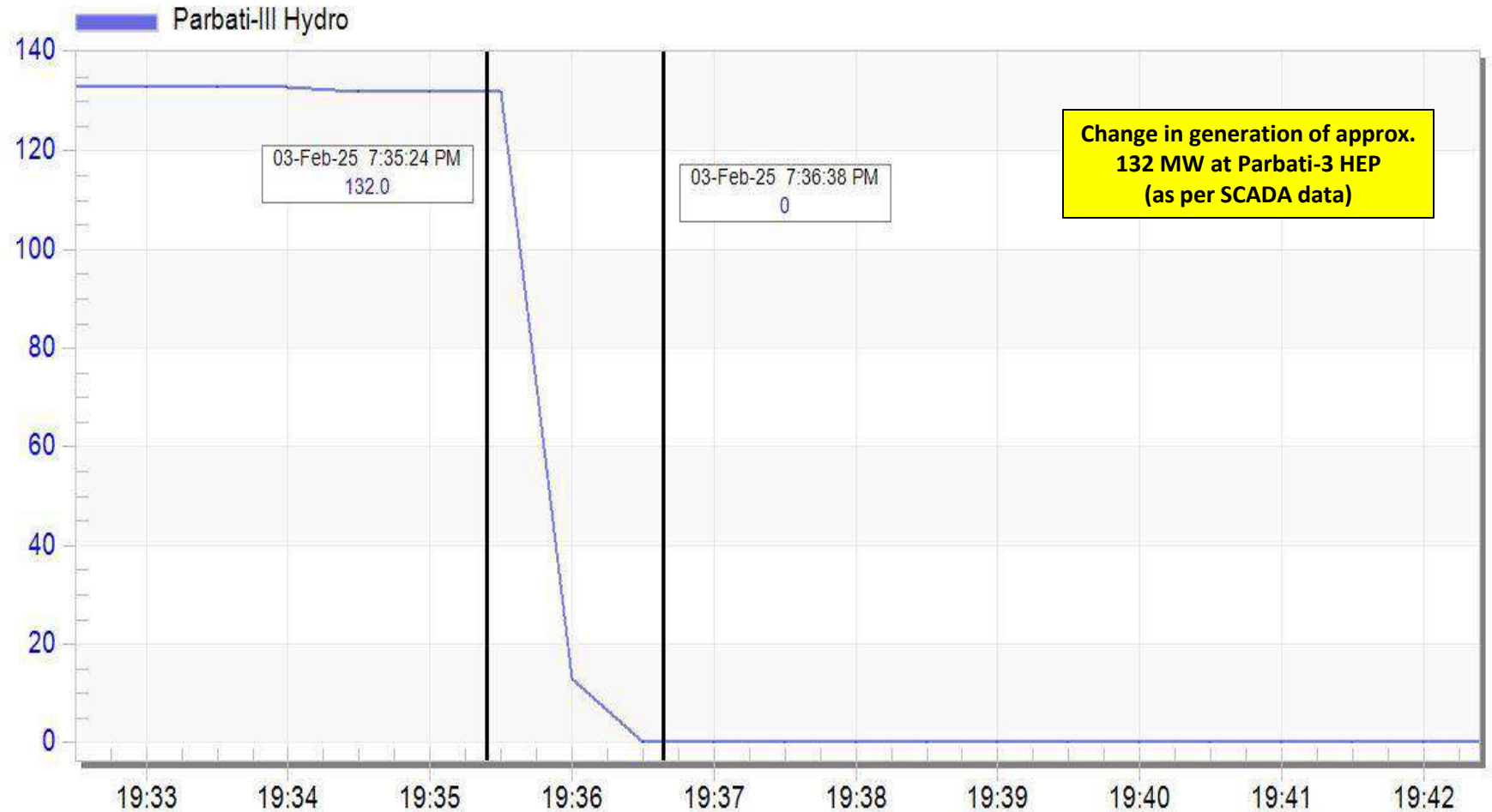
3.2.25 19:36:0

400kV Parbati-3 S/s blackout



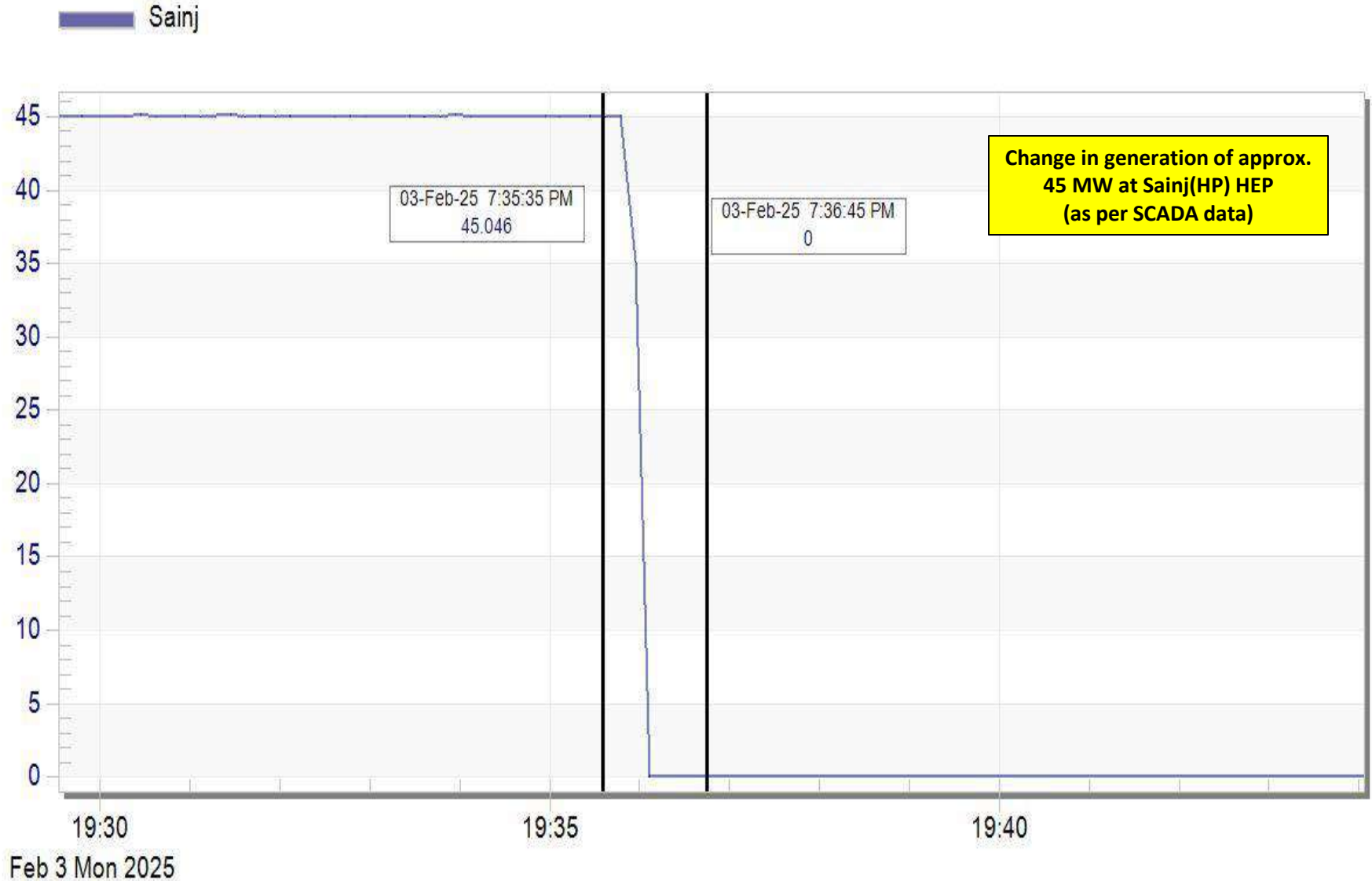
# Parbati-III(NHPC) generation during the event

Parbati-III Generation on 21.06.2020



Feb 3 Mon 2025

# Sainj(HP) HEP generation during the event



# PMU Plot of frequency at Amritsar(PG)

19:36hrs/03-Feb-25

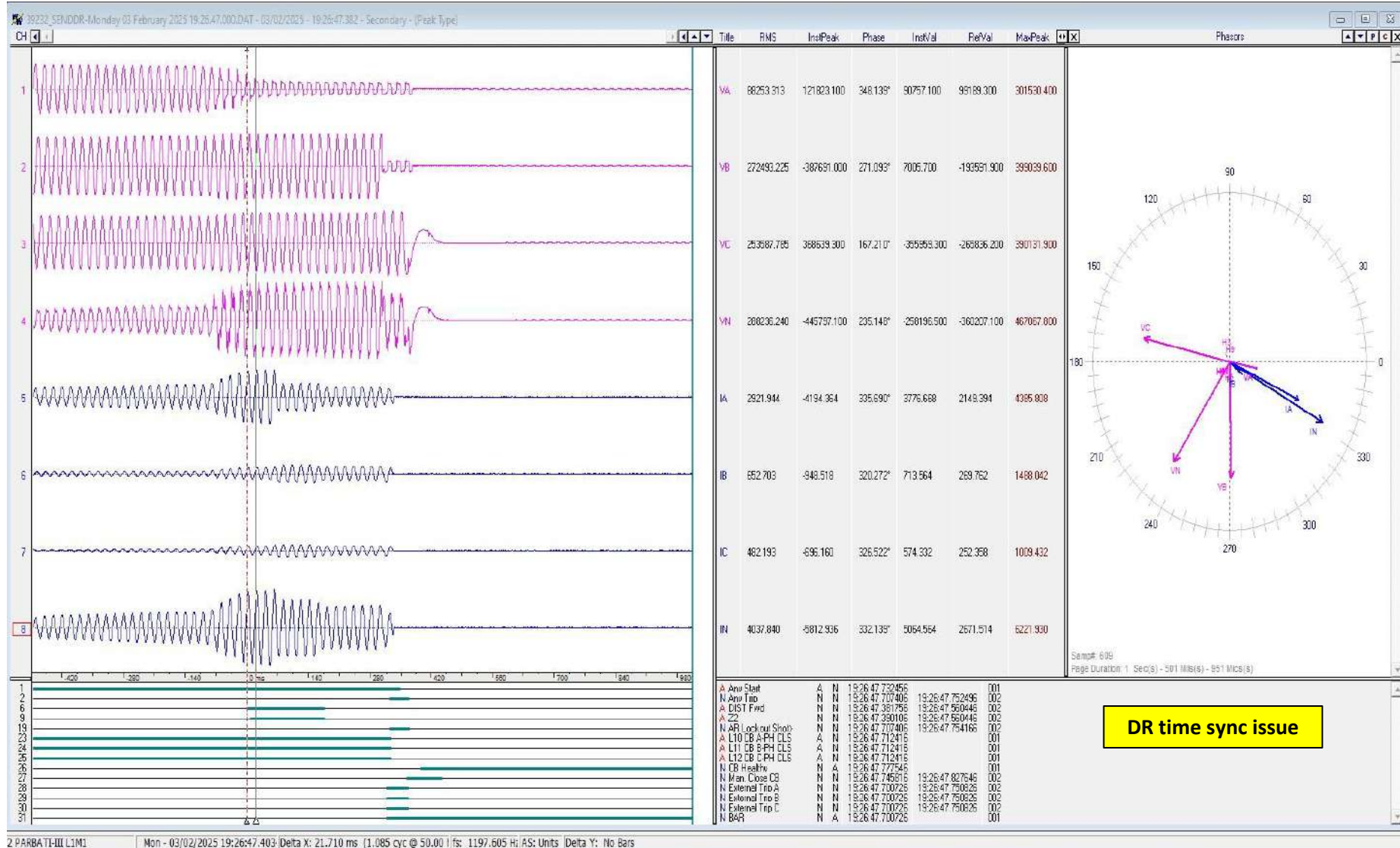


# PMU Plot of phase voltage magnitude at Amritsar(PG)

19:36hrs/03-Feb-25



# DR of 400 KV Parbati 3(NH)- Banala(PG) (end) (PKTCL) Ckt



- ✓ R-N phase to earth fault;  $I_b \approx 2.921 \text{ kA}$ ; fault sensed in zone-2
- ✓ Fault Clearing Time = 440 msec

# SCADA SOE

Time	Station Name	Voltage Level	Element Name	Element Type	Element Status	Remarks
19:35:51	PARBATI3	400kV	L2BNALA1	Circuit Breaker	App	
19:35:51	PARBATI3	400kV	04G4	Circuit Breaker	App	
19:35:51,901	PARBATI3	400kV	L2BNALA1	Circuit Breaker	Open	
19:35:51,901	PARBATI3	400kV	04G4	Circuit Breaker	Open	

## **Points for Discussion**

- i) The reason for delayed fault clearance needs to be shared.
- ii) Details of protection operation and sequence of the tripping need to be shared.
- iii) DR/EL (dat/.cfg file) of all tripped elements along with detailed tripping report and remedial action taken report need to be shared.
- iv) Trippings at Sainj(HP) S/s are not recorded in SCADA SOE. Availability of SCADA SOE data needs to be ensured.



## **Agenda Points of NHPC for 58<sup>th</sup> Protection sub-committee meeting**

### **1. Annexure-B.I,**

**Status of actions points recommended during previous PSC meetings (to be discussed in 58th PSC meeting)**

#### ***SI No-3-Multiple elements tripping at 400kV Sainj (HP), 400kV Parbati2 & Parbati3 (NHPC) Stations on 07th May 2024, 16:17 hrs***

Present Status: - As per LOA, OPGW work shall be completed by Dec'2025. GE engineer visited Parbati-II site, however it is observed during commissioning that there is communication issue with the supplied line differential relay. The relay has been sent to OEM's premisses for rectification. After rectification of the same, the relay can be installed. The same is expected to be completed by May'2025.

### **2. Annexure B-II,**

**SI No-3 (Tripping of i)400 KV Parbati2(NH)-Sainj (HP) (PKTCL) Ckt-1 ii)400 KV Parbati-3(NH)-Parbati Pooling Banala (PG) (PKTCL) Ckt-1 iii)400 KV Parbati3(NH)-Sainj (HP) (PKTCL) Ckt-1**

#### **Analysis report**

##### **Parbati-III**

- i. From the DR of Parbati-III-Banala Line#1 it is evident that the R-Phase voltage reduced to 58.46 KV and R-Phase current increased to 1130 Amp. Accordingly relay sense the fault in Z2 at 19:26:47.386 Hrs but got resetted at 19:26:47.557 Hrs. However, R-Phase External Trip was received and Auto Reclose was blocked at 19:26:47.692 Hrs.
- ii. In SCADA event, "Direct Trip-2 Receive" was recorded at 19:35:58.276 Hrs.
- iii. It is envisaged that, upon receiving of Direct trip signal, master trip relay got activated and subsequently, auto reclose block function activated in the Main-1 relay.
- iv. Line CB of Parbati-III-Sainj Line remained in closed condition from Parbati-III end and tripped from Sainj end.
- v. Due to unavailability of power evacuation path, the running unit i.e. Unit#4 tripped on operation of over frequency protection.

#### **Special finding/ issues identified during restoration**

Receiving of Direct Trip signal from remote end is not proper in the instant case.

#### **Remedial Action to be taken**

End to end test of PLCC shall be carried out after getting approval for taking shutdown of line in forthcoming OCC.

##### **Parbati-II**

Parbati-II-Sainj line CB was remained in closed condition from Parbati-II end.

# Multiple element tripping event at 220/66kV Narela(DTL)

At 09:35 hrs on 15.02.2025

## Tripped Elements

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3	09:35 <u>hrs</u>	10:38 hrs	Busbar protection operated at 220kV bus-1 and bus-2 at Narela(DTL)
4.	220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 & 2		11:04 hrs	
6.	220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1& 2		10:46 hrs	
8.	220 KV DSIDC Bawana-Narela(DV) (DTL) Ckt-1 & 2		10:00 hrs	
10	220 kV Bus-1 and Bus-2 at Narela(DTL)		10:00 hrs	
11.	220/66kV 100 MVA ICT-1, 2 and 3 at Narela(DTL)		10:05 hrs	

## **Brief details of the event**

i) 220kV Narela(DTL) S/s has double main bus arrangement at 220kV level. 220/132kV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) are connected on the same extended Bus of 220KV Narela(DTL).

ii) During antecedent condition, 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3, 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1& 2 and 220/66kV 100 MVA ICT-1, 2 and 3 at Narela(DTL) were connected to 220kV Bus-1 at Narela(DTL) and 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 & 2, 220 KV DSIDC Bawana-Narela(DV) (DTL) Ckt-1 & 2 and 220/132kV 50MVA ICT-1 and 100MVA ICT-2 at Narela(BB) were connected to 220kV Bus-2 at Narela(DTL). 220kV Bus coupler at Narela(DTL) was in OFF position.

iii) As reported, sequence of event is as follows:

a. At 09:19 hrs, both CBs at 220kV side of 220/132kV 50MVA and 100 MVA ICT-1 & 2 at Narela(BB) were manually opened for 220kV Bus Isolator changeover operation from Bus-2 to Bus-1.

b. At 09:30 hrs, 89A Bus-1 Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) was closed.

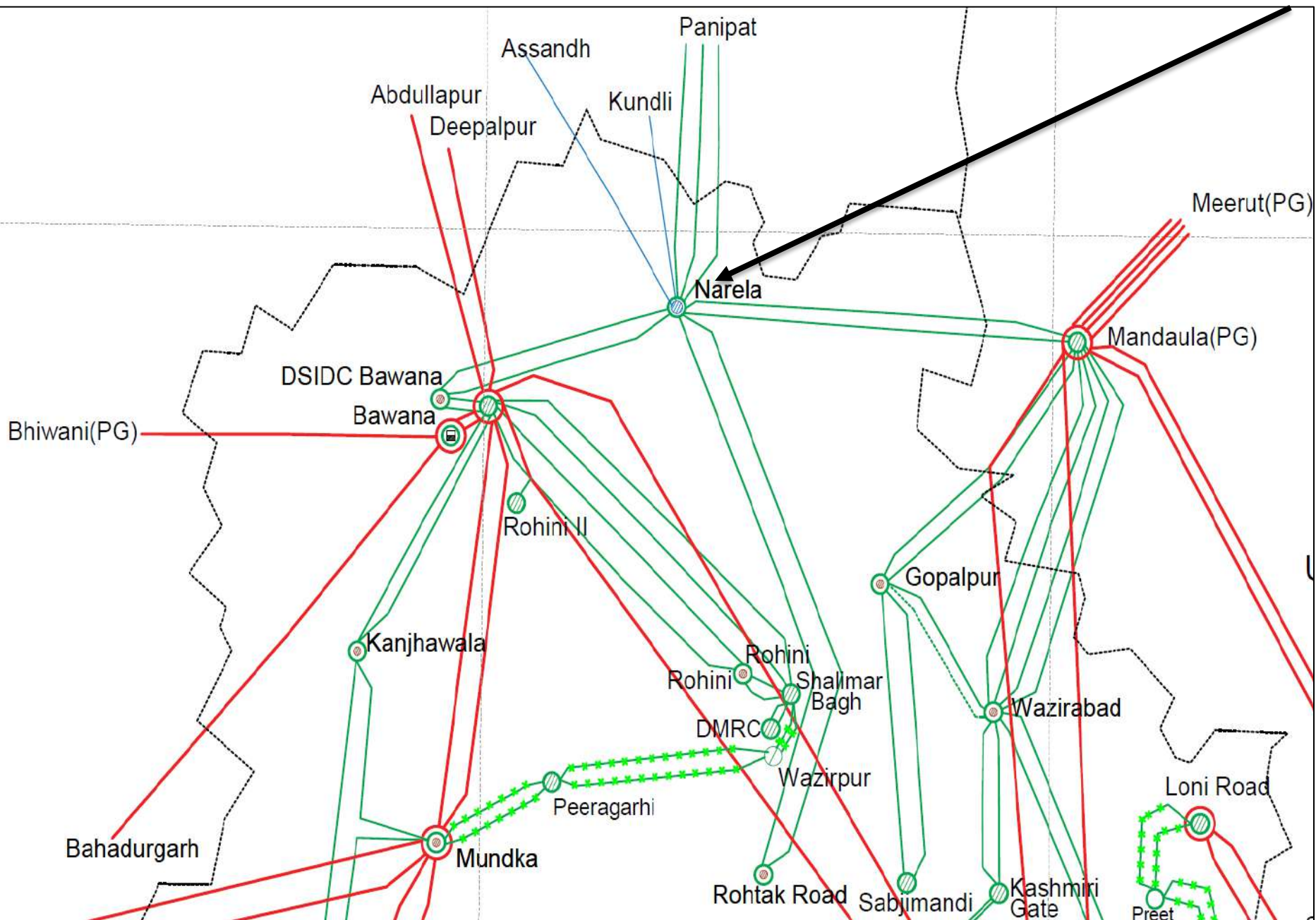
c. Since the 220kV Bus Coupler CB at Narela(DTL) was already in OFF position since 08.09hrs, the said closure of 89A isolator with 89B Isolator already closed of 220/132kV 100MVA ICT-2 at Narela(BB) resulted in a position to function as a 220kV Bus Coupler.

d. At 09:34 hrs, 89B Bus-2 isolator of 220/132kV 100MVA ICT-2 at Narela(BB) was tried to open, but the operation could not be done completely due to 89B isolator struck in between and heavy arcing flames evolved due to said ON load 89B isolator opening operation.

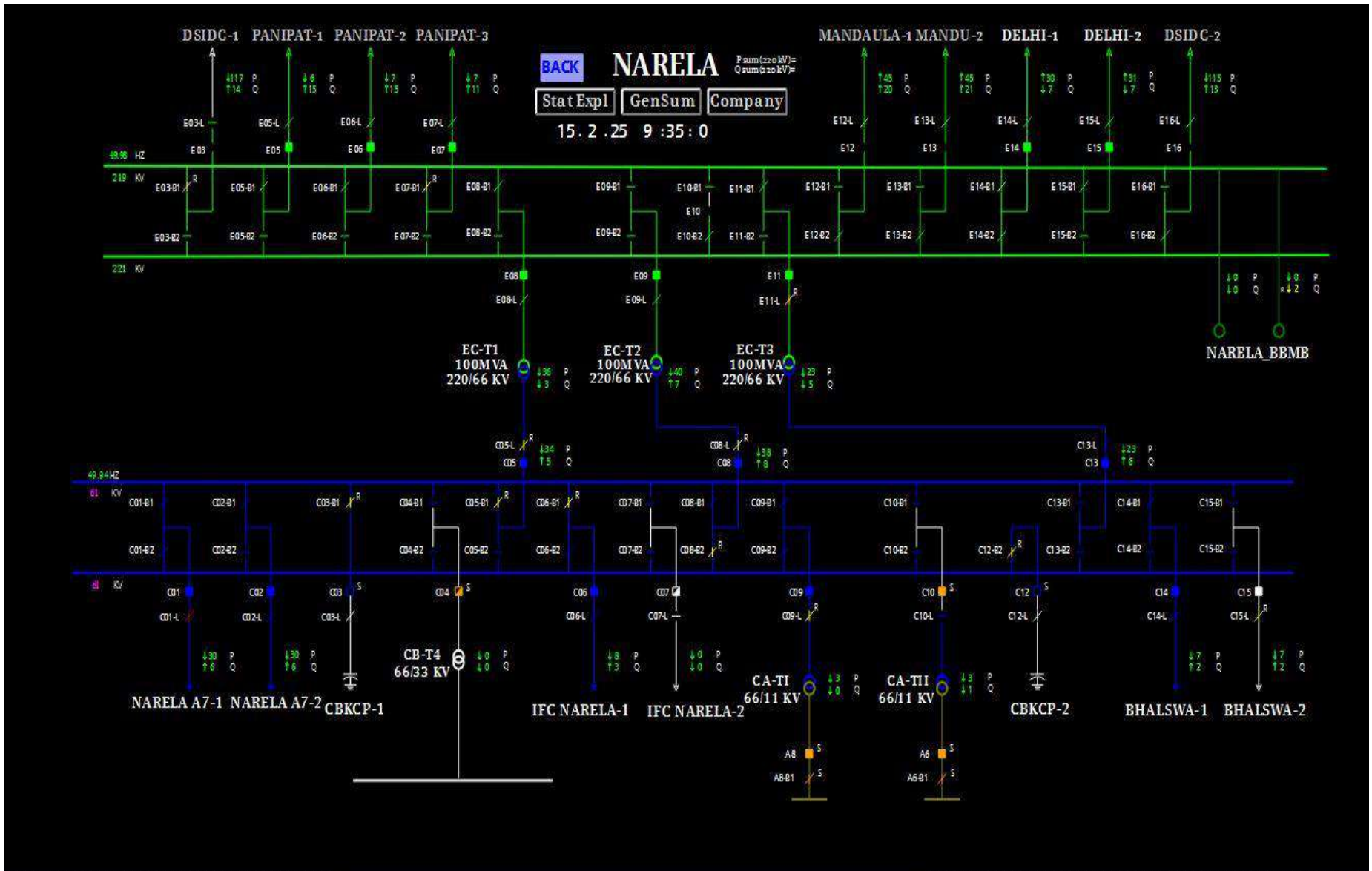
## **Brief details of the event**

- e. It caused ionization in air around 89B isolator of 220/132kV 100MVA ICT-2 at Narela(BB) and R-B-N double phase to earth fault occurred due to arcing via isolator structure.
- f. This resulted in zone-2 busbar protection operation (as confirmed from DR) and all the elements connected to 220kV Bus-2 at Narela(DTL) tripped.
- g. Since 89B isolator opening operation was not complete, fault continued to be fed from Bus-1 through 220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1, 2 & 3 via 89A Bus-1 Isolator of 220/132kV 100MVA ICT-2 at Narela(BB) to faulty 89B Bus-2 Isolator. This led to zone-1 busbar protection operation (as confirmed from DR) and all the elements connected to 220kV Bus-1 at Narela(DTL) also tripped and complete blackout occurred at 220kV Narela(DTL).
- iv) As per DR at Narela(DTL), Zone 2 Bus Bar protection operated followed Zone 1 Bus Bar protection operation.
- v) As per PMU at Maharani Bagh(PG), Y-N phase to earth fault followed by Y-B phase to phase fault with fault clearing time of 120msec and 80msec is observed.
- vi) As per SCADA, change in demand of approx. 58 MW is observed in Delhi control area. However, SLDC-Delhi has reported load loss of approx. 194 MW.

# Network Diagram

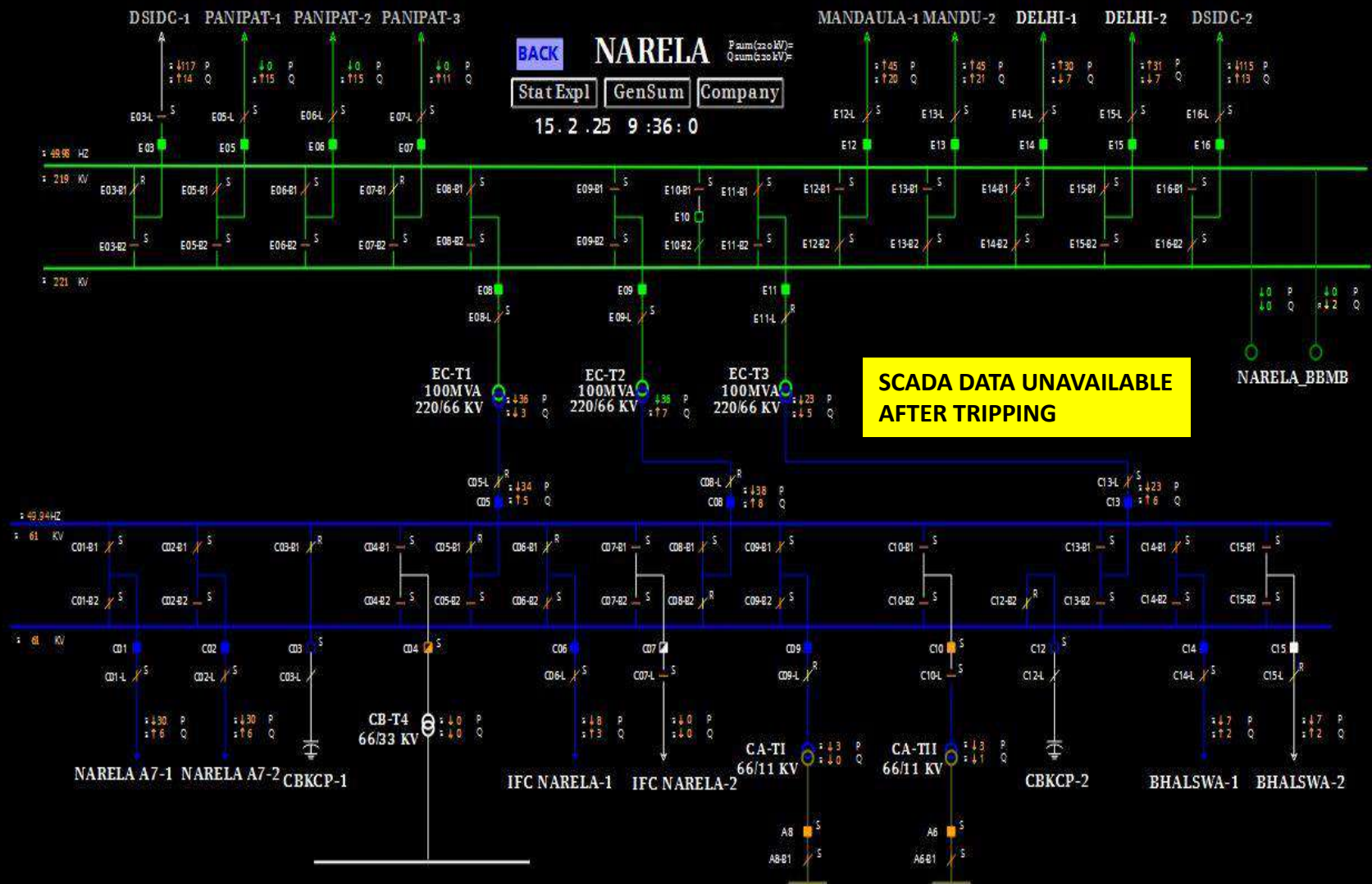


# SLD of 220/66kV Narela(DTL) before the event





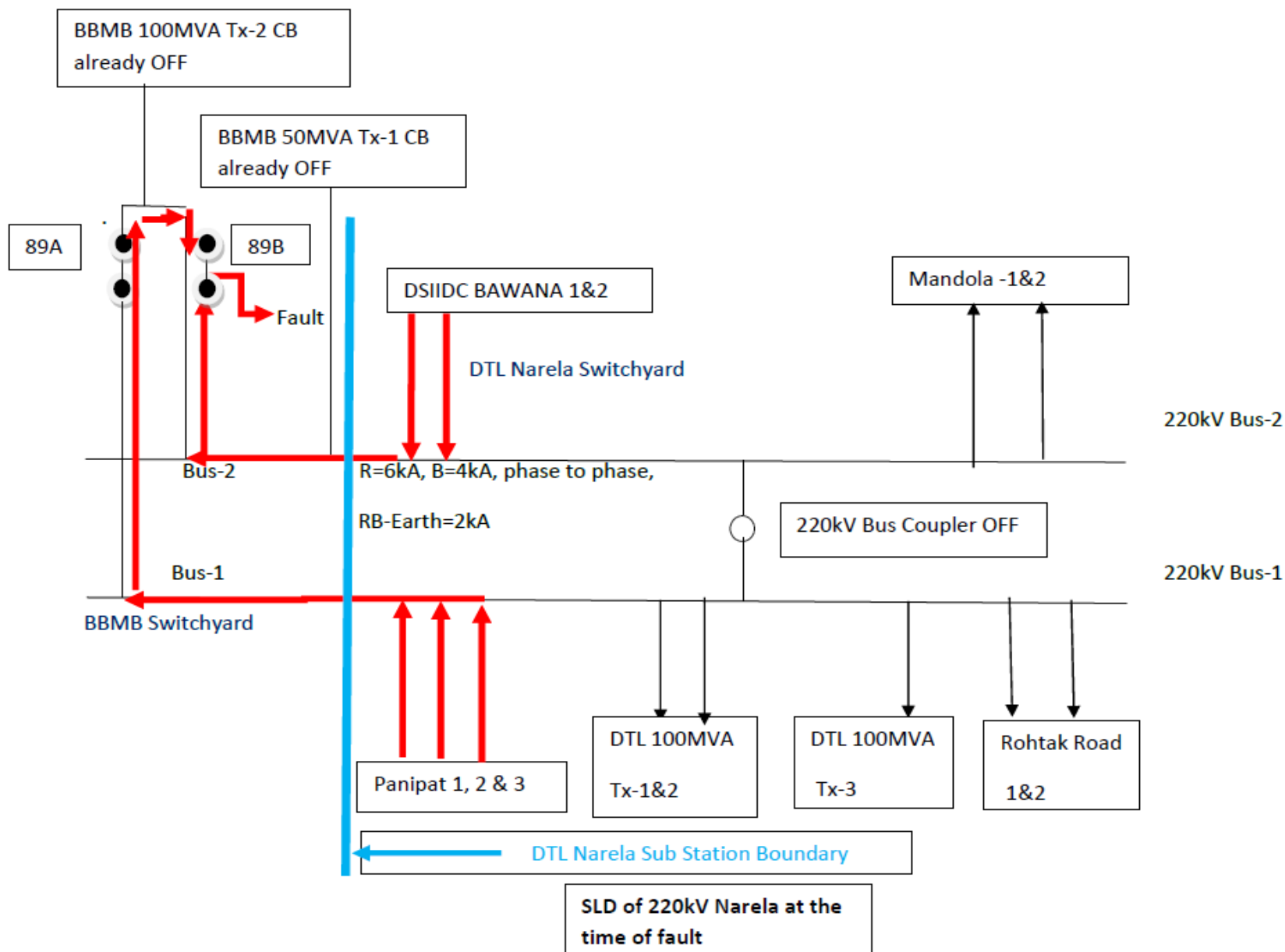
# SLD of 220/66kV Narela(DTL) after the event



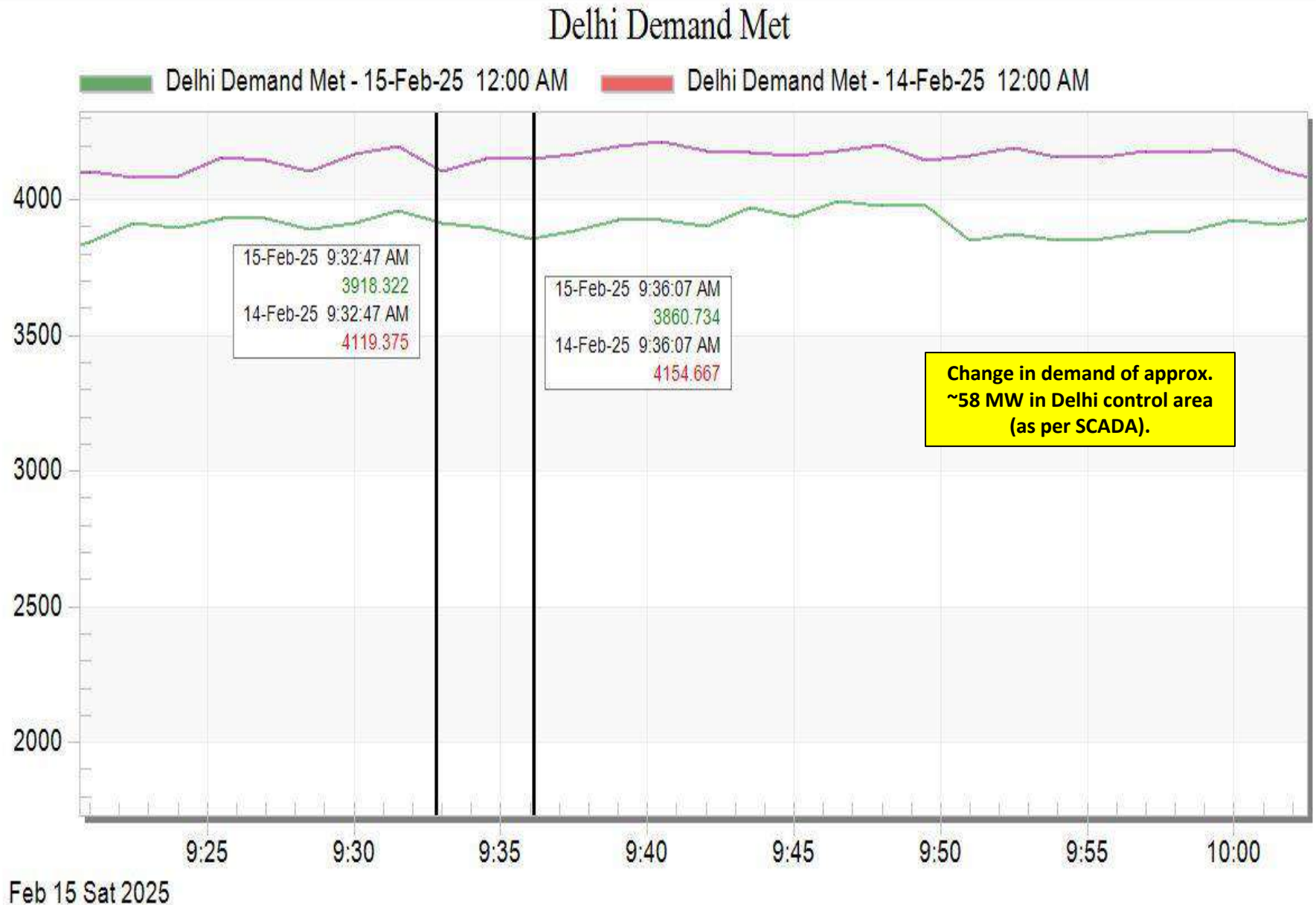


# Connectivity Diagram shared by Delhi

220kV Bus Bar Protection-1&2 trip at 220kV Narela on 15 February 2025 at 09.35Hrs.

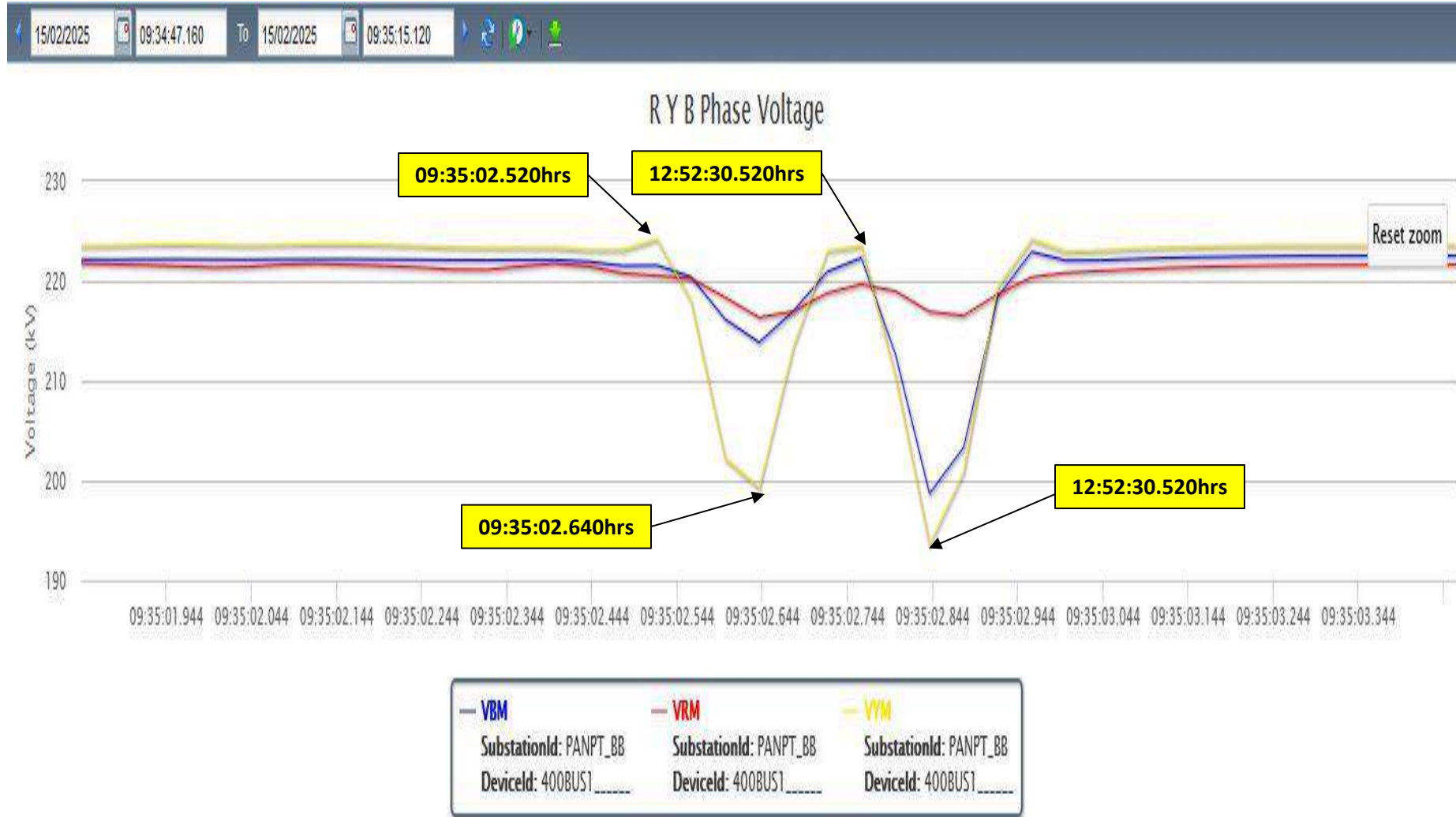


# Delhi demand during the event



# PMU Plot of phase voltage magnitude at Mandaula(PG)

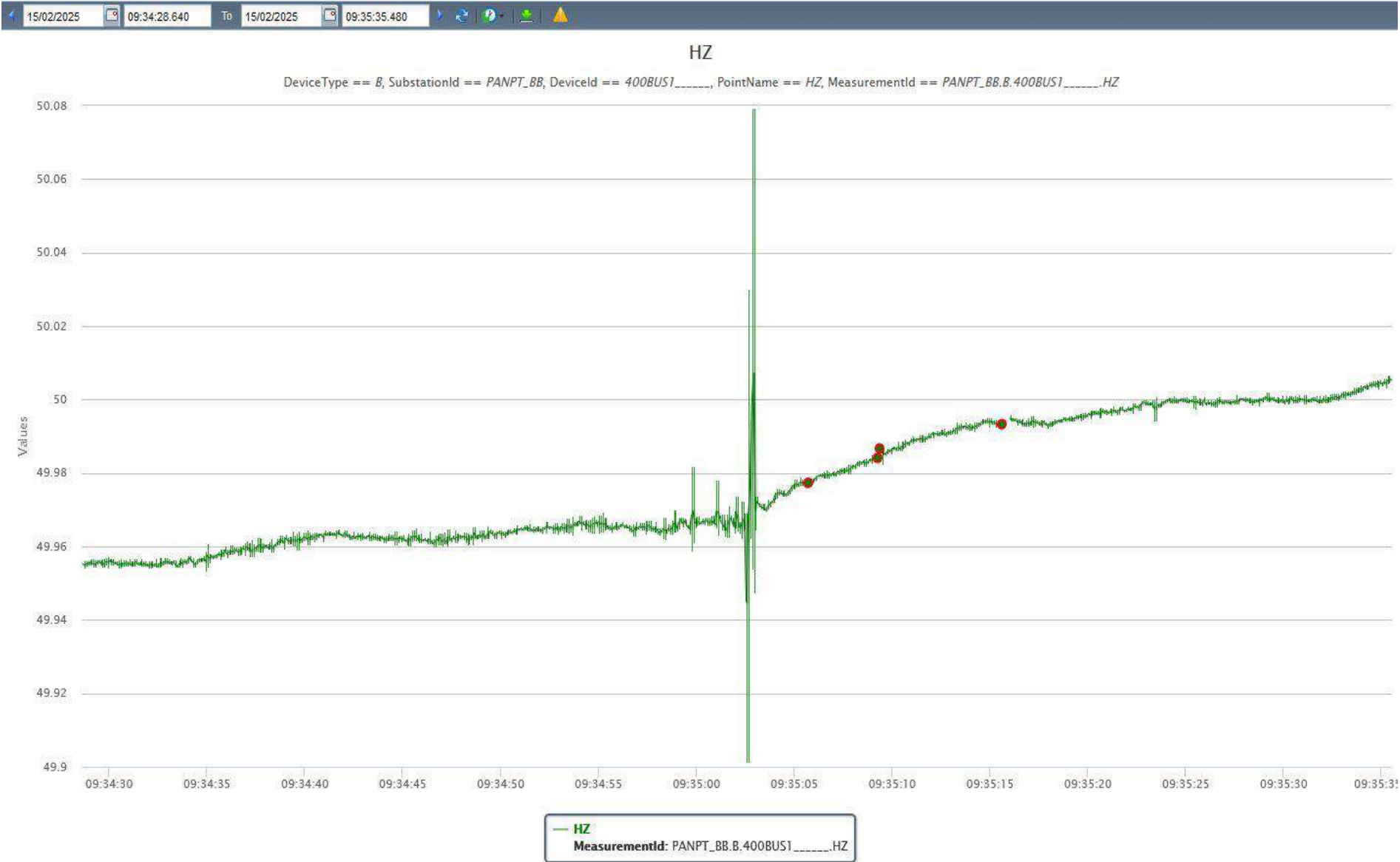
09:35hrs/15-February-2025



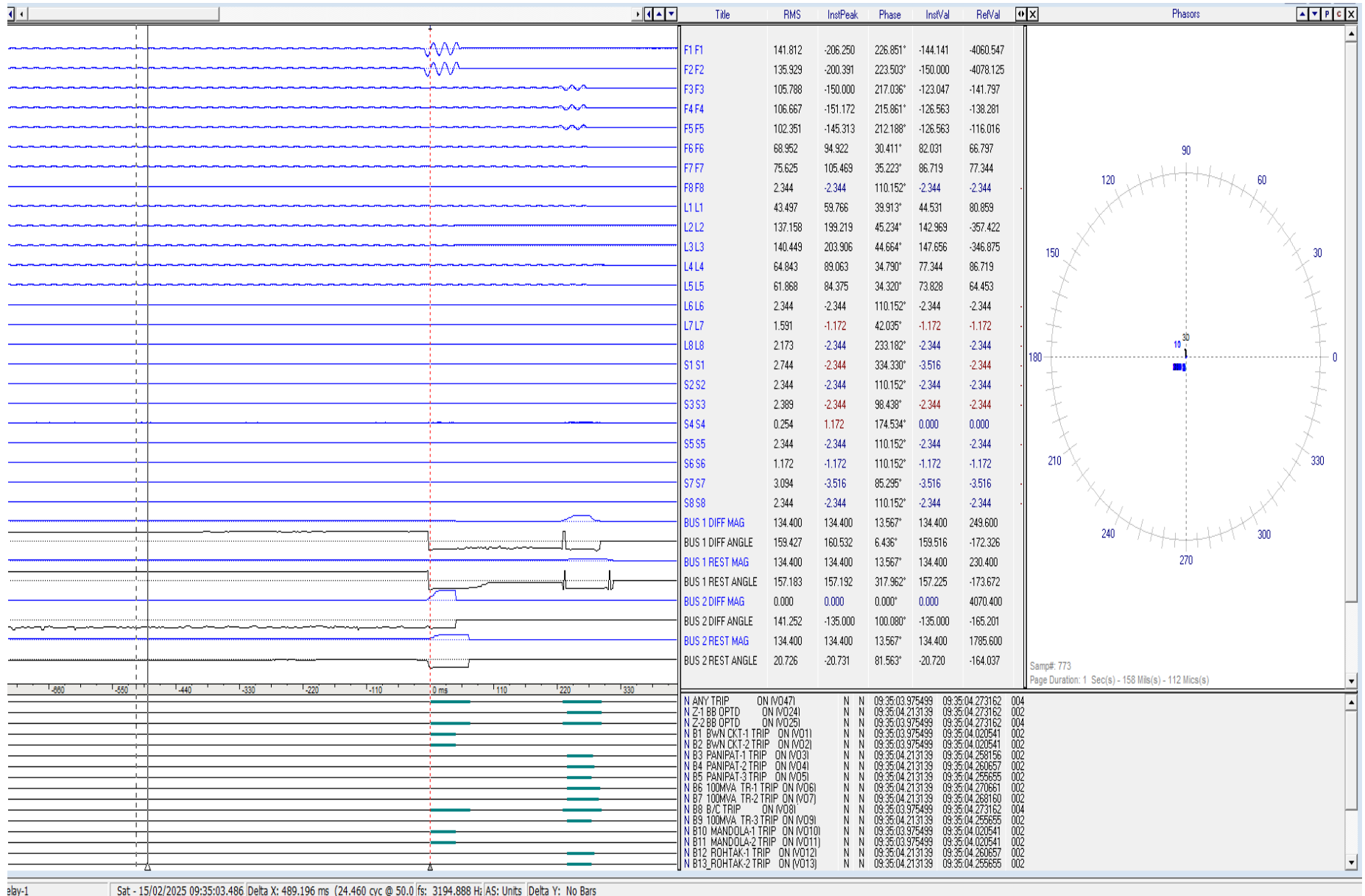
R Y B Phase Voltages Angles

# PMU Plot of frequency at Mandaula(PG)

09:35hrs/15-February-2025

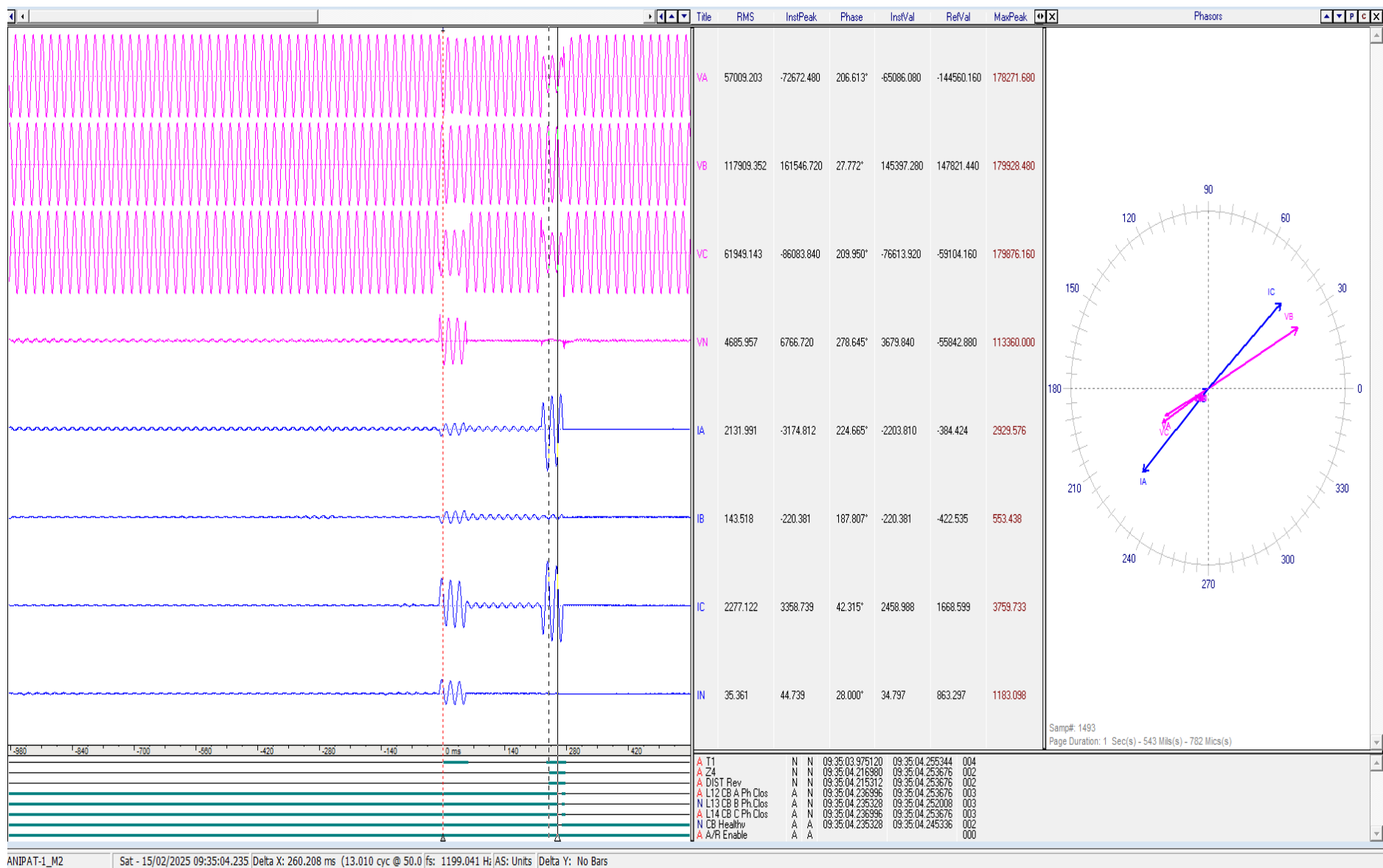


# DR of Busbar relay at Narela(DTL)



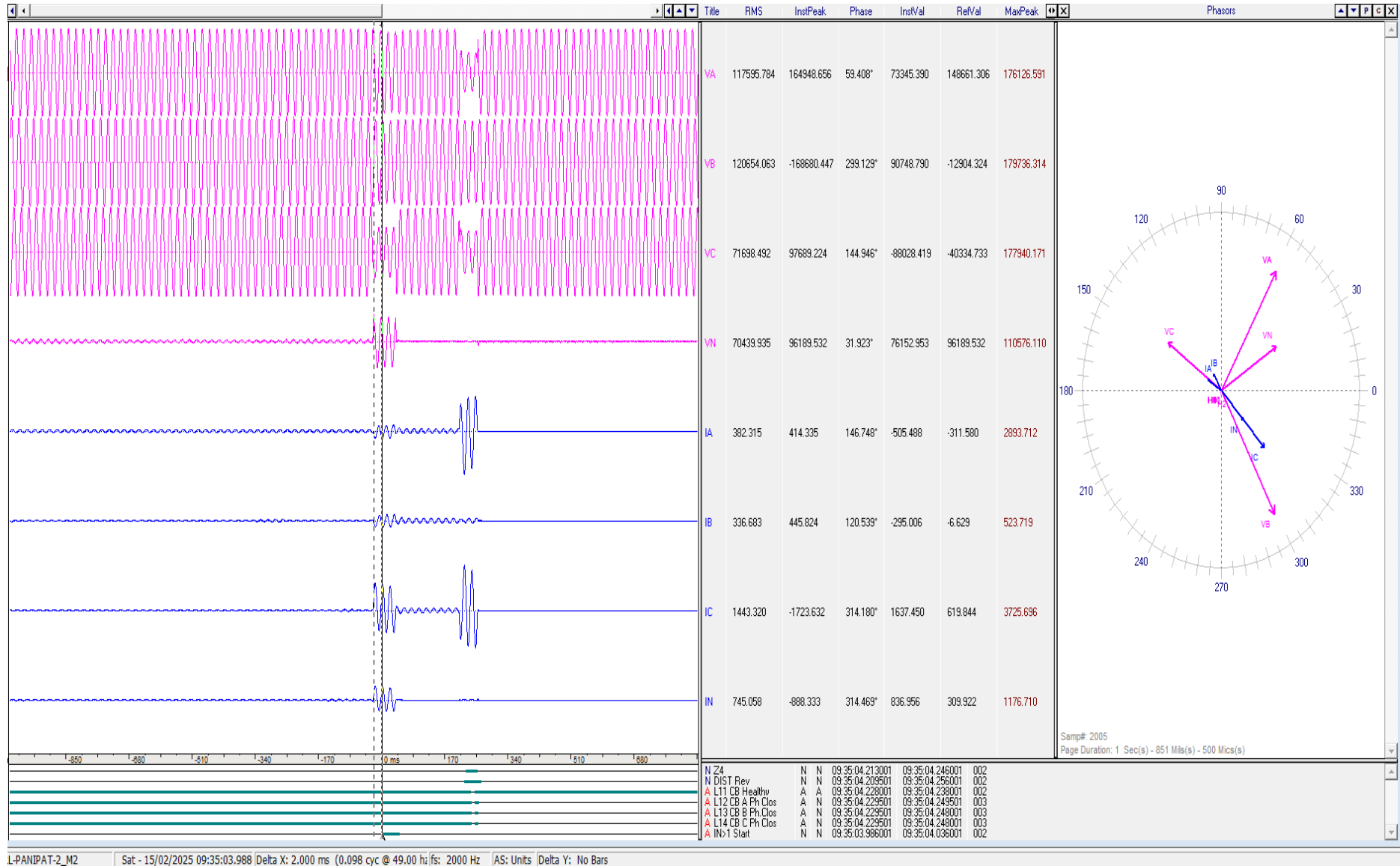
✓ Zone-1 and Zone-2 busbar protection operated

# DR of 220 KV Panipat(BBMB)-Narela(DV) (DTL) end Ckt-1



- ✓ B-N phase to earth fault followed by R-B phase to phase fault.
- ✓ Fault sensed in Zone-4.

# DR of 220 KV Panipat(BBMB)-Narela(DV) (DTL) end Ckt-2



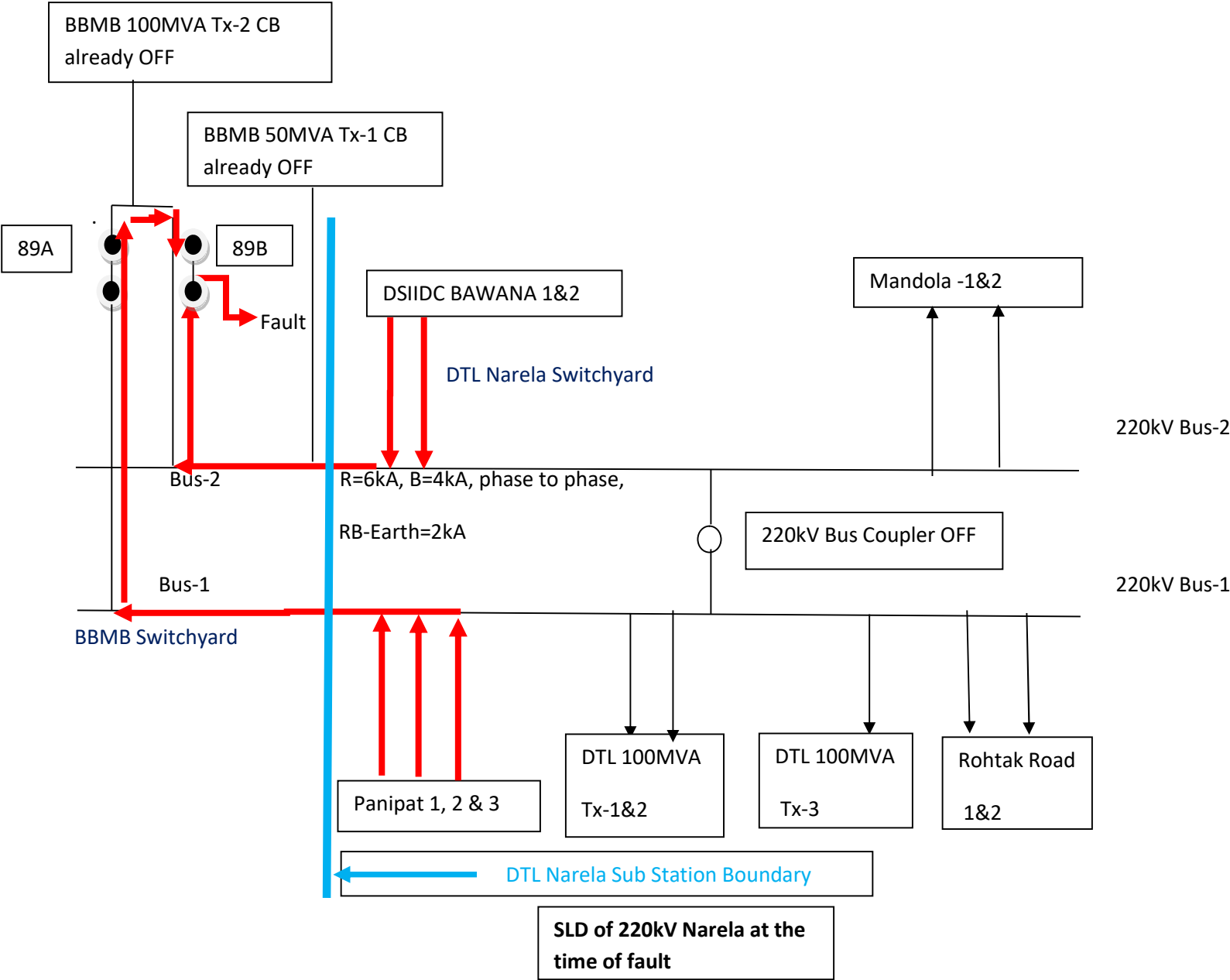
- ✓ B-N phase to earth fault followed by R-B phase to phase fault.
- ✓ Fault sensed in Zone-4.

## **Points for Discussion**

- i) Exact location of fault need to be shared.
- ii) SCADA Data in Narela became unavailable after tripping. Availability and Healthiness of SCADA data needs to be ensured.
- iii) Remedial action taken report to be shared.



**220kV Bus Bar Protection-1&2 trip at 220kV Narela on 15 February 2025 at 09.35Hrs.**



### **1. Operation events at DTL 220kV Narela Sub Station:**

Sequence of operation done by DTL operation staff on 15/02/2025:

220kV DSIIDC BAWANA-1&2 and 220kV Mandola-1&2 were connected to 220kV Bus-2 since date 14/02/2025 with BBMB 50MVA Tx-1 & BBMB 100MVA Tx-2 already connected on the said 220kV Bus.

It is apparent from 220kV Bus Bar Protection Numerical relay event records that 220kV DSIIDC BAWANA-1&2 CB were manually closed at 08.08Hrs and 08.09Hrs respectively. 220kV Bus Coupler CB was manually opened at 08.09Hrs, 220kV Mandola-1&2 CB were manually closed at 08.10Hrs.

### **2. Operation events at BBMB 220kV Narela Sub Station:**

Sequence of operation done by BBMB operation staff on 15/02/2025:

220kV CB of BBMB 50MVA Tx-1 and 100MVA Tx-2 were connected to 220kV Bus-2. Both CB were manually opened at 09.19Hrs by BBMB Narela operation staff for 220kV Bus Isolator changeover operation from Bus-2 to Bus-1. BBMB operation staff closed 89A Bus-1 Isolator of BBMB 100MVA Tx-2 at 09.30Hrs. Since the 220kV Bus Coupler CB at DTL was already in OFF position since 08.09Hrs, the said closure of 89A isolator with 89B Isolator already closed of BBMB 100MVA Tx-2 resulted in a position to function as a 220kV Bus Coupler.

### **3. Bus Bar Protection Tripping Event:**

Following the manual closure of 89A isolator by BBMB staff, 89B Bus-2 Isolator of BBMB Tx-2 was tried to open at 09.34Hrs but the operation could not be done completely due to 89B isolator struck in between and heavy arcing flames evolved due to said ON load 89B isolator opening operation by BBMB staff. It caused in ionization of air around 89B isolator of BBMB 100MVA Tx-2 and RB-Double Phase-Earth ( $R=6\text{kA deg } 0$ ,  $B=4\text{kA deg. } -178$  to Earth IN current= $2\text{kA deg. } -3$ ) fault occurred due to arcing via isolator structure. It resulted in operation of 220kV Bus Bar Protection Zone-B trip at 09.35Hrs. and all CB connected to Bus-2 (DSIIDC BAWANA-1&2, Mandola-1&2) got tripped immediately. Since 89B Isolator opening operation was not complete, fault continued to be fed from Bus-1 through Panipat-1,2,3 via BBMB 100MVA Tx-2 Isolator 89A to faulty 89B isolator, thereby causing 220kV Bus Bar Protection Zone-A also to trip immediately following Bus-Zone B trip and all 220kV CB connected to 220kV Bus-1 (Panipat-1,2,3, DTL 100MVA Tx-1,2&3, Rohtak Road-1&2) tripped as a consequence. Thus both 220kV Bus-1&2 at Narela DTL got isolated from power system network.

### **4. System Restoration Event:**

Restoration operation was initiated by DTL operation and DSIIDC BAWANA-1&2 CB closed at 10.13Hrs. , 100MVA Tx-1,2&3 were closed at 10.14Hrs, but no load was taken due to Bus Coupler CB was in OFF position. 220kV Panipat Ckt-1,2&3 were closed at 10.33 to 10.34 Hrs. , 220kV Rohtak Road CB were closed at 10.45Hrs. and 220kV Mandola-1&2 were restored at 11.04Hrs.

BBMB Narela also restored BBMB 100MVA Tx-2 at 11.10Hrs. and 50MVA Tx-1 at 11.15Hrs.

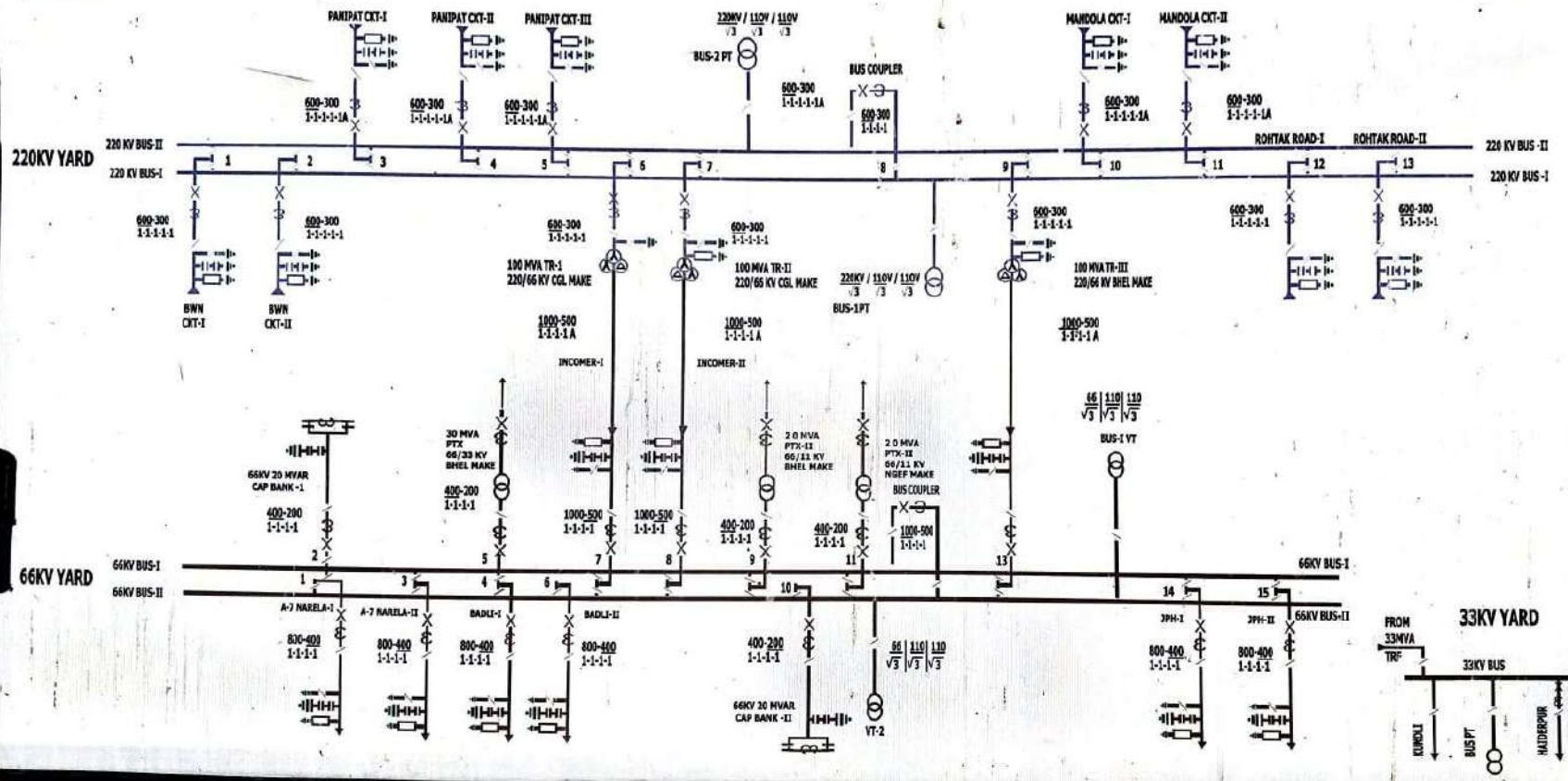
**5. Numerical Bus Bar Protection relay DR current Channel nomenclature:**

Name of Bay	220kV Numerical Bus Bar relay DR Current Channel Name
Bay-1 DSIIDC Bawana-1	F1
Bay-2 DSIIDC Bawana-2	F2
Bay-3 Panipat -1	F3
Bay-4 Panipat -2	F4
Bay-5 Panipat -3	F5
Bay-6 DTL 100MVA Tx-1	F6
Bay-7 DTL 100MVA Tx-2	F7
Bay-8 Bus Coupler	F8
Bay-9 DTL 100MVA Tx-3	L1
Bay-10 Mandola-1	L2
Bay-11 Mandola-2	L3
Bay-12 Rohtak Road-1	L4
Bay-13 Rohtak Road-2	L5
Bay-14 BBMB 50MVA Tx-1	L6
Bay-15 BBMB 100MVA Tx-2	L7



# DELHI TRANSCO LIMITED

## SINGLE LINE DIAGRAM OF 220 KV SUB STATION NARELA



#### **A. Introduction**

1. **Time & Date of Event:** - At 09:35 hrs on 15.02.2025,

2. **Substation(s) Affected along with voltage level:** - 220 KV Substation BBMB Narela.

3. **Brief Event Summary:-** As gathered from DTL, there was a requirement of shutdown at 400KV Mandola S/Stn (PGCIL). In view of this DTL informed BBMB to free 220KV Bus 2. 2 No. Power Transformers i.e. 100MVA T2 and 50MVA T1 were connected to 220KV Bus 2 at BBMB Narela end at the time of occurrence of fault.

At this time 220KV Bus Coupler at DTL end was in OFF position but in the knowledge of BBMB shift staff the Bus coupler was in ON position which was confirmed by DTL shift staff at the time of conveying message to free Bus 2 at BBMB end.

So, after discussion with DTL shift staff, BBMB shift staff tried to free BUS 2 firstly by closing of BUS 1 isolator no. 203 of 100MVA T2 T/F which they did successfully. Then they tried to open BUS 2 isolator no. 204 of this transformer which unfortunately could not be opened due to Isolator Control Mechanism Fault and as such the isolator stuck in between during operation.

As practically the Bus Coupler was in open position so a heavy arc was formed between stucked male-female contacts of the isolator which led to tripping of numerical Bus bar protection installed in DTL control room which resulted into trippings of all elements connected to 220KV Bus 1 & 2.

Reason of blackout at 220KV Rohtak Road BBMB Delhi was tripping of 220KV only source from 220KV DTL Narela (i.e. 220KV Narela -R/Rd Ckt 1&2)

It took approximate 1 Hour to restore the system. Meanwhile, the maintenance staff of BBMB set right the Isolator Mechanism Fault of Bus 2 Isolator No. 204 of 100MVA T2.

Then as per requirement of DTL, 100MVA T2 and 50 MVA T1 were charged at 11:10 Hrs and 11:15 Hrs respectively with the approval of PC Chandigarh.

#### **B. Antecedent Conditions**

1. **Weather Information:** Clear

2. **Additional relevant information viz. power flow-** Available with DTL

#### **C. Event data**

1. **Change in Frequency:** 50.04

2. **Generation Loss/Load Loss:** Generation Loss: - Nil; Load Loss: NIL

3. **Single Line Diagram** - Attached herewith

4. **Name and time of the tripped elements as per SOE :-** NIL at BBMB as 220KV /132KV T1 & T2 were in OFF Position

5. **Location and type of fault:** A heavy flash occurred between male and female contacts of 220KV bus 2 isolator No. 204 of 100MVA Transformer T2.

6. **Flag Details, DR and EL for each affected element:** NIL as no tripping occurred at 220KV BBMB Narela end

7. **Appropriate Graphical Plots:** - DRs/Events files available with DTL.

8. **Equipment failure (if any):-** Control Mechanism of bus 2 isolator of Isolator No. 204 which was replaced with old & used healthy mechanism lying at S/Stn.



**D. Event Description/ Analysis of the Event Description (Detailed description including the reference of DR/EL and explanation based on points):-**  
2 No. Power Transformers i.e. 100MVA T2 and 50MVA T1 were connected to 220KV Bus 2 at BBMB Narela end at the time of occurrence of fault.  
At this time 220KV Bus Coupler at DTL end was in OFF position but in the knowledge of BBMB shift staff the Bus coupler was in ON position which was confirmed by DTL shift staff at the time of conveying message to free Bus 2 at BBMB end.

So, after discussion with DTL shift staff, BBMB shift staff tried to free BUS 2 firstly by closing of BUS 1 isolator no. 203 of 100MVA T2 T/F which they did successfully. Then they tried to open BUS 2 isolator no. 204 of this transformer which unfortunately could not be opened due to Isolator Control Mechanism Fault and as such the isolator stuck in between during operation.

As practically the Bus Coupler was in open position so a heavy arc was formed between stucked male-female contacts of the isolator which led to toperation of numerical Bus bar protection installed in DTL control room which resulted into trippings of all elements connected to 220KV Bus 1 & 2.

It took approximate 1 Hour to restore the system. Meanwhile, the maintenance staff of BBMB set right the Isolator Mechanism Fault of Bus 2 Isolator No. 204 of 100MVA T2.

#### **E. Restoration**

Restoration time of the feeders/Equipment is as below:

1. As per requirement of DTL, 100MVA T2 and 50 MVA T1 were charged at 11:10Hrs and 11:15 Hrs respectively with the approval of PC Chandigarh.

2. **Special finding/ issues identified during restoration:** - Restoration done by DTL

#### **F. Remedial Action:-**

**Remedial Action Taken:** The maintenance staff of BBMB set right the Isolator Mechanism Fault of Bus 2 Isolator No. 204 of 100MVA T2.

#### **G. Lesson Learnt:**

1. There should be no communication gap between DTL Narela and BBMB Narela staff while doing any operation on 220KV Bus 1 & Bus 2

2. In order to avoid recurrence of such type of inadvertent wrong operations, before opening/closing of any 220KV Bus Isolator, 220 KV Bus Coupler must be in ON position.

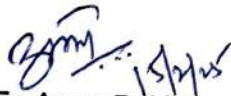
**H. Any other Information:** NIL

  
Er. Tejveer Singh

SSE Narela

  
Er. Ranbir Sharma

AD/P&T Panipat

  
Er. Aman Dahiya  
XEN/O&M Delhi

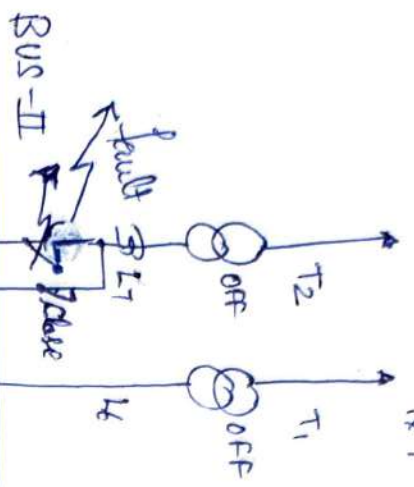
  
Er. Vishal Mohan  
Dy. Dir. /P&T Cell, BBMB, Panipat

# SINGLE LINE DIAGRAM of 220 KV Bus-1 & Bus-2 of DTL Noor

BRMB  
Tx-1

Bawana  
1 & 2

Mandela  
Ckt-1 & 2



F1  
F2

L2  
L3

F8  
OFF

Bus-I

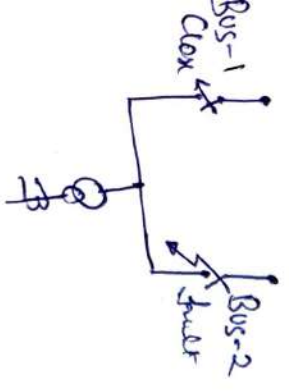
F3  
F4  
F5  
F6  
F7

DTL  
100 MVA  
Tx 1 & 2

DTL  
150 MVA  
Tx-3

Router Road  
Ckt 1 & 2

L4  
L5



R, B fault initiation 09:35 AM.  
LE-1  
Bus-2 Rpf 11.7 KA  
Bus-1 Rpf 6.7 KA

Prm  
AD  
Cer. R.S. Sharma

AN  
888



# Multiple element tripping event at 220/132kV Delina(J&K)

At 14:54 hrs on 17.02.2025

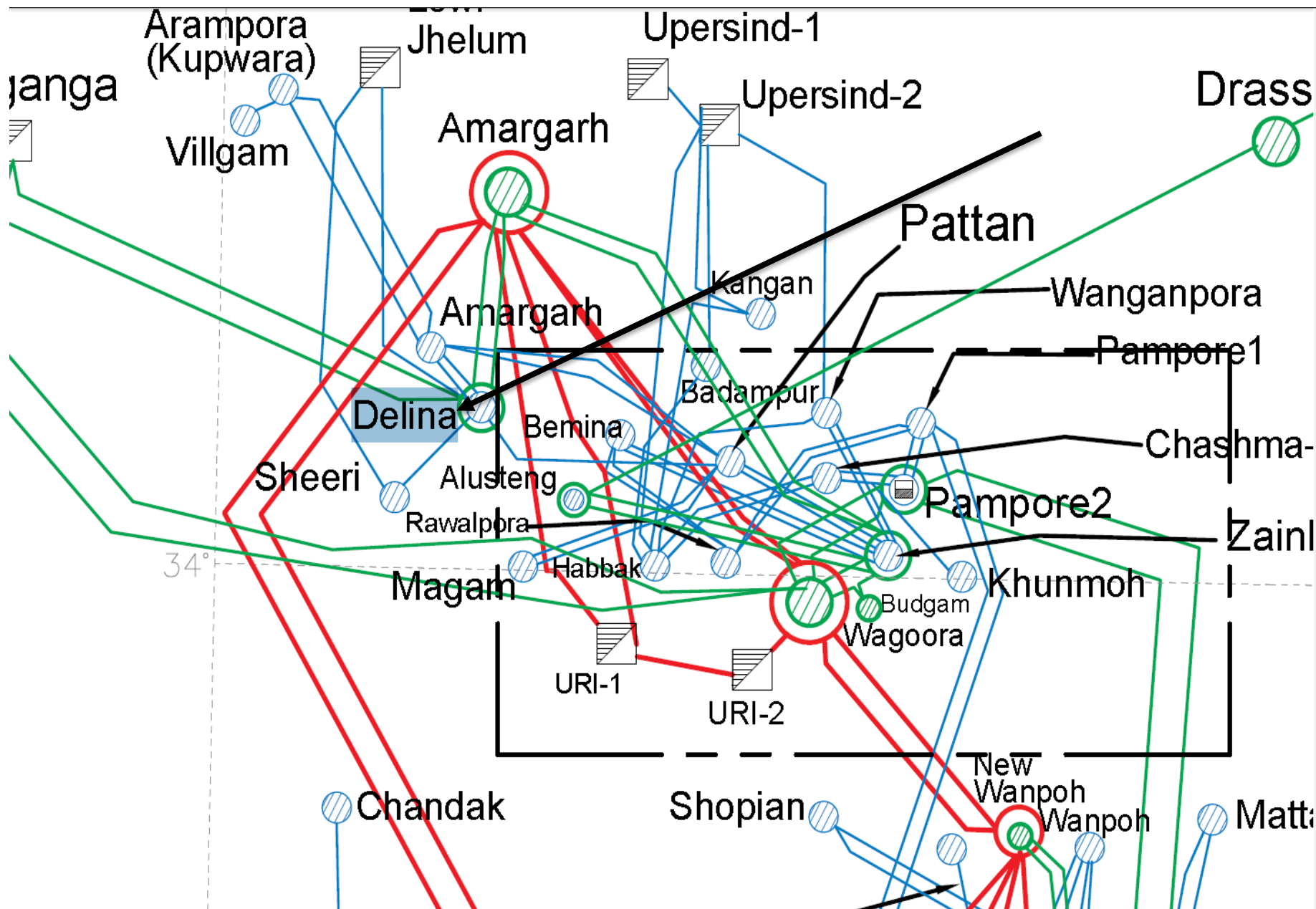
## Tripped Elements

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	220/132kV 160MVA ICT -1 at Delina (JK)	14:54 hrs	14:59 hrs	Earth Fault
2.	220/132kV 160MVA ICT -2 at Delina (JK)			Overloading
3.	220/132kV 160MVA ICT -3 at Delina (JK)			

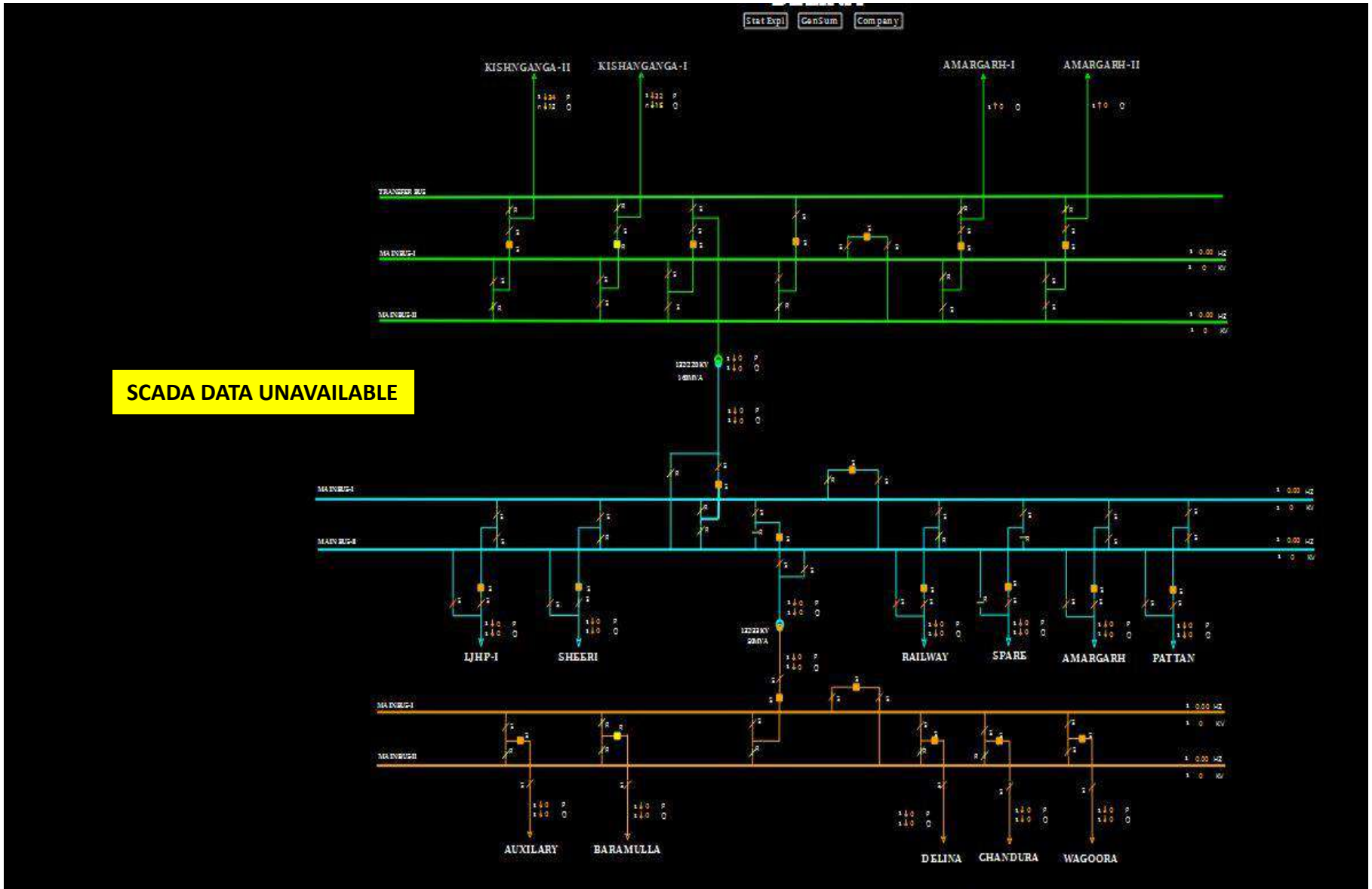
## **Brief details of the event**

- i) 220/132kV Delina substation has Double main and transfer bus scheme.
- ii) During antecedent condition, 220kV Amargarh (INDIGRID) –Delina(JK) D/C was carrying 106 MW each and feeding Delina load.
- iii) As reported, at 14:54 hrs, 132KV Delina – Pattan line tripped due to broken jumper condition while returning the same line from shutdown (exact reason, nature and location of fault yet to be shared).
- iv) During the same time, 220/132kV 160MVA ICT -1 at Delina(JK) tripped on earth fault (exact reason and nature of protection operated yet to be shared).
- v) Subsequently, this led to overloading of 220/132kV 160MVA ICT -2 & 3 at Delina(JK) and ICTs got tripped on over-current protection operation.
- vi) As per PMU at Amargarh (INDIGRID), R-Y-B 3 phase to earth fault with fault clearing time of 80 msec is observed.
- vii) As per SCADA, change in demand of approx. 210 MW is observed in J&K control area.

# Network Diagram

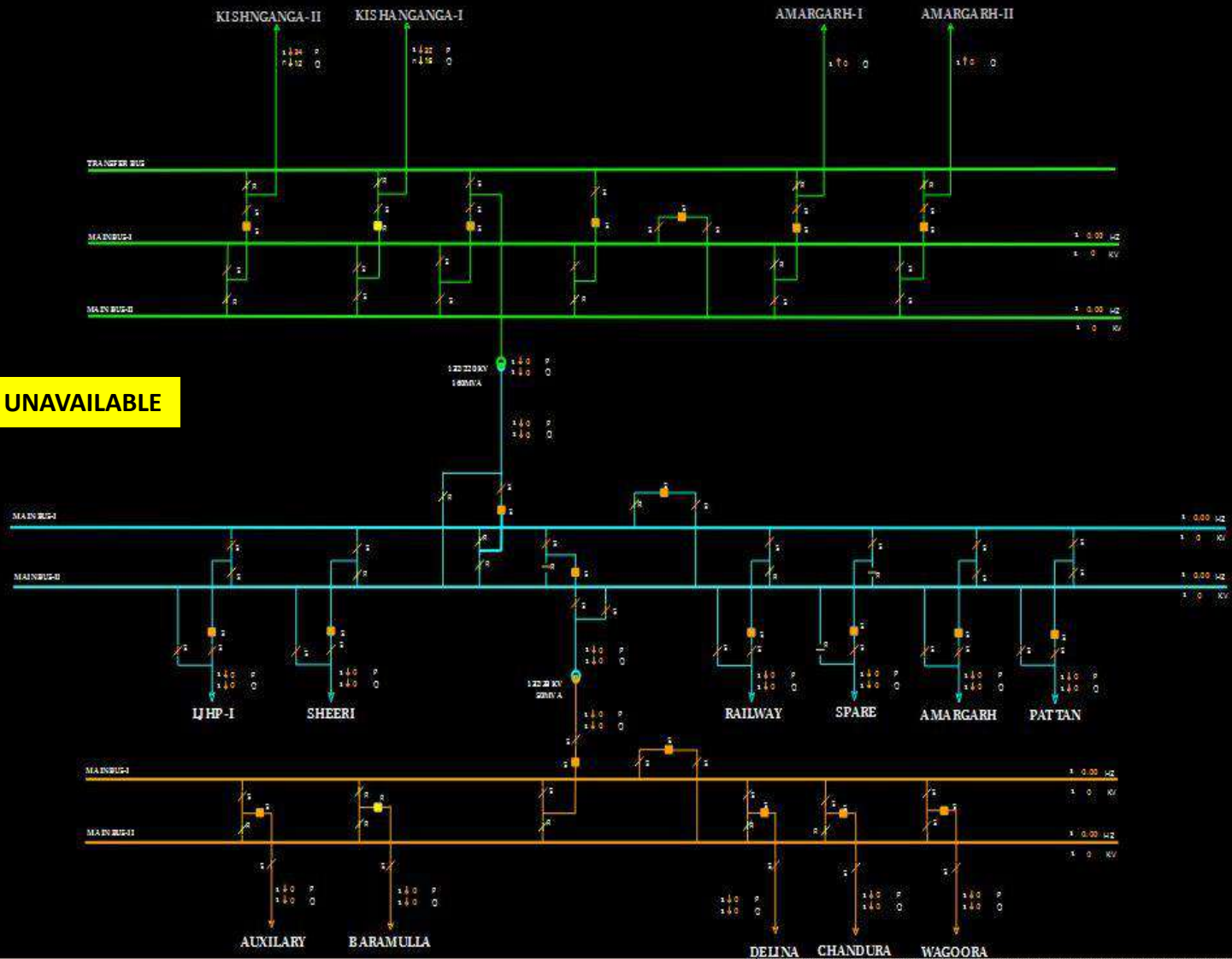


# SLD of 220kV Delina(JK) before the event



# SLD of 220kV Delina(JK) after the event

SCADA DATA UNAVAILABLE



## SLD of 400kV Amargarh(INDIGRID) before the event

CONTACT DETAILS	
EMAIL	nrs329substation@gmail.com
MOBILE	9469795283
HOTLINE	20112455

P sum(400 kV) = 4  
P sum(200 kV) = 2

## AMARGARH GIS

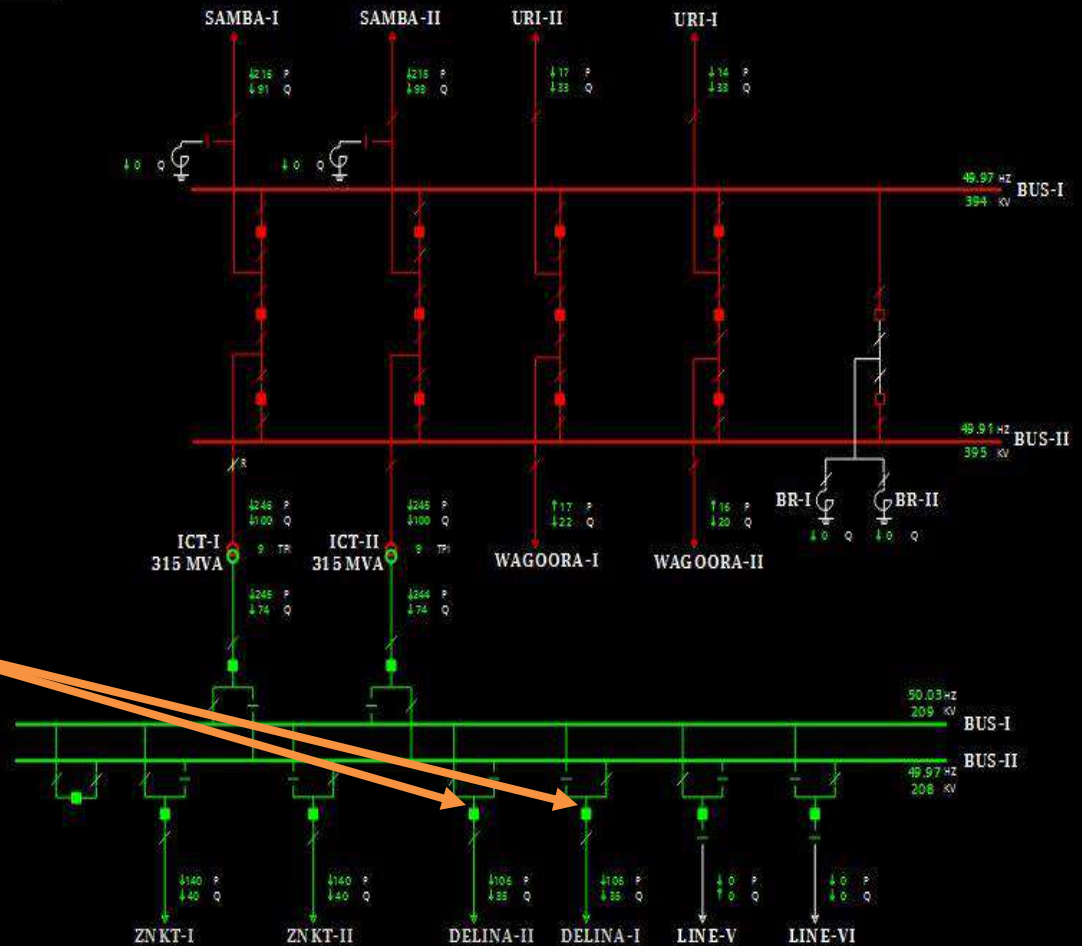
Stat Expl	Gen Sum	Company
-----------	---------	---------

17.2.25 14:54:14

Q sum(400 M) = 3

Q sum(200 M) = 4

Q sum(100 W) = 4



## 106MW in each Circuit

### SLD of 400kV Amargarh(INDIGRID) after the event

CONTACT DETAILS	
EMAIL	nrss29substation@gmail.com
MOBILE	9469795283
HOTLINE	20112455

P sum(400 kV) = 4  
P sum(220 kV) = 4

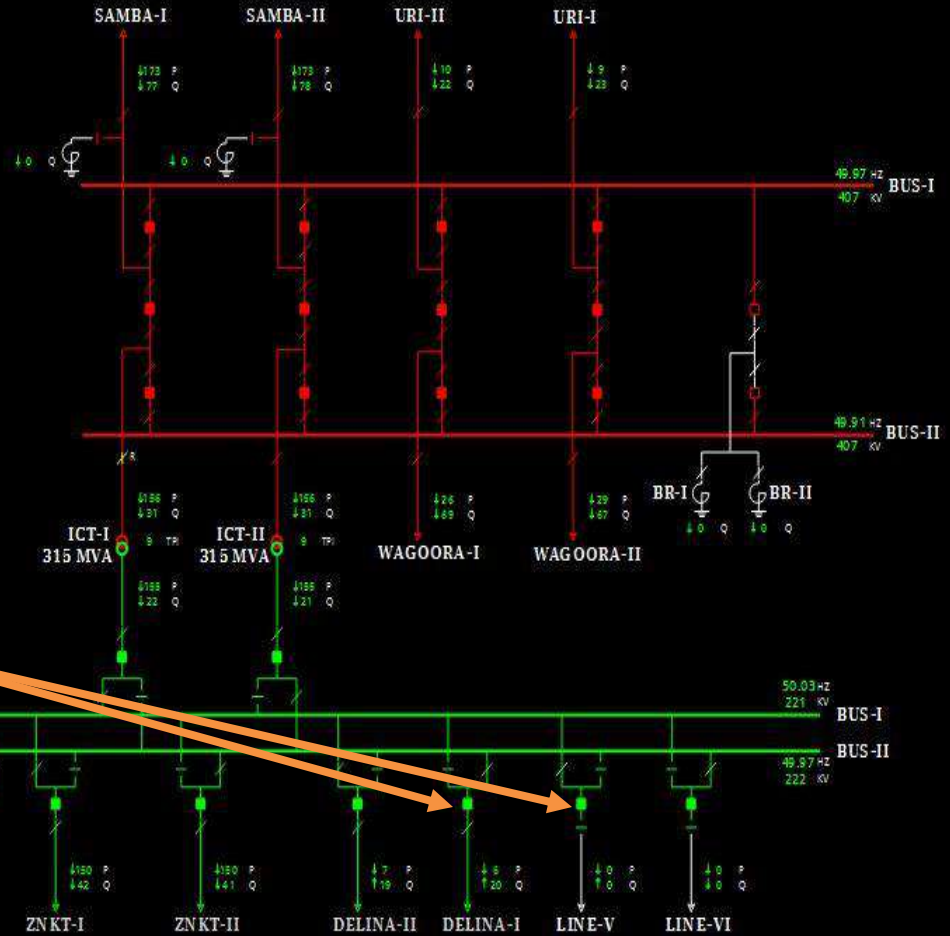
## AMARGARH GIS

Stat Expl Gen Sum Company

17.2.25 14:54:30

Q sum(400 kW) = -8  
Q sum(200 kW) = 3

Q sum(400 kW) = -8  
Q sum(200 kW) = 3



**FLOW REDUCED TO 6MW EACH**



# J&K demand during the event



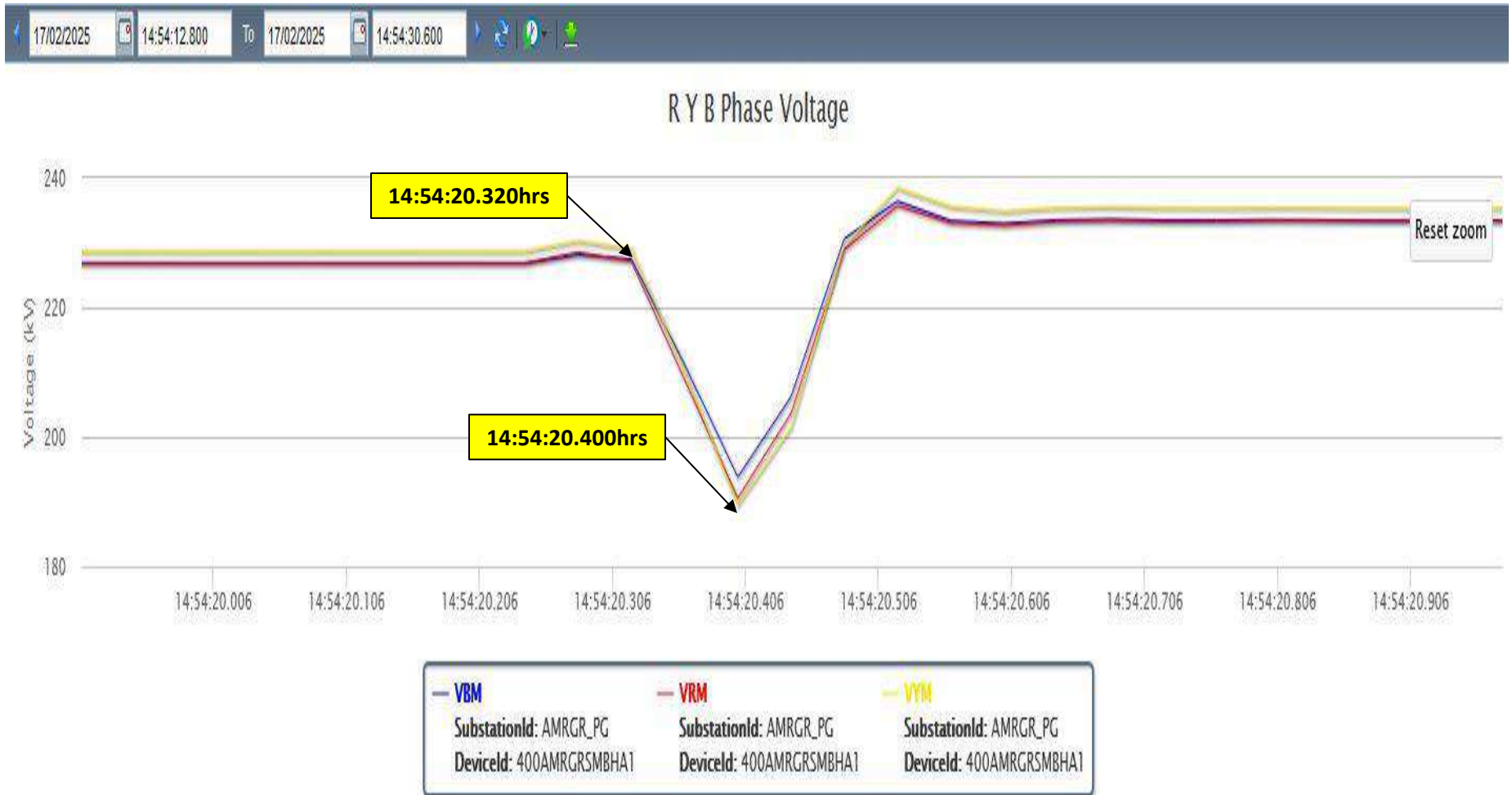
# PMU Plot of frequency at Amargarh(INDIGRID)

14:54hrs/17-Feb-25



# PMU Plot of phase voltage magnitude at Amargarh(INDIGRID)

14:54hrs/17-Feb-25



R Y B Phase Voltages Angles

## **Points for Discussion**

- i) Exact reason, nature & location of fault and nature of protection operated need to be shared.
- ii) Sequence of operation needs to be shared.
- iii) Bus wise arrangement of transmission elements needs to be shared for Delina(JK).
- iv) SCADA data of 220/132kV Delina (JK) S/s was not available during the event. Availability and healthiness of the same need to be ensured.
- v) DR/EL (.dat/.cfg) file of all the tripped elements along with tripping report need to be shared from both the ends.
- vi) Remedial action taken report to be shared.

Multiple element tripping event at  
400/220 Moradabad(UP) and  
220/132KV Moradabad-2(UP)

At 17:18 hrs on 22.02.2025

## Tripped Elements

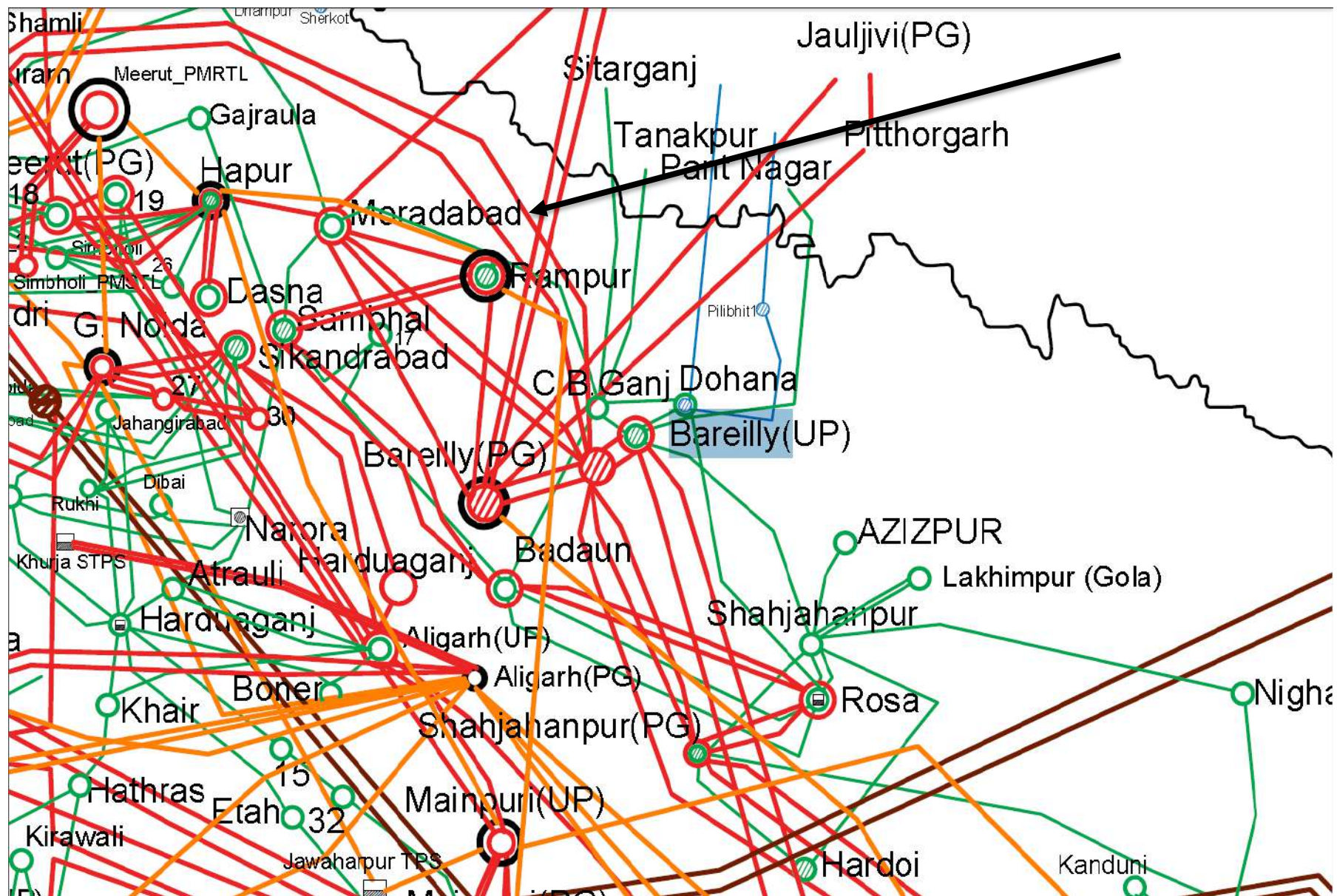
S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400/220 KV 500 MVA ICT 1 at Moradabad(UP)	17:18 hrs	18:40 hrs	Bus Bar Protection of 220KV Bus-1 & 2 at Moradabad-2(UP) operated.
2.	220/132 KV 160 MVA ICT 2 at Moradabad-2(UP)		23:58 hrs	
3.	220/132 KV 160 MVA ICT 3 at Moradabad-2(UP)		16:00 hrs on 23 <sup>rd</sup> Feb'25	
4.	220KV Moradabad-2 – Amroha (UP) Ckt		18:40 hrs	
5.	220KV Muradabad-2 – Sambhal (UP) Ckt		19:10 hrs	

## **Brief details of the event**

- i) 400/220kV Moradabad(UP) has double main and transfer bus scheme in both 400KV and 220KV system. 220/132KV Moradabad-2(UP) was connected to the same 220kV bus as that of 400/220kV Moradabad(UP).
- ii) During the antecedent condition, 400/220 KV 500 MVA ICT 1 at Moradabad(UP), 220/132 KV 160 MVA ICT 2 & ICT 3 at Moradabad-2(UP) were carrying 79MW, 20MW and 20MW. 400/220 KV 240 MVA ICT 3 at Moradabad(UP) was under shutdown.
- iii) As reported, at 17:18hrs, fault occurred in 132KV Moradabad-2 – Golbari Ckt (Exact reason, nature and location of fault yet to be shared).
- iv) Since the fault wasn't cleared at 132KV level, it propagated further into 220KV system which led to Bus Bar protection operation at both 220kV Bus-1 & 2 at Moradabad-2(UP) and all the elements connected to both the 220kV buses at Moradabad-2(UP) tripped.
- v) As per PMU at Bareilly(PG), Y-B phase to phase fault is observed with fault clearing time of 80ms.
- vi) As per SCADA, change in demand of approx. 106MW is observed in UP control area.

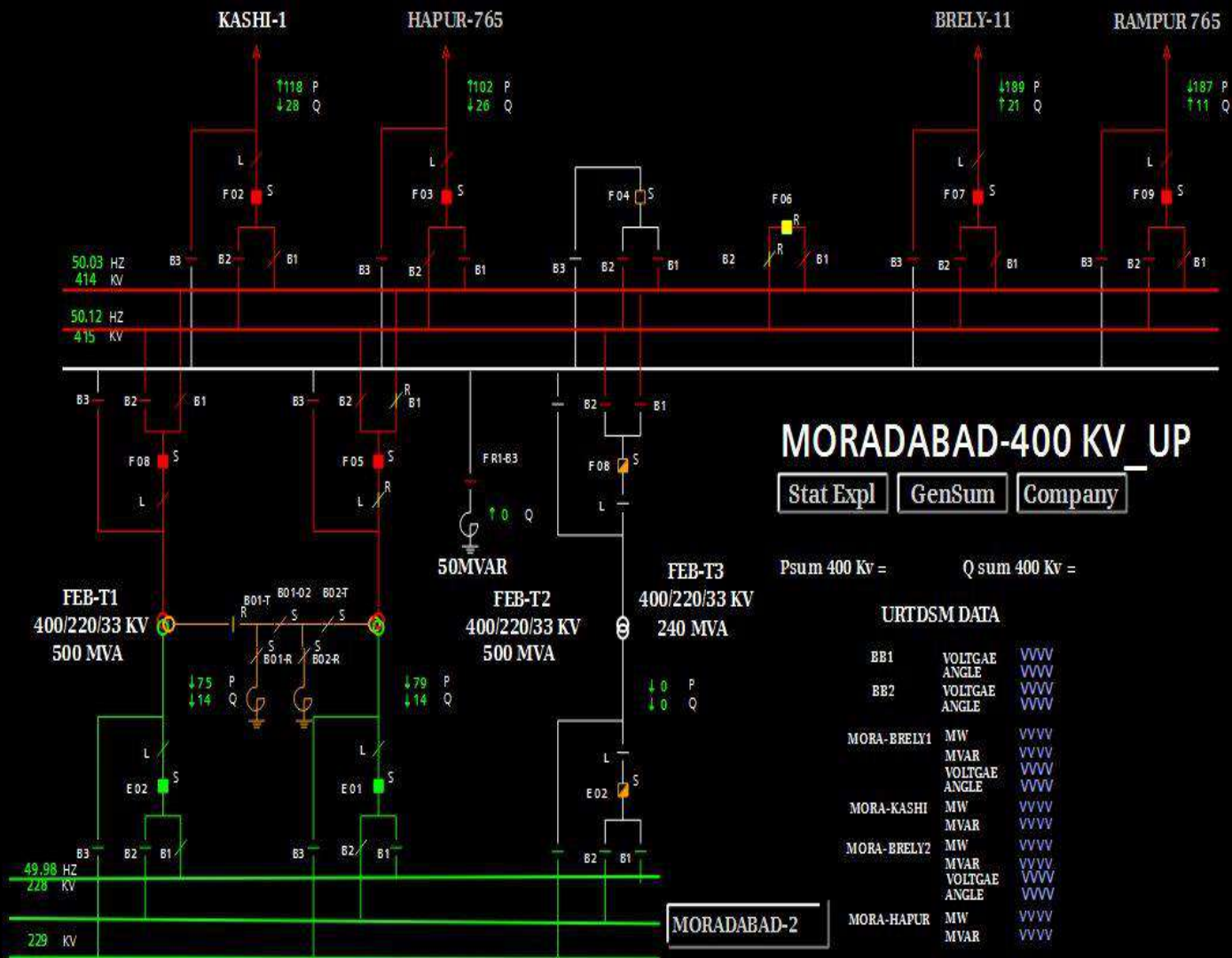


# Network Diagram

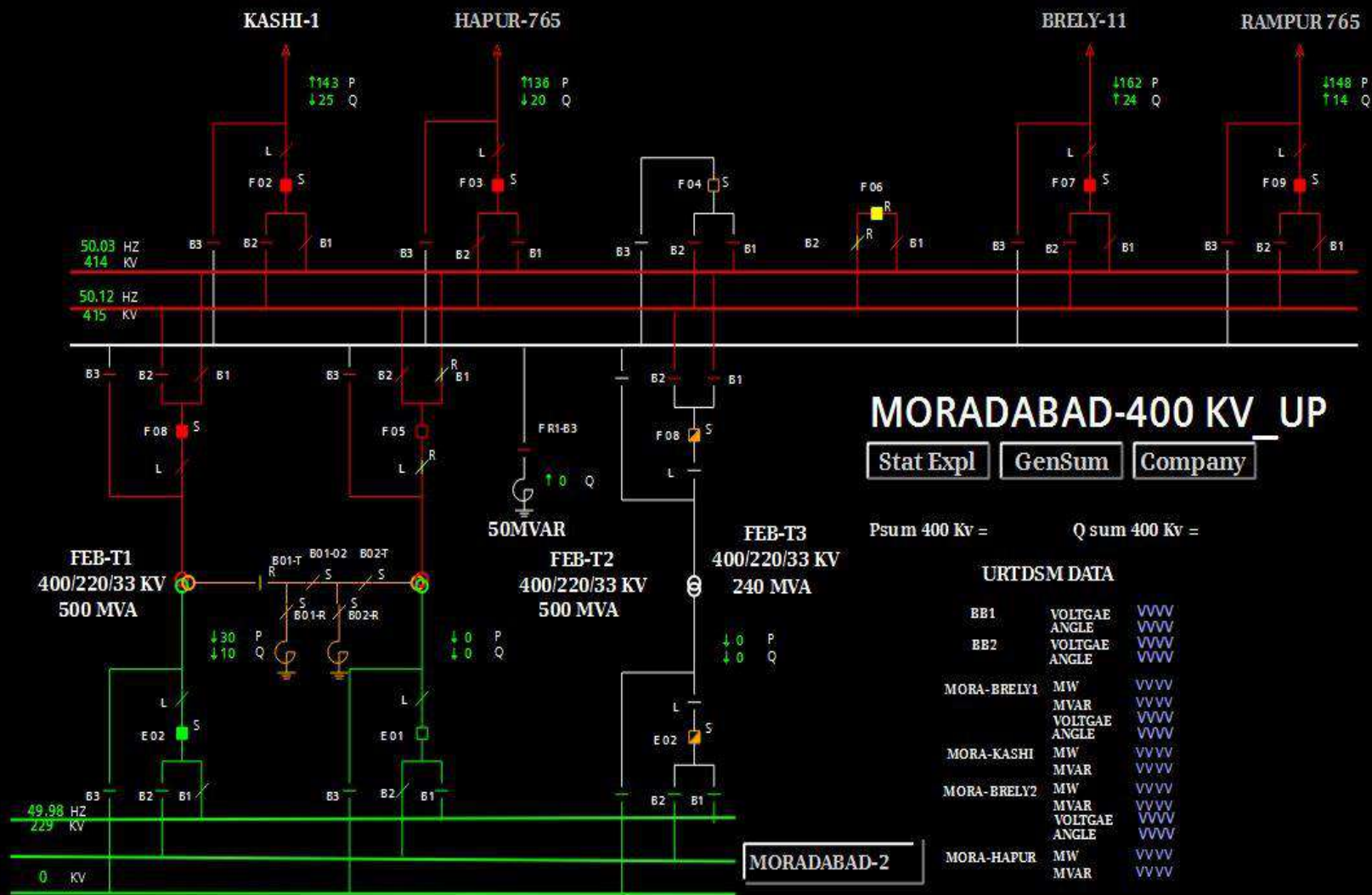




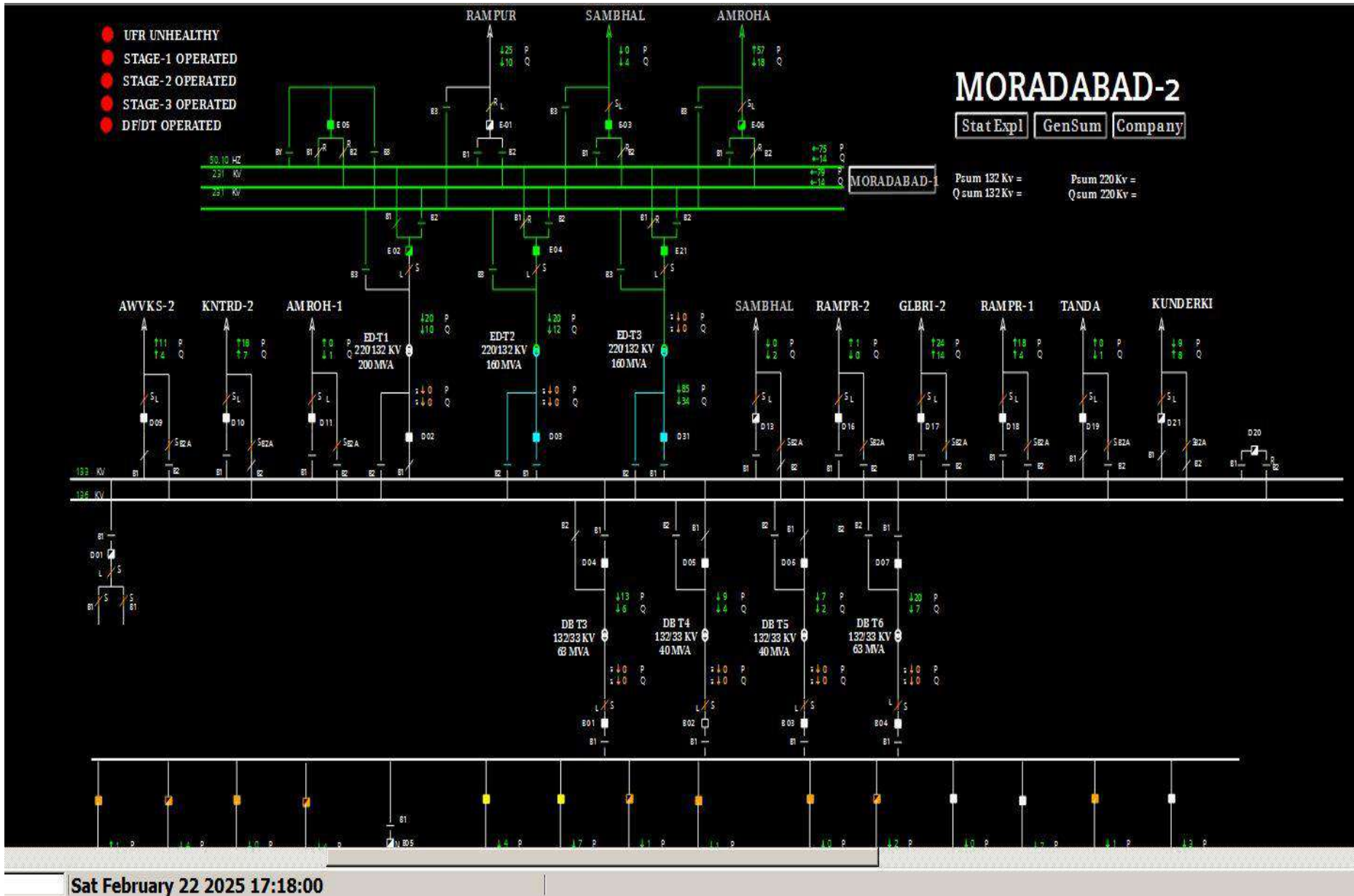
# SLD of 400/220kV Moradabad(UP) before the event



### SLD of 400/220kV Moradabad(UP) after the event



# SLD of 220/132/33kV Moradabad-2(UP) before the event



# SLD of 220/132/33kV Moradabad-2(UP) after the event

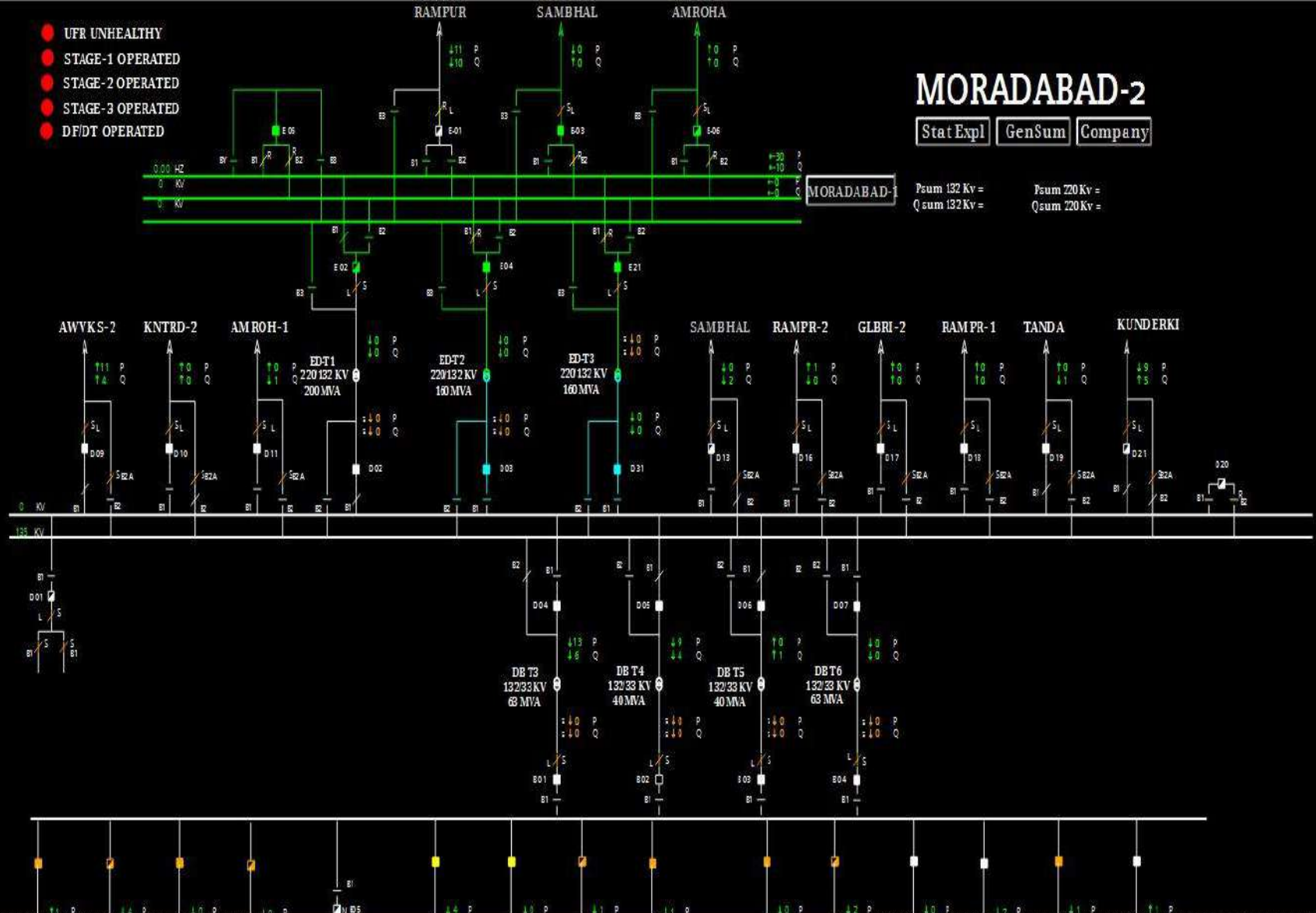
- UFR UNHEALTHY
- STAGE-1 OPERATED
- STAGE-2 OPERATED
- STAGE-3 OPERATED
- DF/DT OPERATED

## MORADABAD-2

Stat Expl GenSum Company

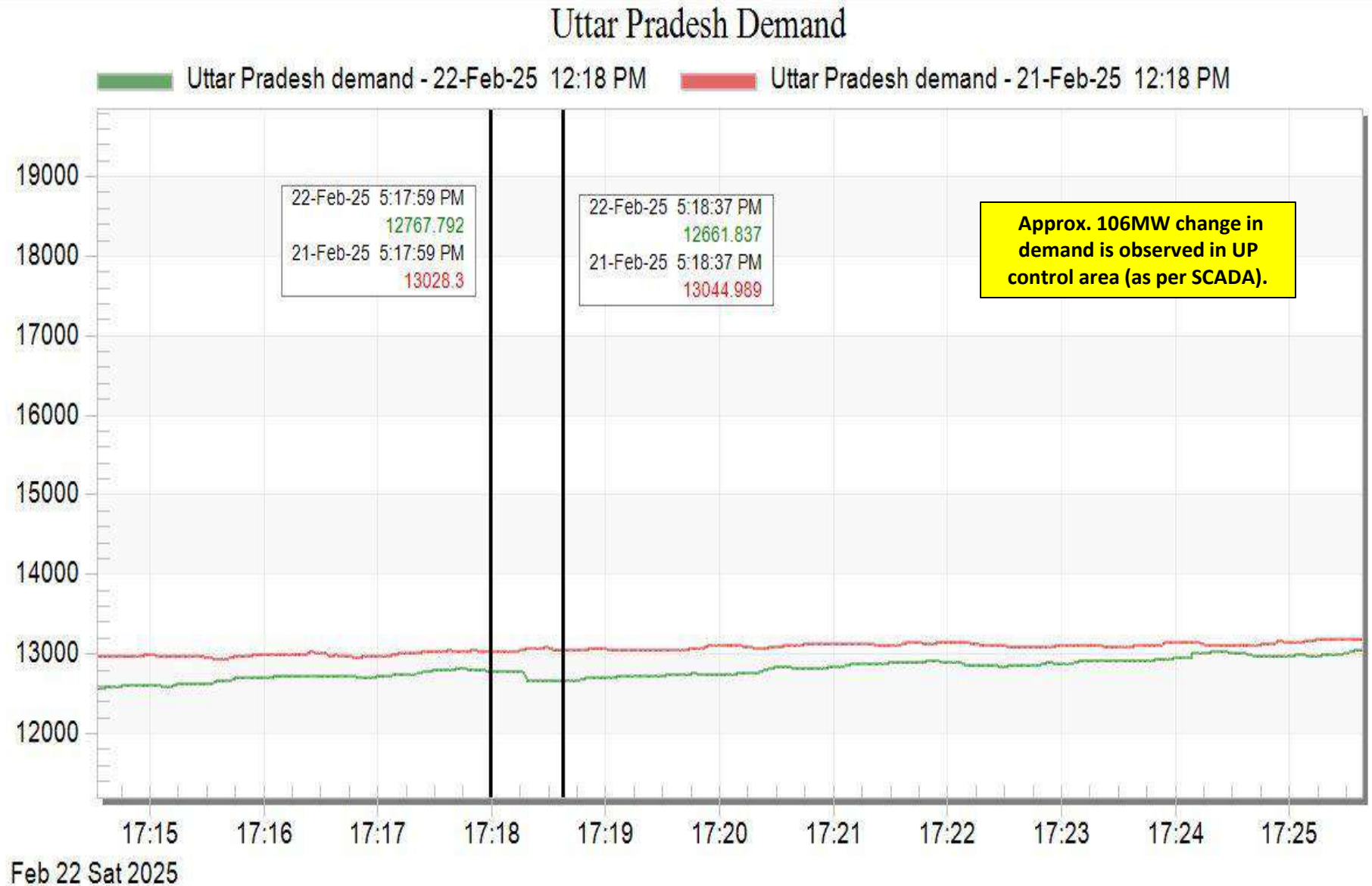
Psum 132 Kv =  
Qsum 132 Kv =

Psum 220 Kv =  
Qsum 220 Kv =



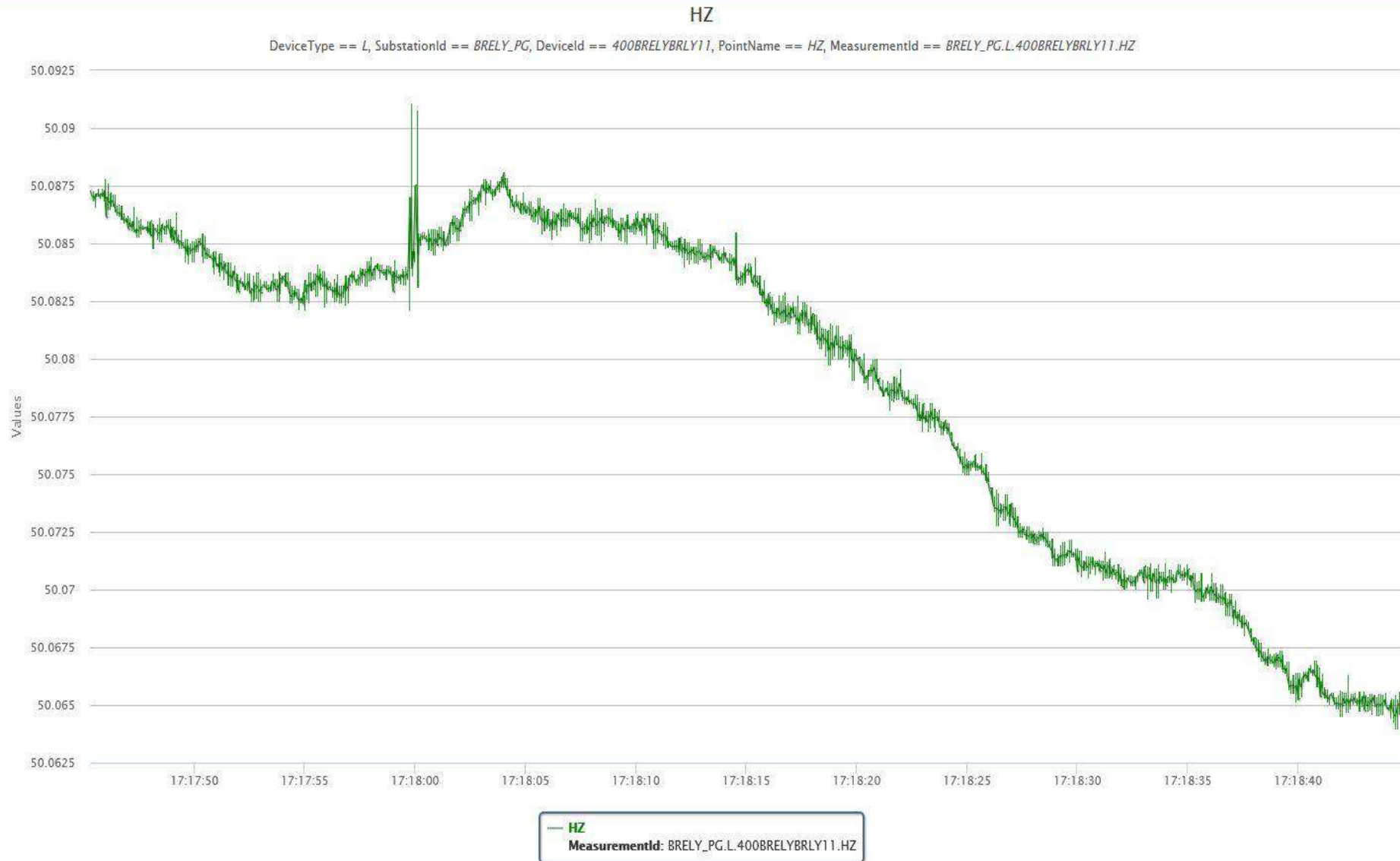


# UP demand during the event



# PMU Plot of frequency at Bareilly(PG)

17:18hrs/22-Feb-25



# PMU Plot of phase voltage magnitude at Bareilly(PG)

17:18hrs/22-Feb-25



R Y B Phase Voltages Angles

✓ Y-B phase to phase Fault was observed as per PMU

# SCADA SOE

Time	Station Name	Voltage	Element Name	Element Type	Element Status	Remarks
17:17:59,505	MORA2_UP	132kV	17GLBRI2	Circuit Breaker	Open	Main CB at Moradabad-2(UP) end of 132KV Moradabad-2 – Golbari(UP) Ckt opened
17:17:59,816	MORA2_UP	220kV	04T2	Circuit Breaker	Open	CB at 220kV side of 220/132kV 160MVA ICT-2 at Moradabad-2(UP) opened
17:18:00,038	MORA1_UP	400kV	05T2	Circuit Breaker	Open	CB at 400kV side of 400/220kV 500MVA ICT-2 at Moradabad(UP) opened
17:18:00,048	MORA1_UP	220kV	01T2	Circuit Breaker	Open	CB at 220kV side of 400/220kV 500MVA ICT-2 at Moradabad(UP) opened



## **Points for Discussion**

- i) Exact reason, nature and location of fault need to be shared.
- ii) SCADA data of 220/132/33kV Moradabad-2(UP) was partially freezed during the event. Availability and healthiness of SCADA data need to be ensured.
- iii) DR/EL (dat/.cfg file) of all the tripped elements along with detailed tripping report need to be shared from both the ends.
- iv) Remedial action taken report to be shared.



**220kV S/S MORADABAD**

---

**BUS-BAR Operation on 22.02.2025  
at 17:18 Hrs**

## Antecedent Conditions:

- **Weather conditions :** - Clear at Moradabad
- **Date & Time of event:** 22.02.2025 at 17:18 Hrs
- **Sub-Station affected:** 220KV S/S Moradabad
- **Bus Voltage(Affected S/S):** 220kV
- **Load conditions on Substation: -** 191MW
- **Frequency:-** 49.98Hz

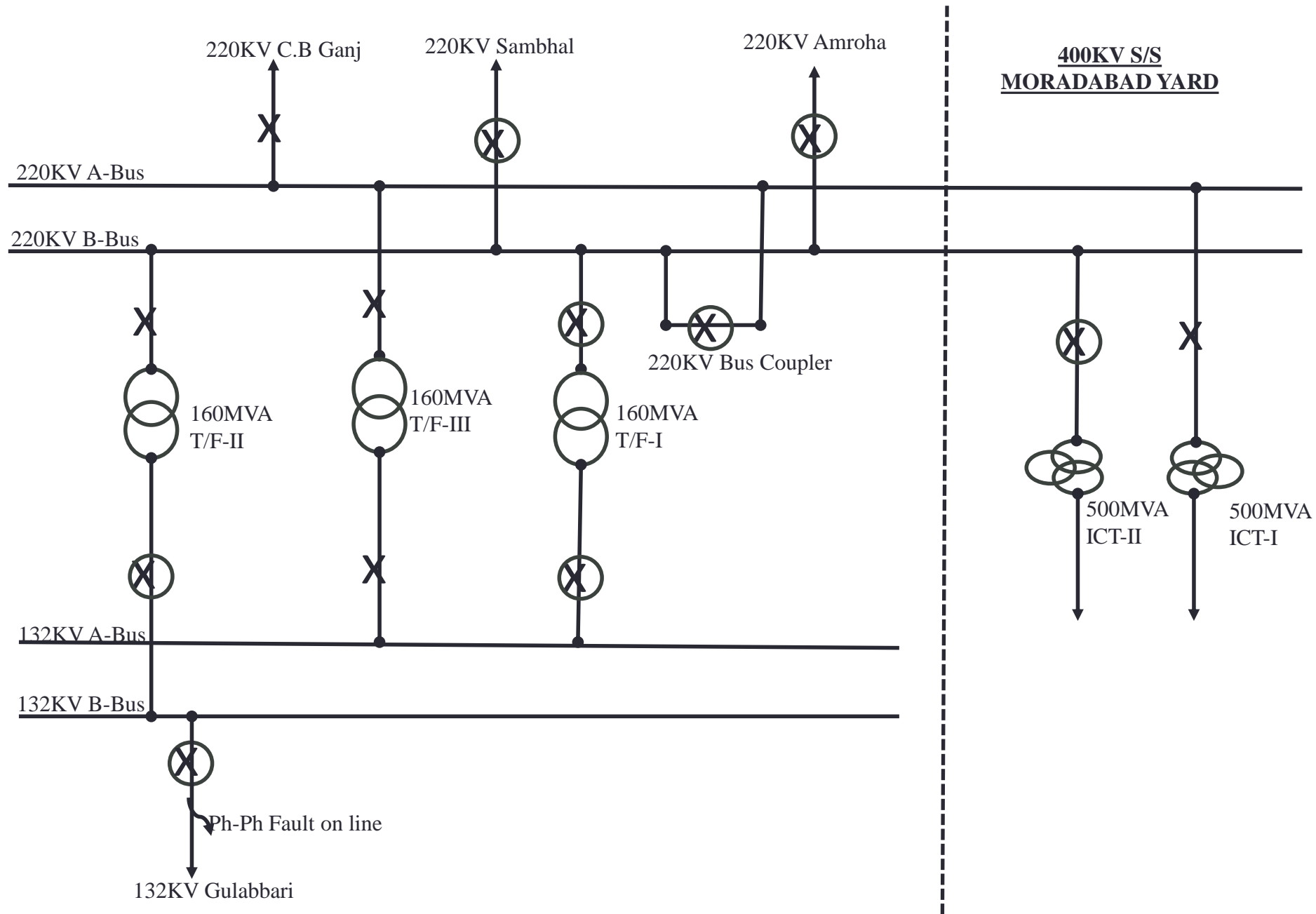
**NAME AND TIME OF THE TRIPPED ELEMENT IN TIME CHRONOLOGY  
ALONG WITH RESTORATION TIME AND BOTH END FLAG**

<b>Name of Element</b>	<b>Load(In MW Before incident)</b>	<b>RESTORATION DATE &amp; TIME</b>	<b>FLAGS END 1 (INCLUDING A/R)</b>	<b>FLAGS END 2 (INCLUDING A/R)</b>
132kV Moradabad- Gulabbari Line	10MW	22.02.2025 at 19:45 Hrs	Relay Trip, Y-ph ,B- ph ,Zone-1,Trip ABC, Dist.-2.5 km, 86A, 86B. IL1= 0.16 kA IL2= 5.40 kA IL3= 5.28 kA.	No Tripping (Line is Radial)
220/132kV 160 MVA T/F-II	72MW	23.02.2025 at 16:00 Hrs	HV B/U Relay:- HS OC FWD OP, 86HV, 86LV. Ia= 0.649 A Ib= 6.375 A Ic= 5.844 A	NA

## Continued..

Following Elements Tripped due to Bus-Bar Operation				
220kV Bus-Coupler(Bay-1)	-	23.02.2025 at 05:15 Hrs		
220kV Line Amroha(Bay-3)	62MW	22.02.2025 at 18:40 Hrs	Bus-Bar Flag:-	
220kV Line Sambhal(Bay-4)	Line Charge Only	22.02.2025 at 19:10 Hrs	CBF Startup, CBF Retrip, Trip Bay 6(220/132kV 160 MVA T/F-II), BZ2 CBF Operated.	NA
220/132kV 160 MVA T/F-II(Bay-6)	72MW	23.02.2025 at 16:00 Hrs	96-1,96-2,96-3,96-4,96-6,96-8,96-10.	
220/132kV 160 MVA T/F-I(Bay-8)	22MW	22.02.2025 at 23:58 Hrs		
500 MVA ICT-II LV Side(Bay-10)	68MW	22.02.2025 at 18:40 Hrs		

## 220KV S/S MORADABAD SINGLE LINE DIAGRAM ON DATE 22.02.2025

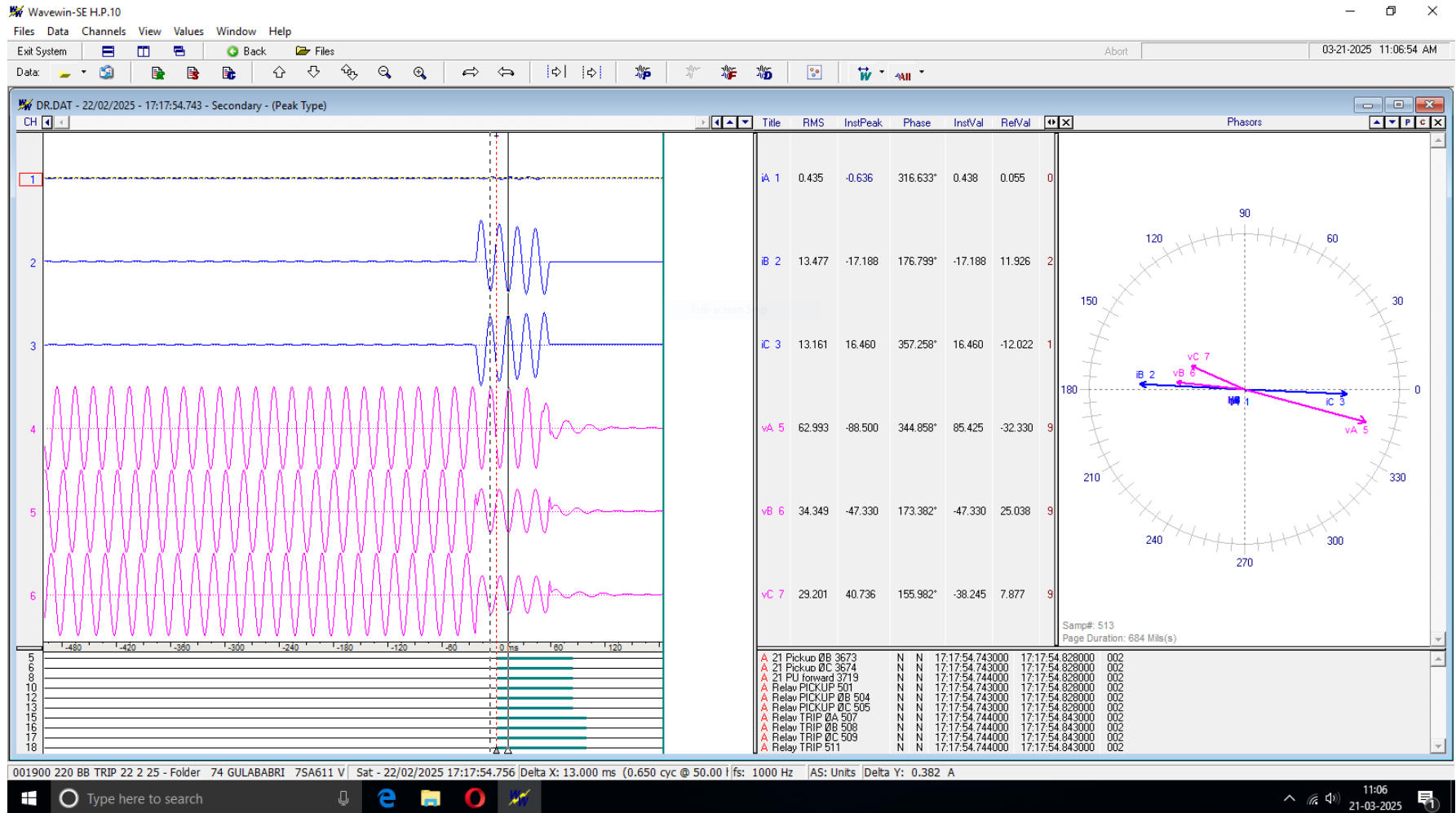


## Sequence of Events:

- Phase Fault occurred on 132kV Moradabad-Gulabbari Line at 17:18 Hrs on 22.02.2025 at a distance of 2.5km. The fault on this line was timely cleared by its distance protection in zone I.
- In spite of timely clearance of line fault, 160MVA T/F II also tripped on High Set HV B/U O/C. However, Transformer HV Breaker failed to trip.
- Since the HV breaker of 160MVA T/F-II did not trip, and the load current to the tune of 0.24 A continued to flow on HV side of 160MVA T/F II, LBB protection for 220kV side CB operated resulting tripping of all elements of 220kV Bus B.
- Following elements connected to 220kV bus-B tripped:

Bay-1 (220kV Bus Coupler), Bay-2 (220kV TBC), Bay-3 (220kV Amroha Line), Bay-4 (220kV Sambhal Line), Bay-6 (160MVA T/F-II), Bay-8 (160MVA T/F-I), Bay-10(500MVA ICT-II LV Side)

# DR of 132kV Gulabbari line





# DR of 160MVA II

Wavewin-SE H.P.10

Files Data Channels View Values Window Help

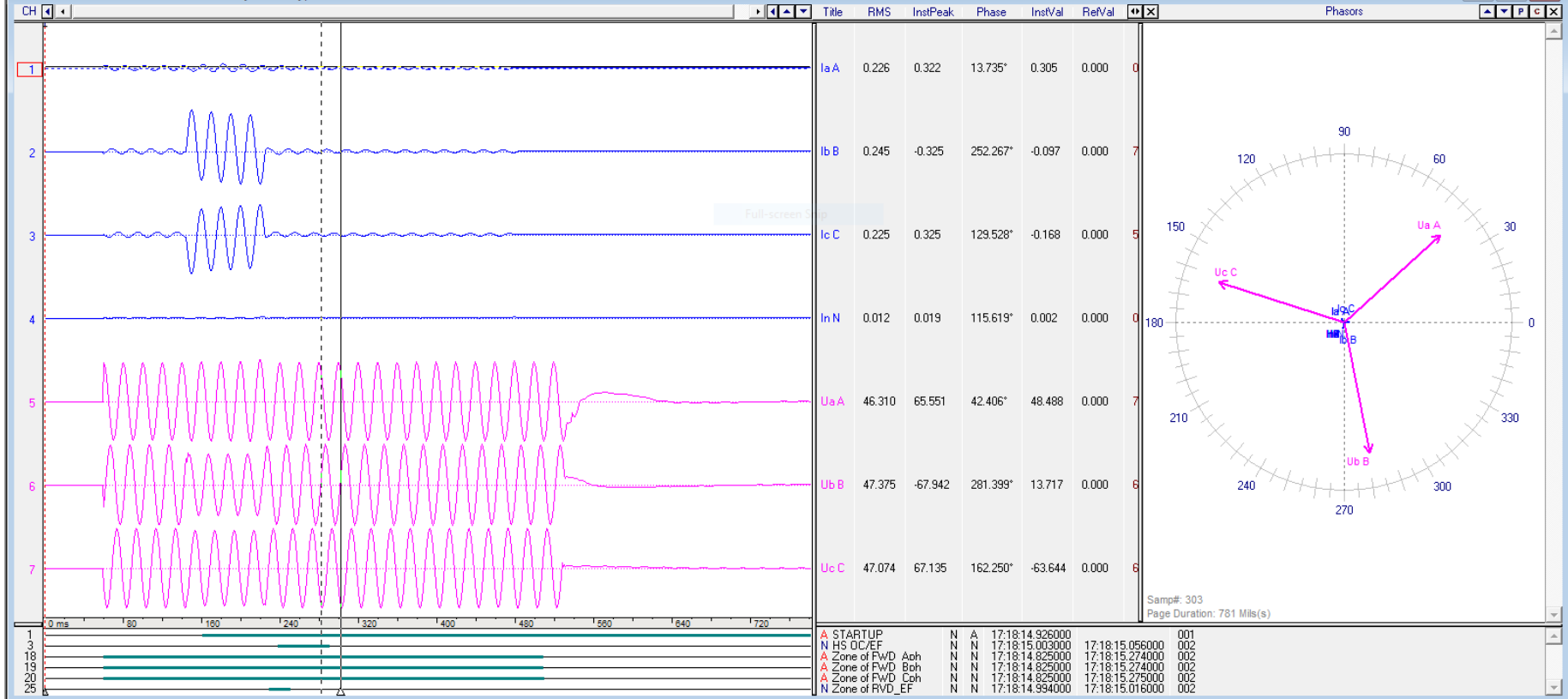
Exit System Back Files

Data: [Icons]

Abort

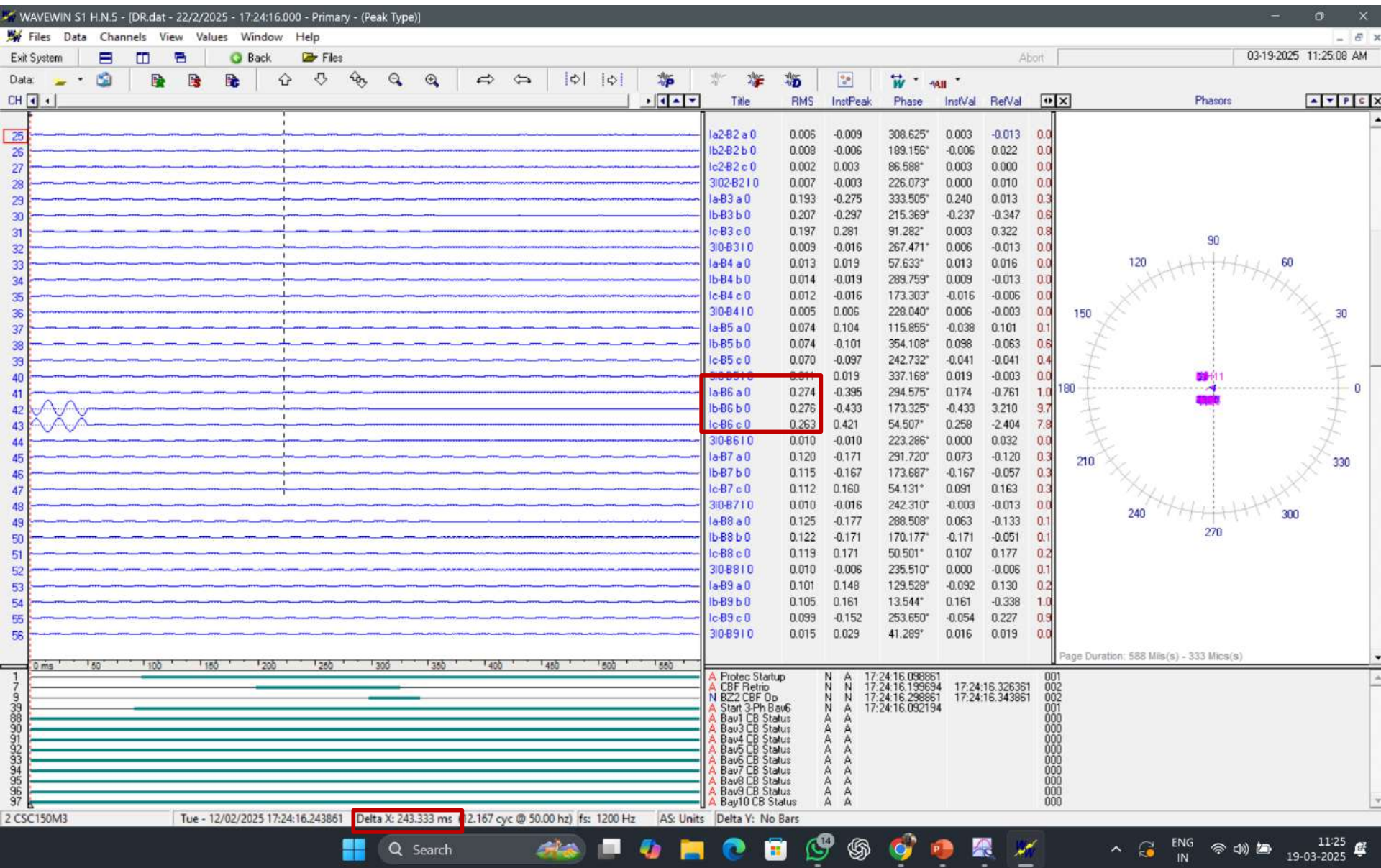
03-21-2025 11:10:38 AM

DR.DAT - 02.22.25 - 17:18:14.805 - Primary - (Peak Type)



DEFAULT FAULT DEFAULT SUBSTATION - 01/00/0 17:18:15.067000 Delta X: 302.000 ms (15.100 cyc @ 50.0 fs: 1000 Hz AS: Units Delta Y: 0.305 A

Busbar DR



## **REASON OF NON OPERATION OF T/F BREAKER :**

- HV Trip Circuit Control Cable of 160MVA T/F-II found damaged, due to which Transformer breaker did not operate.

## **REMEDIAL ACTION TAKEN:**

- Damaged Trip Ckt. Control Cable replaced with New Cable.

## **CONCLUSION**

- To avoid such type of incident in future regular checking and healthiness of protection need to be ensured. Also, any trip circuit faulty alarm should be attended promptly.

**“Thank You”**



# Multiple element tripping event at 400/220kV Daulatabad(HR)

At 08:11 hrs on 27.02.2025

## Tripped Elements

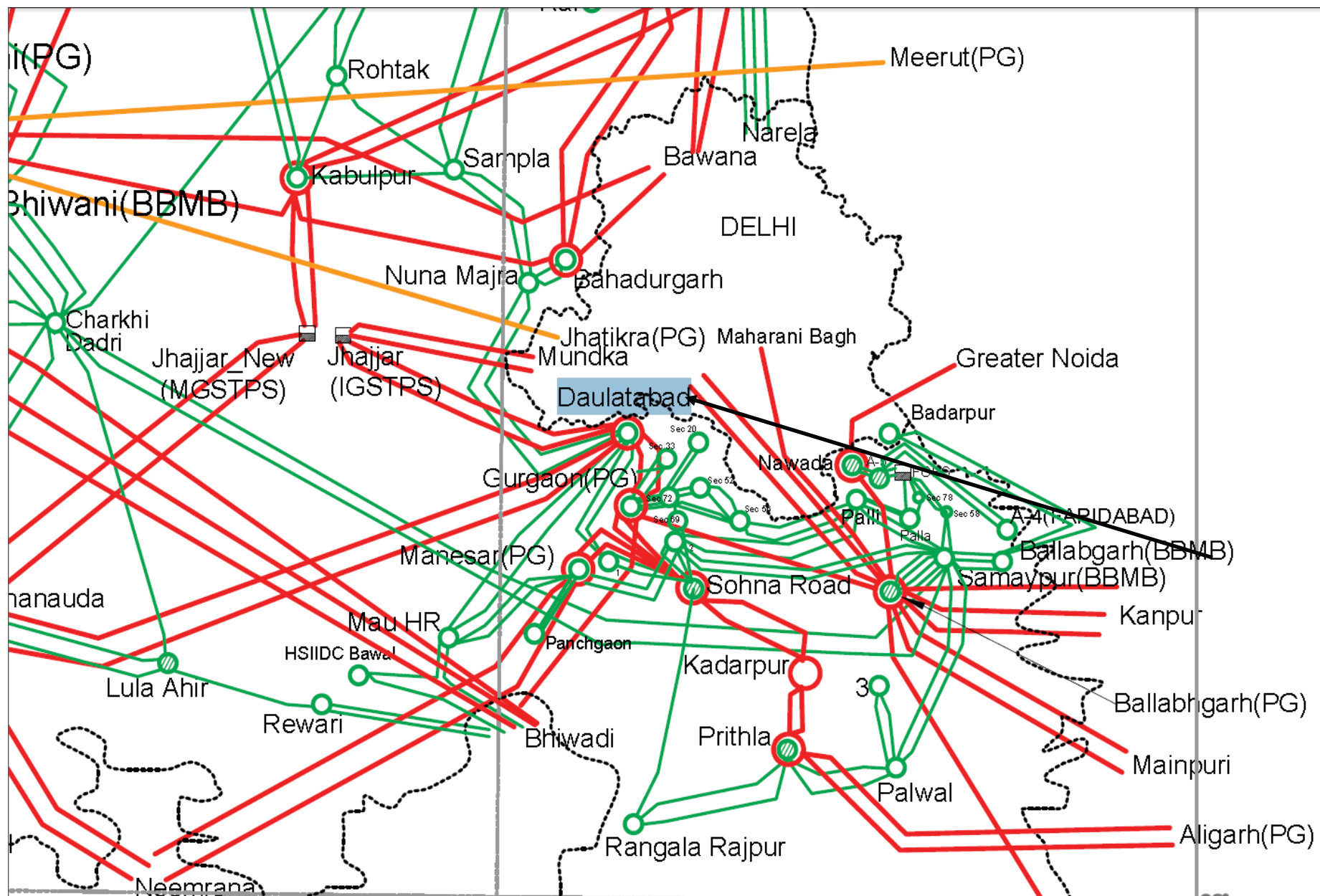
S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2	08:11 hrs	18:06 hrs	B-N phase to earth fault.
2.	400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1		09:36 hrs	Lines tripped from remote end in Z-2
3.	400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-2		09:37 hrs	
4.	400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1		18:36 hrs	
5.	400 KV DAULATABAD-DHANONDA (HV) CKT-1		08:20 hrs	
6.	400 KV DAULATABAD-DHANONDA (HV) CKT-2		08:21 hrs	
7.	400/220 KV 315 MVA ICT 1 AT DAULATABAD(HV)		09:38 hrs	ICTs tripped on operation of non-directional O/C E/F protection operation
8.	400/220 KV 315 MVA ICT 2 AT DAULATABAD(HV)		09:36 hrs	
9.	400/220 KV 315 MVA ICT 3 AT DAULATABAD(HV)		09:36 hrs	
10.	400/220 KV 315 MVA ICT 4 AT DAULATABAD(HV)		09:37 hrs	

## **Brief details of the event**

- i) 400kV Daulatabad(HV) has one and half breaker bus scheme in 400KV and double main bus transfer for 220KV system.
- ii) During the antecedent condition, 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1&2, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1 & 2 and 400kV DAULTABAD-DHANONDA CKT-1&2 were carrying 228MW (each circuit), 353MW (each circuit) and 138MW (each circuit) respectively.
- iii) As reported, at 08:11hrs, B-N fault occurred on 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2. On this fault, line successfully autoreclosed from Gurgaon(PG) end but CB at Daulatabad end failed to open. During patrolling, flag was found wrapped on phase conductor at tower location no. 54-55.
- iv) During inspection, both trip coils of 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-2 at Daulatabad end were found burnt.
- v) As CB at Daulatabad end failed to open, LBB of Gurgaon Bay should have operated. However, LBB protection also didn't operate. During the inspection, it was found that bus bar relay was in error mode.
- vi) Further, all the 400kV lines i.e., 400 KV GURGAON(PG)-DAULATABAD(HV) (HV) CKT-1, 400 KV JHAJJAR(APCL)-DAULATABAD(HV) (HV) CKT-1 & 2 and 400kV DAULTABAD-DHANONDA CKT-1&2 tripped on operation of distance protection in Z-2.
- vii) Further, 400/220kV 315MVA ICT-1,2,3&4 at Daulatabad(HR) tripped on operation of non-directional O/C E/F protection operation and fault got cleared. Tripping of all the elements led to blackout of the 400/220kV Daulatabad(HR) S/s.
- viii) As per PMU at Gurgaon(PG), B-N phase to earth fault with delayed clearance of ~1080 msec is observed.
- ix) As per SCADA, change in demand of approx. 414MW is observed in Haryana control area.
- x) As reported, fault trip coils have been replaced and bus bar relay was reboot. Bus bar relay is working properly however it has been kept under observation and feedback has been given to relay OEM for review of relay.

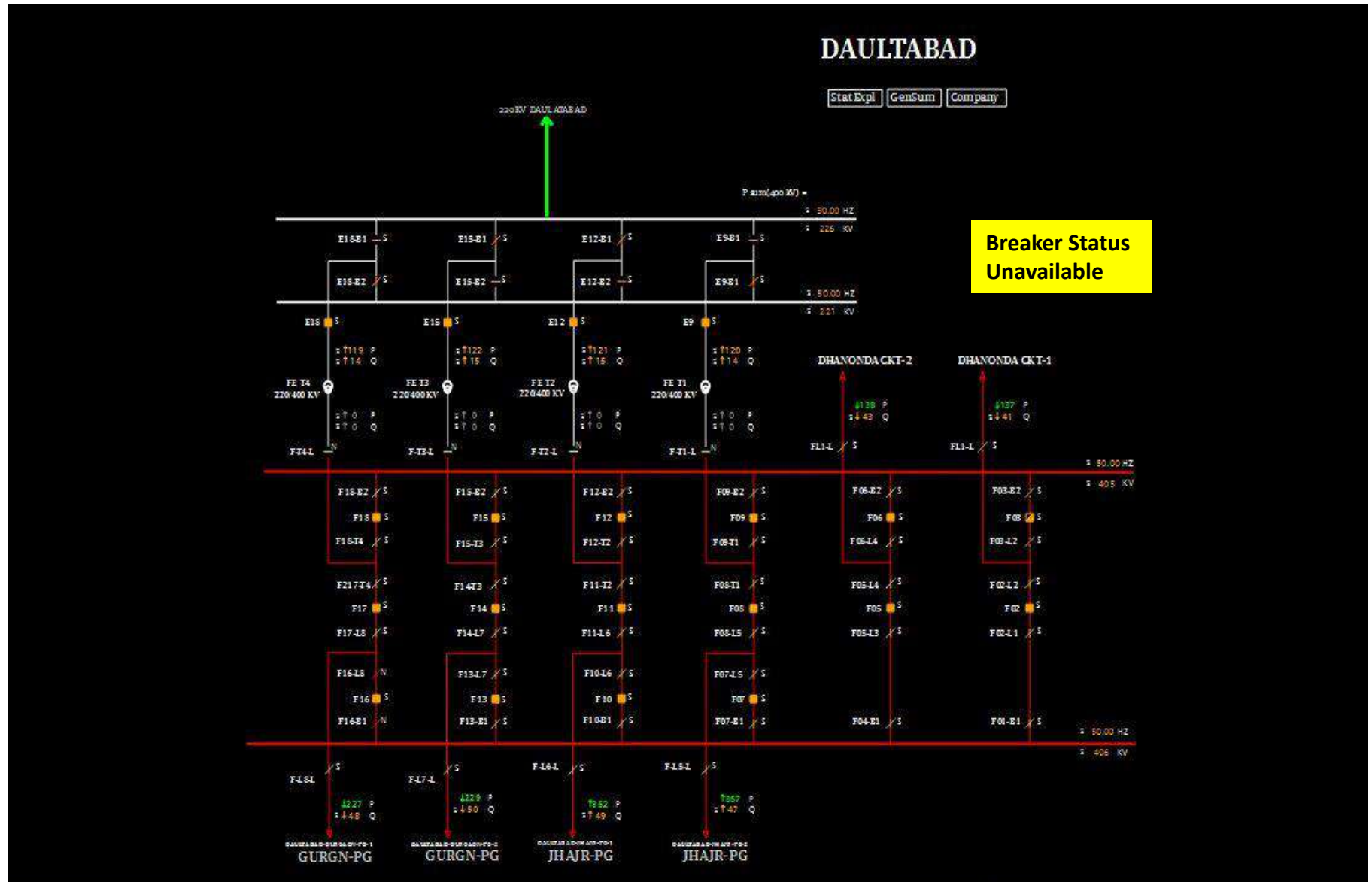


# Network Diagram

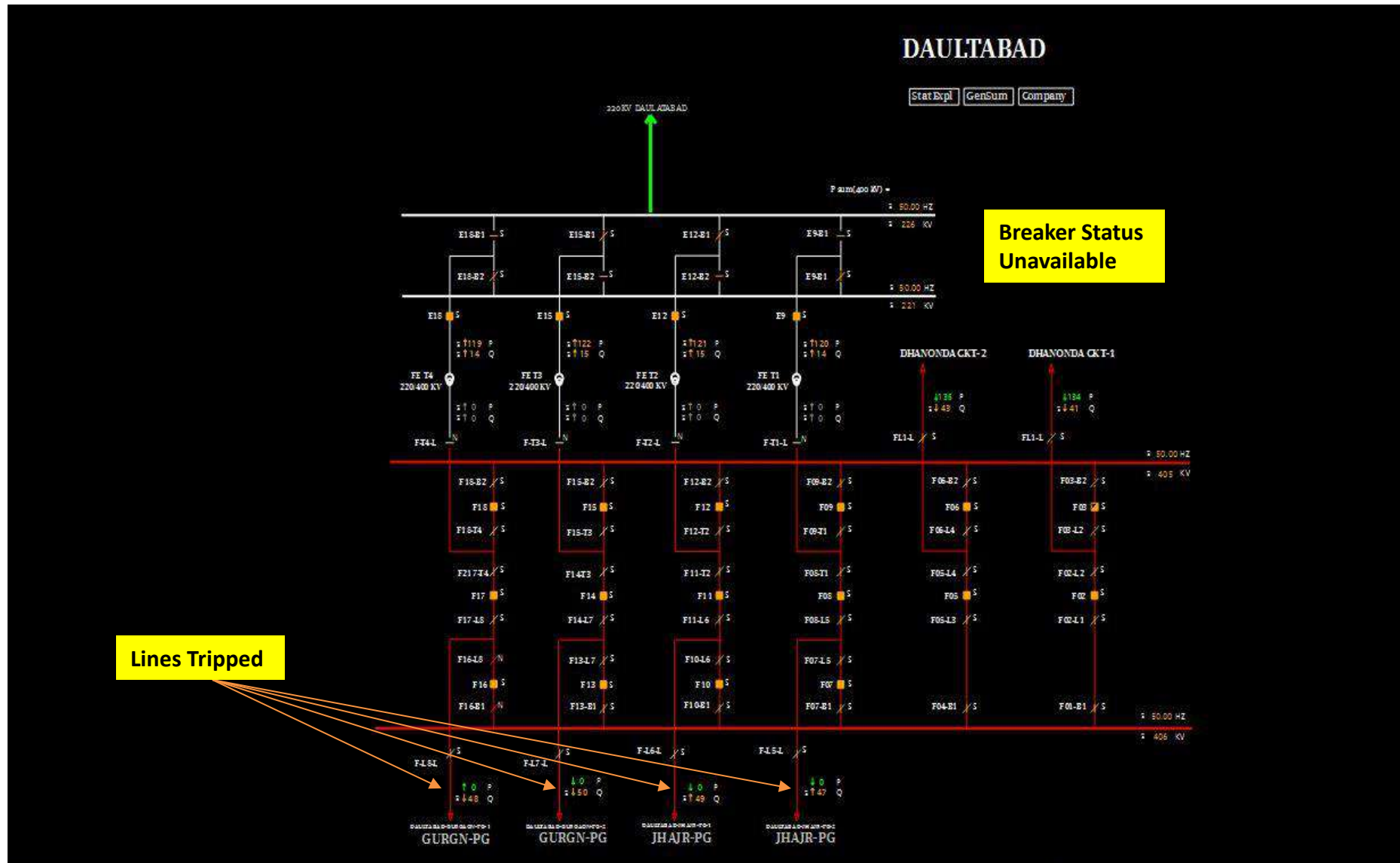




# SLD of 400kV Daulatabad(HV) before the event



# SLD of 400kV Daulatabad(HV) after the event



# SLD of 400/220kV Gurgaon(POWERGRID) before the event

## CONTACT DETAILS

EMAIL: glsggn@powergrid.co.in

MOBILE: 9667322400

HOTLINE: 20112351 / 20112179

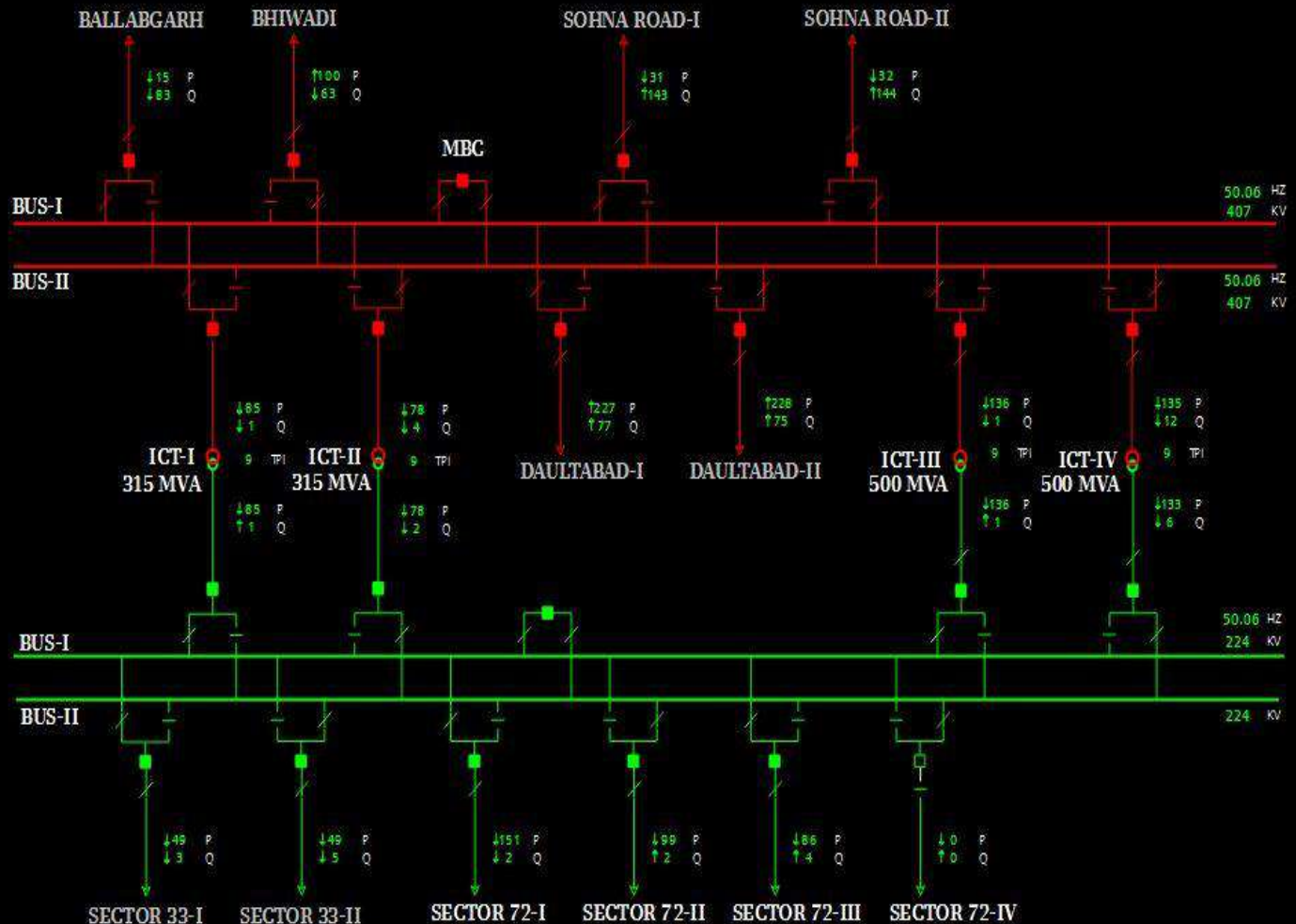
P sum(400 kV) = 3  
P sum(220 kV) = -4

## GURGAON-PG(GIS)

Stat Expl GenSum Company

27.2.25 8:11:30

Q sum(400 kV) = 2  
Q sum(220 kV) = -5



# SLD of 400/220kV Gurgaon(POWERGRID) after the event

## CONTACT DETAILS

EMAIL	glsggn@powergrid.co.in
MOBILE	9667322400
HOTLINE	20112351 / 20112179

P sum(400 kV) = 2  
P sum(220 kV) = -4

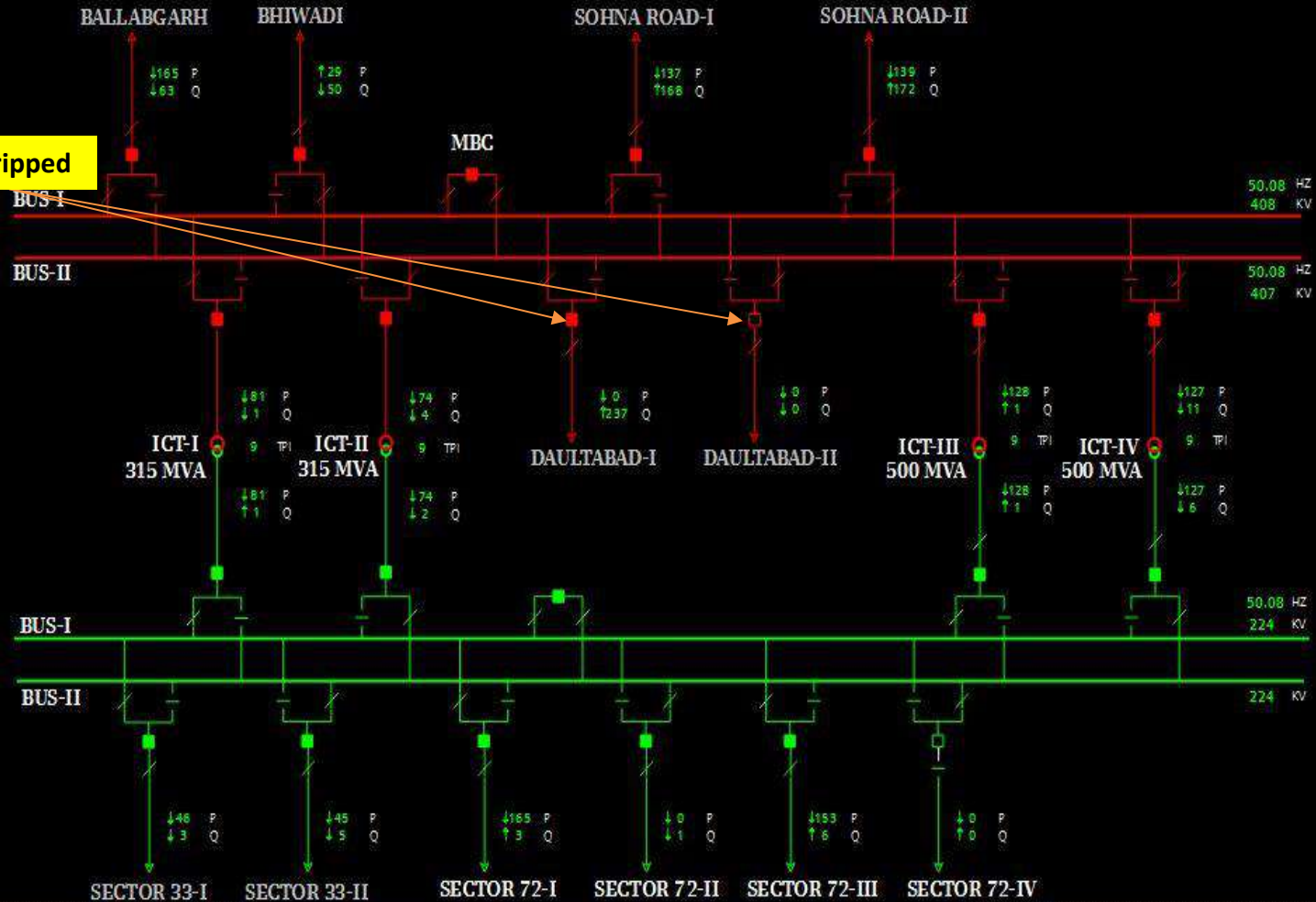
## GURGAON-PG(GIS)

Stat Expl GenSum Company

27.2.25 8:12:30

Q sum(400 kV) = 3  
Q sum(220 kV) = -3

Lines Tripped



# SLD of 400/220kV Jhajjar(APCPL) before the event

CONTACT DETAILS	
EMAIL	igstpp.jhajjar.sce@gmail.com
MOBILE	9996412330
HOTLINE	20112488

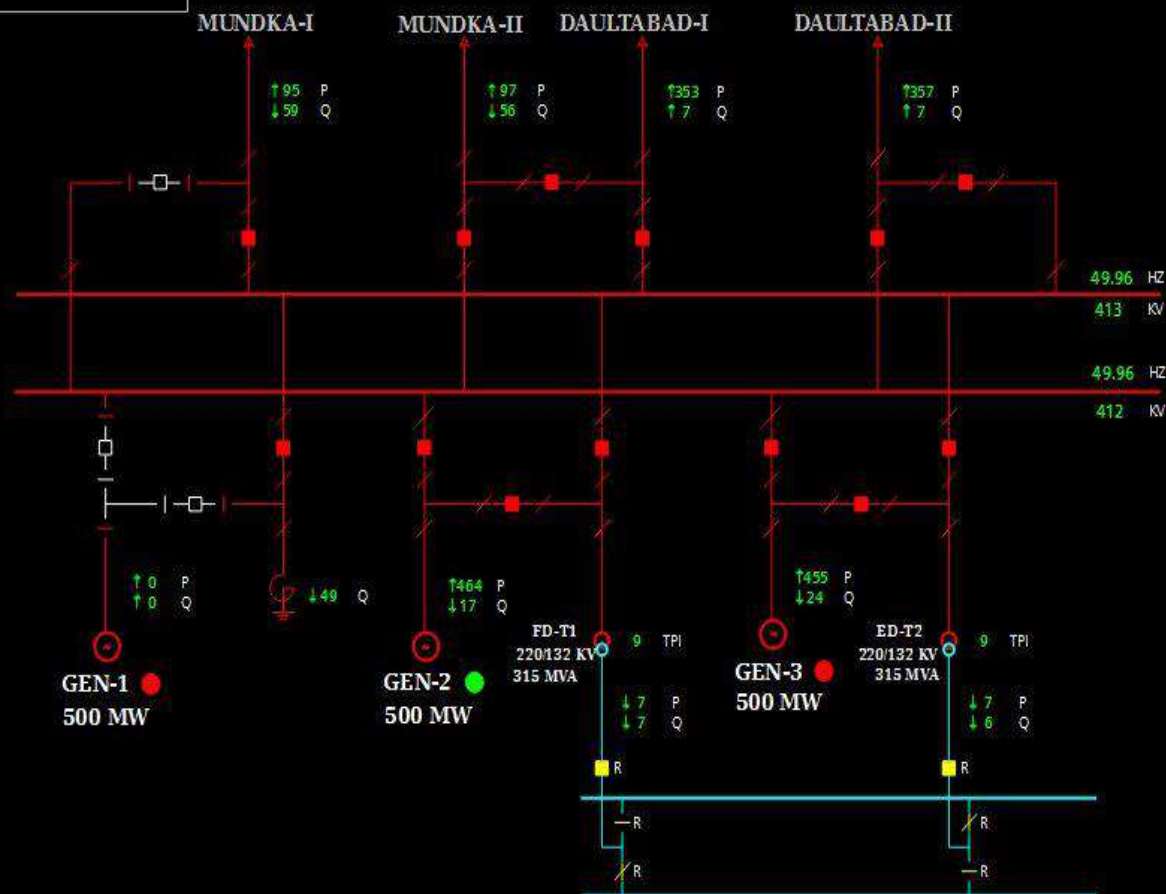
P sum (400 kV) = -2  
Q sum (400 kV) = 3

## JHAJJAR

Stat Expl GenSum Company

27.2 .25 8 :11 :30

PL = 919  
SENT = 903





# SLD of 400/220kV Jhajjar(APCPL) after the event

CONTACT DETAILS	
EMAIL	igstr Lines Tripped om
MOBILE	9996412330
HOTLINE	20112488

P sum(400 kV) = -4

Q sum(400 kV) = -1

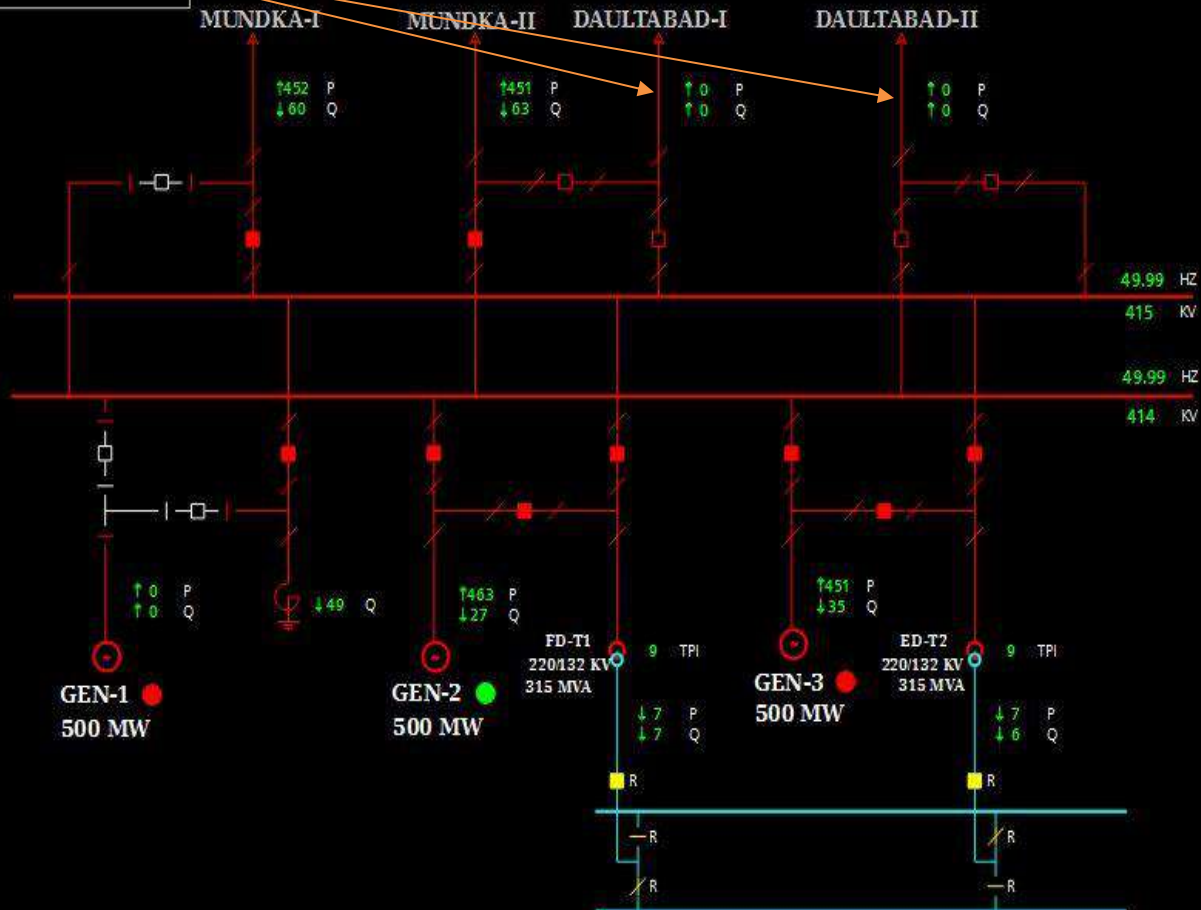
## JHAJJAR

Stat Expl GenSum Company

PL = 916

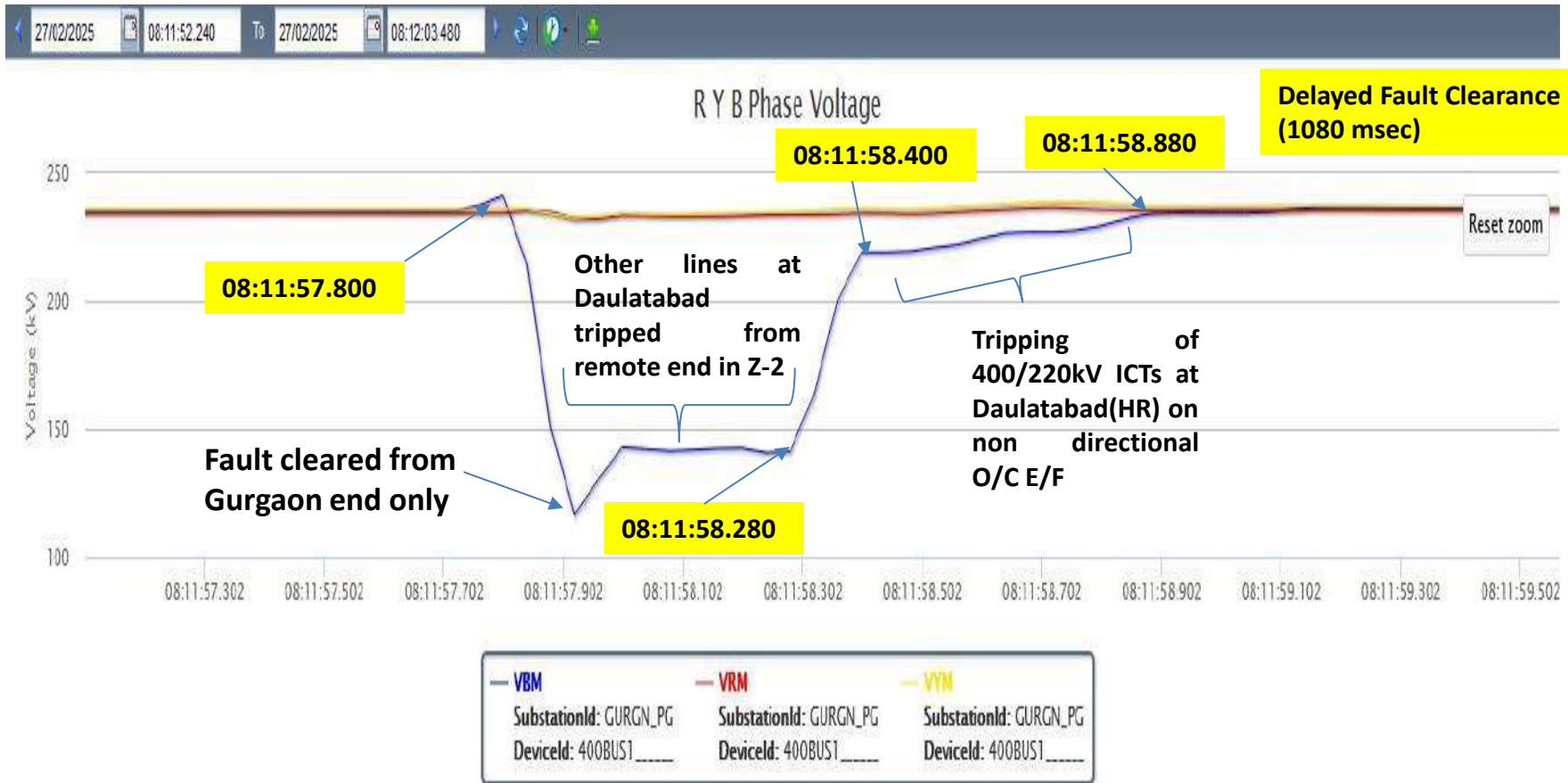
SENT = 900

27.2 .25 8 :12 :30



# PMU Plot of phase voltage magnitude at Gurgaon(PGCIL)

08:11hrs/27-Feb-25



R Y B Phase Voltages Angles

✓ B-N phase to earth fault is observed with delayed fault clearance of 1080ms.

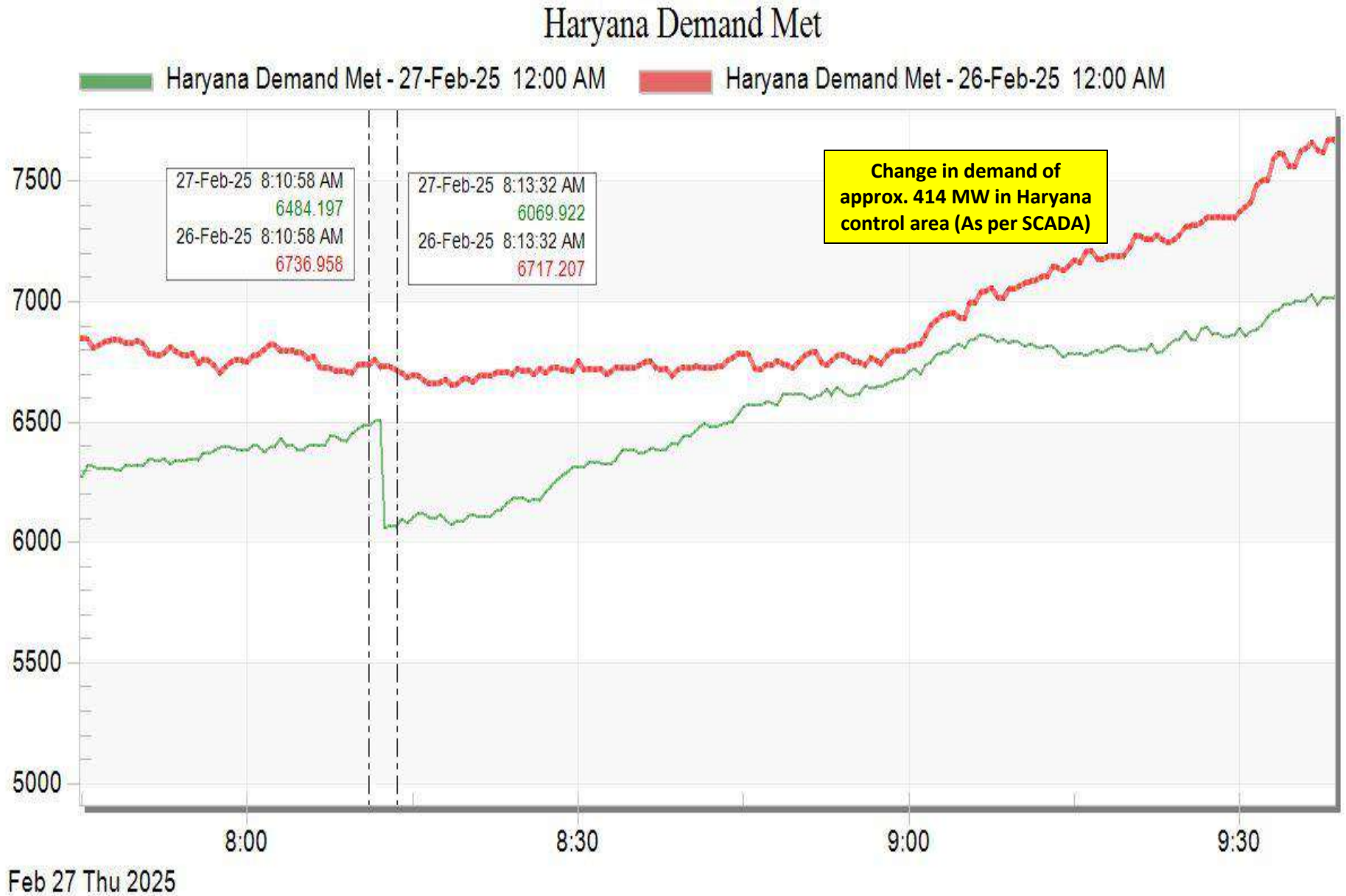
# PMU Plot of frequency at Gurgaon(PGCIL)

02:40hrs/28-Feb-25





# Haryana demand during the event



# SCADA SOE

Time	Station Name	Voltage	Element Name	Element Type	Element Status	Remarks
08:11:58,162	GURGAON	400kV	08DLTBD1	Circuit Breaker	disturbe	
08:11:58,354	GURGAON	400kV	09DLTBD2	Circuit Breaker	Open	Tripping of Main CB of 400 KV Gurgaon(PG)-Daulatabad(HV) (HV) Ckt-1
08:11:58,406	JHAJJAR	400kV	16DLTBD2	Circuit Breaker	Open	Tripping of Main CB of 400 KV Jhajjar(APCL)-Daulatabad(HV) (HV) Ckt-2
08:11:58,412	JHAJJAR	400kV	17DL2TIE	Circuit Breaker	Open	
08:11:58,476	JHAJJAR	400kV	8DLT1MU2	Circuit Breaker	Open	
08:11:58,476	JHAJJAR	400kV	9DLTBD1	Circuit Breaker	Open	Tripping of Main CB of 400 KV Jhajjar(APCL)-Daulatabad(HV) (HV) Ckt-1
08:11:59,179	GURGAON	400kV	08DLTBD1	Circuit Breaker	Close	

## **Points for Discussion**

- i) DR(.dat/.cfg) files of all the tripped elements (from both the ends) need to be shared.
- ii) SCADA data of 400/220 ICTs and all the 400KV Circuit Breakers were unavailable during the event. Availability and healthiness of SCADA data need to be ensured.
- iii) Why was fault in the trip coil and bus bar relay not attended on time? Issue with the bus bar relay need to be rectified at the earliest.
- iv) Remedial action taken report to be shared.

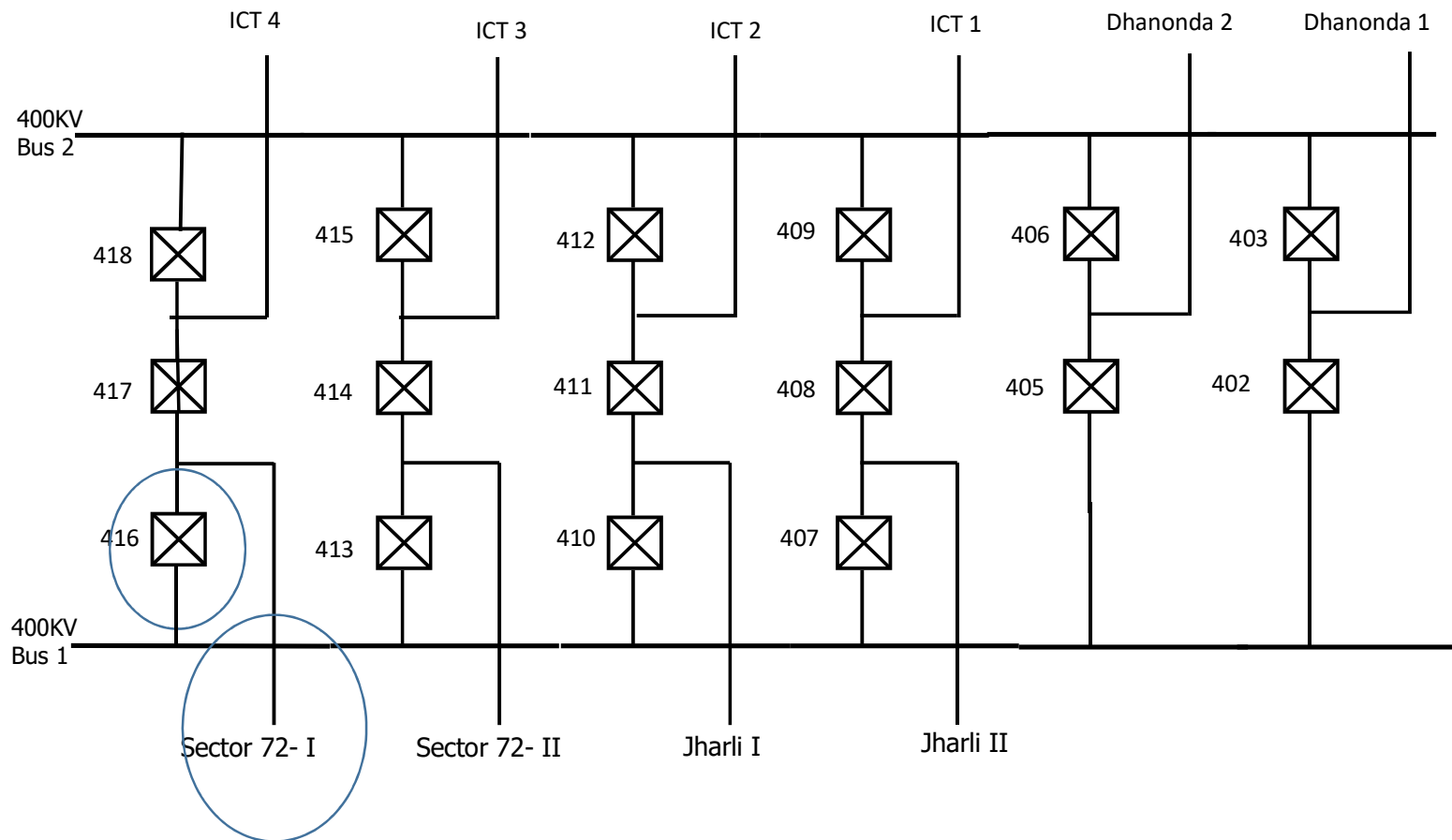
**Tripping report/analysis in respect of disturbance occurred on 27.02.2025 at 08:11 Hrs. at 400 KV Sub Station, HVPNL Daultabad.**

**1. Description of Disturbance**

At 08.11 Hrs on dated 27.02.2025, following transmission elements were tripped at 400 kV sub-station, HVPNL, Daultabad :

Sr. No.	Name of Element	Line length	Time of Tripping (Hrs)		Relay Operated	
			From	To	This end	Other End
1.	400 kV Daultabad-Sector 72 (PG) Ckt-1	20.6	Not tripped (08:11Hrs)	-	DPR Zone-1, Distance= invalid, Ia=290A Ib=1.6 kA Ic=17.34 kA.	DPR Main-1, Zone-1, Distance=14.9KM, Current Ic=10.96KA DPR Main-2, Zone 1, Distance=15.6KM, Current Ic= 11.5KA AR operated
2.	400 kV Daultabad-Sector 72 (PG) Ckt-2	20.6	08.11 Hrs	18:06Hrs	DT Trip, Main-2 <b>pick-up only</b> in Ph L3 REV with Ia=400A, Ib=143A, Ic=3930A, Va=213 kV, Vb=208 kV, Vc=145 kV	DPR Main-1, Zone-2 Distance=27.9 KM, Phase C, Current=9.8 kA
3.	400/220 kV ICT-1	-	08:11 Hrs	9:38 Hrs	HV & LV OC+E/F Trip	-
4.	400/220 kV ICT-2	-	08:11 Hrs	9:36 Hrs	HV & LV OC+E/F Trip	-
5.	400/220 kV ICT-3	-	08:11 Hrs	09:36 Hrs	HV & LV OC+E/F Trip	-
6.	400/220 kV ICT-4	-	08:11 Hrs	09:36 Hrs	HV OC+E/F Trip	-

## 2. SLD of 400 kV Sub-station Daultabad:



### 3. Sequence of Events:

Time of event	400kV Daultabad-Sec 72 ckt-1
08:11:57.882 Hrs	<p>At Daultabad end; DPR sensed B-phase to earth fault but CB didn't trip due to contactor brunt, At PGCIL Sector 72 end; C-ph tripped, AR operated and line reclosed after AR dead time of 1 Sec &amp; remains charged from Sector 72 PG end.</p> <p>As per Main-1 relay : 08.11:57.882 hrs 21 pick up CG 14msec 21 Trip only C phase 214msec 79 start signal time expired 219msec 21 Trip 3 phase</p> <p>08.11:58.148hrs Tie CB open</p> <p>As per BCU: 08.11:58.112hrs Group1 Trip relay optd 08.11:58.117hrs Group2 Trip relay optd 08.11:58.153hrs Tie CB open</p>
	<b>400kV Daultabad-Sec 72 ckt-2</b>
08.11:58.362 Hrs	<p>At 08:11:57.881, 400kV Daultabad-Sec 72 ckt-2 Main-2 <b>pick-up only</b> in Ph L3 REV with Ia=400A, Ib=143A, Ic=3930A, Va=213 kV, Vb=208 kV, Vc=145 kV.</p> <p>As per Main-1 relay : 08.11:58.368hrs DT Receive 08.11:58.384hrs 3-phase trip Relay opted 08.11:58.414hrs Main CB open</p> <p>As per Main-2 relay : 08.11:58.362hrs DT Receive 08.11:58.374hrs 3-phase trip Relay opted 08.11:58.411hrs Main CB open</p> <p>As per BCU: <b>08.11:58.416hrs Main CB open</b> <b>08.11:58.430hrs Tie CB open</b></p>
08.11:57.839 Hrs	<p><b>315 MVA, 400/220 kV ICT-1</b> tripped on O/C+E/F protection.</p> <p>As per HV OC E/F Relay: 08.11:57.842hrs Relay Pick up 916msec 50N/51N Trip</p> <p>As per LV OC E/F Relay: 08.11:57.839hrs Relay Pick up 877msec 50N/51N Trip</p> <p>As per BCU: <b>08.11:58.778hrs Main(409) CB open</b></p>

	<b>08.11:58.787hrs Tie(408) CB open</b>
08.11:57.877hrs	<b>315 MVA, 400/220 kV ICT-2</b> tripped on O/C+E/F protection. As per HV OC E/F Relay: 08.11:xx.xxxhrs* Relay Pick up 898msec 50N/51N Trip <i>*Relay is not time sync.</i>  As per LV OC E/F Relay: 08.11:57.877 hrs Relay Pick up 887msec 50N/51N Trip  As per BCU: <b>08.11:58.824hrs Main(412) CB open</b> <b>08.11:58.820hrs Tie(411) CB open</b>
08.11:57.870hrs	<b>315 MVA, 400/220 kV ICT-3</b> tripped on O/C+E/F protection. As per HV OC E/F Relay: 08.11:57.870hrs Relay Pick up 912msec 50N/51N Trip  As per LV OC E/F Relay: 08.11:57.876hrs Relay Pick up 877msec 50N/51N Trip  As per BCU: <b>08.11:58.429hrs Tie(414) CB open</b> <b>08.11:58.811hrs Main(415) CB open</b>
08.11:57.875hrs	<b>315 MVA, 400/220 kV ICT-4</b> tripped on O/C+E/F protection. As per HV OC E/F Relay: 08.11:57.875hrs Relay Pick up 616msec 50N/51N Trip  As per LV OC E/F Relay: 08.11:57.875hrs Relay Pick up As per BCU: <b>08.11:58.555hrs Main(418) CB open</b> <b>08.11:58.156hrs Tie(417) CB open</b>

- i) DR/EL of the lines/TFs are attached in **Annexure-I**.

#### 4. Observation/Root Cause Analysis:

- i) 400kV Daultabad-Sec 72 ckt-1;  
At Daultabad end; DPR sensed B-phase to earth fault at 08:11:57.882 Hrs but CB didn't trip due to contactor brunt,  
At PGCIL Sector 72 end; C-ph tripped, AR operated and line reclosed after AR dead time of 1 Sec & remains charged from Sector 72 PG end.

**Reason of fault:** It was reported that a kite thread & flag cloth were wrapped on conductors during bad weather conditions (Rain) between TL no. 54 & 55 of 400kV Daultabad-Sec 72 ckt-1 & ckt-2. Initially fault developed in ckt-1 and got cleared from PG end with opening of C-phase but remains being fed from Daultabad end. During AR dead time period of 1 Sec, C-ph remains open from PG Sector 72 end but fault remains fed from Daultabad end till clearance from all other sources i.e. 400 kV Jharli ckt-1 & 2 (from remote end), 400 kV Dhanonda ckt-1 & 2 (from remote end), 400/220 kV ICT-1, 2, 3 & 4. LBB relay of 400kV Daultabad-Sec 72 ckt-1 didn't trip due to error in PU relay of Bus-bar protection relay.

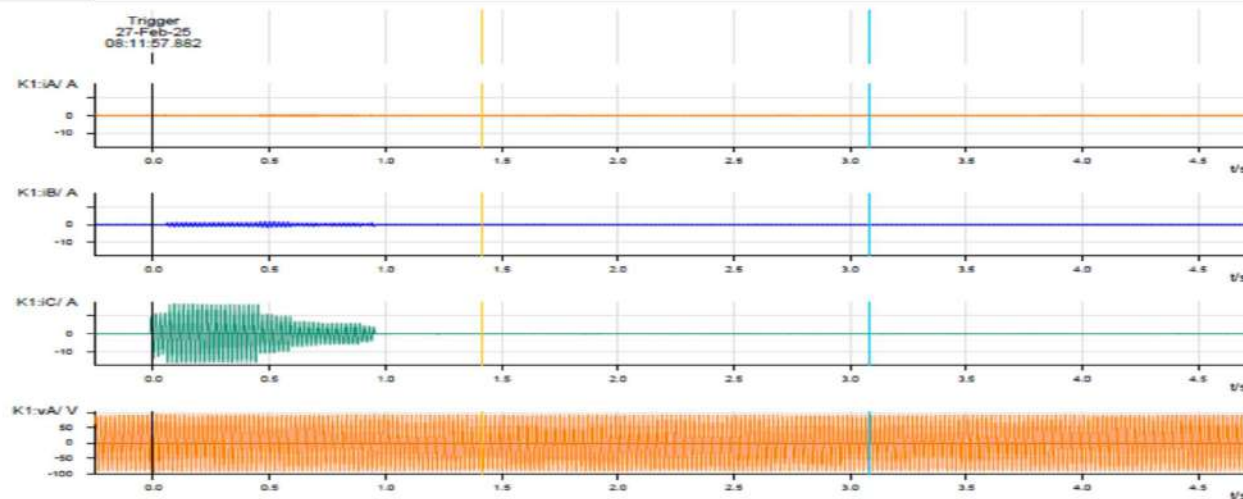
- ii) 400kV Daultabad-Sec 72 ckt-2;  
Ckt tripped at 08.11:58.362hrs on DT Receive.
- iii) 315 MVA, 400/220 kV ICT-1, 2, 3 & 4 tripped on operation of back-up O/C+E/F relay as fault gets fed from 220 kV side sources.





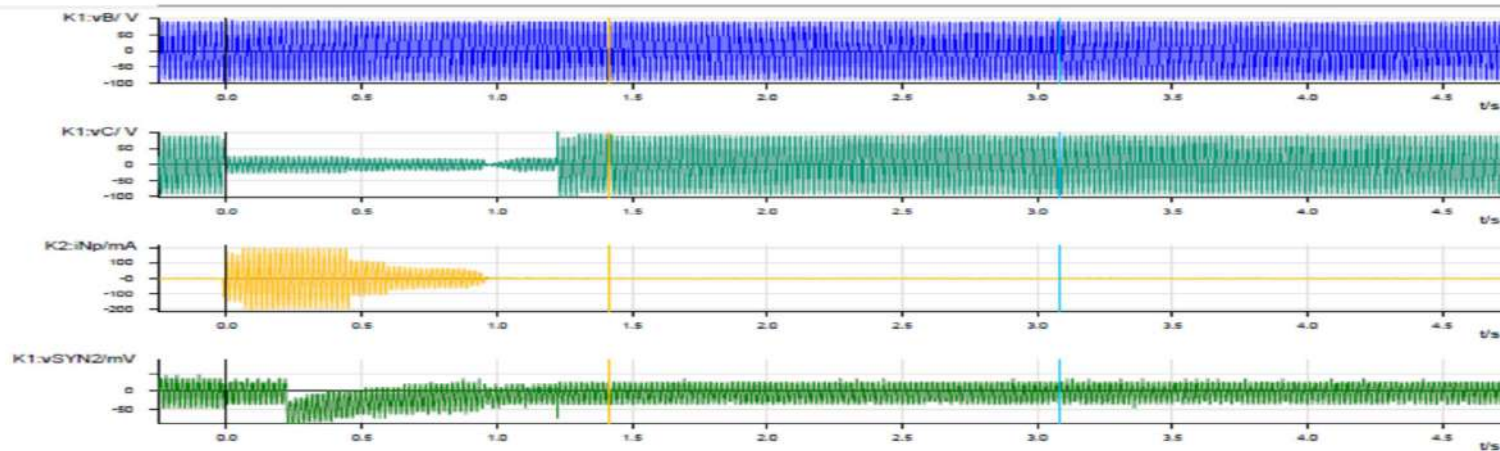
**5. Remedial Measures taken:**

- i) Tripping of 400 kV CB of Daultabad-Sector 72 PG Ckt-1 checked & made healthy after replacement of burnt contactor.
- ii) Healthiness of LBB relay (inbuilt in PU) in 400 kV Daultabad-Sector 72 PG Ckt-1 checked & PU relay rebooted & made healthy.

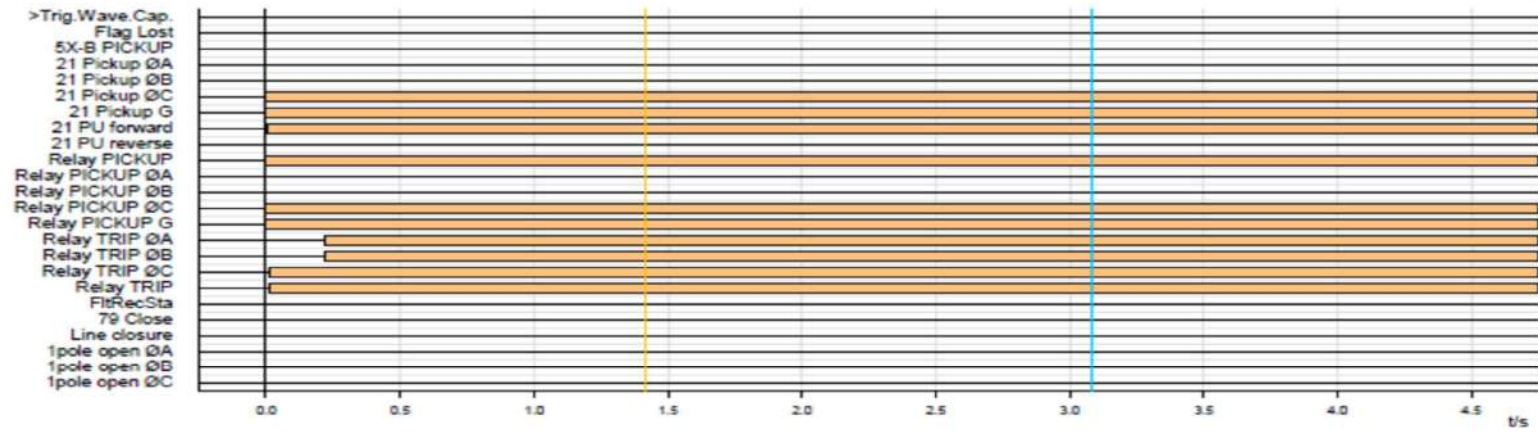


27-Feb-25 / 11:53:00

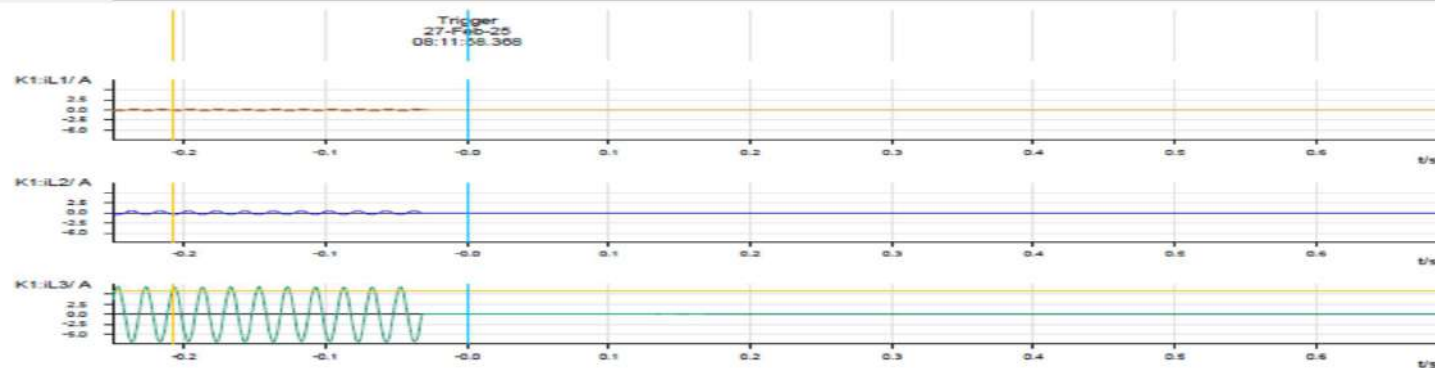
FR000024.CFG

27-Feb-25 / 11:53:00  
SIGRA 4.60

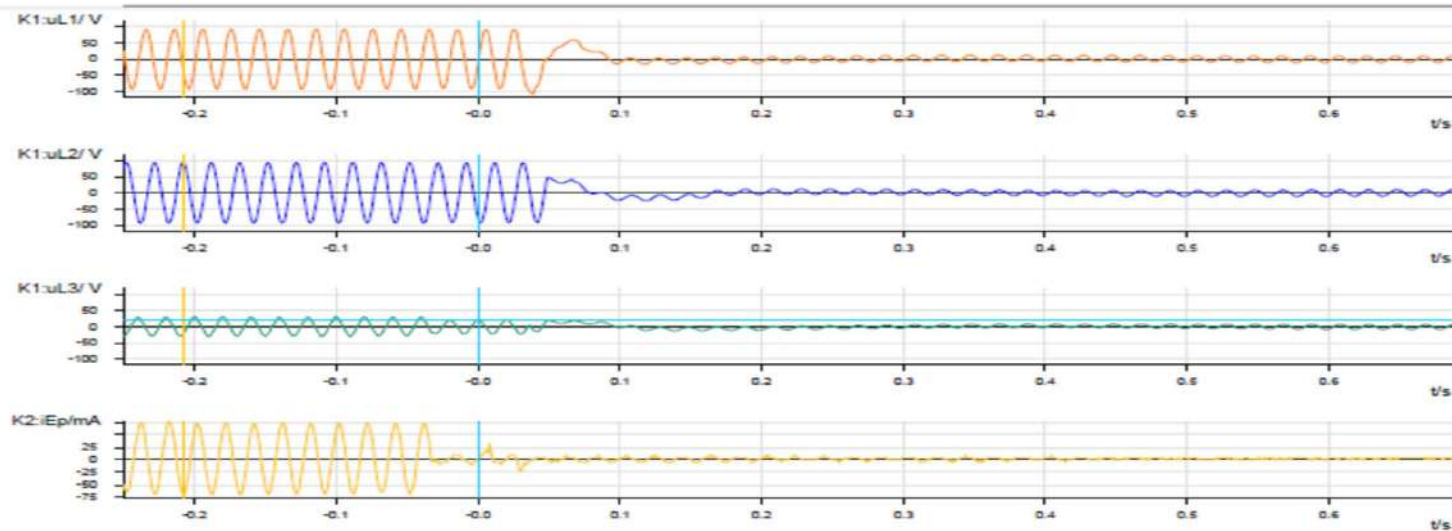
FR000024.CFG

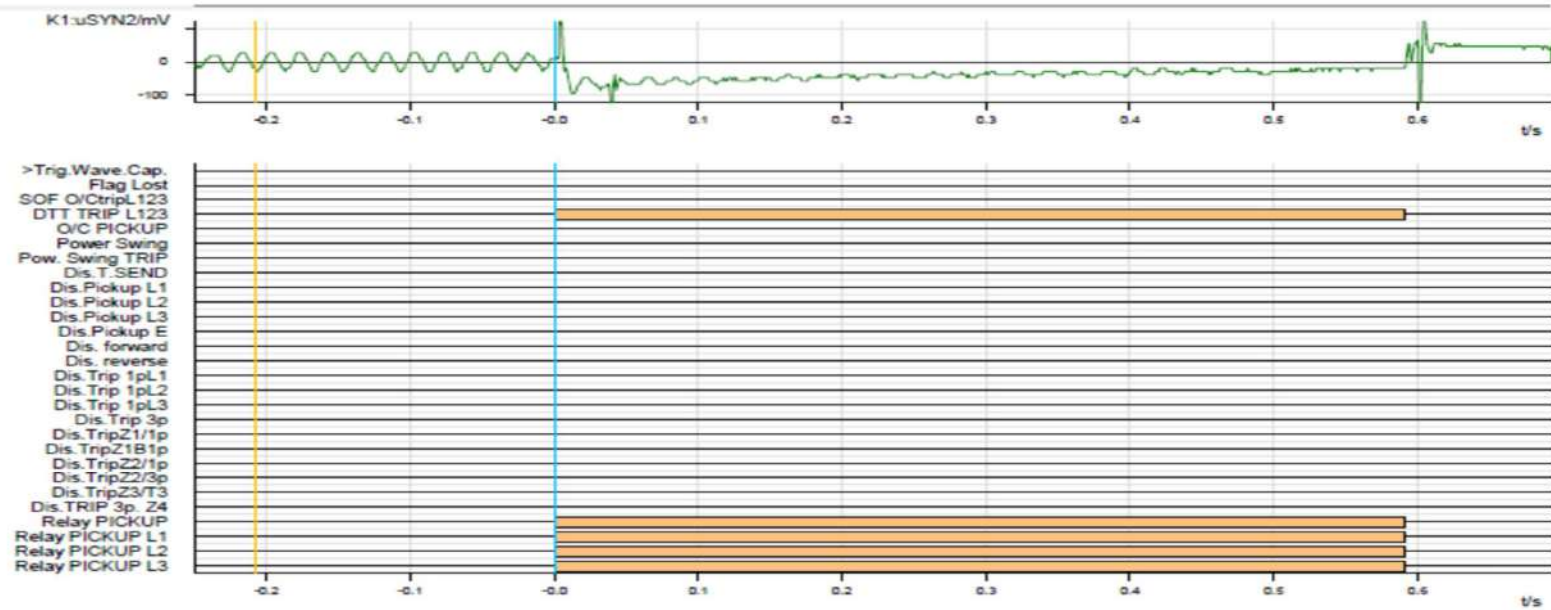


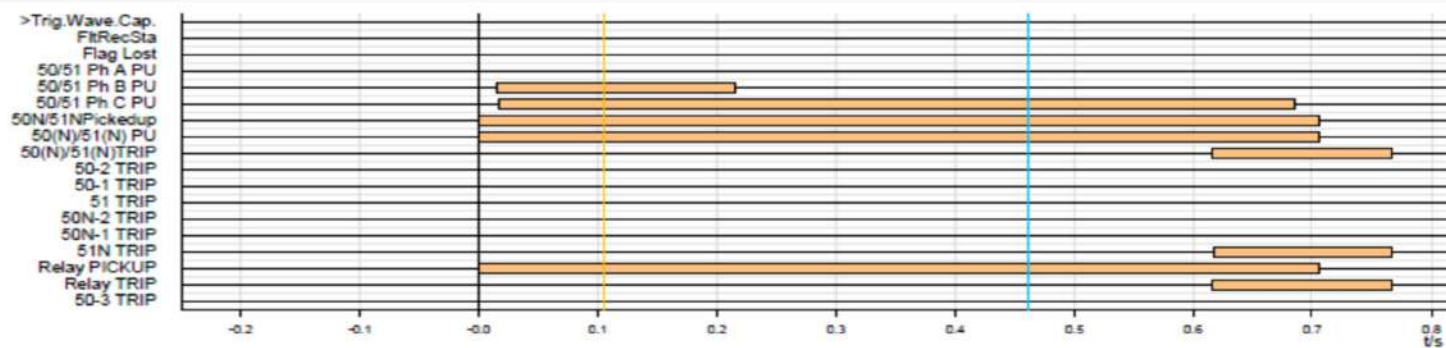
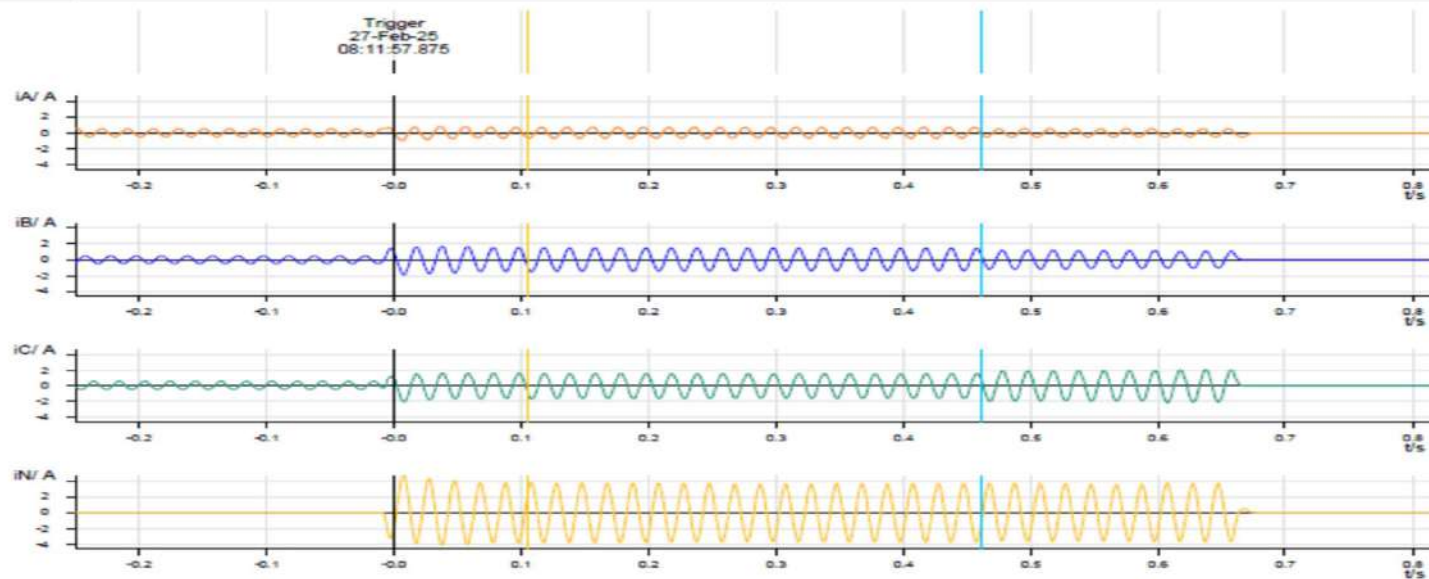
	Time in ms	Measuring Signal	Instantaneous	R.M.S.
Cursor 1:	-208.4	K1:IL3	5.9910 A	4.9176 A
Cursor 2:	0.0	K1:uL3	23.000 V	15.130 V
C2 - C1	208.4	K1:uL3 - K1:IL3		

27-Feb-25 / 11:39:42  
SIGMA 4.60

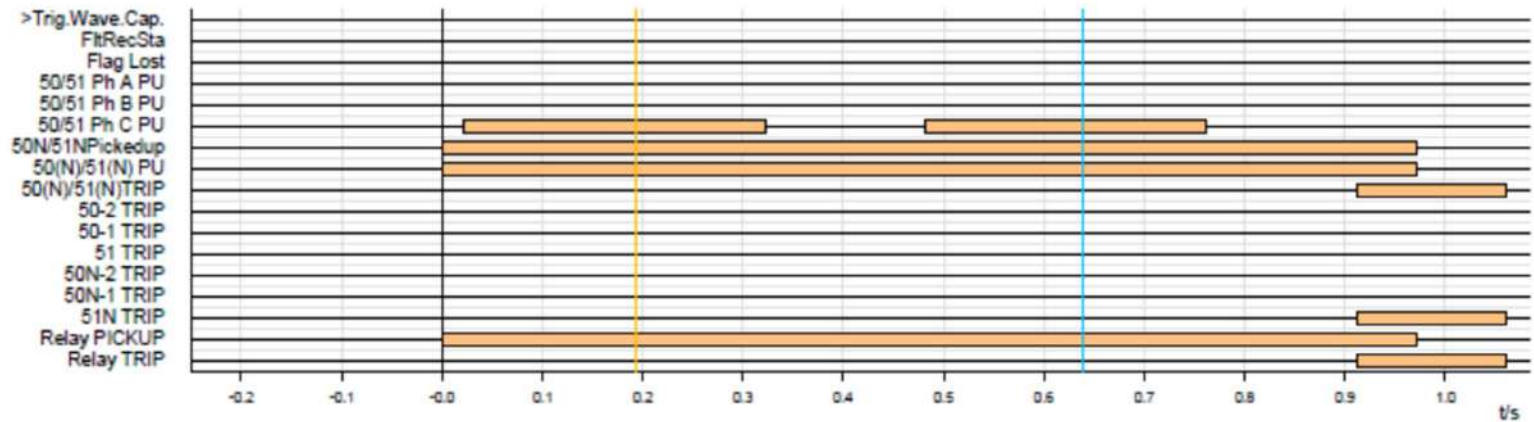
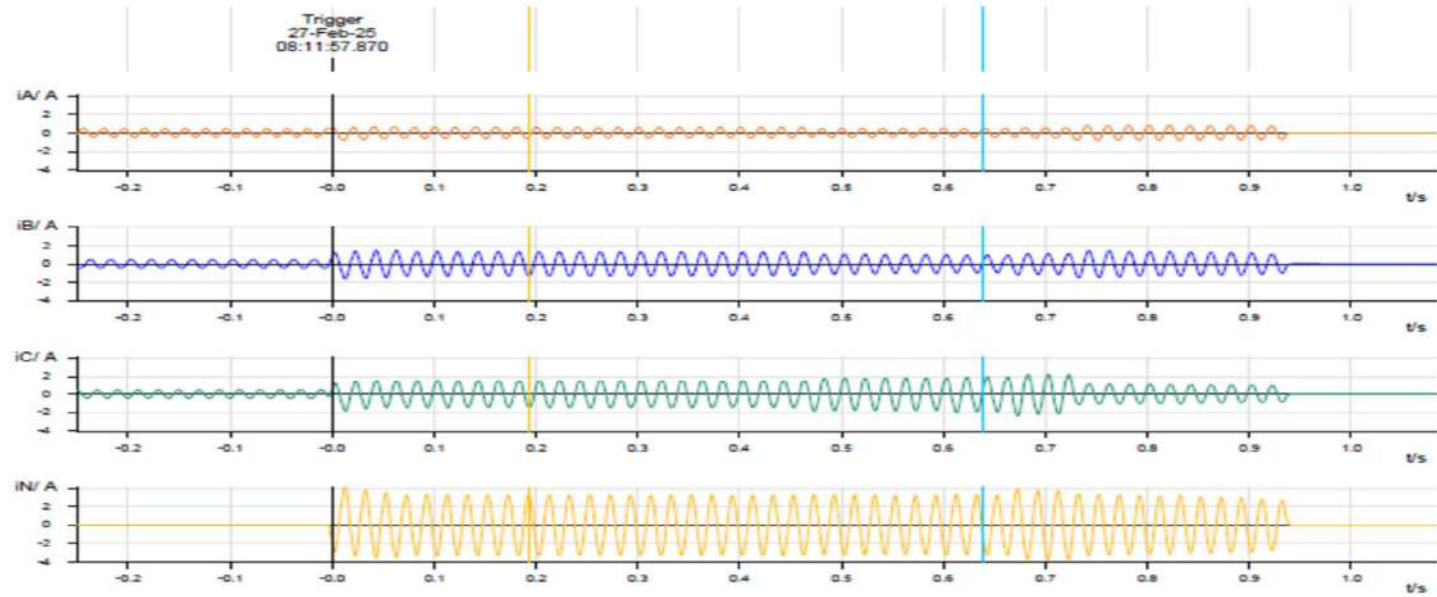
PR000022.CFG

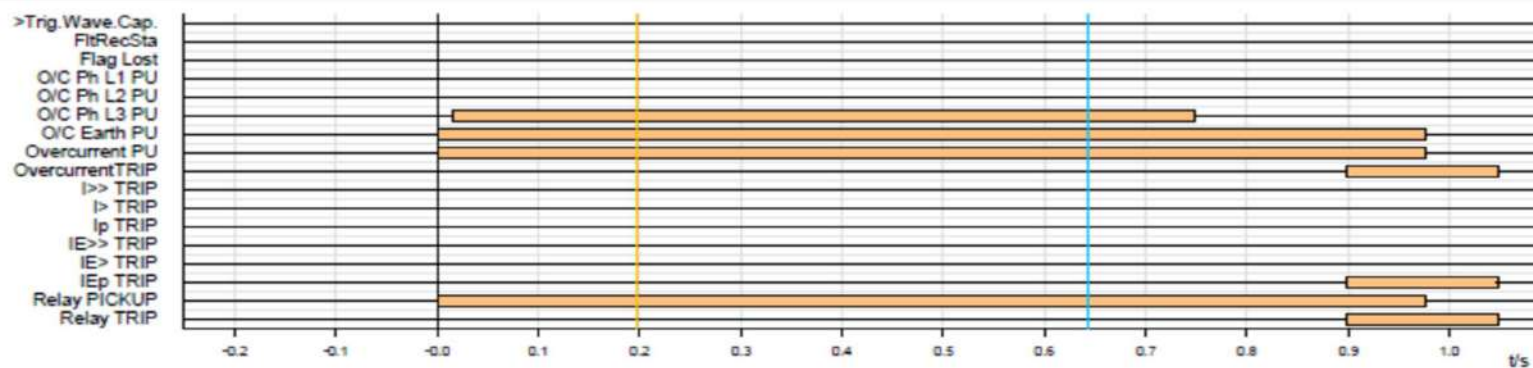
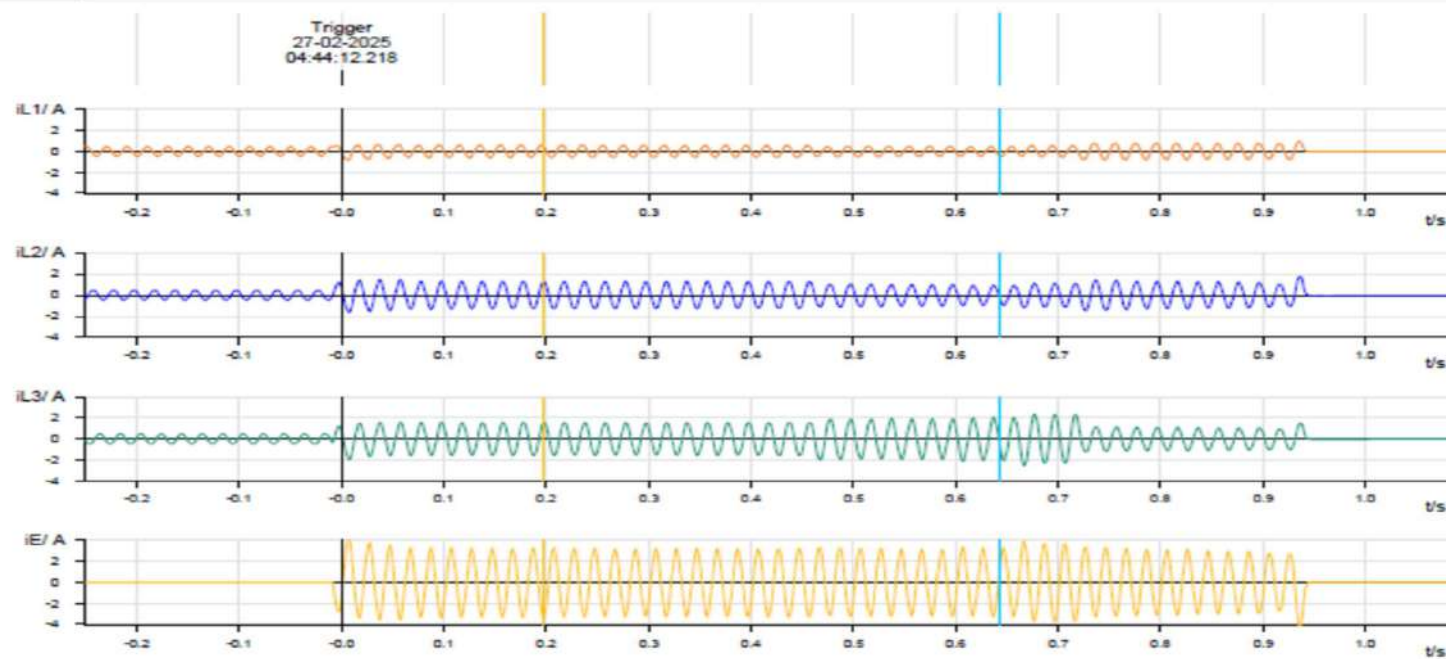




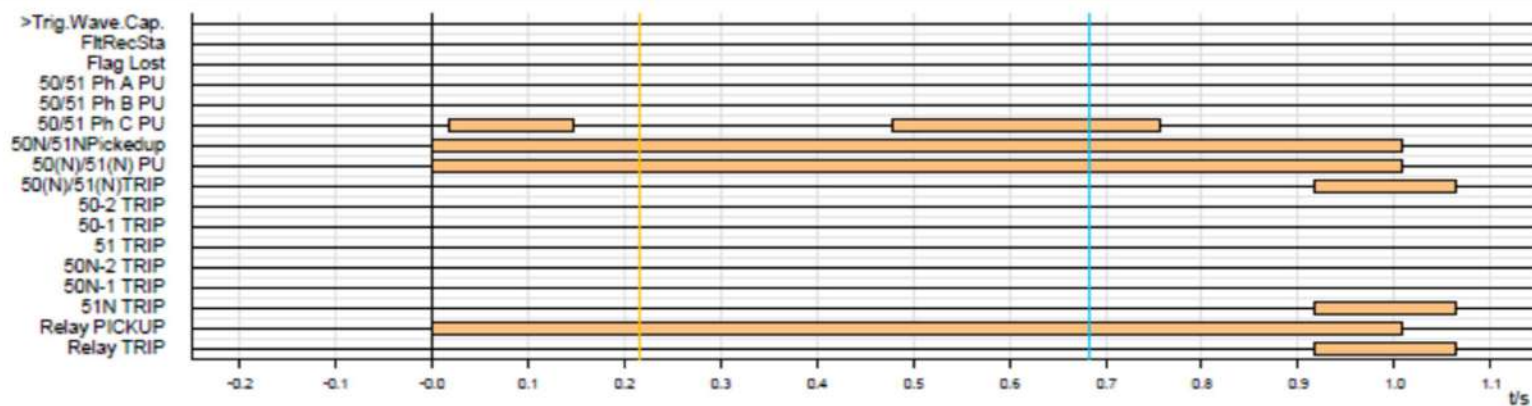
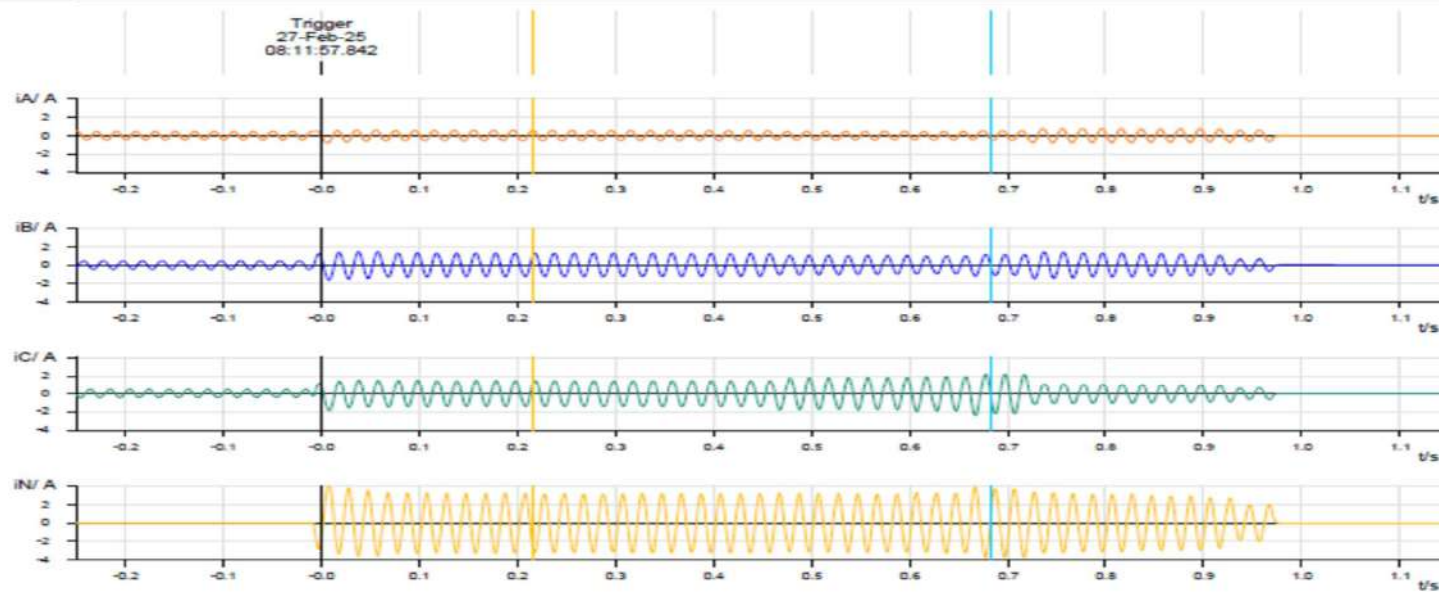












# Multiple element tripping event at 220/132kV Ziankote(J&K)

At 03:30 hrs on 28.02.2025

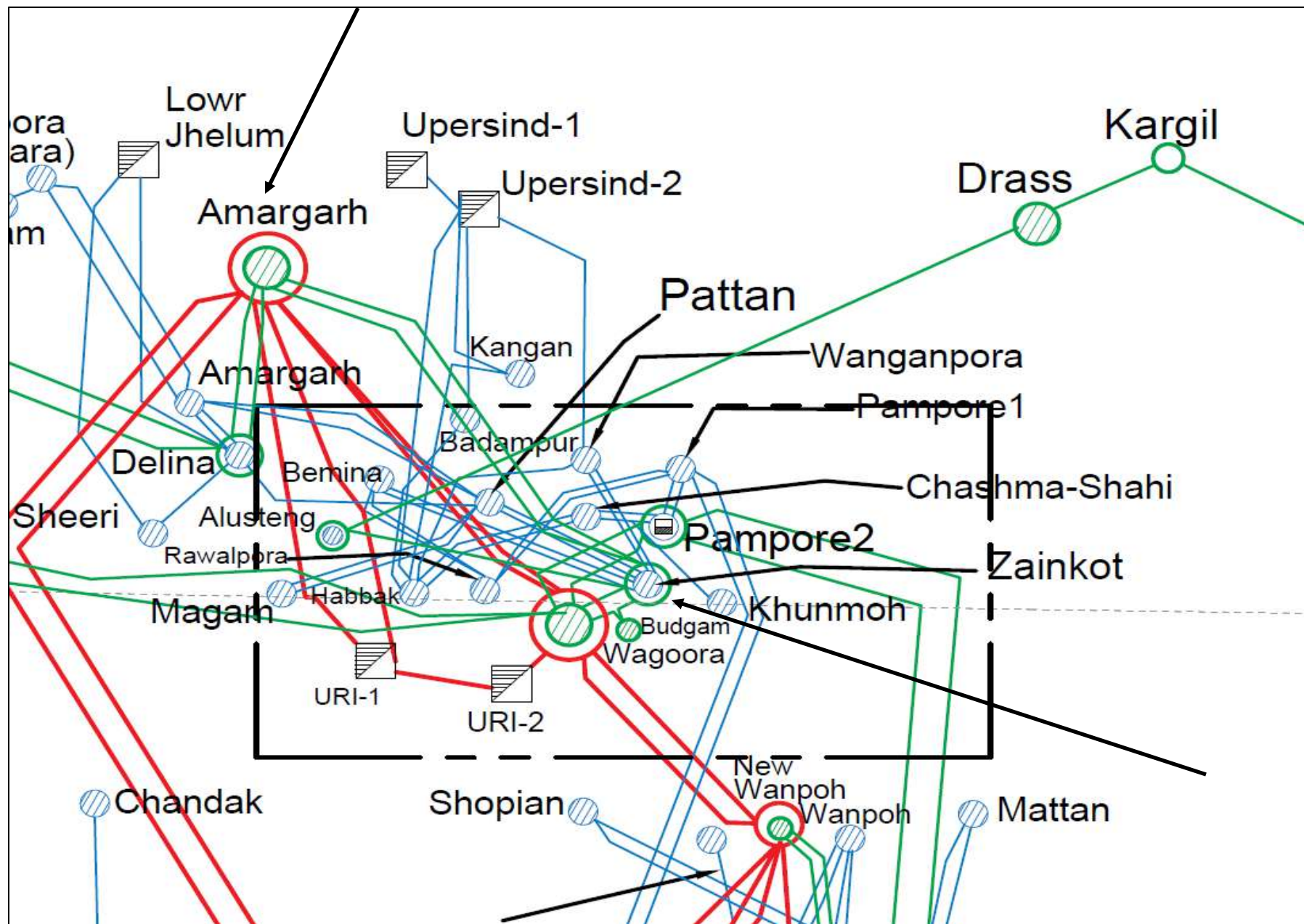
## Tripped Elements

S. No	Name of Elements	Outage Time	Revival Time	Reason of tripping
1.	220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-1	02:40 hrs	06:50 hrs	R-N phase to earth fault
2.	220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2	03:30 hrs	06:48 hrs	R-N phase to earth fault

## **Brief details of the event**

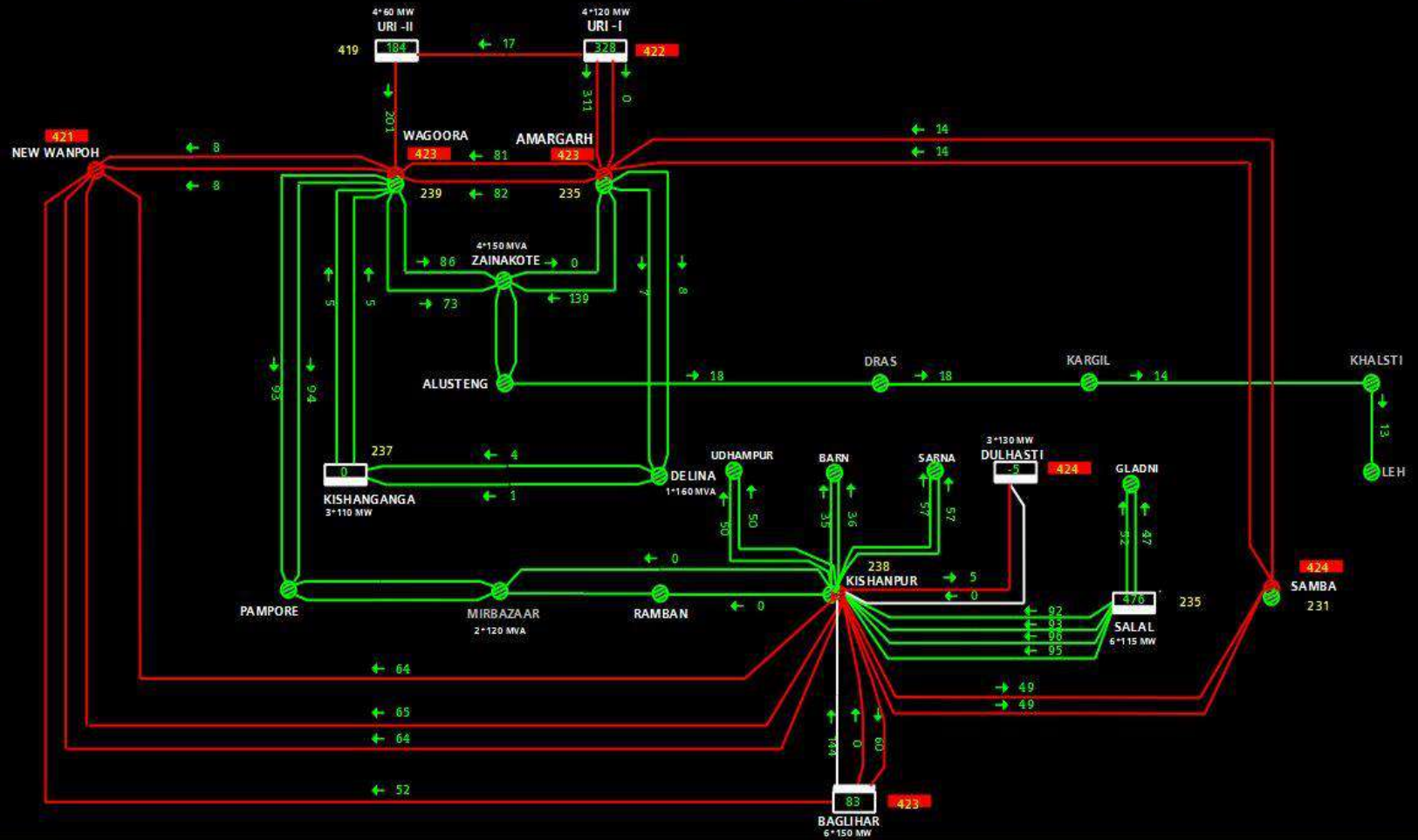
- i) 220/132kV Ziankote S/s have two bus at 220kV side i.e., main bus & reserve bus. 220kV Amargarh-Ziankote ckt-1&2 are on the same tower (D/C tower) and line length is ~21.4km.
- ii) During antecedent condition, 220kV Amargarh (INDIGRID) –Ziankote (JK) ckt-2 was carrying 139 MW and feeding Ziankote load. 220kV Amargarh (INDIGRID) –Ziankote (JK) ckt-1 was already tripped at 02:40 hrs on R-N fault.
- iii) As reported, at 03:30 hrs 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2 also tripped on R-N fault (details of cause of fault and location of fault yet to be received).
- iv) As per PMU at Amargarh (INDIGRID), no fault was observed in system.
- v) As per SCADA, change in demand of approx. 126 MW is observed in J&K control area.

# Network Diagram



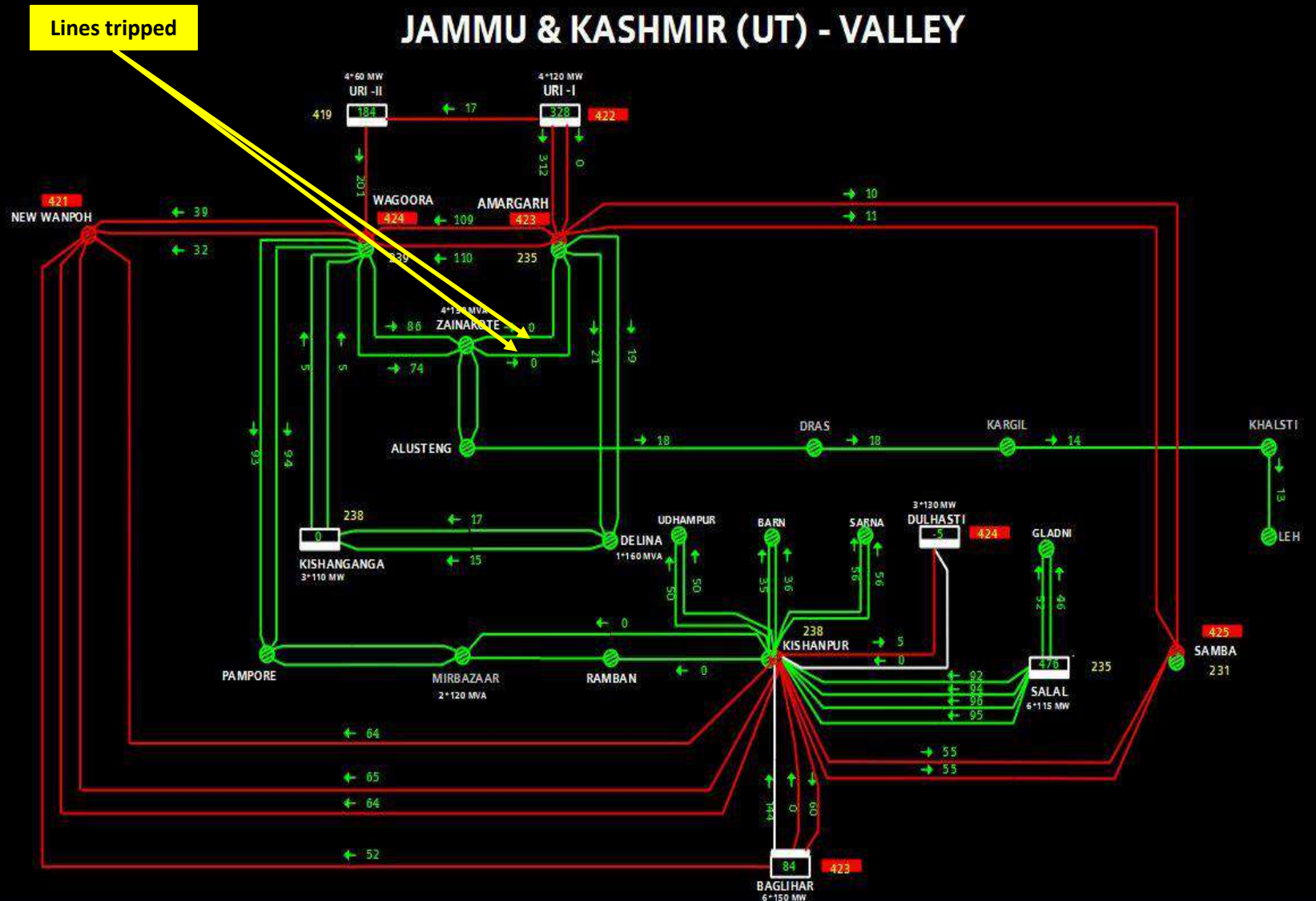
# J&K Valley Network Diagram before the event

## JAMMU & KASHMIR (UT) - VALLEY





# J&K Valley Network Diagram after the event



**SLD of 400/220kV Amargarh(INDIGRID) before the event (02:40)**

CONTACT DETAILS	
EMAIL	nrss29substation@gmail.com
MOBILE	9469795283
HOTLINE	20112455

## AMARGARH GIS

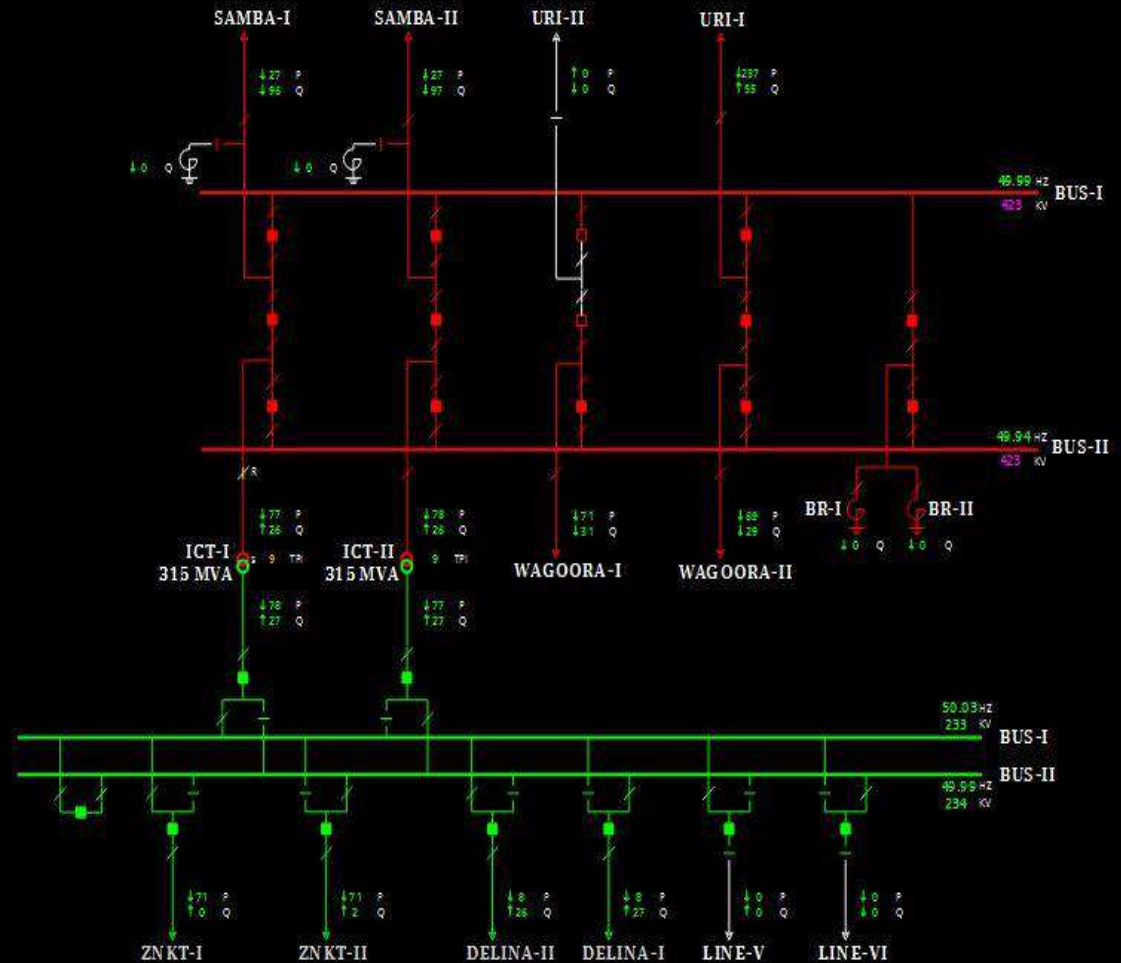
Stat Expl Gen Sum Company

28.2.25 2:40:0

P sum(400 kV) = 3

P sum (220 KV) = 2

Q sum(400 kW) = -129

$$Q_{sum}(120\text{ MW}) = -1$$




# SLD of 400/220kV Amargarh(INDIGRID) after the event (02:40)

CONTACT DETAILS	
EMAIL	nrs329substation@gmail.com
MOBILE	9469795283
HOTLINE	20112455

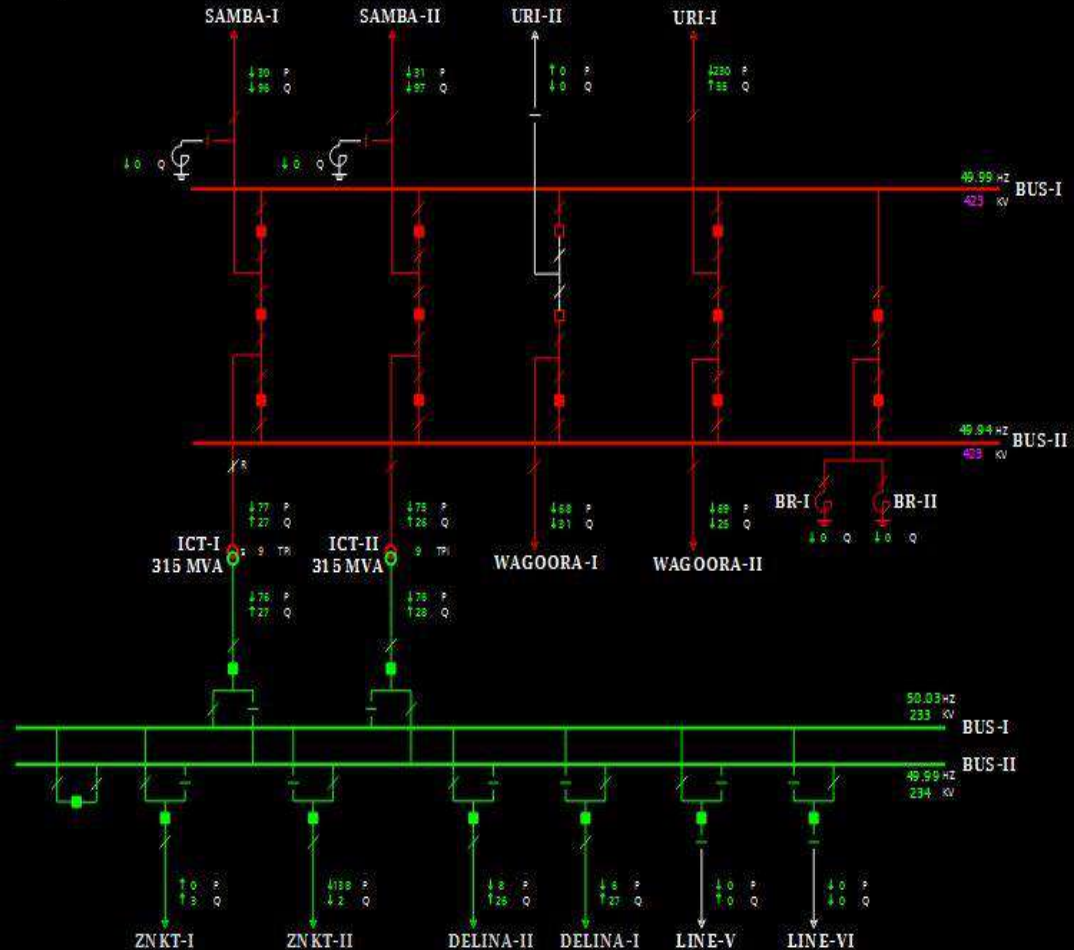
P sum(400 kV) = 3  
P sum(220 kV) = 4

## AMARGARH GIS

Stat Expl GenSum Company

28.2.25 2:40:30

Q sum(400 kV) = -135  
Q sum(220 kV) = 5



# SLD of 400/220kV Amargarh(INDIGRID) before the event (03:30)

CONTACT DETAILS	
EMAIL	nrs529substation@gmail.com
MOBILE	94669795263
HOTLINE	20112455

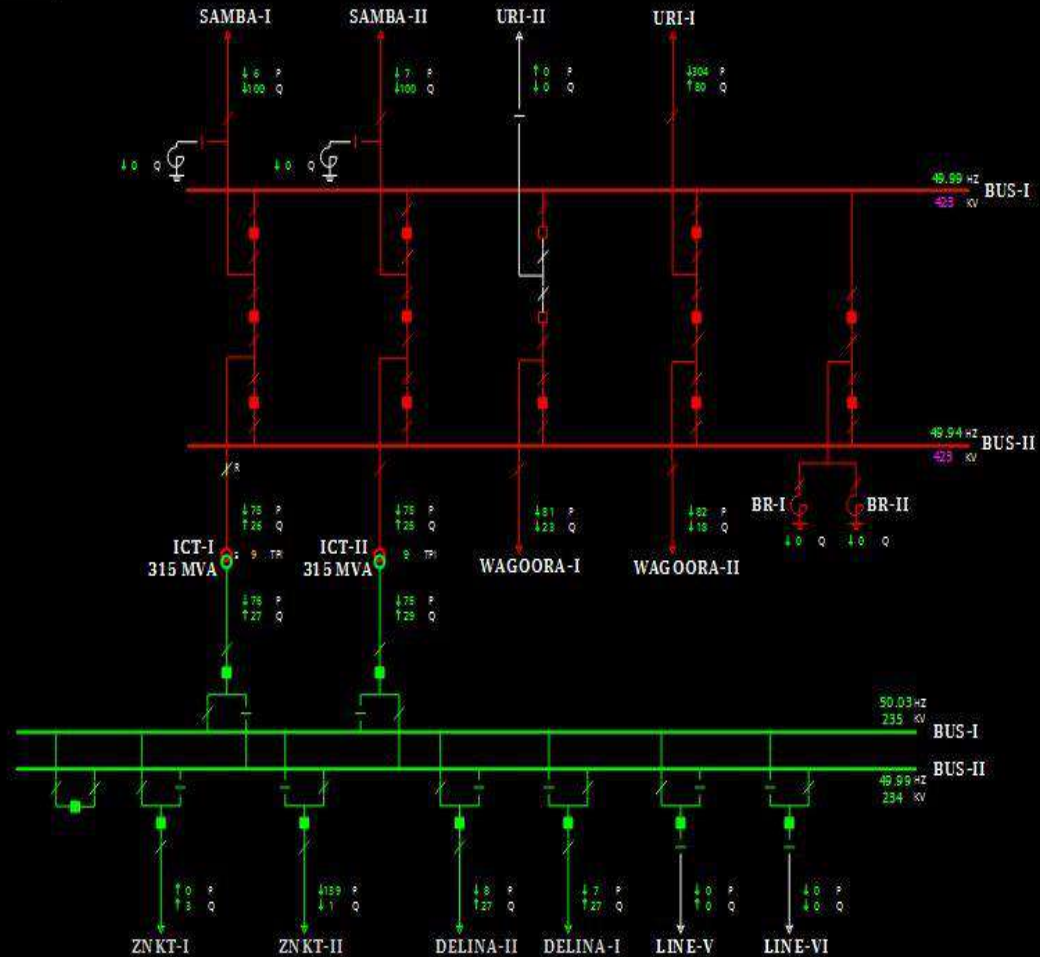
P sum(400 KV) = -2  
P sum(220 KV) = 1

## AMARGARH GIS

Stat Expl Gen Sum Company

28.2.25 3:29:0

Q sum(400 KV) = -130  
Q sum(220 KV) = 0



# SLD of 400/220kV Amargarh(INDIGRID) after the event (03:30)

CONTACT DETAILS	
EMAIL	nrs29substation@gmail.com
MOBILE	9469795283
HOTLINE	20112455

P sum(400 KV) = -42  
P sum(220 KV) = 0

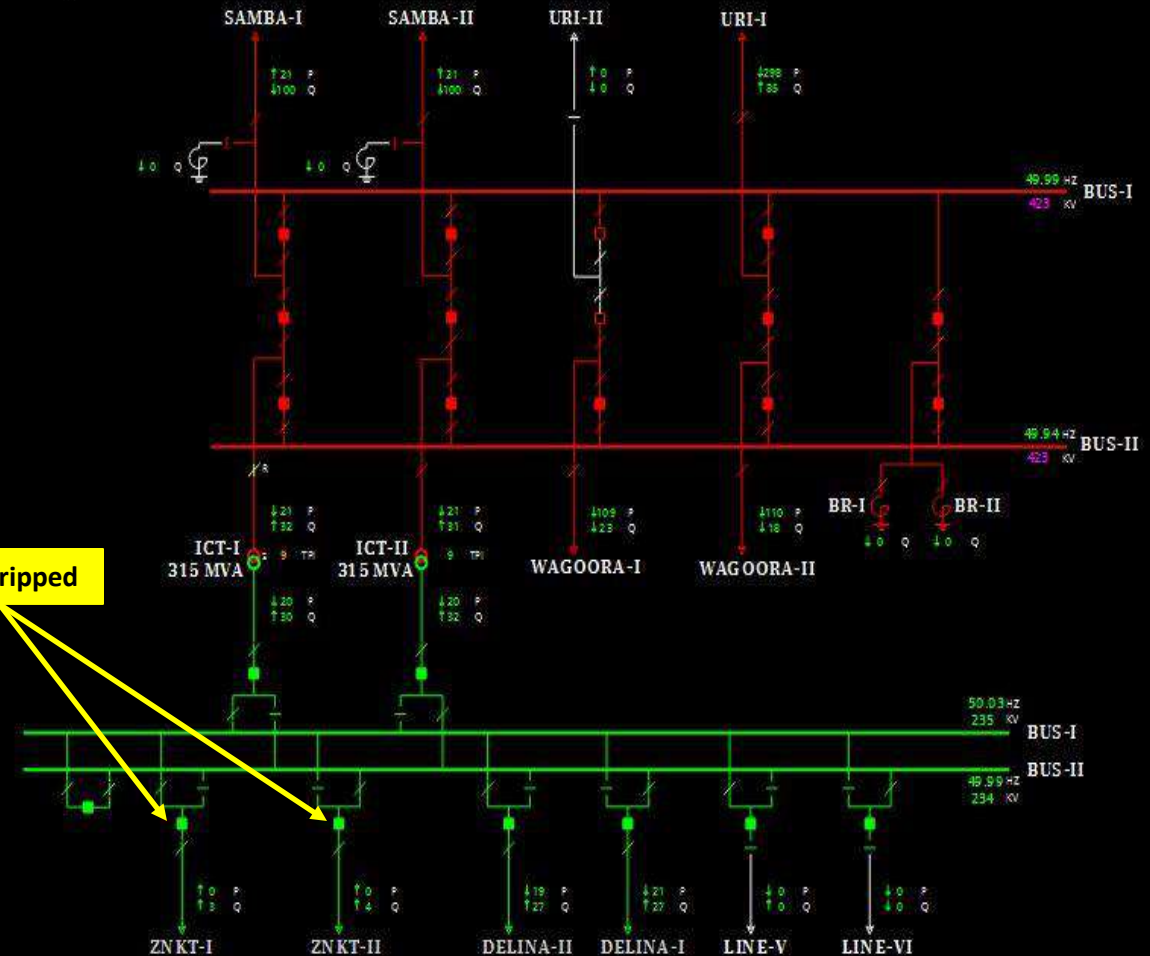
## AMARGARH GIS

Stat Expl Gen Sum Company

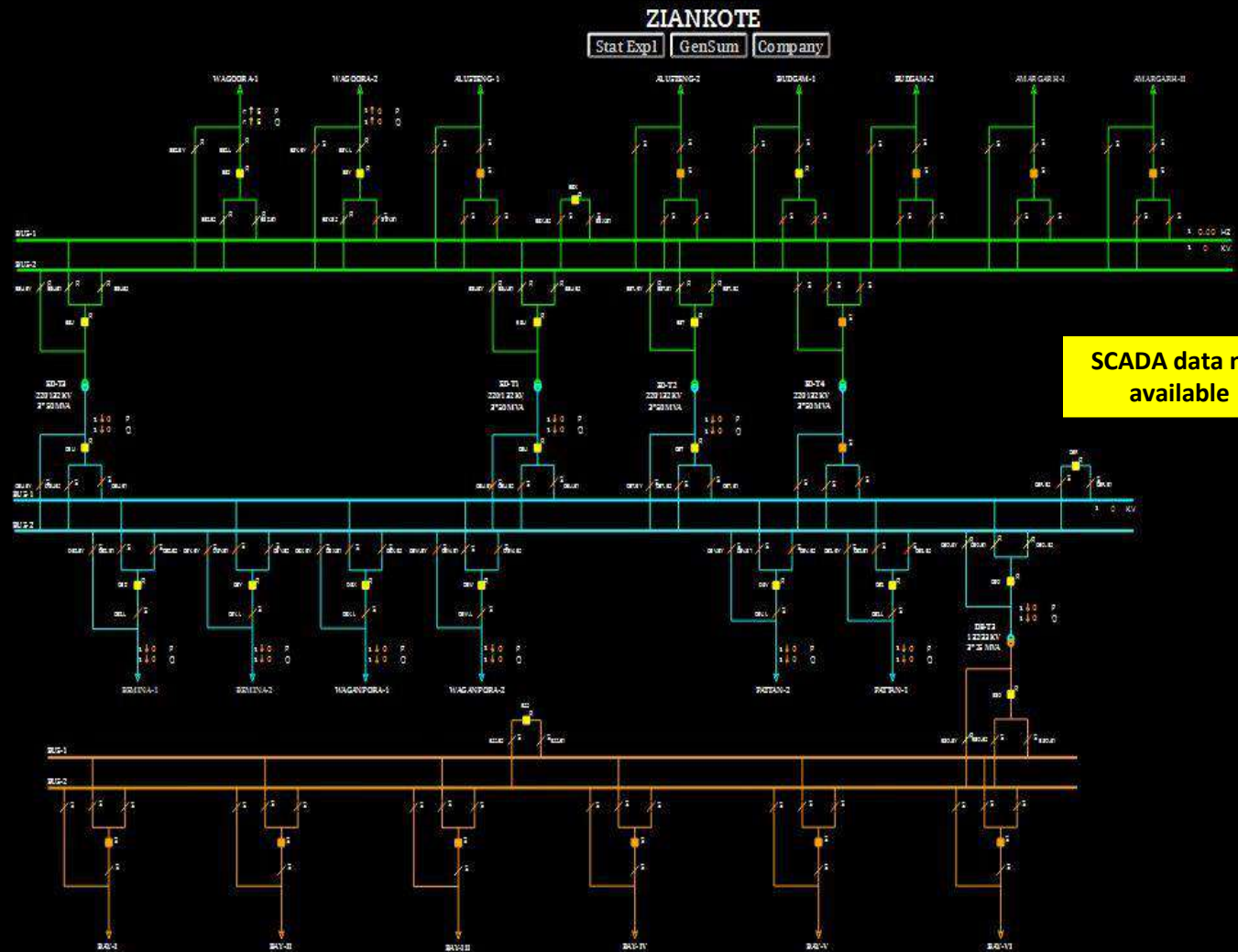
28.2.25 3:29:30

Q sum(400 KV) = -130  
Q sum(220 KV) = 0

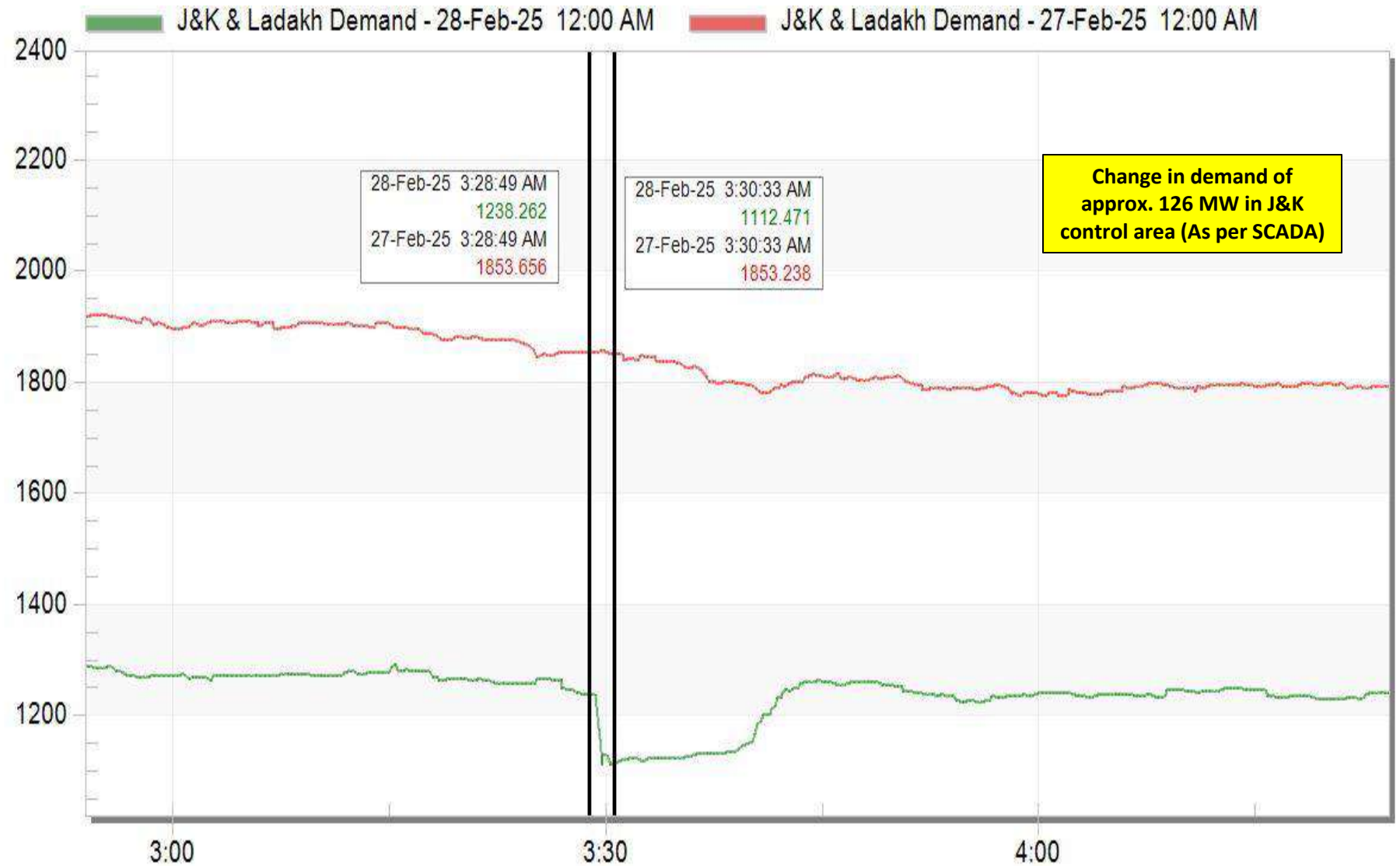
Lines tripped



# SLD of 220/132/66kV Ziankote(JK) after the event (02:40)



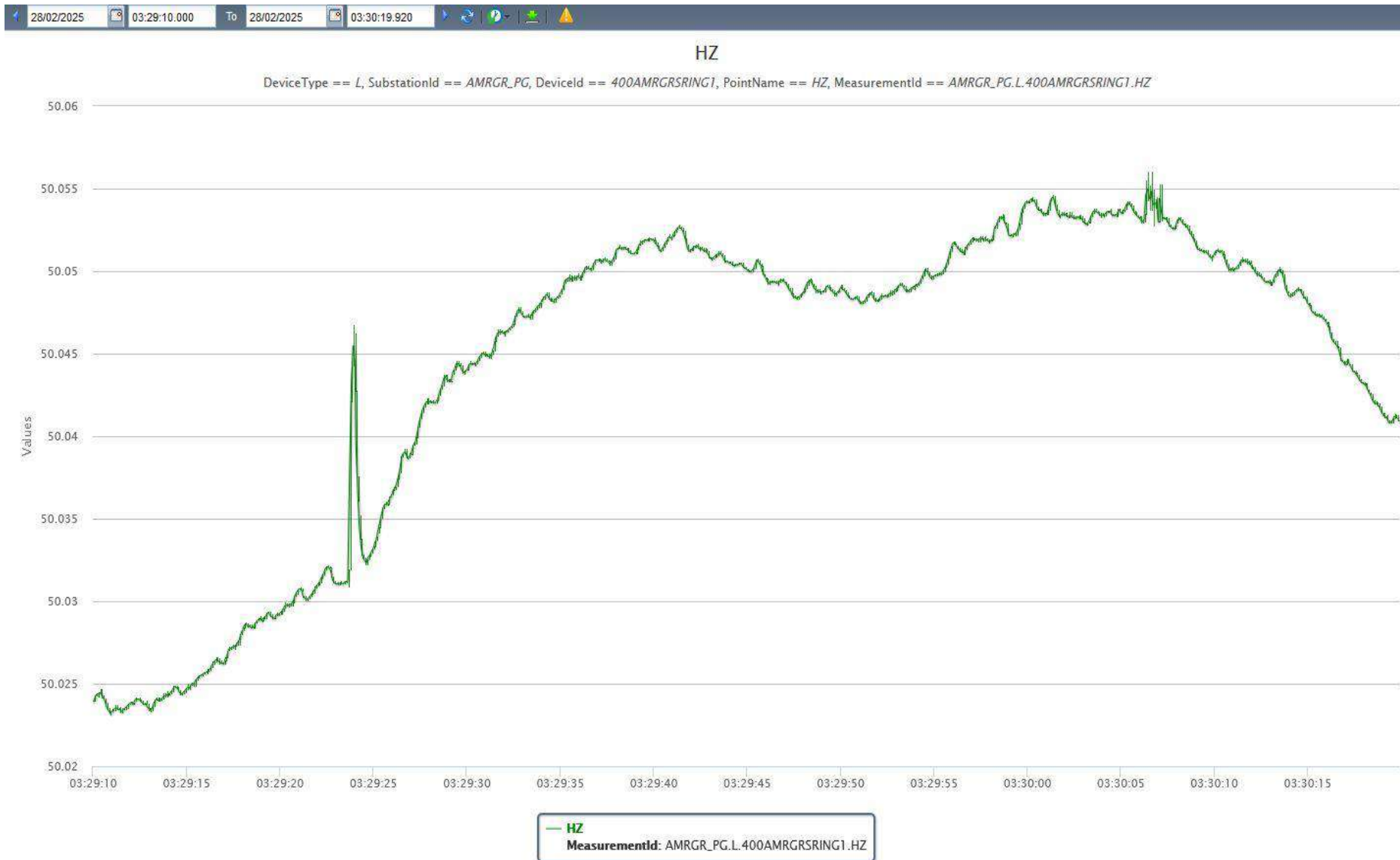
# J&K demand during the event



Feb 28 Fri 2025

# PMU Plot of frequency at Amargarh(INDIGRID)

03:29hrs/28-Feb-25





# PMU Plot of phase voltage magnitude at Amargarh(INDIGRID)

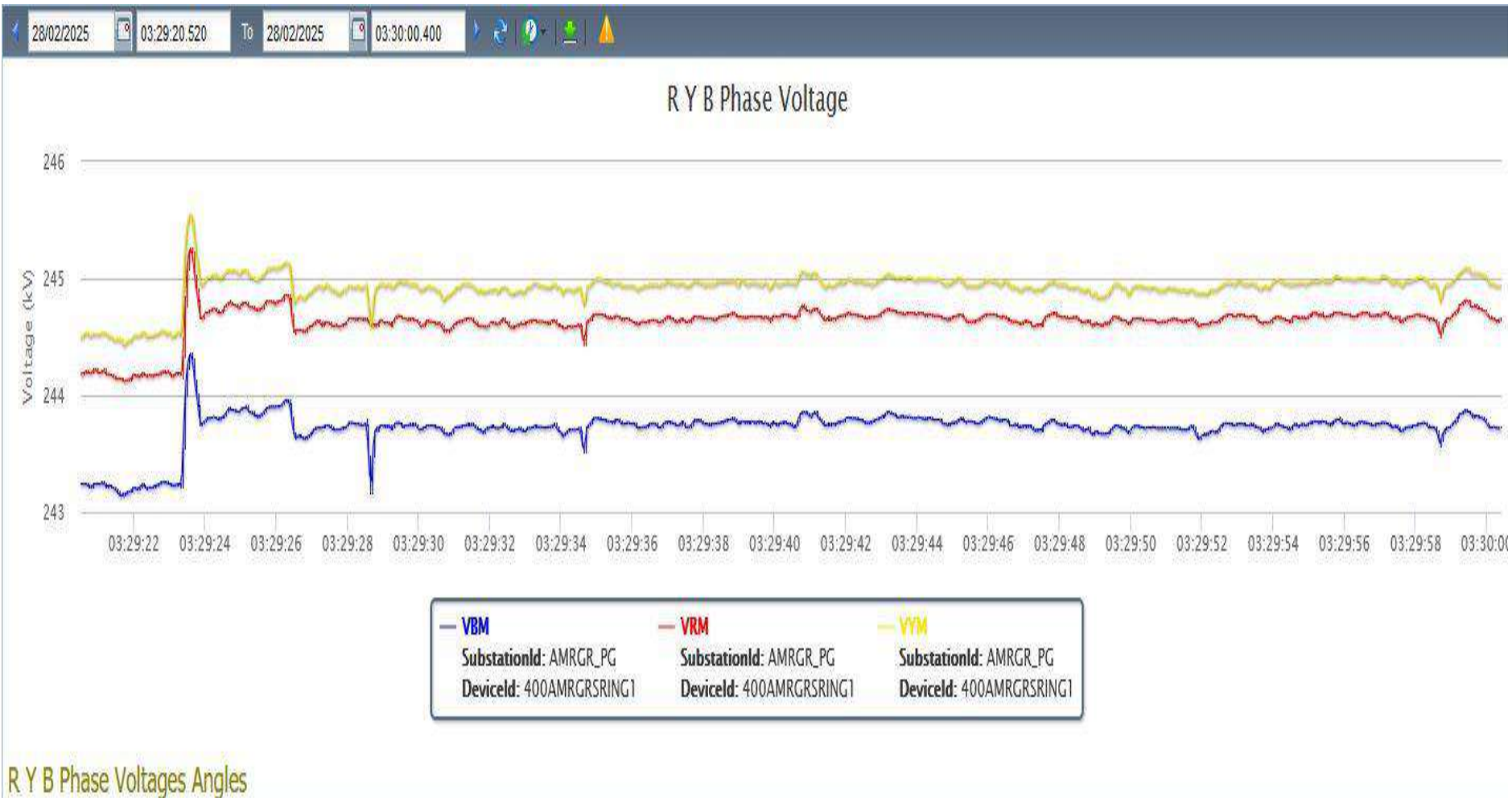
02:40hrs/28-Feb-25



✓ No Fault Was observed as per PMU.

# PMU Plot of phase voltage magnitude at Amargarh(INDIGRID)

03:30hrs/28-Feb-25



✓ No Fault Was observed as per PMU.

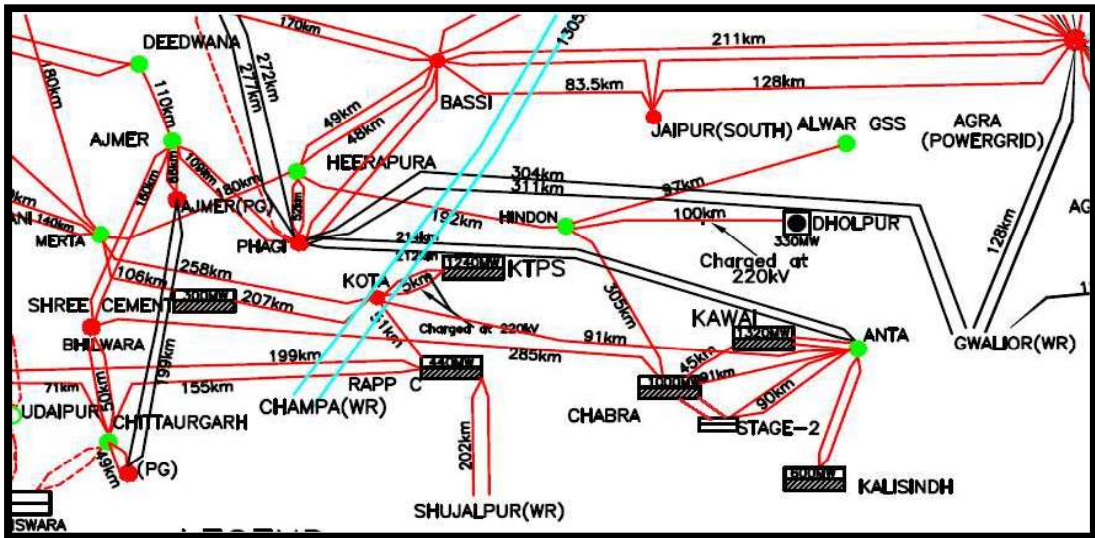


## **Points for Discussion**

- i) Exact location and nature of fault need to be shared.
- ii) SCADA data of 220/132kV Ziankote(JK) S/s is not available. Availability and healthiness of the same need to be ensured.
- iii) DR/EL (.dat/.cfg) file of all the tripped elements along with tripping report need to be shared from both the ends.
- iv) Remedial action taken report to be shared.

S. No.	Name of Transmission Element Tripped	Owner/ Utility	Outage		Load Loss/ Gen. Loss	Brief Reason (As reported)	Category as per CEA Grid standards	# Fault Clearance Time >100 ms for 400 kV and 160 ms for 220 kV)	*FIR Furnished (YES/NO)	DR/EL provided in 24 hrs (YES/NO)	Other Protection Issues and Non Compliance (Inference from PMU, utility details)	Suggestive measures	Remarks
			Date	Time									
1	400 KV Gorakhpur(PG)-Muzaffarpur(PG) (POWERLINK) Ckt-2	POWERLINK	08-Feb-25	03:11	Nil	Phase to Phase Fault R-B	NA	80 msec	Yes (After 24 hours)	Yes (After 24 hours)	NA		As per PMU (Agra PG), R-B phase to phase fault occurred. As per DR & EL, fault current was Ir=4.75kA & Ib=4.71kA and fault distance was 123.5 km (47.5%) from Gorakhpur end; fault sensed in zone-1 at Gorakhpur end.
2	220 KV Auraiya(NT)-Mehegaon(MP) (MPSEB) Ckt- 1	POWERGRID	12-Feb-25	00:48	Nil	Phase to earth fault R-N	NA	80 msec	No	Partially Yes (After 24 hours)	NA	FIR/EL needs to be shared	As per PMU (Unnao UP), R-N phase to earth fault occurred (time sync issue observed), no auto-reclosing is observed. As per DR, fault current was Ir~2.86kA from Auraiya end; fault sensed in zone-1 at Auraiya end.
3	220 KV Auraiya(NT)-Malanpur(MP) (PG) Ckt-1	POWERGRID	19-Feb-25	02:21	Nil	Phase to earth fault R-N	NA	80 msec	No	Partially Yes (After 24 hours)	NA	FIR/EL needs to be shared	As per PMU (Unnao UP), R-N phase to earth fault occurred, no auto-reclosing is observed. As per DR, fault current was Ir~5.43kA from Auraiya end; fault sensed in zone-1 at Auraiya end.
4	765 KV Orail-Jabalpur (PG) Ckt-2	POWERGRID	28-Feb-25	15:33	Nil	DT received at Jabalpur end.	NA	NA	Yes (After 24 hours)	Yes (After 24 hours)	NA		As per PMU (Mainpuri PG), fluctuation in voltage (unequal voltage in all the three phases) is observed. As reported, line tripped from Jabalpur end only and nothing abnormal is found at Orail end.
<p><b># Fault Clearance time has been computed using PMU Data from nearest node available and/or DR provided by respective utilities (Annexure- II)</b></p> <p><b>*Yes, if written Preliminary report furnished by constituent(s)</b></p> <p><b>R-Y-B phase sequencing (Red, Yellow, Blue) is used in the list content.All information is as per Northern Region unless specified.</b></p> <p><b>^^ tripping seems to be in order as per PMU data, reported information. However, further details may be awaited.</b></p>													
Reporting of Violation of Regulation for various issues for above tripping													
1	Fault Clearance time>100ms for 400kV and >160ms for 220kV)	1. CEA Grid Standard-3.e 2. CEA Transmission Planning Criteria											
2	DR/EL Not provided in 24hrs	1. IEGC 37.2(c) 2. CEA Grid Standard 15.3											
3	FIR Not Furnished	1. IEGC 37.2(b) 2. CEA Grid Standard 12.2 (Applicable for SLDC, ALDC only)											
4	Protection System Mal/Non Operation	1. CEA Technical Standard of Electrical Plants and Electric Lines: 43.4.A 2. CEA (Technical Standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)											
5	A/R non operation	1. CEA Technical Standard of Electrical Plants and Electric Lines: 43.4.C 2. CEA Technical Planning Criteria											

Status of Mock Test of SPS in NR					
Sr. No.	Scheme Name	Control Area	Mock testing conducted before 2024-25	Date of SPS Mock testing conducted during 2024-25	Remarks
1	SPS for WR-NR corridor - 765kV Agra-Gwalior D/C	POWERGRID	12-03-2024	Not conducted for FY 24-25	Schedule yet to be received
2	SPS for contingency due to tripping of HVDC Mundra-Mahendergarh	ADANI			Review is being done at OCC/PSC forum
3	SPS for high capacity 400 kV Muzaffarpur-Gorakhpur D/C Inter-regional tie-line related contingency	POWERGRID			Schedule yet to be received
4	SPS for 1500 MW HVDC Rihand-Dadri Bipole related contingency	POWERGRID		Partially conducted on 19-03-2025	Conducted for FY 24-25
5	System Protection Scheme (SPS) for HVDC Balia-Bhiwadi Bipole	POWERGRID		Not conducted for FY 24-25	Schedule yet to be received
6	SPS for contingency due to tripping of multiple lines at Dadri(NTPC)	NTPC			Review is being done at OCC/PSC forum
7	SPS for reliable evacuation of power from NJPS, Rampur, Sawra Kuddu, Baspa Sorang and Karcham Wangtoo HEP	SJVN/HPPTCL/JSW		conducted on 19-12-2024	Conducted for FY 24-25
8	SPS for Reliable Evacuation of Ropar Generation	Punjab		Not conducted for FY 24-25	Schedule yet to be received
9	SPS for Reliable Evacuation of Rosa Generation	Uttar Pradesh	07-05-2022	conducted on 20-04-2024	Conducted for FY 24-25
10	SPS for contingency due to tripping of evacuating lines from Narora Atomic Power Station	NAPS		Not conducted for FY 24-25	Schedule yet to be received
11	SPS for evacuation of Kawai TPS, Kalisindh TPS generation complex	Rajasthan		Partially conducted on 14-03-2025	Conducted for FY 24-25
12	SPS for evacuation of Anpara Generation Complex	Uttar Pradesh	06-07-2020	conducted on 08.10.2024 (unit-7) and 19.10.2024 (unit-6)	Conducted for FY 24-25
13	SPS for evacuation of Lalitpur TPS Generation	Uttar Pradesh	14-07-2018	conducted on 21.05.2024	
14	SPS for Reliable Evacuation of Bara TPS Generation	Uttar Pradesh		conducted on 20.11.2024	
15	SPS for Lahal Generation	Himachal Pradesh	08-07-2020	Not conducted for FY 24-25	Schedule yet to be received
16	SPS for Transformers at Ballabgarh (PG) substation	POWERGRID			Not in service, Review is being done in OCC/PSC forum
17	SPS for Transformers at Maharaniabagh (PG) substation	POWERGRID			
18	SPS for Transformers at Mandola (PG) substation	POWERGRID			Review is being done at OCC/PSC forum
19	SPS for Transformers at Bamnauli (DTL) Substation	Delhi			
20	SPS for Transformers at Moradabad (UPPTCL) Substation	Uttar Pradesh		conducted on 20-04-2024	Conducted for FY 24-25
21	SPS for Transformers at Muradnagar (UPPTCL) Substation	Uttar Pradesh	07-02-2023	conducted on 20-04-2024	
22	SPS for Transformers at Muzaffarnagar(UPPTCL) Substation	Uttar Pradesh		conducted on 20-04-2024	
23	SPS for Transformers at Greater Noida(UPPTCL) Substation	Uttar Pradesh		SPS Unhealthy	SPS not required now, as informed by Transmission wing; Hence SPS may be reviewed
24	SPS for Transformers at Agra (UPPTCL) Substation	Uttar Pradesh	12-07-2023	Not conducted for FY 24-25	Schedule yet to be received
25	SPS for Transformers at 400kV Sarojininar (UPPTCL) Substation	Uttar Pradesh	17-05-2023		
26	SPS for Transformers at 220kV Sarojininar (UPPTCL) Substation	Uttar Pradesh	18-05-2022		
27	SPS for Transformers at 400kV Unnao (UPPTCL) Substation	Uttar Pradesh	19-05-2023	SPS Unhealthy	SPS need to be made healthy; Expected functioning before 20.03.2025, as informed by Transmission wing.
28	SPS for Transformers at 220kV Unnao (UPPTCL) Substation	Uttar Pradesh		Not conducted for FY 24-25	Schedule yet to be received
29	SPS for Transformers at 400kV Sultanpur (UPPTCL) Substation	Uttar Pradesh		SPS Unhealthy	SPS not required now, as informed by Transmission wing; Hence SPS may be reviewed
30	SPS for Transformers at 400kV Bareilly (UPPTCL) Substation	Uttar Pradesh		Not conducted for FY 24-25	Schedule yet to be received
31	SPS for Transformers at 400kV Azamgarh (UPPTCL) Substation	Uttar Pradesh	14-05-2023	conducted on 06-05-2024	Conducted for FY 24-25
32	SPS for Transformers at 400kV Mau (UPPTCL) Substation	Uttar Pradesh	17-01-2019	conducted on 27-04-2024	
33	SPS for Transformers at 400kV Gorakhpur (UPPTCL) Substation	Uttar Pradesh	14-05-2023	conducted on 27-04-2024	
34	SPS for Transformers at 400kV Sarnath (UPPTCL) Substation	Uttar Pradesh	19-05-2023	conducted on 23-05-2024	
35	SPS for Transformer at 400kV Rajpura (PSTCL) Substation	Punjab		conducted on 31-01-2025	
36	SPS for Transformers at 400kV Mundka (DTL) Substation	Delhi	19-06-2023	conducted*	
37	SPS for Transformers at 400kV Deepalpur (JKTCL) Substation	Haryana		Not conducted for FY 24-25	Schedule yet to be received
38	SPS for Transformers at 400kV Ajmer (RVPN) Substation	Rajasthan		conducted on 10.09.2024	Conducted for FY 24-25
39	SPS for Transformers at 400kV Merta (RVPN) Substation	Rajasthan		conducted on 12.09.2024	
40	SPS for Transformers at 400kV Chittorgarh (RVPN) Substation	Rajasthan		conducted on 31.08.2024 & 05.09.2024	
41	SPS for Transformers at 400kV Jodhpur (RVPN) Substation	Rajasthan		conducted on 24.09.2024	
42	SPS for Transformers at 400kV Bhadla (RVPN) Substation	Rajasthan		conducted on 27.09.2024	
43	SPS for Transformers at 400kV Ratargarh (RVPN) Substation	Rajasthan		Conducted on 20.09.2024	
44	SPS for Transformers at 400kV Nehtaur(WUPPTCL) Substation	Uttar Pradesh	05-07-2022	Conducted on 11.01.2025	
45	SPS for Transformers at Obra TPS	Uttar Pradesh		conducted on 20-05-2024	
46	SPS for Transformers at 400kV Kashipur (PTCUL) substation	Uttarakhand	03-09-2023	Septemeber 2024	
47	SPS for Transformers at 400kV Fatehgarh Solar Park (AREPRL)	ADANI		Not conducted for FY 24-25	Schedule yet to be received
48	SPS to relive transmission congestion in RE complex (Bhadla2)	POWERGRID			
49	SPS for Transformers at 400kV Bikaner (RVPN) Substation	Rajasthan		conducted on 26.09.2024	Conducted for FY 24-25
50	SPS for Transformers at 400kV Bawana (DTL) Substation	Delhi	06-09-2023		Schedule yet to be received
51	SPS for Transformers at 400kV Bhilwara (RVPN) Substation	Rajasthan		conducted on 09.07.2024 & 10.07.2024	Conducted for FY 24-25
52	SPS for Transformers at 400kV Hindun (RVPN) Substation	Rajasthan		conducted on 26.09.2024	Not conducted for FY 24-25
53	SPS for Transformers at 400kV Suratgarh (RVPN) Substation	Rajasthan			
54	SPS for Transformers at 400kV Babai(RS) Substation	Rajasthan			
55	SPS for Transformers at 400kV Allahabad(PG) Substation	Uttar Pradesh			
56	SPS for Transformers at 400kV Jaunpur(UP) Substation	Uttar Pradesh			Schedule yet to be received. Implemented in 2024-25

Item	Information Explanation
Reporting Party	RRVPNL/ NRLDC
Scheme's Name	Chhabra/ Chhabra Super Critical/ Kawai/ Kalisindh Complex
Classification	SPS related to Safe evacuation of generation
Reference No.	SPS/NR/GEN/05
Operating Procedure	Refer to Chapter 14, Point No 14.5 of Operating Procedure of NR
Design Objectives	SPS (Inter trip) arrangement has been implemented for taking care of any N-1/ N-1-1/ N-2 contingency in the Chhabra/ Chhabra SCTPS/ Kawai/ Kalisindh complex.
Operation	Automatic back down / tripping of generation in the complex
Modelling	 <p><b>Chhabra TPS</b></p> <ol style="list-style-type: none"> <li><b>Case-1:</b> N-1 contingency of 400kV Chhabra-Hindaun or Chhabra-Bhilwara  <i>Action-1: No backing down required</i></li> <li><b>Case-2:</b> N-1-1/N-2 contingency of 400kV Chhabra-Kawai &amp; Chhabra-Hindaun or N-1-1/N-2 contingency of 400kV Chhabra-Kawai &amp; Chhabra-Bhilwara  <i>Action: No backing down required.</i></li> <li><b>Case-3:</b> N-1-1/N-2 contingency of 400kV Chhabra-Hindaun &amp; Chhabra-Bhilwara  <i>Action: Trip two units at Chhabra TPS.</i></li> </ol>

## Northern Region SPS Details

Item	Information Explanation
	<p><b>Chhabra SCTPS</b></p> <p>1. <b><u>Case-1:</u></b> N-1 contingency of Chhabra SCTPS-Anta 1 &amp; 2</p> <p style="padding-left: 40px;"><i>Action-1: No backing down required</i></p> <p>2. <b><u>Case-2:</u></b> N-1-1/ N-2 contingency of Chhabra SCTPS-Anta 1 &amp; 2</p> <p style="padding-left: 40px;"><i>Action: No backing down required</i></p> <p><b>Kalisindh TPS</b></p> <p>1. <b><u>Case-1:</u></b> N-1-1/ N-2 contingency of Kalisindh-Anta 1 &amp; 2</p> <p style="padding-left: 40px;"><i>Action-1: Tripping of both units at Kalisindh</i></p> <p><b>Chhabra and Kawai TPS complex</b></p> <p>1. <b><u>Case-1:</u></b> N-1 contingency of 400kV Kawai-Anta ckt 1 &amp; 2</p> <p style="padding-left: 40px;"><i>Action-1: No backing down required</i></p> <p>2. <b><u>Case-2:</u></b> N-1-1/ N-2 contingency of 400kV Kawai-Anta ckt 1 &amp; 2</p> <p style="padding-left: 40px;"><i>Action: Trip one unit of Kawai TPS</i></p> <p><b>Chhabra, Kawai and Kalisindh TPS Complex</b></p> <p>1. <b><u>Case-1:</u></b> N-1-1/N-2 of 765/400 kV Anta ICTs</p> <p style="padding-left: 40px;"><i>Action-1: Trip one unit of 660 MW at Chhabra SCTPS to limit the flow on the remaining ICT with in safe range</i></p> <p>2. <b><u>Case-2:</u></b> N-1 of Anta-Phagi 1 &amp; 2</p> <p style="padding-left: 40px;"><i>Action: No action required</i></p> <p>3. <b><u>Case-3:</u></b> N-1-1/ N-2 of Anta-Phagi 1 &amp; 2</p> <p style="padding-left: 40px;"><i>Action: One unit each at Kawai, Chhabra, Kalisindh and Chhabra SCTPS shall be tripped through SPS.</i></p>

## Northern Region SPS Details

Item	Information Explanation
	<p><b>Kawai TPS</b></p> <p>1. <b><u>Case-1:</u></b> Line Loading on Kawai-Chhabra line more than 850 MW but less than 900 MW</p> <p style="text-align: center;"><i>Action: Back down of 240 MW at Kawai</i></p> <p>2. <b><u>Case-2:</u></b> Line Loading on Kawai-Chhabra line more than 900 MW</p> <p style="text-align: center;"><i>Action: Tripping of one selected unit at Kawai</i></p> <p>With the loss of generation of about 2100 MW in the complex in case C.3, equivalent load shedding shall take place in Rajasthan state control area to avoid overloading of WR-NR corridor as well as to avoid over drawal by Rajasthan. However, considering logistics etc, approx 750 MW automatic load shedding in Rajasthan Control area would be required and rest could be manual (almost similar or slightly higher impact as tripping of one unit of 660 MW). RRVPNL was requested to identify the feeders for 750 MW and dovetail the Automatic Load shedding with logic of the SPS given above. RRRVPNL shall endeavour to implement the automatic load shedding within four months. It was agreed that till the time automatic load shedding is operational, manual load shedding shall be done by SLDCs through a pre-agreed procedure with Discoms to keep Rajasthan area load-generation in balance after tripping of the generation. In other cases of contingencies, where backing down and unit tripping is carried out (though to less extent compared to case C.3), appropriate manual load shedding shall be got done by Rajasthan SLDC to keep load generation balance.</p> <p>For implementation of Automatic load shedding scheme target date provided by Rajasthan is 28.02.2018</p>
Original In-Service Year/ Approved date	Approved on 06-01-2016 during special meeting at NRPC, In Service (26-07-2016)
Recent Assessment Group	RRVPNL/ APL/ NRLDC/ NRPC
Recent Assessment Date	11-11-2019 (Revised SPS approved) and has been implemented in the field.

# Fw: Mundra-Mohindergarh HVDC , SPS-NR defect resolutions

Deepak Kumar

Tue 04-Feb-25 17:04

To: Sugata Bhattacharya (सुगता भट्टाचार्या) <sugata@grid-india.in>;

📎 1 attachments (23 KB)

Revised Schedule for Site Visit.xlsx;

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**From:** Sumeet Sharma <Sumeet.Sharma@adani.com>

**Sent:** Monday, February 3, 2025 6:58 PM

**To:** aen.com; m.alwar@rvpn.co.in; aen.mpt&s.rtg@rvpn.co.in; aen.comm.ratangarh@rvpn.co.in; aen.subsldc.bhl@rvpn.co.in; xen.mpts.bhl@rvpn.co.in; aen.prot.mertacity@RVPN.CO.IN; aen.comm.merta@RVPN.CO.IN; nainwal@powergrid.in; vinaykumargupta@powergrid.in; ravindra\_kumar@powergrid.in; smahajan1999@powergrid.in; rkagrawal83@powergrid.in; dharmendrameena@powergrid.in; vineet@powergrid.in; bhakalramjash@powergrid.in; dhanonda400kv@gmail.com; sse220kvlulaahir@hvpn.org.in; sse220kvrwr@hvpn.org.in; sse132kvdadri@hvpn.org.in; ae-220kvg1-mgg@pstcl.org; sse-pm-lalton@pstcl.org; sse-pm-mlrk@pstcl.org; eeetdshamli@upptcl.org; ee400mrd2@upptcl.org; aeoprotection@upslcd.org; ase-sldcop@pstcl.org; bl.gujar@dtl.gov.in; ce.ld@rvpn.co.in; ce-sldc; dtldata@yahoo.co.in; dtlscheduling@gmail.com; eesldccontrol@upslcd.org; ldrrvpnl@rvpn.co.in; ldshutdown@gmail.com; ldshutdown@rvpn.co.in; paritosh.joshi@dtl.gov.in; pccont@bbmb.nic.in; pc-sldcop@pstcl.org; rajbir-walia79@yahoo.com; rtamc.nr1@powergrid.in; pankaj.jha@powergrid.in; neerajk@powergrid.in; se.mpts.udr@rvpn.co.in; se.prot.engg@rvpn.co.in; se.sold@rvpn.co.in; sera@upslcd.org; sesc@upslcd.org; sesldcop@hvpn.org; se-sldcop; setncmrt@upptcl.org; sldcdata@gmail.com; sldcharyanacr@gmail.com; sldcmintoroad@gmail.com; system.uppcl@gmail.com; xenemtcbhpp2@bbmb.nic.in; xenmpccggn@hvpn.org; xenplgss@hvpn.org

**Cc:** NRLDC SO 2; Somara Lakra (सोमारा लाकरा); Mahavir Prasad Singh (महावीर प्रसाद सिंह); Deepak Kumar; Sunil Kumar Raval; Namandeep Matta; Kali Charan Sahu; RAVINDRA ATALE; Nihar Raj; Milan Popat; Abhishek Kukreja; Naman Vyas; Abhishek Kumar Singh

**Subject:** Mundra-Mohindergarh HVDC , SPS-NR defect resolutions

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Dear Sirs,

This refers to the matter discussed during recent Protection subcommittee (PSC) meetings with regards to the requirement of rectifications of SPS-NR implemented for Mundra-Mohindergarh HVDC transmission. We have awarded the service to M/s commtel for survey and restoration of possible elements installed at the locations.

Please note that Engineers from M/s CommTel shall be visiting your stations as per the attached schedule and necessary coordination shall be done by Mr. Abhishek Singh (Station -in charge) of Mohindergarh HVDC station (AESL-GD). He can be contacted at Mobile: 9671306831.

We request your kind permission and necessary support in carrying out the observations/possible restorations of the installations at your respective stations.

Thank you.

Regards,

Sumeet Sharma

Head- Automation, Communications , OT-Cyber & Technology

Adani Energy Solutions Limited.(Grid Division)

Mob +91 90990 05648 | [sumeet.sharma@adani.com](mailto:sumeet.sharma@adani.com) | [www.adani.com](http://www.adani.com)

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**Project :** To check Sytem healthiness anc configuration of system installed Under M/s Adani

S. No	Site name	Region	Site visit
1	Ialtokalan	Punjab	03.02.2025
2	Gobidngarh		04.02.2025
3	Malerkotla		05.02.2025
4	Mandula	UP	06.02.2025
5	Bamnauli	DTL	07.02.2025
6	Ratangarh	Rajasthan	06.02.2025
7	Bhilwara		07.02.2025
8	Merta		07.02.2025
9	Alwar		08.02.2025
10	PG Bhiwani	Haryana	10.02.2025
11	BBMB bhiwani		10.02.2025
12	Hissar		11.02.2025
13	Dadri		11.02.2025
14	Bahadurgah		12.02.2025
15	Dhanoda		12.02.2025
16	Shamli	UP	12.02.2025

# RE: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Thu 8/29/2024 7:29 PM

To:NRLDC SO 2 <nrldcso2@grid-india.in>; CPCC1 <rtamc.nr1@powergrid.in>;

Cc:seo-nrpc <seo-nrpc@nic.in>; Somara Lakra (सोमारा लाकरा) <somara.lakra@grid-india.in>; Mahavir Prasad Singh (महावीर प्रसाद सिंह) <mahavir@grid-india.in>; Arunkumar P <Arunkumar.P@adani.com>; Sugata Bhattacharya (सुगाता भट्टाचार्या) <sugata@grid-india.in>; Deepak Kumar <deepak.kr@grid-india.in>; AMIT SHARMA <amsharma@grid-india.in>; Bikas Kumar Jha (बिकास कुमार झा) <bikaskjha@grid-india.in>; Manas Ranjan Chand (मानस रंजन चंद) <manas@grid-india.in>; Aman Gautam (अमन गौतम) <amangautam@grid-india.in>; Gnanaguru . <Gnanaguru.1@adani.com>; Sumeet Sharma <Sumeet.Sharma@adani.com>; Naman Vyas <Namany.Vyas@adani.com>; Milan Popat <Milan.Popat@adani.com>; Nihar Raj <nihar.raj@adani.com>; Abhishek Kukreja <Abhishek.Kukreja@adani.com>;

5 attachments (9 MB)

Counter (2).jpg; Counter.jpg; TPS (2).jpg; TPS.jpg; 220KV Alwar ss.jpg;

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Malware/ Viruses can be easily transmitted via email.

Dear Sir,

Please find the attached Photos. on 28-08-2024, a representative from M/s. Commtel Networks visited the Mahendragarh site and confirmed the healthiness of the SDH and TPS, along with their associated cards.

All SPS System equipment are functioning properly. The 15 TPS installed in the remote substation.

The details and status of TPS and Counter at Mahendragarh End.

S.No	TPS	TPS Status	Counter	Counter Status
1	PG Hissar	ON	17	OKAY
2	Bhiwani	ON	17	OKAY
3	Dadari	ON	17	OKAY
4	Alwar	ON	-	OFF
5	Bhilwara	ON	12	OKAY
6	Merta	ON	14	OKAY
7	Ratangarh	ON	-	OFF
8	Gobinugarg	ON	-	OFF
9	Malerkotla	ON	-	OFF
10	Laton Kalan	ON	6	OKAY
11	Mandula	ON	12	OKAY
12	Bamnauli	ON	-	OFF
13	Shamli	ON	-	OFF
14	Bahadurgarh	ON	10	OKAY

15	Dhanonda	ON	-	OFF
----	----------	----	---	-----

There alarms on the system are due to the following reasons.

1. Equipment Failure/ card failure/ power failure at Remote Sites.
2. Cable connectivity break between the remote System and cable coming from Field.
3. E1 connectivity outage at remote Sites.

Our team, with support from Commtel Networks, visited the nearest TPS installed at the 220/132 kV Alwar Substation to check its healthiness. However, during the inspection, the panel was found to be de-energized, necessitating an end-to-end test. (Photo Attached) Similarly, each substation needs to be ensured the healthiness of the TPS by respective Substation owner.

We request you to please confirm the healthiness of the Sr no 1 and 2 .

**Thanks and Regards,**

Kalicharan Sahu  
(O&M) HVDC & EHV Substations,  
**Adani Energy Solutions Limited**  
| ±500kV HVDC Mahendragarh Terminal Sub Station I  
Village-Kheri- Aghiyar, Taluka- Kanina, Mahendragarh 123 029, Haryana, India  
Mob +91 9764006167| Off +91 1285 277326

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**From:** NRLDC SO 2 <nrlcso2@grid-india.in>

**Sent:** Tuesday, August 27, 2024 10:07 AM

**To:** SLDC Punjab <se-sldcprojects@pstcl.org>; PC PSTCL SLDC PUNJAB <pcpstcl@gmail.com>; Haryana <sldcharyanacr@gmail.com>; Delhi <sldcmintoroad@gmail.com>; UP <sera@upslcd.org>; Rajasthan <SE.LDRVNL@RVPN.CO.IN>; ce.ld@rvpn.co.in; CPCC1 <rtamc.nr1@powergrid.in>; neerajk@powergrid.in; setncmrt@upptcl.org; bharatlalgujar@gmail.com; akashdeep3433786@gmail.com; xenemtcbhpp2@bbmb.nic.in; PC Control Room <pccont@bbmb.nic.in>; se.prot.engg@rvpn.co.in; Arunkumar P <Arunkumar.P@adani.com>; Kali Charan Sahu <Kalicharan.Sahu@adani.com>; rajbir-walia79@yahoo.com; ase-sldcop@pstcl.org; sesldcop@hvpn.org.in; cepso@upslcd.org; se-sldcop <se-sldcop@pstcl.org>; SICHVDC Controlroom <SICHVDC.Controlroom@adani.com>

**Cc:** seo-nrpc <seo-nrpc@nic.in>; somara.lakra <somara.lakra@grid-india.in>; Mahavir Prasad Singh (महावीर प्रसाद सिंह) <mahavir@grid-india.in>; Sugata Bhattacharya (सुगता भट्टाचार्या) <sugata@grid-india.in>; deepak.kr <deepak.kr@grid-india.in>; AMIT SHARMA <amsharma@grid-india.in>; bikaskjha <bikaskjha@grid-india.in>; Manas Ranjan Chand (मानस रंजन चंद) <manas@grid-india.in>; Aman Gautam (अमन गौतम) <amangautam@grid-india.in>

**Subject:** Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

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Sir,

उत्तर प्रदेश राज्य भार प्रेषण केन्द्र लि०  
यू०पी०एस०एल०डी०सी०परिसर, विभूति  
खण्ड II, गोमती नगर, लखनऊ-226010  
ई मेल : sera@upslde.org



U.P. State Load Despatch Centre Ltd.  
UPSLDC Complex, Vibhuti Khand II  
Gomti Nagar, Lucknow- 226010  
E-mail: sera@upslde.org

No: - 2661 /SE(R&A)/EE-II/SPS

Dated:- 07/08/2024

General Manager, NRLDC18-A,  
SJSS Marg, Katwaria Sarai,  
New Delhi - 110016

**Subject- Regarding SPS of HVDC Mundra-Mahendargarh line**

Kindly refer to SE (ETC) Muzaffarnagar letter no/062/ETC/MZN/400 kV S/S Shamli dated 05.05.2024. (copy enclosed) regarding feeder wise load of Shamli area. As per the letter, at present complete load relief (i.e. 300MW) may not be provided by 220 kV Shamli, so that alternatively feeder and load details of 400 kV Shamli has also been provided. Also it is informed that at present SPS system at 220 kV Shamli is not healthy which is being maintained by PGCIL.

It is therefore requested to kindly instruct the concerned to incorporate 132 kV feeders of 220 kV Shamli & 400 kV Shamli in SPS of HVDC Mundra-Mahendargarh line so that appropriated load relief may be provided from UP Control area and take necessary action regarding healthiness of SPS system

*Sangeeta*  
(Sangeeta)

Superintending Engineer (R&A)

No: - /SE(R&A)/EE-II/SPS

Dated: - 2024

Copy forwarded to following via e-mail for kind information and necessary action:-

1. Director, UPSLDC, Vibhuti Khand II, Gomti Nagar, Lucknow.
2. Director (Operation), UPPTCL, 11<sup>th</sup> Floor, Shakti Bhawan Extn., Lucknow.
3. Chief Engineer (PSO), Vibhuti Khand - II, Gomti Nagar, Lucknow.
4. Chief Engineer (Trans. West), Pareshan Bhawan, 130D, Hydrel Colony, Victoria Park, Meerut 250001.
5. SE (Operations), 18 A SJSS Marg, Katwaria Sarai, New Delhi, 110016.

*/*  
(Sangeeta)

Superintending Engineer (R&A)





कार्यालय  
अधीक्षण अभियन्ता  
विद्युत पारेषण मण्डल  
उपग्रामावर ट्रांसमिशन कारपोरेशन लि०  
132 के०वी० भोपारोड उपकेन्द्र  
मुजफ्फरनगर-251001

OFFICE OF THE  
SUPERINTENDING ENGINEER  
Electricity Transmission Circle  
U.P. Power Transmission Corporation Ltd.  
132 KV Bhopa Road Sub-station  
Muzaffarnagar-251001

दूरभाष : 0131-2608038

Ph. 0131-2608038

E-mail : [seetcmzn@upptcl.org](mailto:seetcmzn@upptcl.org), [seetcmzn@gmail.com](mailto:seetcmzn@gmail.com)

संख्या / No. 1062 / E.T.C./MZN/400 KV S/S Shamli

दिनांक / DATED 05/08/24

Subject: - Regarding SPS of HVDC Mundra-Mahendargarh.

Superintending Engineer (R & A)  
U.P State Load Despatch Centre Ltd.  
UPSLDC Complex, Vibhuti Khand-II  
Gomti Nagar, Lucknow.  
Email. [sera@upslde.org](mailto:sera@upslde.org)

Please refer to your office letter no. 2187 dt. 01.07.2024, forwarded to this office by SE (T&C), Meerut vide endorsement no. 2237/CE(TW)/MT/SPS dt. 23.07.2024 vide which it has been requested to provide details of 132 KV feeders for planned relief to HVDC Mundra-Mahendargarh SPS.

In this reference, it is to apprise that following is the details of 132 KV feeders being fed from 220 KV Sub-Station Shamli.

S.No.	Name of feeder	Connected Load (MVA)	Maximum Load (MW)	Average Load (MW)
1	132 KV Lalukheri	63+63	72	47
2	132 KV Jhinhana	63+40+40	80	52
3	132 KV Kairana-I/II	63+63	41	27
4	132 KV Jasala	63+40	58	38
Total			251	164

1. Following Case wise Trippings of 132 KV Feeders at 220 KV Sub-Station, Shamli for tripping of HVDC Mundra-Mahendargarh Line may be used.

(A) In Maximum Load Condition:-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	220 KV Substation, Shamli	132 KV Jasala	58	1	1	1	1
2			132 KV Kairana-I	20.5		1		1
3			132 KV Kairana-II	20.5	-	1		1
4			132 KV Lalukheri	72	-	-	1	1
5			132 KV Jinjhana	80	-		1	1
Total Relief				251	58	99	210	251

(B) In Average Load Condition :-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	220 KV Subsatatio n, Shamli	132 KV Jasala	38	1		1	1
2			132 KV Kairana-I	13.5	1		1	1
3			132 KV Kairana-II	13.5	-		1	1
4			132 KV Lalukheri	47	-	1	1	1
5			132 KV Jinjhana	52	-	1	1	1
Total Relief				164	51.5	99	164	164



Alternatively HVDC Mundra-Mahendargarh SPS may be shifted to 400 KV Sub-Station Shamli, details of 132 KV feeders from 400 KV Sub-Station Shamli with its Maximum and Average load is as follows :

S.No.	Name of feeder	Connected Load (MVA)	Maximum Load (MW)	Average Load (MW)
1	132 KV Budhana	63+40	82	53
2	132 KV Kharad	63+40	78	51
3	132 KV Jalalpur	40+40	41	27
4	132 KV Thanabhawan	63+63+40	74	48
5	132 KV Kaniyan	40+40	35	23
Total			310	202

2. Following Case wise Trippings of 132 KV Feeders at 400 KV Sub-Station, Shamli for tripping of HVDC Mundra-Mahendargarh Line is hereby recommended

(A). In Maximum Load Condition :-

(A). In Maximum Load Condition :-								
S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 - 50 MW Case-2 - 100 MW Case-3 - 200 MW Case-4 - 300 MW	400 KV Subsatatio n, Shamli	132 KV Budhana	82	-	-	1	1
2			132 KV Kharad	78	-	-	1	1
3			132 KV Jalalpur	41	1	-	1	1
4			132 KV Thanabhawan	74	-	1	-	1
5			132 KV Kaniyan	35	1	1	-	1
Total Relief				310	76	109	201	310

(B). In Average Load Condition :-

(B). In Average Load Condition :-								
S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 = 50 MW Case-2 = 100 MW Case-3 = 200 MW Case-4 = 300 MW	400 KV Subsatatio n, Shamli	132 KV Budhana	53	-	1	1	1
2			132 KV Kharad	51	1	1	1	1
3			132 KV Jalalpur	27	-	-	1	1
4			132 KV Thanabhawan	48	-	-	1	1
5			132 KV Kaniyan	23	-	-	1	1
Total Relief				202	51	104	202	202

Submitted for information and necessary action

(Nikhil Kumar)  
Superintending Engineer

संख्या / No.

/E.T.C./MZN/

दिनांक / DATED

Copy forwarded to the following for information and necessary action :

1. Chief Engineer (TW) UPPTCL Meerut.
2. Superintending Engineer, Electricity (T&C) Circle, UPPTCL Meerut.
3. Executive Engineer Electricity Transmission Division, Shamli

(Nikhil Kumar)  
Superintending Engineer



कार्यालय  
अधीक्षण अभियन्ता  
विद्युत परीक्षण एवं परिचालन मण्डल  
उ०प्र० पावर ट्रांसमिशन कारपोरेशन लि०  
प्रथम तल पारेषण भवन, 130-डी, विक्टोरिया पार्क  
मेरठ- 250 003  
मोबाइल: 9412749817



OFFICE OF THE  
SUPERINTENDING ENGINEER  
Electricity Test & Commissioning Circle  
U.P. POWER TRANSMISSION CORPORATION LTD.  
1<sup>st</sup> Floor Pareshan Bhawan, 130-D, Victoria Park,  
Meerut 250 003  
Mobile: 9412749817

No. 82... / ETCC-MT /

Dated- 30/05/24

Sub :- SPS related to HVDC Mundra-Mahendargarh.

Superintending Engineer (R&A)  
UPSLDC Vibhuti Khand,  
Gomti Nagar,  
Lucknow.

(By e-mail)

In reference to the above cited subject, UPSLDC via email on 22.05.2024 informed that on 17.05.2024 at 16:20 hrs, Case-3 of SPS related to HVDC Mundra - Mahendergarh operated. As per action in case-3 operation of this line SPS, 200MW load relief at 220kV Shamli (UP) is desired. However, no load relief at 220kV Shamli was observed at given date and time. It is to bring in your notice that due to commissioning of 400kV Shamli S/s entire power flow scenario has been changed. Current situation is summarized as below.

At 220kV Shamli S/s feeders shown in the list	Planned load relief (MW)	Current situation
Thana Bhawan -1	25	The only line cateting Thana Bhawan has been made LILO at 132kV Jalalpur. Now Jalalpur is fed from 220kV Shamli S/s while load of Thana Bhawan is fed from 400kV Shamli S/s.
Thana Bhawan -2	25	
Jasala-1	25	Only one line exists.
Jasala-2	25	
Kharad-1	50	Only one line exists which is normally kept open at Kharad and load of Kharad is normally fed from 400kV Shamli S/s.
Kharad-2	50	
Baraut-1	150 (case-4)	No such line exist at 220kV Shamli S/s.
Baraut-2	150 (case-4)	

In view of the above facts, entire load relief strategy needs to be reviewed and redesigned for SPS. On 17.05.2024 at 16:20 hrs, no tripping observed at 220kV S/S Shamli as SPS system is unhealthy, which is being maintained by M/s PGCIL.

Hence it is requested to you to kindly coordinate with M/s PGCIL for modification of the scheme and rectification of the fault in SPS.

(Pramod Kumar Mishra)  
Superintending Engineer

No. 82... / ETCC-MT /

Dated/- 30/05/24

Copy forwarded to the following for information & necessary action:-

1. Chief Engineer (TW), UPPTCL Victoria Park, Meerut.
2. Executive Engineer, Electricity Test & Commissioning Div., Muzaffarnagar.

(Pramod Kumar Mishra)  
Superintending Engineer

## Rajasthan Details

### Revised updated feeder details (radial) along with expected average Load Relief

S.No.	Name of Sub- Station	Feeder name as per existing detail	Revised name of Existing Feeder /Line/Equipment	Average Load relief (MW )	Remark
1	220 kV GSS Alwar	132 kV GSS Mundawar	132 kV GSS Pinan	25	
		132 kv GSS Bansoor	132 kV GSS Telco	45	
		132 kV GSS Ramgarh	132 kV GSS Ramgarh	65	
		132 kV GSS Malakhera	132 kV GSS Malakhera	50	
		132 kV Alwar (LOCAL)	132 kV GSS Alwar (LOCAL)	120	
2	220 kV GSS Ratangarh	132 kV Sardar Sher			Generally Feed from 220 kV Halasar
3	220 kV GSSV Bhilwara	132 kV GSS Gangapur	132 kv GSS Karoi	15	
		132 kV GSS Danta	132 kV GSS Danta	30	
		132 kV GSS Devgarh	132 kV GSS Bankali	18	
		132 kV GSS Kareda			
4	400 kV GSS Merta	132 kV GSS Kuchera	132 kV GSS Dhawa	25	
		132 kV GSS Lamba	132 kV GSS Lamba jatan	55	
		132 kV GSS Gotan			



Email

Control Room CONTROL ROOM SLDC

---

**Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.**

---

**From :** Executive Engineer TS Rewari  
<xentsrwr@hvpn.org.in>

Thu, Aug 29, 2024 01:20 PM

**Subject :** Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.**To :** Control Room CONTROL ROOM SLDC  
<controlroomsldc@hvpn.org.in>**Cc :** SE TS GGN <setsggn@hvpn.org.in>, Executive Engineer Executive Engineer  
<xen400kvdhanoda@hvpn.org.in>, Substation Engineer <sse220kvlulaahir@hvpn.org.in>

In continuation of trailing email and discussion held today telephonically, it is gathered that desired load relief shall not get as load of 220 kV Lula Ahir shall be fed through 220 kV Dadri-Lula Ahir line being synchronized. Therefore, it is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added.

The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA

The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA

---

**From:** "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>  
**To:** "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>  
**Cc:** "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvnarnaul@hvpn.org.in>  
**Sent:** Wednesday, August 28, 2024 12:46:13 PM  
**Subject:** Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In reference of trailing email it is submitted that 220 kV Lula Ahir is connected with 400 kV Dhanonda through 220kV D/C line and with 220 kV Dadri through 220kV S/C line and with 220 kV Rewari with 220kV S/C line.

In general circuits of 400 kV Dhanonda and 220 kV Dadri runs in synchronization. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. It is further added that in general 220 kV Dadri takes load from 220 kV Lula Ahir substation and thus act as sink.

In case of operation of SPS at 400 kV Dhanonda, the desired load relief as mentioned in trailing email (90+95 MW) can be achieved through existing scheme (by outage of three no. 100 MVA TFs and 220 kV Dadri (acting as sink)).

Regards  
XEN/TS Division  
HVPNL Rewari.

---

**From:** "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>  
**To:** "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>, "Executive Engineer TS Rohtak" <xentsrtk@hvpn.org.in>, "Executive Engineer Ts Bhiwani" <xentsbhw@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, xendhanonda@gmail.com  
**Cc:** "Chief Engineer SO Commercial" <cesocomml@hvpn.org.in>, "Chief Engineer TS Panchkula" <cetspkl@hvpn.org.in>, "Chief Engineer TS Hisar" <cetshsr@hvpn.org.in>, "Superintending Engineer SLDC OP" <sesldcop@hvpn.org.in>, "SE TS Rohtak" <setsrtk@hvpn.org.in>, "SE TS GGN" <setsggn@hvpn.org.in>, "Superintending Engineer TS Hisar" <setshsr@hvpn.org.in>, "Superintending Engineer MP CC Dhulkote" <sempccdk@hvpn.org.in>, "Superintending Engineer MP CC Delhi" <sempccdelhi@hvpn.org.in>, "Executive Engineer MP Rohtak" <xenmpccrtk@hvpn.org.in>, "XEN MP Hisar" <xenmpcchsr@hvpn.org.in>, "XEN MP CC" <xenmpccggn@hvpn.org.in>  
**Sent:** Wednesday, August 21, 2024 11:57:59 AM  
**Subject:** Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Sir,

Please see the attachments.

--

Regards,  
SCE (पाली प्रभारी अभियंता )/SLDC Control room,  
HVPNL Panipat  
Contact No- 9053090722,9053090721,0180-2664095

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## Fwd: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Control Room CONTROL ROOM SLDC &lt;controlroomsldc@hvpn.org.in&gt;

Fri 8/30/2024 12:44 PM

To: NRLDC SO 2 &lt;nrldcso2@grid-india.in&gt;; NRLDC SO-II &lt;nrldcso2@gmail.com&gt;; Deepak Kumar &lt;deepak.kr@grid-india.in&gt;;

Cc: Superintending Engineer SLDC OP &lt;sesldcop@hvpn.org.in&gt;;

 2 attachments (209 KB)

Email SPS Rewari.pdf; Regarding SPS Bhiwani.pdf;

\*\*\*\*Warning\*\*\*\*

This email has not originated from Grid-India. Do not click on attachment or links unless sender is reliable. Malware/ Viruses can be easily transmitted via email.

Sir,

In reference to the SPS installed for 500kV HVDC Munda - Mahindergarh link the information received from TS wing (copy attached) is as under:

1. At 400kV Dhanonda through Lula Ahir substation:- It is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA.

2. At 400/220kV Bhiwani BBMB: It is proposed that in the existing scheme SPS, the tripping of 220 kV Bapora (Bhiwani HVPNL) D/C line at Bhiwani BBMB end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV T-1 & T-2 TFs) at 220 kV Bapora (Bhiwani HVPNL) substation may be added. The maximum load on two no. 100 MVA TFs installed at 220kV Bhiwani HVPNL is 80 MW and 85 MW respectively. The average load on two no. 100 MVA TFs installed at 220kV Bhiwani HVPNL is 70 MW and 70 MW respectively.

3. At 132kV Charkhi Dadri: It is proposed that in the existing scheme SPS, the tripping of 132kV Kalanaur line at Dadri BBMB end may be removed and tripping of 132kV Haluwas & 132kV Dadri old at Dadri BBMB may be added. The maximum load on 132kV Haluwas & 132kV Dadri old line is 45 MW and 50 MW respectively. The average load on 132kV Haluwas & 132kV Dadri old line is 40 MW and 40 MW respectively.

Rest information kept unchanged. It is also added here that the fiber connectivity is also available on all the above substations.

It is also pertinent to mention here that 700 MW load relief is expected from Haryana. Rest of the states have been allotted with a relative less amount of relief as compared to Haryana for 500kV HVDC Mundra - Mahendargarh link. The Haryana share from APL Mundra has also been reduced now. In view of the above, the expected load relief from the NR states is required to be reviewed accordingly. The same was also pointed out by this office during the online meeting held on dated 20.08.2024.

This is for information & further necessary action please.

---

From: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>

To: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>

Cc: "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvlulaahir@hvpn.org.in>

Sent: Thursday, August 29, 2024 1:20:08 PM

Subject: Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In continuation of trailing email and discussion held today telephonically, it is gathered that desired load relief shall not get as load of 220 kV Lula Ahir shall be fed through 220 kV Dadri-Lula Ahir line being synchronized. Therefore, it is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added.

The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA

The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA

---

**From:** "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>

**To:** "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>

**Cc:** "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvnamaul@hvpn.org.in>

**Sent:** Wednesday, August 28, 2024 12:46:13 PM

**Subject:** Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In reference of trailing email it is submitted that 220 kV Lula Ahir is connected with 400 kV Dhanonda through 220kV D/C line and with 220 kV Dadri through 220kV S/C line and with 220 kV Rewari with 220kV S/C line.

In general circuits of 400 kV Dhanonda and 220 kV Dadri runs in synchronization. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. It is further added that in general 220 kV Dadri takes load from 220 kV Lula Ahir substation and thus act as sink.

In case of operation of SPS at 400 kV Dhanonda, the desired load relief as mentioned in trailing email (90+95 MW) can be achieved through existing scheme (by outage of three no. 100 MVA TFs and 220 kV Dadri (acting as sink)).

Regards

XEN/TS Division

HVPNL Rewari.

---

**From:** "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>

**To:** "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>, "Executive Engineer TS Rohtak" <xentsrtk@hvpn.org.in>, "Executive Engineer Ts Bhiwani" <xentsbhw@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, xendhanonda@gmail.com

**Cc:** "Chief Engineer SO Commercial" <cesocomml@hvpn.org.in>, "Chief Engineer TS Panchkula" <cetspkl@hvpn.org.in>, "Chief Engineer TS Hisar" <cetshsr@hvpn.org.in>, "Superintending Engineer SLDC OP" <sesldcop@hvpn.org.in>, "SE TS Rohtak" <setsrtk@hvpn.org.in>, "SE TS GGN" <setsggn@hvpn.org.in>, "Superintending Engineer TS Hisar" <setshsr@hvpn.org.in>, "Superintending Engineer MP CC Dhulkote" <sempccdk@hvpn.org.in>, "Superintending Engineer MP CC Delhi" <sempccdelhi@hvpn.org.in>, "Executive Engineer MP Rohtak" <xenmpccrtk@hvpn.org.in>, "XEN MP Hisar" <xenmpccchr@hvpn.org.in>, "XEN MP CC" <xenmpccggn@hvpn.org.in>

**Sent:** Wednesday, August 21, 2024 11:57:59 AM

**Subject:** Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Sir,

Please see the attachments.

--

Regards,

SCE (पाली प्रभारी अभियंता )/SLDC Control room,

HVPNL Panipat

Contact No- 9053090722,9053090721,0180-2664095

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Regards,

SCE (पाली प्रभारी अभियंता )/SLDC Control room,

HVPNL Panipat

Contact No- 9053090722,9053090721,0180-2664095

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HARYANA VIDYUT PRASARAN NIGAM LIMITED

Regd. Office: Shakti Bhawan, Plot No. C-4, Sector-6, Panchkula, 134109.  
Corporate Identity Number: U40101HR1997SGC033683  
Website: [www.hvpn.org.in](http://www.hvpn.org.in), E-mail - [xentsbhw@hvpn.org.in](mailto:xentsbhw@hvpn.org.in)  
Phone No: 01664-242797(O)

To

The Executive Engineer,  
LDPC, HVPNL,  
Panipat.

Memo No.Ch-116/OMBE-7

Dated: 29.08.2024


**Subject: SPS scheme at HVPNL substations for getting load relief due to tripping of 500Kv HVDC Mundra – Mahendargarh**

Please refer to this O/Memo No. 108/OMBE-7 dated 27.08.2024 and O/Email dated 09.08.2024 on the subject cited matter.

In this continuation to above, the details of SPS under TS division, HVPNL, Bhiwani is as under:

S No.	Name of feeding S/Stn	Feeder/Line/Equipment	SPS Installed	Max. Load	Load Relief (Avg Load )	Remarks
1	220KV S/Stn Bhiwani	132KV IA Bhiwani Line	UFR	50MW	40 MW	SPS (UFR )Installed and healthy
2	220KV S/Stn Bhiwani	132KV Bhiwani Ckt 2	UFR	50MW	40 MW	SPS (UFR )Installed and healthy
3	220KV S/Stn Bhiwani	132KV Tosham	UFR	-	-	SPS (UFR) Installed and healthy but line is running on No load as 2 <sup>nd</sup> source to 132KV Tosham
4	220KV S/Stn Bhiwani	132KV Incomer of Transformer 100MVA Transformer T2	-	85MW	70 MW	SPS may be provided for load relief as mentioned on subject above.
5	220KV S/Stn Bhiwani	132KV Incomer of 100MVA Transformer T1	-	80MW	70 MW	SPS may be provided for load relief as mentioned on subject above.
6	132kv substation Dadri-2	132KV Dadri-kalanaur ckt	Yes		Nil	SPS Installed and healthy but line is running on No load as 2 <sup>nd</sup> source to 132KV Kalanaur
7	132kv substation Dadri-2	132KV Dadri-Makrani ckt	Yes		Nil	SPS Installed and healthy but line is running on No load as 2 <sup>nd</sup> source to 132KV Makrani
8	132kv substation Dadri-2	132KV Dadri-Haluwas ckt	-	45MW	40MW	SPS may be provided for load relief as mentioned on subject above.
9	132kv substation Dadri-2	132KV Dadri-Dadri old	-	50MW	40MW	SPS may be provided for load relief as mentioned on subject above.

This is for kind information and necessary action please.

  
Executive Engineer,  
Transmission System Division,  
HVPNL, Bhiwani

CC to:

1. SE/TS Circle, HVPNL, Hisar for kind information, please.

# Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

SLDC, DELHI <sldcmintoroad@gmail.com>

Wed 8/28/2024 3:48 PM

To:NRLDC SO 2 <nrlDCso2@grid-india.in>;

Cc:sinha.surendra <sinha.surendra@yahoo.com>; dgmsodelhisldc@gmail.com <dgmsodelhisldc@gmail.com>; Manager (T) SO <managersogd@gmail.com>;

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In reference to trailing mail, the maximum load on 220kV feeders covered under SPS of 500kV HVDC Mundra-Mahindergarh link are as under:

S. No.	Name of the Element	MW
1	220 KV BAMNAULI-PAPANKALAN-I CKT.-I	120
2	220 KV BAMNAULI-PAPANKALAN-I CKT.-II	120
3	220 KV MANDAULA- GOPALPUR CKT.-I	212
4	220 KV MANDAULA- GOPALPUR CKT.-II	214

Regards,  
SLDC Delhi

On Tue, Aug 27, 2024 at 10:07 AM NRLDC SO 2 <nrlDCso2@grid-india.in> wrote:

Sir,

In reference of the trailing mail, it is to be mentioned that inputs have received from Rajasthan only. Members agreed to shared the details by 22nd August 2024, however no further details received from Haryana, Punjab, Delhi, UP & ADANI.

Kindly share the details as discussed during the meeting held on 20th August 2024, so that further remedial actions can be initiated on the basis of those details.

सादर धन्यवाद/ Thanks & Regards  
प्रणाली संचालन-II/ System Operation-II  
उ०क्षे०भा०प्रे०के०/ NRLDC  
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited  
Formerly known as  
पोसोको / POSOCO

Punjab Details

Punjab Control Area	Name of S/S	66kV Feeders	Average Demand(Amp.)	Maximum Demand(Amp.)
	220/66kV Gobindgarh	66kV Talwara-19(ADANI SPS)	375	430
		66kV Talwara-2(ADANI SPS)	375	430
	220/66kV Lalton kalan	66kV Gill road-1(DADRI SPS)	543	610
		66kV Gill Road-2(DADRI SPS)	518	692
		66kV Dugri(DADRI SPS)	325	450
	220/66kV Malerkotla	66kV Malerkotla(ADANI SPS)	213	403
		66kV Amargarh(ADANI SPS)	238	405
		66kV Malaud ckt 1(DTPC SPS)	257	356

Note: 66kV Malaud at 220kV S/S Malerkotla was bifurcated into two circuits in the month of July 2024.

## Nodal officers details

Control Area	Station Name	Nodal Person (SPS, communication system)	Contact details	Email Id
Rajasthan	220/132kV Alwar	Sh. Vijaypal Yadav XEN (Prot.) Ms. Pooja Verma AEN (Comm)	9413361407 9413375366	<a href="mailto:xen.prot.alwar@rvpn.co.in">xen.prot.alwar@rvpn.co.in</a> <a href="mailto:aen.comm.alwar@rvpn.co.in">aen.comm.alwar@rvpn.co.in</a>
	220/132kV Ratangarh	Sh. Mukesh Somra AEN (MPT&S) , Sh. Dharmender Singh ( Comm.)	9414061442 9413383246	<a href="mailto:aen.mpt&amp;s.rtg@rvpn.co.in">aen.mpt&amp;s.rtg@rvpn.co.in</a> <a href="mailto:aen.comm.ratangarh@rvpn.co.in">aen.comm.ratangarh@rvpn.co.in</a>
	220/132kV Bhilwara	Sh. Madhusudan Sharma, AEN (SLDC-comm Sh. Suresh Garg, XEN (MPT&S)	9413383176 9414061424	<a href="mailto:aen.subsldc.bhl@rvpn.co.in">aen.subsldc.bhl@rvpn.co.in</a> <a href="mailto:xen.mpts.bhl@rvpn.co.in">xen.mpts.bhl@rvpn.co.in</a>
	220/132kV Merta	Mukesh Kumar (AEN Prot.) Mahip Singh ( Aen) Comm)	7734806466 9413362995	<a href="mailto:aen.prot.mertacity@RVPN.CO.IN">aen.prot.mertacity@RVPN.CO.IN</a> <a href="mailto:aen.comm.merta@RVPN.CO.IN">aen.comm.merta@RVPN.CO.IN</a>
BBMB	400/220kV Bhiwani(BBMB)			
POWERGRID	400/220kV Hissar(PG)			
	Bhiwani(PG)			
	400/220kV Bahadurgarh(PG)			
Haryana	400/220kV Dhanonda	Gautam / SSE, 400kV Dhanonda	9313472669	<a href="mailto:ghanonda400kv@gmail.com">ghanonda400kv@gmail.com</a>
	220kV Lulahir	Er. Subhash Chander	9416373135	<a href="mailto:sse220kvlulaahir@hvpn.org.in">sse220kvlulaahir@hvpn.org.in</a>
	220kV Rewari	Er. Kavinder Yadav	9315315649	<a href="mailto:sse220kvrwr@hvpn.org.in">sse220kvrwr@hvpn.org.in</a>
	132kV Charkhi Dadri	Vivek Sangwan	9034459489	<a href="mailto:sse132kvdadri@hvpn.org.in">sse132kvdadri@hvpn.org.in</a>
Punjab	220/66kV Gobindgarh	Er. Harwinder Singh	96461-18184	<a href="mailto:ae-220kvg1-mgg@pstcl.org">ae-220kvg1-mgg@pstcl.org</a>
	220/66kV Laltokalan	Er. Supinder Singh	96461-24495	<a href="mailto:sse-pm-lalton@pstcl.org">sse-pm-lalton@pstcl.org</a>
	220/66kV Materkotla	Er. Sanju Bala	96461-64007	<a href="mailto:sse-pm-mlrk@pstcl.org">sse-pm-mlrk@pstcl.org</a>
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	400kV Muradnagar	Er. D.S. Sengar	9412748666	<a href="mailto:ee400mrd2@upptcl.org">ee400mrd2@upptcl.org</a>
Delhi	400/220kV Bamnauli			
	400/220kV Mandola			