भारतसरकार
Government of India
केंद्रीयविद्युत्प्राधिकरण
Central Electricity Authority
पश्चिमक्षेत्रीयविद्युत्समिति
Western Regional Power Committee
एफ-3,एमआईडीसीक्षेत्र, अंधेरी (पूर्व), मुंबई- 400 093
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No./WRPC/Prot/161st PCM/2024/ 2795-2895 Date: 03.02.2025

सेवा में/ To,
As per List (सूची के अनुसार)

विषय:161वीं संरक्षण समिति की बैठक का एजेंडा.
Sub: Minutes of 161st Protection Committee Meeting.

महोदय/ Sir,

कृपया 24/12/2024 को आयोजित डब्ल्यूआरपीसी की 161वीं संरक्षण समिति की बैठक का कार्यवृत्त इसके साथ संलग्न है। बैठक के कार्यवृत्त वेबसाइट https://wrpc.gov.in पर भी उपलब्ध हैं, कृपया इन्हें डाउनलोड किया जा सकता है।

Please find enclosed herewith the Minutes of the 161st Protection Committee Meeting of WRPC held on 24/12/2024, for necessary action. The Minutes of the meeting is also available on website https://wrpc.gov.in,same may please be downloaded.

संलग्नक : ऊपरोक्तनुसार

Enclosed : As above

भवदीय/ Yours' faithfully,

(P. D. Lone)
अधीक्षण अभियंता (रक्षण)
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28. EE (T), CSPGCL- Fax.No. 07789-226227, Email
29. S.E. (T&C), CSPTCL, Bhilai. Fax.No. 0788 - 2281561, Email
30. S.E. (T&C), CSPTCL, Raipur. Fax No.0771 – 2574749 / 2574458, Email
31. D.G.M. (EM), KSTPS, NTPC, Korba Fax 07759-233088 (Tele fax: 232440) /237462, Email
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33. DGM (EM-I), NTPC, SIPAT Fax-07752-246506 (Tele fax: 246691), Email
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37. AGM (QAIT), TPC, Trombay. Fax –022-66687088, Email
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All WPP/Solar Power Producers in WR

1. AGM, Athena Renewable Private Limited
2. AVP Adani Green EnergyLtd.

3. Manager, Alfanar Energy Private Limited
4. Asst. Manager (Operation & Maintenance), Continuum Power Trading Private Limited
5. Senior Manager, Gujarat Industries Power Company Limited
6. Group Head-Forecasting & Scheduling, Tata Power Renewable Energy Ltd.
7. Sr.Manager, Avikaran Solar India Private Limited
8. Associate Vice President, Powerica Limited
9. Asst. Vice President, Sembcorp Green Indra Ltd
10. Head of O&M, ENEL (Avikiran Solar India Pvt.)
11. Lead-eBoP Asset Management, ReNew Power Limited
12. Vice President, Apraava Energy Private Limited (AEPL)
13. Sr. GM, Avaada
14. Lead Engineer, Senvion India Pvt. Ltd
15. Sr. Manager, SJVN Green energy ltd
16. Manager, Srijan Energy Systems Private Limited
17. AVP Project, UPC renewables Ltd.
18. Arinsun Clean Energy Private Limited
19. Mahindra Renewables Private Limited
20. ReNew Power Limited
21. Electro Solaire Private Limited
22. Sitac Kabini Renewables Private Limited
23. Sherisha Raipur

Minutes of 161st Protection Sub Committee Meeting (PCM) of WRPC held on 24.12.2024 through Hybrid Mode.

The 161th Protection sub-Committee Meeting was held on 24 December 2024 in hybrid mode. The List of Participants is enclosed at Annexure-1.

Item no. 1. Confirmation of Minutes of the 160th PCM

The 160th meetings of protection sub-committee were held on 12th September 2024 through hybrid mode. The Minutes of the meeting were circulated vide letter WRPC/Protection/160th PCM/2024/4861-4961 dated 26.11.2024

No comments have been received on the 160th PCM Minutes.

161th PCM Discussions:

The Sub-Committee confirmed the minutes of the 160th Protection sub-Committee meeting.

Item no. 2. Major Occurrences/grid disturbances

The update on the PCM Action taken report for the previous PCMs is attached as Annexure 2.

161st PCM discussed grid events occurred during August to October 2024

2A. Occurrences in Gujarat system:

2A.1. Grid Event at f 400 kV Kansari-Bus substation on 19th August 2024

1. **Event Category: GI-2**
2. **Event Date and Time:** 19th August 2024, 23:48 Hrs
3. **Event Summary:** At 23:48 Hrs / 19-08-2024, Y phase CT of 400 kV Kansari-Bus Coupler towards 400 kV Kansari-Bus-2 side failed, resulting in Bus Bar protection operation and tripping of 400 kV Kansari-Bus-2 and all connected elements. After 2 seconds the smoke from failed CT reached 400 kV Kansari-Bus-1 resulting in Bus Bar protection operation and tripping of 400 kV Kansari-Bus-1 and all connected elements. 400 kV Kansari-Bus-1: 400/220 kV Kansari-ICT-3&4, 400 kV Kansari-Soja-1, 400 kV Kansari-Banaskantha, 400 kV Kansari-Charanka-1, 400 kV Kansari-Kankroli-1 and 400 kV Kansari-B/R-1400 kV Kansari-Bus-2: 400 kV Kansari-Charanka-2, 400/220 kV Kansari-ICT-1&2, 400 kV Kansari-Kankroli-2 (Bypassed at Bhinamal), 400 kV Kansari-B/R-2.Prior to the trippings, 400 kV Kansari-Soja-1 was under outage for Voltage Regulation. 400 kV Kansari side became dead and 220 kV Kansari was intact. No generation / load loss occurred due to the event.

4. Elements Tripped –

1. 400 kV Kansari-Bus Coupler
2. 400 kV Kansari-Bus-1&2
3. 400 kV Kansari-Charanka-1&2
4. 400 kV Kansari-Banaskantha
5. 400 kV Kansari-Veloda
6. 400 kV Kansari-Soja-1
7. 400 kV Kansari-Kankroli-1
8. 400 kV Kansari-Kankroli-2 (Bypassed at Bhinamal)
9. 400/220 kV Kansari-ICT-1,2,3&4 (315 MVA)
10. 400 kV Kansari-B/R-1&2

5. Time and Date of Restoration- 01:16/ 20-08-2024

6. Protection/Operational issues Observed-

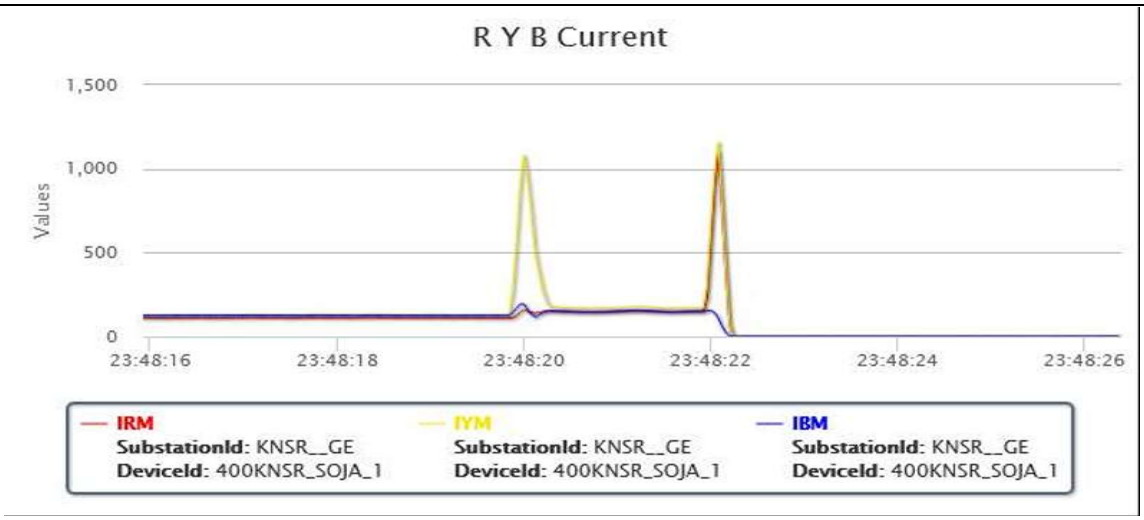
There is time mismatch of 4 minutes in the event w.r.t. PMU and the information and DR Provided by GETCO. Correct event time is 23:48 Hrs as per PMU. 400kV Busbar Zone-2 delayed tripped after the Differential current reached 70% of Bias Current. Hence for Busbar Scheme having Bus coupler Bay CTs on both side of Main Bus and configured for Busbar Differential Zone-4, the slope setting shall be reduced up to 60% by GETCO.

7. Action Taken/Remedial Measures:

400kV Bus Coupler Bay isolators opened and both 400kV Main Bus-1 & 2 normalized by GETCO. Y-Ph. CT replaced on 20-08-2024 and Bus coupler taken in services by GETCO. There is time mismatch of 4 minutes in the event w.r.t. PMU and the information and DR provided by GETCO. GETCO may kindly fix this issue of time mismatch in DR. 400kV Busbar Zone-2 delayed tripped after the Differential current reached 70% of Bias Current. Hence for Busbar Scheme having Bus coupler Bay CTs on both side of Main Bus and configured for Busbar Differential Zone-4, the slope setting shall be reduced up to 60% by GETCO.

<u>161th PCM Discussions:</u>

Analysis from PMU:



GETCO informed that Y phase CT of 400 kV Bus Coupler towards 400 kV Bus-2 failed resulting in Bus Bar protection operation and tripping of 400 kV Kansari-Bus-2 and all connected elements. After 2 seconds, the smoke from failed CT reached 400 kV Kansari-Bus-1 resulting in Bus Bar protection operation and tripping of 400kV Kansari-Bus-1 and all connected elements.

The Sub-Committee noted that the tripping was in order. A detailed report is enclosed as Annexure 2A.1.

2A.2. Grid Event at 220 kV Haldarwa-Bus substation on 07th October 2024

1. **Event Category: GI-1**

2. **Event Date and Time:** 07th October 2024, 09:29 Hrs

3. **Event Summary:** At 09:29 Hrs / 07-10-2024, Bus bar protection operated in 220 kV Haldarwa-Bus- Double Main Bus scheme) due to broken jumper over Y phase Bus side isolator of 220 kV GPEC-Haldarwa-1, resulting in of tripping of all the connected elements (as mentioned in elements tripped column). No Generation loss or load loss of occurred to the event.

4. **Elements Tripped –**
    1. 220 kV Gandhar-Haldarwa 2
    2. 220 kV Haldarwa-Kawas-2
    3. 220 kV Haldarwa-Kakrapar(1&2)-2
    4. 220 kV Dahej-Haldarwa-1
    5. 220 kV GPEC-Haldarwa-1
    6. 220 kV Jambuva-Haldarwa-1
    7. 220 kV Suva-Haldarwa
    8. 220 kV Haldarwa-Bus-2
    9. 220/66 kV Haldarwa ICT-2&3

5. **Time and Date of Restoration- 13:40/ 07-10-2024**

6. Protection/Operational issues Observed-

DR are not time synced. SOE not generated

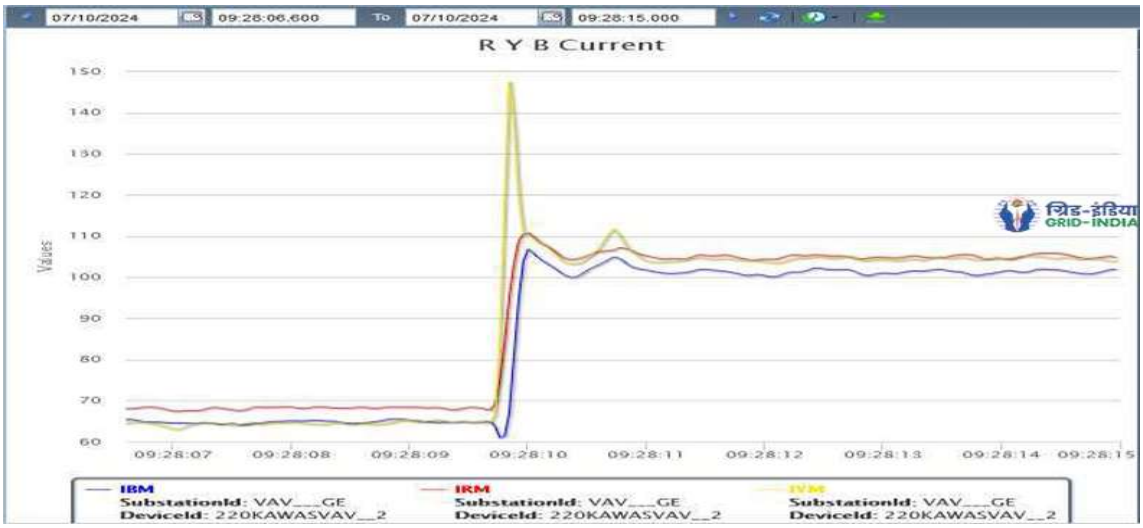
7. Action Taken/Remedial Measures:

As informed by GETCO, "Y"-ph jumper found broken from clamp towards Main Bus-B side. Jumper isolator palm clamp found mechanically broken & earthed at bottom side of Porcelain Insulator of same phase. Same was attended with New Porcelain Insulator, isolator jaw and new jumper clamp in 220kV main Bus B and system was restored. Last thermography of 220kV GPEC

Line-1 was carried out on 08-07-2024 by GETCO and hot point observed on Bus-A isolator but there wasn't any observational abnormality on Bus B isolator side. Issue of DR time sync to be resolved by GETCO. Issue of non-generation of SOE to be resolved by GETCO in coordination with WRLDC SCADA

161th PCM Discussions:

Analysis from PMU:



GETCO informed that Busbar (Bus-B) Differential Protection operated at 220 kV Haldarwa S/s due to broken jumper of Y-Ph isolator of Bus-B and all elements connected to Bus-B were tripped. He further informed that broken end of the jumper causes the Y- E fault resulting in busbar operation.

The Committee noted that the tripping was in order. A detailed report is enclosed in Annexure 2A.2.

2B.Occurrences in Madhya Pradesh

No events in Madhya Pradesh system.

2C. Occurrences in Maharashtra system

2C.1. Grid Event at 400/220 kV Dhule (MH) substation on 12th August 2024

1. **Event Category:** GD-1

2. **Event Date and Time:** 12th August 2024, 05:09 Hrs

3. **Event Summary:** At 05:09 Hrs / 12-08-2024, 400/220 kV Dhule (MH)-ICT-3 tripped on differential protection operation due to blasting of Y phase bushing. 400/220 kV Dhule (MH)-ICT-1 tripped on Backup to Earth Fault protection operation. 400 kV Dhule (MH)-Khandwa-1 tripped on Over voltage stage-1 protection operation which was a maloperation. 400 kV Dhule (MH)-Dhule (BDTCL)-2 tripped on Z-4 protection operation at Dhule (MH) end and Z-2 protection operation at Dhule (BDTCL) end. 400 kV Dhule (MH)-SSP-2 tripped on Z-4 protection operation at Dhule (MH) end and Z-1 protection operation at SSP end (tripping on Z-1 at SSP) which was a maloperation. 400 kV Dhule (MH)-Bableswhwar-2 tripped on Z-2 protection operation at Bableshwar end. Ideally the fault should have been cleared on LBB protection operation, but LBB protection not operated. Load loss of 70.06 MW occurred at occurred due to LTS stage-1 and LTS stage-2 operation due to 400/220 kV Dhule (MH)-ICT-1&3.

4. **Elements Tripped –**

1. 400/220 kV Dhule (MH)-ICT-3
2. 400/220 kV Dhule (MH)-ICT-1
3. 400 kV Dhule (MH)-Khandwa-1
4. 400 kV Dhule (MH)-Dhule (BDTCL)-2
5. 400 kV Dhule (MH)-SSP-2
6. 400 kV Dhule (MH)-Bableswhwar-2

5. **Time and Date of Restoration- 09:00/ 12-08-2024**

6. **Protection/Operational issues Observed:**

400 kV Dhule (MH)-Khandwa-1 tripped on Over voltage stage-1 protection operation which was not in order. The fault persisted for 600 msec, ideally the fault should have been cleared in 200 msec on LBB protection operation, but LBB protection not operated. 400 kV Dhule (MH)-SSP-2 tripped on Z-4 protection operation at Dhule (MH) end and Z-1 protection operation at SSP end, tripping on Z-1 at SSP end was not in order.

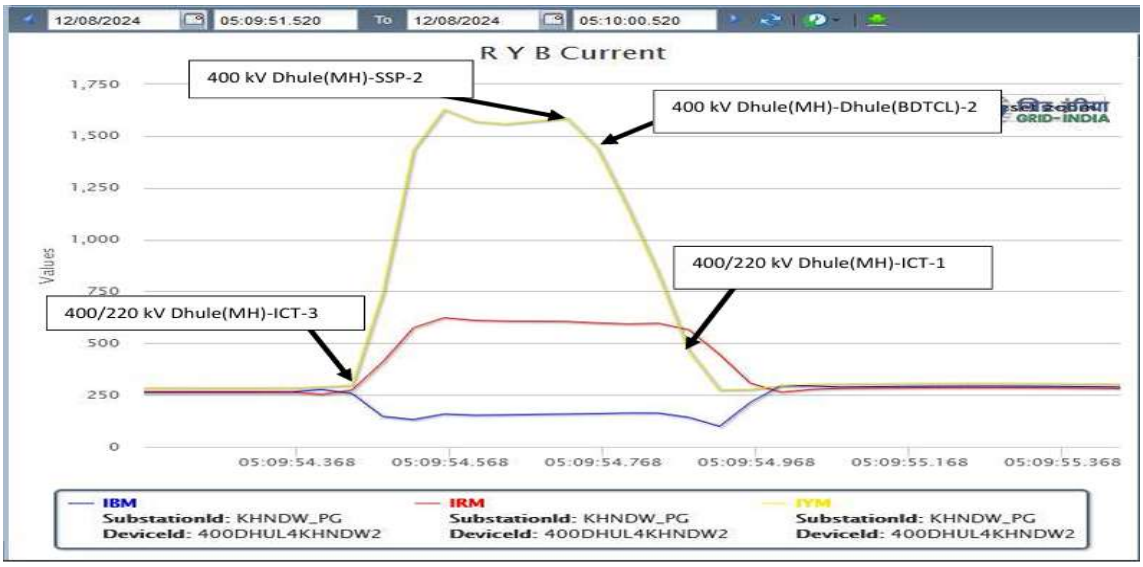
7. **Action Taken/Remedial Measures:**

MSETCL to kindly check the tripping of 400 kV Dhule (MH)-Khandwa-1 tripped on Over voltage stage-1 protection, clarify the reason of maloperation and inform about the action taken. MSETCL

to kindly check the non-operation of LBB relay, clarify the reason of nonoperation and inform about the action taken. NCA to kindly check the tripping of 400 kV Dhule (MH)-SSP-2 on Z-1 at SSP end, clarify the reason of maloperation and inform about the action taken.

161th PCM Discussions:

Analysis from PMU:



MSETCL informed that the Differential Protection relay and Backup Protection relay of ICT-3 operated due to the bursting of HV 'Y' ph bushing of 501MVA, 400/220 kV ICT-3 (CGL Make, 2010) at Dhule substation. Simultaneously, 315MVA 400/220 kV ICT-1, connected on the same Bus-II tripped on LV Backup protection.

They also stated that 400 kV Songir-2 tripped on Zone-4 Reverse Zone protection at Dhule end & Zone-2 at Songir end, 400 kV SSNL-2 line tripped on Zone-4 Reverse Zone protection at Dhule end & Zone-2 at SSNL end and 400 kV BBLR-2 line tripped on Zone-2 at BBLR end, 400 kV Bus Coupler Tripped on OC/EF protection & 400 kVKhandwa-1 line tripped on Over Voltage protection.

Further, the Differential relay (Sifang CSC326) of the ICT-3 operated correctly and did not extend the command to 186 & 286 Master trip relays. Hence ICT-3 tripped on HV & LV Backup protection. Master trip relays 186 & 286 operated on HV & LV Backup protections and HV/LV Circuit Breakers tripped correctly.

From the Disturbance record of the Differential relay, it is clear that Differential protection operated correctly but the relay output contacts did not operate, hence could not extend the command to master trip relays 186& 286. Also, the fault was fed by the 400 kV feeder bays connected to 400 kV BUS-II & tripped on their own protections correctly. The Differential relay (Sifang CSC326) operation during the earlier occurrences was found in order.

Remedial measures:

1. **The non-operation of the output contact of the Sifang relay matter was referred to M/s Sifang for detailed investigation and solution. Also, these Sifang make CSC326 differential relays of all 3 nos. of ICTs at 400 kV Dhule SS have been replaced with new Siemens make Reyrolle 7SR54 Transformer protection relay under C.O. retrofitting work in order to avoid such mal-operations of Sifang make relays. The new Siemens make relay retrofitted for ICT-3 on Dt.23.08.2024, ICT-14.09.2024 and ICT-1 on Dt.19.09.2024 at 400 kV Dhule SS.**

2. **All Protection relays of ICT-3 were tested & confirmed with HV/LV Circuit breaker tripping.**

The Committee noted the above. A Detailed report is enclosed as Annexure 2C.1.

2C.2 Grid Event 220 kV STT-Mahape and STT-TIFIPL Substation on 12th August 2024

1. **Event Category:** GD-1
2. **Event Date and Time:** 12th August 2024, 21:49 hrs
3. **Event Summary** At: At 21:49 Hrs / 12-08-2024, 220 kV STT-Mahape and 220 kV STT-TIFIPL tripped on differential protection operation due to R phase lightening arrestor of 220 kV STT-Mahape burst at STT substation. Tripping of 220 kV STT-TIFIPL for a fault in 220 kV STT-Mahape is undesirable. No load loss occurred due to the event.
4. **Elements Tripped –**
    1. 220 kV STT-Mahape
    2. 220 kV STT-TIFIPL
5. **Time and Date of Restoration-** 03:22 / 13-08-2024
6. **Protection/Operational issues observed:**

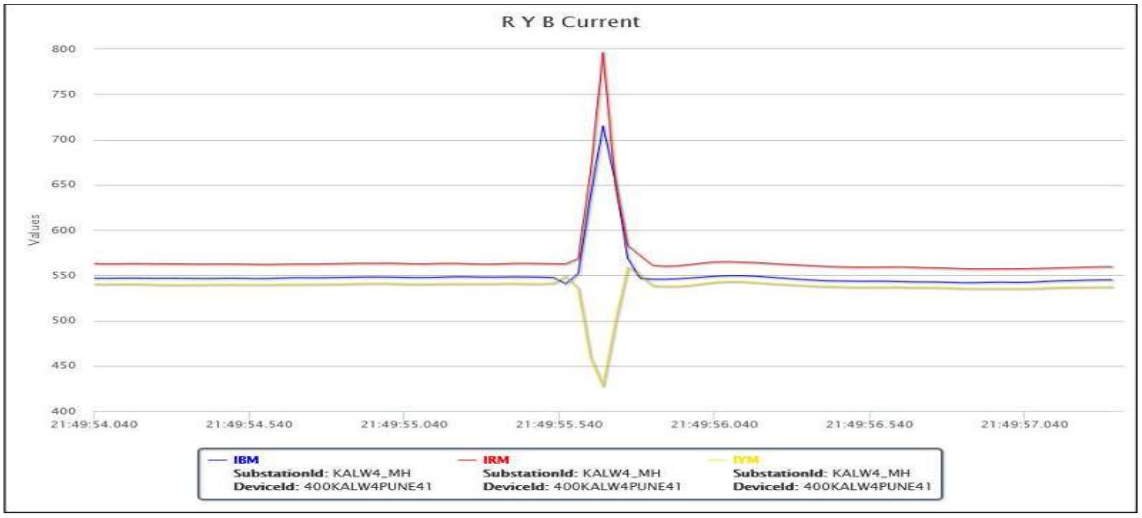
    220kV STT- TIFIPL line also tripped at the same time due to relay maloperation. As explained by MSETCL, "Siemens make 7SL87" differential relay at STT end sensed the fault on SOTF due to wrong configuration and incorrect settings in the relay. In the 7SL87 differential relay, SOTF initiation was given CB close status instead of CB close command due to which the SOTF initiation was permanently high and the SOTF setting was kept nondirectional along with DT send command configured to it which caused the maloperation of the relay and isolated the STT from both the sources." MSETCL may kindly take up the issue of non-generation of SOE in coordination with WRLDC SCADA.

7. **Action Taken/Remedial Measures:**

MSETCL has corrected the relay settings. The SOTF setting of 220 kV STT- TIFIPL line has been revised and the DT send command on OTF removed.

161th PCM Discussions:

Analysis from PMU:



MSETCL informed that 220 kV STT TFIPL Line & 220 kV STT Mahape Line Tripped from both ends due to R-Phase Insulator String Flashover & LA dislocation on the Cable Termination Tower at STT Global Data Center. Further, 220 kV STT-Mahape R phase LA flash over occurred on CTT tower at STT end, the differential protection of 220 kV STT-Mahape line operated and tripped the breakers at both ends. But, the 220 kV STT-TIFIL line Siemens make 7SL87 differential relay at STT end mal-operated due to sensing the fault on SOTF because of wrong configuration and setting in the relay.

Reason for 7SL87 differential relay mal operation:

The BI of 7SL87 differential relay was given CB close status instead of CB close command due to which the SOTF initiation was permanently high and the SOTF setting was kept non-directional along with the DT send command configured to it which caused the mal-operation of the relay.

Remedial Measures:

1. **The SOTF setting of the 220 kV STT-TIFIL line has been revised.**
2. **The DT send command on SOTF was removed.**

The Committee noted the above. A Detailed report is enclosed as Annexure 2C.2.

2C.3. Grid Event at 220 kV Chitegaon substation on 24th August 2024

1. **Event Category: GI-2**

2. **Event Date and Time:** 24th August 2024, 03:54 Hrs

3. **Event Summary:** At 03:54 Hrs / 24-08-2024, 220 kV Chitegaon substation became dead due to Bus-Bar protection operation caused by abrupt closing of 220 KV Hybrid GIS Bus sectionalizer earth switch automatically at Chitegaon end. Load loss of 25 MW occurred due to the event.

4. **Elements Tripped -**

   1. 220 kV Chitegaon Main Bus
   2. 220 kV Chitegaon Auxillary Bus
   3. 220/132 kV Chitegaon-ICT-1,2,3&4
   4. 220/33 kV Chitegaon-ICT-1&2
   5. 220 kV Chitegaon-Waluj
   6. 220 kV Aurangabad (PG)-Chitegaon-1&2

5. **Time and Date of Restoration-** 08:02 / 24-08-2024

6. **Protection/Operational issues observed:**

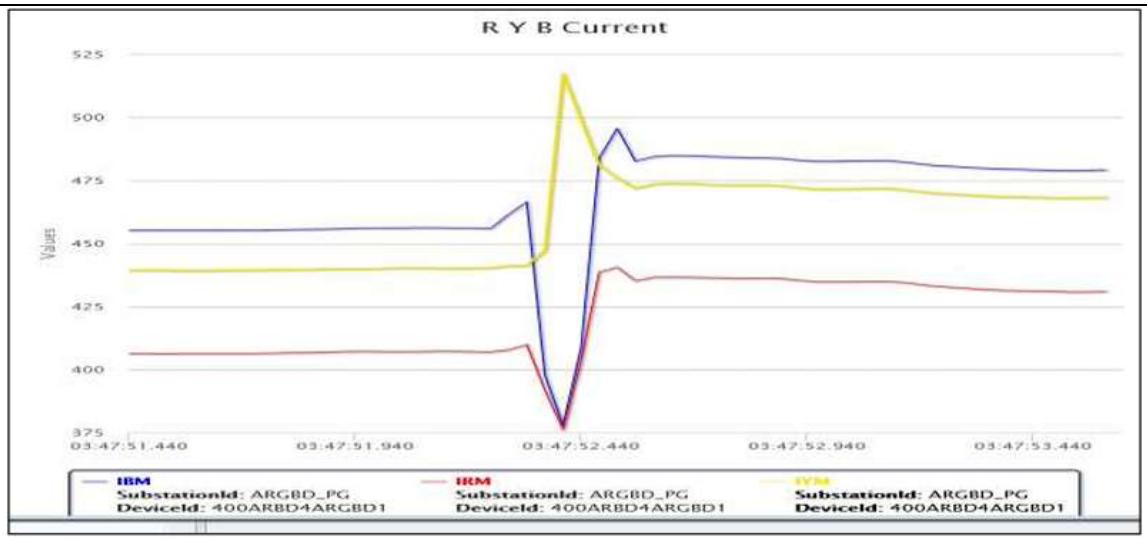
   As reported by SLDC Maharashtra, earth switch 220KV Bus sectionaliser (HybridPass) Closed automatically on Live Bus, causing bus fault and operation of Busbar Protection and all bays connected tripped through 96 Relay. ABB make RADSS Busbar Protection has only two Zone provision (Main+Aux) hence all 96 relays operated. As seen from the DR and PMU, only Y & B Phase found Earth switch of Bus Section 2 got earthed automatically. SLDC Maharashtra may kindly investigate the reason for automatic closing of earth switch thoroughly and take necessary action to avoid this kind of incident in future. DR not time synced.SOE not generated.

8. **Action Taken/Remedial Measures:**

   As per the report submitted by SLDC MAHARASHTRA, Mal operation of earth switch problem is referred to M/s CGL for resolution and providing the mechanical interlock. SLDC Maharashtra may kindly take up with WRLDC SCADA for not generation of SOE. DR is not time synced, SLDC Maharashtra may kindly resolve the issue

161th PCM Discussions:

Analysis from PMU:



MSETCL informed that the Earth Isolator (Y and B ph) of 220 kV Bus Sectionaliser (Hybrid Pass) closed automatically on Live Bus, resulting in a 220 kV Bus fault and operation of Busbar Protection at 220 kV Chitegaon substation. All 220 kV bays connected to the bus got tripped. Further, ABB make RADSS Busbar Protection have only two Zone provisions (Main +Aux) hence the 96-relays operated correctly.

On inspection of the Hybrid Pass bus sectionaliser, they observed that water was accumulated in the control box of the disconnector which might have led to the operation of the driving mechanism of the Earth isolator of 220 kV Bus Hybrid Pass Bus sectionaliser.

Remedial Measures:

1. **As per the discussion with the M/s CGL representative, 220 kV Hybrid PASS was disconnected from the bus and the load was restored.**
2. **Mal operation of earth Isolator problem referred to M/s CGL and instructed to provide the mechanical interlock.**
3. **The 220 kV Hybrid pass unit has been sent to M/s CGL works for rectification.**

NPCIL stated that they removed the fuses of the disconnector to avoid such trippings and suggested that MSETCL adopt the same practice.

The Committee noted the above. A Detailed report is enclosed as Annexure 2C.3.

2C.4 Grid Event 220 kV Aurangabad-Shendra Substation on 15th September 2024

1. **Event Category**: **GD-1**
2. **Event Date and Time:** 15th September 2024, 17:03 hrs.

3. Event Summary At 17:03 hrs / 15-09-2024, 220 kV Aurangabad-Shendra tripped at 17:03 hrs due to LA blast of 220 kV Aurangabad-Shendra-1 at Shendra end. Details not received from both ends. As informed by SLDC Maharashtra, 220 kV Aurangabad-Shendra-1&2 tripped. Tripping of 220/132 kV Shendra-ICT-1 (100 MVA) and 220/33 kV Shendra-ICT-1&2 (50 MVA) and 220 kV Aurangabad-Shendra-2 may be due to bus bar protection operation. Load loss of 65 MW occurred due to the event.

4. Elements Tripped –

1. 220 kV Aurangabad-Shendra-1&2
2. 220/132 kV Shendra-ICT-1 (100 MVA)
3. 220/33 kV Shendra-ICT-1&2 (50 MVA)

5. Time and Date of Restoration- 08:41 / 01-10-2024

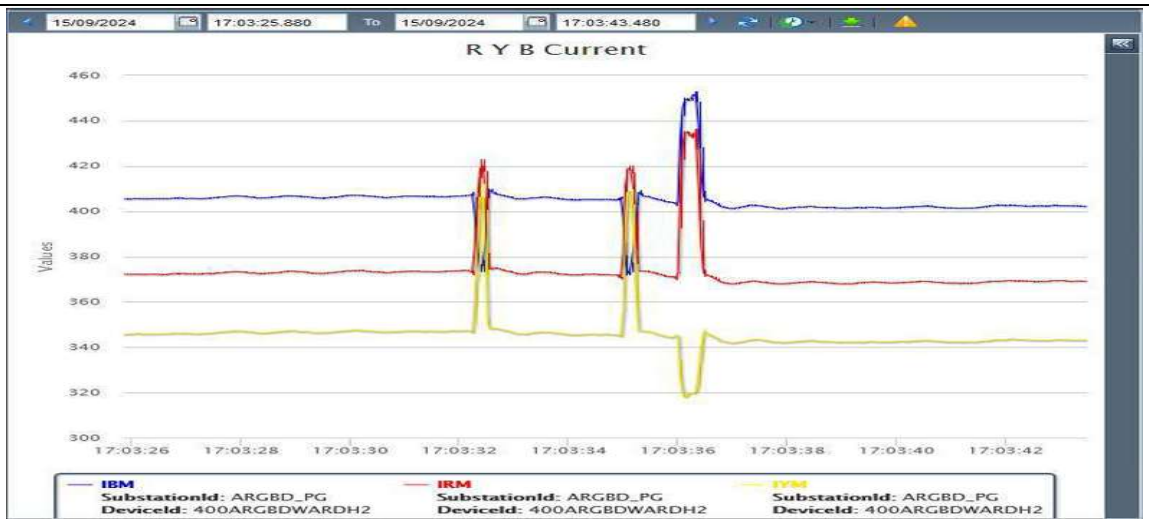
6. Protection/Operational issues observed: Y phase fault was occurred on 220 kV Shendra - GIS Shendra Line. At 220 kV Shendra (GIS) all 3 phase tripped which was correct operation. As seen from the DR, only Y phase breaker auto reclosed, which was undesirable. Since fault reoccurred in A/R reclaim time, all 3 phases should have been tripped, but it didn't happen.

7 . Action Taken/Remedial Measures:

As informed by SLDC Maharashtra, the cause of operation of Dir EF Back Up relay of 220KV Shendra (old)- Aurangabad PGCIL line at Shendra (old)- end is attributed to PT Fuse failure of the BU relay, due to which relay sensed the fault in Z-2. On inspection of panel, PT fuse of BU relay found blown. Non sensing of cable fault in Z-1 by Dist relay (ABB REL 670) is being investigated of Shendra –Shendra line at Shendra (old) end. Also, fault data/DR and relay setting being shared to M/s ABB for analyzing the Non sensing of cable fault in Z-1 by Dist relay (ABB REL 670) by SLDC Maharashtra. Cable fault of 220KV Shendra old-GIS Shendra Line was attended and line restore on dated 22 Sept 2024. PT supply of the BU relay PGCIL Line at 220KV Shendra Old restore and BU relay protection made healthy. AR Prep3P output of BCU relay properly wired up to the Distance relay. Also relay testing carried out and 3 pole tripping confirmed. The cause of EHV cable failure of 220KV Shendra old-GIS Shendra Line has been referred to OEM for investigation and corrective measures. 220 kV Aurangabad-Shendra-2 was normalized at 18:39 hrs after MSLDC given readiness and all the load is restored by 18:45 hrs. 125 Instructed Maharashtra SLDC to provide detailed reason of the event

<u>161th PCM Discussions:</u>

Analysis from PMU:



MSETCL stated that AR operated successfully at 220 kV Shendra Old End on the first fault on Y-Ph. Before that, the AR function of 220 kV Shendra-GIS Shendra line kept off in the Distance relay, but the AR function was configured in the BCU (Bus bar control unit) and was kept ON.

The BCU generated the AR Prep3P output to Distance relay for the second fault on Y-Ph after 2.75 Sec, but the wire of AR Prep3P was loose and disconnected at Distance relay I/P terminal, due to which Distance relay issued 1-Pole operation command to open the Y-pole of line CB.

An R-ph cable fault occurred and the fault was sensed by the Distance relay as a Ph-Ph and Z-2 fault. From DR, it is observed that the Distance relay did not sense the fault continuously in Z2 causing the Z2 timer to restart frequently, delaying the fault clearance in Z-2 time. Hence, this fault was cleared by BU EF relay of 220 kV Shendra-PGCIL line at PGCIL end. For the same fault, BU relay of 220 kV Shendra-PGCIL line at Shendra end operated for reverse fault due to PT Fuse failure at the same time.

<u>Remedial Measures:</u>

1. **The cable fault of 220 kV Shendra old-GIS Shendra Line was attended and the line was restored on 22 Sept 2024.**
2. **PT supply of the BU relay of 220 kV PGCIL Line at 220 kV Shendra end was restored and BU relay protection was made healthy.**
3. **The wiring of AR Prep3P input was properly tightened on the Dist relay input. Relay testing was carried out, and three-pole tripping was confirmed.**
4. **Resistive reach setting of Distance relay at 220 kV Shendra end modified.**

The Committee noted the above. A Detailed report is enclosed as Annexure 2C.4

2C.5. Grid Event 220 kV Uran Substation on 01St October 2024

1. **Event Category: GI-1**

2. Event Date and Time: 1St October 2024, 16:40 hrs.

3. Event Summary At 16:40 Hrs / 01-10-2024, LBB protection mal operated of 220 kV Uran-Bus-1 resulting in tripping of all connected elements (as mentioned in elements tripped column). Generation loss of 77 MW and load loss of 14 MW occurred at Uran substation due to the event.

4. Elements Tripped

1. 220 kV Uran Bus-1
2. Uran U-7 (108 MW)
3. 220 kV Uran-Apta-2
4. 220 kV Uran-Apta-4
5. 220 kV Uran-Ulwe-2
6. 220 kV Uran-ONGC
7. 220/33 kV Uran-ICT-1 (50 MVA)

5. Time and Date of Restoration- 17:05 / 01-10-2024

6. Protection/Operational issues observed:

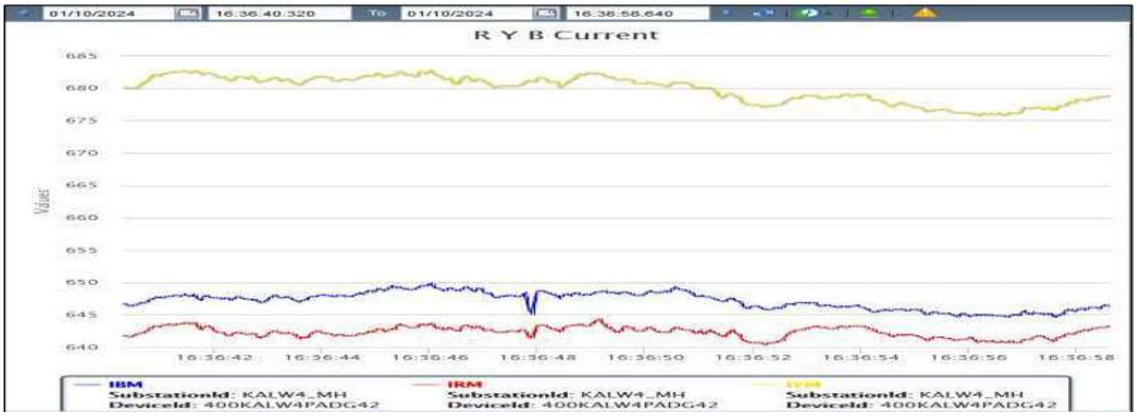
LBB protection mal operated of 220 kV Uran-Bus-1 resulting in tripping of all connected elements.

7 . Action Taken/Remedial Measures:

I. As informed by MSETCL, Isolator status of all Generation bays are given through isolator interlocking modules which was obsolete and there is problem of electrical operation of some bay modules which will be attended by MSETCL. The faulty control cable from OGM Junction box to GTPS control panel is to be removed & replaced with new one. MSETCL may kindly update the status of the same.

<u>161th PCM Discussions:</u>

Analysis from PMU:



MSETCL stated that the LBB protection operated due to a false tripping initiation command received from generation end (GTPS) at 220/22 kV Uran Sub-Station. The Bus bar relay is configured/programmed for selective bus operation of the LBB function when it gets the Binary Input High (AND Logic) of LBB initiation from respective bay standalone LBB relay and closing status of Bus Isolator of the respective bay.

As per the investigation done by the Generation (GTPS) testing team, the false LBB Tripping initiation was received due to damage & shorting of the old 3-core control cable connected between the LBB relay located in the generation side CRP to the OGM junction box located in switchyard (the IR value of this 3-core control cable is very low i.e. about 10 k ohm).

220 kV STN TF-01 was out of service for the last 8 months and the CB & all isolators of 220 kV Station TF-01 were in OFF condition, however, the binary input of Bus1 isolator close status was continuously high in the Bus bar relay. On investigation, the GTPS testing team found that the Isolator Interlocking modules located in the OGM junction box were being utilized for various Isolator functions & status as per the requirement of the schemes. The operating /resetting coils of this Isolator Interlocking module was electrically actuated on the actual operation of the Isolator & through its auxiliary contact.

Hence, due to the false LBB initiation & Bus-1 isolator closing status of Sation T/F-01, the Bus bar Protection relay activated its Bus-1 internal LBB protection and all 96 relays of 220 kV lines, Generators &transformers connected to Main Bus-1 along with Bus Coupler got tripped.

Remedial Measures:

1. **The isolator status of all Generation Bay was given through isolator interlocking modules which was obsolete and there is a problem with the electrical operation of some bay module, hence this isolator status shall be given directly through a manual switch.**
2. **The faulty control cable from the OGM Junction box to the GTPS control panel should be removed & replaced with a new control cable.**

The Committee noted the above. A Detailed report is enclosed as Annexure 2C.5

2C.6. Grid Event 400 kV New Koyna on 25th October 2024

1. **Event Category**: **GI-2**
2. **Event Date and Time:** on 25th October 2024, 02:16 hrs.
3. **At 02:16 hrs / 25-10-2024,** Busbar protection operated in 400 kV New Koyna-Bus-2 due to B phase CT blast of 400 kV New Koyna-Karad-1 at Koyna, resulting in resulting in tripping of all connected elements (as mentioned in elements tripped column). Two machines at Koyna (4) running in condesor mode also got triped. No generation or load loss occurred due to the event.
4. **Elements Tripped –**
   1. 400 kV New Koyna Bus-2
   2. 400 kV New Koyna-Karad2

3. 400 kV New Koyna-Jaigad-1
4. 400/200kV New Koyna ICT-1,3
5. 400 kV New Koyna-Dhabol-2
6. 400 kV New Koyna Bus Coupler.
7. 400 kV New Koyna-Koyna (4)-2

5. Time and Date of Restoration- 04:13 / 25-10-2024

6. Protection/Operational issues observed:

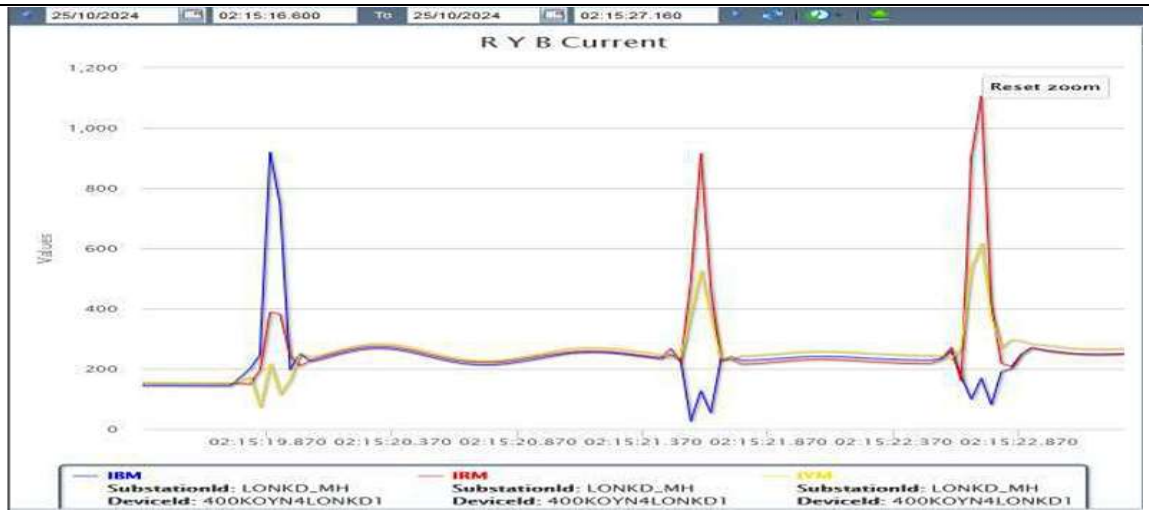
Bus Bar protection signal is not reflected in the DRs shared for lines which needs to be checked by MSETCL whether the signals are through or not. Dhabhol end A/R is not available as informed by MSETCL telephonically which should be in service. As informed by MSETCL, distance of fault in 400KV Dabhol New Koyna Ckt-I & II was wrong due to ground compensation factor (kZN) which is corrected.

7 . Action Taken/Remedial Measures:

Bus Bar protection signal is not reflected in the DRs shared for lines which needs to be checked by MSETCL whether the signals are through or not. Dhabhol end A/R is not available as informed by MSETCL telephonically which should be in service. MSETCL informed that, the distance protection relay of 400 kV New Koyna Dabhol Ckt-1 line at New Koyna end will be tested in next outage. MSETCL informed that, 400 kV Dabhol New Koyna Ckt -1 &ll distance protection relays at Dabhol end will be tested in outages for updated ground compensation factor. MSETCL informed that, Cleaning of equipment and insulator strings needs to be carried out, as algae formation has been observed due to heavy monsoon. MSETCL informed that, Equipment (C.B. CT. CVT. LA, CC) that has completed 25 years of service life needs to be replaced by preparing an L.E scheme. MSETCL informed that, Stub bus insulator strings & 220KV & 400 KV Bus strings that has completed 25 years of service life needs to be replaced, by antifog insulator strings.

<u>161th PCM Discussions:</u>

Analysis from PMU:



MSETCL intimated that the failure of the B phase CT on the 400 kV New Koyna-Karad Circuit 1 resulted in the operation of the 400 kV Bus Bar Protection Zone II, leading to the tripping of all bays connected to Bus II.

Further, the B phase CT of 400 kV New Koyna-Karad Circuit 1 caught fire and smoke from the fire reached the nearest phase of the 400 kV New Koyna-Karad Circuit II (On Bus 1), the R phase stub bus insulator string after the CT location. This led to the tripping of the 400 kV New Koyna Circuit II on distance protection, with auto reclosing operation & lockout from both ends.

400 kV New Koyna Dabhol-1 (On Bus-1) line tripped on distance protection from New Koyna end. For the previous faults, the distance protection relay operation was in order. 400 kV Dabhol New Koyna Circuit-I & II both lines tripped on distance protection from Dabhol end in Zone-I. Further, after verification of the settings parameters of the MICOM P443 (M-1) relay of both lines, the ground compensation factor (kZN) was incorrect. The same was changed in both the relays and kept under observation.

The Committee noted the above. A Detailed report is enclosed as Annexure 2C.6

2C.7. Grid Event at 220 kV Kalwa-Pawane substation on 30th October 2024

1. **Event Category: GI-1**
2. **Event Date and Time:** 30th October 2024, 16:22 Hrs
3. **Event Summary:** At 16:22 hrs / 30.10.2024, 220 kV Borivali -CTRLS line tripped due to B phase LA failure on CTT (Cable termination tower). This LA fell under induction zone of 220 kV Kalwa-Pawne line led to flowing of heavy fault current. 220 kV Kalwa-Pawane line B phase jumper between Line isolator and CB broken down and grounded & 220 kV Main Bus B and all connected elements tripped at Kalwa SS along with 400/220kV ICT 1& 2 at Kalwa. No load loss reported by MSLDC. However, during charging of 220kV Kalwa-Colorchem line, LTS operated at Colorchem at 16:56 Hrs & 47 MW load loss occurred as informed by MSLDC, Load restored at 17:16 hrs

4. **Elements Tripped -**

   1. 220 kV Kalwa-Pawana

5. **Time and Date of Restoration-** 16:22 hrs / 30.10.2024

6. **Protection/Operational issues observed:**

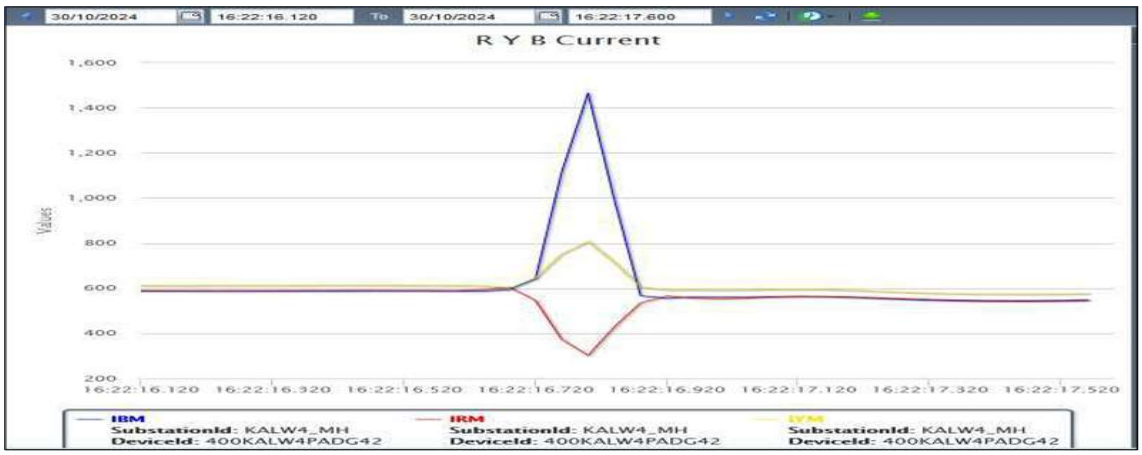
   Differential protection signal failed after 10 second of the first fault. The reason for the same may kindly be find out by MSETCL. During the above Event at 16:22 Hrs, as per SCADA some load loss in Mumbai region is visible. However, MSLDC has reported nil load loss. DR are not time synced at Kalwa

7. **Action Taken/Remedial Measures:**

   MSLDC was advised to maximize Mumbai generation considering increased loading of ICT's at Vikhroli & Padghe in real time by WRLDC Control room. MSLDC may kindly further investigate on the quantum of load loss. 220 kV Borivali -CTRLS B phase LA was replaced and line restored. Wave trap of 220 kV Kalwa Pawne bypassed and line restored. MSLDC may kindly find out the load loss quantum in Mumbai area and reason for the same in detail.

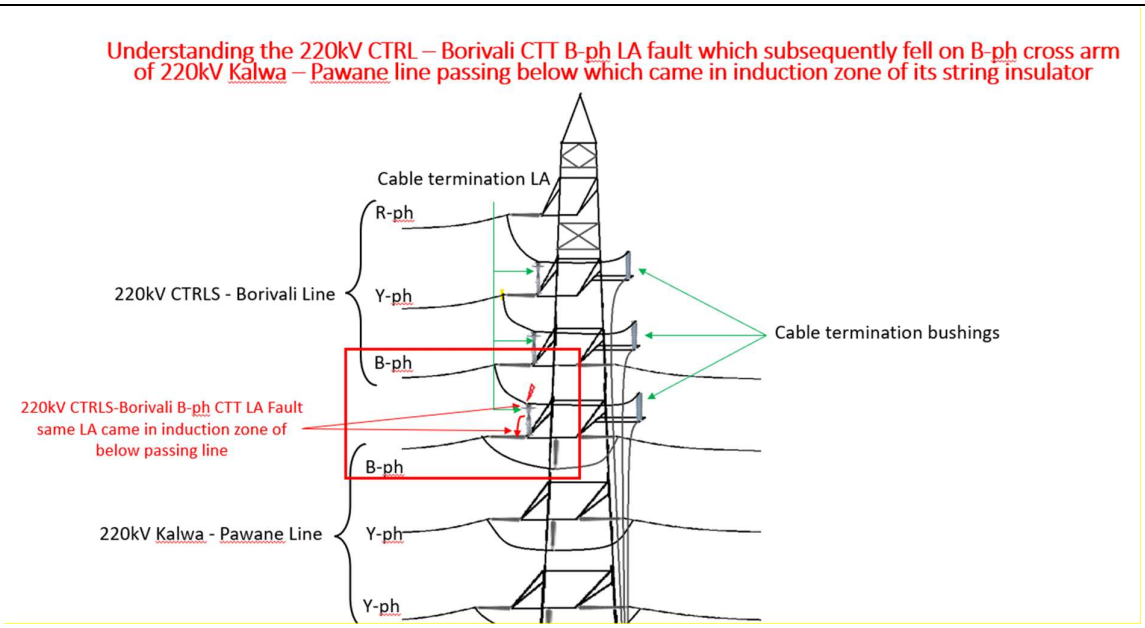
161th PCM Discussions:

Analysis from PMU:



MSETCL intimated that the 220kV CTRLS Borivali line tripped due to failure of B-ph LA of 220 kV CTRLS Borivali line on multi-circuit CTT tower at Kalwa complex, and falling on B-ph cross arm of 220kV Kalwa - Pawane line.

Further, B ph LA corona ring came in the induction zone of the Kalwa - Pawane line resulting in B-ph to Earth fault on 220 kV Kalwa - Pawane line. This resulted in the tripping of Kalwa - Pawane line on 87L Differential Protection and AR operation was successful at both ends.
After CB reclaim time, (i.e. 34 sec) B-ph to Earth fault occurred on 220kV Kalwa - Pawane line and tripped on Distance (Zone-1) protection. After the AR trial, the reclaim time started. In between, Differential Communication failure was recorded in 87L of 220kV Kalwa - Pawane line. Further, the 220kV B-Bus Busbar operated at 400kV Kalwa as a jumper between 'B phase' 29D and CB broke along with the 29D isolator jaw and grounded of 220kV Kalwa - Pawane line.



Action Taken:

1. **After the occurrence and yard inspection carried out, the faulty 220 kV Kalwa-Pawane bay was isolated and 220 kV Main Bus-2 was taken into service by charging 400 kV ICT-2. All other bays were taken into service one by one.**
2. **The wave trap of 220 kV Kalwa-Pawane line was by-passed at Kalwa end and after the jumper replacement line was taken into service on 31.10.2024 at 09:31 Hrs.**

The Committee noted the above. A Detailed report is enclosed as Annexure 2C.7

2D.Ocurrences in Goa system:

No events in Goa system.

2E.Occurrences in Chhattisgarh system:

2E.1. Grid Event at 220 kV Raigarh-Bus-1&2 substation on 18th October 2024

1. **Event Category: GD-1**
2. **Event Date and Time**: 18th October 2024, 07:23 Hrs
3. **Event Summary:** At 07:23 Hrs / 18-10-2024, Bus bar protection operated in 220 kV Raigarh-Bus-1&2 (Double Main and Transfer Bus scheme) due to breaking of jumper of Y phase CT of 220 kV Raigarh-Jindal and felling of conductor of same on 220 kV Raigarh-Auxilary Bus, resulting in tripping of all connected elements (as mentioned in elements tripped column). Load loss of 726 MW occurred at Raigarh(CG), Saraipalli and associated downstream network due to the event.

4. Elements Tripped -

1. 220 kV Raigarh(PG)-Raigarh(CG)-1,2&3
2. 220 kV Raigarh(CG) Bus-1&2
3. 220 kV Raigarh-Saraipali-1&2
4. 220 KV Raigarh-Gerwani
5. 220 KV Raigarh-JSPL-1&2
6. 220 KV Raigarh-Korba East

5. Time and Date of Restoration- 07:23 / 09-06-2024

6. Protection/Operational issues observed:

The 220 kV Main Bus-1 PT fuses failed during PT shifting of 220 kV Raigarh(CG)-Saraipalli-2 from Main Bus-2 to Main Bus-1 during the test charging of 220 kV Raigarh(CG)-Saraipalli-2. The PT supply of both the Main Bus 1&2 got paralleled from secondary side resulting in blowing of PT fuses. Ideally, fuse failure protection should have blocked the distance protection scheme. Due to this PT supply to DPR relays got missing. This condition was sensed by DPR relays of loaded feeders and consequently they tripped in Distance protection. It is seen that the bus configuration at 220 kV Raigarh (Chhattisgarh) is asymmetric. 220 kV Raigarh (CG)-Saraipalli-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase. Also, line didn't trip from remote end. 220 kV Raigarh (CG)-JSPL-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase. 220 kV Raigarh(CG)-Raigarh(PG)-1,2 & 3 tripped on Z-4 protection operation at Raigarh(CG), it is seen that the zone-4 timing for all 3 lines is around 800 msec which is not in order. Some of the disturbance recorders have not been submitted by utilities (प्रमुख ट्रि ट् ि◌ंग / Major Elements Tripped) making it difficult to visualize the sequence of tripping during the event. SCADA SoE at Raigarh Substations were not reported during the event

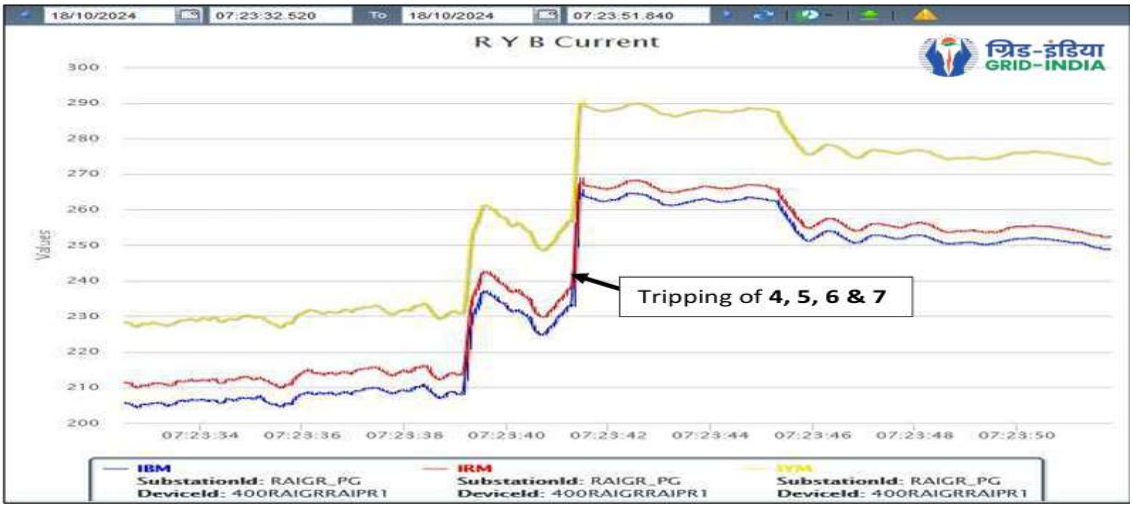
7.Action Taken/Remedial Measures:

As informed by SLDC Chhattisgarh, for shifting of 220 kV PT of Main bus in 220 kV Raigarh(CG)- Saraipali-2 panel the PT selection switch will be used through separate PT cables connected to Bus-1 & Bus-2 and wiring will be done to 220 kV Raigarh(CG)-Saraipali-2 panel. This will avoid paralleling of PT from secondary side and therefore prevent blowing of PT fuses during PT supply shifting. PT supply of incoming 220 kV Raigarh(CG)-Raigarh(PG)-1,2&3 Feeders will be given from their respective Line CVTs instead of Bus PT. Ideally, fuse failure protection should have blocked the distance protection scheme. SLDC Chhattisgarh is requested to enable the fuse failure protection in distance protection scheme as per CEA guidelines. Suitable voltage balance relays shall be provided to monitor the fuse failure of three sets of potential transformers and to block the relays or other devices that may operate incorrectly on the absence of voltage due to fuse failure of potential transformers. It is seen that the bus configuration at 220 kV Raigarh (Chhattisgarh) is asymmetric. SLDC Chhattisgarh may share the reason for keeping this bus configuration and may change if possible. Voltage Transformer Supervision signal became high during tripping of 220 kV

Raigarh (CG)-JPL-1 at JPL end same may be checked by SLDC Chhattisgarh and Jindal Power. SLDC Chhattisgarh is requested to attend the following mal-operation of relays and communicate the same: o 220 kV Raigarh (CG)-Saraipalli-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase. Also, line didn't trip from remote end. of 220 kV Raigarh (CG)-JSPL-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase. o 220 kV Raigarh(CG)-Raigarh(PG)-1,2 & 3 tripped on Z-4 protection operation at Raigarh(CG), it is seen that the zone-4 timing for all 3 lines is around 800 msec which is not in order. Powergrid WR-1 and Jindal Power are requested to share the DRs of Raigarh (PG) and JSPL respectively. The digital signal in DRs of 220 kV Raigarh (CG)-JPL-1 at JPL end are not standardized making it difficult to read. As per IEGC-2023, 17.2 : "The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals which shall be included in the guidelines issued by the respective RPCs." Jindal Power and SLDC Chhattisgarh are requested to update the signals. DR of 220 kV Raigarh (CG)-JPL-1 at JPL end is not time synchronized. As per IEGC-2023, 17.2: "The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals which shall be included in the guidelines issued by the respective RPCs." Jindal Power and SLDC Chhattisgarh are requested to attend the time synchronization

161th PCM Discussions:

Analysis from PMU:



CSPTCL stated that the 220 kV Main Bus-1 PT fuses failed during PT shifting from Main Bus-2 to Main Bus-1 during the test charging of 220 kV Raigarh (CG)-Saraipalli-2. The PT supply of both the Main Bus 1&2 got paralleled from secondary side resulting in blowing of PT fuses. Ideally, fuse failure protection should have blocked the distance protection scheme. Due to this PT supply to DPR relays got missing and this condition was sensed by DPR relays of loaded feeders and consequently they tripped in Distance protection.

SE(P) WRPC opined that the DPS not getting blocked in the event of PT failure is a serious matter and CSPTCL should check this. Further, instead of using Bus PT for DPS, Line PT should be provided. CSPTCL representative replied that the PT failure bocking in DPS was not configured. Further, a proposal of separate line PT have been proposed.

The Committee noted the above. A Detailed report is enclosed as Annexure 2E.1

2F.Occurrences in DD and DNH system:

2F.1. Grid Event at 220kV Sayali-Vapi II substation on 03th September 2024

1. **Event Category: GD-1**
2. **Event Date and Time: 03th September 2024, 02:37 Hrs**
3. **Event Summary:** At 02:37 Hrs / 03-09-2024, 220kV Sayali-Vapi II-1 & 2 tripped on R-E fault (ckt-1tripped from Vapi II end only) and 220kV Sayali Switching Substation became dead. As informed by sterlite fault was in Z-1 220 kV Sayali-Vapi II-1 (1.1 km from Vapi II end). As seen from DRs, 3 phase trip issued for a single phase fault at vapi end of 220 kV Sayali-Vapi II-1 circuit and line tripped from Vapi end only. Also, 220 kV Sayali-Vapi II-2 tripped on Z-3 distance protection operation at Vapi end without any time delay. The trippings were not in order. Load loss of 73 MW occurred at of 220kV Alok Industries Ltd (which is being fed radially through 220 kV Sayli) due to the event.
4. **Elements Tripped -**
    1. 220 kV Vapi II Sayali-1
    2. 220 kV Vapi II Sayali-2
    3. 220kV Sayali-Alok Industries Ltd
    4. Sayali - 220 kV - Bus-1
    5. Sayali - 220 kV - Bus-2
5. **Time and Date of Restoration-** 06:03 / 03-09-2024
6. **Protection/Operational issues observed**:

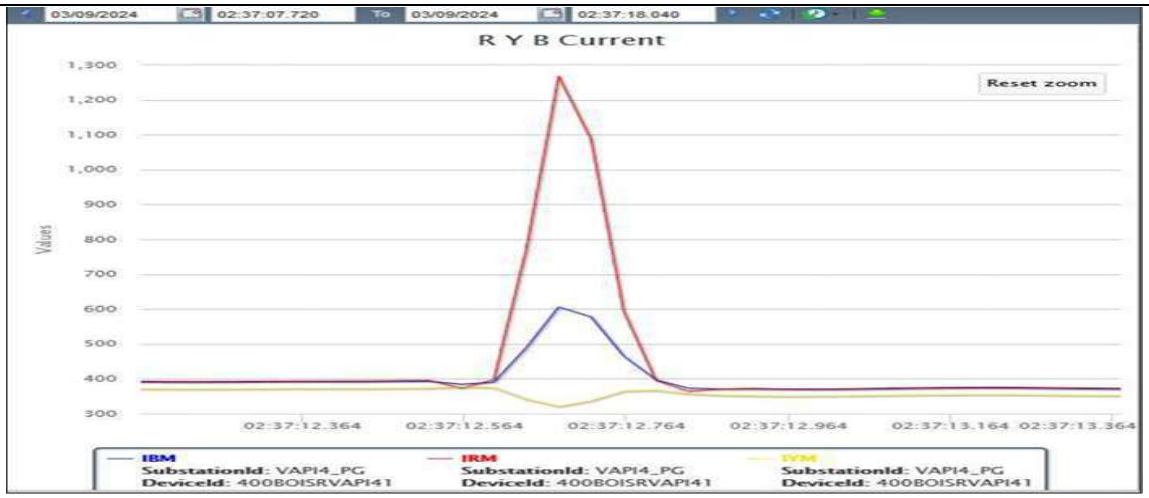
    3 phase trip issued for a single phase fault (R-N fault) at Vapi II end for 220 kV SayaliVapi II-1 circuit and line tripped from Vapi II end only. Line did not trip at Sayali end due to faulty. relay at Sayali end.220 kV Sayali-Vapi II-2 tripped on Z-3 distance protection operation at Vapi end without any time delay after relay pick up. The trippings were not in order.

7. **Action Taken/Remedial Measures:**

    Status of rectification/ replacement of unhealthy relay at Sayali to be updated by SLDC DNH to WRLDC incorrect relay operations as mentioned in point no. 12 needs to be investigated and explained by SLDC DNH and MUML.

161th PCM Discussions:

Analysis from PMU:



Sterlite stated that 220 kV Sayali-Vapi II-1 & 2 tripped on RE fault (ckt-1tripped from Vapi II end only) and 220 kV Sayali Switching Substation became dead resulting in a load loss of 73 MW at of 220 kV Alok Industries Ltd (which is being fed radially through 220 kV Sayali). Further, 3 phase trip was issued for a single-phase fault at Vapi end of 220 kV Sayali-Vapi II-1 circuit and line tripped from Vapi end only. Also, 220 kV Sayali-Vapi II-2 tripped on Z-3 distance protection operation at Vapi end without any time delay. The trippings were not in order.

<u>Cause:</u> 220 kV Vapi-II Sayali line-1 tripped due to line fault (peacock was found on the line which causes the earth fault in the R-ph) and all the distance protection relays for both line 1 & 2 at Sayali end (maintained at DNH) were faulty. They had adopted SOTF (instantaneous trip) with current flow or manual close BI settings and also DT sent was kept enabled for all kind of fault sensed at Vapi-II S/s end. However, the respective CB did not open due to some fault at CB end (as understood from Sayali S/s) which caused persistent fault in the system and inter-trip Vapi-II Sayali line-2 on SOTF.

<u>Corrective actions:</u>

1. **Sayali DNH to take necessary measures for replacement of all Main 1 & 2 relays.**
2. **DNH have kept SOTF with manual closing BI only at Vapi-II S/s.**

DNH informed that they have replaced the relays and the SOTF settings have been addressed.

The sub-committee noted the above. A Detailed report is enclosed as Annexure 2F.1

2F.2. Grid Event at 400 kV Vapi II substation on 11th September 2024

1. **Event Category:** GD-1

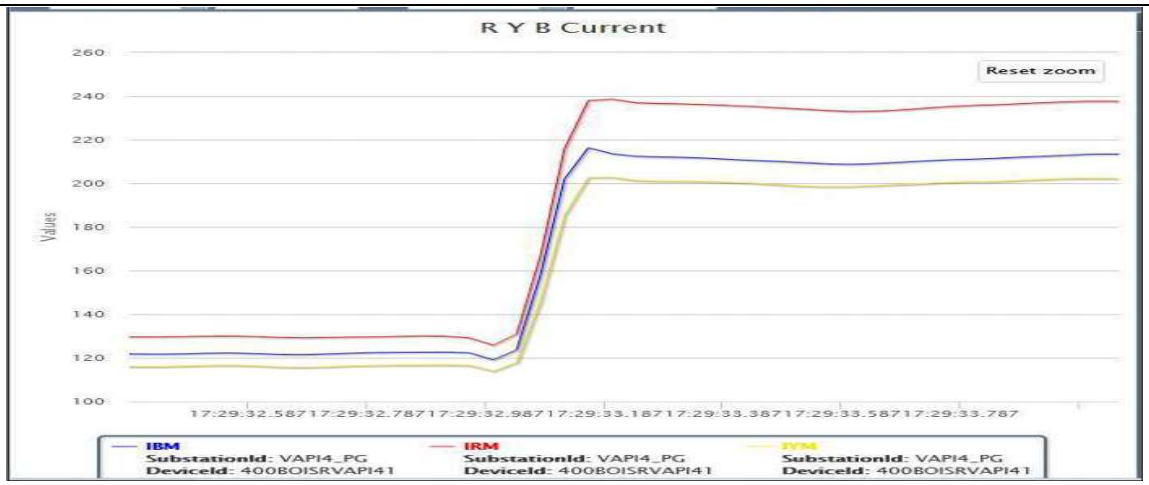
2. **Event Date and Time:** 11th September 2024, 17:29 Hrs
3. **Event Summary:** At 17:29 hrs / 11-09-2024, 400 kV Vapi II-Bus-1&2 tripped on bus bar protection operation due to maloperation of Main Control Unit-2 relay and all elements connected tripped from 400 kV Vapi II side only. As informed by Sterlite, no abnormalities were found during inspection and the tripping may be due to moisture ingress due to heavy rainfall. 220 kV Sayali station connected to Vapi II became dark due to tripping of 220 kV Vapi II-Sayali-1&2. Load loss of 80 MW occurred at of 220 kV Alok Industries Ltd (which is being fed radially through 220 kV Sayli) due to the event.
4. **Elements Tripped -**
    1. 400 kV Vapi II-Bus-1&2
    2. 400kV Vapi II-Vapi (PG)-1&2
    3. 400 kV Kakrapar(3&4)-Vapi II-1&2
    4. 400/220 kV Vapi II-ICT-1&2 (500 MVA)
    5. 400 kV Vapi II-Bus Reactor
    6. 220 kV Vapi II-Sayali-1&2
5. **Time and Date of Restoration-** 18:58 / 11-09-2024
6. **Protection/Operational issues observed**:

   400 kV Vapi II-Bus-1&2 tripped on bus bar protection operation due to maloperation of Main Control Unit-2 relay.
7. **Action Taken/Remedial Measures:**

   MUML may kindly investigate the reason for maloperation.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Sterlite stated that all the Circuit Breakers connected to 400 kV Main Bus-1 & 400 kV Main Bus-2, 220 kV ICT-1 & ICT-2 incomer got tripped due to maloperation of MCU 2 (due to receipt of inter tripping command).

<u>Cause:</u> It was observed that both Main Bus 1 & 2 "gas zone trip BI" was high at MCU 2 relay. However, during physical inspection, no abnormalities of SF6 gas pressure were observed in any compartment. As torrential rainfall was happening during that period, it is apprehended that due to moisture ingress, the contacts mal-operated causing all the bus 1 & 2 side CBs tripping. Further, due to inter-tripping of ICT bays, respective 220 kV side Main Bus CBs got tripped.

<u>Corrective Action:</u>

1. **Cleaned the MCU-2 relay contacts and also installed dehumidifier with panels heater in CRP rooms to avoid moisture ingress.**
2. **ICT bays inter-tipping logic rectified with both Main Bay side and Tie Bay side CB open status.**

The sub-committee noted the above. A Detailed report is enclosed as Annexure 2F.2

2F.3. Grid Event at 220/66 kV Khadoli-ICT-2 on 08th October 2024

1. **Event Category:** GD-1
2. **Event Date and Time:** 08th October 2024, 23:37 Hrs
3. **Event Summary:** At 23:37 Hrs / 08-10-2024, 220/66 kV Khadoli-ICT-2 tripped due to bursting of 66 kV side Y phase CT causing damage to R and Y phase circuit brakers. After 80 msec, 220/66 kV Khadoli-ICT-1&3 tripped on Earth Fault protection operation. Due to the above trippings of ICTs flow on 220 kV lines connected to Khadoli became zero due to load loss of 444 MW in DNHDD network.

4. **Elements Tripped -**

1. 220/66 kV Khadoli-ICT-2
2. 220/66 kV Khadoli ICT-1
3. 220/66 kV Khadoli ICT-3

5. **Time and Date of Restoration-** 04:42/ 09-10-2024

6. **Protection/Operational issues observed**:

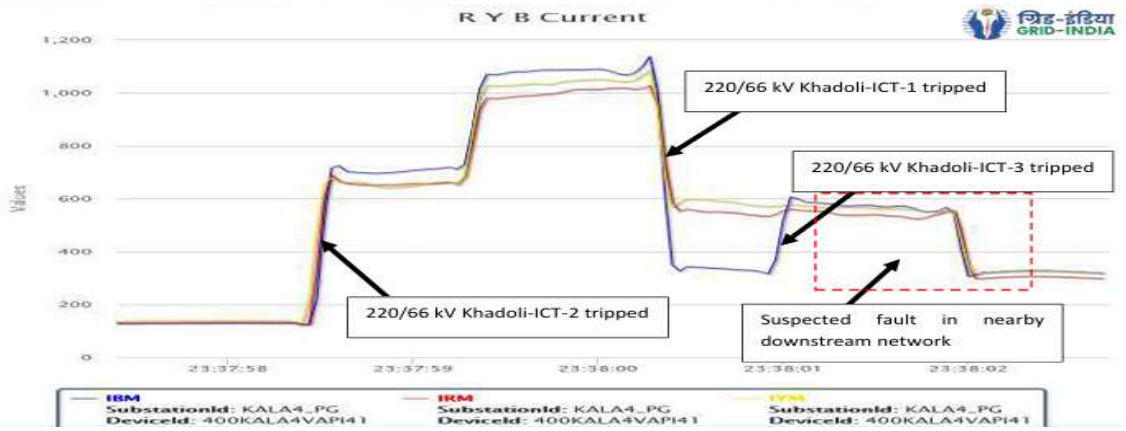
220/66 kV Khadoli-ICT-1&3 tripped on TOC time over current operation after around 1.8 seconds of tripping of 220/66 kV Khadoli-ICT-2. From PMU plots, fault is suspected in nearby area of 400 kV Kala-Vapi-D/C after tripping of 220/66 kV Khadoli-ICT-3. No tripping in 400 kV network at that instance had occurred. The trippings may be in 220 kV and other downstream network may be present which was not reported to WRLDC. No SCADA SOE reported during the event.

7. **Action Taken/Remedial Measures:**

220/66 kV Khadoli-ICT-1&3 tripped on TOC time over current operation after around 1.8 seconds of tripping of 220/66 kV Khadoli-ICT-2. LTS scheme at Khadoli may be implemented by DNH for tripping of Khadoli ICTs. No SCADA SOE reported during the event. SLDC DNH may kindly coordinate with WRLDC SCADA team and resolve the issue. The 220/66 kV Khadoli-ICT-1, 2 & 3 ICTs load was around 300 MW before the tripping. But load loss reported by SLDC DNH was around 444 MW. SLDC DNH may kindly furnish the details of trippings at downstream network and load loss during the event.

<u>161th PCM Discussions:</u>

Analysis from PMU:



DNH intimated that 220/66 kV Khadoli-ICT-2 tripped due to the bursting of Y phase (66 kV side) CT, causing damage to R and Y phase circuit breakers. After 80 msec, 220/66 kV Khadoli-ICT-1&3 tripped on Earth Fault protection operation. Due to the above

trippings of ICTs, flow on 220 kV lines connected to Khadoli became zero due to a load loss of 444 MW in the DNHDD network.

The sub-committee noted the above. A Detailed report is enclosed as Annexure 2F.3

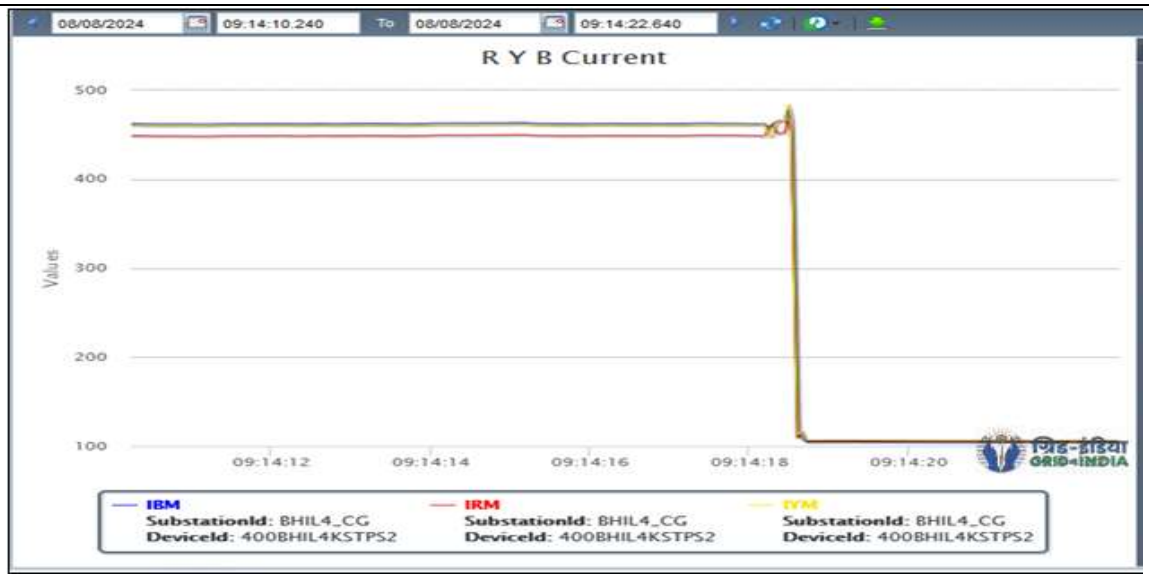
2G. . Occurrences in IPPs, NTPC and Powergrid::

2G.1 Grid Event at 400 kV 400 kV Korba Substation on 8th August 2024

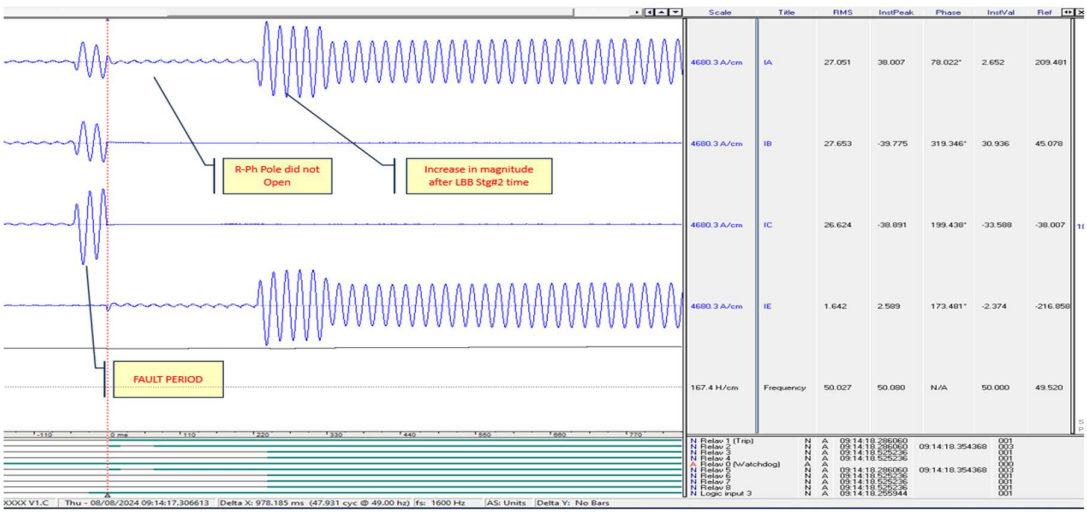
1. **Event Category:** GI-2
2. **Event Date and Time:** 8th August 2024, 09:14 hrs
3. **Event Summary:** At 09:14 Hrs / 08-08-2024, 400 / 33 kV KSTPS-Tie Transformer-4 tripped from LV side on Restricted Earth Fault, smoke observed in LV side terminal box. Due to non-opening of R phase breaker at 400 kV side, LBB operated resulting in tripping of 400 kV KSTPS-Bus-2 (Double Main and Transfer Bus) and all connected elements. Generation loss of 560 MW occurred at Korba-NTPC Thermal Power Plant due to the event.
4. **Elements Tripped -**
   1. 400 / 33 kV KSTPS-Tie Transformer-4
   2.400 kV KSTPS-Bus-2
   3.400kV KSTPS-Bhilai-2
   4.KSTPS-Unit-1,2&3 (210 MW occurred at)
5. **Time and Date of Restoration-** 11:48 / 08-08-2024
6. **Protection and Operational issues observed:** KSTPS-Unit-1 (210 MW) tripped on Generating Transformer Backup Earth Fault protection operation. As informed by NTPC Korba, the unit didn't trip on LBB protection operation even though the GRP trip relays 186A and 286A relays initiated 3-phase LBB initiation in the LBB relay.
7. **Action Taken/Remedial Measures:**
   NTPC Korba may share the Root Cause Analysis of flashover on 33kV side of Tie Transformer. NTPC Korba may investigate the KSTPS-Unit-1 (210 MW) tripping and share the findings

161th PCM Discussions:

Analysis from PMU:



NTPC stated that 100 MVA (400/33 kV) Tie Transformer-4 relays sensed REF (Restricted Earth Fault) protection on LV side and initiated tripping on both HV and LV side. Further, Tie Transformer-4 tripped from LV side as per the protection scheme and only Y & B phases of breaker pole operated while the R-phase pole did not operate on the HV side. Due to this, LBB2 protection operated thereby tripping 400kV BUS-2 on bus-bar protection. 400 kV Bus coupler breaker and bus-2 – Bus-4 Bus sectionalizer breaker tripped as per protection scheme due to LBB (stage-2) operation. On Unit side, Generator#1 tripped on GT BKUP E/F 51NGT protection (Class-A) protection. Generator-2 and 3 tripped on Class-B protection.



Sl. No	Observation	Status as on 24.12.24
01	Cause of flashover on 33kV side of Tie Transformer needs to be investigated.	Flashover occurred due to insulator tracking on LV side terminal box of Tie T/F-4
02	400 kV breaker 1052 all 3 phases servicing to be done by GE (CB OEM)	All 06 nos of breakers of GE make servicing completed by OEM GE T&D

03	Gen-1 3-ph initiation from 796 to LBB relay to be checked on opportunity.	Checked and rectified during U-1 Overhauling.
04	Gen-1 tripping through TC-1 and TC-2 from 796 relay to be checked on opportunity.	Checked and rectified during U-1 Overhauling.

Committee noted the above. Detailed report is enclosed as Annexure 2G.1.

2G.2 Grid Event at 400 kV Asoj Substation on 8th August 2024

1. **Event Category:** 2G-2
2. **Event Date and Time:** 8th August 2024, 14:52 hrs
3. **Event Summary:** At 14:52 Hrs/08-08-2024, 400 kV Asoj Main Bus-2 tripped in R-Ph to Earth fault by Busbar Protection Scheme and all 400 kV Main Bus-2 bays including 220 kV Bus coupler tripped. A/R operated successfully at Kosamba end only in 400kV Asoj-Kosamba line connected with Bus 1 due to DPS relay overreach. Loud blast sound was heard but no physical cause of occurrence could be found by GETCO. No load loss reported by GETCO.
4. **Elements Tripped -**
   1. 400 kV Indore
   2. 400 kV Choraniya
   3. 400 kV Vadodara 400
   4. 400/220 kV,500MVA ICT-2
   5. 400/220 kV,500MVA ICT-4
   6. 400 kV Bus Coupler
5. **Protection/Operational issues observed:**

   Undesirable operation of A/R at Kosamba end for 400 kV Asoj-Kosamba due to DPS over- reached. DR not time sync for 400 kV Asoj Vadodara-2 line at Asoj.

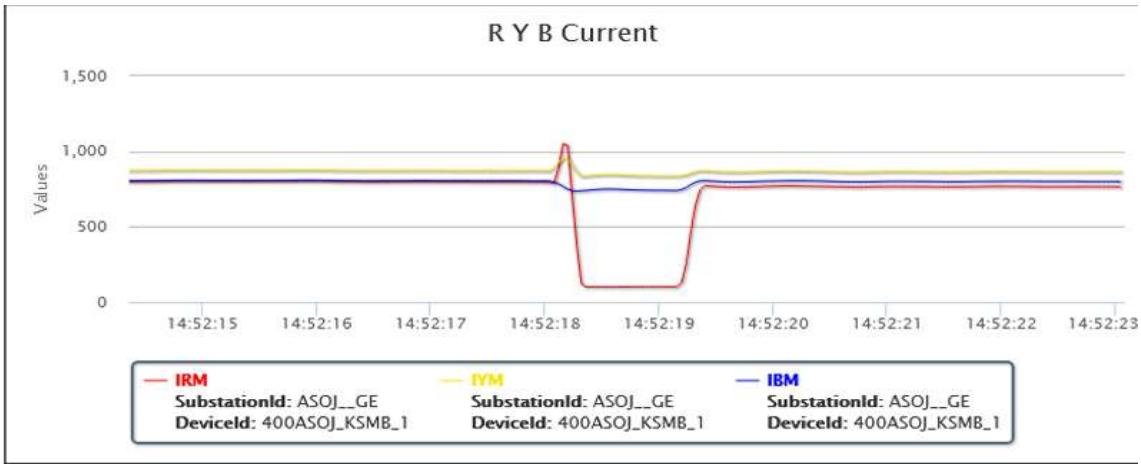
6. **Action Taken/Remedial Measures:**

   DPS schemes will be kept under supervision by GETCO and if future occurrence observed of similar nature, Z1 Settings will be reduced to 75%. No physical cause of occurrence could be found by GETCO after switchyard inspection, thermovision scanning and PID. It is suspected that transient type of bus fault might have caused by any foreign object which was cleared (Burnt Out) during 71 Bus Fault or it is also possible that any R-phase silicon rubber insulator of 400kV Main Bus-2 might have flashed and regained its property later on. 400 kV Main Bus-2 was charged from 400 kV Choraniya Line-2 at 16:40 Hrs. 400 kV Bus Coupler made ON at 17:10 Hrs. While taking 500MVA 400/220kV ICT-4 in service, it is observed that its 220 kV

side breaker Y-Pole was stuck-up. Hence ICT-4 was taken out from H.V side and again taken into service on 09-08-2024 at 14:53 Hrs after attending 220 kV side CB mechanism problem. DR not time sync for 400 kV Asoj Vadodara-2 line at Asoj. GETCO may kindly resolve.

161th PCM Discussions:

Analysis from PMU:



GETCO stated that 400 kV Main Bus-2 tripped under R-Ph to Earth fault resulting in tripping of all elements connected to 400 kV Main Bus-2 including 400 kV Bus Coupler.

Further, overreaching of DPS schemes was observed at Kosamba end resulting in A/R operation as observed from DRs of 400 kV Asoj-Kosamba line. Even though line was connected to 400 kV Main Bus-1 at 400 kV Asoj End, A/R operated in R-phase from Remote end (details given at Annexure-3C).

He also informed that they didn't find the physical cause of occurrence even after switchyard inspection, thermo vision scanning and PID. It is suspected that transient type of bus fault might have caused by any foreign object which was cleared (Burnt Out) during bus fault or it is also possible that any R-phase silicon rubber insulator of 400 kV Main Bus-2 might have flashed and regained its property later on.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2G.2.

2G.3 Grid Event at 400 kV Kakrapar (3&4)-Navsari Substation on 03rd September 2024

1. **Event Category:** GI-2
1. **Event Date and Time:** 03rd September 2024, 06:50 hrs
2. **Event Summary:** At 06:50 hrs / 03-09-2024, 400 kV Kakrapar(3&4)-Navsari-ckt-1 tripped on R-E fault at 400 kV Navsari end. Simultaneously, at 400 kV Kakrapar(3&4), 400 kV Kakrapar(3&4)-Navsari-ckt-1 and 400 kV Kakrapar(3&4)- bus2 tripped on LBB protection

operation. As seen from PMU plot, fault did not persist for 200 msec, hence LBB protection operation was not in-order.

As informed by NPCIL Kakrapar(3&4), the operation of LBB relay was not as per intent. The LBB current element is set at 20 % of C primary = 20 % of 2000 A = 400 A with a time delay of 200 millisecond.

During R-E fault on 400 kV Kakrapar(3&4)-Navsari-ckt-1 at 06:50 Hrs, R phase fault got cleared in 95 milliseconds. However, due to relay's internal CB fail element logic issue, by seeing the other 2 phases (Y&B phases) current more than the set value, the relay has initiated LBB trip after 200 milliseconds of LBB initiation.

At 07:01 hrs / 03-09-2024, during the outage of 400 kV Kakrapar(3&4)-Navsari-1 (forced outage from 06:50hrs/03.09.2024), loading on 400 kV Kakrapar(3&4)-Navsari-ckt-2 was around 1400 A and Y-Phase dropper melted at KAPS (3&4). 400 kV Kakrapar(3&4)-Navsari-ckt-2 tripped on T-protection. As informed by Kakrapar, 400 kV Kakrapar(3&4)-GT-4 R-phase DS jumper also melted during the event and Turbine-3 tripped due to power swing during the disturbance, resulting in trippings of 400 kV Kakrapar(3&4)-Unit-4&3 (700 MW) respectively. Generation loss of 1267 MW occurred at Kakrapar(3&4) Nuclear Power Plant due the event.

4. Elements Tripped -

1. 400/220 kV DGEN-ICT-1
2. 400 kV DGEN-Bus-2
3. 400 kV DGEN-Bus Reactor
4. 400/22 kV DGEN-GT-1
5. 400 kV Navsari-DGEN-1

5. Time and Date of Restoration- 18:14 / 17-09-2024

6. Protection and Operational issues observed:

400 kV Kakrapar(3&4)-Navsari-1 and 400 kV Kakrapar(3&4)-Bus2 tripped on LBB protection operation, even though the fault got cleared within 96 msec

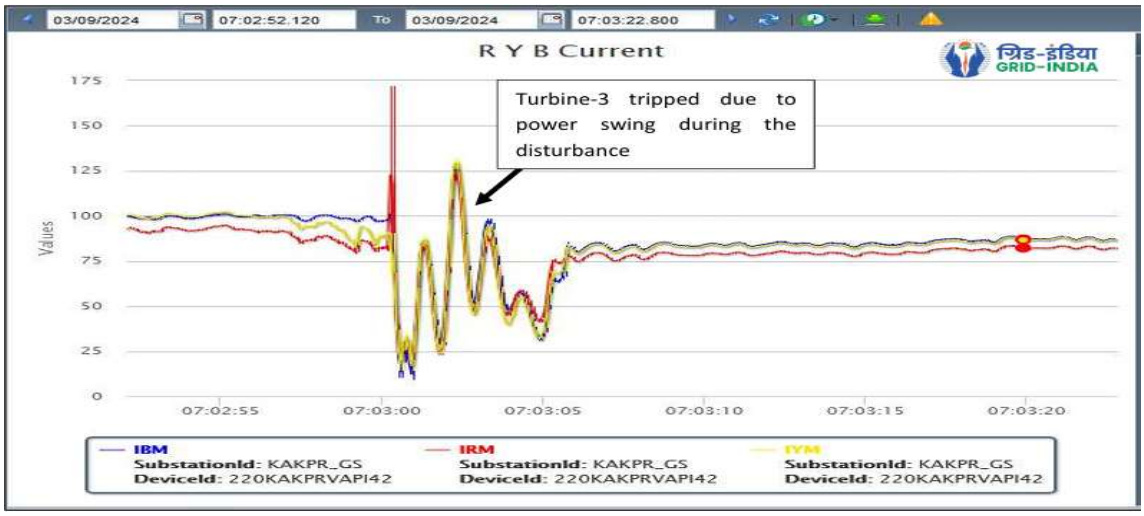
7. Action Taken/Remedial Measures:

Following are the corrective Actions taken by KAPS (3&4) a. The internal CB fail element that caused the incorrect tripping has been disabled. b. The PSL (Programmable Scheme Logic) has been modified, and the LBB scheme is now implemented solely via the PSL, ensuring that tripping will only occur when the current in the corresponding phase is detected, rather than in

the other two phases. c. These modifications have been implemented in all LBB relays at KAPS-3&4 by NPCIL.

161th PCM Discussions:

Analysis from PMU:



NPCIL stated that 400 kV KAPS-Navsari line-1 tripped on carrier-aided protection due to R Ph-E fault (18.6 KA) that occurred at a distance of around 6 km at Navsari. Further, R-phase CB got opened in KAPS-Navsari line-1, and power evacuation was done through remaining two phases. However, as per existing LBB logic, Y& B phase LBB got actuated, since current was more than the LBB current setting of 400A. Thus, R-Phase fault resulted in actuation of three phase LBB. Subsequently, LBB got initiated which resulted in BUS-II de energization.

He also informed that power flow from GT-4 got established through BUS-1 and power evacuation of KAPS-4 through this path resulted in heating and failure of bus bar joint, BPI and Bus bar IPS aluminum tube. This resulted in the tripping of turbine-3 due to power swing during the disturbance, which resulted in the tripping of 400 kV Kakrapar (3&4)- Unit-3&4.

Further, KAPS-Navsari-II tripped on the actuation of STUB/TEE differential protection due to the snapping of the Y-phase line conductor due to overheating of joint and R-Y phases got shorted.

Action Taken:

1. 400 kV CB-09 Healthiness was checked & found all breaker parameters within range. Navsari -1 was charged.

2. Navsari-II line-Y phase moose conductor, corona bell was replaced.

3. Turbine synchronized with grid.

4. BUS-I isolation was done and the following jobs were carried out:

a. 4.5 and 4 inch IPS tube bus bar was repaired. CRM was taken and found values within the range. Tests are attached at Annexure-03.

b. Two Bus post Insulator modules were replaced.

c. Corona ring, corona bell connector was replaced.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2G.3.

2G.4 Grid Event at 400 kV DGEN Substation on 17th September 2024

1. **Event Category:** GI-2
2. **Event Date and Time:** 17th September 2024, 15:31 hrs3
3. **Event Summary:** At 15:31 hrs / 17-09-2024, Bus bar protection operated in 400 kV DGEN-Bus-2 due to failure of LA of 400/220 kV DGEN-ICT-1, resulting in tripping of all connected elements to 400 kV DGEN-Bus-2. No generation loss occurred due to the event.
4. **Elements Tripped -**
   1. 400/220 kV DGEN-ICT-1
   2. 400 kV DGEN-Bus-2
   3. 400 kV DGEN-Bus Reactor
   4. 400/22 kV DGEN-GT-1
   5. 400 kV Navsari-DGEN-1
5. **Time and Date of Restoration-** 18:14 / 17-09-2024
6. **Protection and Operational issues observed:**

   Periodic maintenance and testing activities to be carried out to avoid such events in future and to ensure healthiness of equipment. Bus bar protection operation is undesirable as the fault cleared through differential protection relay of ICT-1.

7. **Action Taken/Remedial Measures:**

   DGEN - 400KV B/R 1 was first charged at 18:51 hrs/17.09.2024. But after charging bus reactor, heavy spark observed in its R-phase bushing. So again, bus reactor discharged and taken into

service next day after rectification. • DGEN-ICT-ICT-1 R-Phase LA replacement is pending and expected to be finish by December 2024 as per telephonic information by DGEN.

161th PCM Discussions:

Bus bar protection operated in 400 kV DGEN-Bus-2 due to failure of LA of 400/220 kV DGEN-ICT-1, resulting in tripping of all connected elements to 400 kV DGEN-Bus-2.

The subcommittee noted the above. A Detailed report is enclosed as Annexure 2G.4

2H Occurrences in RE Generators. .

2H.1 Grid Event 220 kV Bhuj-Nanavalka Substation on 1st August 2024.

1. **Event Category**: GD-1
2. **Event Date and Time:** 1st August 2024, 16:41 Hrs
3. **Event Summary:** At 16:41 Hrs / 01-08-2024, 220 kV Bhuj-Nanavalka tripped on R-E fault after auto recloser attempt. It is seen that Auto recloser attempt taken from Bhuj End only and three phase trip issued at Nanavalka end for single phase fault. Generation loss of 230 MW occurred at Nanavalka (Alfanar) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Bhuj-Nanavalka
5. **Time and Date of Restoration-** 01:50/01-08-2024
6. **Protection/Operational issues observed:**

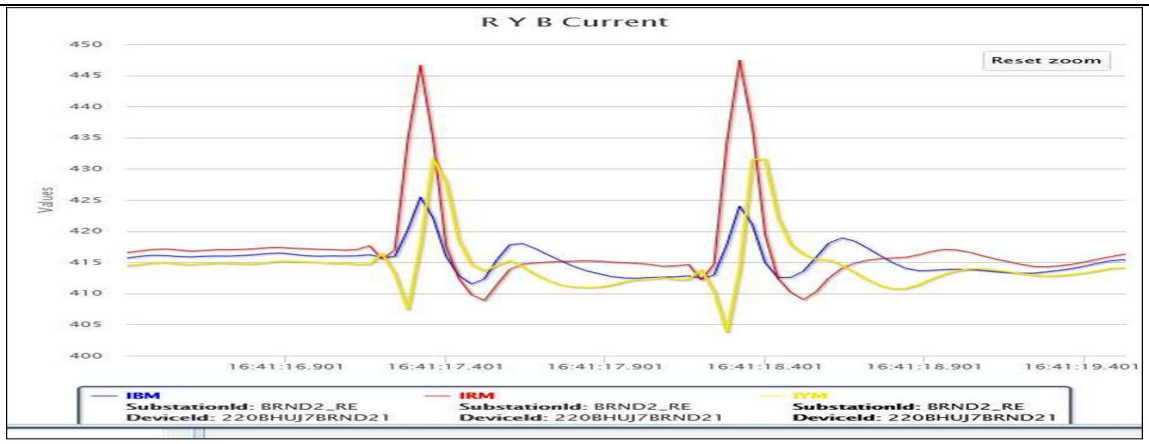
   A/R not attempted at Nanavalka end for single phase fault D/R not time sync at Bhuj end SOE of Nanavalka end not reported at WRLDC Scada.

7. **Action Taken/Remedial Measures**:

   DR not time sync at Bhuj end. POWERGRID –WR2 may kindly resolve A/R not attempted at 220 Nanavalka for single phase fault. Alfanar may kindly investigate the reason for the same SOE of Nanavalka end not reported at WRLDC Scada. Alfanar may kindly resolve the issue in co-ordination with WRLDC-SCADA

161th PCM Discussions:

Analysis from PMU:



Alfanar informed that 220 kV Bhuj-Nanavalka tripped on an R-E fault after an auto recloser attempt and the generation loss of 230 MW occurred due to loss of evacuation.

WRLDC enquired whether the A/R attempt took place for a three-phase fault or a single-phase fault. Alfanar replied that they would send the report after checking and also the relay settings within one week.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.1.

2H.2 Grid Event at 220 kV Bhuj-Naranpar Substation on 2nd August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time**: 2nd August 2024. 03:47 Hrs
3. **Event Summary:** At 03:47 Hrs / 02-08-2024, 220 kV Bhuj-Naranpar tripped on R-E fault at Bhuj end only. Generation loss of 238 MW occurred at Naranpar (GIWEL-3) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**

   1. 220 kV Bhuj-Naranpar
5. **Time and Date of Restoration-** 06:53 / 02-08-2024
6. **Protection/Operational issues observed:**

   3 phase Fault not sensed at Naranpar end.
7. **Action Taken/Remedial Measures:**

   GIWEL-Naranpar may kindly investigate the reason for not sensing fault and not tripping at Naranpar end.

<u>161th PCM Discussions:</u>

220 kV Bhuj-Naranpar tripped on R-E fault at Bhuj end only and the generation loss of 238 MW occurred at Naranpar (GIWEL-3) Wind Power plant due to loss of evacuation path.

The subcommittee noted the above. A detailed report is enclosed as Annexure 2H.2.

2H.3 Grid Event 220 kV Bhuj II-Nakhatrana Substation on 06th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time: 06th August 2024,**09:36 **Hrs**
3. **Event Summary:** At 09:36 Hrs / 06-08-2024, 220 kV Bhuj II-Nakhatrana tripped on R-E fault after unsuccessful Auto recloser attempt. At the time of patrolling, R Phase disc insulator failure observed at location 45. Generation loss of 300 MW occurred at Nakhatrana and Dedhiya (Adani) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Bhuj II-Nakhatrana
5. **Time and Date of Restoration-** 16:00 / 06-08-2024
6. **Protection/Operational issues observed**:

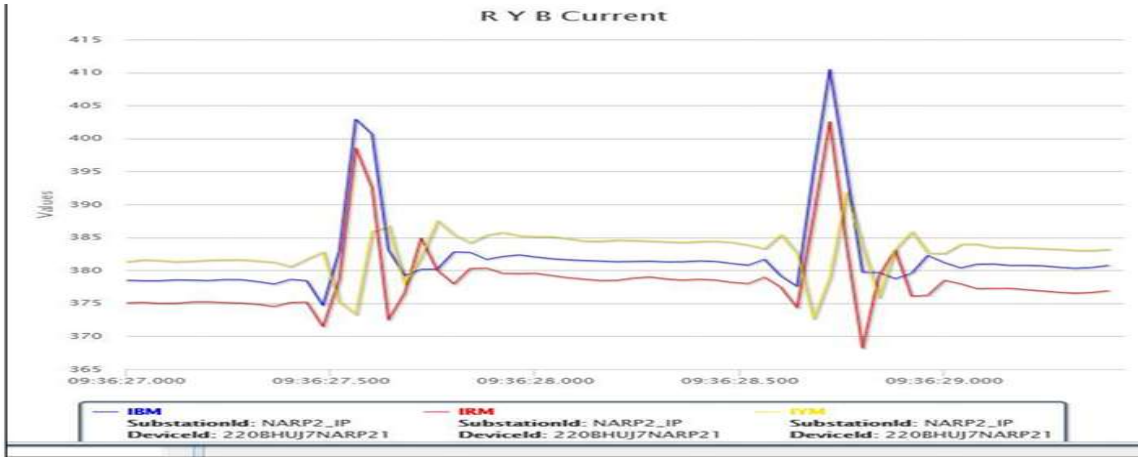
SOE of Nakhatrana end not reported correctly at WRLDC Scada

7. **Action Taken/Remedial Measures:**

During Patrolling R-Phase Disc Insulator Failure at Tower No.45 From Nakhatrana PSS was found. Line charged after insulator replacement. SOE of Nakhatrana end not reported correctly at WRLDC Scada. ADANI, Nakahtrana may kindly resolve the issue in coordination with WRLDC-SCADA.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Adani informed that 220 kV Bhuj II-Nakhatrana tripped on R-E fault after unsuccessful Auto recloser attempt due to failure of R Phase disc insulator. Further, generation loss of 300 MW occurred at Nakhatrana and Dedhiya plants due to loss of evacuation path.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.3.

2G.4 Grid Event at 220kV Bhuj-Ratadiya-1 on 07th August 2024

1. **Event Category**: GD-1
2. **Event Date and Time: 7th June 2024, 13:59 hrs**
3. **Event Summary:** At 13:59 Hrs / 07-08-2024, 220kV Bhuj-Ratadiya-1 tripped on Y-E fault. Simultaneously, 220kV Bhuj-Ratadiya-2 tripped on under voltage protection operation. At the time of patrolling, Y phase jumper found open at location 165. Generation loss of 436 MW occurred at Ratadiya (Adani) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped -**
   1. 220 kV Bhuj II-Morjar (Srijan)
5. **Time and Date of Restoration-** 20:53 / 07-08-2024
6. **Protection/Operational issues observed:**

   PMU data stopped at the time of tripping. Ratadiya (Adani) may kindly resolve this issue. A/R not attempted at Bhuj end for Ckt-1 220KV Ratadiya-Bhuj-2 Line couldn't be charged immediately due to some issue in the closing circuit of circuit breaker.

7. **Action Taken/Remedial Measures:**

   Test charge of Ckt-1 got failed. During Line Patrolling Found that Tower No. 165 Y Phase Jumper is Open which was rectified and line restored by Adani.

   Ckt-2 was restored after the closing circuit of the circuit breaker was reconnected.

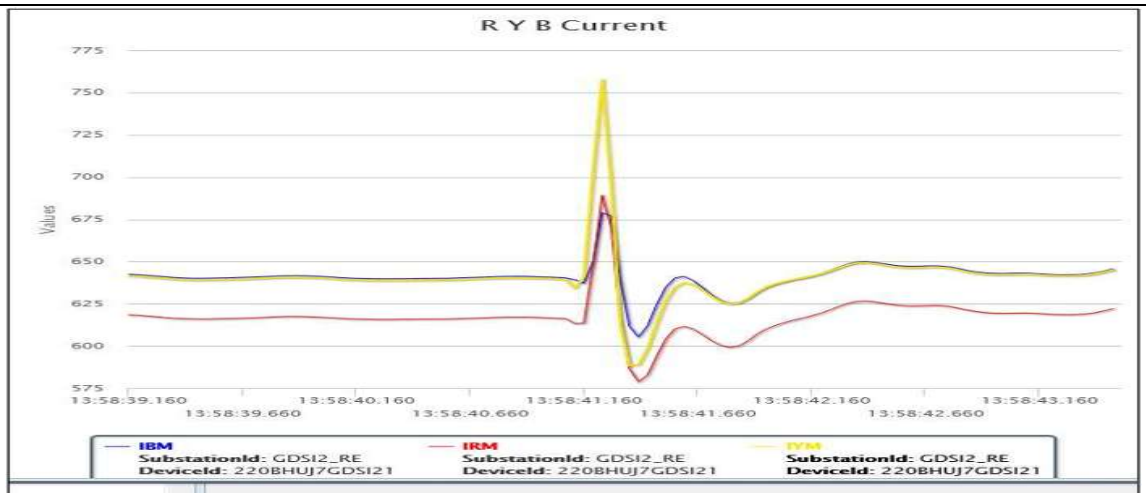
   PMU data stopped at the time of tripping. Ratadiya (Adani) may kindly resolve this issue.

   This issue has been flagged multiple times by WRLDC.

   To avoid single line overload during any 220 KV line 1 or 2 tripping SPS scheme is proposed to WRPC for further approval.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Adani informed that 220 kV Bhuj-Ratadiya-1 tripped on Y-E fault and 220 kV Bhuj-Ratadiya-2 tripped on overloading at Ratadiya end as the bus coupler was in on condition. Further, they found that Tower No. 165 Y Phase Jumper was open during line patrolling, which was rectified and the line restored by Adani.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2G.4.

2H.5 Grid Event 220 kV Bhuj II-Morjar (Srijan) Substation on 11th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 11th August 2024, 11:17 Hrs
3. Event Summary: At 11:17 Hrs / 11-08-2024, 220 kV Bhuj II-Morjar (Srijan) tripped on Zone-2 distance protection operation on Y-E fault. During inspection it was found that, Y phase voltage was not seen by relay. The same was corrected and line was charged. PMU data stopped immediately after the line tripping indicating failure of back supply or absence of backup supply at station. Generation loss of 131 MW occurred at Morjar (Srijan) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**

   1. 220 kV Jamkhambaliya-Khakharda
5. **Time and Date of Restoration-** 13:40 / 11-08-2024
6. **Protection/Operational issues observed:**

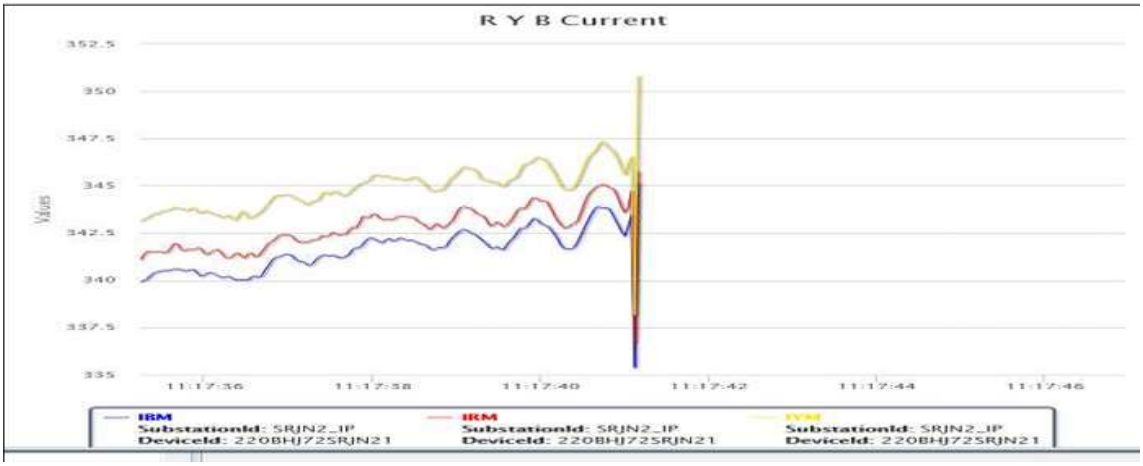
   PMU data stopped at the time of tripping. Morjar (Srijan) may kindly resolve this issue.

   Line tripped on maloperation due to Y phase voltage was not coming in main 2.
7. **Action Taken/Remedial Measures:**

   PMU data stopped at the time of tripping. Morjar (Srijan) may kindly resolve this issue. This issue has been flagged multiple times by WRLDC. During inspection Morjar (Srijan) observed that, Y phase voltage was not coming in main 2, so they rectified the issue in the related CKT.

161th PCM Discussions:

Analysis from PMU:



Srijan informed that 220 kV Bhuj II-Morjar (Srijan) tripped on Zone-2 distance protection operation on Y-E fault. During inspection, they found that the Y phase voltage seen by the relay was less due to loose connection and the same was corrected.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.5.

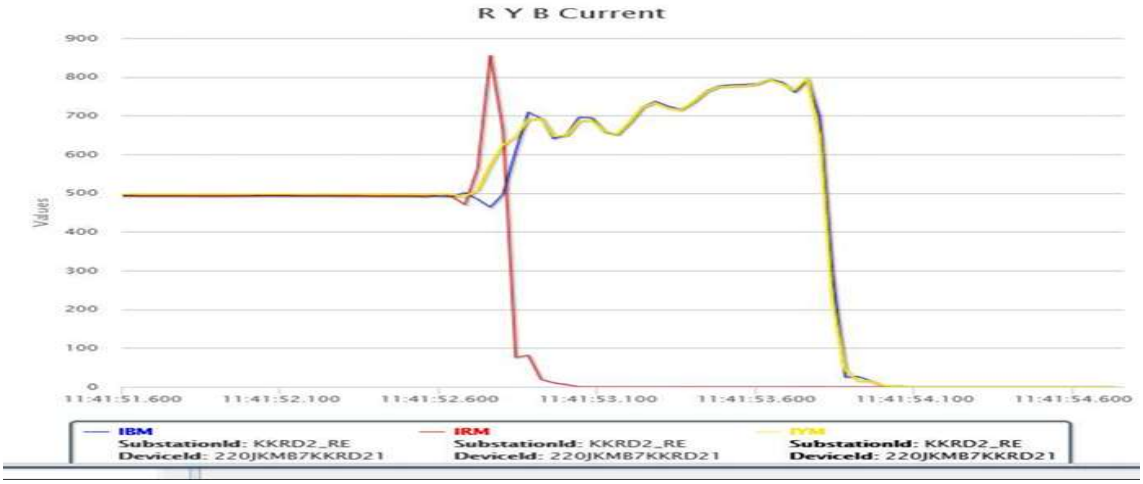
2H.6 Grid Event at 220 kV Jamkhambaliya-Khakharda Substation on 17th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 17th August 2024, 11:42 Hrs
3. **Event Summary:** At 11:42 Hrs / 07-08-2024, 220 kV Jamkhambaliya-Khakharda tripped on R-E fault.During patrolling R phase insulator failure was observed. Generation loss of 187 MW occurred at Khakharda (Apraava) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Jamkhambaliya-Khakharda
5. **Time and Date of Restoration-** 19:54 / 17-08-2024
6. **Protection/Operational issues observed: NIL**
7. **Action Taken/Remedial Measures:**

   System restored after insulator replacement.

161th PCM Discussions:

Analysis from PMU:



Apraava informed that 220 kV Jamkhambaliya-Khakharda tripped on R-E fault due to failure of R phase insulator. Line restored after the replacement of insulator.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.6.

2H.7 Grid Event at 220 kV Bhuj II-Nakhatrana Substation on 19th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 19th August 2024, 02:24 Hrs
3. **Event Summary:** At 02:24 Hrs / 19-08-2024, 220 kV Bhuj II-Nakhatrana tripped on Y-E fault after unsuccessful autoreclose attempt. During patrolling Y phase insulator failure was observed at Tower location 51. Generation loss of 47 MW occurred at Nakhatrana and Dedhiya (Adani) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Bhuj II-Nakhatrana
5. **Time and Date of Restoration-** 09:02 Hrs / 19-08-2024
6. **Protection/Operational issues observed:**

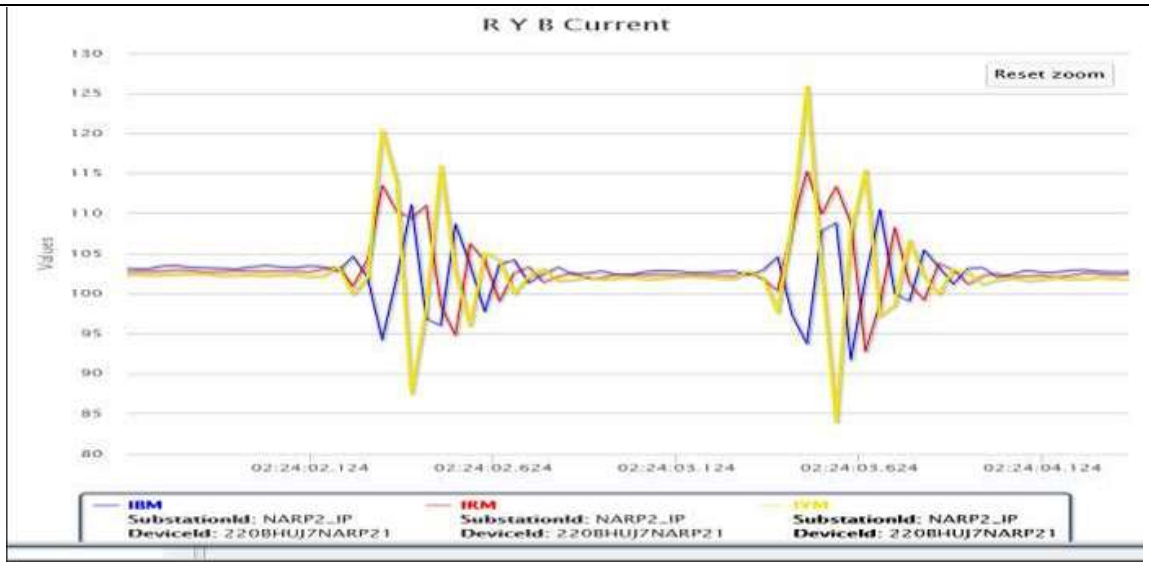
   SOE of Nakhatrana end not reported correctly at WRLDC Scada.

7. **Action Taken/Remedial Measures:**

   220KV Nakhatrana-Bhuj 2 PGCIL Line Tripped in Y Phase E/F and During Patrolling found out that Tower No.51 From Nakhatrana PSS, Y-Phase Disc Insulator Failed. System restored after insulator replacement. SOE of Nakhatrana end not reported correctly at WRLDC Scada. ADANI, Nakahtrana may kindly resolve the issue in coordination with WRLDC-SCADA.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Adani informed that 220 kV Bhuj II-Nakhatrana tripped on Y-E fault due to failure of Y phase insulator at tower. Line restored after the replacement of insulator.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.7.

2H.8 Grid Event at 220 kV Jamkhambaliya-Sidhpur Substation on 19th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 19th August 2024, 12:24 Hrs
3. **Event Summary:** At 12:24 Hrs / 19-08-2024, 220 kV Jamkhambaliya-Sidhpur tripped on Y-E fault, 3 phase tripped for fault in 1 phase which is undesirable, also Auto Recloser block signal was active. During patrolling Y phase insulator failure was observed at Tower location 59. Generation loss of 9.6 MW occurred at Sidhpur (Torrent) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Jamkhambaliya-Sidhpur
5. **Time and Date of Restoration-** 07:42 / 20-08-2024
6. **Protection/Operational issues observed:**

   As per DR of 220kV JKTL-Sidhpur of Sidhpur end, it is observed that Auto Recloser block signal was active hence A/R didn't attempt for single phase fault and line tripped on 3 phase fault.

7. **Action Taken/Remedial Measures**:

   Sidhpur (Torrent) has planned inspection of all 220 KV line towers with binoculars and thermography to avoid unnecessary tripping in future. Sidhpur (Torrent) may kindly investigate the reason for non-operation of A/R for single phase fault.

<u>161th PCM Discussions:</u>

220 kV Jamkhambaliya-Sidhpur tripped on Y-E fault due to the failure of insulator at tower location 59. 3 phase tripping for a fault a 1 phase fault is undesirable, also Auto Recloser block signal was active.

The sub-committee recommended checking the A/R at Sidhpur substation. A Detailed report is enclosed as Annexure 2H.8.

2H.9 Grid Event 220 kV Chugger-Bhuj-II-S/c Substation on 27th August 2024.

1. **Event Category: GD-1**
2. **Event Date and Time: 27th August, 01:51 Hrs**
3. **Event Summary:** At 01:51 Hrs / 27-08-2024, 220 kV Chugger-Bhuj-II-S/c tripped on R-E fault. During patrolling, R phase Jumper found open at Tower location 07 along with failure of insulator. Generation loss of 240 MW occurred at Chugger (Sitac) Wind Power plant due to loss of evacuation path.

4. **Elements Tripped-**

   1. 220 kV Chugger-Bhuj-II-S/c

5. **Time and Date of Restoration-** 21:32 / 27-08-2024.

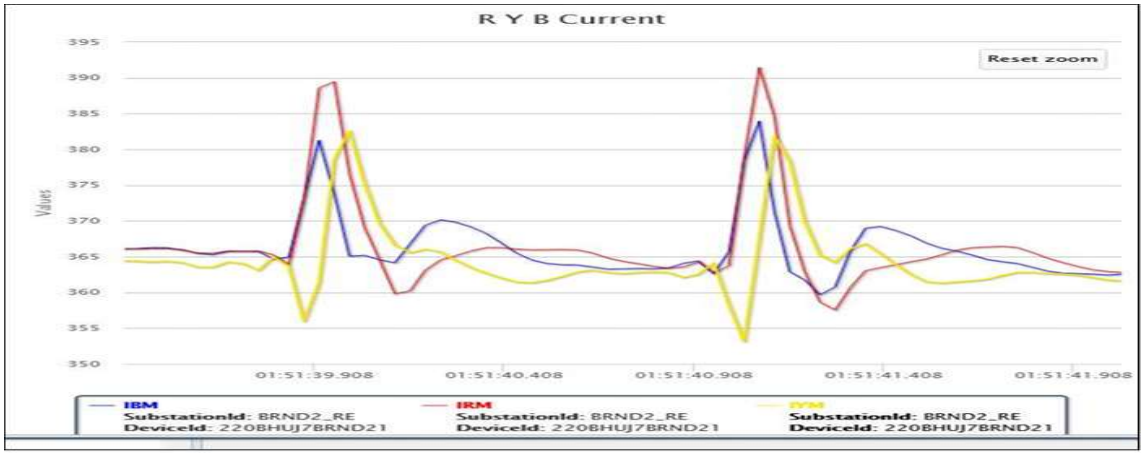
6. **Protection/Operational issues observed: NIL**

7. **Action Taken/Remedial Measures:**

   Line restored after rectification

<u>161th PCM Discussions:</u>

Analysis from PMU:



Sitac informed that 220 kV Chugger-Bhuj-II-S/c tripped on R-E fault due to failure of the insulator. During patrolling, they found that the R phase Jumper was open at Tower location 07 along with the failure of insulator.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.9.

2H.10 Grid Event at 220 kV Bhuj-Baranda-S/c substation on 27th August 2024.

1. **Event Category:** GD-1

2. **Event Date and Time:** 27th August 2024, 16:58 Hrs

3. **Event Summary:** At 16:58 Hrs / 27-08-2024, 220 kV Bhuj-Baranda-S/c tripped on B-E fault. Generation loss of 148 MW occurred at Baranda (ASIPL) Wind Power plant due to loss of evacuation path.

4. **Elements Tripped-**
   220 kV Bhuj-Baranda

5. **Time and Date of Restoration-** 20:47 / 27-08-2024

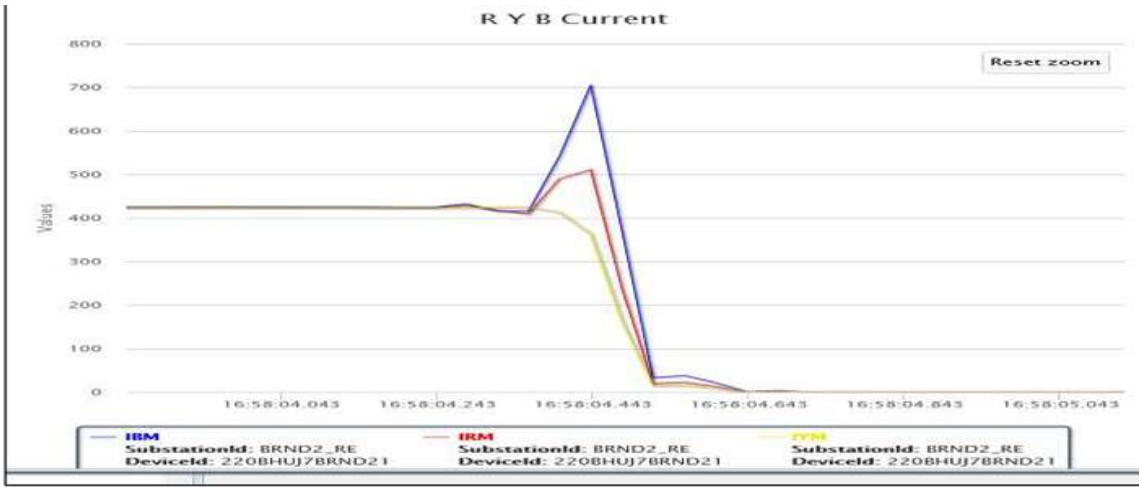
6. **Protection/Operational issues observed:**

   Patrolling work done by Avikiran Baranda but no fault was found. Fault might have occurred due to heavy rain & lightening in that area.

7. **Action Taken/Remedial Measures:** NIL

<u>161th PCM Discussions:</u>

Analysis from PMU:



Avikaran informed that 220 kV Bhuj-Baranda-S/c tripped on a B-E fault and a generation loss of 148 MW occurred at Baranda (ASIPL) Wind Power plant due to loss of evacuation path. Further, no fault was found during patrolling and fault might have occurred due to heavy rain & lightning in that area.

The sub-committee recommended checking the A/R at Baranda substation. A detailed report is enclosed as Annexure 2H.10.

2H.11 Grid Event at 220 kV Bhuj-Naranpar Substation on 29th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 29th August 2024, 18:52 Hrs
3. **Event Summary:** At 18:52 Hrs / 29-08-2024, 220 kV Bhuj-Naranpar tripped on Y-E fault after auto recloser attempt. At the time of patrolling, Y Phase disc insulator failure observed at location 45. Generation loss of 69 MW occurred at Naranpar (GIWEL-3) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Bhuj-Naranpar
5. **Time and Date of Restoration-** 13:39 / 31-08-2024
6. **Protection/Operational issues observed:**

   Restoration took 2 days, which is comparatively higher for insulator replacement work. Work to be expedited in future for such events.

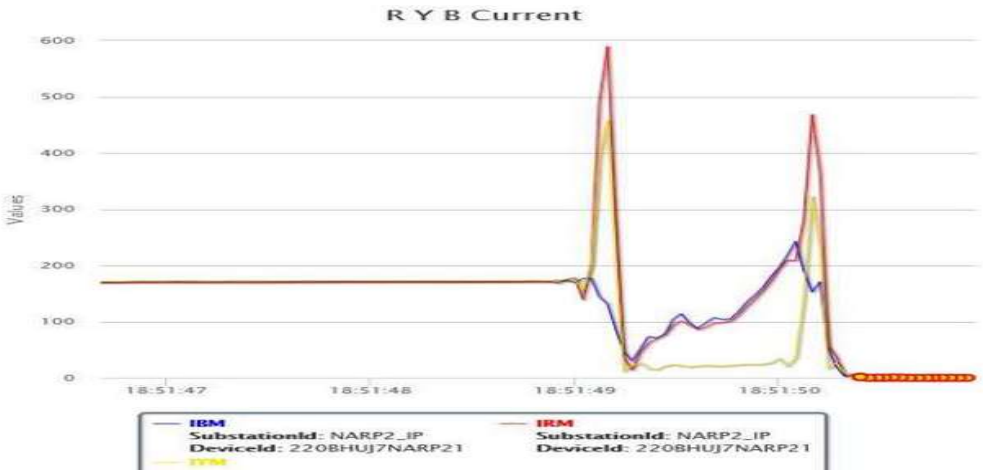
7. **Action Taken/Remedial Measures:**

   Line restored after insulator replacement

   Work to be expedited in future for such events.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Naranpar informed that 220 kV Bhuj-Naranpar tripped on Y-E fault due to failure of Y-ph disc insulator after an auto recloser attempt.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.11.

2H.12 Grid Event at 220 kV Bhuj-Kothda(Madh) Substation on 30th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 30th August 2024, 03:26 Hrs
3. **Event Summary:** At 03:26 Hrs / 30-08-2024, 220 kV Bhuj-Kotda Madh-S/c tripped on B-E fault due to fault occurred during auto recloser reclaim time. Generation loss of 19 MW occurred at Kotda Madh (Alfanar) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Bhuj-Kotda Madh
5. **Time and Date of Restoration-** 05:31 / 30-08-2024
6. **Protection/Operational issues observed:**

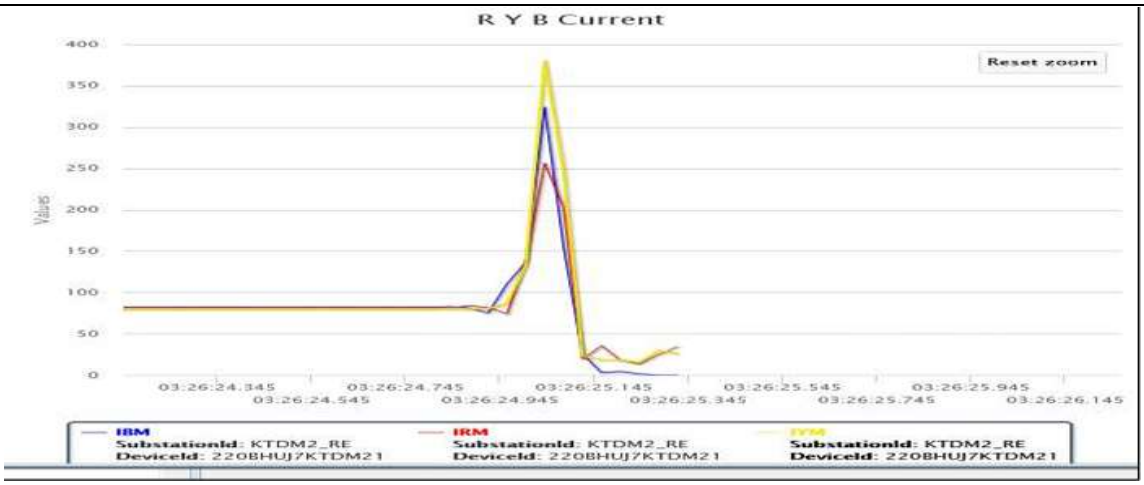
   PMU data stopped at the time of tripping

7. **Protection/Operational issues observed:**

   PMU data stopped at the time of tripping. Kotda Madh (Alfanar) may kindly resolve this issue. This issue has been flagged multiple times by WRLDC.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Alfanar informed that 220 kV Bhuj-Kotda Madh-S/c tripped on a permanent B-E fault resulting in a generation loss of 19 MW due to loss of evacuation path.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.12.

2H.13 Grid Event at 220 kV Bhuj-Dayapar-1&2 Substation on 30th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 30th August 2024, 05:53 Hrs
3. **Event Summary:** At 05:53 Hrs / 30-08-2024, 220 kV Bhuj-Dayapar-1&2 tripped due to blast in capacitor banks at Dayapar. Blast was due to grounding of PSS DC cable in Capacitor control panel, which resulting in burning of control panel of capacitor banks-1&2, meters, MCCBs. Simaltaneously, feeder-8 conductor also fell down within the plant. Generation loss of 98 MW occurred at Dayapar (INOX) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**

   1. 220 kV Bhuj-Dayapar-1&2

5. **Time and Date of Restoration-** 14:00 / 30-08-2024
6. **Protection/Operational issues observed:**

   Fault in 33 kV system not cleared at Dayapar end, leading to tripping of 220 kV system. 220 kV Bhuj- Dayapar 1&2 didn't trip at Dayapar end in spite of receiving DT.

7. **Action Taken/Remedial Measures:**

   Ionox Dayapar isolated battery charger 2 from the circuit and took all DC load on charger 1. Upon checking one DC cable was found short which was replaced and system restored. Inox Dayapar may kindly investigate the reason for not clearing the fault in 33 kV system and non tripping of 220 kV Bhuj-Dayapar 1&2 at Dayapar end.

161th PCM Discussions:

220 kV Bhuj-Dayapar-1&2 tripped due to a blast in capacitor banks at Dayapar. The blast was due to the grounding of the PSS DC cable in Capacitor control panel, which resulted in the burning of control panel of capacitor banks-1&2, meters, MCCBs. Simultaneously, the feeder-8 conductor also fell within the plant. A generation loss of 98 MW occurred at Dayapar (INOX) Wind Power plant due to the loss of evacuation path.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.13.

2H.14 Grid Event at 220 kV Bhuj-Kotda Madh-S/c Substation on 30th August 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 30th August 2024, 06:34 Hrs
3. **Event Summary:** At 06:34 Hrs / 30-08-2024, 220 kV Bhuj-Kotda Madh-S/c tripped on B-E fault after auto recloser attempt. During patrolling rope was found hanging on B-phase conductor. Generation loss of 37.8 MW occurred at Kotda Madh (Netra) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   220 kV Bhuj-Kotda Madh

5.Time and Date of Restoration- 13:11 / 30-08-2024

6. Protection/Operational issues observed:

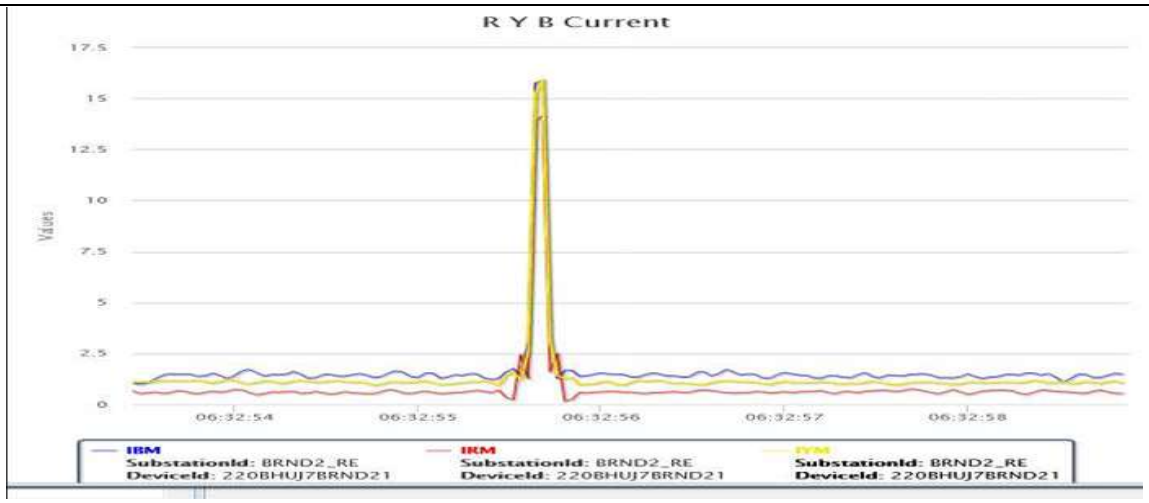
PMU data not generated at Kotda madh at the time of tripping**.** Relay indication informed is REF fault, but the DR reflects tripping due to overloading.

7. Action Taken/Remedial Measures:

PMU data not generated at the time of tripping. Kotda Madh (Alfanar) may kindly resolve this issue. This issue has been flagged multiple times by WRLDC.

161th PCM Discussions:

Analysis from PMU:



Netra informed that 220 kV Bhuj-Kotda Madh-S/c tripped on B-E fault after auto recloser attempt and the generation loss of 37.8 MW occurred due to loss of evacuation path. Further, a rope was found hanging on the B-phase conductor during patrolling.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.14.

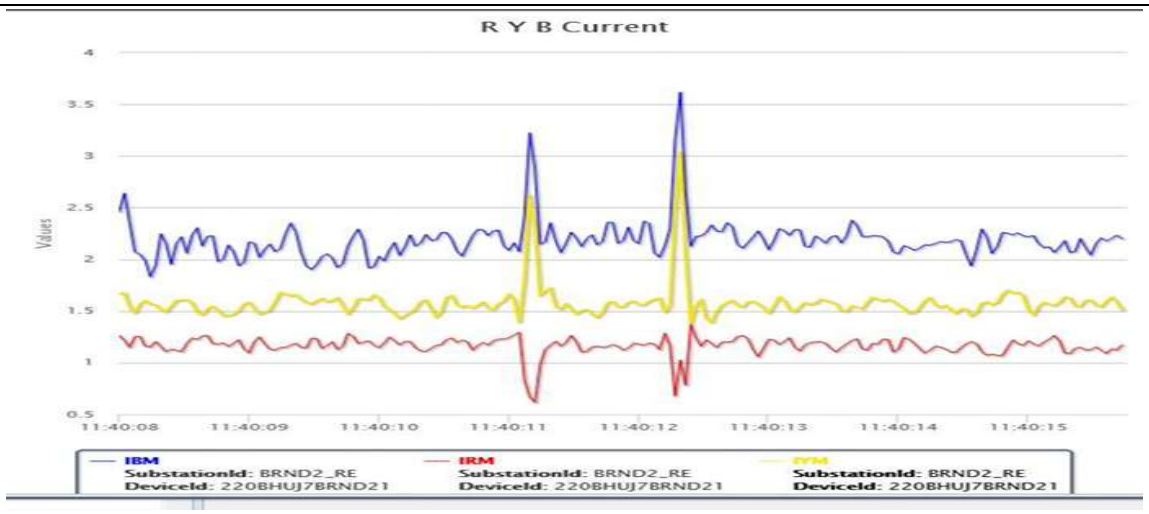
2H.15 Grid Event at 220 kV Chugger-Bhuj-II Substation on 30th August 2024.

1. **Event Category: GD-1**
2. **Event Date and Time: 30th August 2024, 11:40 Hrs**
3. **Event Summary:** At 11:40 Hrs / 30-08-2024, 220 kV Chugger-Bhuj-II tripped on B-E fault. At the time of patrolling, insulator failure observed at tower location 147 and 206. Generation loss of 48 MW occurred at Chugger (Sitac) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
   1. 220 kV Chugger-Bhuj-II
5. **Time and Date of Restoration-** 10:31 / 01-09-2024
6. **Protection/Operational issues observed: Nil**
7. **Action Taken/Remedial Measures**:

   Line restored after insulator replacement

<u>161th PCM Discussions:</u>

Analysis from PMU:



Sitac informed that 220 kV Chugger-Bhuj-II tripped on B-E fault and the generation loss of 48 MW occurred due to loss of evacuation path. At the time of patrolling, insulator failure was observed at tower locations 147 and 206.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.15.

2H.16 Grid Event 220 kV Nalasopara S/s Substation on 31st August 2024.

1. **Event Category**: GD-1
2. **Event Date and Time:** 31st August 2024, 10:35 Hrs
3. **Event Summary:** At 10:35 Hrs / 31-08-2024, 220 kV Nalasopara S/s became dead due to tripping of all elements on busbar protection operation. During the event, switchyard works were going on. 220 kV Palgar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote eneds which was undesirable. Load loss of 219 MW occurred at Nalasopara Substation due to the event.
4. **Elements Tripped-**:
   1. 220 kV Palgar-Nalasopara
   2. 220 kV Boisar-Nalasopara
   3. 220 kV Nalasopara-ICT-1,2&3
5. **Time and Date of Restoration-** 11:08 / 31-08-2024
6. **Protection/Operational issues observed:**

   220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable. 220 kV PalgharNalasopara and 220 kV Boisar- Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable. This happened due to incorrect configuration reported. This issue may be checked for other 220 kV lines also. Fault created by manual error during switchyard works. MSETCL may kindly take proper

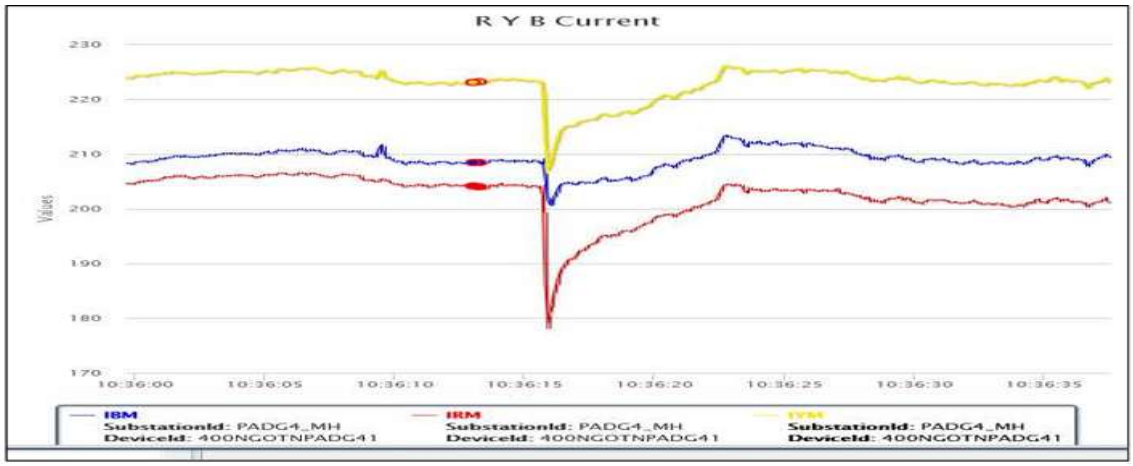
care during the operational activities to avoid such events in future. Relay indication informed is REF fault, but the DR reflects tripping due to overloading.

7. **Action Taken/Remedial Measures:**

MSETCL disconnected the Faulty Directional Unit Aux Supply. Checked healthiness of interconnecting cables from Bushar Panel to Individual CRP, ensured that no abnormal was observed. Then, Bus Bar taken back in service.

<u>161th PCM Discussions:</u>

Analysis from PMU:



MSETCL informed that 220 kV Bus Bar Protection operated at 220 kV Nalasopara SS leading to the tripping of all elements on main bus due to which the substation went into dark. Smoke and black spots were observed inside the directional unit of the RADSS busbar, which is suspected to have extended the trip to the external LBB circuit and resulted in the operation of all bays 96 relays. He also informed that switch yard works were going on during the event.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.16.

2H.17. Grid Event 220 kV Bhuj-Gadhsisa Substation on 2nd September 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 2nd September 2024, 00:42 Hrs
3. **Event Summary:** At 00:42 Hrs / 02-09-2024, 220 kV Bhuj-Gadhsisa tripped on B-E fault. It is observed from DRs that Auto recloser didn't attempt at Gadhsisa end for single phase fault and three phase tripped observed at Bhuj End. During patrolling spare conductor of other utility was lying on 220 kV Bhuj-Gadhsisa. Generation loss of 20 MW occurred at Gashsisa (Renew Power) Wind Power plant due to loss of evacuation path.

4. **Elements Tripped-**

   1. 220 kV Bhuj-Gadhsisa

5. **Time and Date of Restoration**- 06:12 / 02-09-2024
6. **Protection/Operational issues observed:**

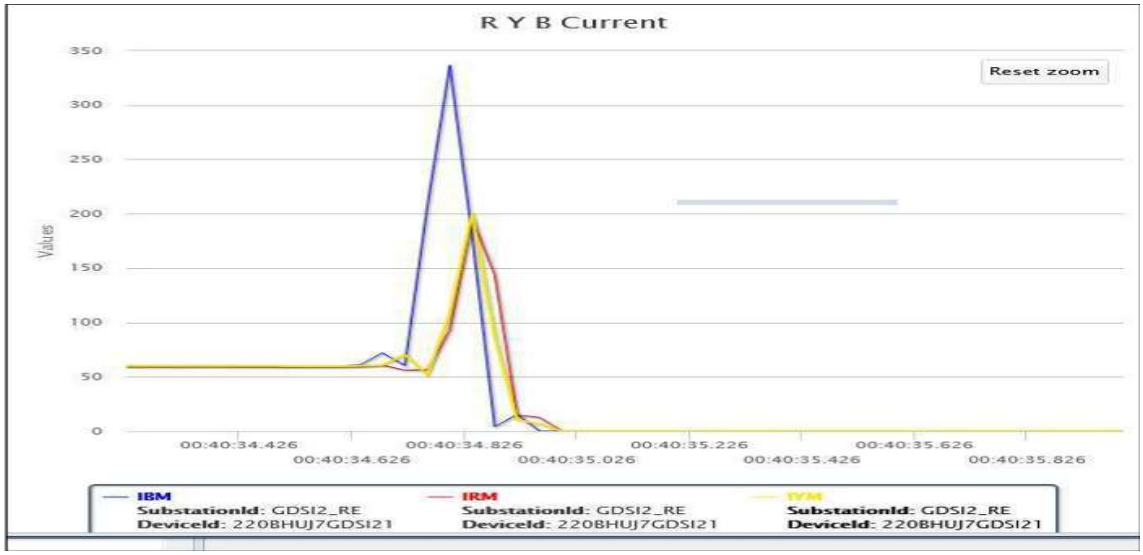
   DR not time sync at Gadhsisa

7. **Action Taken/Remedial Measures:**

   Gadhsisa, renew power may kindly fix the issue of time sync of DR.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Renew power informed that 220 kV Bhuj-Gadhsisa tripped on B-E fault resulting in a generation loss of 20 MW due to loss of evacuation path. Further, they observed that the spare conductor of another utility was lying on 220 kV Bhuj-Gadhsisa during patrolling.

The Sub-Committee suggested Renew power to take the necessary action to avoid the frequent tripping of the line due to the falling of the spare conductor. A Detailed report is enclosed as Annexure 2H.17.

2H.18. Grid Event 220 kV Bhuj-Nanavalka Substation on 3rd September 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 3rd September 2024, 22:40 Hrs
3. **Event Summary:** At 22:40 Hrs / 03-09-2024, As informed by Alfanar 220 kV Bhuj-Nanavalka tripped on B-E fault, but is seen from DRs R-B phase to phase fault occurred. During patrolling it was found that the suspension insulator on Tower No. 39/0 B phase and Tower- No 36/0 Y phase Tension insulator had failed.

Multiple test charging was taken but line tripped on SOTF it is inferred that thorough patrolling had not been carried out before attempting test charging. Generation loss of 6 MW occured at Nanavalka (Alfanar) Wind Power plant due to loss of evacuation path.

4. **Elements Tripped-**

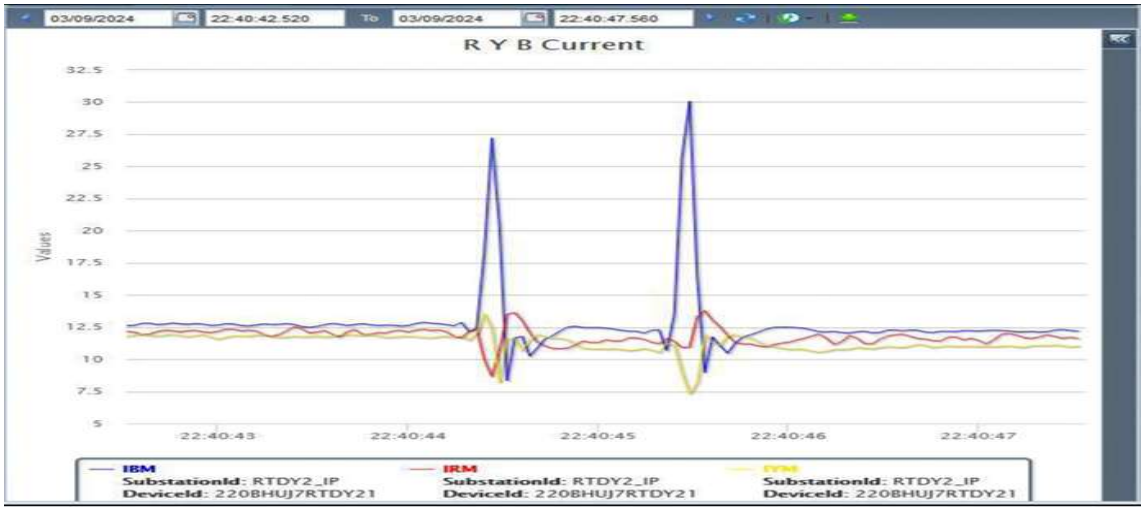
   220kV Bhuj-Nanavalka

5. **Time and Date of Restoration-** 12:36 / 04-09-2024
6. **Protection/Operational issues observed:** Multiple test charging were taken but line tripped on SOTF. It is inferred that thorough patrolling had not been carried out before attempting test charging.
7. **Action Taken/Remedial Measures:**

   Line restored after insulator replacement. In case of SOTF, charging attempt should not be made without thorough patrolling. Healthiness to be ensured before attempting test charging in future.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Alfanar informed that 220 kV Bhuj-Nanavalka tripped on B-E fault due to the failure of insulator and the generation loss of 6 MW occurred due to the loss of evacuation path. During patrolling they found that the suspension insulator on Tower No. 39/0 B phase and Tower- No. 36/0 Y phase Tension insulator had failed.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.18.

2H.19. Grid Event 220 kV Bhuj II-Morjar (Srijan) Substation on 4th September 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 4th September 2024, 11:42 Hrs

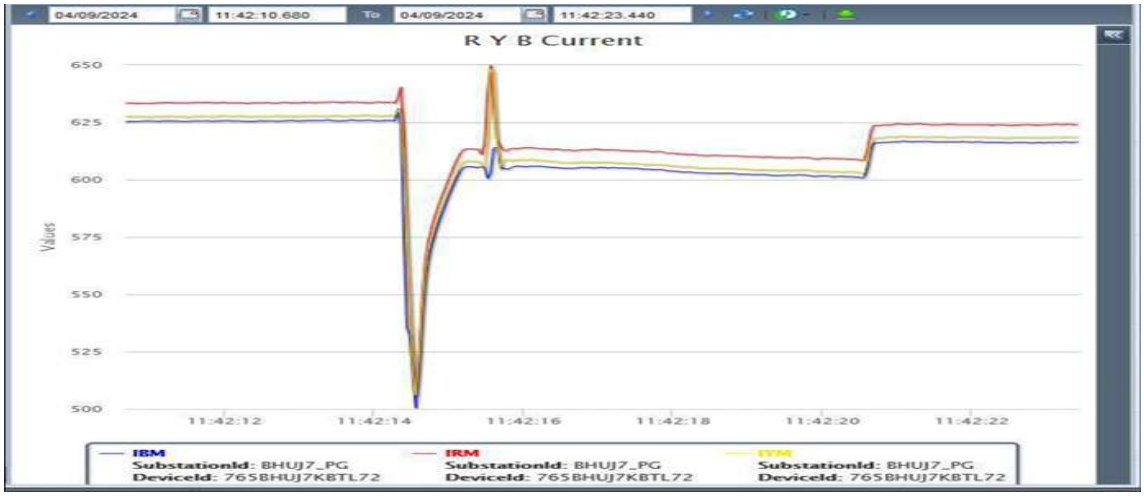
3. **Event Summary:** At 11:42 Hrs / 04-09-2024, 220 kV Bhuj II-Morjar (Srijan) tripped on R-E fault. During patrolling it was found that a tension insulator failed at tower number AP-05A . Generation loss of 31 MW occured at Morjar (Srijan) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**

   220 kV Bhuj II-Morjar (Srijan)
5. **Time and Date of Restoration**- 15:59 / 05-09-2024
6. **Protection/Operational issues observed:** NIL
7. **Action Taken/Remedial Measures:**

   Line restored after insulator replacement

<u>161th PCM Discussions:</u>

Analysis from PMU:



Srijan informed that 220 kV Bhuj II-Morjar (Srijan) tripped on R-E fault due to the failure of insulator which resulted in the generation loss of 31 MW due to loss of evacuation path. During patrolling they found that a tension insulator failed at tower number AP-05A.

WRLDC enquired as to why the 3-ph trip was issued for single phase fault and suggested checking the A/R at Srijan substation.

The Sub-Committee suggested checking the A/R at Srijan substation. A Detailed report is enclosed as Annexure 2H.19

2H.20. Grid Event 220 kV Bhawsingpura Substation on 6th September 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 6th September 2024, 13:10 Hrs
3. **Event Summary:** At 13:09 hrs / 06-09-2024, 220 kV Bhawsinghpura-Bus-1 and all connected elements tripped on Bus bar protection operation due to actuation of

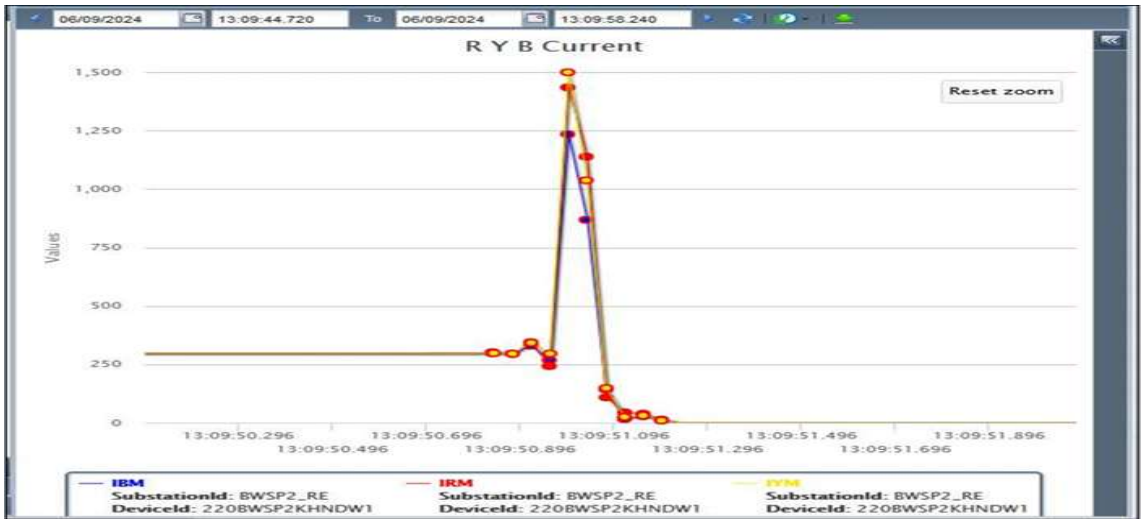
Overcurrent relay (50/51). 220 kV Bhawsingpura-Kanwani-1, 220 kV Bhawsingpura-Khandwa-1 and 220/33 kV Bhawsingpura-ICT-1 tripped leading to generation loss of 118 MW.Prior to the incident, 220/33 kV Bhawsingpura-ICT-1 tripped on over current protection operation at 12:50 hrs. Generation loss of 269 MW Bhawsinghpura and Kanwani (Masaya Solar) Solar Pwer Plant occurred due to the event.

4. **Elements Tripped-**
   1. 220 kV Bhawsingpura-Kanwani-1
   2. 220 kV Bhawsingpura-Khandwa-1
   3. 220 kV Bhawsingpura-Bus-1
   4. 220/33 kV Bhawsingpura-ICT-1
5. **Time and Date of Restoration-** 16:49 / 06-09-2024
6. **Protection/Operational issues observed:**

   Masaya Solar may kindly investigate the reason for Bus bar protection operation and ICT tripping on overloading.
7. **Action Taken/Remedial Measures:**
   System restored.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Masaya Solar intimated that 220 kV Bhawsinghpura-Bus-1 and all connected elements tripped on Bus bar protection operation due to the actuation of Overcurrent relay (50/51) resulting in the generation loss of 269 MW at Bhawsinghpura and Kanwani plants. Prior to the incident, 220/33 kV Bhawsingpura-ICT-1 tripped on over current protection operation.

WRLDC enquired about the reason of bus bar operation.

The Sub-Committee requested to submit the report on the operation of the bus bar operation within a week. A Detailed report is enclosed as Annexure 2H.20.

2H.21. Grid Event 220 kV Bhuj-Gadhsisa Substation on 10th September 2024.

1. **Event Category: GD-1**
2. **Event Date and Time: 10th September 2024, 00:31 Hrs**
3. **Event Summary:** At 00:31 Hrs / 10-09-2024, 220 kV Bhuj-Gadhsisa tripped on Y-B fault at Bhuj end. During patrolling it was found that Tower Number 46/0 was damaged from Cage section. Generation loss of 59 MW occured at Gashsisa (Renew Power) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
    1. 220 kV Bhuj-Gadhsisa
5. **Time and Date of Restoration-** 00:31 / 10-09-2024
6. **Protection/Operational issues observed:**
    DR not time sync at Gadhsisa end. Renew power may kindly resolve.
7. **Action Taken/Remedial Measures:**

DR not time sync at Gadhsisa end. Renew power may kindly resolve

161th PCM Discussions:

220 kV Bhuj-Gadhsisa tripped on Y-B fault at Bhuj end. During patrolling, it was found that Tower Number 46/0 was damaged from the Cage section. A generation loss of 59 MW occurred at Gashsisa (Renew Power) Wind Power plant due to the loss of evacuation path.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.21.

2H.22. Grid Event 220 kV Dayapar Substation on 19th September 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 19th September 2024, 15:03 Hrs
3. **Event Summary:** At 15:03 hrs / 19-09-2024, 220 kV Dayapar sub-station AC supply cable and DC supply cable of 220/33 kV Dayapar-ICT-1 got punctured resulting in tripping of 220 kV Bhuj-Dayapar-1&2 and 220/33 kV Dayapar-ICT-1,2,3&4. Generation loss of 30 MW occurred at Dayapar () Wind Power Plant due to the event.
4. **Elements Tripped-**
    1. 220 kV Bhuj-Dayapar-1&2
    2. 220/33 kV Dayapar-ICT-1,2,3&4
5. **Time and Date of Restoration-** 15:52 / 19-09-2024
6. **Protection/Operational issues observed: NIL**
7. **Action Taken/Remedial Measures:** Faulty cable was isolated and replaced with spare by Inox, Dayapar and system was restored.

161th PCM Discussions:

220 kV Dayapar sub-station AC supply cable and DC supply cable of 220/33 kV Dayapar-ICT-1 got punctured resulting in tripping of 220 kV Bhuj-Dayapar-1&2 and 220/33 kV Dayapar-ICT-1,2,3&4. Generation loss of 30 MW occurred at Dayapar Wind Power Plant due to the event.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.22.

2H.23. Grid Event 220kV Bhuj- Gadhsisa Substation on 24th September 2024.

1. **Event Category:** GD-1
2. **Event Date and Time:** 24th September 2024, 01:03 Hrs
3. **Event Summary:** At 01:03 Hrs / 24-09-2024, 220kV Bhuj- Gadhsisa line tripped on Y-ph to earth fault. During patrolling it was found tower damaged on top section due to conductor theft of spare line on Same tower no T15/0. Generation loss of 59 MW occured at Gashsisa (Renew Power) Wind Power plant due to loss of evacuation path.
4. **Elements Tripped-**
    1. 220kV Bhuj-Gadhsisa
5. **Time and Date of Restoration-** Under Outage
6. **Protection/Operational issues observed:** 3 Ph tripping observed at both ends on single phase fault without A/R operation. Renew Power may kindly take appropriate legal action to avoid such occurrences of theft in future leading generation loss. DR not time sync at Renew Gadhsisa end.
7. **Action Taken/Remedial Measures:**

    Damaged tower repaired and charging attempt taken on 9/10/2024 at 19:11 which failed as the insulator was found damaged. Line restored at 22:39/11.10.2024 after insulator replacement. Renew Power may kindly take appropriate legal action to avoid such occurrences of theft in future. DR not time sync at Renew Gadhsisa end. Renew power may kindly resolve.

161th PCM Discussions:

220kV Bhuj- Gadhsisa line tripped on Y-ph to earth fault. During patrolling, it was found that the tower damaged on the top section due to conductor theft of a spare line on the same tower no T15/0. A generation loss of 59 MW occurred at Gashsisa (Renew Power) Wind Power plant due to the loss of evacuation path.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.23.

2H.24 . Grid Event 220 kV Bhuj-Baranda Substation on 1st October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 1st October 2024**, 02:45 Hrs

3. **Event Summary:** At 02:45 Hrs / 01-10-2024, 220 kV Bhuj-Baranda tripped on B-E fault, Autorecloser not attempted at Baranda end, line tripped at Bhuj end after autorecloser attempt. During patrolling Lunger thrown by villagers found at tower location 233. Generation loss of 63 MW occured at Baranda (Avikiran) Wind Power plant due to loss of evacuation path.

4. **Elements Tripped-**

   1. 220 kV Bhuj-Baranda

5. **Time and Date of Restoration-** 02:45 Hrs / 01-10-2024

6. **Protection/Operational issues observed:**

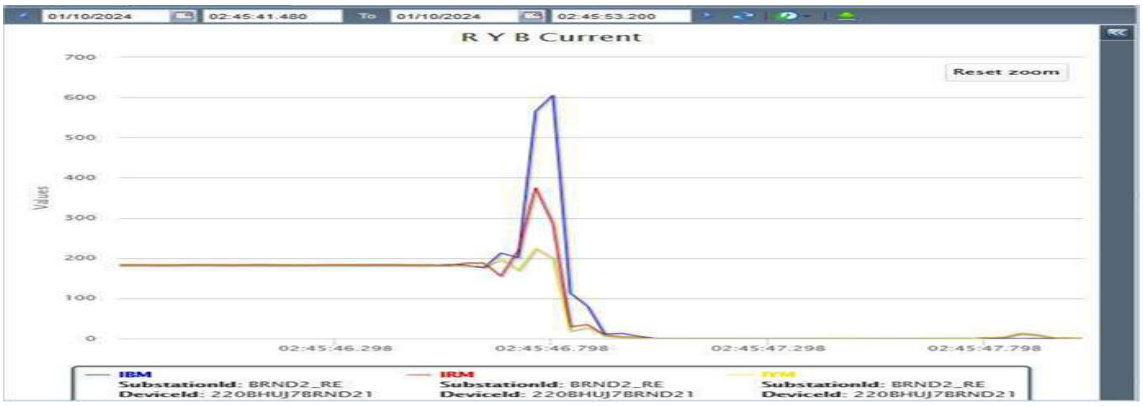
   During Patrolling, Avikiran found foreign object on the B phase to ground at Tower no. 233 on 220KV Baranda – Bhuj line. Avikiran resolved this issue in discussion with locals and and foreign object has also been removed from the line. 3 phase tripping on Single phase fault without A/R attempt

7.Action Taken/Remedial Measures:

After removal of foreign object from 220KV Baranda- Bhuj Line, Line charged successfully.SLD of SST Bhuj-Gadhsisa Substation

<u>161th PCM Discussions:</u>

Analysis from PMU:



Avikaran informed that 220 kV Bhuj-Baranda tripped on B-E fault and the generation loss of 63 MW occurred due to loss of evacuation path. During patrolling they found Lunger at tower location 233.

WRLDC stated that three-phase tripping occurred for single-phase fault without A/R attempt at both ends.

The Sub-Committee suggested checking the A/R at Baranda substation. A Detailed report is enclosed as Annexure 2H.24.

2H.25 Grid Event 220 kV Nakhtrana-Dedhiya Substation on 10th October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 10th October 2024**, 15:24 Hrs

3. **Event Summary:** At 15:24 Hrs / 10-10-2024, 220kV Nakhtrana-Dedhiya tripped on R-E fault from Nakhatrana end only, Auto recloser successful at Dedhiya end. It is seen from DR at Nakhatrana end that all three phases tripped for a fault in single phase which is a maloperation. During patrolling it was found that R phase conductor fell from suspension insulator clamp at tower location 55. Generation loss of 96 MW occurred at Nakatrana & Dedhiya wind power plant (Adani) due to the event.

4. **Elements Tripped-**

   1. 220kV Nakhtrana-Dedhiya

5. **Time and Date of Restoration-** 17:30 / 11/10/2024

6. **Protection/Operational issues observed:**

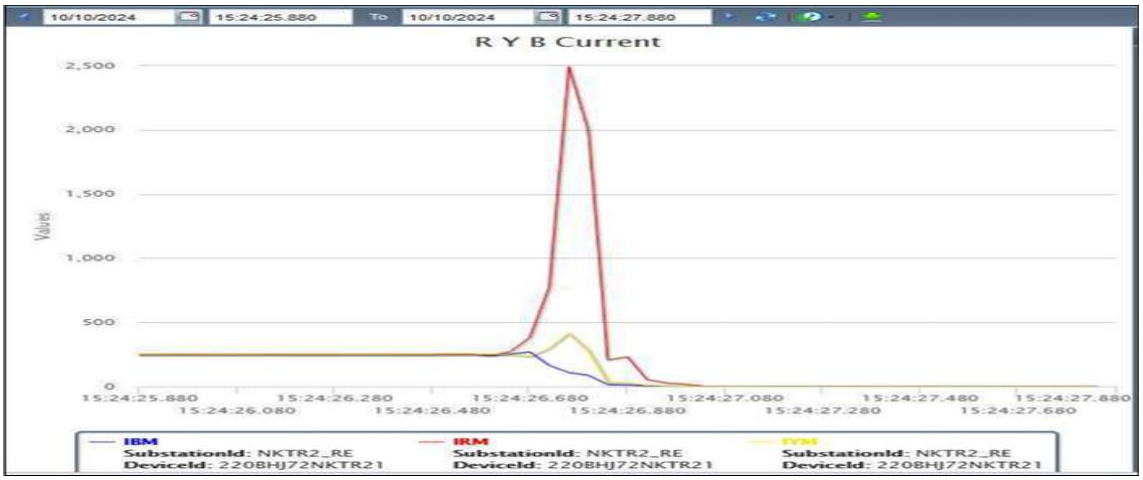
   Three phase tripping occurred for single phase fault at Nakhatrana without A/R attempt. Line didn't trip at Dhediya end.

7. **Action Taken/Remedial Measures:**

   During Patrolling, M/s Adani found that at Tower No.55 from Dhediya PSS, R-Phase Conductor fell down from Suspension insulator clamp. Suspension clamp R-pin was missing, so conductor fell down from suspension clamp and was touching with tower structure. Line charged after inserting Rpin in Clamp and placing conductor in Suspension clamp. M/s Adani may kindly investigate the reason behind not attempting A/R at Nakhatrana and non-tripping at Dedhiya end.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Adani informed that 220 kV Nakhtrana-Dedhiya tripped on R-E fault and the generation loss of 96 MW occurred at Nakatrana & Dedhiya wind power plant (Adani). During patrolling, they found that the R phase conductor fell from the suspension insulator clamp at tower location 55.

WRLDC stated that three-phase tripping occurred for single-phase fault without A/R attempt at both ends.

The Sub-Committee suggested checking the A/R at Nakhatrana substation. A Detailed report is enclosed as Annexure 2H.25.

2H.26 Grid Event 220 kV Bhawsingpura- Khandwa Substation on 11th October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 11th October 2024**, 13:04 Hrs

3. **Event Summary:** At 13:05 Hrs / 11-10-2024, 220 kV Bhawsingpura- Khandwa tripped on Y-E fault on Z-3 protection operation. The tripping was not in order because instantaneous trip issued at Bhawsingpura end for a fault in Zone-3 in 400 kV Khandwa-Dhule-1 at the same time. 220 kV Bhawsingpura- Kanwani line also tripped after 200 msec without any relay indication. Generation loss of 98 MW occurred at Bhawsingpura and Kanwani solar power plant (Masaya Solar) due to loss of evacuation path.

4. **Elements Tripped-**
    1. 220 kV Bhawsingpura-Kanwani-1
    2. 220 kV Bhawsingpura-Khandwa-1
    3. 220/33 kV Kanwani-ICT-1

5. Time and Date of Restoration- 15:32 / 11/10/2024

6. Protection/Operational issues observed:

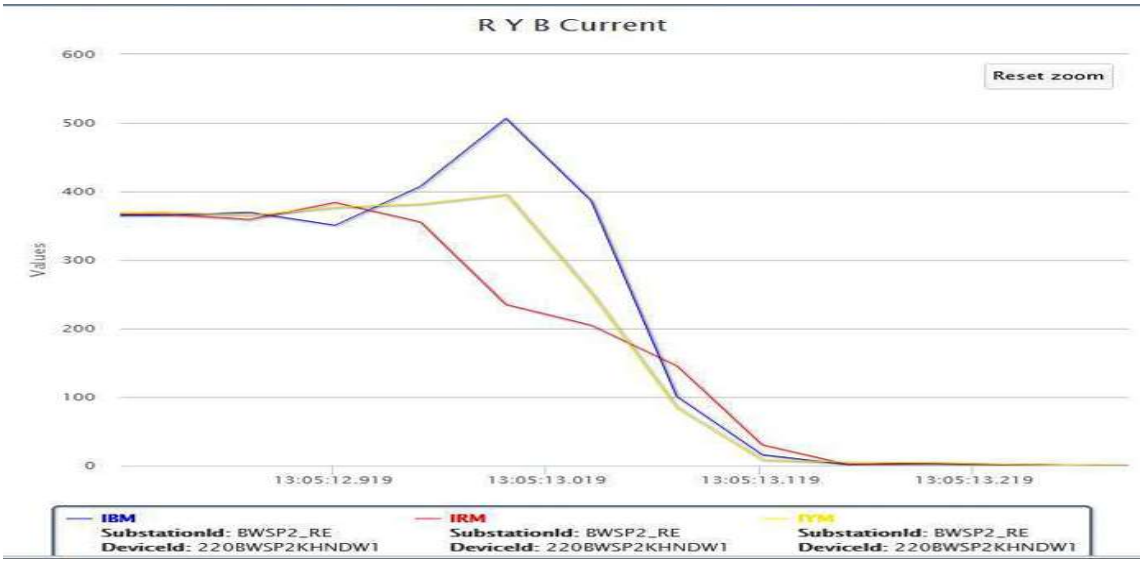
220 kV Bhawsingpura- Khandwa tripped on Z-3 protection mal-operation at Bhawsingpura end only.

7. Action Taken/Remedial Measures:

Masaya Solar may kindly investigate and review the protection settings to find out the root cause of mal-operation.

<u>161th PCM Discussions:</u>

Analysis from PMU:



Masaya Solar informed that 220 kV Bhawsingpura- Khandwa tripped on Y-E fault on Z-3 protection operation and the generation loss of 98 MW occurred at Bhawsingpura and Kanwani Solar power plant.

WRLDC stated that tripping was not in order because the instantaneous trip issued at Bhawsingpura end due to relay overreach as 400 kV Khandwa-Dhule-1 tripped on Y-N fault at the same time.

The Sub-Committee requested to submit the report on the operation of distance protection within a week. A Detailed report is enclosed as Annexure 2H.26.

2H.27 Grid Event 220 kV Nakhatrana-Dedhiya ckt Substation on 14th October 2024.

1.Event Category: GD-1

2.Event Date and Time: 14th October 2024, 16:43 Hrs

3.Event Summary: At 16:43 Hrs / 14-10-2024, 220 kV Nakhatrana-Dedhiya ckt tripped on B Ph-E fault. As seen from DR at Nakhatrana end all 3-phases tripped due to tripping command from main-2 relay, fault was seen in zone-2. As seen from DR at Dhediya end even though fault was seen in zone-3, carrier was sent to Nakhatrana end which is not in order. During patrolling no abnormalities were found. Generation loss of 38 MW occurred at Nakatrana & Dedhiya wind power plant (Adani) due to the event.

4. Elements Tripped-

1. 220 kV Nakhatrana-Dedhiya line
2. 220kV Dedhiya SS Bus-1
3. 220kV Dedhiya SS Bus-2
4. 220/33kV Dedhiya ICT-1
5. 220/33kV Dedhiya ICT-2

5. Time and Date of Restoration- 19:39 / 14/10/2024

6. Protection/Operational issues observed:

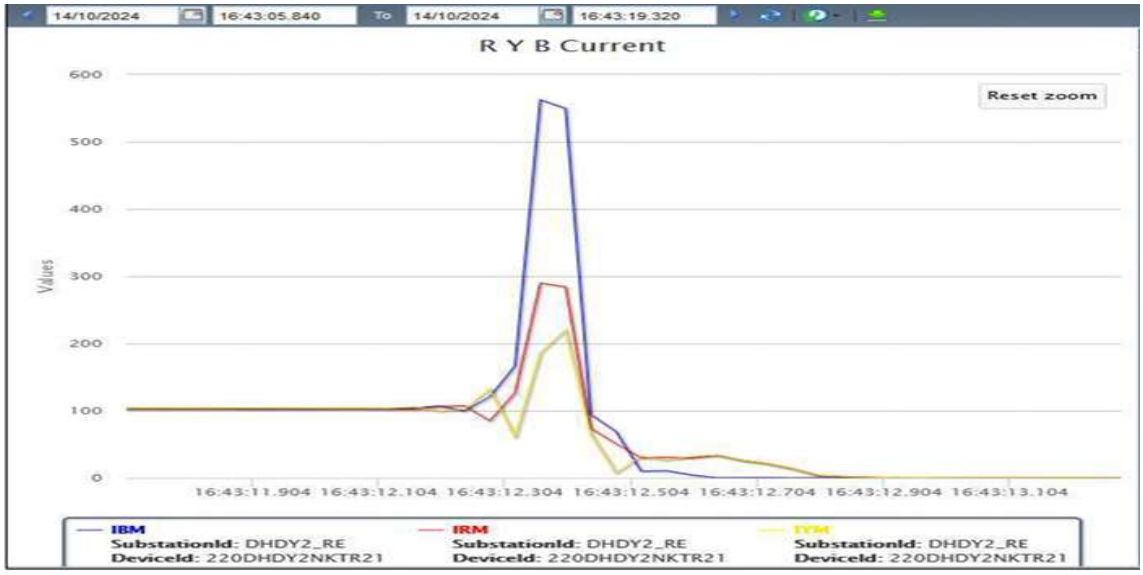
Three phase tripping occurred for single phase fault without A/R attempt at both ends.

7. Action Taken/Remedial Measures:

No any abnormalities found by M/s Adani during patrolling. Tripping is suspected by lightening. M/s Adani may kindly investigate the reason behind not attempting A/R at both ends

<u>161th PCM Discussions:</u>

Analysis from PMU:



Adani informed that the 220 kV Nakhatrana-Dedhiya circuit tripped on B Ph-E fault and the generation loss of 38 MW occurred at Nakatrana & Dedhiya wind power plants (Adani).

WRLDC stated that three-phase tripping occurred for single-phase fault without A/R attempt at both ends.

The Sub-Committee suggested checking the A/R at Nakhatrana substation. A Detailed report is enclosed as Annexure 2H.27.

2H.28 Grid Event 220 kV Bachau-Ostro Substation on 14th October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 14th October 2024**, 22:20 Hrs

3. **Event Summary:** At 22:20 Hrs / 14-10-2024, 220 kV Bachau-Ostro-1&2 tripped on R-E fault. It is seen from Disturbance recorders at Ostro end that all three phases tripped for a fault in single phase which is a maloperation. During patrolling no abnormalites were found. Generation loss of 140 MW occurred at Ostro (Renew Power) Wind power plant due to loss of evacuation path.

4. **Elements Tripped-**

   1. 220 kV Bachau-Ostro-1

   2. 220 kV Bachau-Ostro-2

5. **Time and Date of Restoration-** 23:58 / 14/10/2024

6. **Protection/Operational issues observed:**

   A/R not attempted in both the circuits. As seen from EL "A/R is not ready" signal generated.

7. **Action Taken/Remedial Measures:**

   Renew power may kindly investigate the reason for not attempting A/R in both the ckts.

<u>161th PCM Discussions:</u>

220 kV Bachau-Ostro-1&2 tripped on R-E fault and all three phases tripped for a fault in a single phase which is a maloperation. During patrolling, no abnormalities were found. A generation loss of 140 MW occurred at Ostro (Renew Power) Wind power plant due to the loss of evacuation path.

The Sub-Committee suggested checking the A/R at Ostro substation. A Detailed report is enclosed as Annexure 2H.28.

2H.29 Grid Event 220 kV Naranpar(Roha)-Bhuj S/Con 15th October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 15th October 2024**, 00:29 Hrs

3. **Event Summary:** At 00:29 Hrs /15-10-2024, 220 kV Naranpar(Roha)- Bhuj S/C tripped on B-E fault from Bhuj end. A/R successful from Naranpar end and line tripped at Bhuj end. 220 kV Naranpar(Roha) s/s went dark due to the event. During patrolling, it was observed that Tower no-67, 68 collapsed and there was also conductor theft. There was no Wind generation at the time of the event at 220 kV Naranpar(Roha).

4. **Elements Tripped-**

   1. 220 kV Naranpar(Roha)- Bhuj

5. **Time and Date of Restoration-** 21:51 / 18/10/2024

6. **Protection/Operational issues observed:**

   As informed by GIWEL-3, A/R successful from Naranpar end but DR not generated at Naranpar end, GIWEL-3 may kindly look into this and solve this issue. As seen from the DR, A/R attempted at Bhuj end, there was no visible fault current during A/R dead time. Therefore, A/R should have been successful. However, all 3 phases tripped which was a wrong operation, POWERGRID-WR-2 may kindly look into this.

7. **Action Taken/Remedial Measures:**

   During patrolling, Naranpar (GIWEL-3) found that tripping occurred due to collapsing of Tower no-67, 68 and there was conductor theft also observed. As informed by GIWEL-3, A/R successful from Naranpar end but DR not generated at Naranpar end, GIWEL-3 may kindly look into this and solve this issue. A/R attempted at Bhuj end, there was no fault visible during A/R so, A/R should have been successful, but all 3 phases tripped, this is a wrong operation, POWERGRID-WR-2 may kindly look into this.

<u>161th PCM Discussions:</u>

220 kV Naranpar(Roha)- Bhuj S/C tripped on B-E fault from Bhuj end. A/R was successful from Naranpar end and the line tripped at Bhuj end. 220 kV Naranpar(Roha) s/s went dark due to the event. During patrolling, it was observed that Tower no-67, 68 collapsed and there was also conductor theft.

The Sub-Committee noted. A Detailed report is enclosed as Annexure 2H.29.

2H.30 Grid Event 220 Vadva-Bhuj S/C 15th October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 15th October 2024**, 16:24 Hrs

3. **Event Summary:** At 16:24 Hrs /15-10-2024, 220 kV Vadva-Bhuj S/C tripped on R-E fault from Vadva end only. A/R successful at Bhuj end. During inspection LA counter of transformer increased by 1 indicating presence of surges. Generation loss of 84 MW occurred at Vadva (GIWEL-2) wind power plant due to the event.

4. **Elements Tripped-**

   1. 220 kV Vadva- Bhuj

5. **Time and Date of Restoration-** 17:49 / 15/10/2024

6. **Protection/Operational issues observed:**

   A/R not attempted at Vadva end for single phase fault.

7. **Action Taken/Remedial Measures:**

   GIWEL-3 may kindly investigate as the A/R not attempted at Vadva end for single phase fault.

<u>161th PCM Discussions:</u>

220 kV Vadva-Bhuj S/C tripped on R-E fault from Vadva end only. A/R successful at Bhuj end. During inspection, LA counter of the transformer was seen to increase by 1 indicating the presence of surges.

The Sub-Committee noted the above. A Detailed report is enclosed as Annexure 2H.30.

2H.31 Grid Event 220kV Umariya (Agar Unit-5) Pachora ckt 18th October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 18th October 2024**, 13:02 Hrs

3. **Event Summary:** At 13:02 Hrs /18-10-2024 220kV Umariya (Agar Unit-5) Pachora ckt tripped on Differential protection operation on Y-phase to Earth fault. A/R not operated

for single phase fault. During patrolling no abnormilities found. Generation loss of 247 MW occurred at Umariya (Agar) Wind Power Plant due to loss of evacuation.

4. Elements Tripped-

1. 220kV Umariya (Agar)-Pachora

5. Time and Date of Restoration- 14:45 / 18/10/2024

6. Protection/Operational issues observed:

Line tripped without A/R attempt

7. Action Taken/Remedial Measures:

M/S Beempow may kindly investigate the reason for 3 phase tripping on single phase fault

161th PCM Discussions:

220 kV Umariya (Agar Unit-5) Pachora ckt tripped on Differential protection operation on Y-phase to Earth fault. A/R did not operate for a single phase fault. During patrolling no abnormalities were found.

The Sub-Committee suggested checking the A/R at Umariya substation. A Detailed report is enclosed as Annexure 2H.3.

2H.32 Grid Event 220 kV Bhuj-Gadhsisa 23rd October 2024.

1. Event Category: GD-1

2. Event Date and Time: 23rd October 2024, 22:36 Hrs

3. Event Summary: At 22:36 Hrs / 23-10-2024 220 kV Bhuj-Gadhsisa tripped on B-E fault. During pattrolling it was found that Tower got damaged from Top section due to conductor theft of spare line at tower location 13/2. No Generation loss occurred due to the event.

4. Elements Tripped-

1. 220 kV Bhuj-Gadhsisa

5. Time and Date of Restoration- 23:59 / 01/11/2024

6. Protection/Operational issues observed:

A/R not attempted at both ends for single phase fault, Renew power and POWERGRID-WR2 may kindly look into this.

7. **Action Taken/Remedial Measures:**

A/R not attempted at both ends for single phase fault, Renew power and POWERGRID-WR2 may kindly look into this.

161th PCM Discussions:

220 kV Bhuj-Gadhsisa tripped on B-E fault. During patrolling, it was found that Tower got damaged from the top section due to conductor theft of a spare line at tower location 13/2. No Generation loss occurred due to the event.

The Sub-Committee noted. A Detailed report is enclosed as Annexure 2H.32.

2H. 33 Grid Event 220 kV Bhuj-Nanavalka 27th October 2024.

1. **Event Category:** GD-1

2. **Event Date and Time: 27th October 2024**, 06:25Hrs

3. **Event Summary:** At 06:25 Hrs / 27-10-2024 220 kV Bhuj-Nanavalka tripped on B-E fault. It is seen from Disturbance recorders at Nanavalka end that all three phases tripped for a fault in single phase which is a maloperation. During patrolling no abnormalites were found. Generation loss of 28 MW occurred at Nanavalka (Alfanar) Wind power plant due to loss of evacuation path.

4. **Elements Tripped-**

1. 220 kV Bhuj-Nanavalka

5. **Time and Date of Restoration-** 07:53 / 27/10/2024

6. **Protection/Operational issues observed:**

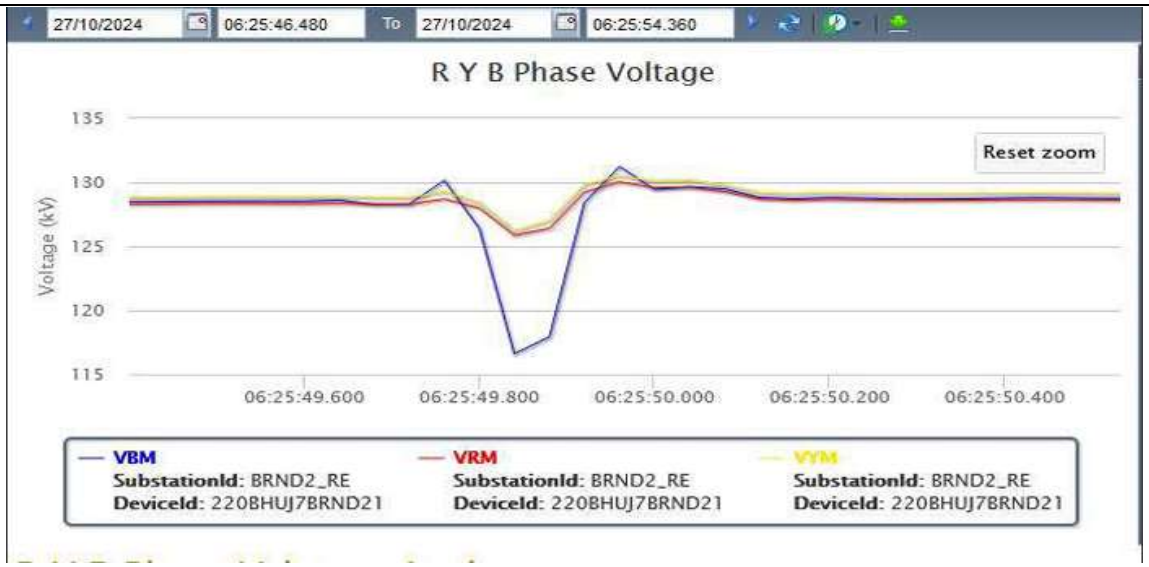
A/R not attempted and all 3 phases tripped at Nanavalka end.

7. **Action Taken/Remedial Measures:**

A/R not attempted and all 3 phases tripped at Nanavalka end. Alfanar may kindly investigate the reason for the same.

161th PCM Discussions:

Analysis from PMU:



Alfanar informed that 220 kV Bhuj-Nanavalka tripped on B-E fault and the generation loss of 28 MW occurred at Nanavalka (Alfanar) Wind power plant due to loss of evacuation path.

WRLDC stated that three-phase tripping occurred for a single-phase fault without an A/R attempt at both ends.

The Sub-Committee suggested checking the A/R at Nanavalka substation. A Detailed report is enclosed as Annexure 2H.33.

Item no. 3. Performance Indices of Utilities in Western Region

As per IEGC 2023, all the utilities are required to submit the 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. These indices are as given below:

1. **The Dependability Index** defined as $D = Nc/\ (Nc+Nf)$
2. **The Security Index** defined as $S = Nc\ /(Nc+Nu)$
3. **The Reliability Index** defined as $R = Nc\ /(Nc+Ni)$

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.

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

In 155th PCM meeting held on 24.01.2023, All utilities were agreed to submit the above Indices by the 10th of the next month.

The status of Performance indices submitted by Utilities is given below:

N.R – Not Received

Sr. no	Utility	August -2024			September-2024			October-2024		
		D.I	**S. I**	**R. I**	**D.I**	**S. I**	**R. I**	**D.I**	**S. I**	**R. I**
1	MSETCL	0.98	0.98	0.97	1	0.98	0.98	1	0.99	0.99
2	CSPTCL	1.0	0.98	0.98	0.96	0.98	0.95	0.91	0.91	0.84.
3	MPPTCL	0.99	0.98	0.98	N. R	N. R	N. R	N. R	N. R	N. R
4	GETCO	0.993	0.957	0.95	N. R	N. R	N. R	0.99	0.99	0.98
5	Goa	1	1	1	1	1	1	1	1	1
6	DNH	N. A	N. A	N. A	1	1	1	1	1	1
7	PowerGrid WR-1	1	1	1	1	1	1	N. R	N. R	N. R
8	PowerGrid WR-2	1	1	1	1	1	1	N. R	N. R	N. R
9	NTPC	1	1	1	1	1	1	1	1	1
10	TAPS 3&4	N. A	N. A	N. A	1	1	1	1	1	1
11	KAPS 3&4	1	1	1	1	1	1	1	1	1
11	AESL(TL)	1	0.6	0.6	1	0.66	0.66	1	0.5	0.5
12	INDIGRID	1	0.8	0.8	1	0.9	0.9	1	1	1
13	Adani TPPS	1	1	1	1	1	1	1	1	1
14	Tata Power				1	1	1	1	1	1

The incorrect operations occurred in utilities during August 2024 September 2024 and October 2024 is attached as **Annexure -3.1.**

The Sub- Committee requested PowerGrid, GETCO & MPPTCL to furnish the Indices along with details regularly to WRPC & WRLDC.

Item no. 4. Third-Party Protection Audit carried out before Nov. 2023- Rectification of deficiencies.

CERC vide its order dated 21.02.2014 in respect to petition No. 220/MP/2012 filed by POWERGRID have directed that CTU and SLDCs shall submit quarterly Protection Audit Report to the respective RPC latest by 15th day of the first month of next quarter and RPCs shall submit the report to the Commission latest by 15th day of the second month of next quarter. The Member Secretary of Regional Power Committees shall monitor the protection-related

issues and bring to the notice of the Commission any instance of non-compliance of Regulation 1.5 of the Grid Code in respect of the protection-related issues considered in the instant petition

The status of the deficiencies detected in protection audit (2020-2023) compliances received from Utilities is shown below:

Sr. No	Utility	TPPA Agency	No. of s/s Audit carried out	No. of deficiencies		No. of deficiencies attended		No. of deficiencies not yet attended	
				Cat-A	Cat-B	Cat-A	Cat-B	Cat-A	Cat-B
1	**GETCO**	**ERDA**	105	2060	3	2060	3	0	0
2	**PowerGrid WR1**	**CPRI**	22	83	1	83	1	0	0
3	**PowerGrid WR2**	**CPRI**	26	40	4	40	2	0	2
4	**GSECL**	**ERDA**	14	46	5	46	3	0	2
5	**NTPC**	**CPRI**	17	64	3	52	0	12	3
6	**DDDNH**	**CBIP**	2	50	20	47	12	3	8
7	**Goa**	**CPRI**	5	55	29	55	27	0	2
8	**AEML**	**ERDA**	10	7	0	7	0	0	0
9	**MSETCL**	**Internal**	463	1802	1713	1802	1711	0	2
10	**MPPTCL**	**Internal**	33	160	93	158	70	2	23
11	**CSPTCL**	**Internal**	12	0	35	0	4	0	31
12	**CSPGCL**	**Internal**	5	3	8	2	1	1	7

The detailed observations are enclosed at **Annexure 4**. **All Utilities are requested to give the updated status on the above.**

<u>161th PCM Discussions:</u>

SE (Prot.), WRPC stated that the details of the TPPA discrepancies were circulated along with the agenda and all the utilities were requested to give a detailed plan for attending each of the discrepancies.

2. **The current status apprised by the utilities are as follows:**
   - **i. GSECL - CPRI completed the Third-party protection audit of their substations. They will submit the report to WRPC.**
   - **ii. NTPC - 10 Cat-B and 3 Cat-A observations were pending and will be attended by April 2025.**
   - **iii. MSETCL - 2 pending discrepancies will be attended within 3 months.**
   - **iv. MPPTCL - The Cat-A observations have already been attended and 10 Cat-B observations were pending for which procurement is under process.**

v. **CSPTCL - Procurement for attending 22 Cat-B discrepancies is underway.**

SE (Prot.), WRPC requested all the utilities to attend the pending protection audit discrepancies immediately.

Item no. 5. TPPA deficiencies of audits carried out in 2024

Background: As per the decision in the 48th WRPC meeting, the schedule of the TPP Audit was finalized in the Special Meeting held on 06.11.2023. The Audit plan schedule was circulated and taken up for implementation from December 2023.

The TPPA deficiencies observed by the audit teams in the above audit were submitted by the states in the approved format and is tabulated below:

Sr. No	Utility	Deficiencies of No. of s/s received	No. of deficiencies		No. of deficiencies attended		No. of deficiencies not yet attended	
			Cat-A	Cat-B	Cat-A	Cat-B	Cat-A	Cat-B
1	**GETCO**	Not Received						
2	**MSETCL**	10	162	72	97	19	65	53
3	**MPPTCL**	5	74	11	62	6	12	5
4	**CSPTCL**	Not Received						
5	**Goa**	Not Received						

The detailed observations are enclosed at **Annexure 5.1**.

The deficiencies of following S/Ss pointed out in the TPPA report by TPPA teams were not submitted by states in the approved format and are compiled by WRPC for 15 S/Ss and the deficiencies of 29 S/Ss is under preparation. The categorization of deficiencies of 15 S/Ss compiled by WRPC is as follows:

Sr. No.	Name of the S/s	TTPA Agency	Month of Audit	No. of Deficiencies		
				Total	Category A	Category B
1	400 kV Marwa	MPPTCL	Jan-24	7	6	1
2	400 kV Ukai	MPPTCL	Jan-24	14	9	5
3	400 kV Bhilai	MSETCL	Jan-24	10	5	5
4	400 kV Katni	MSETCL	Apr-24	73	55	18
5	400 kV Bina	MSETCL	Apr-24	51	41	10
6	400 kV Pancham	MSETCL	Mar-24	9	9	0
7	400 kV Raita	MPPTCL	Mar-24	5	5	0
8	400 kV Mandsaur	MSETCL	Apr-24	11	9	2
9	400 kV Kirnapur	MSETCL	Apr-24	16	15	1

10	220 kV Amona	MSETCL	Jan-24	13	13	0
11	220 kV Tivim	MSETCL	Apr-24	9	7	2
12	400 kV Julwania	MSETCL	Apr-24	39	37	2
13	400 kV Alkud	GETCO	Dec-23	5	4	1
14	400 kV Khadaka (bhusawal)	GETCO	Feb-24	35	23	12
15	400 kV Badnawar	MSETCL	Jan-24	12	10	2

The detailed discrepancies are enclosed as **Annexure 5.2.**

The respective states are requested to tabulate the deficiencies pointed out by TPPA teams in the format enclosed at Annexure-5.3 and submit the update of its compliance to WRPC regularly.

161th PCM Discussions:

SE (Prot.), WRPC briefed the agenda and requested utilities to submit the observations of Third-party protection audit discrepancies carried out by TPPA teams during 2024, in the stipulated formats.

MPPTCL, MSETCL and CSPTCL intimated that they have submitted the TPPA discrepancies in stipulated formats to WRPC.

Item no. 6. Status of Third-Party Protection Audit Plan for 400 kV substations in WR (220 kV in Goa).

Background: As per the decision in 48th WRPC meeting the draft plan and status of nominations were reviewed in the special PCM held on 06.11.2023. The teams and the schedule of S/S wise TPP Audit was circulated along with the Minutes of the Special Meeting on 28.11.2023 and comments were also invited on the S/S wise TPP Audit plan. The Audit plan schedule circulated above therefore was taken up for implementation from December 2023.

1. The Status of the TPPA completed till November is as follows:

State Team	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Total
Maharashtra	**2(2)**	**6(6)**	**3(3)**	**3(3)**	**3(3)**	**4(4)**	**3(3)**	**1(2)**	**2(2)**	**0(2)**	**0(1)**	**0(1)**	**27(32)**
Chhattisgarh	**1(1)**	**1(1)**	**2(2)**	**1(1)**	**0(1)**	**1(1)**	**-**	**-**	**-**	**-**	**-**	**-**	**6(7)**
MP	**1(1)**	**3(3)**	**2(2)**	**2(2)**	**2(3)**	**1(3)**	**2(4)**	**-**	**0(2)**	**-**	**-**	**-**	**13(20)**
Gujarat	**1(1)**	**1(1)**	**1(1)**	**-**	**1(1)**	**0(2)**	**2(2)**	**1(2)**	**2(2)**	**-**	**-**	**-**	**9 (12)**
NPCIL	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**2(2)**	**2(2)**	**-**	**-**	**-**	**4(4)**
TOTAL	**5(5)**	**11(11)**	**8(8)**	**6(6)**	**6(8)**	**6(10)**	**7(9)**	**4(6)**	**6(8)**	**0(2)**	**0(1)**	**0(1)**	**59 (75)**

*Guna and Khansari were audited by private team.

2. The details of the stations whose TPPA is pending as per the plan is as given below:

Sr. No.	State Team		State to be audited	Name of Substation	Proposed Month of Audit	Status
1	CSPTCL	CS-C	Maharashtra	Kolhapur	April	pending
2	MPPTCL	MP-C	Maharashtra	Ektuni (Aurangabad (3))	April	pending
3	MPPTCL	MP-D	Chhattisgarh	Korba (W)	April	pending
4	GETCO	GJ-B	Maharashtra	Lonikhand	May	pending
5	MPPTCL	MP-D	Chhattisgarh	Korba (W)-Ext	May	pending
6	MPPTCL	MP-E	Gujarat	Bhachunda	May(R)	pending
7	GETCO	GJ-A	Maharashtra	Taptithanda	May(R)	pending
8	MPPTCL	MP-A	Maharashtra	Karad	June	pending
9	MPPTCL	MP-E	Gujarat	Shapar	June	pending
10	GETCO	GJ-A	Maharashtra	Padghe HVDC	July	pending
11	Maharashtra	MH-C	Madhya Pradesh	Malwa (Singhaji-1)	July	pending
12	MPPTCL	MP-B	Gujarat	Bhogat	August	pending
13	Maharashtra	MH-C	Madhya Pradesh	Satpura	September	pending
14	Maharashtra	MH-D	Gujarat	KAPS 1&2	September	pending
15	Maharashtra	MH-G	Goa	Ponda	October	pending
16	Maharashtra	MH-G	Goa	Cuncolim	November	pending

The nodal officers of the states may give the reasons for the delays and the plan for the Audit of the above stations.

<u>161th PCM Discussions:</u>

SE (P), WRPC enquired about the status of the pending TPPA of substations that were planned from April to November 2024. The status submitted by the utilities are as follows:

i. **CSPTCL - Protection audit team has been deputed for the TPPA of Kolhapur substation.**
ii. **MPPTCL - TPPA of Ektuni and Karad substations was pending and would be completed in 15**
iii. **GETCO - The pending TPPA will be completed by 1st week of January 2025.**

SE (P), WRPC requested all the utilities to complete the pending TPPA of substations by 15th Jan-2025.

Item no. 7. TPPA plan for 220 kV substations in the states of WR

Background: As per the decision in 48th WRPC meeting the TPPA plan for 400 kV substations in the states of WR was planned from Dec2023 to Nov 2024.

A draft plan of TPPA of 220 kV substations in the states of WR for Jan to Dec 2025 and Jan to Dec.2026 is prepared and is as follows:

TPPA plan of 220 kV substations in the states of WR for the years Jan25-Dec25, Jan26-Dec26				
S.NO	**Utility**	**220 kV Substations**	**Jan25-Dec25**	**Jan26-Dec26**
1	Maharashtra	85	42	43
2	Chhattisgarh	28	14	14
3	Madhya Pradesh	95	48	47
4	Gujarat	20	10	10
	Total	228	114	114

Detailed plan for Jan25-Dec25								
			Audit Teams					
S.NO	**Utility**	**Substations to be audited**	**MSETCL**	**CSPTCL**	**MPPTCL**	**GETCO**	**GOA**	**TOTAL**
1	Maharashtra	42	0	2	35	4	1	42
2	Chhattisgarh	14	6	0	6	2	0	14
3	Madhya Pradesh	48	31	9	0	4	4	48
4	Gujarat	10	4	2	4	0	0	10
	Total	114	41	13	45	10	5	114

Detailed plan for Jan26-Dec26							
			Audit Teams				
S.NO	**Utility**	**Substations to be audited**	**MSETCL**	**CSPTCL**	**MPPTCL**	**GETCO**	**TOTAL**
1	Maharashtra	43	0	2	37	4	43
2	Chhattisgarh	14	6	0	6	2	14
3	Madhya Pradesh	47	33	10	0	4	47
4	Gujarat	10	4	2	4	0	10
	Total	114	43	14	47	10	114

The detailed plan is enclosed at **Annexure 7.1.** Utilities are requested to give comments/suggestions on the draft TPPA plan for 220 kV substations, so that the same can be taken up for implementation from January 2025.

161th PCM Discussions:

SE (Prot.), WRPC briefed the agenda and requested utilities to offer their comments on the draft 220 kV plan.

2. MPPTCL stated that they are not willing to participate in the above exercise due to constraints faced by them in deputing their teams for TPPA inspection because of shortage of staff. They added that they will take up the audit of their S/Ss by hiring a private third-party protection audit firm.

3. SE(P) WRPC, stated that the S/Ss identified for audit in 2025 and 2026 are based on the importance of the S/Ss in the grid, their criticality and past tripping records of these stations. 48 no. of MP state S/Ss have been planned to be audited in 2025 and if they opt out of the above scheme, they will have to get the audit done in 2025 and give a detailed plan of TPPA of 48 S/Ss to WRPC.

4. The Sub-Committee recommended that WRPC may rework the plan by excluding MP from the above scheme.

Item no. 8. Status of data received from utilities for Relay setting database.

As per IEGC 2023 regulations, RPCs shall maintain a centralized database and update the same on a periodic basis in respect of their respective region containing details of relay settings for grid elements connected to 220 kV and above (132 kV and above in NER). RLDCs shall also maintain such database.

2. In the 48th WRPC meeting it was decided that WRPC shall invite tenders for the development of the software for the database and simultaneously request PSDF funding as per the budgetary estimate. In line with this decision, the specifications/scope of the database project for funding through PSDF was discussed in the special PCM held on 06.11.2023 and the DPR was finalized. Subsequently, WRPC submitted the DPR of the protection relay setting database to NPC vide letter no. WRPC/PROTECTION/PSDF/2023-24/877 dated 07.02.2024. The request for funding through PSDF was returned because of the paucity of funds.

3. In the 49th WRPC meeting, it was decided that WRPC will develop a basic minimum database, in line with the action being explored by NRPC from the WRPC Chairperson Fund, to fulfill IEGC obligations. Accordingly, in a special PCM (held on 06.11.2024), all utilities were requested to submit the relay setting files (.pdf) for 220 kV and above substations as early

as possible to WRPC. Also, all utilities were requested to submit the details on the email id– relaydb.wrpc@gmail.com

4. The relay settings in the approved/standardized format (enclosed at **Annexure-8.1**) have not been received and Utilities are submitting the relay settings in RAW format only. The status of Relay setting data (RAW or approved/standardized format) received by WRPC is as follows:

Sr.no	Utility	State	Relays data Received (Number of stations)			Total Stations
			765 kV	400kV	220kV	
1	GETCO	Gujarat	NA	5(24)	104(106)	109(130)
2	GOA	GOA	NA	NA	5(5)	5(5)
3	DDNH	DDNH	NA	NA	6(6)	6(6)
4	MPPTCL	Madhya Pradesh	NA	0(16)	1(95)	1(111)
5	MPPGCL	Madhya Pradesh	NA	1(4)	NA	1(4)
6	MSETCL	Maharastra	1(1)	13(35)	31(85)	45(121)
7	CSPTCL	Chattisgarh	NA	2(5)	22(28)	24(33)
8	CSPGCL	Chattisgarh	NA	0(2)	NA	0(2)
9	NTPC		0(2)	0(10)	NA	0(12)
10	PGCIL WR1		0(14)	0(8)	NA	0(22)
11	PGCIL WR1		0(8)	0(18)	NA	0(26)
12	NPCIL	Gujarat/ Maharastra	NA	0(2)	NA	0(2)
13	ACBIL	Chattisgarh	NA	0(1)	NA	0(1)
14	APMuL	Gujarat	NA	0(1)	NA	0(1)
15	ACPL	Chattisgarh	NA	0(1)	NA	0(1)
16	ATIL	Gujarat	NA	0(1)	NA	0(1)
17	APML	Maharastra	NA	0(1)	NA	0(1)
18	BALCO	Chattisgarh	NA	0(1)	NA	0(1)
19	BDTCL	Madhya Pradesh/Maharastra	0(2)	1(2)	NA	1(4)
20	DB-Power	Chattisgarh	NA	0(1)	NA	0(1)
21	DGEN	Gujarat	NA	0(1)	NA	0(1)

22	Dhariwal Infra	Maharastra	NA	0(1)	NA	0(1)
23	ESSAR	Gujarat	NA	0(1)	NA	0(1)
24	GPEC	Gujarat	NA	0(1)	NA	0(1)
25	GWEL	Maharastra	NA	0(1)	NA	0(1)
26	HAZIRA	Gujarat	NA	0(1)	NA	0(1)
27	IEPL	Maharastra	NA	0(1)	NA	0(1)
28	JAIGAD-IPP	Maharastra	NA	0(1)	NA	0(1)
29	Jhabua Power Ltd	Madhya Pradesh	NA	0(1)	NA	0(1)
30	Jaypee	Madhya Pradesh	NA	0(2)	NA	0(2)
31	JPL	Chattisgarh	NA	0(2)	NA	0(2)
32	KSK	Chattisgarh	NA	0(1)	NA	0(1)
33	JKTL	Gujarat	NA	0(1)	NA	0(1)
34	Mahan_Energen	Madhya Pradesh	NA	1(1)	NA	1(1)
35	MB-Power	Madhya Pradesh	NA	0(1)	NA	0(1)
36	LANCO	Chattisgarh	NA	0(1)	NA	0(1)
37	LBTL	Gujarat	0(1)	0(1)	NA	0(2)
38	MCCPL	Chattisgarh	NA	0(1)	NA	0(1)
39	MEGPTCL	Maharastra	0(2)	0(3)	NA	0(5)
40	NSPCL	Chattisgarh	NA	0(1)	NA	0(1)
41	REGL	Chattisgarh	NA	0(1)	NA	0(1)
42	Ratan India	Maharastra	NA	0(2)	NA	0(2)
43	RGPPL	Maharastra	NA	0(1)	NA	0(1)
44	RKM	Chattisgarh	NA	0(1)	NA	0(1)
45	RPREL	Chattisgarh	NA	0(1)	NA	0(1)
46	SPL	Madhya Pradesh	0(1)	0(1)	NA	0(2)
47	SKS	Chattisgarh	NA	0(1)	NA	0(1)
48	SSNNL	Gujarat	0(1)	0(1)	NA	0(2)
49	TPL	Gujarat	NA	0(4)	NA	0(4)
50	TRN	Chattisgarh	NA	0(1)	NA	0(1)

51	KTL-Sterlite	Madhya Pradesh	0(1)	0(1)	NA	0(2)
52	NHPTL	Madhya Pradesh	0(1)	0(1)	NA	0(1)
53	PBTL	Gujarat	0(1)	0(1)	NA	0(2)
54	RRWTL-Adani	Maharastra	0(1)	NA	NA	0(1)
55	PWTL	Maharastra	0(1)	0(1)	NA	0(2)
56	PPTL	Maharastra	0(1)	0(1)	NA	0(2)

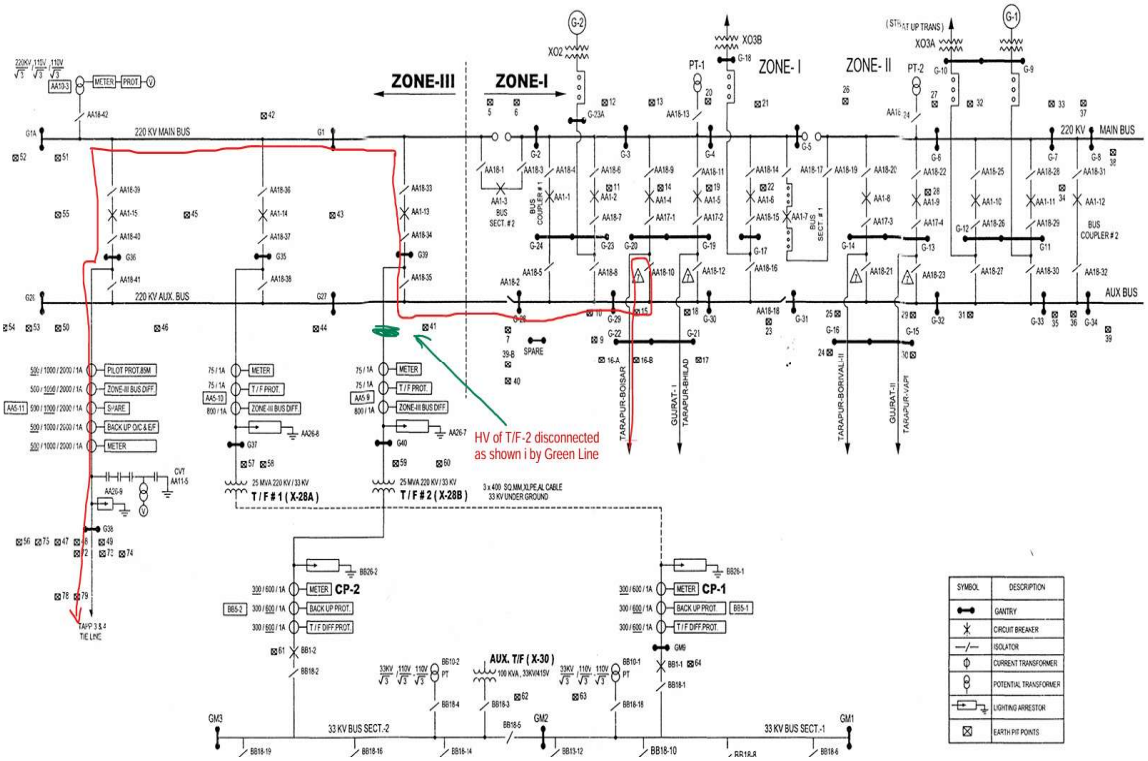
All the above utilities are requested to submit the relay settings strictly in the approved/standardized formats along with the RAW relay setting files.

161th PCM Discussions:

SE (Prot.), WRPC briefed the agenda and requested all the utilities to submit the relay setting data in standard formats along with raw relay setting files by February 2025.

Item no. 9. Relay Setting Approval at NPCIL (NPCIL Agenda).

Zone -1 outage is planned from 6th January to 11th January for six days for replacement of CT & isolator of Bus sectionalizer-2 and other job. (Switchyard single line drawing attached). It is proposed to back charging of Zone-3 from Boisar feeder. Boisar Feeder is connected to auxiliary bus to Zone-3 to TAPS-1&2 - TAPS-3&4 Tie line. (Temporary system configuration for Zone-1 Outage is marked by RED PEN)



During back charging of Zone-3, TAPS-1&2 to Boisar line breaker at TAPS-1&2 end will be bypassed and inter-tripping is not available.

TAPS-1&2 - TAPS-3&4 Tie line have pilot wire protection and distance protection in back-up (TAPS-3&4 end breaker of Tie line setting attached).

Matter is discussed with our HQ, Mumbai, They have suggested, revised the setting of tie line breaker at TAPS-3&4 end by the TAPS-1&2 -Boisar line breaker at TAPS-1&2 end so reach of the Distance protection is increase and TAPS-1&2- Boisar line breaker at BOISAR end and Tie line breaker at TAPS-3&4 end is simultaneously tripped during fault and entire line and system will be under protection.

Setting suggested by HQ, NPCIL, Mumbai as follows

"The resistive reaches at the TAPS 3&4 end tie line distance relay to be set same as existing TAPS1&2 end of TAPS1&2-Boisar line. Please note that CT/PT ratio for TAPS12-Boisar line is 0.4 while for tie line it is 0.25. Therefore accordingly values have to be scaled and are mentioned below: -

Resistive Reach as follows-

R1G: 8.09375 ohm

R1Ph: 1.09375 ohm

R2G: 8.2625 ohm

R2Ph: 1.2625 ohm

R3G: 9.9375 ohm

R3Ph: 2.9375 ohm

Zone setting as follows-

line *at TAPS 3&4 end* as follows

* Zone-1 reach* = 1.852 ohm (same as existing Zone-1)

* Zone-1 time*= 0 sec (revised i.e. made instantaneous so as to isolate faults in Zone -1 of TAPS12-Boisar line immediately)

* Zone-2 reach*=2.775 ohm (revised i.e., made equal to Zone-2 of existing TAPS12-Boisar line Zone-2 of TAPS12 end)

* Zone-2 time*= 0.25 sec (revised so as to isolate faults faster in Zone-2 of TAPS12-Boisar line)

* Zone-3 reach*= 11.823 ohm (same as existing Zone-2)

* Zone-3 time* = 0.7 sec (same as existing Zone-2)

The trip commands from above zones shall also need to be mapped in PSL for energizing trip output relays.

Also, the TAPS3&4-Boisar end relay at PGCIL Boisar remote end still remains coordinated after above changes."

The Above matter is discussed with MSETCL Testing group, VASHI MSETCL is concurred along with concerns. MSETCL concerns and Reply of NPCIL attached.

In connection with the above subject, it is to inform that MSETCL has to change in Zone 1,2,3 reach settings at 220kV Boiser end. Please note that carrier aided protection will not be available for new proposed network.

MSETCL queries	**Reply by NPCIL**
There is one transformer bay (TF no.1) is connected in between this line, which is not as per practice. Distance protection may mal operate during through fault or transformer charging.	Assuming that tie line is heavily loaded (current=625A), and there is a25MVA, 220kV/33kV transformer charging with inrush current of 12times of FL current and duration of 0.1 seconds, the effective load impedance seen by the distance relay at TAPS-3&4 end

	(tie line) will be around 90 ohms. The zone settings Z1, Z2, Z3 atTAPS-3&4 end (tie line) are approx. 7.4 ohms, 11 ohms, and 48ohms respectively. Since 90>Z3>Z2>Z1 and also duration is very less, distance relay may not mal-operate in this scenario. When there is a fault at the transformer LV side, the effective impedance seen by the distance relay at TAPS-3&4 end (tie line) will be approx. 85 ohms. Since, 85>Z3>Z2>Z1, distance relay may not mal-operate in this scenario also. For faults within the transformer, transformer differential relay shall operate instantaneously. However, as per calculations, a fault up to 5% of transformer impedance from line side may lead to simultaneous operation of both distance relay and transformer differential relay.
As PLCC link is not available between TAPS 3&4(TIE) TO BOISER, carrier aided protection is not available, hence Zone 2 tripping will be delayed.	TheZone-2 time has been reduced to 250 msec which also remains coordinated with the upstream TAPS-3&4 Boisar line. Reducing the time delay further may cause mal-operation of distance relay at TAPS-3&4 end (tie line), for faults beyond Boisar substation. It is to be noted that the outage is being planned for5-6 days and probability of fault in the remaining 20% of the Boisar line is less as compared to that on 80% of the line.
At 220 kV TAPS1&2 Zone 1& Zone 3 bus bar protection may become unstable in the new configuration.	As per the standard operating procedure, it is seen that Boisar line CT's core for B/B differential protection will be shorted and Zone-I bus bar protection will be out. For Zone-III bus bar protection, it shall remain in service, however, there will be a spill current equal to the current flowing in the Boisar line. Asper TAPS-1&2 data provided, the max current in the Boisar Line is seen to be 650 A which is less than the Zone-III B/B differential protection set point of 800 A. So differential protection is supposed to remain stable under normal operation. The bus bar differential protection relay gets blocked automatically on current > 40 A (open CT detection). Station is requested to manually reset the relay else it be in blocked state permanently. It is also to be noted that the operating slope of the differential function is fixed to 53%. In case there is a genuine internal fault in the bus

	bar, the differential current measured will be same as the input current supplied giving the slope to near 100% and thus will lead to operation of busbar differential protection (as intended). However, when there is through fault (w.r.t to B/B diff. protection), say a fault in Boisar line, or tie line, the resulting spill current will be huge which may cause operation of B/B differential protection. The effect of this will be that entire Zone-III will be out. TAPS-3&4 220 kV switchyard will remain charged viaTAPS-3&4 Boisar line and will not be affected. This may also happen in case of 25MVA transformer charging with huge inrush current. To avoid this, transformer charging must not be attempted during this outage period, however, if necessary, charging shall be done only after taking tie line out.
LBB protection for Boiser line (TF2 HV) breaker is not available.	LBB protection is currently under process of implementation atTAPS-1&2. For TAPS-3&4 end (tie line) breaker, LBB protection is existing. After Completion of zone-1 outage, settings of tie line to be normalized at TAPS-3&4 breaker end and system configuration is also normalized. Kindly approved the interim arrangement to facilitate zone-1 outage of TAPS-1&2

<u>161th PCM Discussions:</u>

NPCIL explained the background of the agenda and requested the sub-Committee to examine & approve the relay settings for the zone-1 outage of TAPS 1&2 switchyard for the replacement of CT, isolator, CVT, Earth screen wire, support replacement and maintenance work.

2. WRLDC enquired whether NPCIL will be adopting to the above configuration during zone-1 shutdown in future also. NPCIL replied that during the future shutdown of zone-1 at TAPS 1&2 they shall be adopting the above configuration and requested sub-committee to approve the relay settings for zone-1 during the outage at TAPS 1&2 for future shutdown of zone-1 also.

3. EE(P), WRPC clarified that the relay settings should be reverted to the original setting during normalization of zone-1. Further, the relay settings may be kept at TAPS

3&4 for future shutdown of zone-1 after observing the operational conditions during upcoming outages in consultation with WRLDC.

The sub-Committee approved the settings proposed by NPCIL during the zone-1 shutdown for adopting the temporary configuration of Boisar Feeder marked with red ink in the above line diagram of the S/S.

Item no. 10. Date and venue of the next meeting:

It was decided that the date and venue of the next PCM (162nd) meeting will be intimated in due course.

Annexure-1

Participant List for the Meeting held on 24.12.2024 through hybrid mode.

SI. No	Name	Designation	Organization	Mobile No.	Email address
1	P D Lone	S.E(Commml. & Prot.)	WRPC	9867622823	prc-wrpc@nic.in
2	Deepak Sharma	Executive Engineer	WRPC	9711250509	prc-wrpc@nic.in
3	V Hareesh	AD	WRPC	9666446163	prc-wrpc@nic.in
4	Abhay Sahu	AGM (OS)	NTPC Ltd	9423137986	agsahu@ntpc.co.in
5	Vijay Kumar Kodali	DGM	WRLDC	9909914256	vkkodali@grid-india.in
6	Rishab Jain	Deputy Manager	Grid India	7618774491	protectionwrldc@grid-india.in
7	Ruchir Oza	ACE	NPCIL	8007992596	rvoza@npcil.co.in
8	Pandey Sanjay	SO/G	NPCIL	8552000188	spandey@npcil.co.in
9	Dayanand Konduskar	Head- Electrical Testing	Tata Power Co. Ltd	9223552951	dtkonduskar@tatapower.com
10	ARUNAVA SAHA	AVP	STERLITE POWER	9051762110	arunava.saha2@sterlite.com
11	Sunil Mandora	Asst. Manager Operation & Maintennce	Continuum Group (Morjar)	9979002348	sunil.mandora@continuumenergy.in
12	Ranjit Raval	Deputy Manager	EDF Renewables India (Project-SItac Kabini Renewables P L)	7046090312	ranjit.raval@edf-re.in
13	Vishal Waghchaure	Superintending Engineer (Protection)	MSETCL, CO, Mumbai	8108106238	seprotection@mahatransco.in
14	Gohil Nikhilkumar Jivanbhai	AM	Adani green energy LTD	08306633344	Nikhil.Gohil@adani.com
15	Karan Rai	Manager	IndiGrid	8400400557	karan.rai@indigrid.com
16	Ankit Prakash Vaishnao	Ch Manager	Powergrid WR1	9425293863	apvaishnao@powergrid.in
17	A M Shah & J K Karoliya	EE & DE	GSECL	8980031372	det.gseccl@gebmail.com
18	Mahesh Bhagat	Manager	Sterlite Power	9206682124	mahesh.bhagat1@sterlite.com
19	Akabar Alam	Engineer	Alfanar and Netra	9265131282	Akabar.a@alfanar.com
20	ANIRUDH MESHRAM	ASSISTANT ENGINEER	MPPGCL	94258080636	edengg.mppgcl@gmail.com
21	Arjun Kumar Ram	AGM	Jindal Power Ltd Tamnar	9329003515	arjun.ram@jindalpower.com
22	Yogendra Kumar Khunte	Executive Engineer	HTPS, CSPGCL	8770192356	yogendra.khunte17@gmail.com
34	Tejaskumar Shingala	Assistant Manager	Adani wind energy kutch four ltd.	8160892422	Tejaskumar.Shingala@adani.com
35	V S OZA	MANAGER	GIPCL	8799473764	vsoza@gipcl.com
36	Vaishali Verma	Assistant Engineer (SLDC-DNH)	SLDC-DNH	9426868777	vrverma.sldc@gmail.com, aesldc-dnh@ddd.gov.in

37	Kiran Tidke	SM	Enel Green Power	6364101112	kiran.tidke@enel.com
38	Makarand V Bhoot	EE HVDC T&T	MSETCL	8554993498	ee4350@mahatransco.in
39	VIVEK KUMAR SINGH	DY MANAGER	MB POWER (MP) LTD, ANUPPUR	7773011721	vivek.singh@hpppl.in
40	Akshay	Manager	POWERGRID CORPORATION OF INDIA LTD	9111103679	asharma@powergrid.in
41	Manoj Joshi	SE, PACC, MSETCL, Vashi	MSETCL	9769213824	se7500@mahatransco.in
42	Mohan Waingankar	Assistant V P	Adani Electricity Mumbai Limited	09324216664	mohan.waingankar@adani.com
43	sanjeev pal	DGM Electrical	ksk Mahanidhi power comapany limited	7024130799	sanjeev.p@ksk.co.in
44	aashish gupta	executive engineer	mp sldc	9425806913	sldcmpjbp@gmail.com
45	Chandrakant Shrivastava	Executive Engineer	MPPTCL	9425805244	ckelectricals1@gmail.com
46	VIVEK KUMAR SINGH	DY MANAGER	MB POWER (MP) LTD, ANUPPUR	7773011741	vivek.singh@hpppl.in
47	anant mishra	SO/F (sCIENTIFIC OFFICER-F)	NPCIL	9429892061	apmishra@npcil.co.in
48	A.K.CHOUBEY	E.E. SLDC MPPTCL BHOPAL	MPPTCL	9425804989	awadhesh6466@gmail.com
49	Manoranjan Kumar	DyEE	400 KV New Koyna MSETCL	8411001856	adee3143@mahatransco.in
50	KARAN TRIPATHI	DGM (EMD)	NTPC Korba	9650991173	karantripathi@ntpc.co.in
51	ABHAY SAHU	AGM	NTPC LTD	09423137986	AGSAHU@NTPC.CO.IN
52	Harshdeep Ware	Assistant Engineer (MRT Raigarh)	CSPTCL	9179654343	eemrtrgh@rediffmail.com

Annexure-2

Sr. No	Time and Date of occurrence	Control Area	PCM	Brief details of the event (pre-fault and post-fault system conditions)	Observations/ Remarks of PCM	Action taken
1	19:19 / 30/10/2023	IPP (SSP)	154	At 19:19 hrs /30-10-2023, LBB protection operated and 400 kV SSP-Bus-2 and all connected elements tripped (presently SSP is being run with split bus arrangement). During inspection feeder due to which LBB operated couldn't be identified and there was no fault during the tripping. Generation loss of 600 MW occurred at 400/220 kV SSP (Sardar Sarovar Power Plant) due to the event.	Committee observed that the LBB scheme be thoroughly checked/tested.	***They have checked the LBB scheme and referred to OEM. The Purchase order is in approval for complete testing of bus bar as suggested by OEM. By the end of Oct-2024 PO for testing will be placed. SSP placed the order and the testing of the busbar will be complete by Jan-25.***
2	16:06 / 29/11/2023	DNH	155	At 16:04 Hrs / 29-11-2023, R phase CT of Bus coupler burst at 220 kV Kharadpada, 220 kV Kharadpada-New Kharadpada-1&2 tripped on Over Current Earth Fault, 200 kV Vapi-Bhilosa-1 and 220 kV Vapi-Kharadpada-1 tripped from Vapi end only on zone-2 R-E fault. Due to these trippings power flow to 220 kV Kharadpada-Bus-1&2 became zero (Bus became Dead). Load loss of 487 MW occurred at Kharadpada and Bhilosa due to the event.	The committee suggested DNH DD to bring the new BB protection at Kharadpada into service as early as possible.	***DNH informed that they will complete within 2 months. DNH stated that they placed the tender and the bus bar protection will be commissioned within a month.***

3	10:49 / 10-05-2024	RE	158	At 10:49 Hrs / 10-05-2024, 220 kV Bhavsingpura-Khandwa tripped from Khandwa end only due to relay maloperation. Generation loss of 248 MW occurred at Bhavsingpura and Kanwani (Masaya Solar) Solar power plant due to loss of evacuation path.	Committee observed that the relay mal-operation be investigated.	***Masaya solar informed that line tripped at PG end due to mal operation of relay. PG WR2 to check the relay mal operation. PGCIL stated that ownership belongs to Masaya Solar. Masaya Solar will submit the report regarding the mal operation.***
4	17:59 / 28-05-2024	MSET CL	158	At 17:59 Hrs / 28-05-2024, Failure of R phase Bus-1 side isolator chamber at 220 kV Gorai GIS led to bus bar protection operation in 220 kV Gorai-Bus-1&2 and tripping of all connected elements. Load loss of 99 MW reported by SLDC Maharashtra at Gorai area due to the event. However, from the demand curves of Maharashtra and Mumbai the instantaneous load loss of around 2000 MW and 1000 MW occurred in Maharashtra and Mumbai control area, out of which around 500 MW recovered within 5 minutes of the tripping. Same was evident from the PMU plots wherein frequency rises by 0.15 Hz during above incident and Phase voltage of Kalwa dipped from 230 kV to 110 kV. It is suspected that, induction machine during severe voltage dip, might have stalled resulting in demand reduction and after fault clearance might have started automatically (demand started increasing in few sec itself after fault clearance). Also,some machines might have stopped and had to be started manually as	Committee observed that the voltage dip was severe and the load loss during the voltage dip was also serious. Actions are required to be taken to contain the short circuit level at the S/S.	***MSETCL informed that 220 kV Ghodbunder-Gorai line & 220 kV Gorai-Versova line was bunched to create a new i.e. 220kV Ghodbunder -Versova line, for Mumbai grid reliability. Further STU is reviewing the proposals for permanent solution (Operating Gorai from Boriwali in radial mode). MSLDC &STU had a joint meeting and they are reviewing the proposals of***

				restoration took longer than normal. SLDC Maharashtra has reported load loss of 1045 MW in Mumbai Control area. The load loss calculated using ICTs loading at Maharashtra control area was 1587 MW.		***temporary arrangement.***
5	01:13 / 05-06-2024	CSPTCL	160	At 01:13 hrs / 05-06-2024, 220 kV Siltara-Main Bus and all connected elements tripped on bus bar protection operation due to falling of earth wire laid over 220 kV Siltara-Raipur(PG) and 220 kV Siltara-Dardehi over 220 kV Siltara-Main Bus. Due to loss of supply at 220 kV Siltara, the transmission lines connected at 132 kV Siltara tripped on Over current protection operation. 220 kV Kachna-Siltara-1&2 tripped on reverse power flow protection operation. At 01:33 hrs / 05-06-2024, 220 kV Urla-Raipur(PG) tripped on R-E fault resulting in blackout at 220/132 kV Urla and Borjhara stations. Load loss of 810 MW occurred due to the above events.	The Sub-Committee requested Powergrid to provide support in implementing the LTS scheme	***CSPTCL stated that the LTS scheme has been implemented and they will submit the report to WRPC.***
6	18:16 / 13-06-2024	JPL	160	At 18:16 hrs / 13-06-2024, 400 kV JPL Stage-1-Tamnar tripped on Z-1 protection operation due to flashover occurring on tie breaker of 400 kV JPL Stage-1 Tamnar and 400 kV JPL Stage-1-JPL Stage-2 due to lightning strike. At the same time, 400 kV JPL Stage-1-Raipur-1&2 tripped, no fault signature was present as seen from disturbance recorders. All four units at JPL stage-1 (250MW) tripped on over frequency protection operation. Generation loss of 1095 MW occurred at JPL (Jindal) Stage-1 and JSDCPP. Load loss of 350 MW occurred in Gerwani of Chhattisgarh control area.	The Sub-Committee observed the following: 1. 400 kV JPL Stage1-Raipur-1&2 tripped on zone 4 distance protection was undesirable. Therefore, the protection settings are to be reviewed and checked. 2. The reason for delayed operation of differential protection in 400 kV IC line to be investigated by JPL. 3. Tripping of 220 kV lines on overvoltage was undesirable and therefore, the O/V	***JPL stated that they have disabled the O/V settings and they will replace the relays (as these are obsolete).***

					settings may be kept disabled.	
7	11:32 / 17-06-2024	NTPC	160	At 11:32 hrs / 17-06-2024, 400/33kV Korba NTPC Tie Transfomrer-1 tripped on directional Earth fault protection operation. This led to the tripping of 33 kV Bus A at Korba (NTPC), which was feeding the auxiliaries of Korba (NTPC)-Unit-1,2&3 (210 MW). Prior to the tripping, 220 Korba(W)-Bus-1 was under planned shutdown and 220 Korba(W) Bus-2 tripped while shifting of feeders on 220 Korba(W)-Bus-2. As per PMU plot fault persisted for 440 msec due to which 400/33kV Korba NTPC Tie Transfomrer-1 tripped on directional Earth fault. As informed by NTPC Korba no indication in relays of 400 kV Korba(NTPC)-Korba(W) was present. 220 Korba(W) substation became dark. Simultaneously, 220 kV Amarkantak-Annupur-2 tripped on overcurrent protection operation. Prior to the tripping, 220 kV Amarkantak-Annupur-1 was under planned shutdown. Due to tripping of units at Korba (NTPC), Korba(E), DSPM and 220 kV Korba Churri-2, the load of Kotmikala was fed through 220 kV Annupur, resulting in overloading of 220 kV Amarkantak-Annupur-2. With these Annupur and Kotmikala became dark (Elements hand tripped due to no load). 220 kV Kotmikala-Churi-1&2 were out to control loading on 220 kV Annupur-Amarkantak-2. Generation loss of 500 MW at Korba (NTPC), 136 MW at Korba(W) and 440 MW at DSPM (Korba East Extension) occurred due to the event. Load loss of 250 MW occurred at Kotmikala, Churri.	The Sub-Committee opined that the Busbar protection scheme should be put into service immediately.	
8	15:47 /09-07-2024	RE-Gadsisa	160	At 15:47 Hrs/09-07-2024, 220 kV Bhuj- Kotda Madh tripped on B-N fault at Bhuj end & on DT receipt at Kotda Madh end. At the same time, 220 kV Bhuj- Nanavalka	The Sub-Committee suggested that the DPR at Gadhsisa end be tested and	***Gadsisa did not attend the 161st PCM.***

				tripped at Bhuj end only on R-N fault. At the same time, 220kV Bhuj- Gadhsisa tripped at Gadhsisa end only due to maloperation. Due to loss of evacuation path, generation loss of 111 MW, 37.5 MW & 70 MW occurred at Gadhsisa, Nanavalka & Kotda Madh WPPs respectively.	the non-tripping of 220kV Bhuj-Navalka line be investigated.	
9	07:23 /23-07-2024	RE-Gadsisa	160	At 07:23 Hrs/23-07-2024, 220/33 kV Gadhsisa ICT-1 tripped due to operation of Restricted earth fault (REF) Relay, which resulted in loss of evacuation path from 33 kV to 220 kV side as 220/33 kV Gadhsisa ICT-2 was already in tripped condition since 21:15 Hrs/22.07.2024 due to sparking in 33 KV side isolator. About 120 MW wind generation loss occurred at 220 KV Gadhsisa WPP.	The Sub-Committee observed that the operation of REF for through fault was undesirable and suggested that the relay be tested	***Gadsisa did not attend the 161st PCM.***
10	11:33 Hrs/25.07.2024	RE-Srijan	160	At 11:33 Hrs/25.07.2024, 220kV Srijan Morjhar-Bhuj-II-1 tripped on Z 2, R-N fault at Srijan end only. No indications received. Generation loss of 95 MW occurred due to loss of evacuation path.	The Sub-Committee suggested that the 220kV Srijan Morjhar-Bhuj-II-1 DPR be tested	***Srijan stated that the event occurred due to P.T loose connection and they have taken the necessary action.***

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				of supply at 220 kV Siltara, the transmission lines connected at 132 kV Siltara tripped on Over current protection operation. 220 kV Kachna-Siltara-1&2 tripped on reverse power flow protection operation. At 01:33 hrs / 05-06-2024, 220 kV Urla-Raipur(PG) tripped on R-E fault resulting in blackout at 220/132 kV Urla and Borjhara stations. Load loss of 810 MW occurred due to the above events.		
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				indication in relays of 400 kV Korba(NTPC)-Korba(W) was present. 220 Korba(W) substation became dark. Simultaneously, 220 kV Amarkantak-Annupur-2 tripped on overcurrent protection operation. Prior to the tripping, 220 kV Amarkantak-Annupur-1 was under planned shutdown. Due to tripping of units at Korba (NTPC), Korba(E), DSPM and 220 kV Korba Churri-2, the load of Kotmikala was fed through 220 kV Annupur, resulting in overloading of 220 kV Amarkantak-Annupur-2. With these Annupur and Kotmikala became dark (Elements hand tripped due to no load). 220 kV Kotmikala-Churi-1&2 were out to control loading on 220 kV Annupur-Amarkantak-2. Generation loss of 500 MW at Korba (NTPC), 136 MW at Korba(W) and 440 MW at DSPM (Korba East Extension) occurred due to the event. Load loss of 250 MW occurred at Kotmikala, Churri.		
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ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
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पश्चिमी क्षेत्र के 400 के॰वी. कंसारी उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400 kV Kansari of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary** : At 23:48 hrs / 19-08-2024, 400kV Bus coupler Bay Y-Phase CT (Towards 400kV Main Bus-2), failed causing tripping of 400kV Bus coupler bay by Busbar Protection scheme under Zone-4 Y-ph to Earth Fault. Simultaneously, after 153ms, 400kV Main Bus-2 also tripped by Busbar Protection Scheme under Zone-2 Y-ph to Earth Fault. The failed CT caught huge flames and smoke which further came under contact with R & Y Phase of 400kV Main Bus-1 flyover conductors in 400kV Bus coupler Bay. This again caused tripping of 400kV Main Bus-1 by Bus bar Protection Scheme under Zone-1 R & Y Phase to Phase fault after 2 seconds from first fault. With these tripping 400 kV side at Kansari became dead and 220 kV side was intact. No Load loss occurred during the event as the 220 kV system was intact.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 19-08-02024 at 23:44 Hrs

3. **ग्रिड घटना का प्रकार / Event Category :** Grid Incident (GI)-2

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Kansari, Gujarat

5. पूर्ववर्ती स्थिति / Antecedent Conditions:

- **Bus Position:** Bus position of Bays/Equipment's at time of occurrence was as below.

400kV Main Bus –A	400kV Main Bus -B
400/220KV 315 MVA ICT-3	400/220KV 315 MVA ICT-2
400/220KV 500 MVA ICT-4	400/220KV 315 MVA ICT-1
400KV Soja line no. 2 [CB OFF]	400KV Veluda line
400KV Soja line no. 1	400KV Soja line no. 3
400KV Banashkantha line	400KV Charanka line no. 2
400KV Charanka line no. 1	400KV Kankroli line no. 2
400KV Kankroli line no. 1	400KV 50MVAr Bus Reactor
400KV 125MVAr Bus Reactor	

Bus Coupler Bay: ON
TBC Bay: Not in Service.
Bays Out of Service: -

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.02	66639	53356	9308	15803
घटना के बाद Post Event	50.02	66620	53055	9304	15604

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Nil

7. रुकावट की अवधि / Duration of interruption: 01:28 Hrs

8. प्रभावित क्षेत्र का नक्शा / Network across the affected area

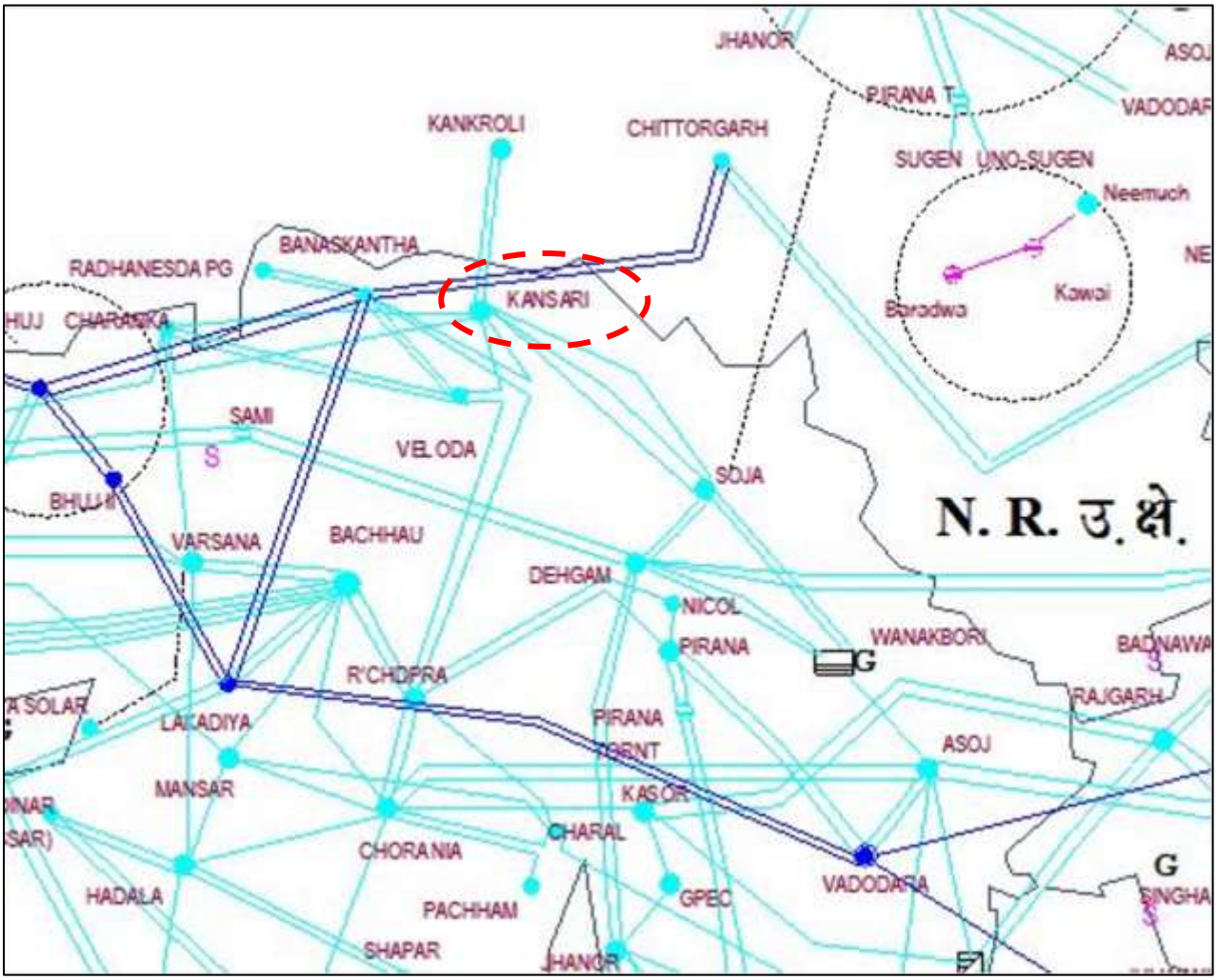


Figure 1. Network across the affected area

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

400kV Bus coupler Bay Y-Phase CT

10. संचरण लाइन / उत्पादन इकाई जो घटना के दौरान बंद हो गयी Transmission/Generation element Tripped during the event :

क्रo सिंo S.No.	संचरण लाइन/ विधुत उत्पादन इकाई का नाम Transmission/ Generation element name	बंद होने का समय Trip Time	कारण/ रिले संकेत Reason/ Relay Indication	कारण/ रिले संकेत Reason/ Relay Indication	वापस आने का समय Restoration Time
1	400/220KV 315 MVA ICT-3	23:48/ 19.08.2024	87BB Zone-1, R & Y Ph Trip	Inter-Trip, 86A&B operated	01:40/ 20-08-2024
2	400/220KV 315 MVA ICT-4	23:48/ 19.08.2024	87BB Zone-1, R & Y Ph Trip	Inter-Trip, 86A&B operated	01:46/ 20-08-2024
3	400KV Soja line no. 1	23:48/ 19.08.2024	87BB Zone-1, R & Y Ph Trip, DT Send 1&2	DT Received, 86A&B operated	02:28/ 20-08-2024
4	400KV Banashkantha line	23:48/ 19.08.2024	87BB Zone-1, R & Y Ph Trip, DT Send, CR Received	DT Received, 86A&B operated	02:11/ 20-08-2024
5	400KV Charanka line no. 1	23:48/ 19.08.2024	87BB Zone-1, R & Y Ph Trip, DT Send 1&2, CR Received	DT Received, 86A&B operated	01:16/ 20-08-2024
6	400KV Kankroli line no. 1	23:48/ 19.08.2024	87BB Zone-1, R & Y Ph Trip, DT Send 1&2	DT Received, 86A&B operated	03:05/ 20-08-2024
7	400KV 125MVAr Bus Reactor	23:48/ 19.08.2024	87BB Zone-1, R & Y Ph Trip	Not Applicable	01:32/ 20-08-2024
8	400/220KV 315 MVA ICT-2	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	Inter-Trip, 86A&B operated	01:46/ 20-08-2024
9	400/220KV 315 MVA ICT-1	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	Inter-Trip, 86A&B operated	01:39/ 20-08-2024
10	400KV Veluda line	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	DT Received, 86A&B operated	02:07/ 20-08-2024
11	400KV Soja line no. 3	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	DT Received, 86A&B operated	02:29/ 20-08-2024

12	400KV Charanka line no. 2	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	DT Received, 86A&B operated	01:27/ 20-08-2024
13	400KV Kankroli line no. 2	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	DT Received, 86A&B operated	06:52/ 20-08-2024
14	400/√3 50MVAr Bus Reactor	23:44/ 19.08.2024	87BB Zone-2, Y Ph Trip	DT Received, 86A&B operated	01:32/ 20-08-2024
15	400kV Bus Coupler-A PU	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	Not Applicable	23:50/ 21-08-2024
16	400kV Bus Coupler-B PU	23:48/ 19.08.2024	87BB Zone-2, Y Ph Trip	Not Applicable	01:40/ 20-08-2024

11. घटना का विश्लेषण /Event Analysis (Based on PMU, SCADA & DR) as explained by GETCO:

i. "From DR of 400kV Busbar Central Unit, it is observed that on dt 19-08-2024 23:44 hrs, Busbar Protection Scheme operated and tripped Busbar Zone-4 under Y-ph to earth fault. Refer DR at **Annx 3A**.

ii. The Cause of Busbar Zone 4 fault was failure of Y-phase CT of 400kV Bus Coupler Bay CT towards 400kV Main Bus-2 side.

iii. Maximum fault current at time of Busbar Zone-4 Y-ph to earth fault was 30.96kA. Refer DR at **Annx 3B**.

iv. The Busbar Zone-4 Protection operated and correctly tripped 400kV Bus coupler breaker as per Busbar Topology.

v. After tripping of 400kV Buscoupler circuit breaker, the fault current through Y-ph CT continued to be fed from 400kV Main Bus-2. However, from Busbar Central Unit DR, the Differential current recorded was below 70% of Bias current to operate Busbar Zone-2 [400Kv Main Bus-2]. Refer DR at **Annx 3C**.

vi. After 153ms, Differential current recorded was equal to 70% of Bias current, hence 400kV Main Bus-2 tripped by Busbar Protection scheme under Zone-2 Differential protection. Refer DR at **Annx 3D**. All 400kV Main Bus-2 bays tripped correctly.

vii. From photograps of 400kV Bus coupler bay Y-phase Failed CT, Huge flames and smoke can be seen in 400kV Buscoupler Bay. Refer Pictures at **Annx 4**.

viii. After 2Seconds from Zone-4 operation, 400kV Main Bus-1 tripped by Busbar Protection Scheme under Zone-1 R to Y-Phase to Phase fault. Refer DR at **Annx 3E**.

ix. It is suspected that due to high flames and smoke of Failed Y-ph CT, the air between 400kV Main Bus-1 flyover got ionised for R& Y Phase and created R-Y Phase to Phase 400kV MainBus-1 fault.

x. Busbar Protection scheme operated correctly in both 400kV Main Bus-1 and 400kV Main Bus-2 occurrences as per current Settings and topology."

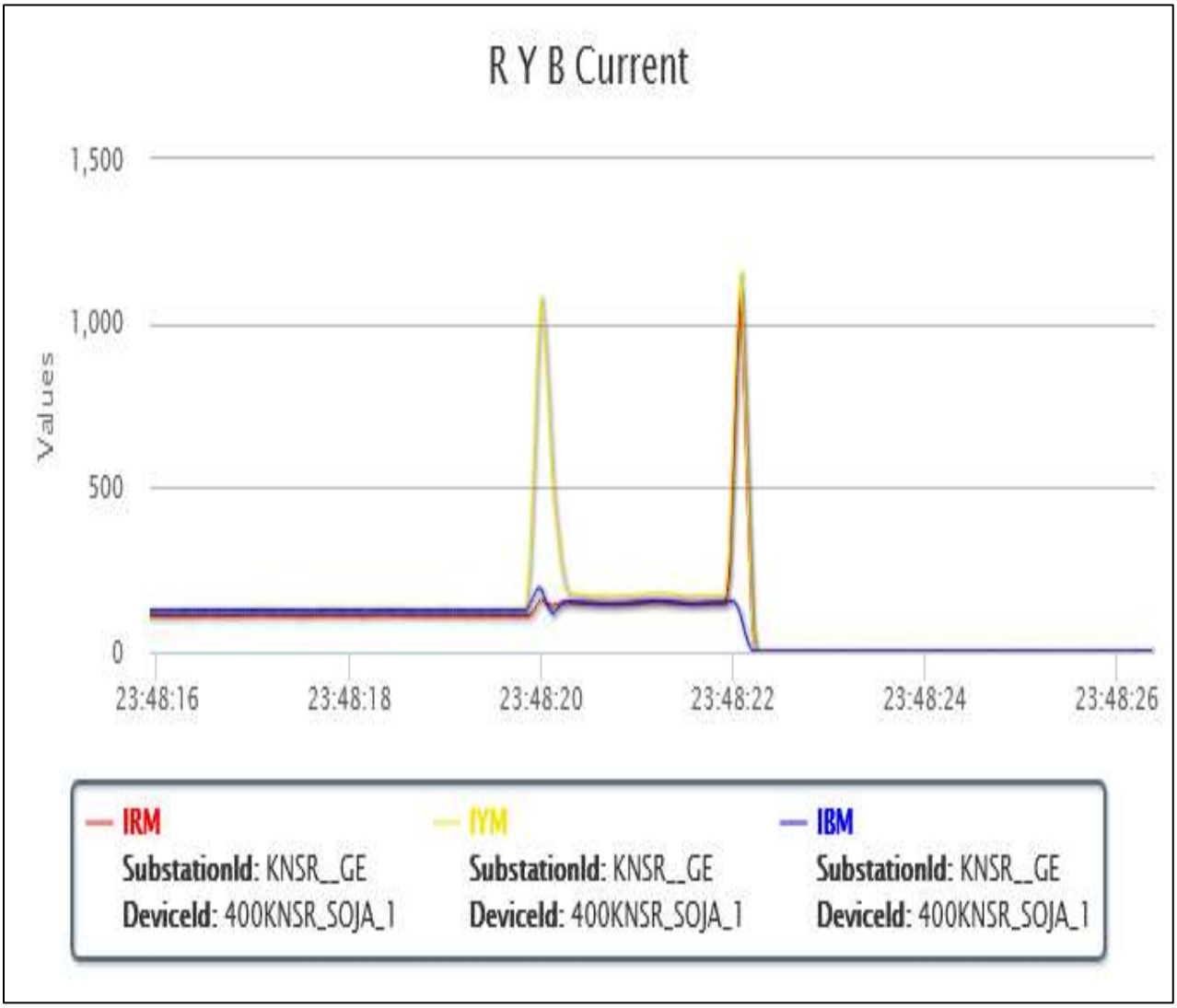


Figure 2. PMU Current plot of 400 kV Kansari -Soja-1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- There is time mismatch of 4 minutes in the event w.r.t. PMU and the information and DR provided by GETCO. Correct event time is 23:48 Hrs as per PMU.
- 400kV Busbar Zone-2 delayed tripped after the Differential current reached 70% of Bias Current. Hence for Busbar Scheme having Buscoupler Bay CTs on both side of Main Bus and configured for Busbar Differential Zone-4, the slope setting shall be reduced upto 60% by GETCO.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- 400kV Bus Coupler Bay isolators opened and both 400kV Main Bus-1 & 2 normalized by GETCO.
- Y-Ph. CT replaced on 20-08-2024 and Bus coupler taken in services by GETCO.
- There is time mismatch of 4 minutes in the event w.r.t. PMU and the information and DR provided by GETCO. GETCO may kindly fix this issue of time mismatch in DR.
- 400kV Busbar Zone-2 delayed tripped after the Differential current reached 70% of Bias Current. Hence for Busbar Scheme having Buscoupler Bay CTs on both side of Main Bus and configured for Busbar Differential Zone-4, the slope setting shall be reduced upto 60% by GETCO.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from GETCO
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from GETCO
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from GETCO i.e. on 03.09.2024

4.	DR Time Synchronization Issues	IEGC section 17.3	There is time mismatch of 4 minutes in the event w.r.t. PMU and the information and DR provided by GETCO. GETCO may kindly fix this issue of time mismatch in DR.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- 400kV Busbar Zone-2 delayed tripped after the Differential current reached 70% of Bias Current. Hence for Busbar Scheme having Buscoupler Bay CTs on both side of Main Bus and configured for Busbar Differential Zone-4, the slope setting shall be reduced upto 60% by GETCO.

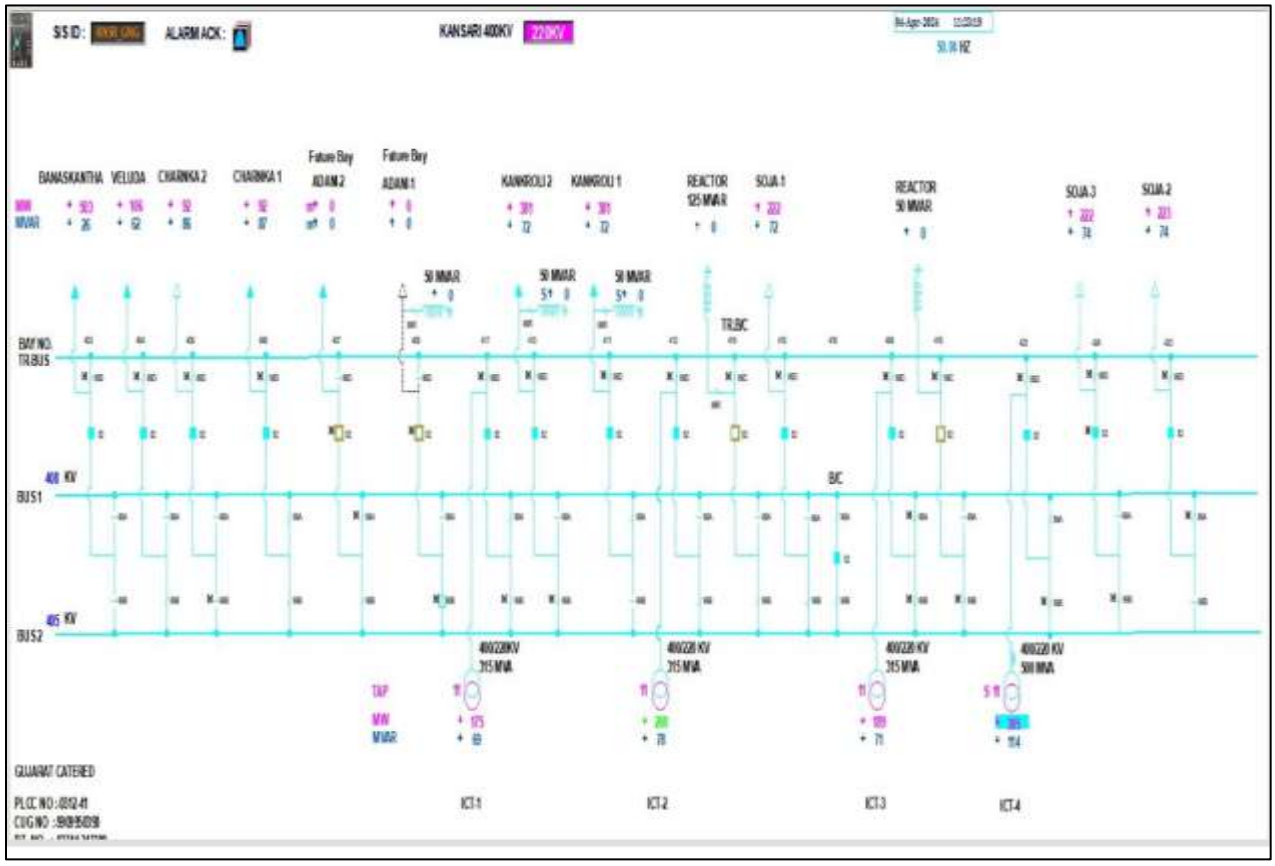
अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA:

SOE from WRLDC SCADA-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
GETCO	400KV-CB	CHRS_GNG	CHARANKA CB 40352 (KNSR-1) OPEN	23:48:19	944
GETCO	400-SOE	CHRS_GNG	CHARANKA CB 40352 (KNSR-1) NORMAL	23:48:19	916
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB COUPLER CB 41652 OPEN	23:48:19	986
GETCO	400-SOE	KNSR_GNG	KANSARI ZERDA CB 41752 (T1_P) NORMAL	23:48:20	110
GETCO	220KV-CB	KNSR_GNG	KANSARI ZERDA CB 20652 (T2_S) OPEN	23:48:20	163
GETCO	220KV-CB	KNSR_GNG	KANSARI ZERDA CB 21452 (T1_S) OPEN	23:48:20	151
GETCO	400KV-CB	SOJA_GNG	SOJA CB 41452 (KNSR-3) OPEN	23:48:20	97
GETCO	400-SOE	SOJA_GNG	SOJA CB 41452 (KNSR-3) ACTED	23:48:20	85
GETCO	400KV-CB	VELU_GNG	VELUDA CB 40852 (KNSR-1) OPEN	23:48:20	222
GETCO	400-SOE	VELU_GNG	VELUDA CB 40852 (KNSR-1) NORMAL	23:48:20	193
GETCO	400KV-CB	CHRS_GNG	CHARANKA CB 40452 (KNSR-2) OPEN	23:48:20	128
GETCO	400-SOE	CHRS_GNG	CHARANKA CB 40452 (KNSR-2) NORMAL	23:48:20	99
WRLDC	400KV-CB	KNKRL_RJ	KANKROLI CB 41052 (BHNML) OPEN	23:48:20	226
WRLDC	400KV-CB	KNKRL_RJ	KANKROLI CB TIE 11 - CB 41152 OPEN	23:48:20	209
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB 40452 (VELU-1) OPEN	23:48:20	116
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB 40552 (CHRS-2) FAULTY	23:48:20	133
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB 41052 (BHNML) OPEN	23:48:20	126
GETCO	400-SOE	KNSR_GNG	KANSARI ZERDA CB 41252 (T2_P) NORMAL	23:48:20	110
GETCO	220-SOE	VOND_JTG	220KV VONDH BUS 220Kv Bus 1 ACTED	23:48:21	193
GETCO	400-SOE	KNSR_GNG	KANSARI ZERDA BUS 400Kv Bus 1 NORMAL	23:48:22	21
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB 40352 (BNSK7) OPEN	23:48:22	51
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB 40652 (CHRS-1) FAULTY	23:48:22	73
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB 40952 (T3_P) OPEN	23:48:22	70
GETCO	400-SOE	KNSR_GNG	KANSARI ZERDA CB 40952 (T3_P) TRANSIT	23:48:22	50
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB TBC CB 41352 OPEN	23:48:22	69
GETCO	400KV-CB	KNSR_GNG	KANSARI ZERDA CB REACTOR- CB 41952 OPEN	23:48:22	68
GETCO	400-SOE	KNSR_GNG	KANSARI ZERDA CB 42252 (T4_P) NORMAL	23:48:22	73
GETCO	220KV-CB	KNSR_GNG	KANSARI ZERDA CB 20152 (T3_S) OPEN	23:48:22	120
GETCO	220-SOE	KNSR_GNG	KANSARI ZERDA CB 21952 (T4_P) NORMAL	23:48:22	89
GETCO	400KV-CB	SOJA_GNG	SOJA CB 41552 (KNSR) OPEN	23:48:22	31
WRLDC	400KV-CB	KNKRL_RJ	KANKROLI CB 41352 (KNSR) OPEN	23:48:22	165
WRLDC	400KV-CB	KNKRL_RJ	KANKROLI CB TIE 14 - CB 41452 OPEN	23:48:22	150
WRLDC	400KV-CB	BNSK7_PG	BANASKANTHA CB 41252 (KNSR) OPEN	23:48:22	144
WRLDC	400KV-CB	BNSK7_PG	BANASKANTHA CB TIE 11 - CB 41152 OPEN	23:48:22	145
WRLDC	765-SOE	BNSK7_PG	BANASKANTHA CB 71852 (T3_P) ACTED	23:48:25	396
WRLDC	765KV-CB	BNSK7_PG	BANASKANTHA CB 71852 (T3_P) OPEN	23:48:25	726

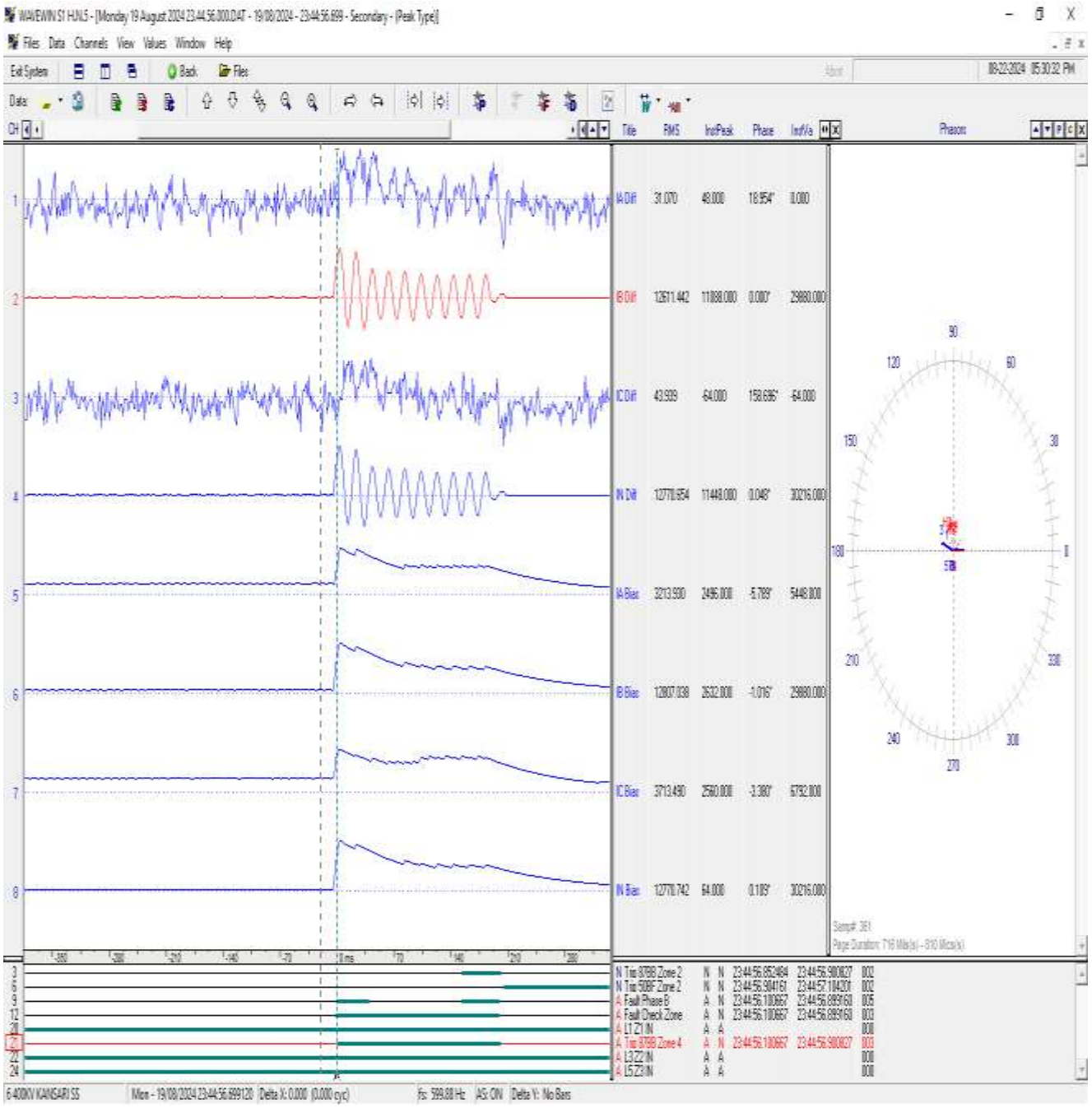
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

400 kV Kansari SLD-

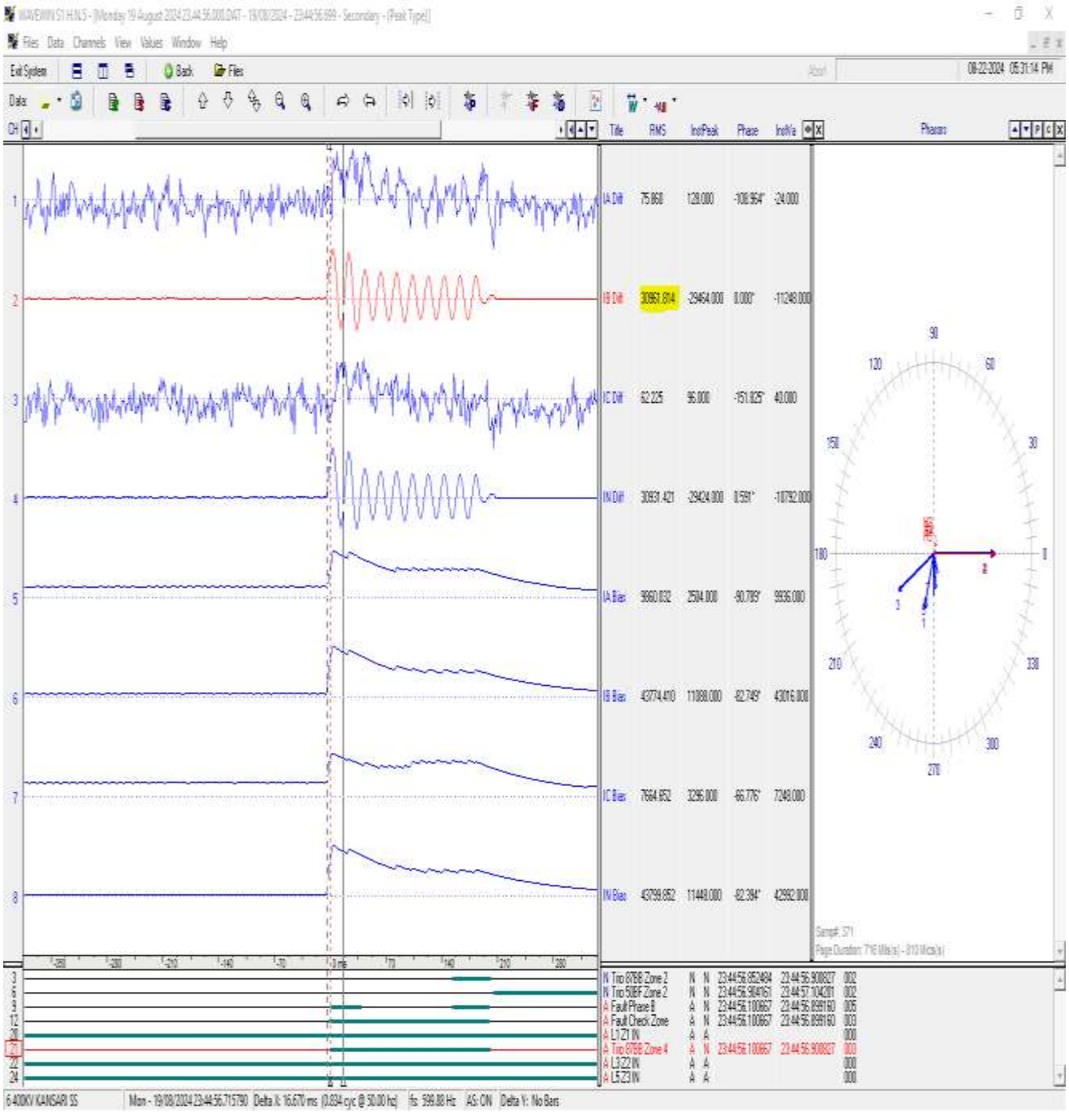


अनुलग्नक-3 / Annexure-3: Disturbance recorder

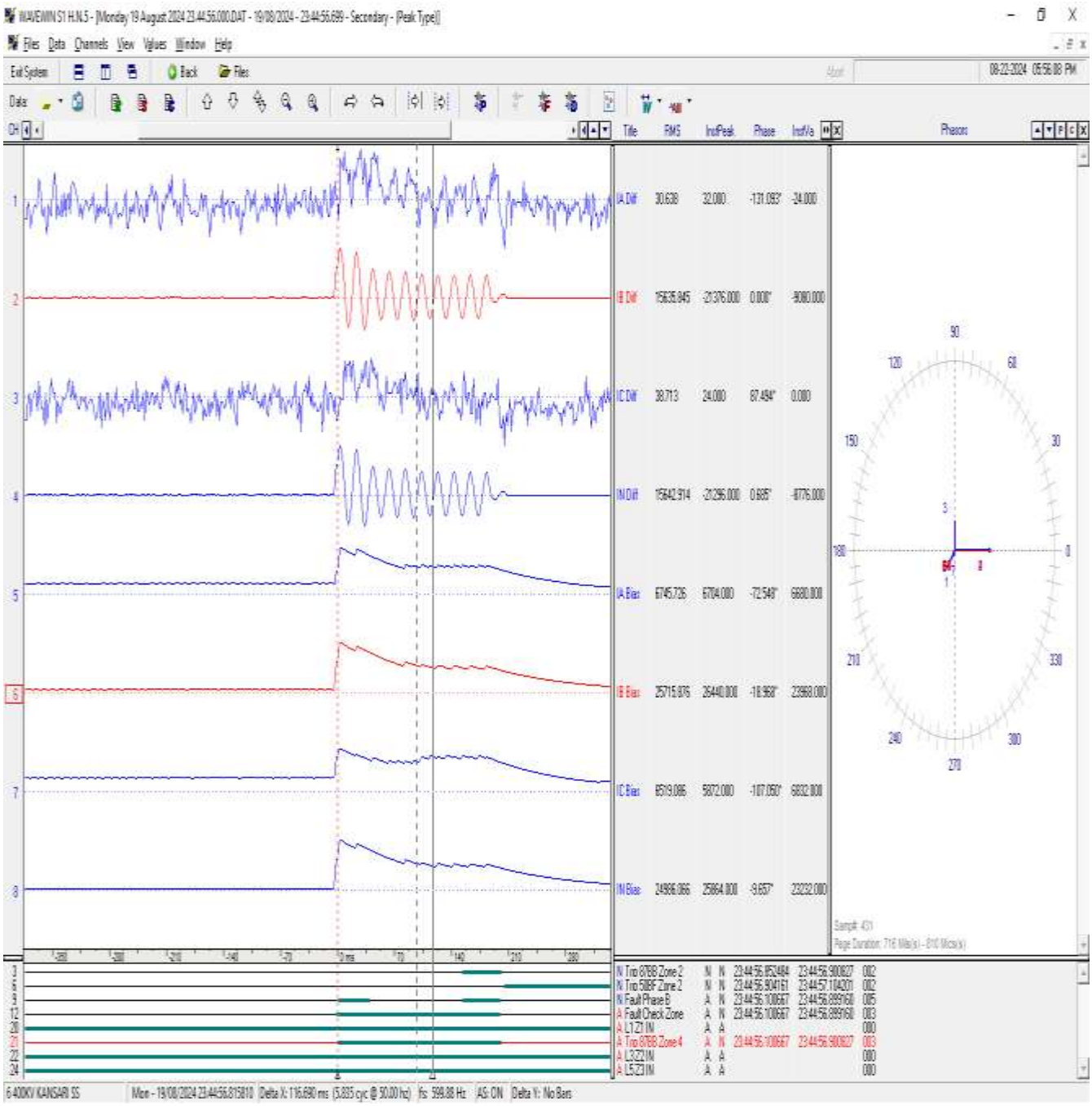
	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Substation 19/08/2024 23:44 hrs	P741	Busbar Protection – Zone 4 operated	3A
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)		Zone -4 is Region between Two CTs in 400kV Buscoupler Bay	



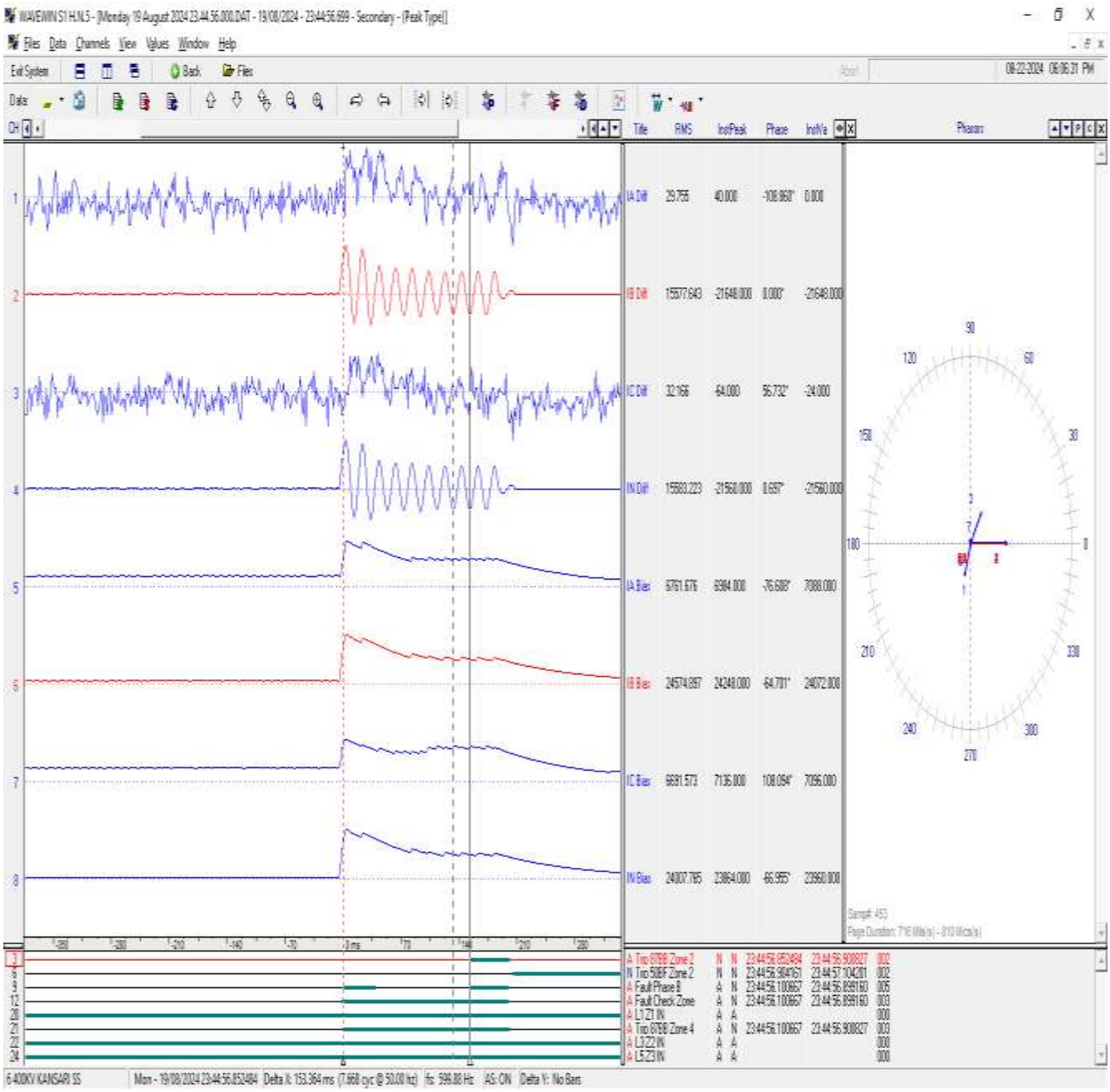
	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Subststion 19/08/2024 23:44 hrs	P741	Busbar Protection – Zone 4 operated	3B
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)		Maximum Fault Current : Zone-4 Y-ph 30.96kA.	



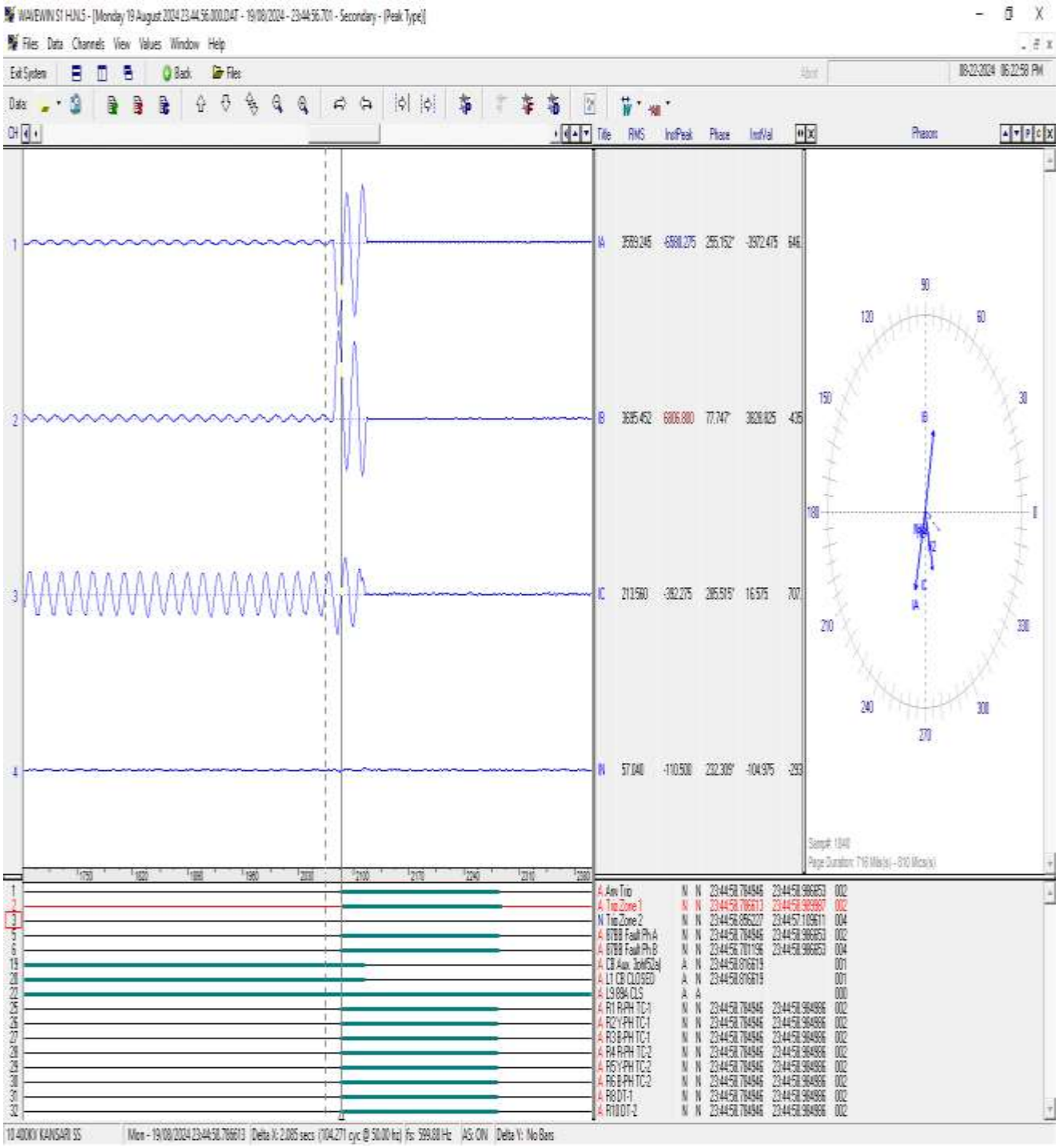
	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Substation 19/08/2024 23:44 hrs	P741	Busbar Protection – Zone 2 though fault	3C
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)		Diff. Current is less than 70% of Bias Current : **Calculated slope: 66%**	



	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Substation 19/08/2024 23:44 hrs	P741	Busbar Protection – Zone 2 Differential Fault.	3D
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)		Diff. Current equals to 70% of Bias Current: **calculated slope: 69.88%**	



	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Subststion 19/08/2024 23:44 hrs	P743	Busbar Protection – Zone 1 R to Y fault (P-P)	3E
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)	400kV Soja-1		



अनुलग्नक-3 / Annexure-4: Site photographs shared by GETCO-





के विजय कुमार

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी॰ हल्दर्वा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Haldarwa of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 08-11-2024

1. **घटना का सारांश / Event Summary:** At 09:29 Hrs / 07-10-2024, Bus bar protection operated in 220 kV Haldarwa-Bus-2 (Double Main Bus scheme) due to broken jumper over Y phase Bus side isolator of 220 kV GPEC-Haldarwa-1, resulting in of tripping of all the connected elements (as mentioned in elements tripped column). No Generation loss or load loss occurred.

2. **घटना का समय और दिनांक / Time and Date of the Event : 09:29 Hrs/07-10-2024**

3. **Bus Position:** Bus position of Bays at time of occurrence was as below.

220KV Main Bus A	**220KV Main Bus -B**
220KVWAGRA	220KV DAHEJ
220KV DAHEJ-2	220KV SUVA
220KV ZANOR-3	220KV JAMBUVA
220KV ZANOR-1	220KVZANOR-2
220KV KAPP-1	220KV KAPP-2

220KV KAWAS-1	220KV KAWAS-2
220KV GPEC-2	220KV GPEC-1
220/66KV 100MVA TRF-1	220/66KV 100MVA TRF-3
220/132KV 100MVA TRF-1	220/132KV 100MVA TRF-2

Bus Coupler Bay: ON
TBC Bay: Not Available
Bays Out of Service: 1) 220/66kV 50MVA TR-2
2) 220/132kV 50MVA TR-3

4. ग्रिड घटना का प्रकार / Event Category : Grid Incident (GI)-1

5. स्थान/नियंत्रण क्षेत्र / Location/Control Area : Haldarwa, Gujarat

6. पूर्ववर्ती स्थिति / Antecedent Conditions:

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.93	68810	62753	12276	19668
घटना के बाद Post Event	49.94	62957	69016	12319	19524

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

7. लोड और जेनरेशन हानि / Load and Generation loss: Nil

8. **रुकावट की अवधि / Duration of interruption:** 01 Hours 16 Minutes (Time of revival of first element)

9. **प्रभावित क्षेत्र का नक्शा / Network across the affected area**

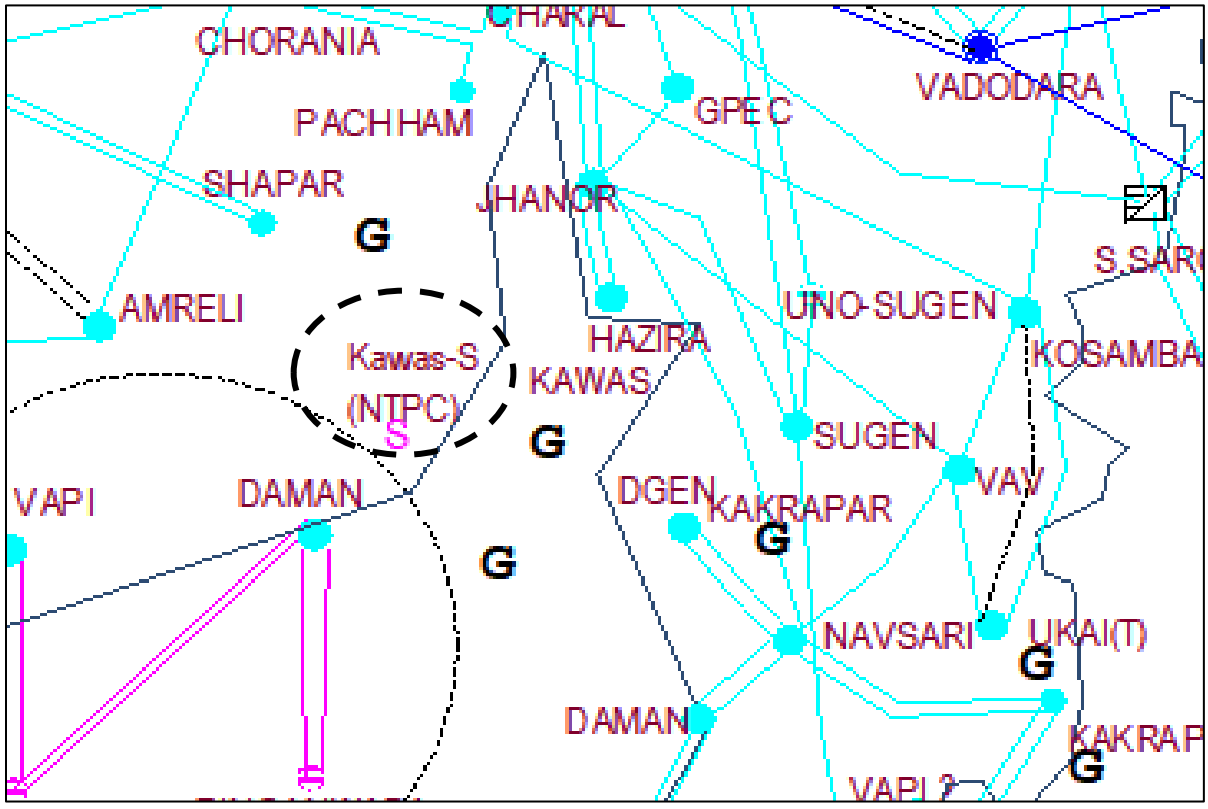


Figure 1. Network across the affected area

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

11. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1)Haldarwa	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time (All on 18-03-2024)
1.	220kV Haldarwa-Dahej line no.1	09:29	Busbar operated	Not tripped	10.45hrs
2.	220kV Haldarwa-Suva line	09:29	Busbar operated	Not tripped	11.15hrs
3.	220kV Haldarwa-Jambuva line	09:29	Busbar operated	Not tripped	23.13hrs
4.	220kV Haldarwa -NTPC Zanor line no.2	09:29	Busbar operated	Not tripped	14.07hrs
5.	220kV Haldarwa-KAPP line no.2	09:29	Busbar operated	Not tripped	13.55hrs
6	220kV Haldarwa-Kawas line no.2	09:29	Busbar operated	Not tripped	13.40hrs
7	100 MVA 220/132kV Trf. No.2	09:29	Busbar operated	-	11.51hrs
8	220kV Haldarwa-GPEC line no.1	09:29	Busbar operated	Not tripped	23.25hrs
9	100 MVA 220/66kV Trf. No.3	09:29	Busbar operated	-	11.20hrs

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

- Bus bar protection operated in 220 kV Haldarwa-Bus-2 (Double Main Bus scheme) due to broken jumper over Y phase Bus side isolator of 220 kV GPEC-Haldarwa-1, resulting in of tripping of all the connected elements
- DRs downloaded and analysed, From CU DR, Y-Ph Differential current went to maximum at the magnitude of 41.283kA.(D.R Snap-B1&B2)
- 220kV Busbar protection scheme at Haldarwa s/s operated and fault was cleared within 3 cycles to clear Bus-B Fault caused by grounding of jumper from palm connector connection on Bus-B Isolator Y-phase of 220kV GPEC Line-1
- Attachments:
    - SLD: A1/A2
    - DRs: B1/B2
    - Photographs: C1/C2/C3

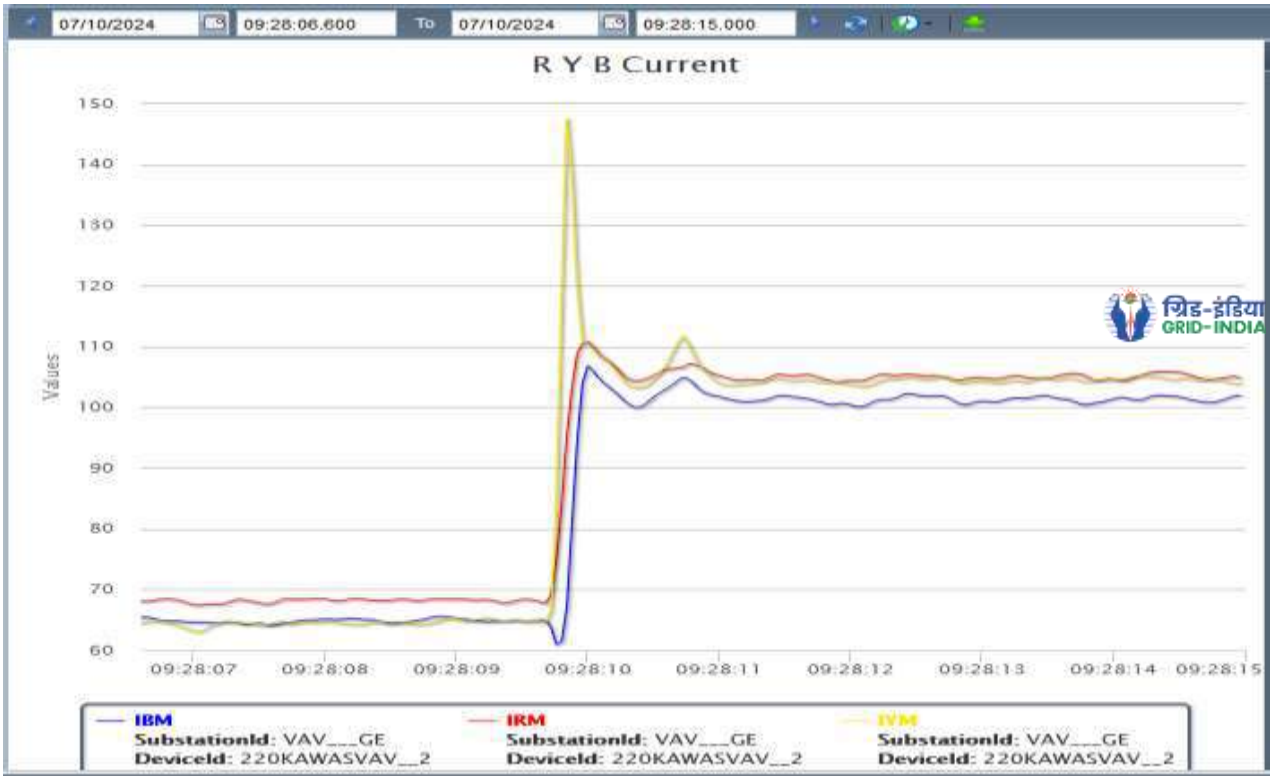


Figure 2. PMU Current Plot (220 kV Kawas Vav-2)

13. प्रमुख अधिगम बिंदु / Protection and Operational issues observed:

- DR are not time synced.
- SOE not generated

14. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- As informed by GETCO, "Y"-ph jumper found broken from clamp towards Main Bus-B side. Jumper isolator palm clamp found mechanically broken & earthed at bottom side of Porcelain Insulator of same phase. Same was attended with New Porcelain Insulator, isolator jaw and new jumper clamp in 220kV main Bus B and system was restored.
- Last thermography of 220kV GPEC Line-1 was carried out on 08-07-2024 by GETCO and hot point observed on Bus-A isolator but there wasn't any observational abnormality on Bus B isolator side.
- Issue of DR time sync to be resolved by GETCO.
- Issue of non-generation of SOE to be resolved by GETCO in coordination with WRLDC SCADA

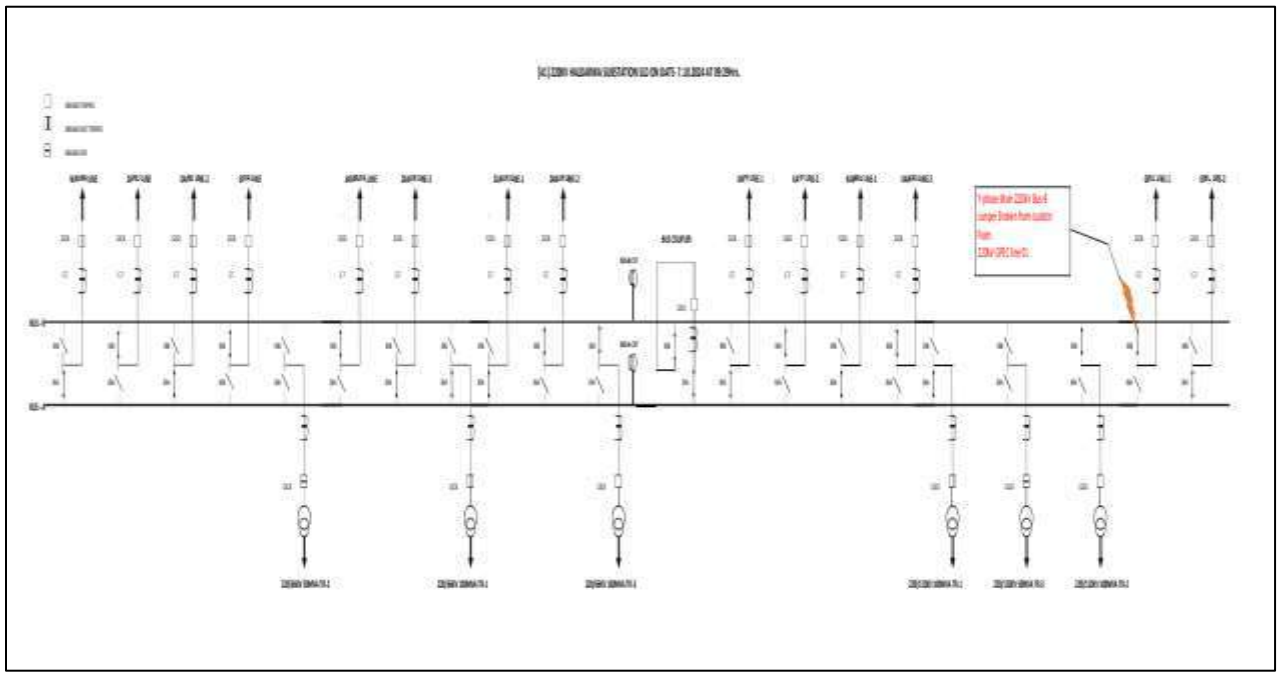
15. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not Received
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late.
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late i.e. on 06.11.2024
4.	DR Time Synchronization Issues	IEGC section 17.3	DR not time sync

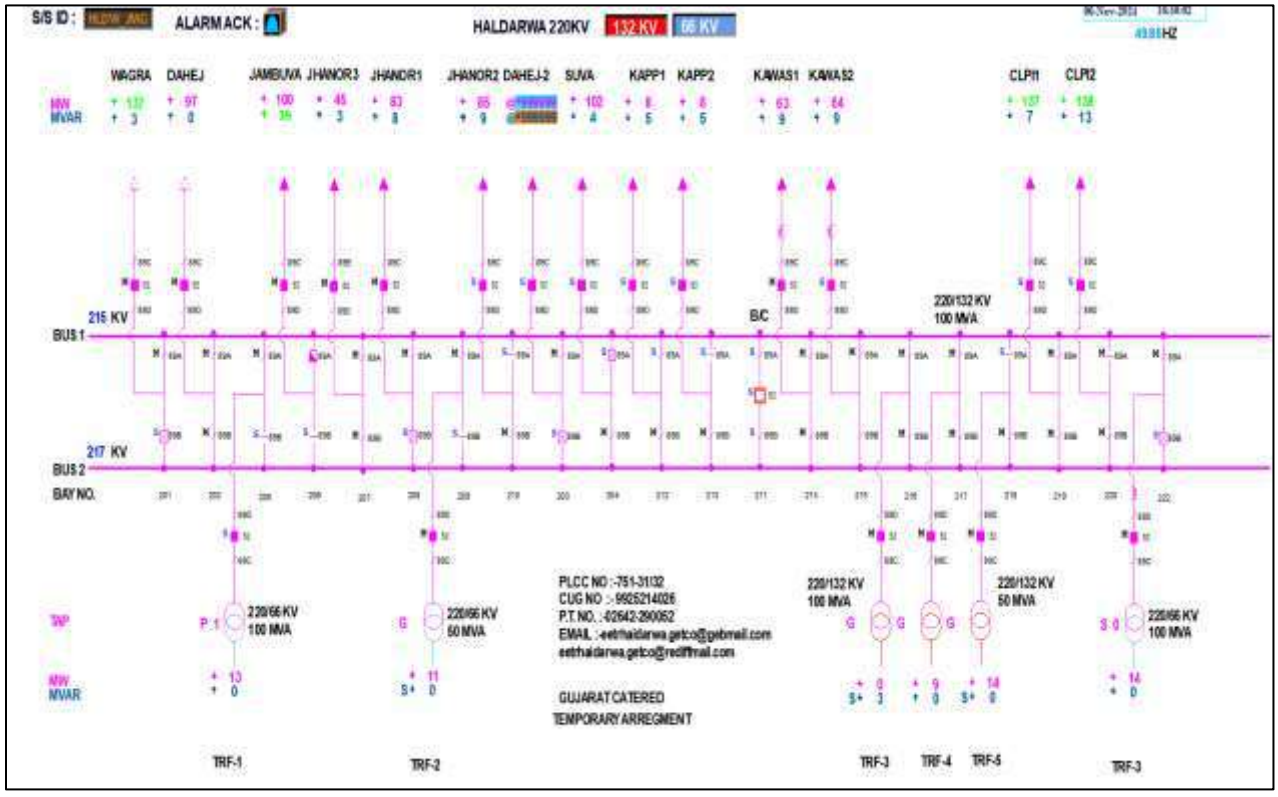
16. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-A / Annexure A

A1. 220 kV Haldarwa SLD from Haldarwa(SLDC Gujarat)

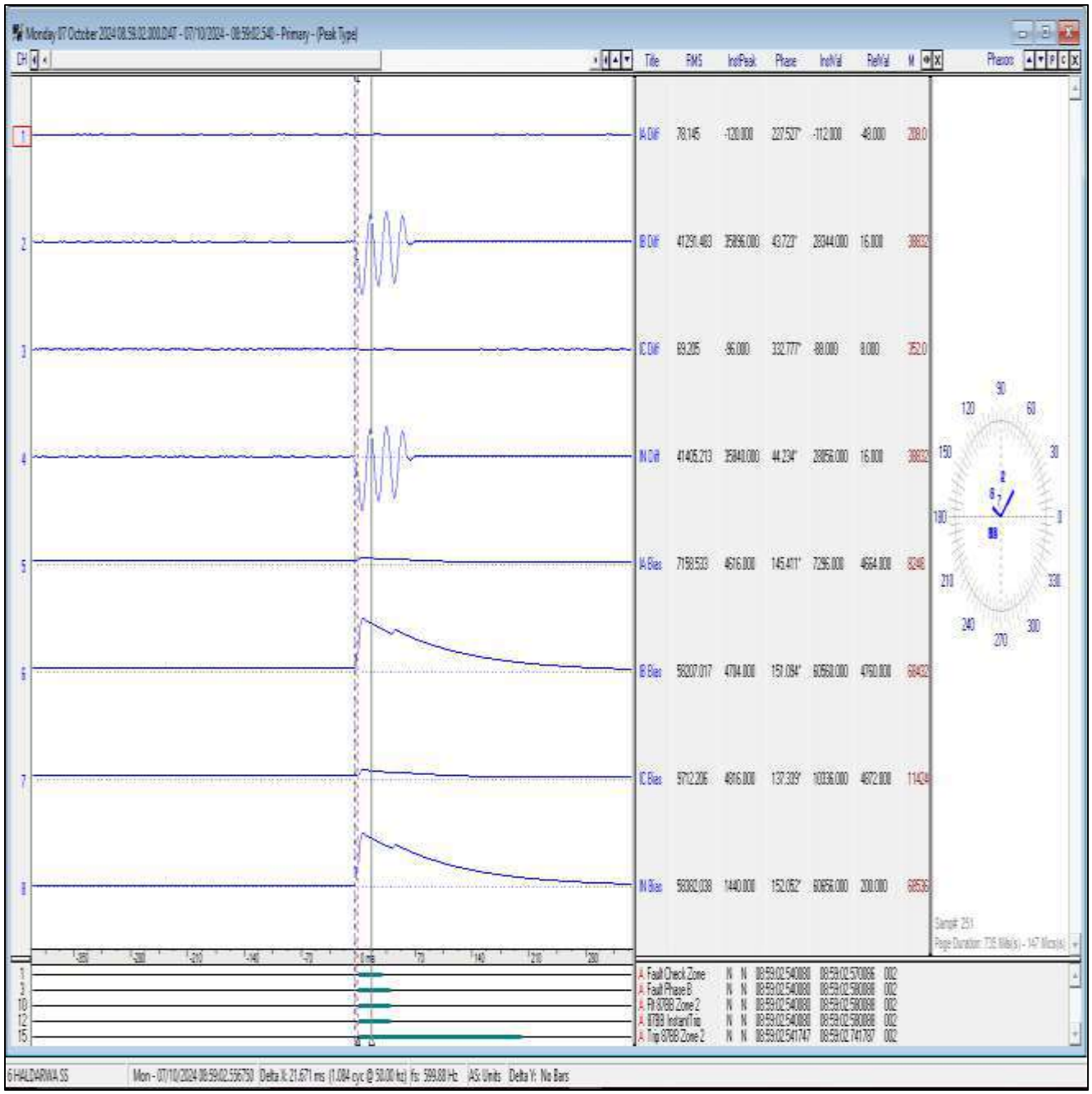


A2. 220 kV Haldarwa SLD from WRLDC SCADA

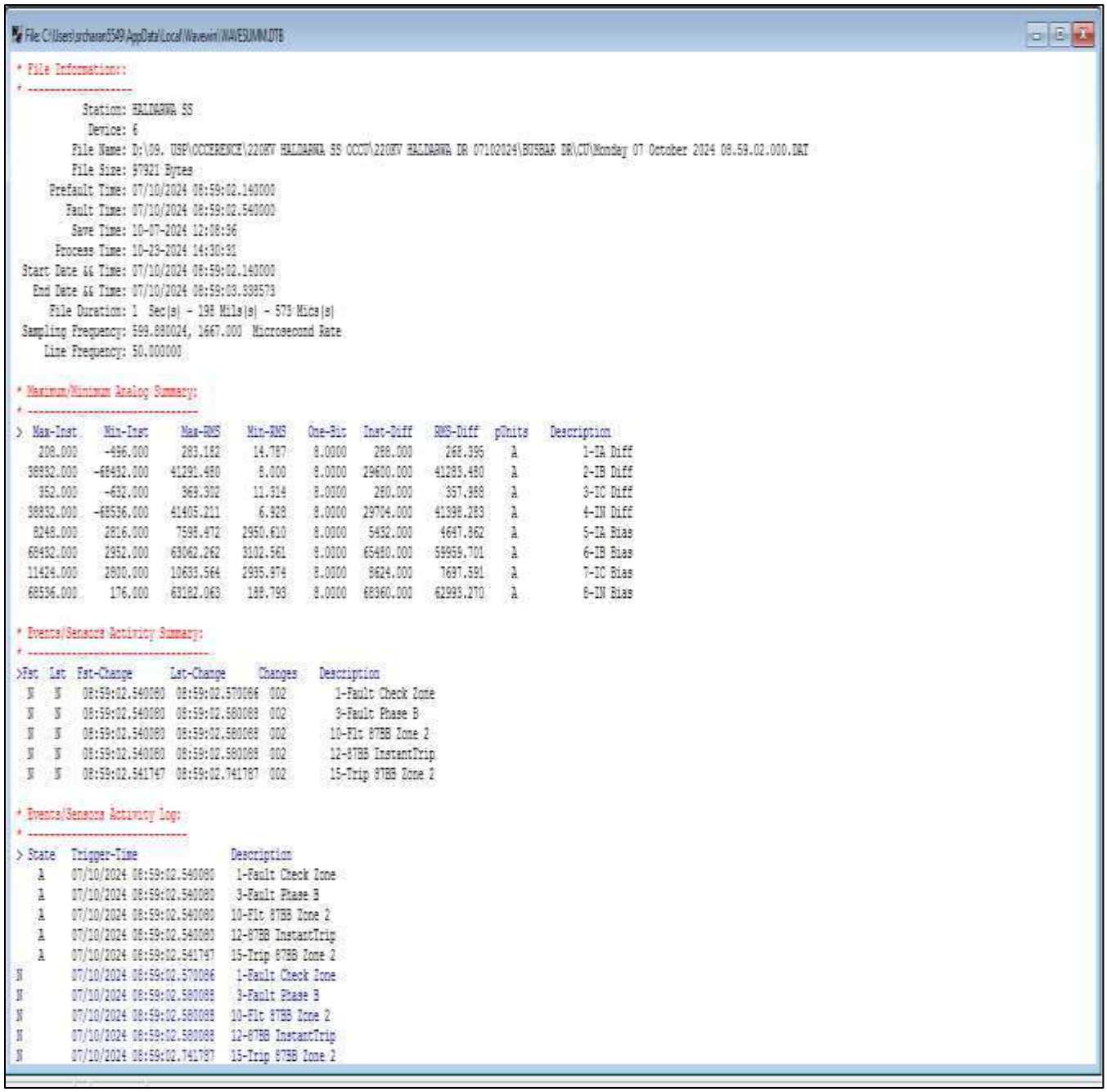


अनुलग्नक-B / Annexure-B: Disturbance recorder –

	OCCURRENCE DETAIL	RELAY TYPE	DR OBSERVATIONS	REF.
	220KV HALDARWA SS BUS-B BB	**P741**	**BB Central Unit DR**	B1
	220KV GPEC LINE-1 BUS-B Yph ISO. PALM	**Central Unit**	**BB Differential current with magnitude of 41kA observed**	



	OCCURRENCE DETAIL	RELAY TYPE	DR OBSERVATIONS	REF.
	220KV HALDARWA SS BUS-B BB OPERATED	**P741**	**BB Central Unit DR**	B2
	220KV GPEC LINE-1 BUS-B Yph ISO. PALM	**Central Unit**	**Bus-B BB Differential & Restrain Current Value**	



```
File C:\Users\srchavan0549\AppData\Local\Wavewin\WAVESUMM.DTB

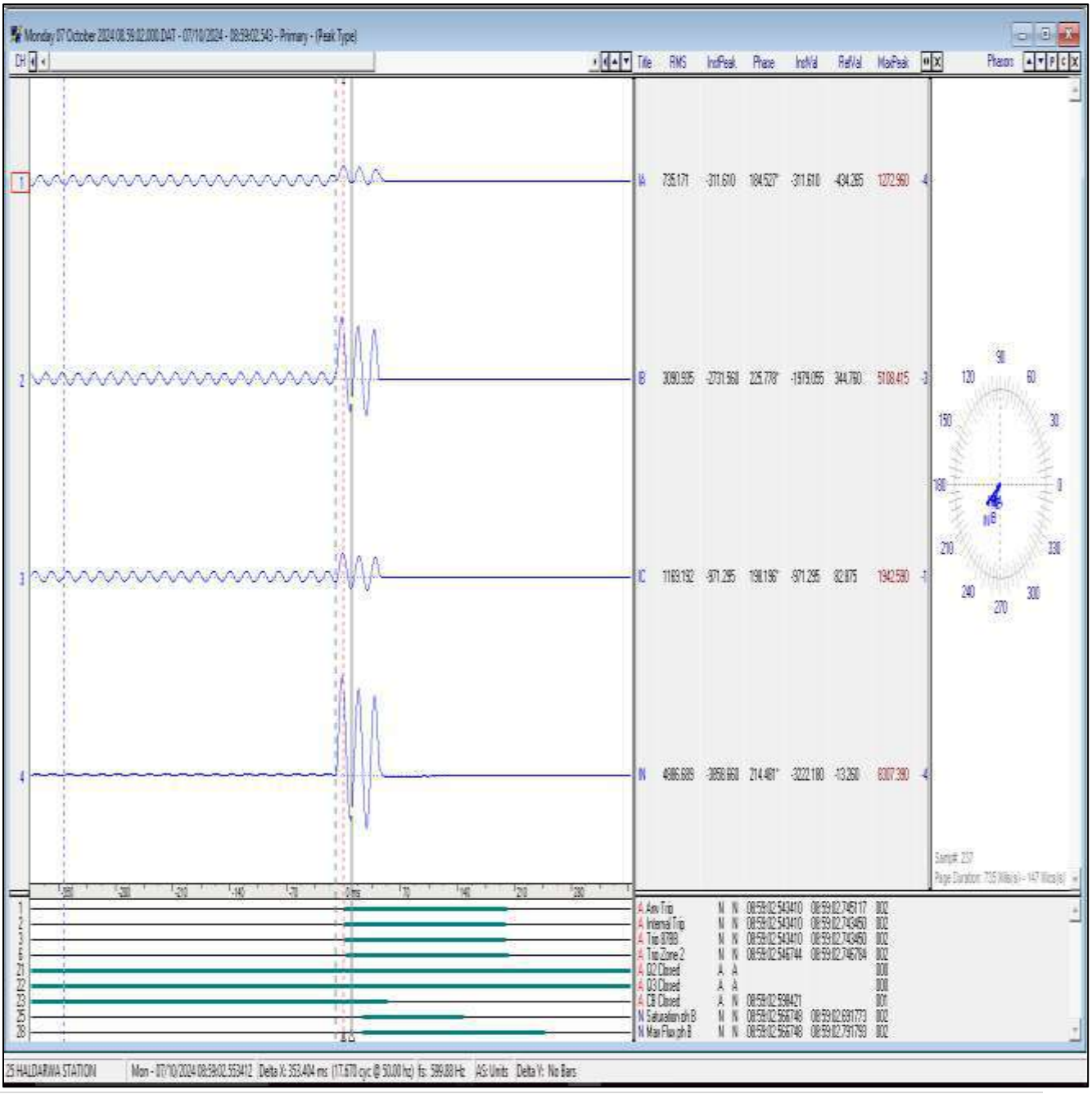
* File Information::
* ------------------
         Station: HALDARWA SS
          Device: 6
       File Name: D:\09. USP\OCCURENCE\220KV HALDARWA SS OCCR\220KV HALDARWA DR 07102024\BUSBAR DR\CT\Monday 07 October 2024 08.59.02.000.DAT
       File Size: 97921 Bytes
    Prefault Time: 07/10/2024 08:59:02.140000
      Fault Time: 07/10/2024 08:59:02.540000
      Save Time: 10-07-2024 12:08:36
   Process Time: 10-23-2024 14:30:31
 Start Date && Time: 07/10/2024 08:59:02.140000
   End Date && Time: 07/10/2024 08:59:03.339573
    File Duration: 1  Sec(s) - 198 Mils(s) - 573 Mics(s)
 Sampling Frequency: 599.880024, 1667.000  Microsecond Rate
    Line Frequency: 50.000000

* Maximum/Minimum Analog Summary:
* -------------------------------
>  Max-Inst    Min-Inst     Max-RMS    Min-RMS   One-Bit   Inst-Diff    RMS-Diff   pUnits   Description
   208.000    -496.000     283.182     14.787     8.0000     288.000     268.395      A          1-IA Diff
 38832.000  -68432.000   41291.480      8.000     8.0000   29600.000   41283.480      A          2-IB Diff
   352.000    -632.000     369.302     11.314     8.0000     280.000     357.988      A          3-IC Diff
 38832.000  -68536.000   41405.211      6.928     8.0000   29704.000   41398.283      A          4-IN Diff
  8248.000    2816.000    7598.472   2950.610     8.0000    5432.000    4647.862      A          5-IA Bias
 68432.000    2952.000   63062.262   3102.561     8.0000   65480.000   59959.701      A          6-IB Bias
 11424.000    2800.000   10633.564   2935.974     8.0000    8624.000    7697.591      A          7-IC Bias
 68536.000     176.000   63182.063    188.793     8.0000   68360.000   62993.270      A          8-IN Bias

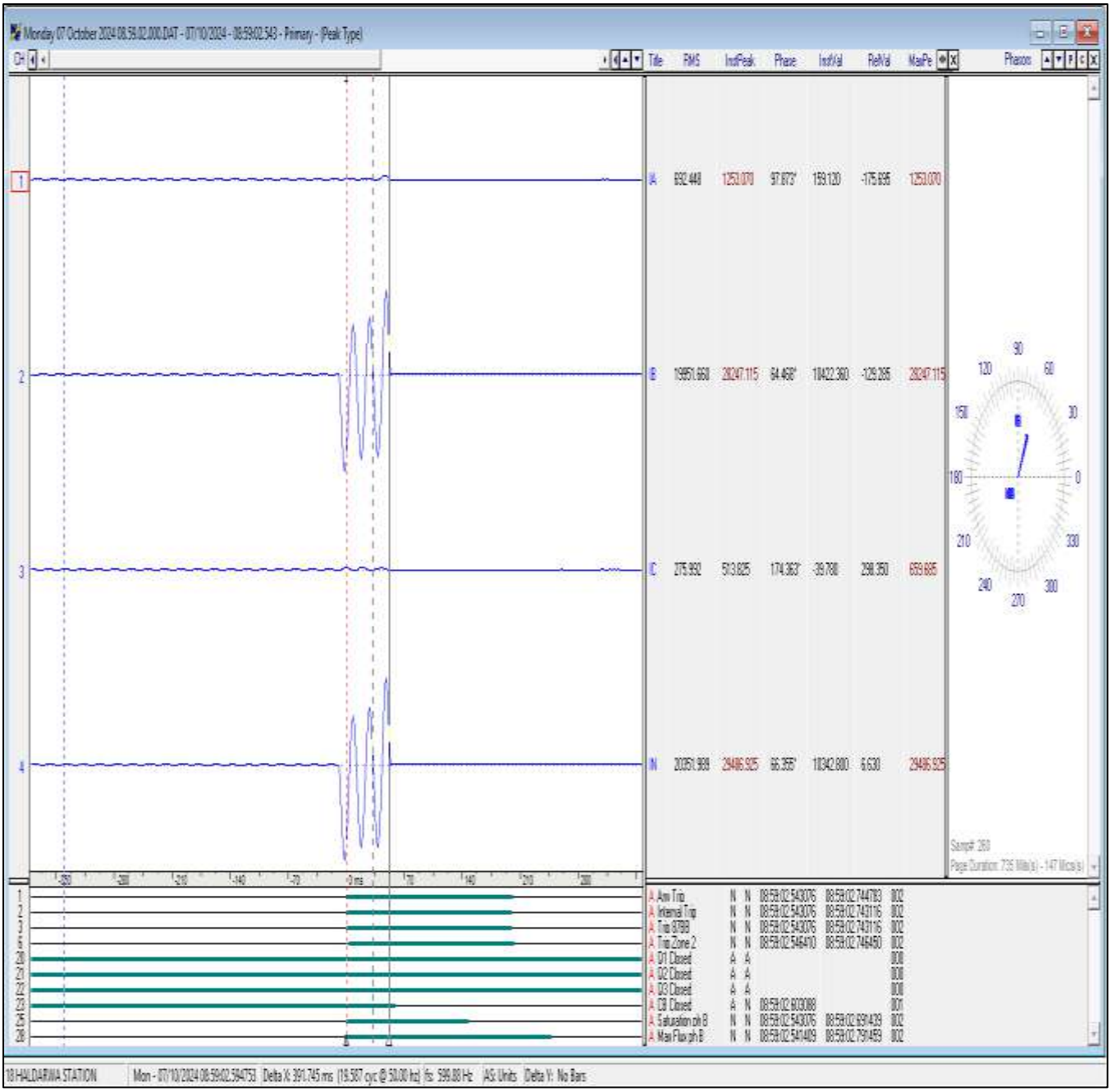
* Evence/Senseve Activity Summary:
* ---------------------------------
>Pat  Lat  Pat-Change       Lat-Change       Changes    Description
  N    N    08:59:02.540080  08:59:02.570086  002          1-Fault Check Zone
  N    N    08:59:02.540080  08:59:02.580088  002          3-Fault Phase B
  N    N    08:59:02.540080  08:59:02.580088  002         10-Flt 87BB Zone 2
  N    N    08:59:02.540080  08:59:02.580088  002         12-87BB InstantTrip
  N    N    08:59:02.541747  08:59:02.741787  002         15-Trip 87BB Zone 2

* Evence/Senseve Activity Log:
* ----------------------------
> State  Trigger-Time              Description
    A    07/10/2024 08:59:02.540080   1-Fault Check Zone
    A    07/10/2024 08:59:02.540080   3-Fault Phase B
    A    07/10/2024 08:59:02.540080  10-Flt 87BB Zone 2
    A    07/10/2024 08:59:02.540080  12-87BB InstantTrip
    A    07/10/2024 08:59:02.541747  15-Trip 87BB Zone 2
N        07/10/2024 08:59:02.570086   1-Fault Check Zone
N        07/10/2024 08:59:02.580088   3-Fault Phase B
N        07/10/2024 08:59:02.580088  10-Flt 87BB Zone 2
N        07/10/2024 08:59:02.580088  12-87BB InstantTrip
N        07/10/2024 08:59:02.741787  15-Trip 87BB Zone 2
```

	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	220KV HALDARWA SS BUS-B BB OPERATED	**P743**	**BB GPEC Line-1 PU D.R**	B3
	220KV GPEC LINE-1 BUS-B Yph ISO. PALM BROKEN	**Central Unit**	**GPEC LINE-1 PU Current Value**	



	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	220KV HALDARWA SS BUS-B BB OPERATED	**P741/P743**	**BB Bus Coupler PU D.R**	B4
	220KV GPEC LINE-1 BUS-B ISO. PALM BROKEN		**Bus coupler PU Current Value**	



अनुलग्नक-C / Annexure-C Any other photograph-

	OCCURRENCE DETAIL	DATE & TIME	C1
	220KV HALDARWA SS BUS-B BB OPERATED	DATE: 7.10.2024	
	220KV GPEC LINE-1 BUS-B ISO. PALM BROKEN	TIME: 9:29 Hrs	



	OCCURRENCE DETAIL	DATE & TIME	C2
	220KV HALDARWA SS BUS-B BB OPERATED	DATE: 7.10.2024	
	220KV GPEC LINE-1 BUS-B ISO. PALM BROKEN	TIME: 9:29Hrs	



	OCCURRENCE DETAIL	DATE & TIME	C3
	220KV HALDARWA SS BUS-B BB OPERATED	**DATE: 7.10.2024**	
	220KV GPEC LINE-1 BUS-B ISO. PALM BROKEN	**TIME: 9:29Hrs**	



अनुलग्नक-D/Annexure D:

Sequence of Events- SOE not generated.

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 400/220 के°वी° धुले (महाराष्ट्र) उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400/220 kV Dhule (Maharashtra) Substation of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 25-10-2024

1. **घटना का सारांश / Event Summary**: At 05:09 Hrs / 12-08-2024, 400/220 kV Dhule(MH)-ICT-3 tripped on differential protection operation due to blasting of Y phase bushing. 400/220 kV Dhule(MH)-ICT-1 tripped on Backup to Earth Fault protection operation. 400 kV Dhule(MH)-Khandwa-1 tripped on Over voltage stage-1 protection operation which was not in order.

   400 kV Dhule(MH)-Dhule(BDTCL)-2 tripped on Z-4 protection operation at Dhule(MH) end and Z-2 protection operation at Dhule(BDTCL) end. 400 kV Dhule(MH)-SSP-2 tripped on Z-4 protection operation at Dhule(MH) end and Z-1 protection operation at SSP end, tripping on Z-1 at SSP end was not in order. 400 kV Dhule(MH)-Bableswhwar-2 tripped on Z-2 protection operation at Bableshwar end.

   Ideally, the fault should have been cleared on LBB protection operation, but LBB protection not operated. Load loss of 70.06 MW occurred due to LTS stage-1 and LTS stage-2 operation on 400/220 kV Dhule(MH)-ICT-1&3.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 05:09 Hrs / 12-08-2024

3. **ग्रिड घटना का प्रकार / Event Category : Grid Incident (GI)-2**

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Dhule (MSETCL), Maharashtra

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.01	62683	50951	13018	20082
घटना के बाद Post Event	49.983	62734	50834	13043	20198

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. **लोड और जेनरेशन हानि / Load and Generation loss:** Load loss of 70.06 MW occurred due to LTS operation at Dhule (MH)

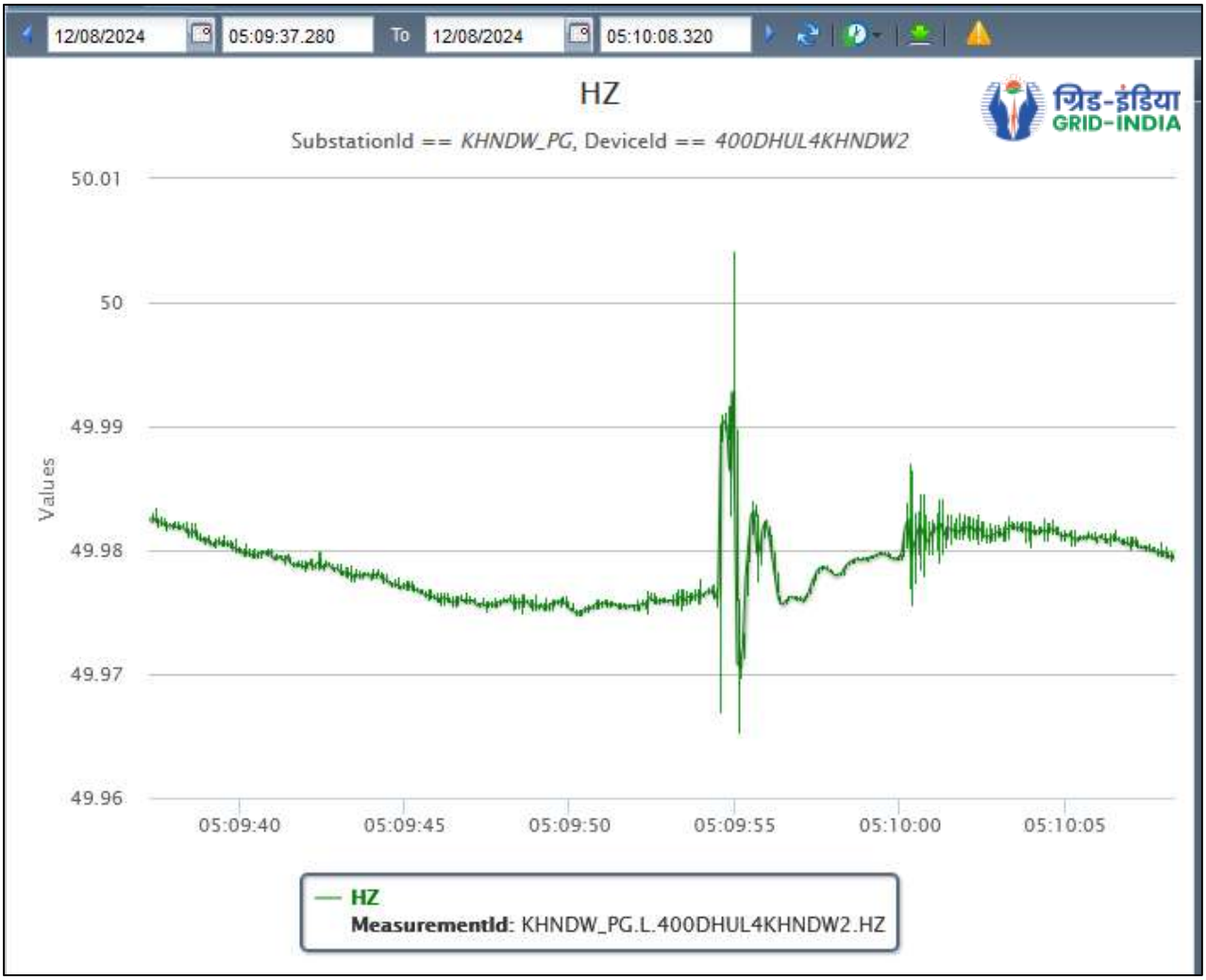


Figure 1. PMU Frequency Plot (400 kV Dhule-Khandwa-2)

7. रुकावट की अवधि / Duration of interruption: 03 Hours 51 Minutes (Time of revival of first element)

8. प्रभावित क्षेत्र का नक्शा / Network across the affected area

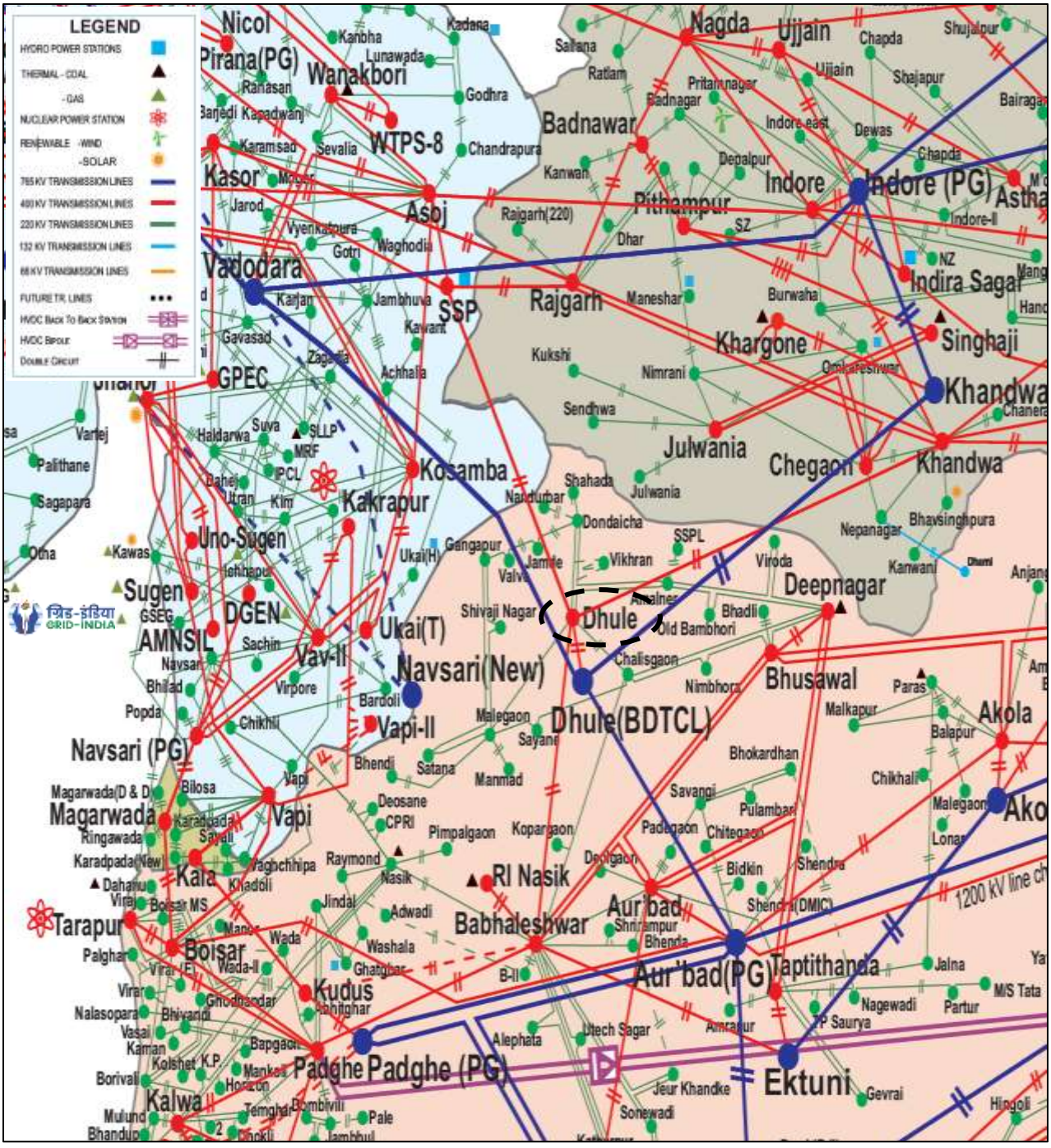


Figure 2. Network across the affected area

9. उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event): Y-phase of bushing blast of 400/220 kV Dhule(MH)-ICT-3

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time (hh:mm)
1.	400/220 kV Dhule(MH)-ICT-3	05:09:54.400	Differential Protection operation	Inter trip	18:21
2.	400/220 kV Dhule(MH)-ICT-1	05:09:54.995	Over Current Earth Fault	DRs not provided by MSETCL	06:33
3.	400 kV Dhule(MH)-Khandwa-1	05:09:54	DRs not provided by MSETCL	DRs not provided by Powergrid WR-2	09:37
4.	400 kV Dhule(MH)-Dhule(BDTCL)-2	05:09:54.854	Z-4 Distance Protection	Z-2 Distance Protection	09:39
5.	400 kV Dhule(MH)-SSP-2	05:09:54.804	Z-4 Distance Protection	DRs not provided by NCA	10:06
6.	400 kV Dhule(MH)-Bableswhwar-2	05:09:54	DRs not provided by MSETCL	DRs not provided by MSETCL	09:00
7.	400 kV Dhule(MH)-Bus-Coupler	05:09:54.420	DRs not provided by MSETCL	Not Applicable	09:14

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

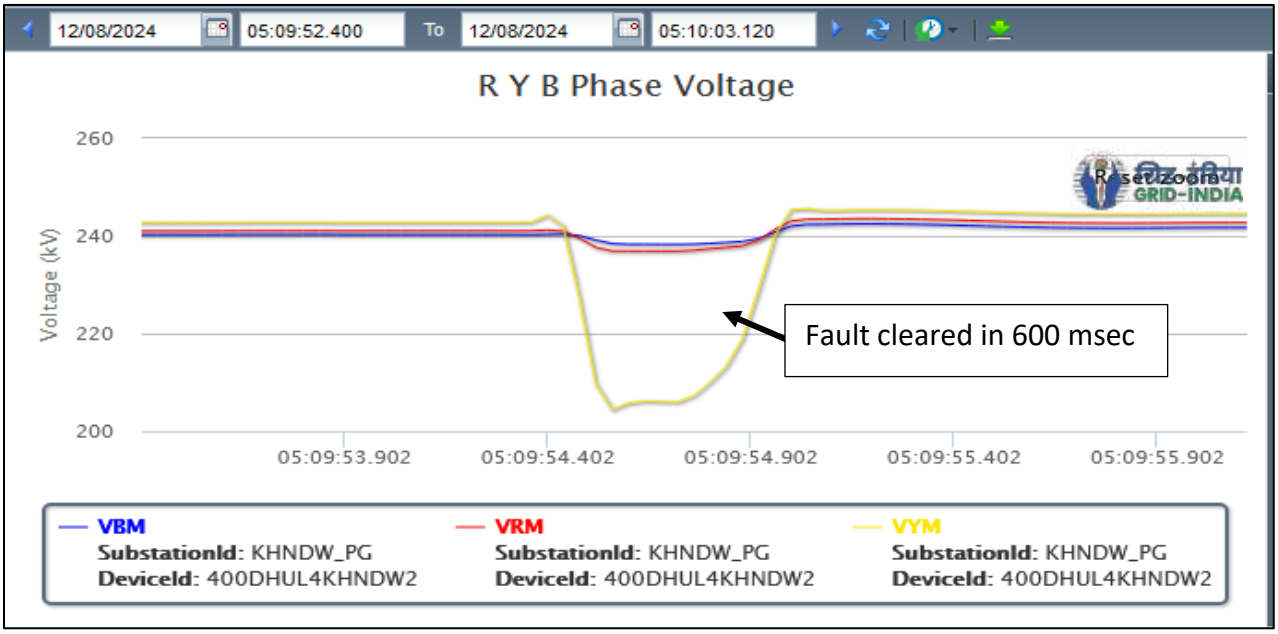


Figure 3. PMU Voltage Plot (400 kV Dhule-Khandwa-2)

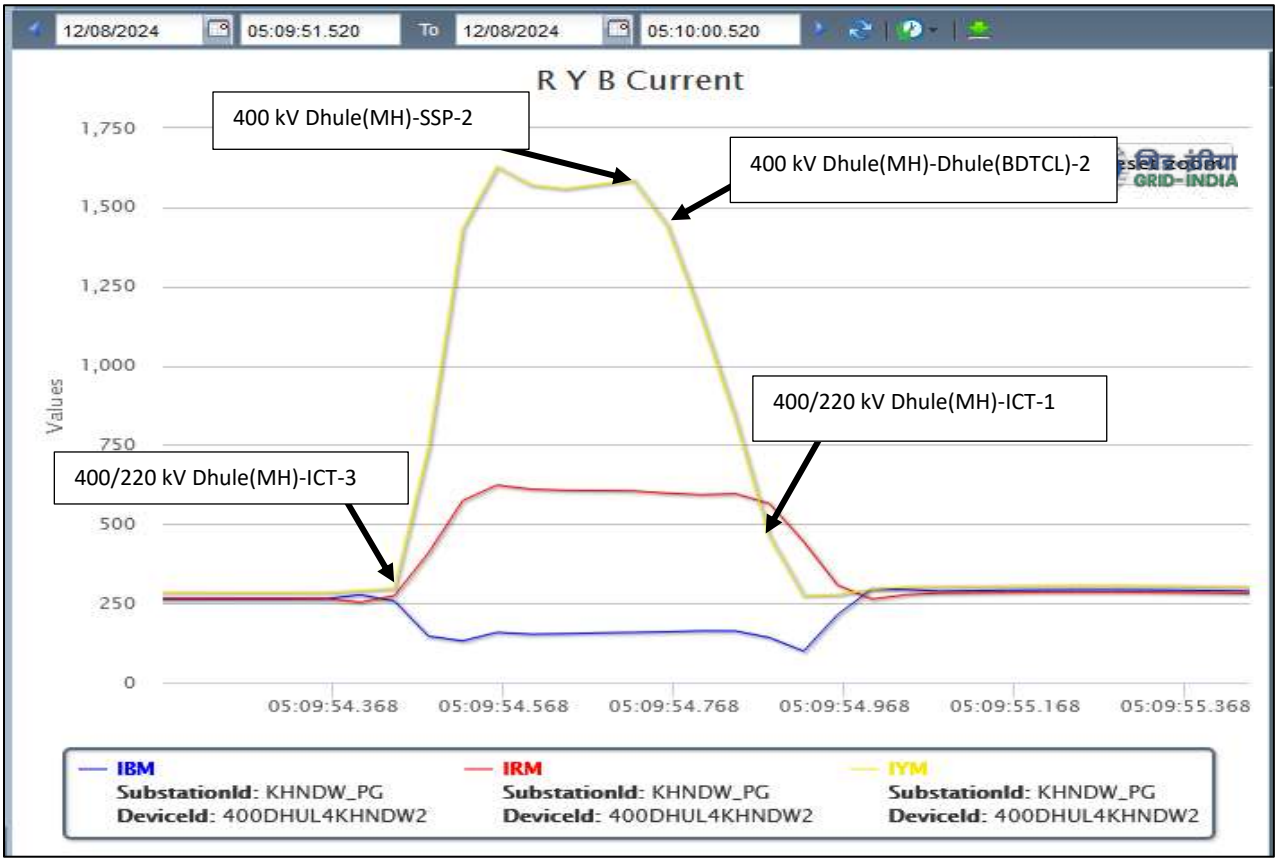


Figure 4. PMU Current Plot (400 kV Dhule-Khandwa-2)

12. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	उपयोगकर्ता Utilities	टिप्पणी Remarks
1.	DR/EL not uploaded in 24 Hrs	IEGC section 37.2 (c)	POWERGRID WR-1	DRs uploaded after 24 Hrs by POWERGRID WR-1
2.	Flash Report received after 8hrs	IEGC section 37.2 (b)	POWERGRID WR-1	Report not received

13. प्रमुख अधिगम बिंदु / Protection and Operational issues observed:

- 400 kV Dhule(MH)-Khandwa-1 tripped on Over voltage stage-1 protection operation which was not in order.
- The fault persisted for 600 msec, ideally the fault should have been cleared in 200 msec on LBB protection operation, but LBB protection not operated.
- 400 kV Dhule(MH)-SSP-2 tripped on Z-4 protection operation at Dhule(MH) end and Z-1 protection operation at SSP end, tripping on Z-1 at SSP end was not in order.

14. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- MSETCL to kindly check the tripping of 400 kV Dhule(MH)-Khandwa-1 tripped on Over voltage stage-1 protection, clarify the reason of maloperation and inform about the action taken.
- MSETCL to kindly check the non-operation of LBB relay, clarify the reason of non-operation and inform about the action taken.
- NCA to kindly check the tripping of 400 kV Dhule(MH)-SSP-2 on Z-1 at SSP end, clarify the reason of maloperation and inform about the action taken.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

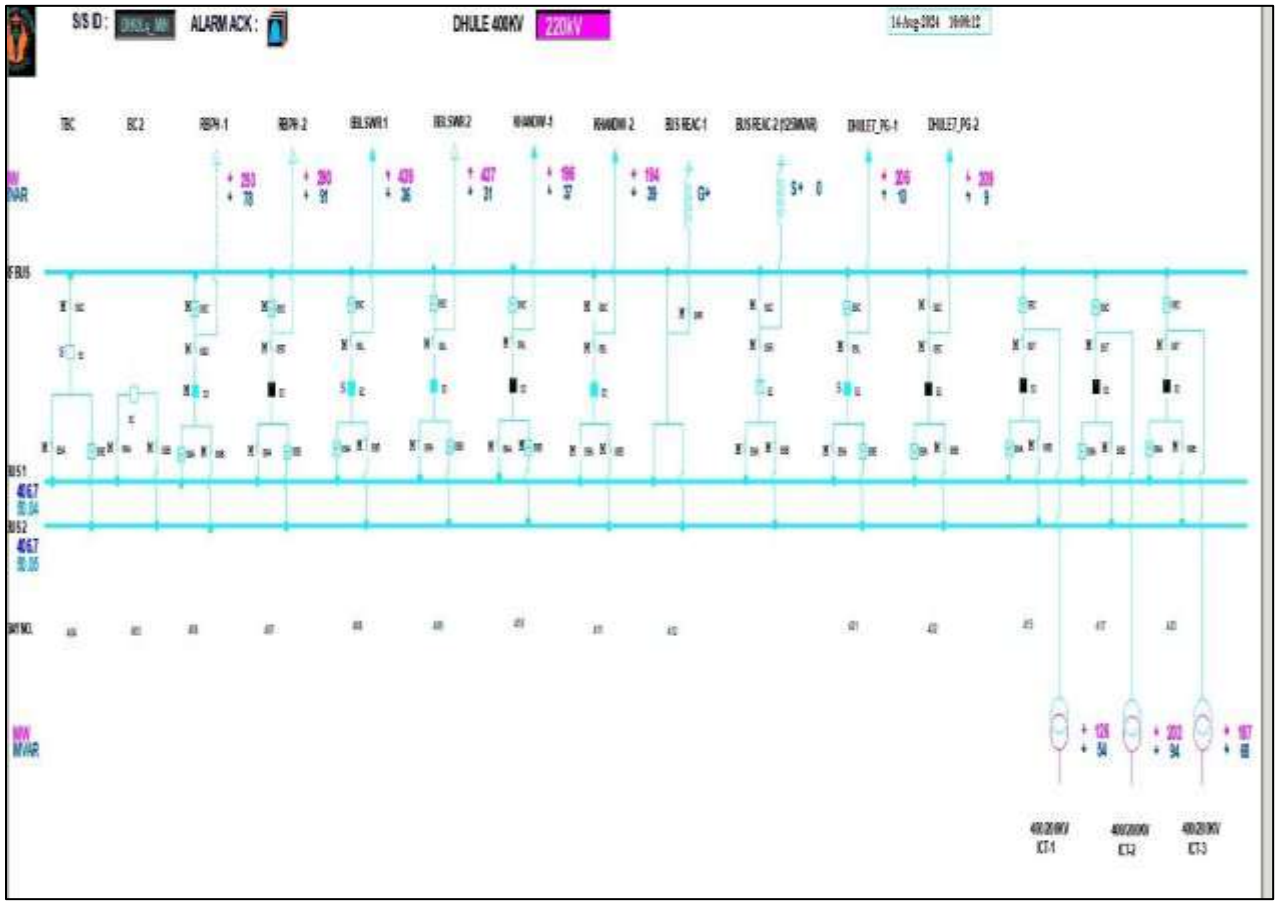
-x-x-x-x-x-

विजय कुमार कोडाली Vijay Kumar Kodali
उप महाप्रबंधक Deputy General Manager
प्रणाली प्रचालन System Operation

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA

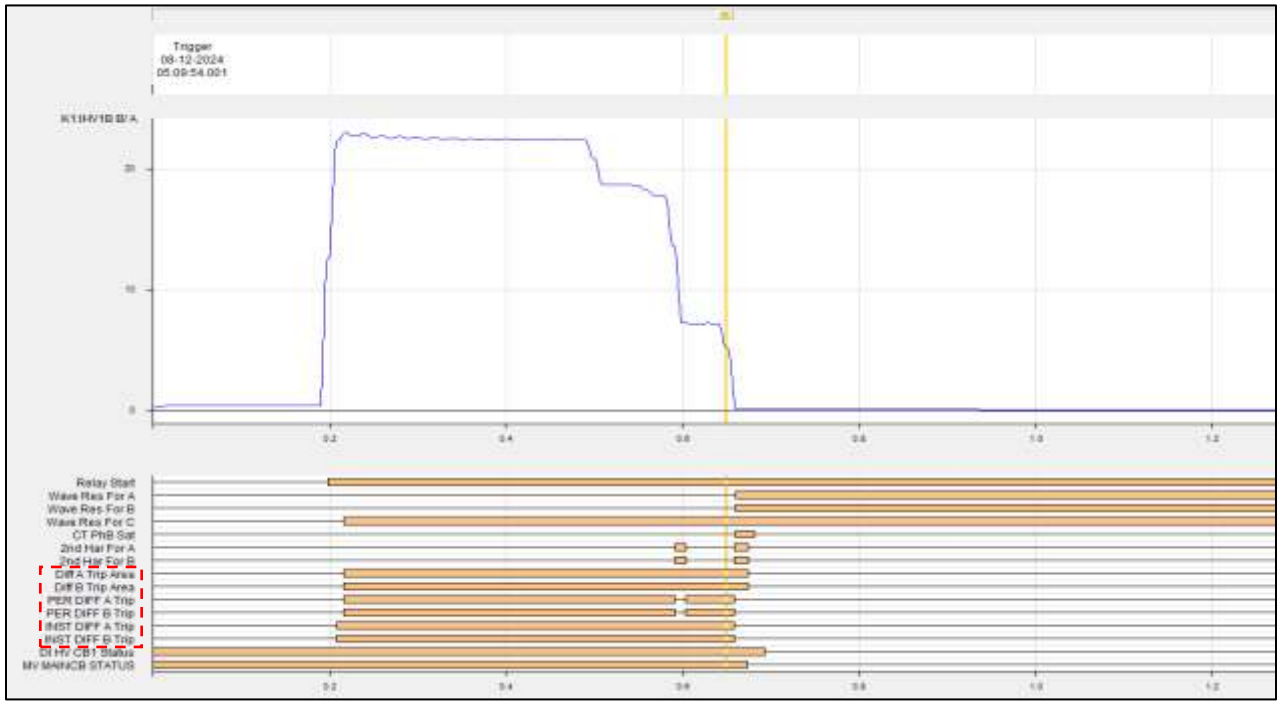
Area	CATEGORY	LOCATION	TEXT	hh:mm:ss	ms
WRLDC	400-SOE	DHUL7_PG	DHULE 765 CB 40952 (DHUL4-2) NORMAL	05:09:54	874
WRLDC	400KV-CB	DHUL7_PG	DHULE 765 CB 40952 (DHUL4-2) OPEN	05:09:54	874
WRLDC	400-SOE	DHUL7_PG	DHULE 765 CB TIE 08 - CB 40852 NORMAL	05:09:54	874
WRLDC	400KV-CB	DHUL7_PG	DHULE 765 CB TIE 08 - CB 40852 OPEN	05:09:54	874
WRLDC	400KV-CB	DHUL4_MH	DHULE CB 40752 (RBPH-2) OPEN	05:10:00	448
WRLDC	400KV-CB	DHUL4_MH	DHULE CB 42252 (DHUL7-2) OPEN	05:10:07	162
WRLDC	400KV-CB	DHUL4_MH	DHULE CB 41552 (T1) OPEN	05:10:07	443
WRLDC	400KV-CB	DHUL4_MH	DHULE CB 41052 (KHNDW-1) OPEN	05:10:07	682
WRLDC	400KV-CB	DHUL4_MH	DHULE CB 42352 (T3) OPEN	05:10:07	682
WRLDC	400KV-CB	DHUL4_MH	DHULE CB CB T4_LD_XF1 OPEN	05:10:09	0
WRLDC	400KV-CB	DHUL4_MH	DHULE CB CB T4_LD_XF3 OPEN	05:10:09	0

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

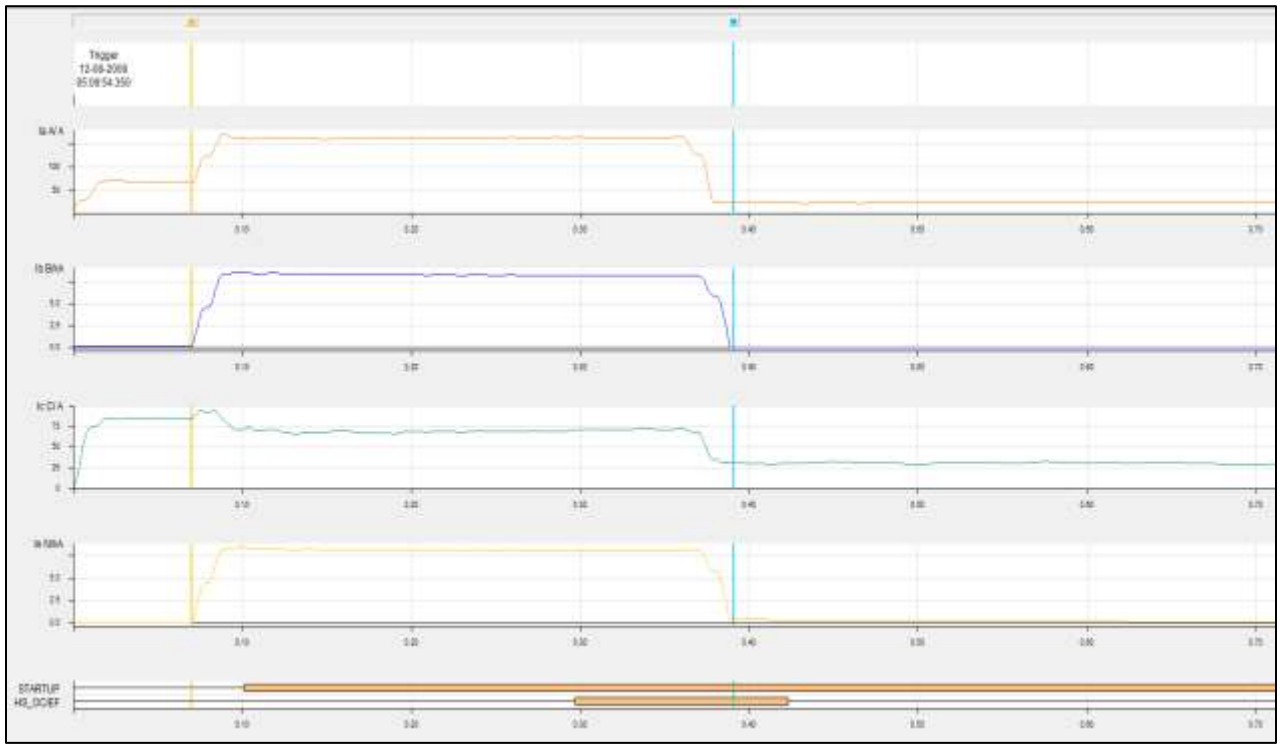


अनुलग्नक-3 / Annexure-3: Disturbance recorder

A. 400/220 kV Dhule(MH)-ICT-3



B. 400/220 kV Dhule(MH)-Bus-2



अनुलग्नक-4 / Annexure-4: Site Photographs- Nil

अनुलग्नक-5 / Annexure-5: Report from SLDC Maharashtra

MAHATRANSCO
Maharashtra State Electricity Transmission Co. Ltd.
CIN No.U40109MH2005SGC153646)
MAHARASHTRA STATE ELECTRICITY TRANSMISSION CO. LTD.

From :	To:
Superintending Engineer **EHV O&M Circle,** M.S.E.T.C.L. 400kV. Sub Station. Campus At.Po. **Khadka** Tal. Bhusawal, Dist : Jalgaon - 425 201	The Chief Engineer, EHV Project cum (O&M) Zone, MSETCL Nashik.
Phone – (02582) (O) 248 016, 248 017 E mail – se5200 @ mahatransco.in	Fax – (02582) 248 020 URL – www.mahatransco.in

Ref: SE/EHV/O&M/Cir/KDK/BSL/TECH/No. Date: - 12.08.2024

Sub:- Preliminary occurrence report of 400/220kV, 501 MVA, ICT-3 on Dt. 12.08.2024 at 400kV Dhule substation under EHV (O&M) Circle, Bhusawal.

In connection with the above subject, it is to inform that on dt. 12.08.2024 at 05:12 Hrs,, 400/220 KV 501 MVA, ICT-3 tripped on differential Protection.

1. FOR ABOVE MENTIONED TRIPPING THE W.I. AND R.I ARE MENTIONED BELOW:

400/220KV 501 MVA ICT-3		
Window Indication HV side	**Window Indication LV side**	**Relay Indication**
1) Differential Prot. Operated 2) Yph Bucholz Alarm	Yph Bucholz Trip	**HV** 1. Inst. Diff protn Trip ph-A 2. Inst. Diff protn Trip ph-B 3. Per. Diff protn Trip ph-A 4. Per. Diff protn Trip ph-B 5. 186 & 286 Master Trip Relay Optd 6. Trafo Buch Alarm Yph **LV-** Trafo Buch Trip Yph

Note- Separate sheet attached of other feeders tripping indications.

2. 400/220 KV 501 MVA ICT-3 DIFFERENTIAL RELAY DR:

OCCURRENCE DATE: 12.08.2024 ,TIME: 05:12 HRS
DR NOT AVAILABLE
NIFPS PANEL(CTR) INDICATIONS:-

1)DIFFERENTIAL TRIP	2)TRANSFORMER TRIP	3) TCIV Closed

3. P.L.C.C. COUNTER: NOT APPLICABLE

4. SEQUENCE OF OPERATION:

1) At 400kV Dhule R/S, 400/220kV 501MVA ICT-3 tripped due to Yph HV Bushing burst at 05:12Hrs. dt.12.08.2024
Due to this 400KV Main Bus -2 connected feeder trip,
Following 400kV Bus-2 connected feeders tripped-

a) 400kV Bus Coupler-100A,40MW
b) 400kV Dhule-Khandwa-1 line- LBT-275A,186mw(I),40mvar(I)
c) 400kV Dhule-SSNNL-2 line - LBT-427A,290mw(I),87mvar(I)
d) 400kV Dhule-Songir-2 line- LBT-329A,218mw(I),18mvar(E)
e) 400kV Dhule-BBLR-2 line CB at Dhule end is ON & At BBLR end, CB tripped- LBT-538A,350mw(E),58mvar(I)
f) 400/220kV 315MVA ICT-1 HV & LV- LBT-241A,162mw(E),58mvar(E)
g) 400/220kV 501MVA ICT-3 HV & LV - LBT-359A,242mw(E),75mvar(E)
h) 400/220kV 167MVA Spare ICT-2 CB is ON
i) 400/220kV 105MVA Spare ICT-1 CB is ON
j) 400kV 125Mvar Bus Reactor on Bus-2 but already Hand Tripped.

Then 400/220KV 501 MVA ICT-3 (HV & LV) isolated.
Due to Tripping of ICT-1 & ICT-3 LTS Stage1 & Stage2 Operated .Total LTS Load Relief-70.06MW.

2) Then 400/220KV 501 MVA ICT-3 (HV & LV) isolated.
3) 400/220kV 501MVA ICT-2 tripped on Overload at 06:12Hrs.
4) 220kV Dhule- Malegaon line H/T at only 220kV Malegaon end for charging of ICT-1 & ICT-2 at 07:00Hrs.
400/220kV 315MVA ICT-1 charged by shifting HV side from 400kV Bus-2 to 400kV Bus-1 at 06:33Hrs & load taken at 07:00Hrs.
400/220kV 315MVA ICT-2 charged at 06:32Hrs & load taken at 07:00Hrs.
220kV Dhule- Malegaon line charged at 220kV Malegaon end after charging of ICT-1 & ICT-2 at 07:04Hrs.
5) No indication/ operation of 400kV Busbar relay.Also no LBB relay operation.
6) Work permit issued to work on 400/220 KV 501 MVA ICT-3 & Spare 167MVA ICT-2

4. RESTORATION TIME:

a) 400/220kV 315MVA ICT-1 charged by shifting HV side from 400kV Bus-2 to 400kV Bus-1 at 06:33Hrs & load taken at 07:00Hrs.
b) 400/220kV 315MVA ICT-2 tripped on overload at 06:12Hrs charged at 06:32Hrs & load taken at 07:00Hrs.
c) 220kV Dhule- Malegaon line charged at 220kV Malegaon end after charging of ICT-1 & ICT-2 at 07:04Hrs.
d) 400kV Main Bus-2 charged through charging 400kV Dhule-BBLRckt-2 from 400kV BBLRend at 09:00Hrs

e) 400kV Bus Couple charged at 09:14Hrs
f) 400kV Dhule-Khandwa ckt-1 charged from both end at 09:37Hrs.
g) 400kV Dhule-Songir ckt-2 charged from both end at 09:39Hrs.
h) 400kV Dhule-SSNNL ckt-2 charged from both end at 10:06Hrs.
i) **400/220 kV, 501 MVA ICT-3 not restored yet**.

5. EQUIPMENT FAILURE IF ANY:

400/220kV 501MVA ICT-3 tripped due to Yph HV Bushing burst.

6. ANALYSIS:

1. ICT tripped on Differential Protection operated & Buchholz Trip Yph due Yph HV Bushing burst.

2. After fire control of Yph unit ICT-3 isolated.

7. L.B.T (HV):

a) 400kV Bus Coupler-100A,40MW
b) 400kV Dhule-Khandwa-1 line- LBT-275A,186mw(I),40mvar(I)
c) 400kV Dhule-SSNNL-2 line - LBT-427A,290mw(I),87mvar(I)
d) 400kV Dhule-Songir-2 line- LBT-329A,218mw(I),18mvar(E)
e) 400kV Dhule-BBLR-2 line CB at Dhule end is ON & At BBLR end, CB tripped- LBT-538A,350mw(E),58mvar(I)
f) 400/220kV 315MVA ICT-1 HV & LV- LBT-241A,162mw(E),58mvar(E)
g) 400/220kV 501MVA ICT-3 HV & LV - LBT-359A,242mw(E),75mvar(E)
h) 400/220kV 167MVA Spare ICT-2 CB is ON LBT-On No load
i) 400/220kV 105MVA Spare ICT-1 CB is ON LBT-On No load
j) 400kV 125Mvar Bus Reactor on Bus-2 but already Hand Tripped.

7. AREA AFFECTED:

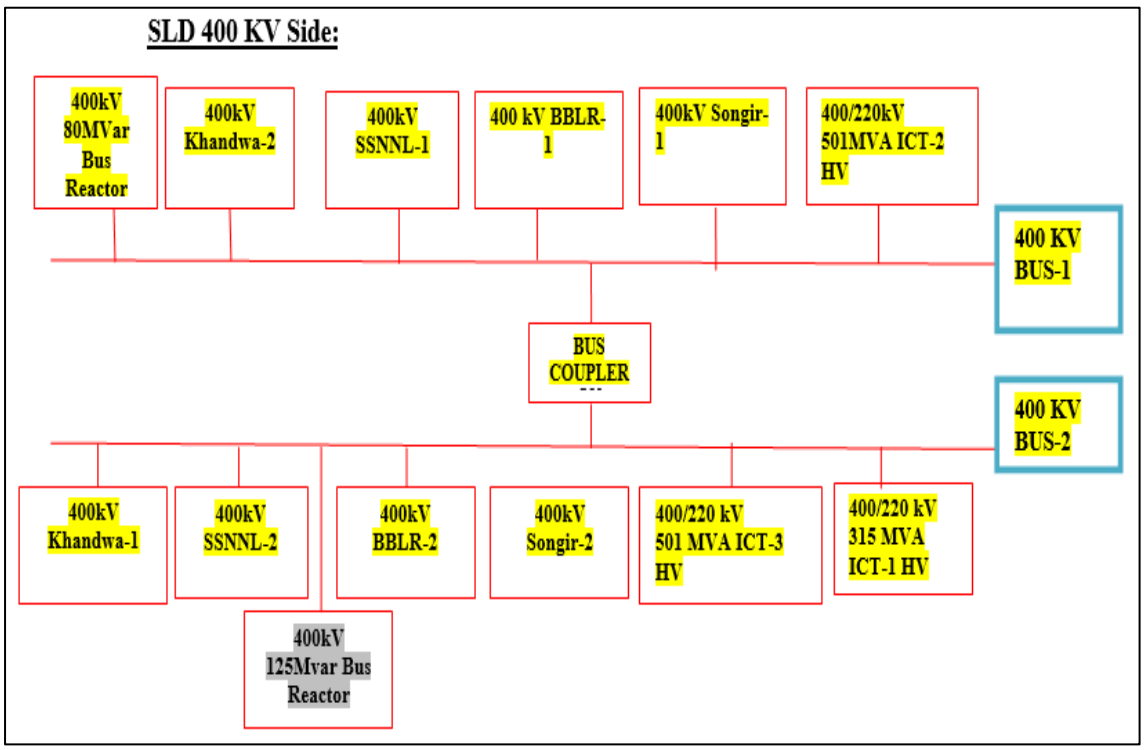
Area affected due to ICT LTS operation-Stage 1-18.81MW,Stage 2-51.25MW.

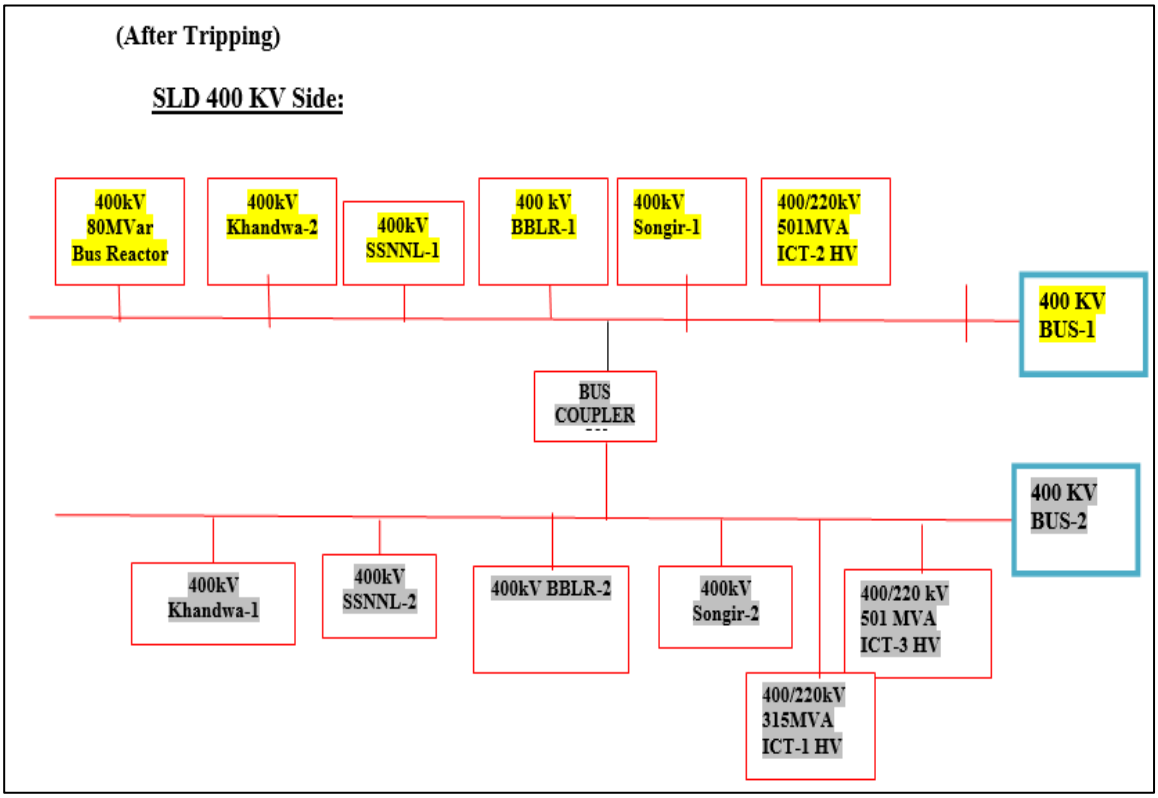
Area affected due to avoiding overloading of ICT-2- 75.99MW

Total area affected-146.05MW

9. REMEDIAL MEASURES: Details as follows.

10. S.L.D.: (Before Tripping) Yellow marking- CB ON, Gray marking – CB OFF


SLD 400 KV Side:
400kV 80MVar Bus Reactor
400kV Khandwa-2
400kV SSNNL-1
400 kV BBLR-1
400kV Songir-1
400/220kV 501MVA ICT-2 HV
400 KV BUS-1
BUS COUPLER
400 KV BUS-2
400kV Khandwa-1
400kV SSNNL-2
400kV BBLR-2
400kV Songir-2
400/220 kV 501 MVA ICT-3 HV
400/220 kV 315 MVA ICT-1 HV
400kV 125Mvar Bus Reactor


(After Tripping)
SLD 400 KV Side:
400kV 80MVar Bus Reactor
400kV Khandwa-2
400kV SSNNL-1
400 kV BBLR-1
400kV Songir-1
400/220kV 501MVA ICT-2 HV
400 KV BUS-1
BUS COUPLER
400 KV BUS-2
400kV Khandwa-1
400kV SSNNL-2
400kV BBLR-2
400kV Songir-2
400/220 kV 501 MVA ICT-3 HV
400/220kV 315MVA ICT-1 HV

(400/220kV 315MVA ICT-1 charged by shifting HV side from 400kV Bus-2 to 400kV Bus-1 at 06:33Hrs & load taken at 07:00Hrs)
Submitted for your kind information and further necessary action please.

Encl:- 1) Letter under ref. (1).

(Manish Khatri)
Superintending Engineer
EHV O&M Circle,
Bhusawal

Copy f.w.c. to: 1) The Superintending Engineer, PAC Circle, Nashik.

Copy to : 1) The Executive Engineer, 400 kV R.S. Division, Khadka.
2) The Executive Engineer, PAC Division, Dhule.

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के. वी. एसटीटी-महापे उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV STT-Mahape Sub Station of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary:** At 21:49 Hrs / 12-08-2024, 220 kV STT-Mahape and 220 kV STT-TIFIPL tripped on differential protection operation due to due to R-Phase Insulator String flash over & LA dislocation on Cable Termination Tower at STT Global Data center. Tripping of 220 kV STT-TIFIPL for a fault in 220 kV STT-Mahape is undesirable. No load loss occurred due to the event.
2. **घटना का समय और दिनांक / Time and Date of the Event** : 21:49 Hrs / 12-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** STT-Mahape S/S, Maharashtra
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.06	71405	55276	15413	21919
घटना के बाद Post Event	50.01	71398	55211	15396	21859

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Cloudy weather

6. लोड और जेनरेशन हानि / Load and Generation loss: Nil

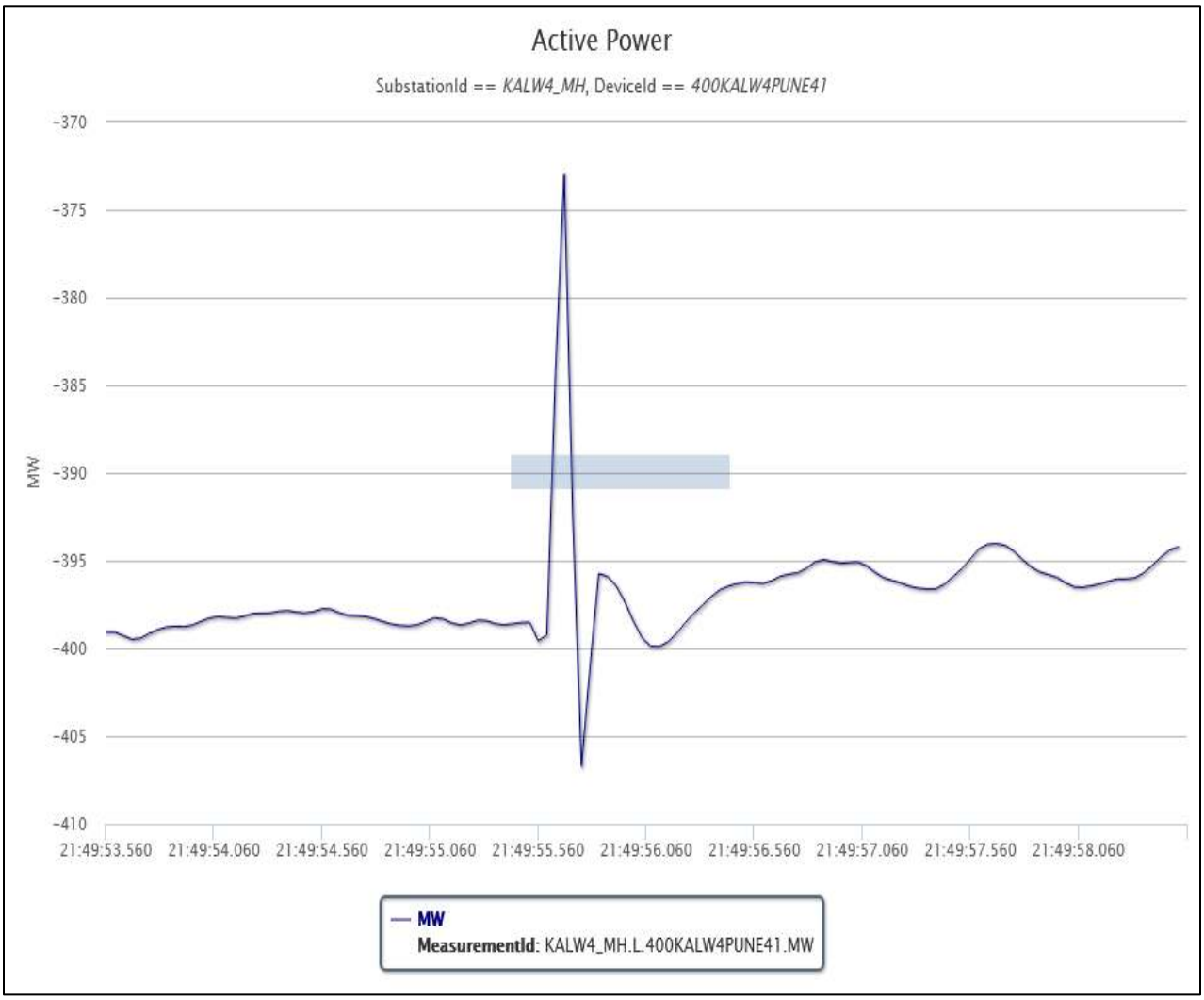


Figure 1. Active plot of 400 kV Kalwa- Pune-1 line

7. रुकावट की अवधि / Duration of interruption: 14 hours 47 Minutes.

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

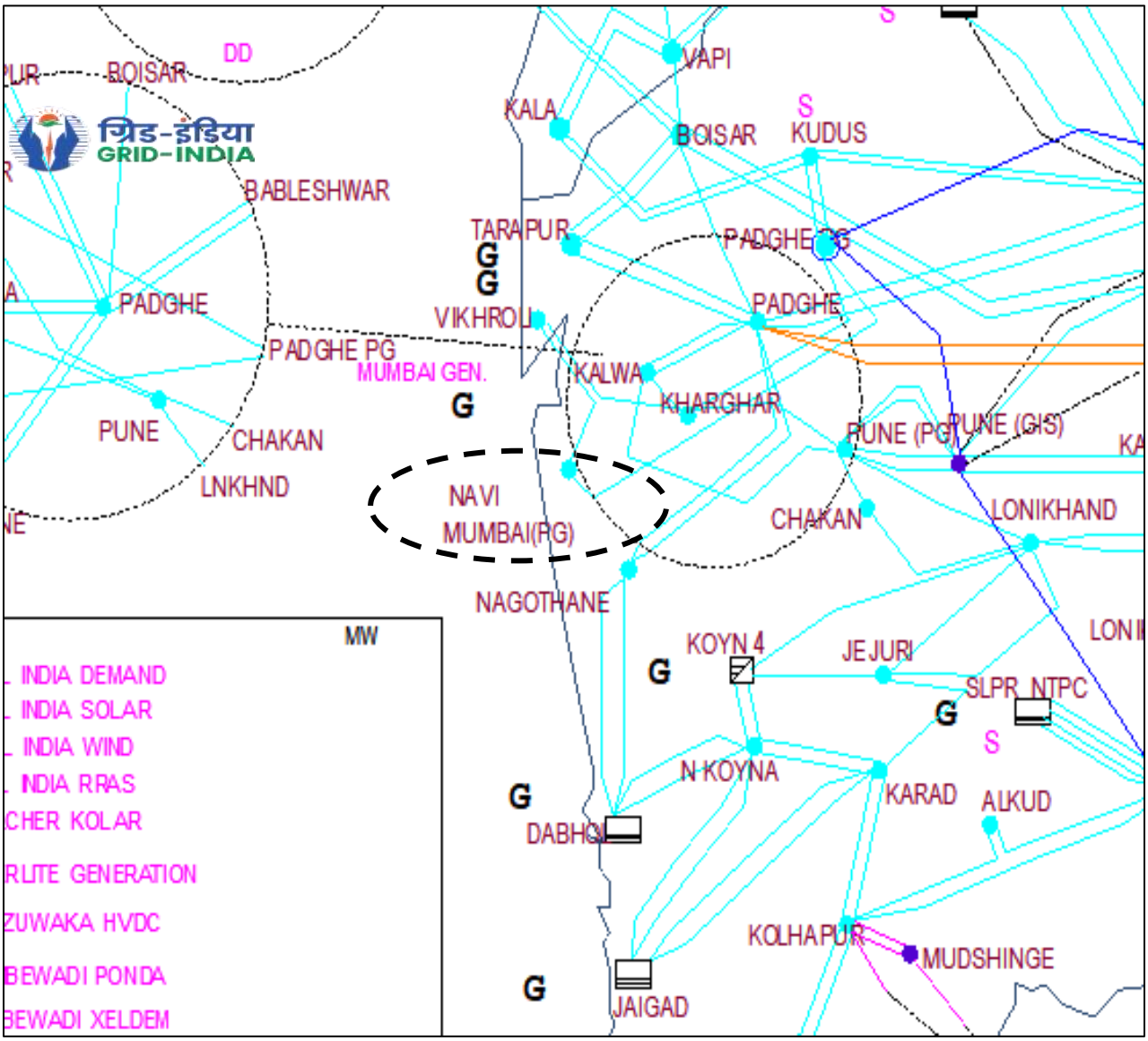


Figure 2. Network across the affected area

9. **उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event):** R phase lightening arrestor of 220 kV STT-Mahape burst at STT substation end LTT tower

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (STT)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (remote end)	वापसी का समय Restoration time
1	220 kV STT GIS-Mahape	21:49/12-08-2024	Siemens Main 1 Differntial Relay (7SL87) Fault resistance Sec 0.173 Ohm Fault reactance sec 0.139 Ohm Fault resistance Primary 0.347 Ohm Fault distance in % 23.9 % Fault loop A-G Fault Distance 0.9 km Fault Reactance prim 0.277 Ohm Fault Current IN 9932 A IC 292 A IB 267A IA 10478 A Distance prot1 Opert Phase A Distance Prot Z1 Pick up Phase A Cicruit Breaker 3 Phase Trip Overcurrent Relay 50 Phase A Pick up Distance protection 1 Pickup A-G forward GE Main 2 Differential Relay (P545) Faulted Phase AN, Tripped Phase AN, Start I>Diff ON ,Start Z2 ,Z3 Fault values IA 10.12 kA angle -77.11 deg IB 253.9 A angle -94.58 deg IC 282.0 A angle -107.40 deg IN 9.587 kA angle -77 deg Im Fault angle not available VA 8.399 kV angle -43.85 deg VB 150 kV angle -128.5 deg VC 142.7 kV angle 129.7 deg VN 179.4 kV angle -175.4 deg Local IA-9.691 kA ,IB-243.4 A ,IC-245.9 A Remote IA-11.53 kA ,IB-232.4 A ,IC-224.6A	GE make 545 main 2 relay:- R-Phase Trip , Diff.Trip ,Aided Trip Carrier Send,Carrier Received,AR Block IA 13.29 kA angle -76.91 deg IB 268.9 A angle -83.17 deg IC 298.6 A angle -74.80 deg IN 13.86 kA angle -76.99 deg Im Fault angle not available VA 20.23 kV angle -13.95 deg VB 147.5 kV angle -127 deg VC 139.3 kV angle 128 deg VN 155.7 kV angle -175.2 deg IA Differential =23.62 kA IB Differential =21.89 A IC Differential =18.53 A IA Bias =11.81 kA Ib Bias =258.7 A IC Bias =274.4 A Siemens Main 1 Differntial Relay Line 1:-21 Dist prot 1 Z2 Pick up :- Ph A to Ground Forward ,PU Time 72 ms Line 1:-21 Dist .Prot1,Z1 Operate -	12:37/13-08-2024

			IA Diff -21.22 kA ,IB Diff-13.57 A IC Diff- 21.85 A IA Bias -10.61 kA ,IB Bias-237.9A ,ICBias -235.3 A	Ph A ,Trip Time 15 ms Fault Distance 2.5 km	
2	220 kV STT GIS-TFIPL	21:49/12-08-2024	<u>Siemens Main 1 Differntial Relay (7SL87)</u> 50 OC High Speed Pick up Phase A 50 OC High Speed Operate On Circuit Breaker 3 Phase Trip Definite T 1 Pick up ON Fault Current IN 9932 A IC 415 A IB 376 A IA 10711 A CB Definitive Trip True <u>GE Main 2 Differential Relay (P545)</u> Faulted Phase AN, Tripped Phase AN, Start I>3 Fault location : -1.378 km <u>Fault values</u> IA 10.01 kA angle 102.6 deg IB 358.1 A angle -82.87 deg IC 387.0 A angle -73.99 deg IN 9.263 kA angle 102.7 deg Im Fault angle not available VA 8.447 kV angle -43.72 deg VB 150.6 kV angle -128.8 deg VC 142.5 kV angle 129.4 deg VN 179.2 kV angle -175.8 deg Local IA-10.06 kA ,IB-357.5 A ,IC-374.9 A Remote IA-10.06 kA ,IB-343.8 A ,IC-363.3A IA Diff -227.2 A ,IB Diff-20.47 A IC Diff- 12.95 A IA Bias -10.07 kA ,IB Bias-350.6 A ,ICBias -369.1 A	<u>GE Make P545 Main 2 Differential Relay</u> NIL <u>Siemens Main 1 Differntial Relay</u> Line 1:-Distance Protection 1 Group Indication Pick up	12:36/13-08-2024
3	220 kV STT GIS Bus	21:49/12-08-2024	-	-	12:36/13-08-2024

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

- 220 kV STT TFIPL Line & 220 kV STT Mahape Line Tripped from both ends due to R-Phase Insulator String flash over & LA dislocation on Cable Termination Tower at STT Global Data center.
- 220kv STT-Mahape R phase LA flash over occurred at STT end CTT tower, the differential protection of 220kv STT-Mahape line operated and isolated both end breakers.
- 220kV STT- TIFIPL line also tripped at the same time due to relay maloperation.

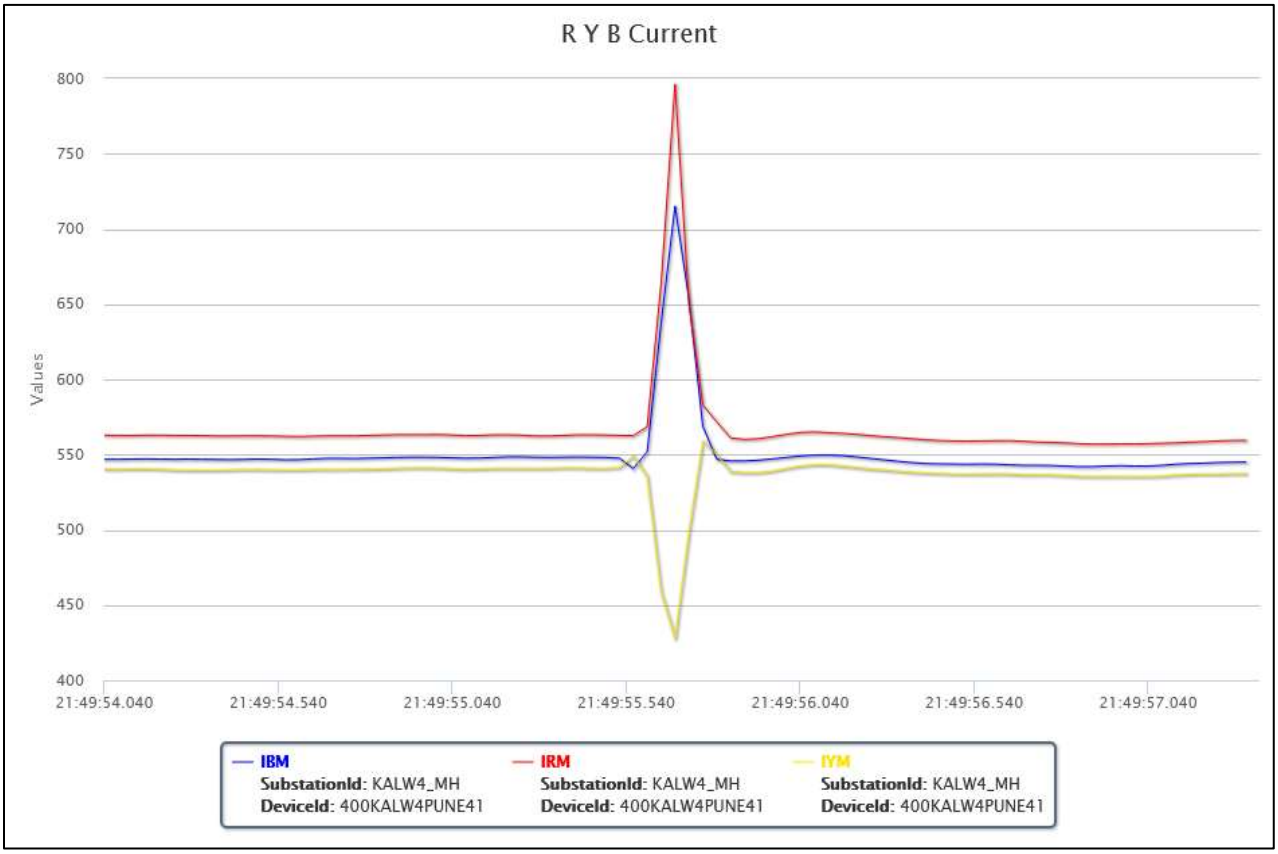


Figure 3. PMU Current plot of 400 kV Kalwa- Pune-1 line

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- 220kV STT- TIFIPL line also tripped at the same time due to relay maloperation.

- As explained by MSETCL, "*siemens make 7SL87 differential relay at STT end sensed the fault on SOTF due to wrong configuration and incorrect settings in the relay. For SOTF initiation in 7SL87 differential relay was given CB close status instead of CB close command due to which the SOTF initiation was permanently high and the SOTF setting was kept non directional along with DT send command configured to it which caused the maloperation of the relay and isolated the STT from both the sources.*"
- MSETCL may kindly take up the issue of non generation of SOE in coordination with WRLDC SCADA.
- SOE not generated.
- SLD not shared by MSETCL

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- MSETCL has corrected the relay settings. The SOTF setting of 220 kV STT- TIFIPL line has been revised and the DT send command on OTF removed.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not Received from MSETCL
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from MSETCL I.E. ON 10.10.2024
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from MSETCL i.e. on 08.10.2024

4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	220kV STT- TIFIPL line tripped due to relay maloperation.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

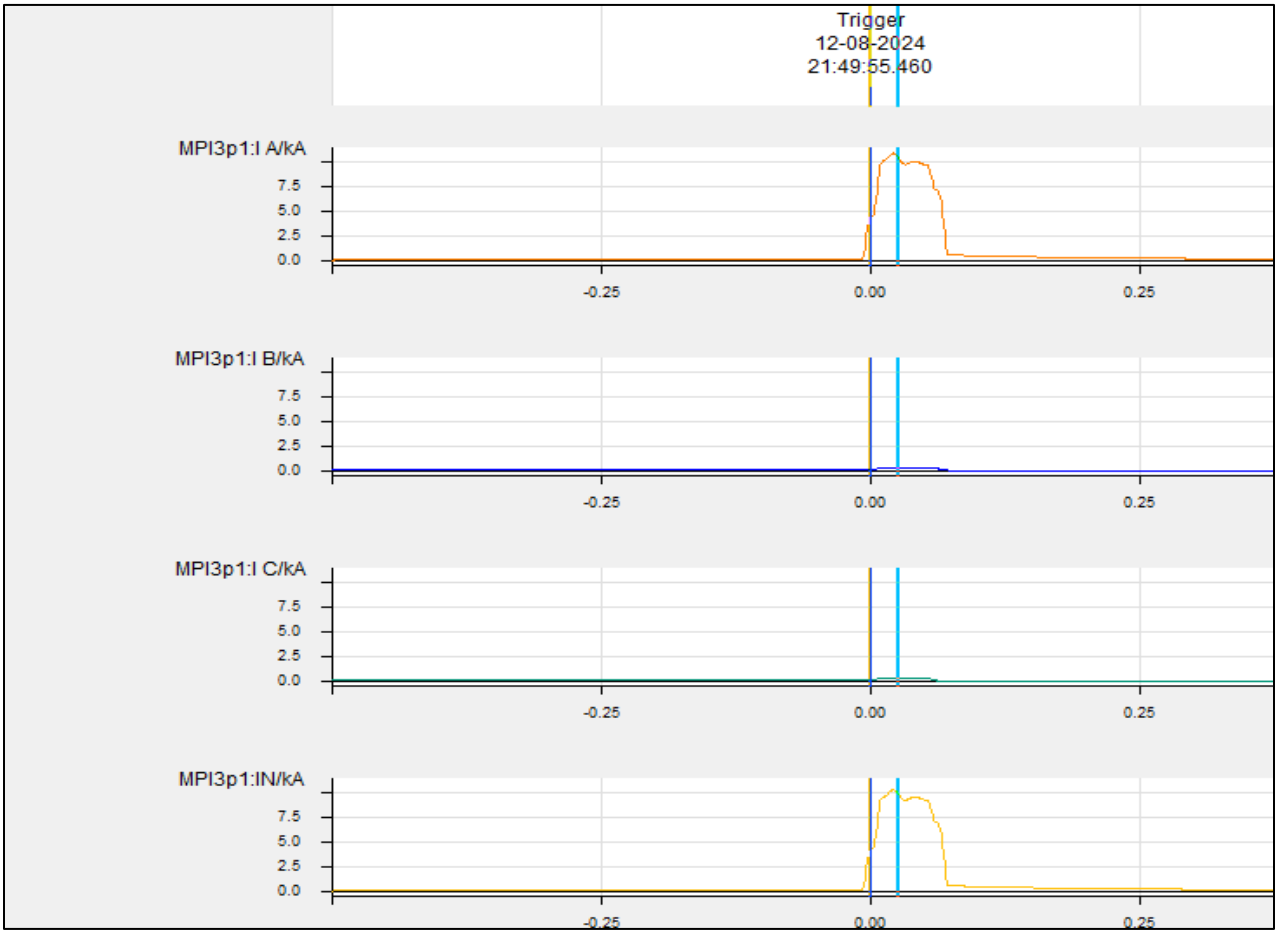
अनुलग्नक-1 / Annexure-1: Sequence of Events-

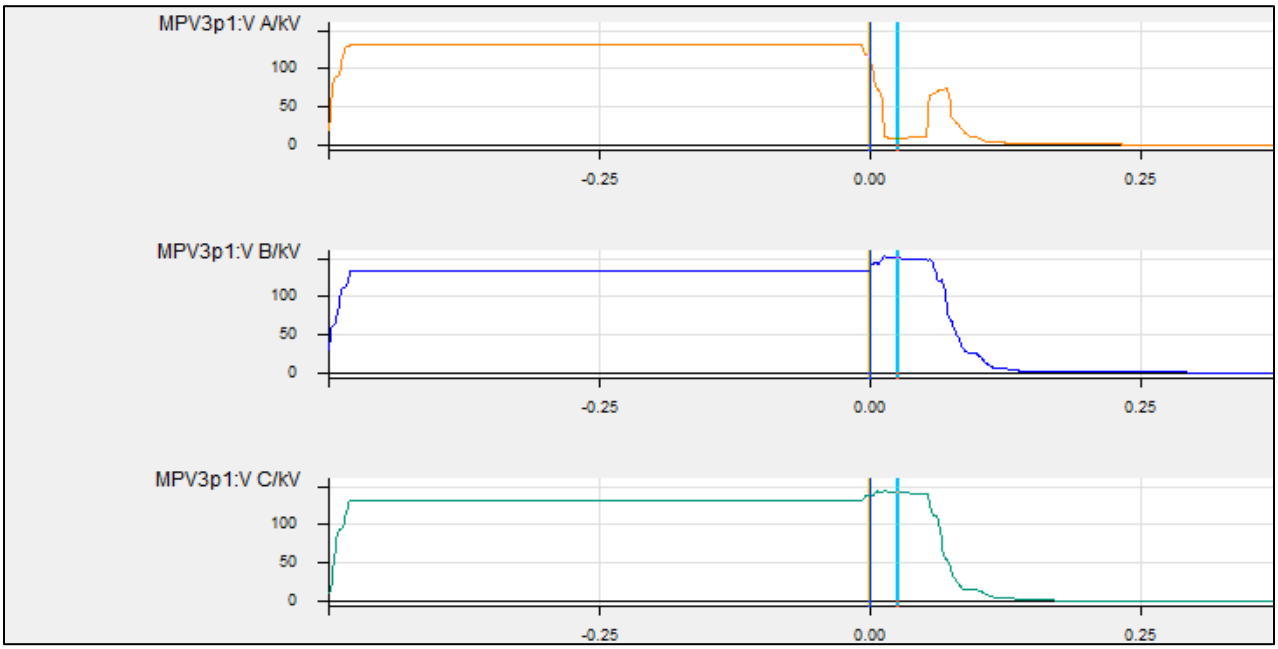
SOE from WRLDC- SOE not generated.

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram- Not provided by SLDC Maharashtra

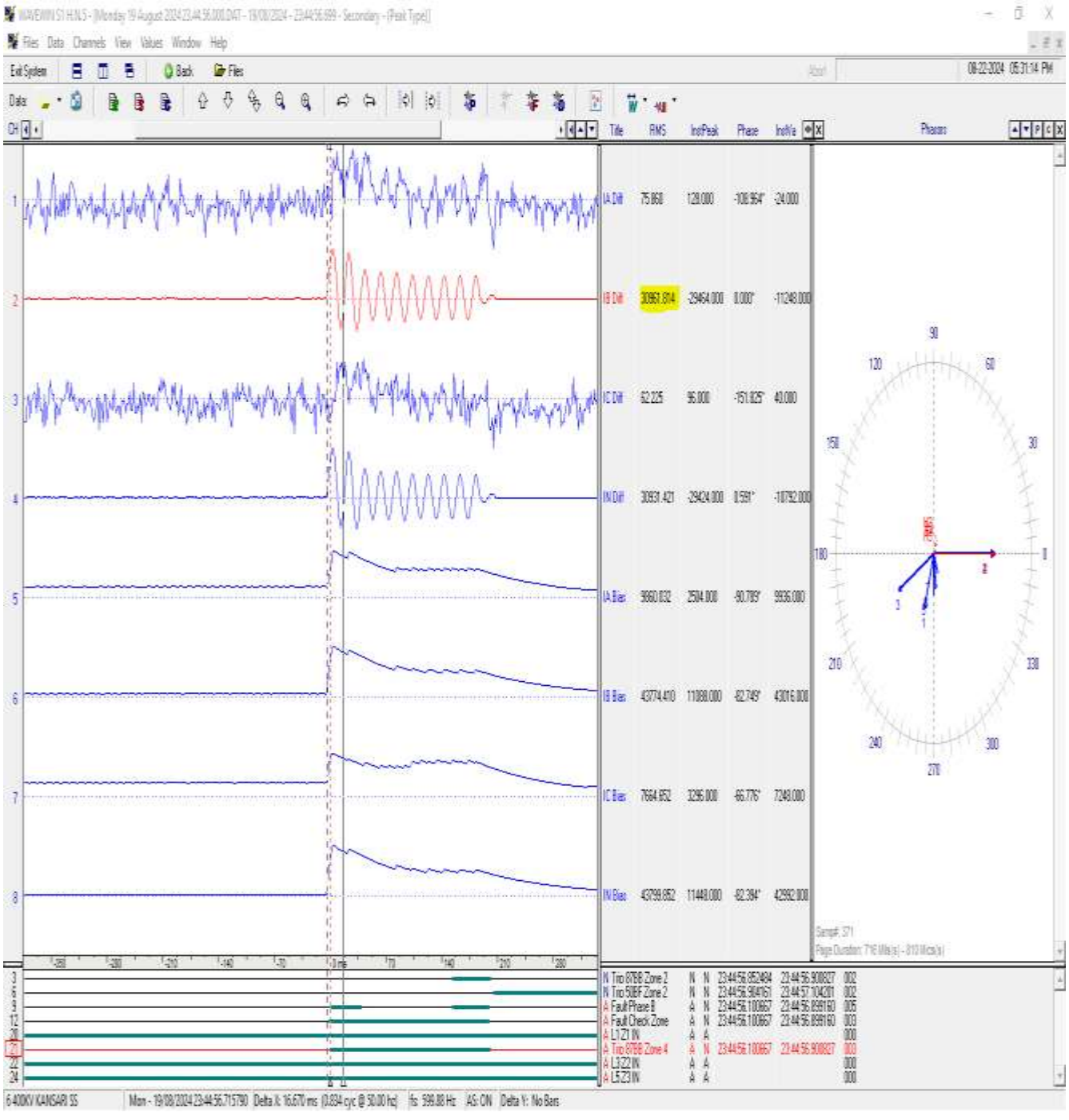
अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below- Nil

A. DR of 220 kV STT GIS-Mahape line from STT GIS end





	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Subststion 19/08/2024 23:44 hrs	P741	Busbar Protection – Zone 4 operated	3B
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)		Maximum Fault Current : Zone-4 Y-ph 30.96kA.	



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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के. वी. चितेगाव उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Chitegaon S/S of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary:** At 03:47 Hrs / 24-08-2024, 220 kV Chitegaon substation became dead due to Bus-Bar protection operation caused by abrupt closing of 220 KV Hybrid GIS Bus sectionalizer earth switch automatically (Y and B phase only) at Chitegaon end. Load loss of 25 MW occurred due to the event.
2. **घटना का समय और दिनांक / Time and Date of the Event** : 03:47 Hrs / 24-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Chitegaon (Maharashtra)
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.02	65914	51525	12356	18626
घटना के बाद Post Event	50.03	65833	51560	12305	18627

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 25 MW load loss.

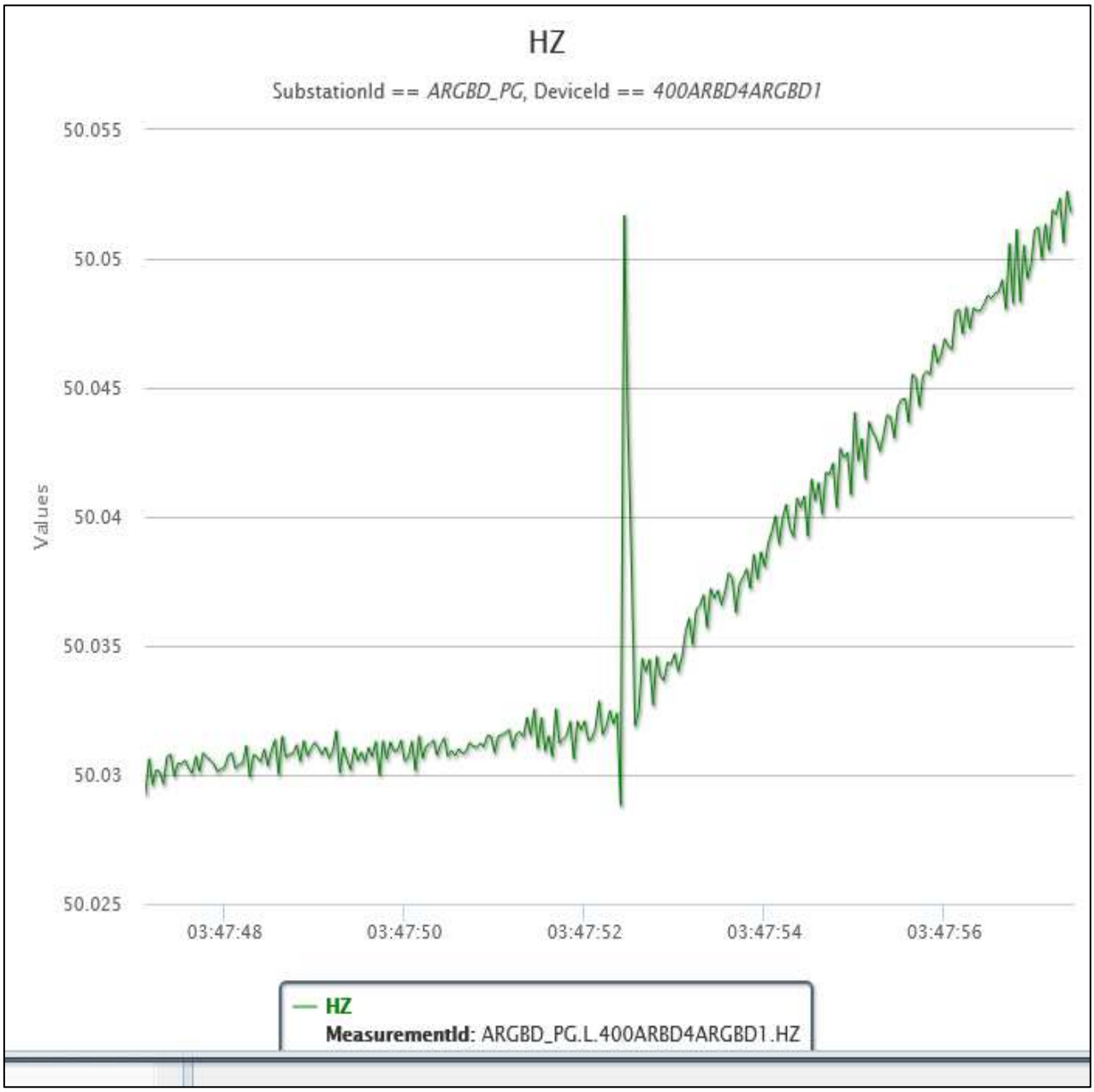


Figure 1. 400 kV Aurangabad PG-Aurangabad(Waluj)-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 04 Hours 12 Minutes

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

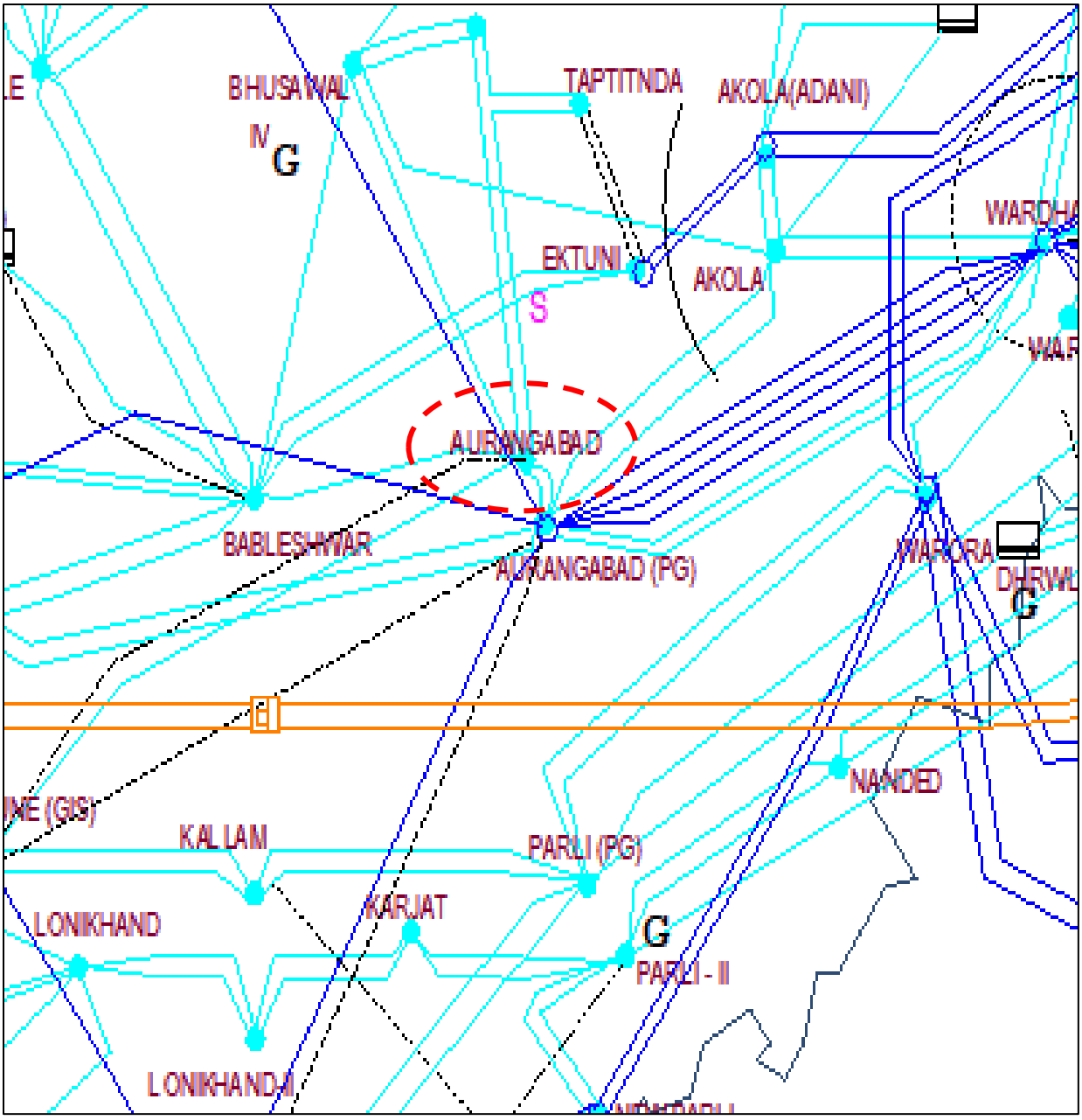


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (Chitegaon)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (remote end)	वापसी का समय Restoration time
1	220KV BusBar	03:47	Flag S, T & U, All 96 (9 No.)	-	06:58
2	220KV PGCIL-1	03:47	NIL	NIL	21:40
3	220KV PGCIL-2	03:47	NIL	NIL	21:41
4	220KV Waluj	03:47	NIL	NIL	06:58
5	220KV Sawangi	03:47	NIL	NIL	08:02
6	220/33KV, 50MVA, TF-1	03:47	NIL	NA	08:35
7	220/33KV, 50MVA, TF-2	03:47	NIL	NA	08:03
8	220/132KV, 100MVA, ICT-1	03:47	NIL	NIL	08:32
9	220/132KV, 100MVA, ICT-2	03:47	NIL	NIL	08:30
10	220/132KV, 100MVA, ICT-3	03:47	NIL	NIL	08:42
11	220KV Bus Sectionlizer	03:47	NIL	DS/ES Drive Fail	NIL

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

- 220 kV Chitegaon substation became dead due to Bus-Bar protection operation caused by abrupt closing of 220 KV Hybrid GIS Bus sectionalizer earth switch automatically (Y and B phase only) at Chitegaon end

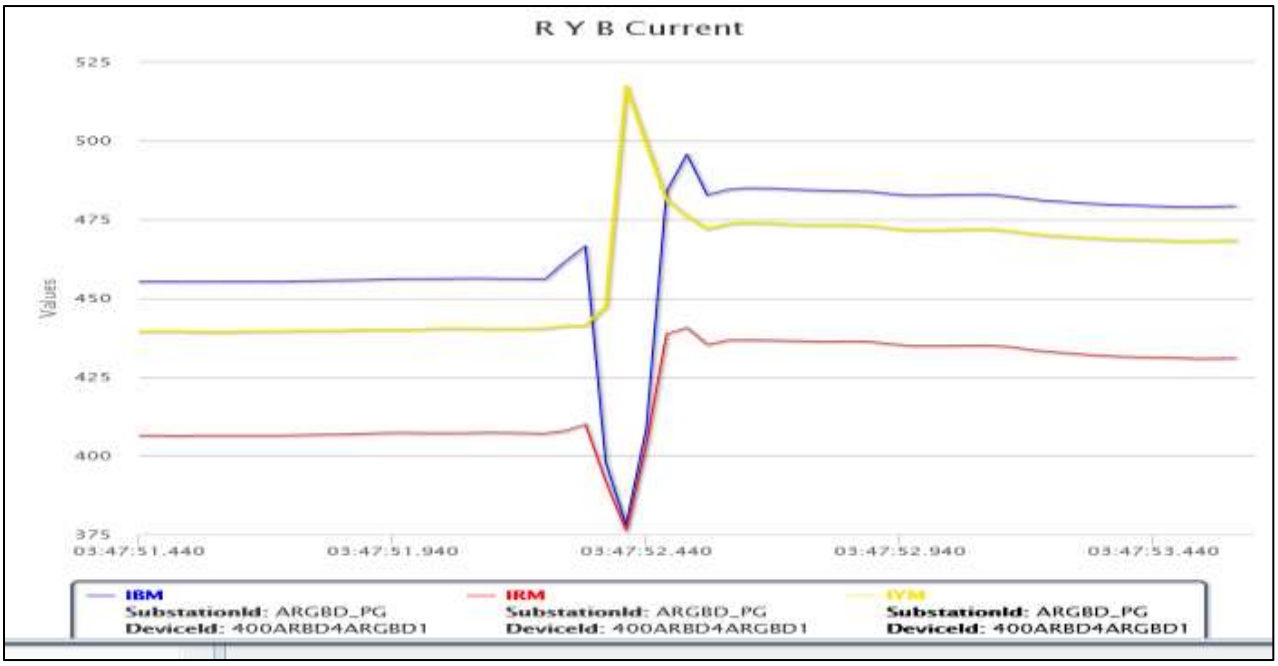


Figure 3. 400 kV Aurangabad PG-Aurangabad(Waluj)-1 Current Plot

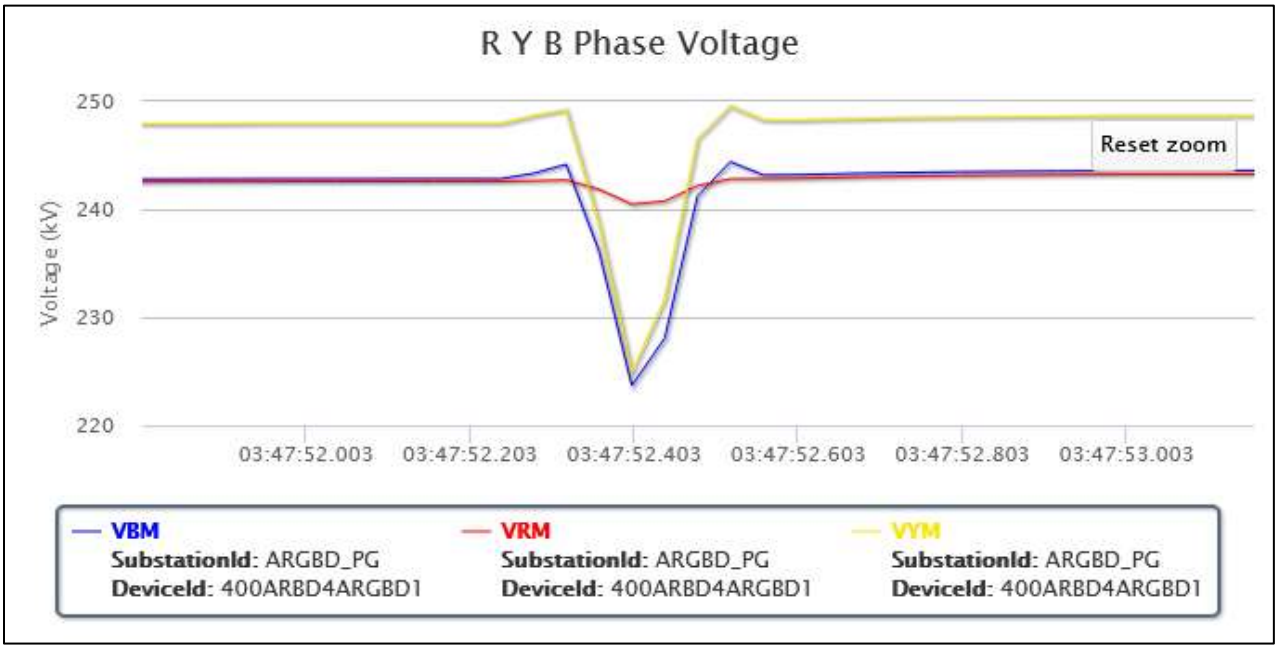


Figure 4. 400 kV Aurangabad PG-Aurangabad(Waluj)-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- As reported by SLDC Maharashtra, earth switch of 220KV Bus Sectionaliser (HybridPass) Closed automatically on Live Bus, Causing bus fault and operation of Busbar Protection and all bays connected tripped through 96 Relay. ABB make RADSS Busbar Protection has only two Zone provision (Main+Aux) hence all 96 relay operated.
- As seen from the DR and PMU, only Y & B Phase found Earth switch of Bus Section 2 got earthed automatically.
- SLDC Maharashtra may kindly investigate the reason for automatic closing of earth switch thoroughly and take necessary action to avoid this kind of incident in future.
- DR not time synced.
- SOE not generated.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- As per report submitted by SLDC MAHARASHTRA, Mal operation of earth switch problem is referred to M/s CGL for resolution and providing the mechanical interlock.
- SLDC Maharashtra may kindly take up with WRLDC SCADA for not generation of SOE.
- DR not time synced, SLDC Maharashtra may kindly resolve the issue.

14. नियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late i.e. on 03.09.2024
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late i.e. on 03.09.2024
4.	DR Time Synchronization Issues	IEGC section 17.3	DR not time sync

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

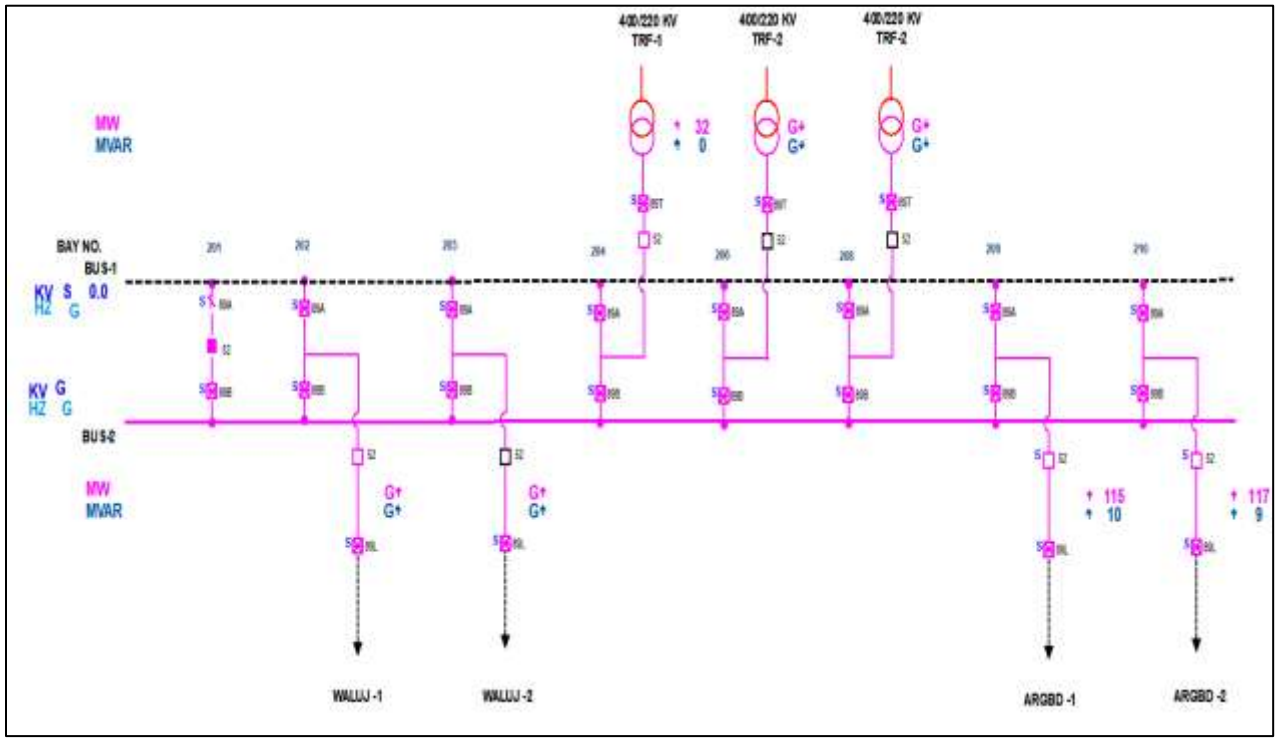
- Earth switch of 220KV Bus Sectionaliser (HybridPass) closed automatically on Live Bus, causing bus fault. SLDC Maharashtra may kindly investigate the reason for the same and care to be taken for avoiding such incidents in future.

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE from WRLDC SCADA-SOE not generated.

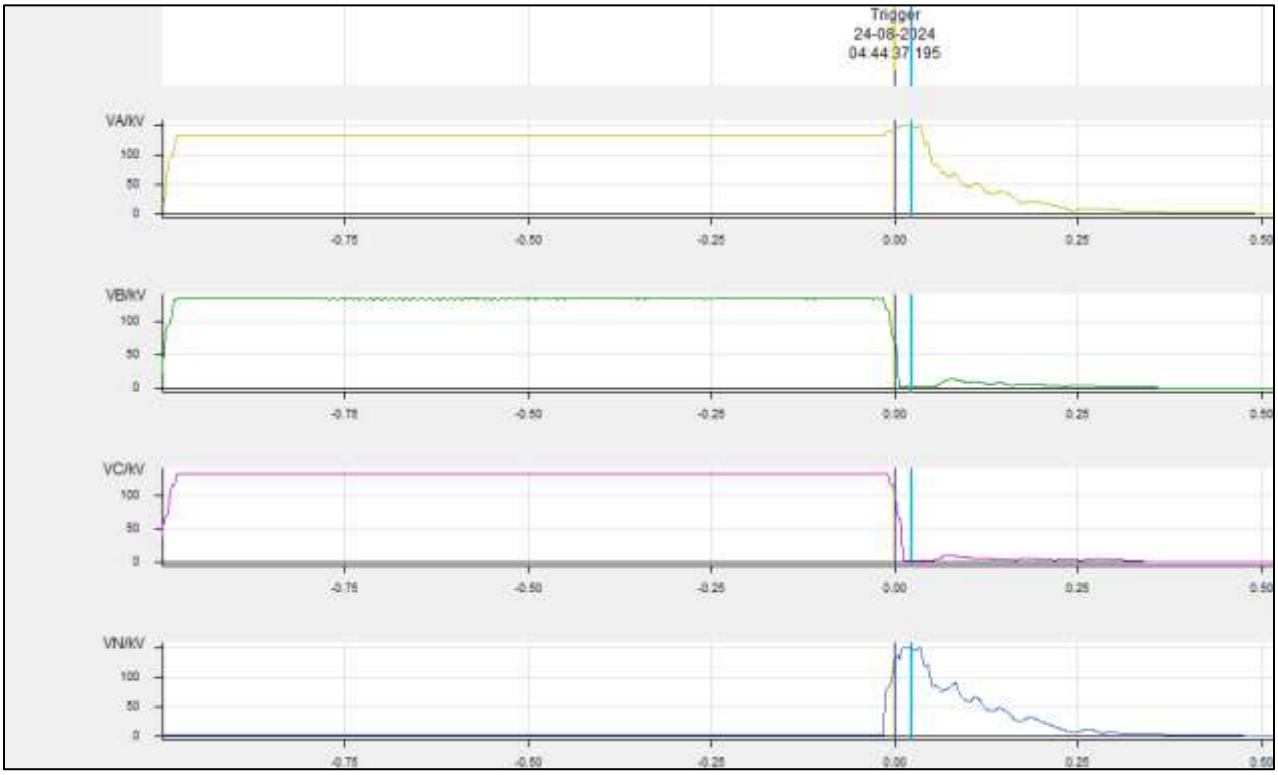
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

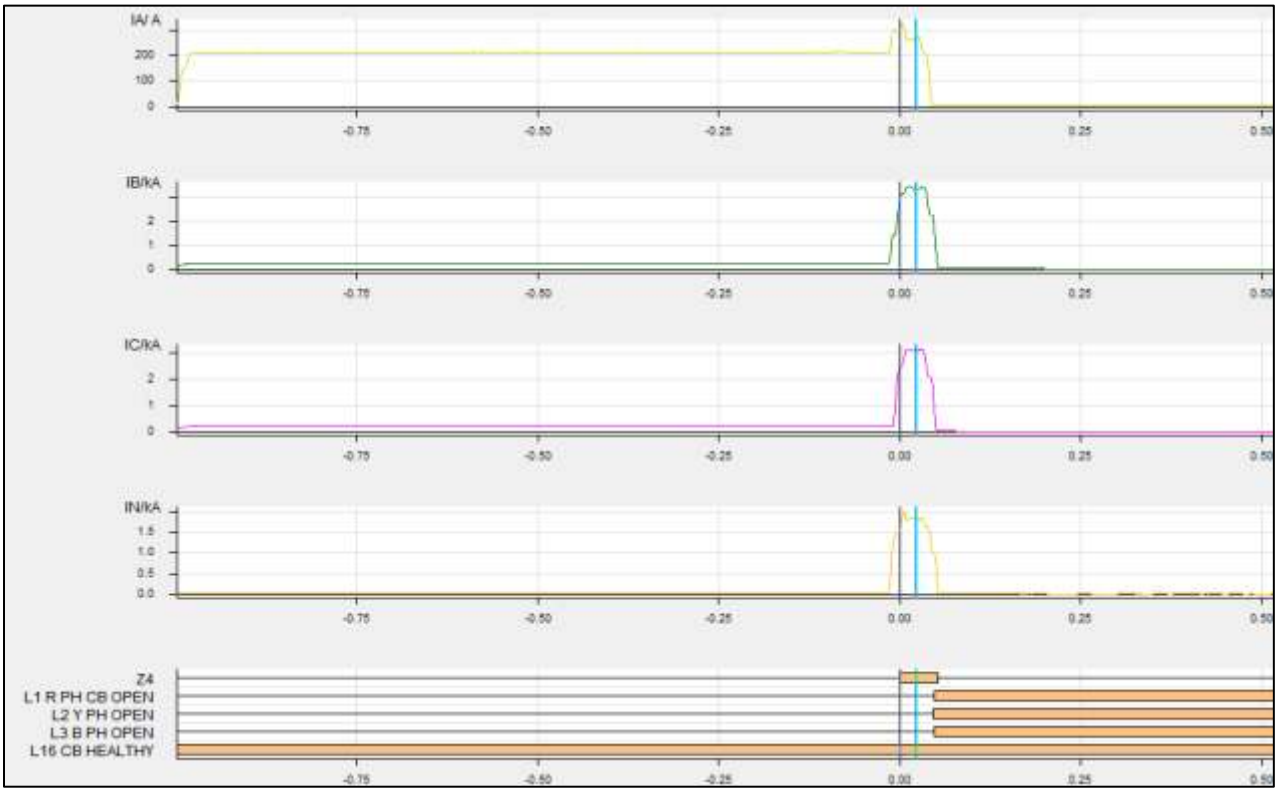
220kkV Chitegaon SLD.



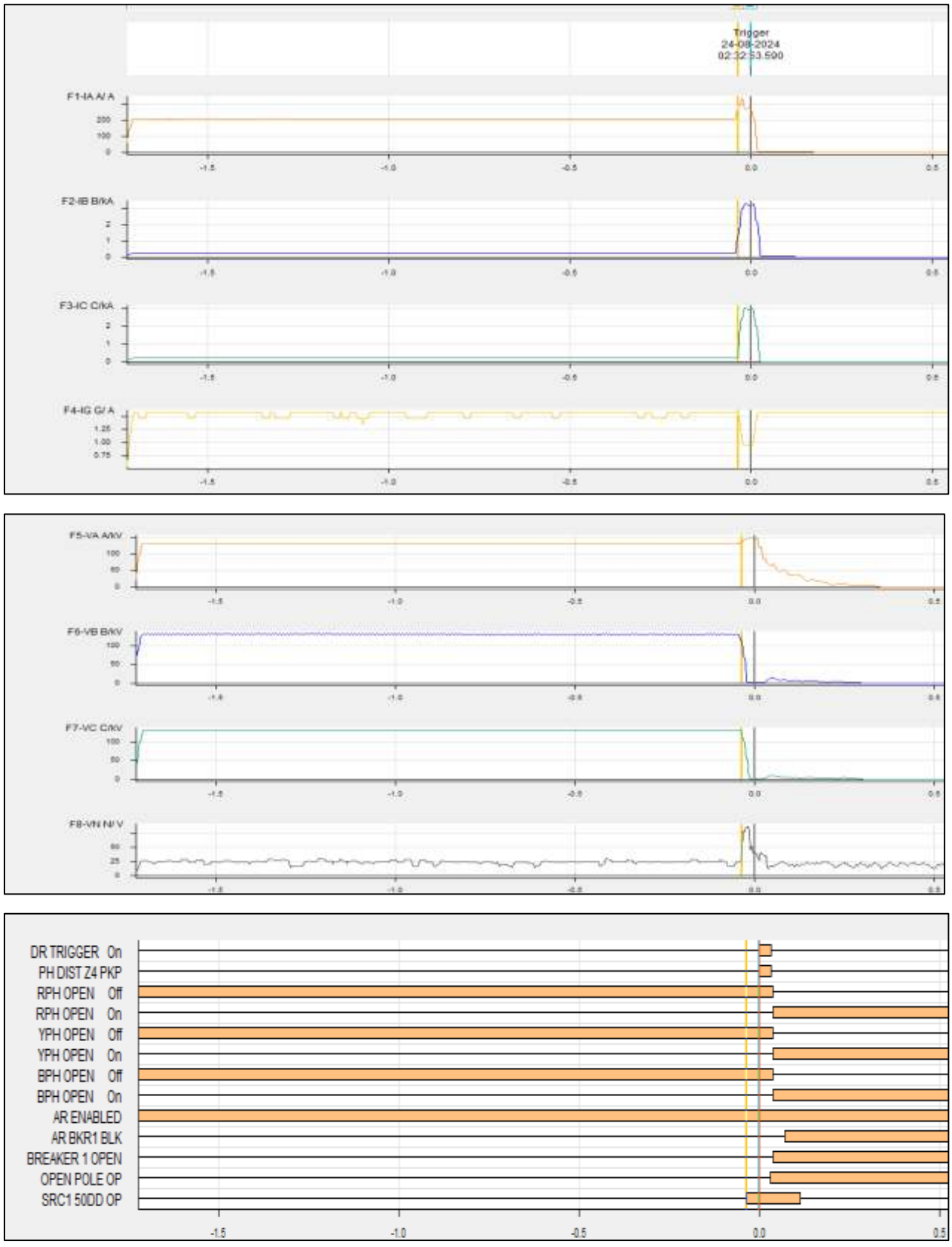
अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below-

A. DR of 220 kV Aurangabad(Waluj)-Chitegaon-1

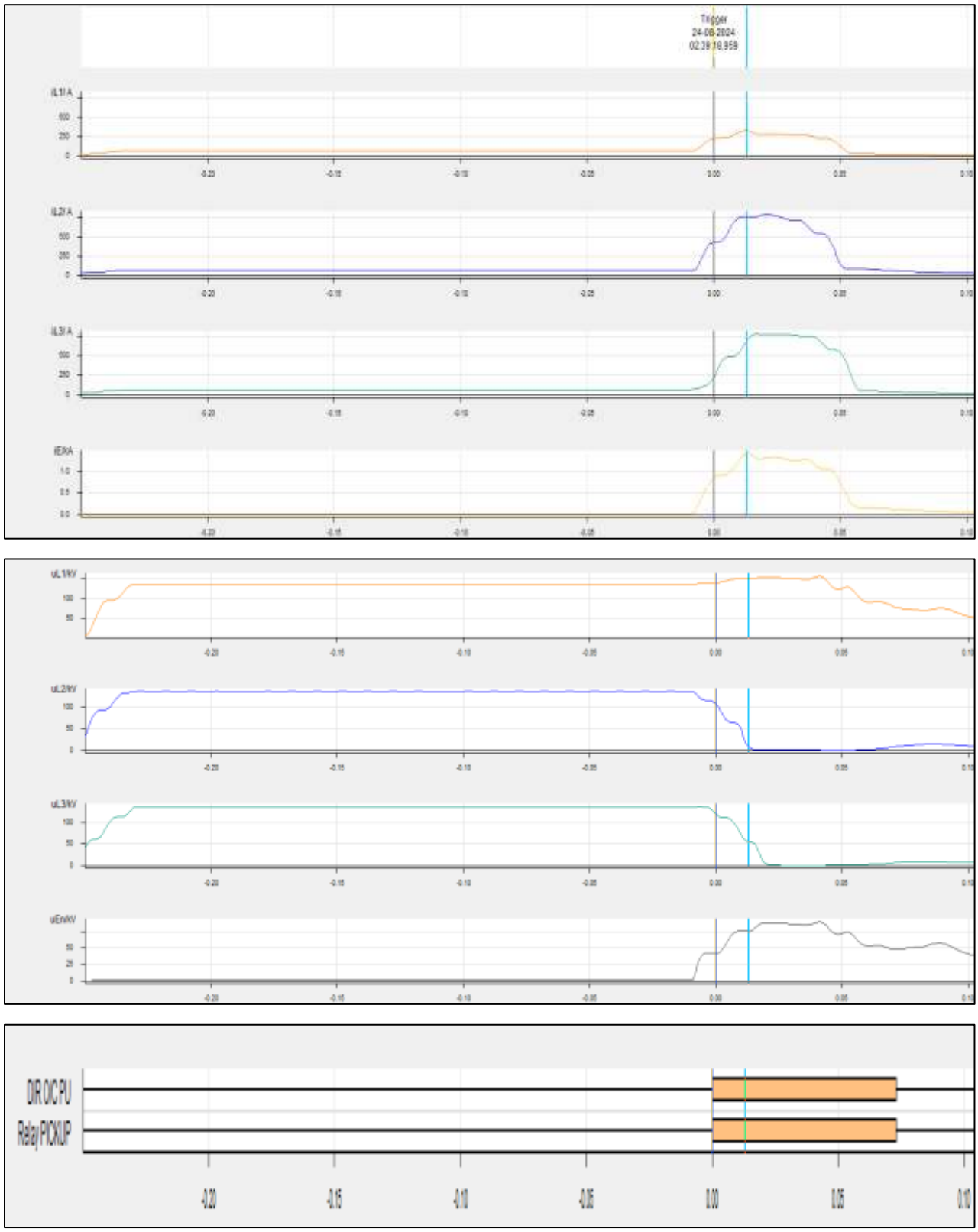




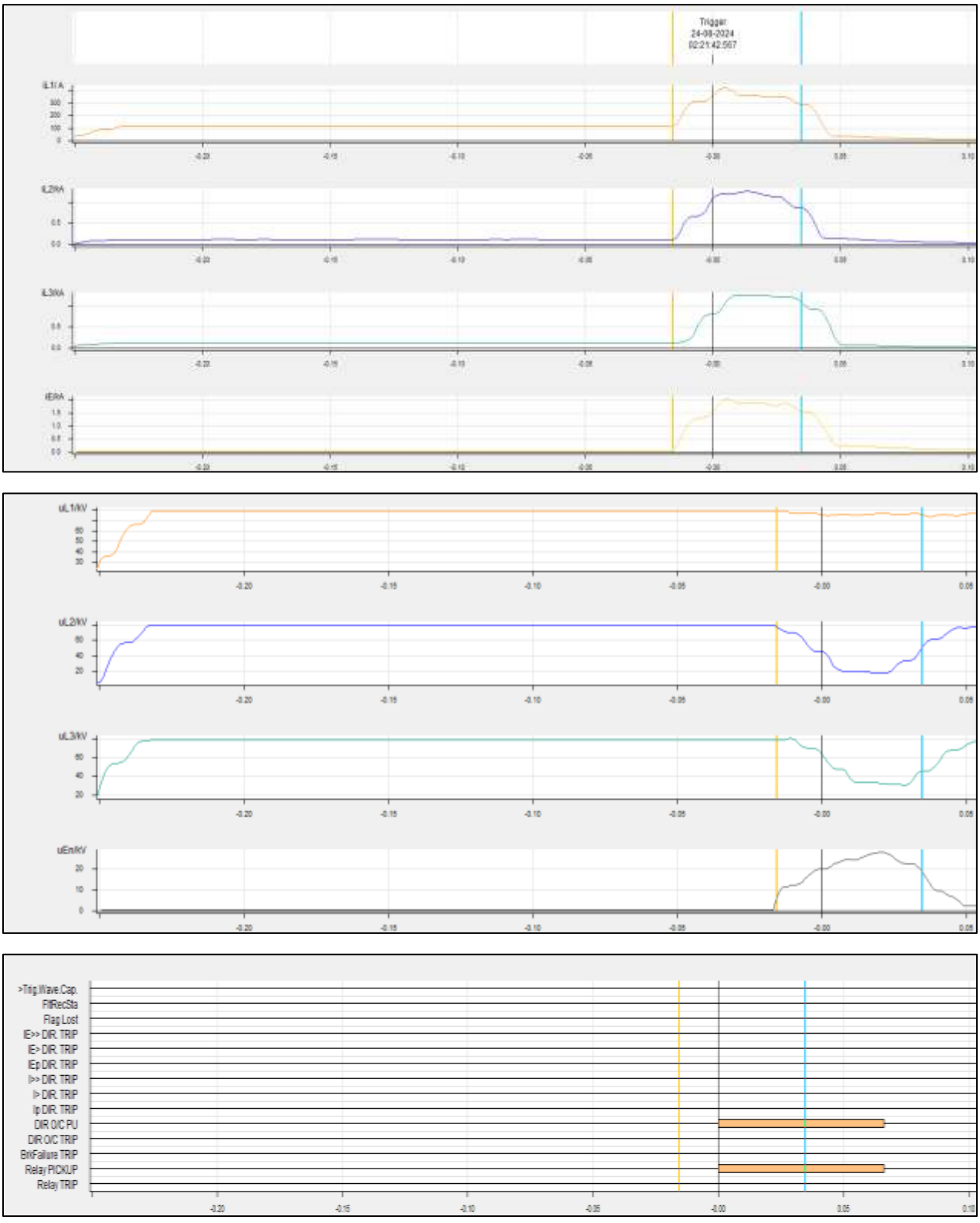
B. DR of 220 kV Aurangabad(Waluj)-Chitegaon-2



C. DR of 220 kV Chitegaon ICT-2(HV).



D. DR of 220 kV Chitegaon ICT-2(LV).



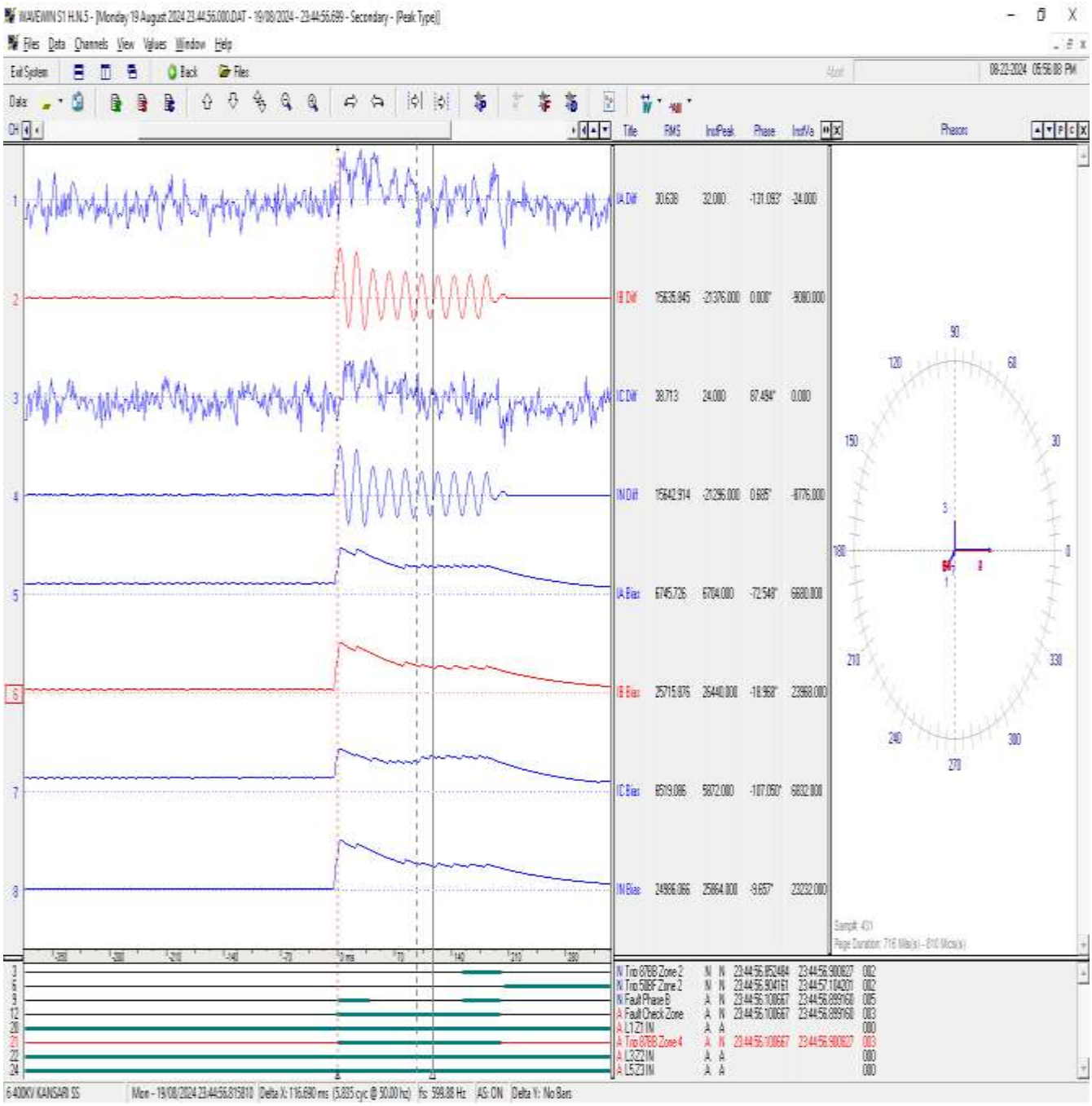
अनुलग्नक-4 / Annexure-4: - Site photographs- Nil

के विजय कुमार

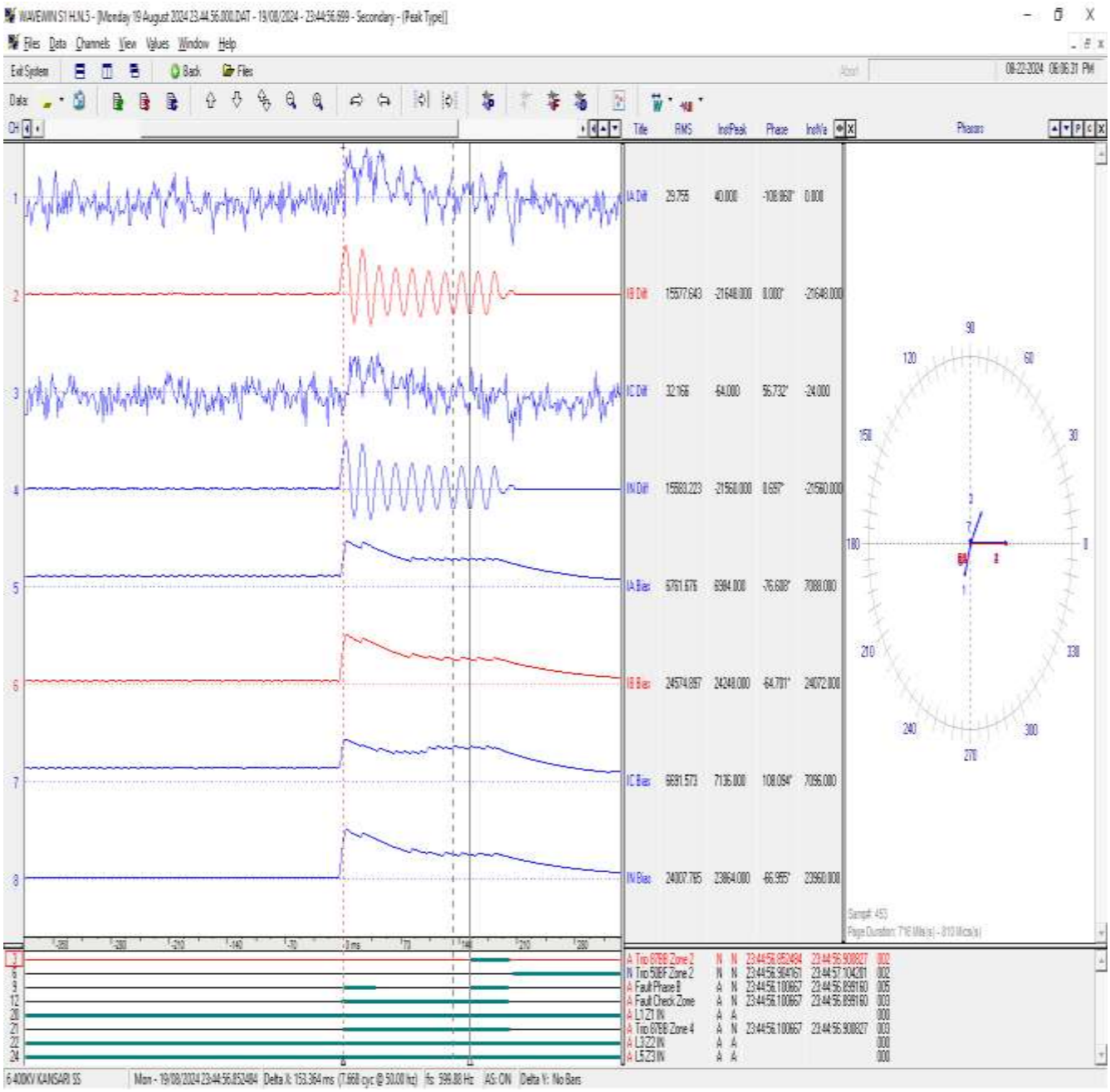
Vijay Kumar Kodali

DGM, SO, WRLDC

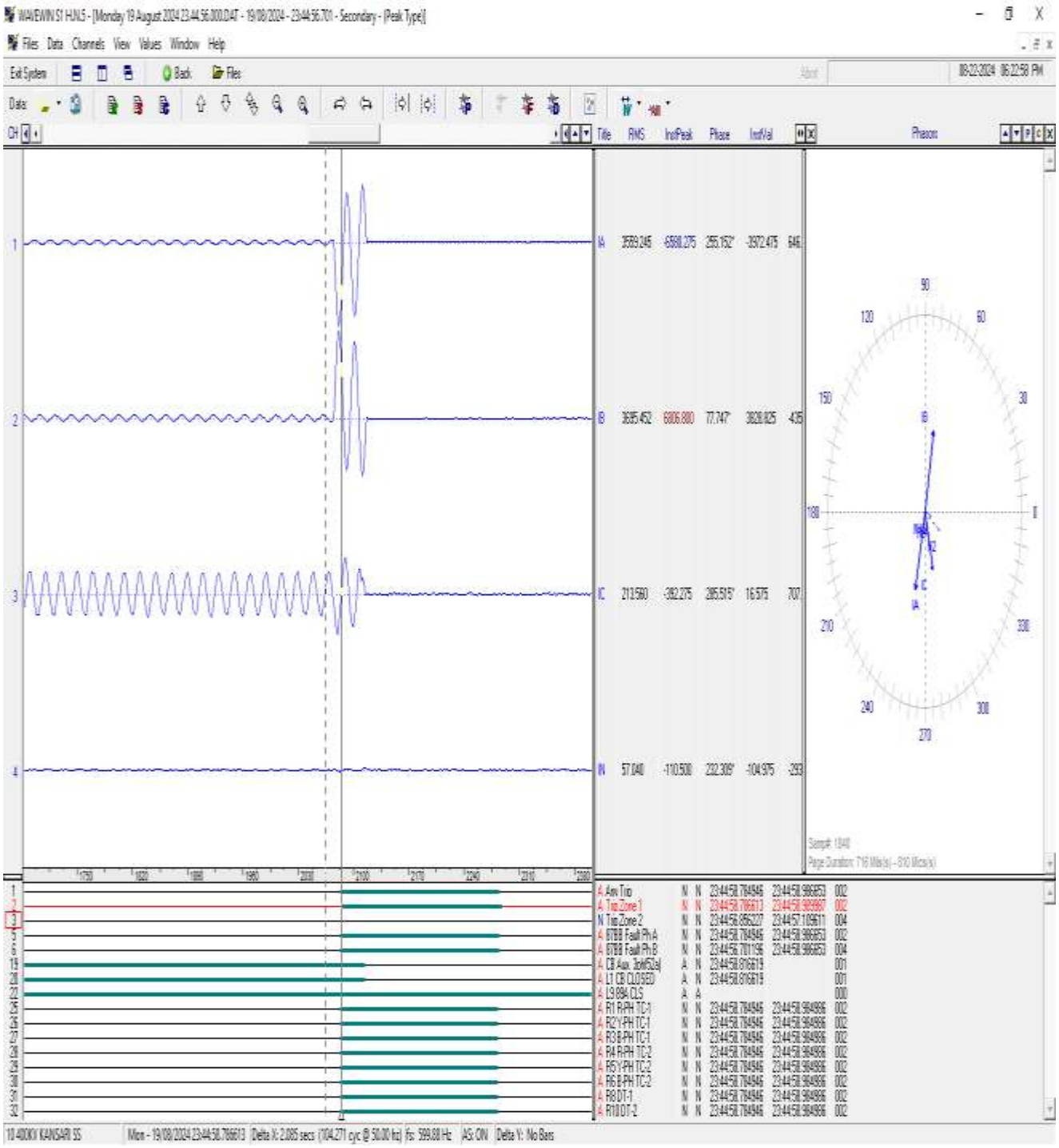
	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Substation 19/08/2024 23:44 hrs	P741	Busbar Protection – Zone 2 though fault	3C
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)		Diff. Current is less than 70% of Bias Current : **Calculated slope: 66%**	



	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Substation 19/08/2024 23:44 hrs	P741	Busbar Protection – Zone 2 Differential Fault.	3D
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)		Diff. Current equals to 70% of Bias Current: **calculated slope: 69.88%**	



	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Kansari Subststion 19/08/2024 23:44 hrs	P743	Busbar Protection – Zone 1 R to Y fault (P-P)	3E
	400kV Buscoupler Bay Y-ph CT Failure (T/W Bus-2)	400kV Soja-1		



अनुलग्नक-3 / Annexure-4: Site photographs shared by GETCO-





के विजय कुमार

Vijay Kumar Kodali

DGM (SO), WRLDC

ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
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पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के. वी. शेनद्रा (ओल्ड) उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Shendra (old) Sub Station of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 23.10.2024

1. घटना का सारांश / Event Summary:

i. At 17.01 hrs/15.09.2024, Y phase Z-1 fault occurred on 220KV Shendra-GIS Shendra old Line near to Shendra Old SS leading to AR successful at both ends.

ii. After around 2.75 Sec, again Y phase fault was occurred on 220KV Shendra - GIS Shendra Line. At 220KV Shendra (GIS) all 3 phase tripped which was correct operation. As seen from the DR, only Y phase breaker auto reclosed, which was undesirable. Since fault reoccurred in A/R reclaim time, all 3 phases should have been tripped, but it didn't happen.

iii. After 1 Sec, R phase fault was occurred on 220KV Shendra Old- Shendra GIS Line. The Dist. Relay at Shendra old end sensed the fault in Z-2, however fault was cleared by Back up EF relays of 220KV Shendra (old)- Aurangabad PGCIL line at both ends and R & B pole of 220KV Shendra old- GIS Shendra line CB

were tripped on PDR (PDR setting 1.5 Sec) and tripped Aurangabad PG end also.

iv. Hence Shendra old S/S became dark leading to 58.66 MW Load Loss.

2. घटना का समय और दिनांक / Time and Date of the Event : 17:03 hrs / 15-09-2024

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

4. स्थान/नियंत्रण क्षेत्र / Location/Control Area : Shendra old S/S, Maharashtra

5. पूर्ववर्ती स्थिति / Antecedent Conditions:

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.08	63047	56159	13251	20464
घटना के बाद Post Event	50.08	63014	56256	13388	20508

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: 58.66 MW Load Loss

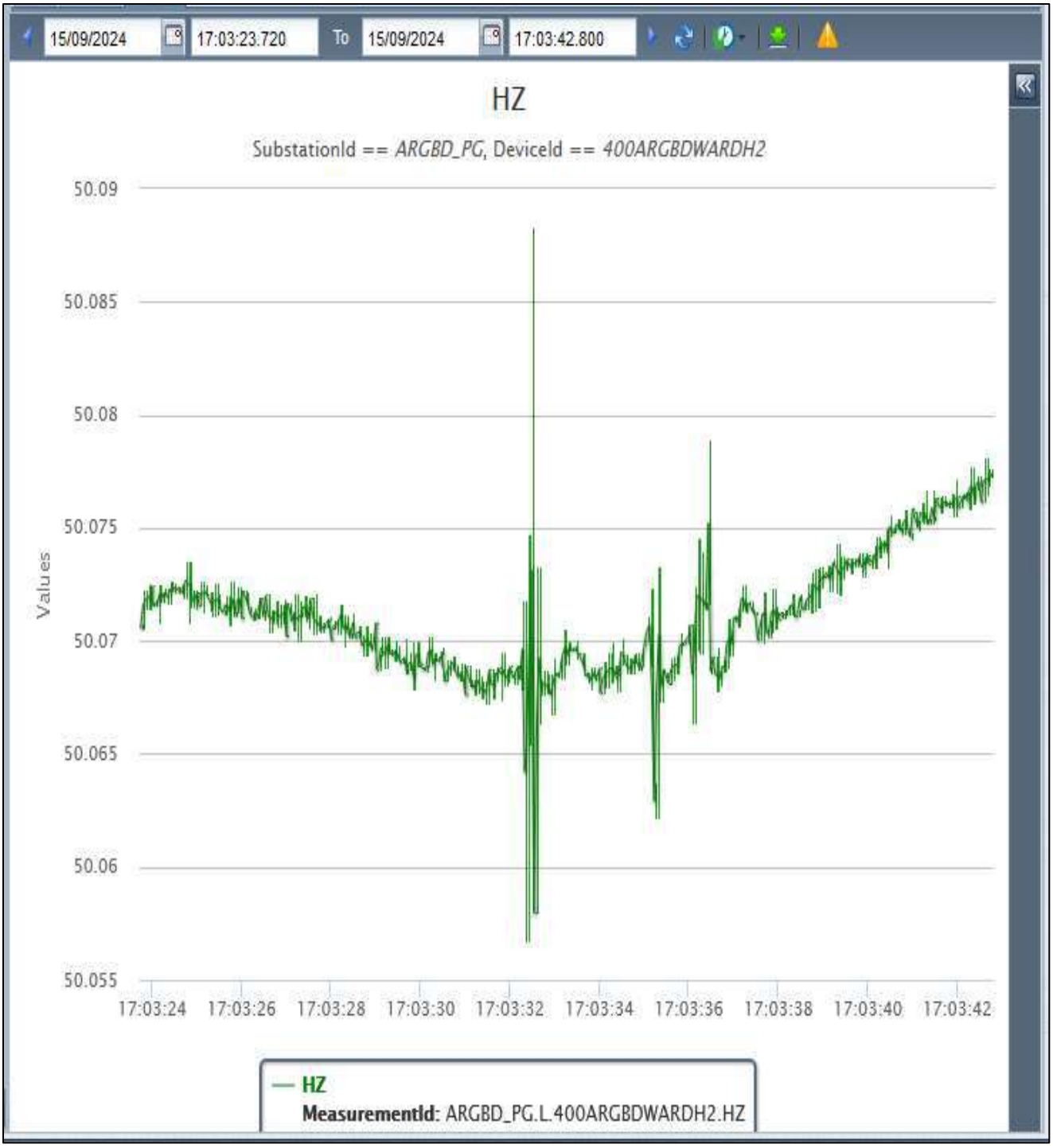


Figure 1. PMU Frequency plot of 400 kV Aurangabad- Wardha-2 line

7. **रुकावट की अवधि / Duration of interruption:** 01 Hours 34 Minutes

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

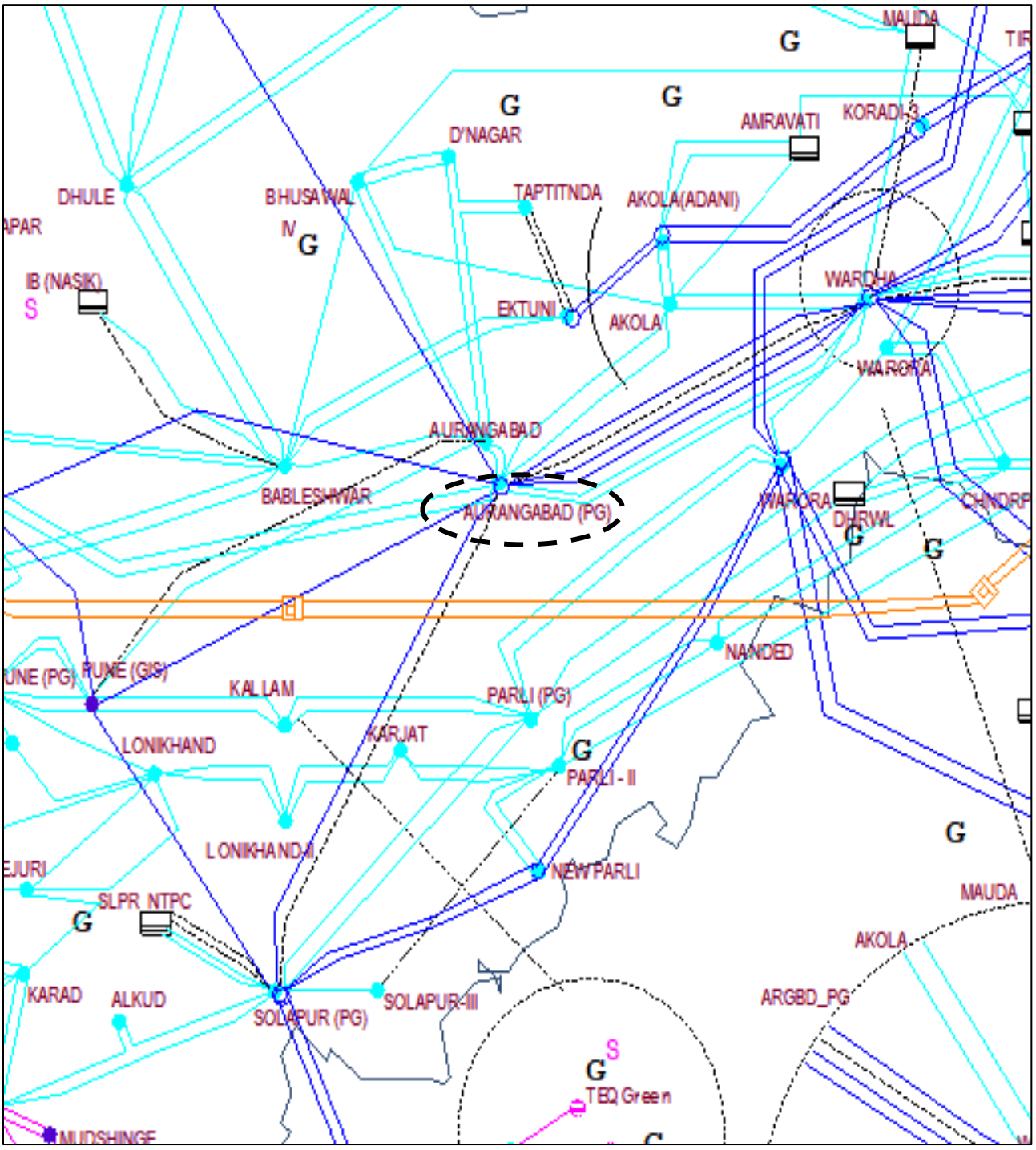


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (Shendra old)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (remote end)	वापसी का समय Restoration time
1	220KV Shendra GIS Shendra old Line	15.08.24@17:01	220 kV Aurangabad-Shendra-d/c tripped at 17:03 hrs due to LA blast of 220 kV Aurangabad-Shendra-1 at Shendra end. 86Yx OPTD Zone-1 OPTD Distance Protection Y•Ph 86Yx , Z1, Y ph	21 Distance OPTD ZCOM Optd, YPH Trip	22.09.24 @18.51
2	220KV Aurangabad-Shenra old Line	15.09.24@17:01	86A OPTD Earth Fault OPTD R-Ph OPTD 67N , TEF optd	Earth to Ground Fault OPTD	15.09.24 @18:35
3	100 MVA 220/132 kV ICT#1 at Shendra old	15.08.24@17:01	Not provided		18:45 hrs
4	50 MVA 220/33kV ICT#1 at Shendra old	15.09.24@17:01			18:40 hrs
5	50 MVA 220/33kV ICT#2 at Shendra old	15.08.24@17:01			18:50 hrs

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

- **Observations:**

I. On 15 Sept 2024 at 17.01 hrs, Y phase Z-1 fault occurred on 220KV Shendra-GIS Shendra old Line near to Shendra Old SS leading to AR successful at both ends.

II. After around 2.75 Sec, again Y phase fault was occurred on 220KV Shendra - GIS Shendra Line. At 220KV Shendra (GIS) all 3 phase tripped which was correct operation. As seen from the DR, only Y phase breaker auto reclosed, which was

undesirable. Since fault reoccurred in A/R reclaim time, all 3 phases should have been tripped, but it didn't happen.

III. After 1 Sec, R phase fault was occurred on 220KV Shendra Old- Shendra GIS Line. The Dist. Relay at Shendra old end sensed the fault in Z-2, however fault was cleared by Back up EF relays of 220KV Shendra (old)- Aurangabad PGCIL line at both ends and R & B pole of 220KV Shendra old- GIS Shendra line CB were tripped on PDR (PDR setting 1.5 Sec) and tripped Aurangabad PG end also.

IV. Hence Shendra old S/S became dark

- **Analysis:**

- As informed by SLDC Maharashtra, AR function of Shendra Old-GIS Shendra line kept off from Distance relay at Shendra GIS end But AR function has been configured in the Bay Control Unit. Hence AR successfully operated at 220KV Shendra Old End on first Y-Ph fault of said line.

- On second time Y-Ph fault of said fine was reoccurred during Reclaim time and therefore, 3Ph trip on AR L/O should have been initiated by Dist relay. The Bay Control Unit of said line initiated AR Prep3P output that was given to the Distance relay, but as informed by SLDC Maharashtra, wire of 3 pole preparation was found loose and disconnected on relay. Due to this, Distance relay initiated Y-Ph signal pole auto reclose command for fault in reclaim time which occured after 2.75 Sec on Y phase at Shendra old end. R and B pole were not tripped.

- After 1 Sec, R phase cable fault was occurred on Shendra Old-GIS Shendra line which was sensed by the Dist relay in Z-2. As informed by SLDC Maharashtra, fault was not sensed continuously in Z2. It was having some breaks during sensing of fault in Z-2, causing timer of Z-2 got reset from first start. Due to this delay in Z-2 start, Back up EF relay at Aurangabad PGCIL end sensed the fault and 220KV Shendra (old)- Aurangabad PGCIL line was tripped at Aurangabad PGCIL End also.



Figure 3. PMU Current plot of 400 kV Aurangabad- Wardha-2 line

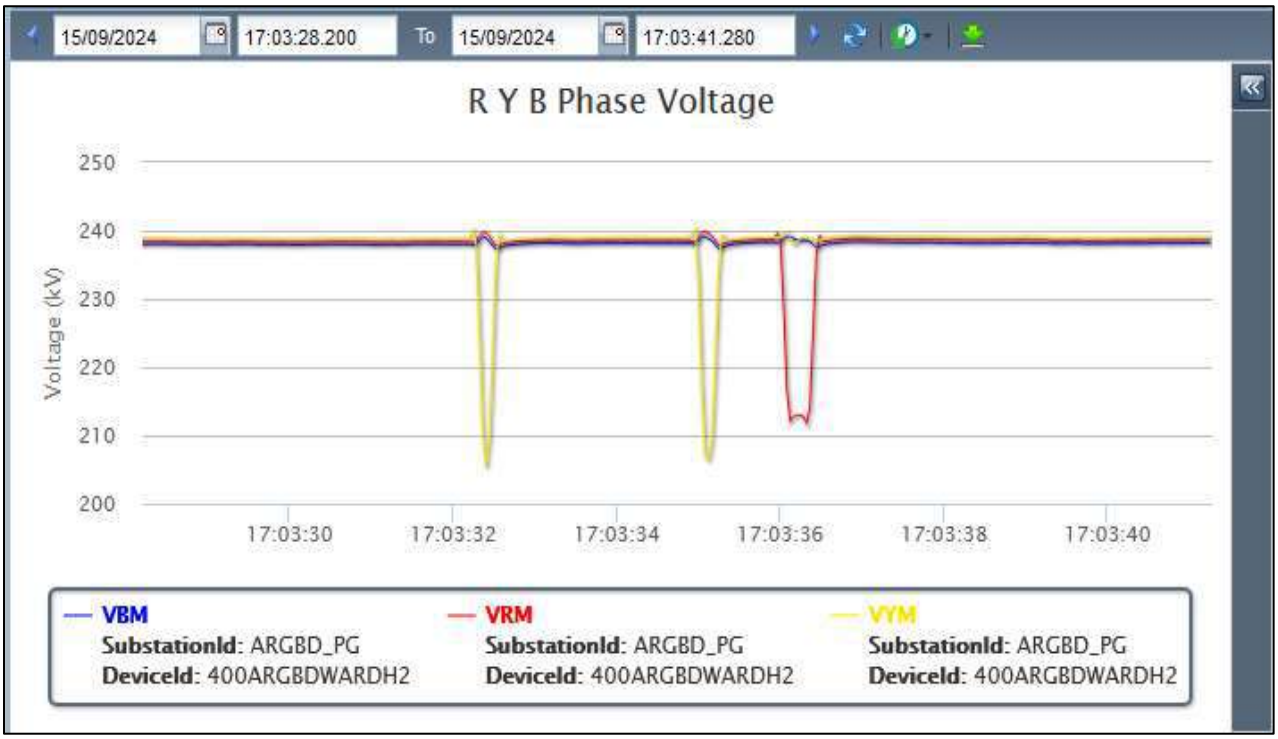


Figure 4. PMU Voltage plot of 400 kV Aurangabad- Wardha-2 line

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Y phase fault was occurred on 220KV Shendra - GIS Shendra Line. At 220KV Shendra (GIS) all 3 phase tripped which was correct operation. As seen from the DR, only Y phase breaker auto reclosed, which was undesirable. Since fault reoccurred in A/R reclaim time, all 3 phases should have been tripped, but it didn't happen.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- As informed by SLDC Maharashtra, the cause of operation of Dir EF Back Up relay of 220KV Shendra (old)- Aurangabad PGCIL line at Shendra (old)- end is attributed to PT Fuse failure of the BU relay, due to which relay sensed the fault in Z-2. On inspection of panel, PT fuse of BU relay found blown.
- Non sensing of cable fault in Z-1 by Dist relay (ABB REL 670) is being investigated of Shendra –Shendra line at Shendra (old) end. Also, fault data/DR and relay setting being shared to M/s ABB for analyzing the Non sensing of cable fault in Z-1 by Dist relay(ABB REL 670) by SLDC Maharashtra.
- Cable fault of 220KV Shendra old-GIS Shendra Line was attended and line restore on dated 22 Sept 2024.
- PT supply of the BU relay PGCIL Line at 220KV Shendra Old restore and BU relay protection made healthy.
- AR Prep3P output of BCU relay properly wired up to the Distance relay. Also relay testing carried out and 3 pole tripping confirmed.
- The cause of EHV cable failure of 220KV Shendra old-GIS Shendra Line has been referred to OEM for investigation and corrective measures.
- 220 kV Aurangabad-Shendra-2 was normalized at 18:39 hrs after MSLDC given readiness and all the load is restored by 18:45 hrs.

- Instructed Maharashtra SLDC to provide detailed reason of the event.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from MSETCL on 16.10.2024
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from MSETCL on 16.10.2024. Moreover, the report shared was containing some incorrect information and wrong analysis.
4.	DR Time Synchronization Issues	IEGC section 17.3	Shendra GIS end DR are not time synced.
5.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	220 kV Shendra old-Shendra GIS all 3-phases didn't trip at Shendra old end during A/R reclaim time. SLDC MH may kindly check the protection setting and ensure healthiness of Relays.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

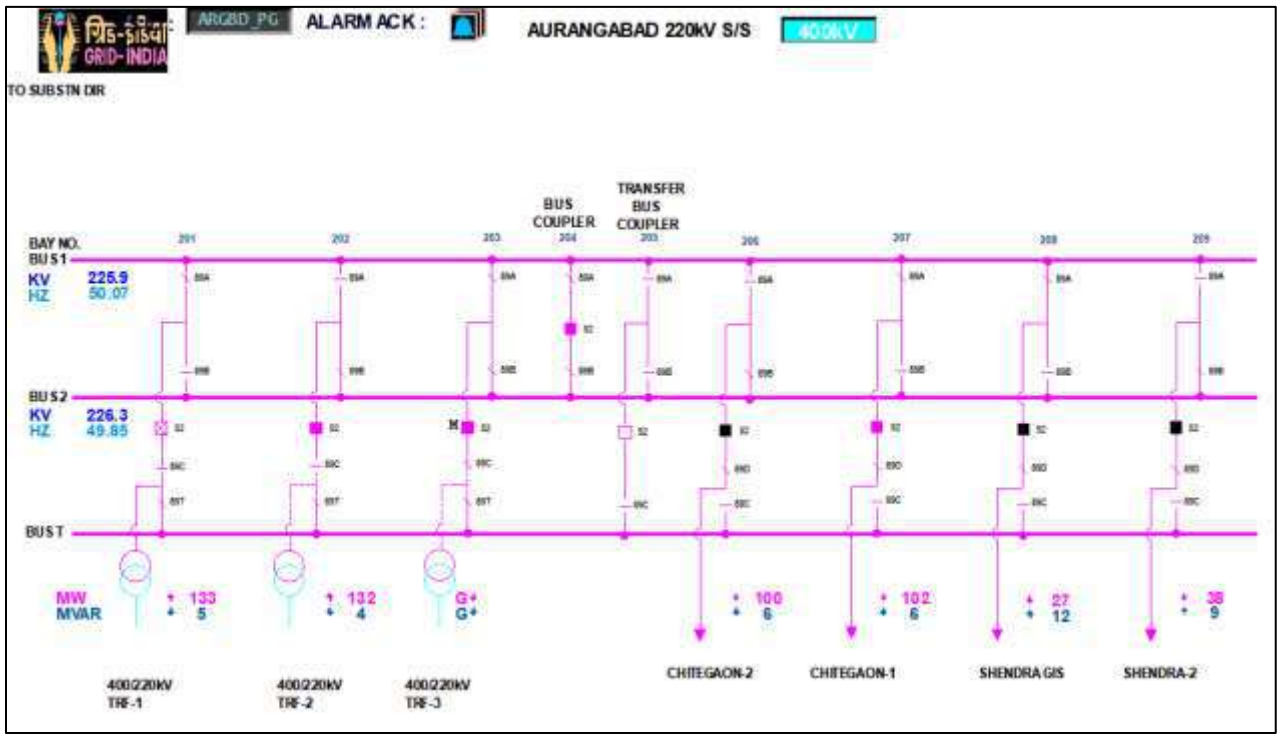
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE from WRLDC-

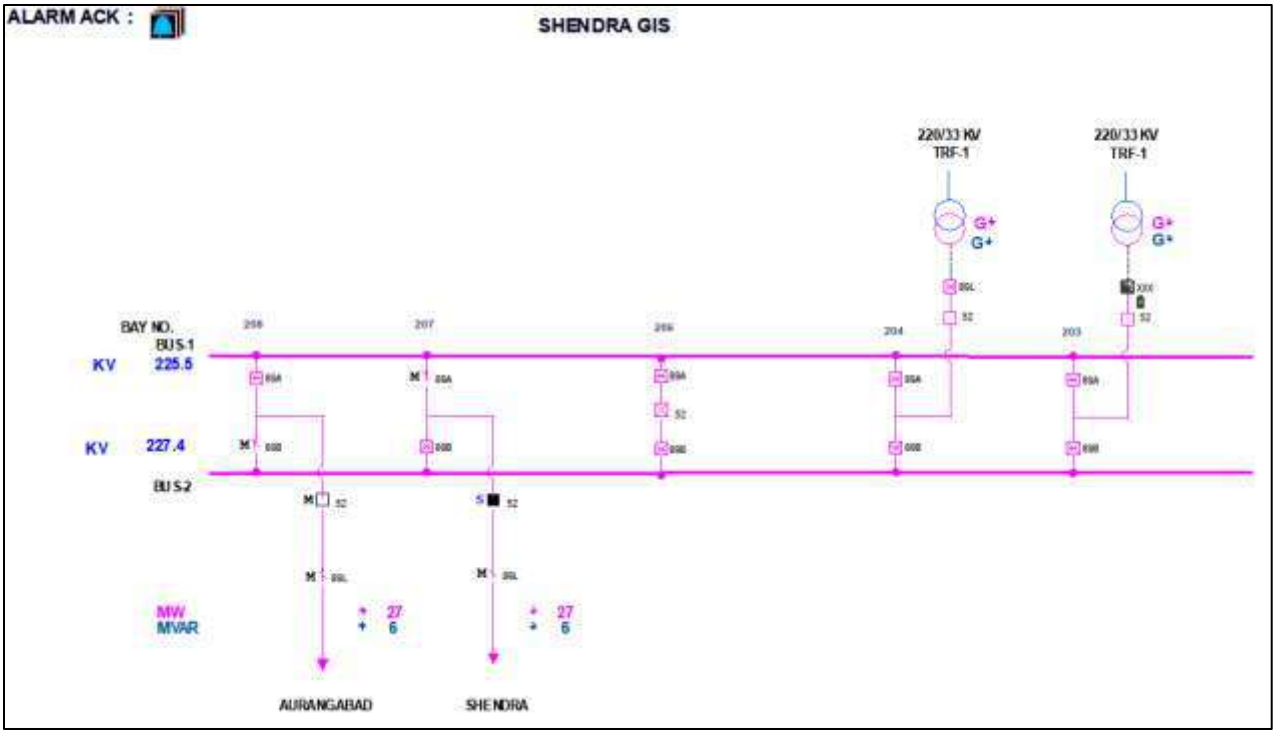
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	ARGBD_PG	AURANGABAD CB 20952 (SHNDR-2) ACTED	17:03:36	450
WRLDC	220KV-CB	ARGBD_PG	AURANGABAD CB 20952 (SHNDR-2) OPEN	17:03:36	450

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

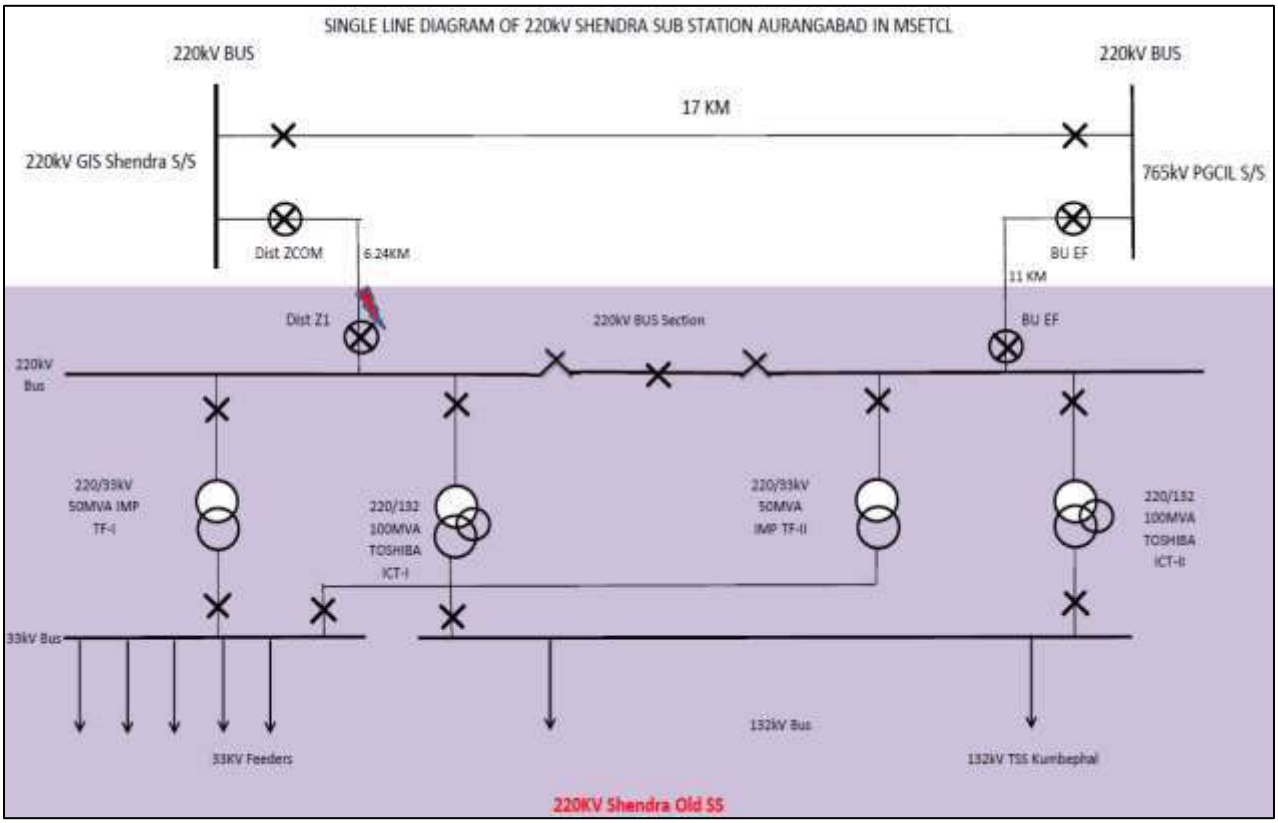
220 kV Aurangabad SLD:



220 kV Shendra SLD:

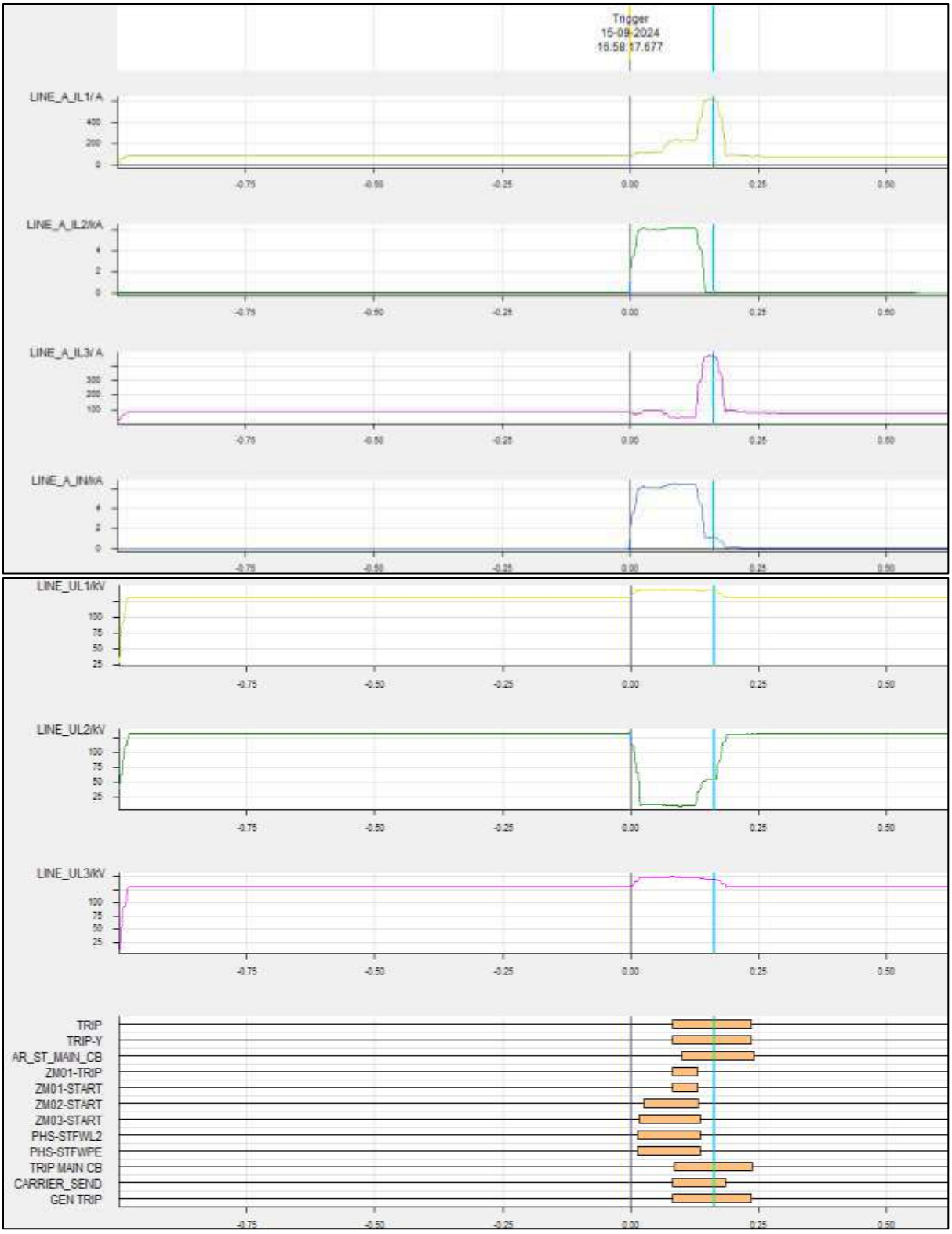


220 kV Shendra SLD from MSETCL:

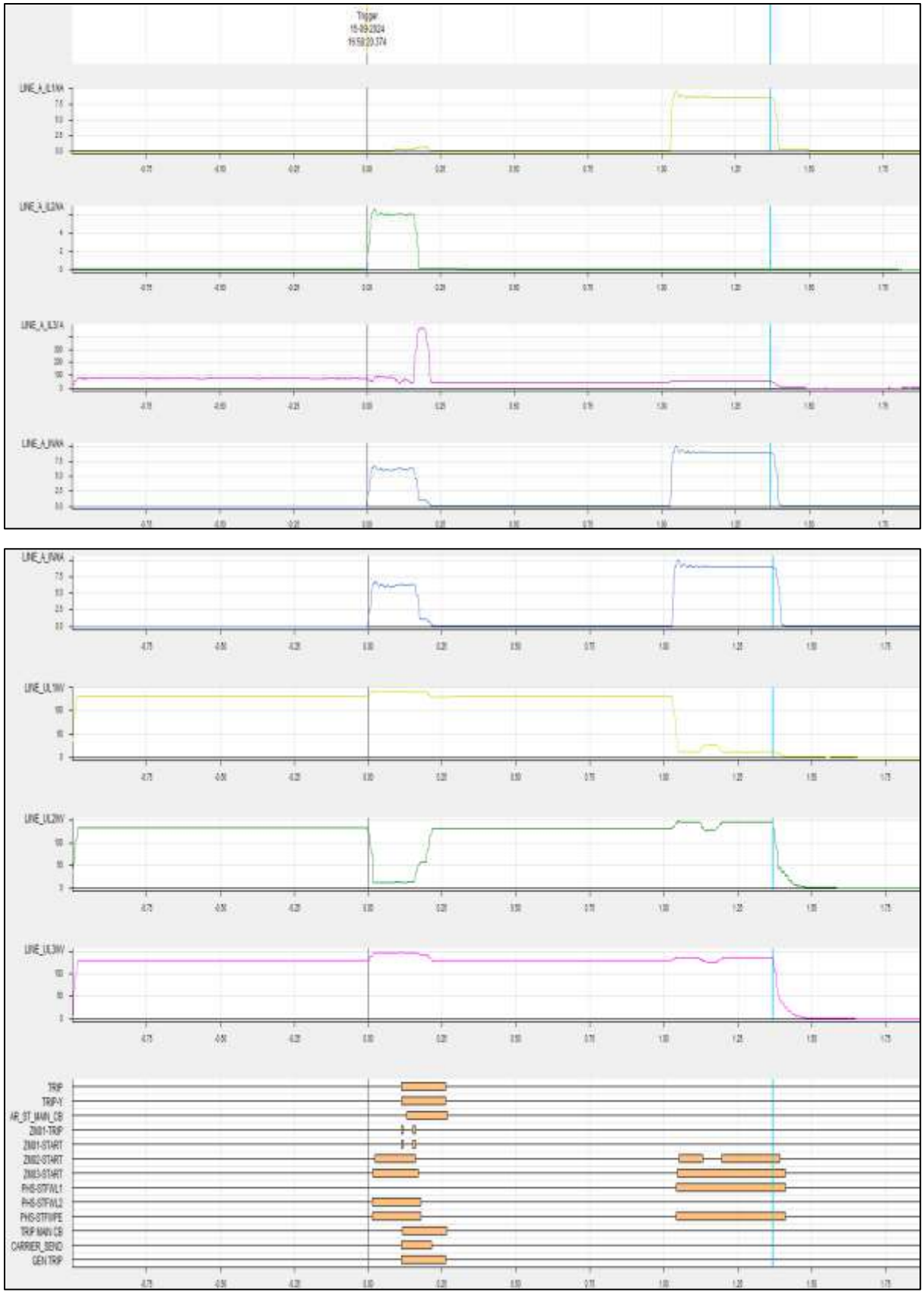


अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below-

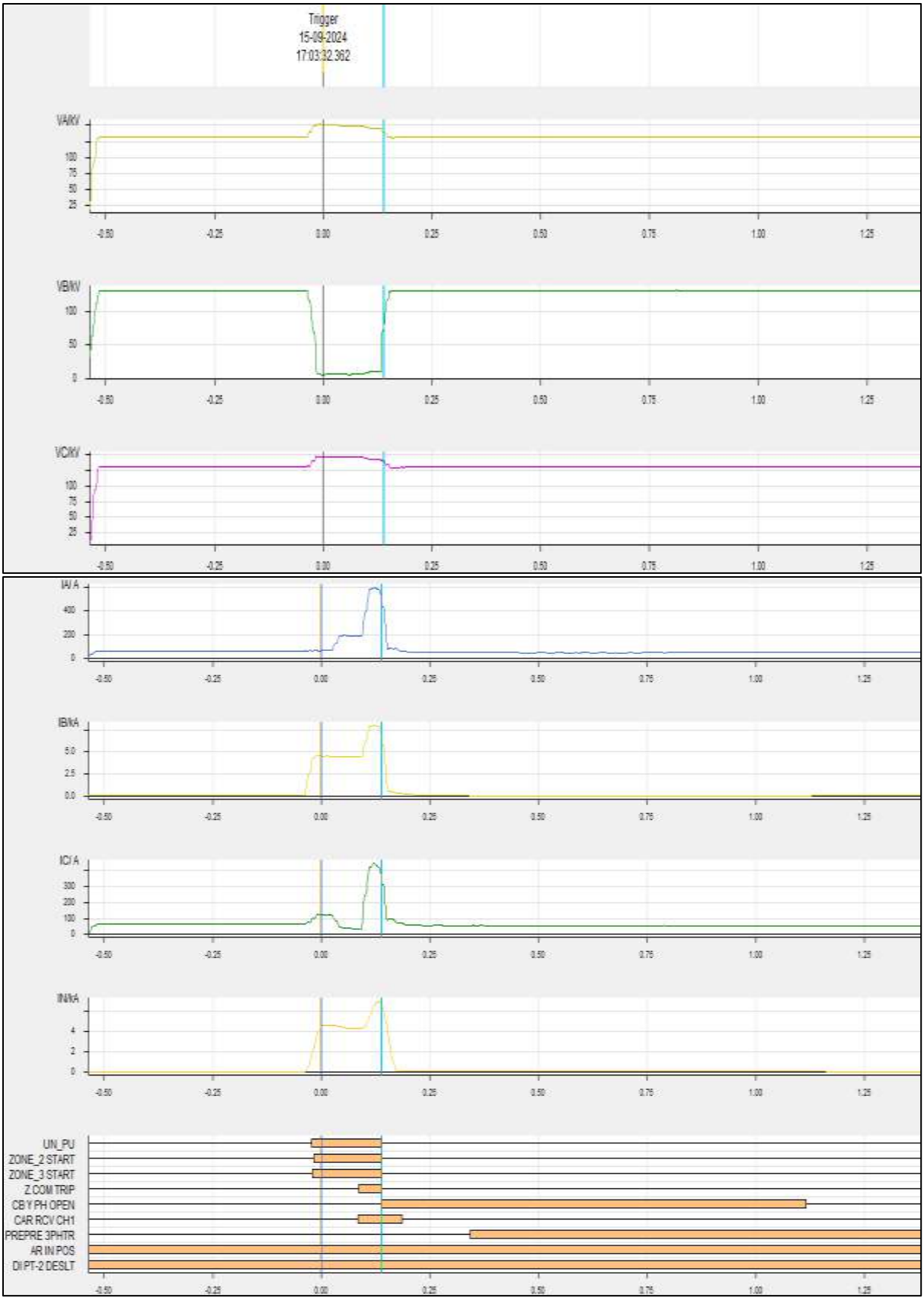
A. Shendra old- GIS Shendra at Shendra old



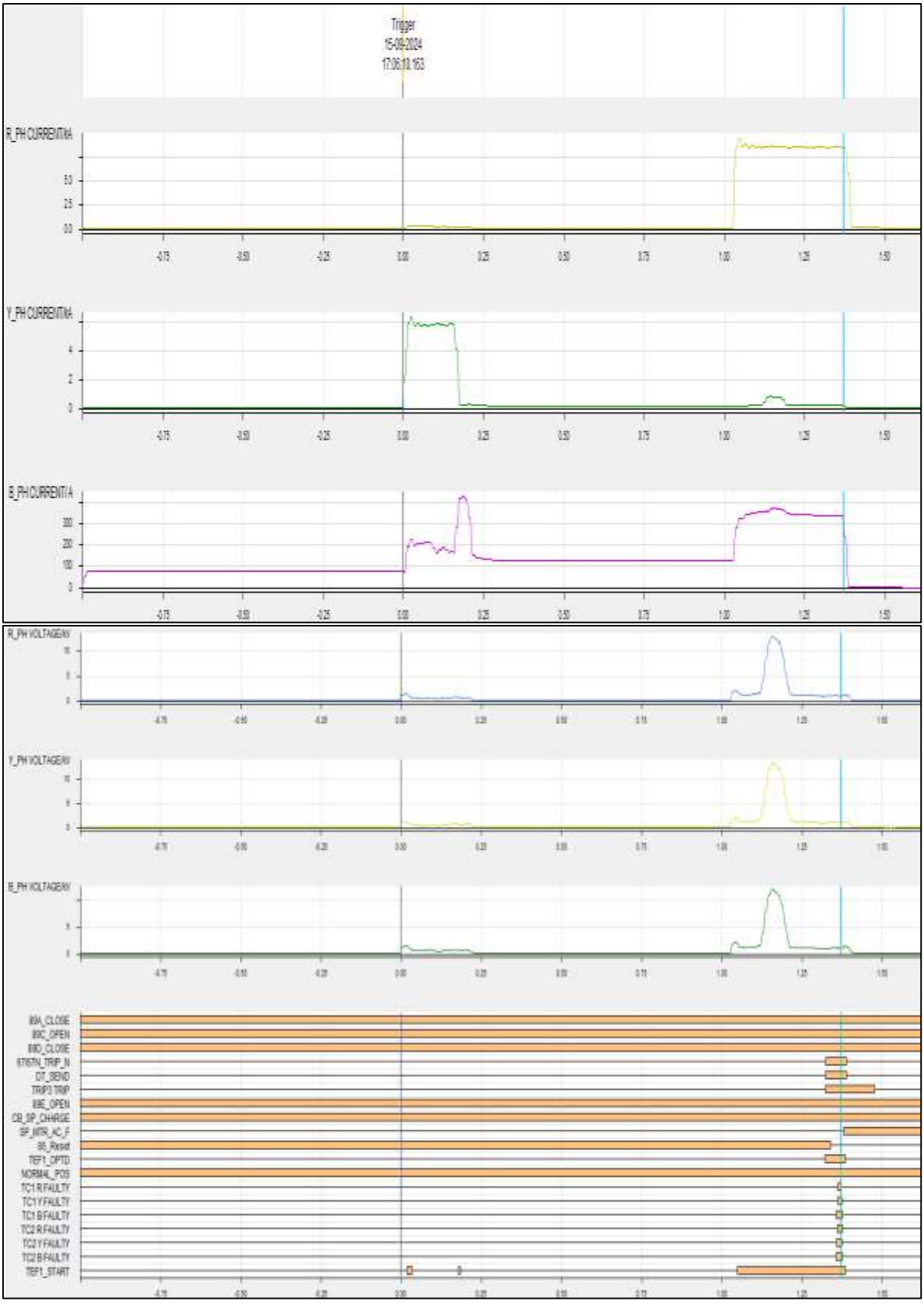
B. Shendra old- GIS Shendra at Shendra old



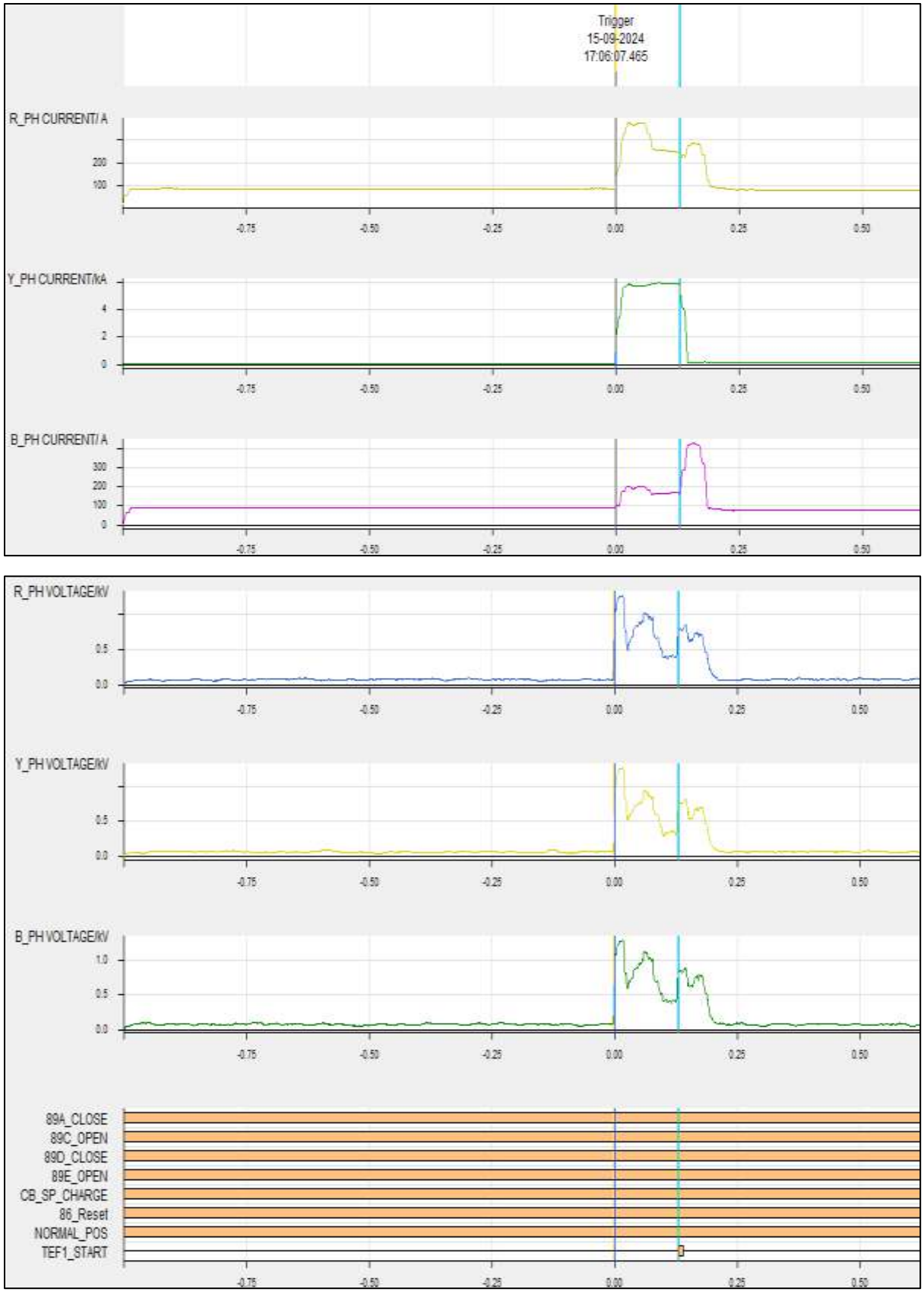
C. Shendra GIS (Shendra GIS Shendra Old line)



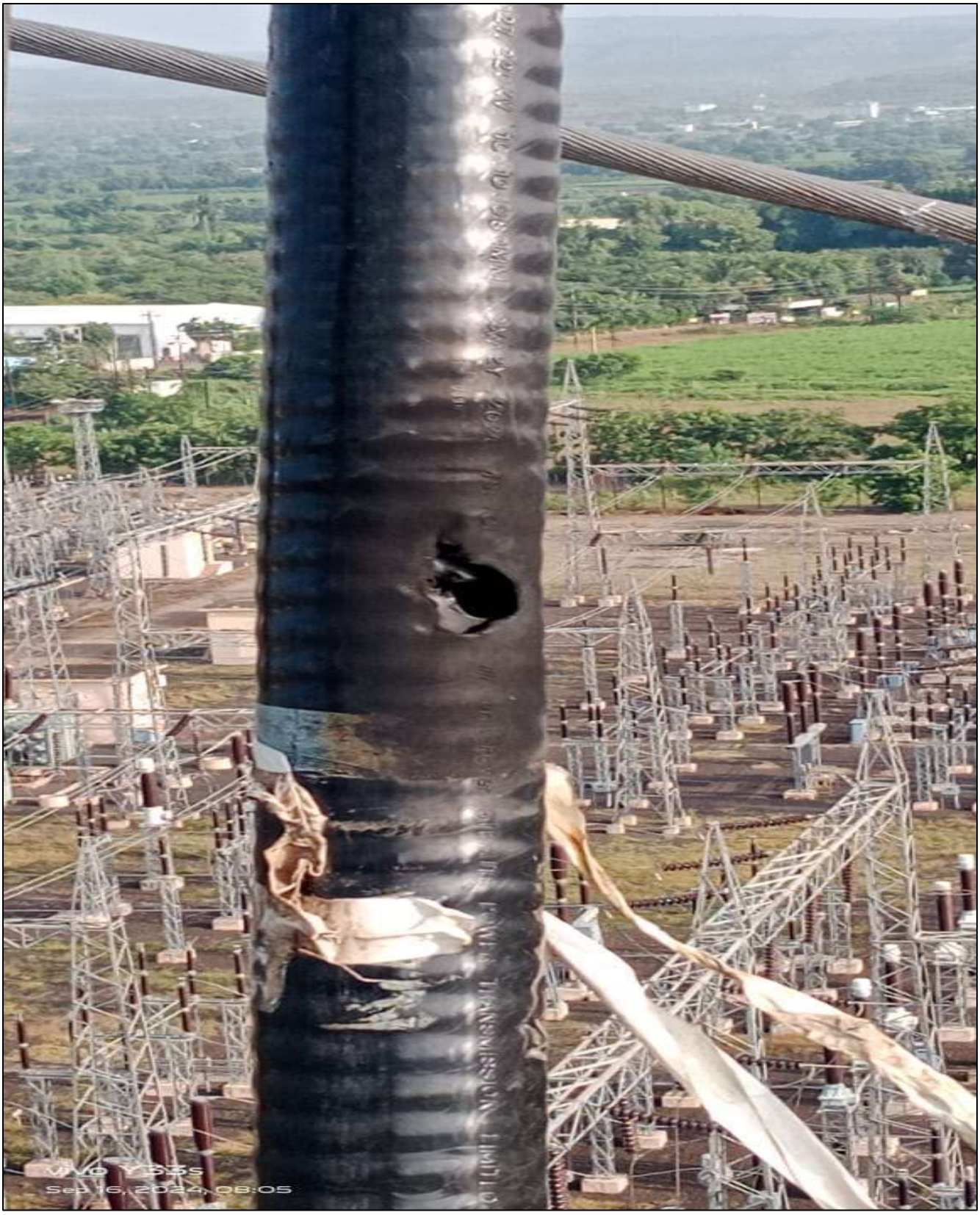
D. Shendra old- Aurangabad PGCIL BU Relay-1 at Shendra old end



E. Shendra old- Aurangabad PGCIL BU Relay-1 at Shendra old end



अनुलग्नक-D / Annexure-D: Site photographs- Cable photos-


Sep 16, 2024 08:05



Vijay Kumar Kodali

DGM, SO WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. उरण उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Uran Sub Station of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 12.11.2024

1. **घटना का सारांश / Event Summary:** At 16:36 Hrs / 01-10-2024, false LBB initiation command generated from bay of 220 kV Stn Transformer-1 (located in generator premises) lead to tripping of 220 kV Uran-Bus-1 resulting in tripping of all connected elements. Generation loss of 77 MW and load loss of 14 MW occurred at Uran substation due to the event.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 16:36 Hrs / 01-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Incident (GI)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area:** Uran, Maharashtra
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.04	73431	60921	14922	23375

घटना के बाद Post Event	49.99	73267	60867	14803	23352

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Generation loss of 77 MW and load loss of 14 MW occurred at Uran substation due to the event.

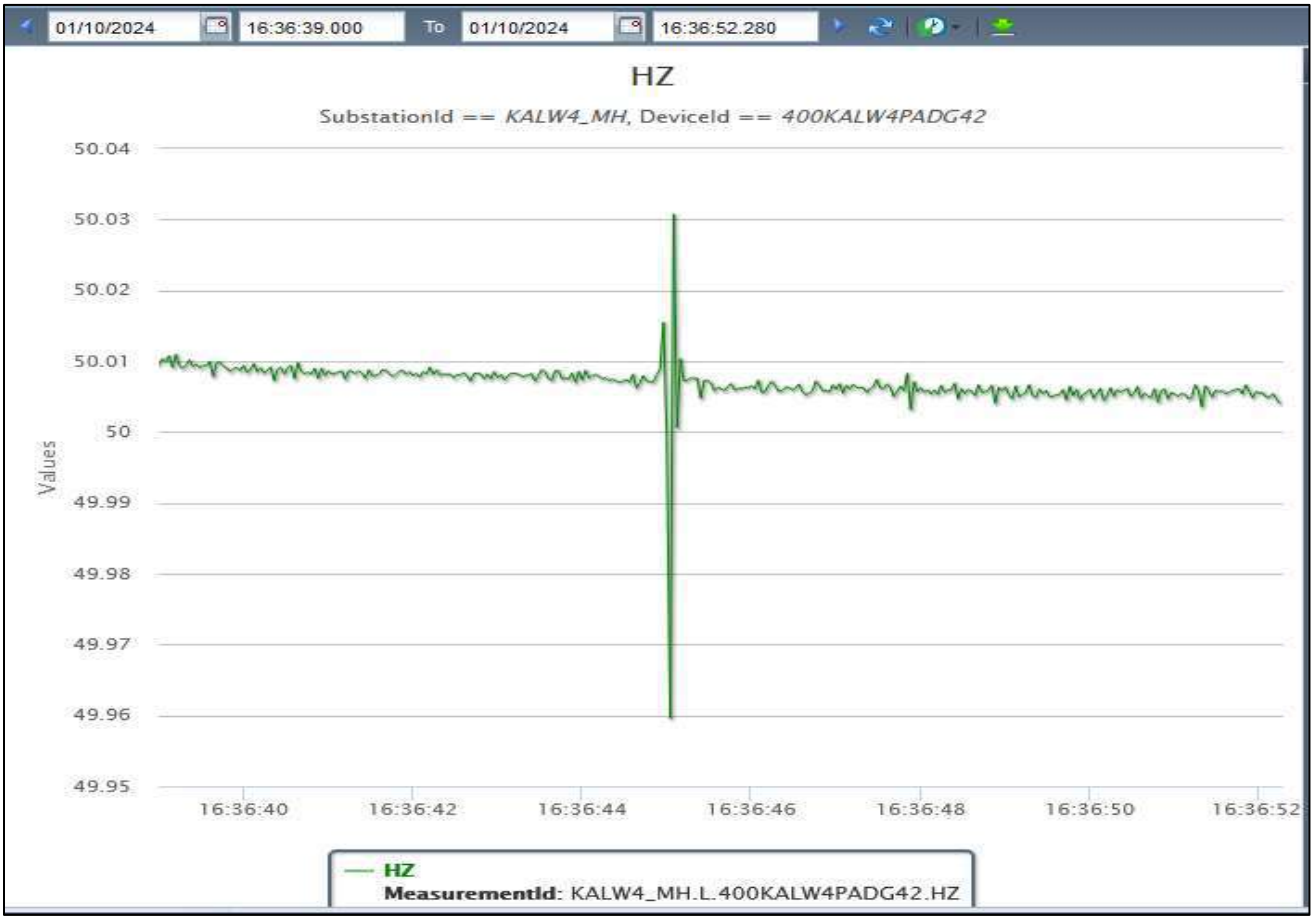


Figure 1. 400 kV Kalwa- Padghe-2 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 29 Minutes

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

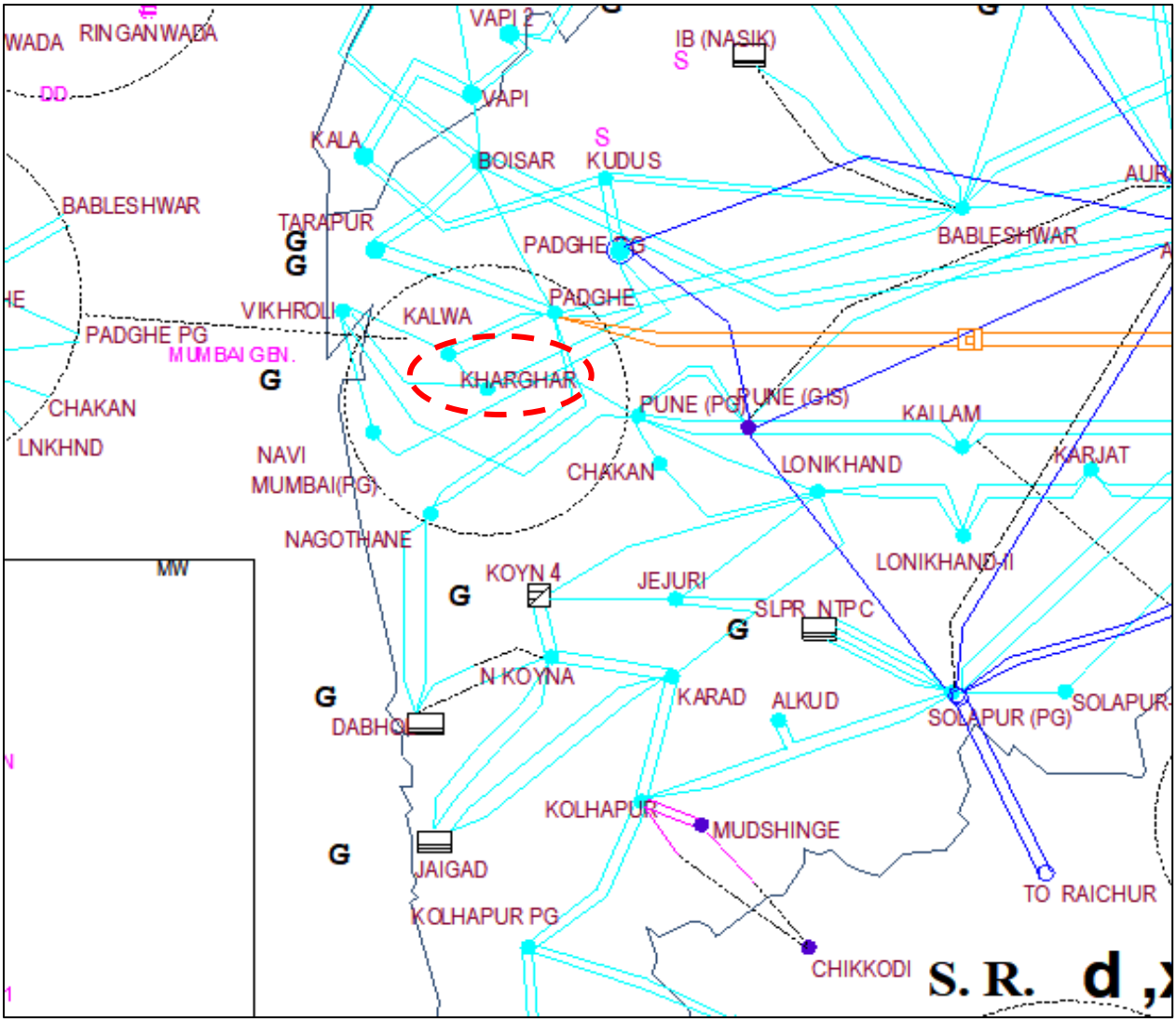


Figure 2. Network across the affected area

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

Nil

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Uran	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time

1	220 kV Uran Bus-1	16:36	Bus bar General trip & Bus Bar Zone A-opt Bus 1 Trip LED R Y B Trip Start Bus 1 LBB Trip Relay flag optd Stn T/F-1 (BB Panel)	NA	17:05
2	Uran U-7	16:36	96 Optd	NA	20:00/ 02.10.2024
3	220 kV Uran-Apta-2	16:36	96 Optd	Not submitted	17:06
4	220 kV Uran-Apta-4	16:36	96 Optd	Not submitted	17:20
5	220 kV Uran-Ulwe-2	16:36	96 Optd	Not submitted	17:08
6	220 KV Uran-ONGC	16:36	96 Optd	Not submitted	17:11
7	50 MVA T/F-1	16:36	96 Optd	NA	17:10
8	GT WHRP A0	16:36	96 Optd	NA	17:05

11. घटना का विश्लेषण / Event Analysis (Based on PMU, SCADA & DR) as submitted by MSETCL:

"On 01.10.2024 @ 16:36 hrs, at 220/22 kV Uran Sub Station, LBB protection Operated due to False tripping initiation command received from generation end (GTPS). After detailed investigation the observations are listed as below.

I. 220kV STN TF-01 is out of service since last 8 months

II. The CB & All isolators of 220kV STN TF-01 are in OFF condition, however the binary input of Bus 1 isolator close status is continuously high in the Bus bar relay.

III. LBB & its aux relay of 220kV STN TF-01 which is installed in Generation premises, initiated false tripping command to the Bus bar protection relay through Auxiliary relay installed at MSETCL Control room.

IV. The LBB trip initiation 3 core control cable is routed from LDD relay & its auxiliary relay to OGM junction box T.B. located in switch yard, this cable is further connected to Bus Bar protection relay at MSETCL end for operation of LBB function

V. As per investigation done by Generation (GTPS) testing & reported that, the false LBB Tripping initiation is received due to damage & shorting of old 3 core control cable connected between LBB relay located in generation side CRP 10 OGM junction box located in switchyard. It is also reported that the IR value of this 3 core control cable is very low I.e. about 10k ohm.

VI. The closing status of bus-1 Isolator binary Input High to BB relay even though all Isolators are in OPEN condition, is further investigated & found that, the Isolator Interlocking modules located in OGM junction box are being utilizing for various Isolator functions & status as per requirement of the schemes. The operating resetting coils of these isolator Interlocking modules are eclectically actuated on actual operation of Isolator & through its Auxiliary contact

VII. The Bus bar relay have been given the Bus Isolator ON/OFF status from NO/NC contacts of Isolator Interlocking modules, which are very old, obsoleted, hence the proper operation of Isolator Interlocking modules of STN TF-1 has not been done on actual of operation of Bus-1 Isolator, And hence its close status remain High to the BB relay.

VIII. The Bus bar relay is configured/programmed for selective bus operation of LBB function, when it get following Binary Input High (AND Logic) of 1) LBB initial from respective buy stand lone LBB relay ii) Closing stars of Bus Isolator of respective bay

IX. Hence due to the false LBB initiation & Bus isolator closing status of STN T/F-01, Bus her Protection relay activated its Bus 1 internal LBB protection and all 96 relays of 220 kV fines Generators &transformers connected to Main Bus 1 along with Bus Coupler are tripped

X. The operation of Bus bar relay is normal & correct due to unwarranted LBB initiation & bel Isolator close status

XI. After disconnecting the 1.BB control cable of Stn T/F 1 from MSETCI & Isolator Control DC supply from GTPS, normalcy has been restored"

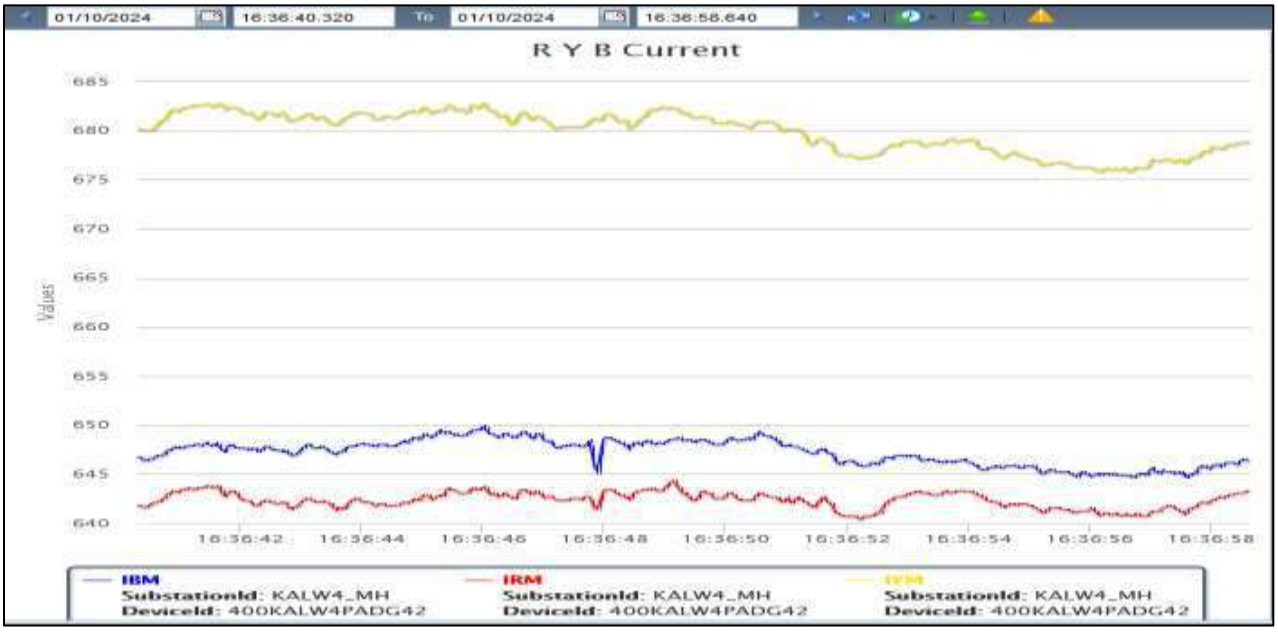


Figure 3. PMU Current plot of 400 kV Kalwa- Padghe-2

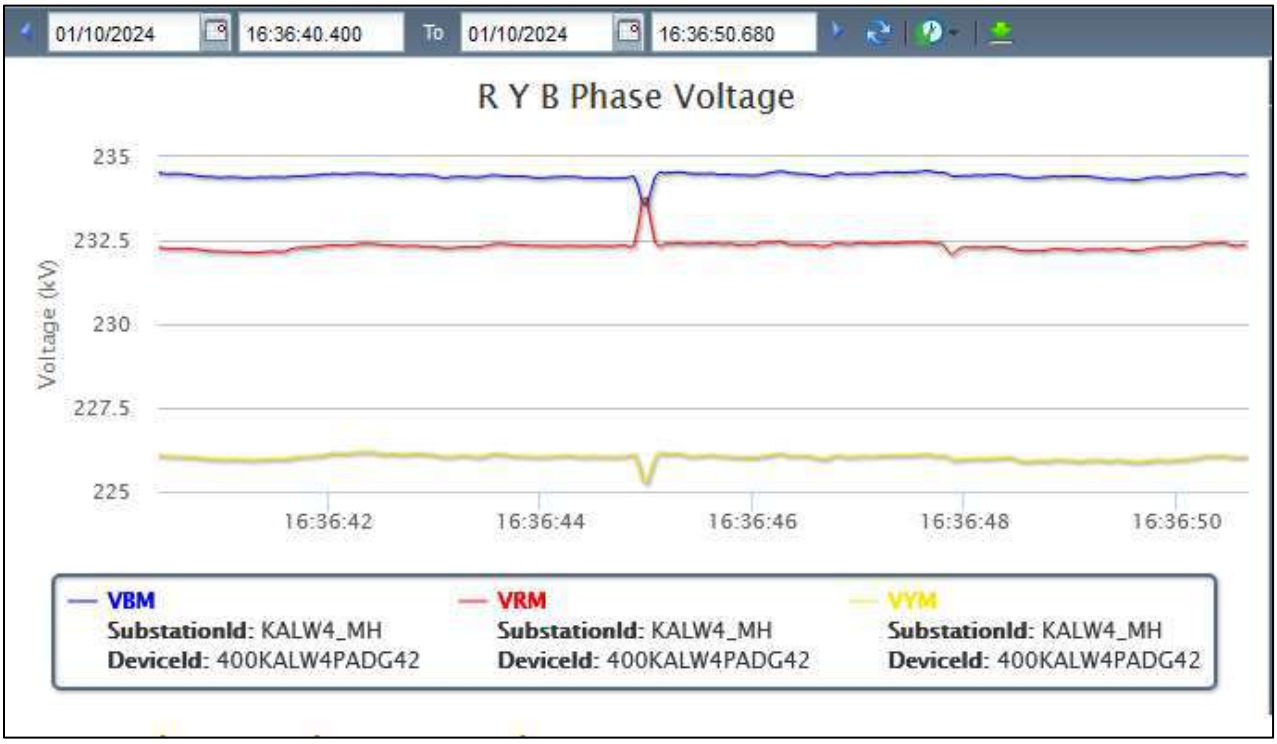


Figure 4. PMU Voltage plot of 400 kV Kalwa- Padghe-2

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- LBB protection maloperated of 220 kV Uran-Bus-1 resulting in tripping of all connected elements

13. सुधारात्मक उपाय / Action Taken/Remedial Measures:

I. As informed by MSETCL, Isolator status of all Generation bays are given through isolator interlocking modules which was obsolete and there is problem of electrical operation of some bay modules which will be attended by MSETCL.

II. The faulty control cable from OGM Junction box to GTPS control panel is to be removed & replaced with new one**.** MSETCL may kindly update the status of the same.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr. No.	Issues	Regulation Non-Compliance	Utilities
1.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from MSETCL
2.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received from MSETCL on 11.11.2024
3.	DR Time Synchronization Issues	IEGC section 17.3	DR are not time sync
4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	LBB protection maloperated of 220 kV Uran-Bus-1 due to wrong LBB initiation command generated from bay of 220 kV Stn TF-1

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	URAN__MH	URAN CB CB 20552 (U3) OPEN	16:37:25	0
WRLDC	220KV-CB	URAN__MH	URAN CB CB 20152 FAULTY	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB CB 20752 (U5) FAULTY	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB 21252 (KARGR-2) FAULTY	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB 21452 (APTA_-2) FAULTY	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB CB 20152 OPEN	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB CB 20752 (U5) OPEN	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB 21052 (ONGC) OPEN	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB 21252 (KARGR-2) OPEN	16:37:26	0
WRLDC	220KV-CB	URAN__MH	URAN CB 21452 (APTA_-2) OPEN	16:37:26	0

SOE from MSETCL-

Y PHASE LBB EVENT-

Type	Date & Time	Signal name	Status
P	10/1/2024 4:19:42:193 PM	Bay17 PROT TR	On
P	10/1/2024 4:19:42:193 PM	ZA BFP TRIP	On
P	10/1/2024 4:19:42:193 PM	ZA COMON TRIP	On
P	10/1/2024 4:19:42:499 PM	Bay17 PROT TR	Off
P	10/1/2024 4:19:42:499 PM	ZA BFP TRIP	Off
P	10/1/2024 4:19:42:499 PM	ZA COMON TRIP	Off
P	10/1/2024 6:44:35:524 PM	Bay17 to ZA	Off
P	10/1/2024 6:44:35:530 PM	Bay17 to ZA	On
P	10/1/2024 6:44:35:539 PM	Bay17 to ZA	Off

B PHASE EVENT-

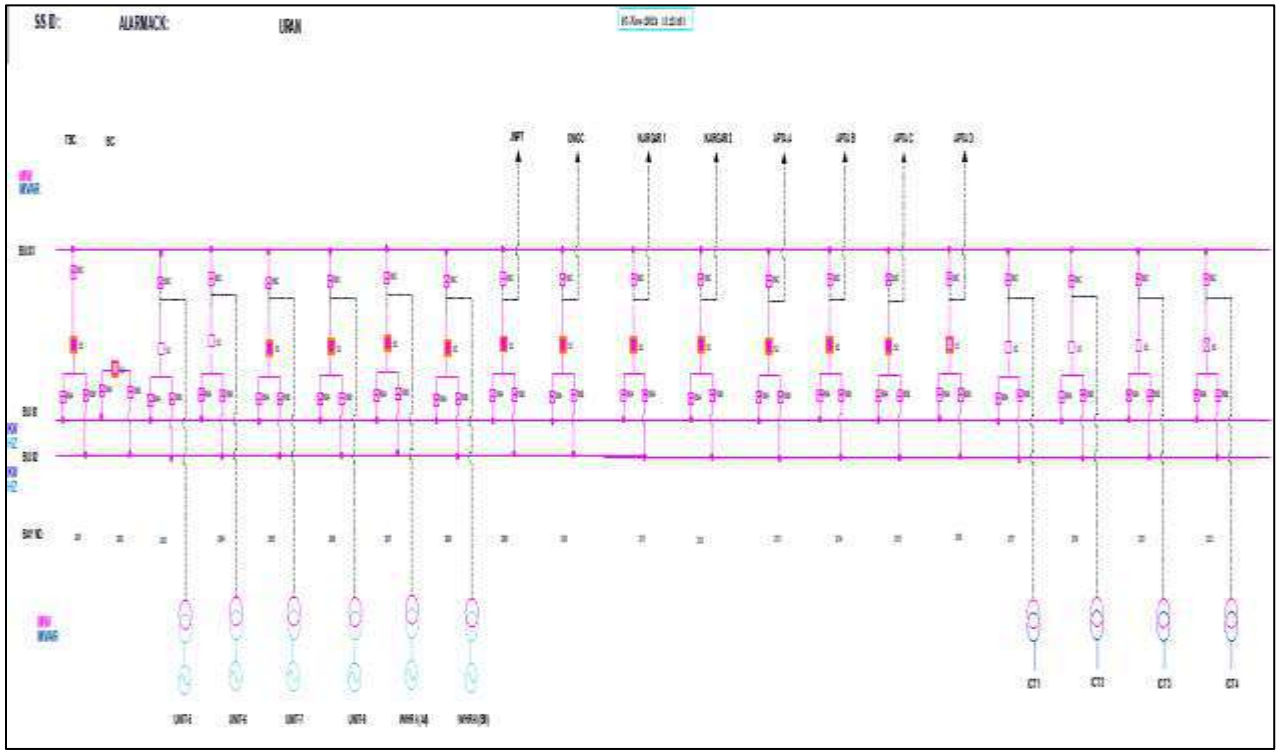
Type	Date & Time	Signal name	Status
P	10/1/2024 4:36:46:121 PM	Bay17 PROT TR	On
P	10/1/2024 4:36:46:121 PM	ZA BFP TRIP	On
P	10/1/2024 4:36:46:121 PM	ZA COMON TRIP	On
P	10/1/2024 4:36:46:427 PM	Bay17 PROT TR	Off
P	10/1/2024 4:36:46:427 PM	ZA BFP TRIP	Off
P	10/1/2024 4:36:46:427 PM	ZA COMON TRIP	Off
P	10/1/2024 7:01:39:580 PM	Bay17 to ZA	Off
P	10/1/2024 7:01:39:583 PM	Bay17 to ZA	On
P	10/1/2024 7:01:39:595 PM	Bay17 to ZA	Off

LBB EVENT-

Type	Date & Time	Signal name	Status
P	10/1/2024 4:38:37:908 PM	Bay17 PROT TR	On
P	10/1/2024 4:38:37:908 PM	ZA BFP TRIP	On
P	10/1/2024 4:38:37:908 PM	ZA COMON TRIP	On
P	10/1/2024 4:38:38:214 PM	Bay17 PROT TR	Off
P	10/1/2024 4:38:38:214 PM	ZA BFP TRIP	Off
P	10/1/2024 4:38:38:214 PM	ZA COMON TRIP	Off
P	10/1/2024 7:03:31:395 PM	Bay17 to ZA	Off

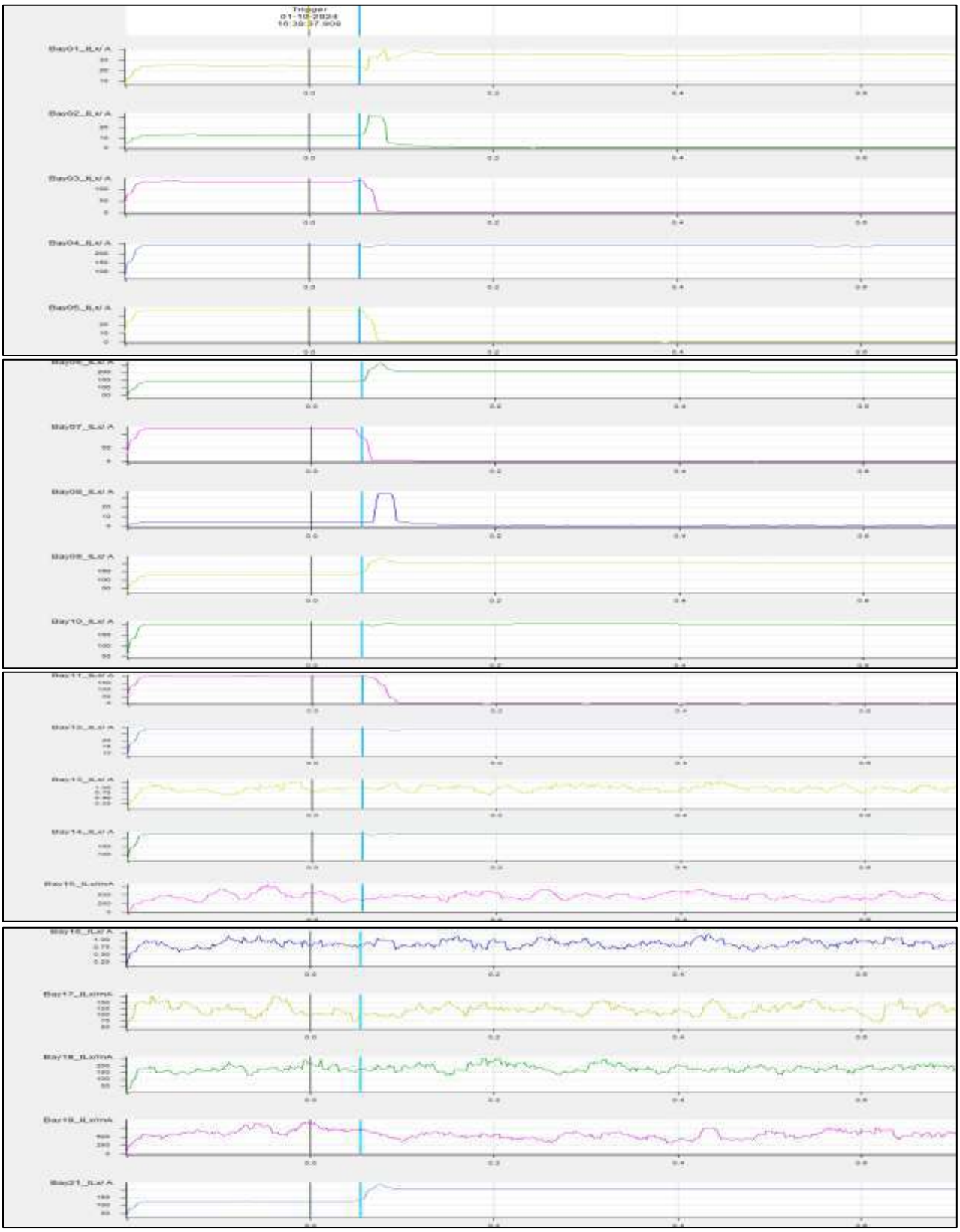
अनुलग्नक-2 / Annexure-2:

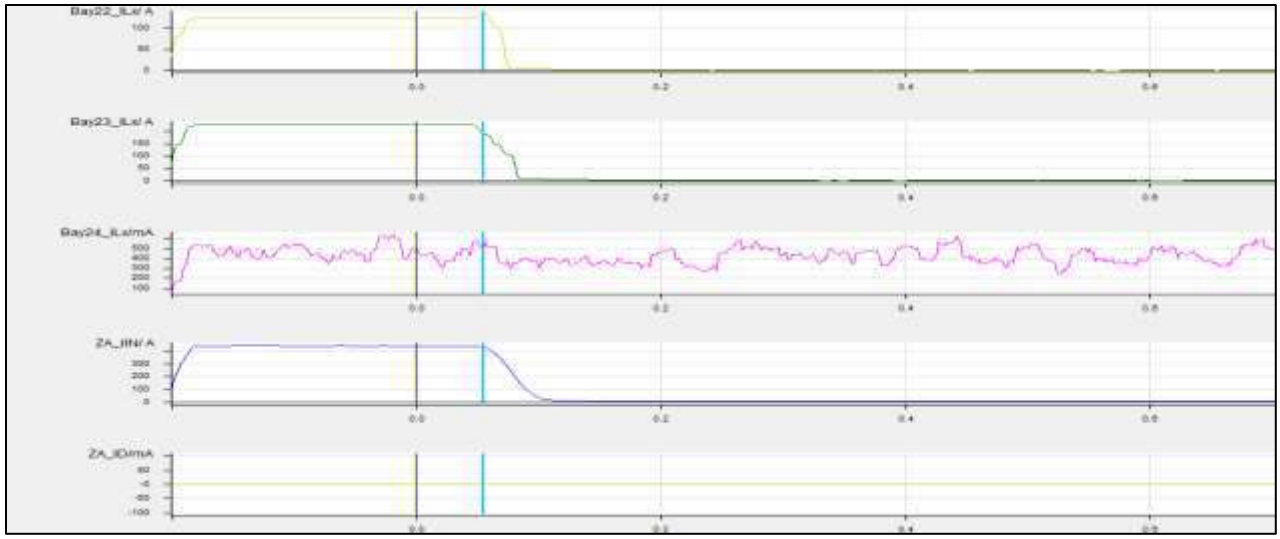
220 kV Uran SLD

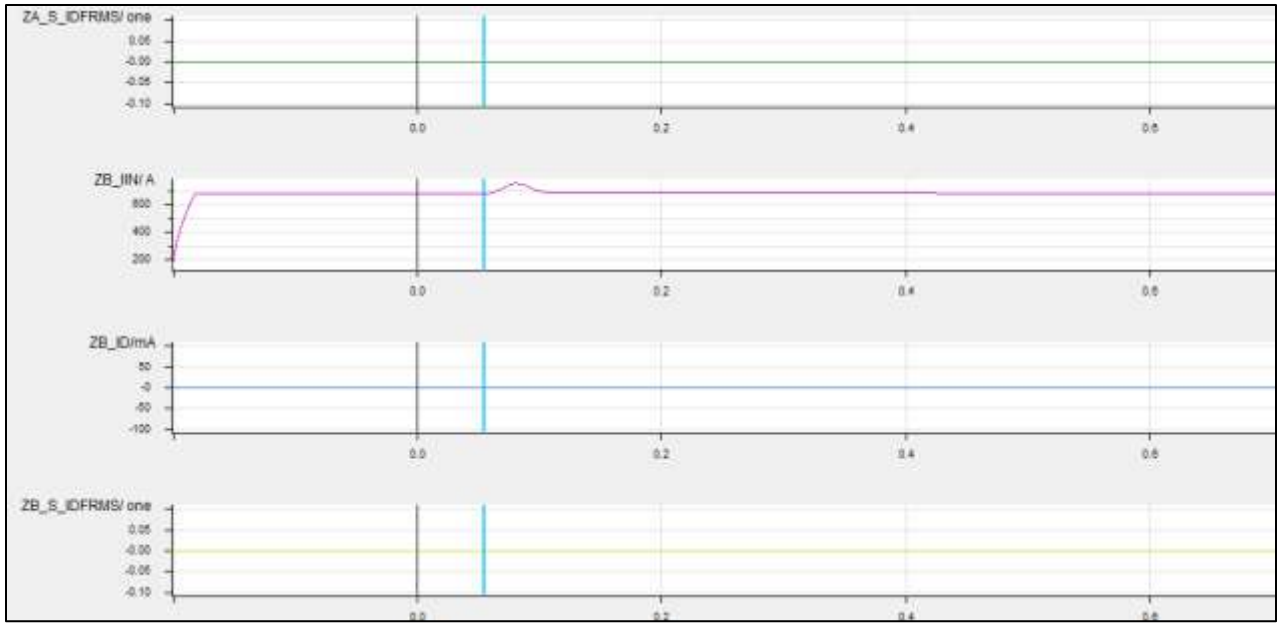


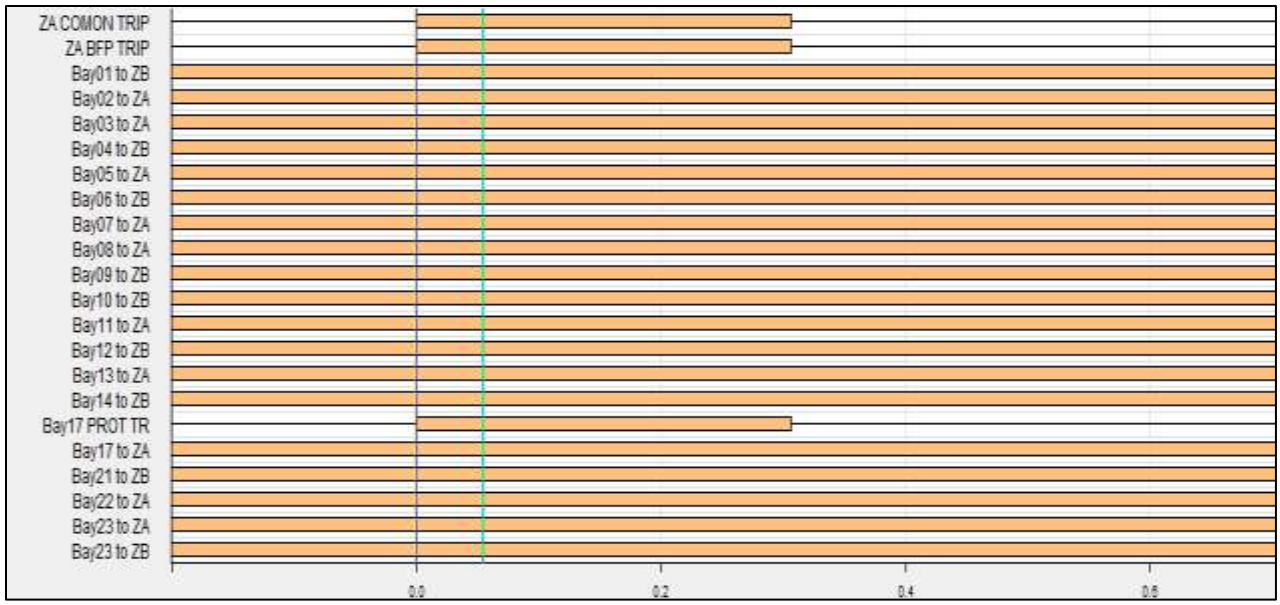
अनुलग्नक-3 / Annexure-3: Disturbance recorder –

A. DR of 220 kV Uran Bus 1




Bay22_IL1/ A
Bay23_IL1/ A
Bay24_IL1/mA
ZA_IIN/ A
ZA_ID/mA


ZA_S_IDFRMS/ one
ZB_IIN/ A
ZB_ID/mA
ZB_S_IDFRMS/ one


ZA COMON TRIP
ZA BFP TRIP
Bay01 to ZB
Bay02 to ZA
Bay03 to ZA
Bay04 to ZB
Bay05 to ZA
Bay06 to ZB
Bay07 to ZA
Bay08 to ZA
Bay09 to ZB
Bay10 to ZB
Bay11 to ZA
Bay12 to ZB
Bay13 to ZA
Bay14 to ZB
Bay17 PROT TR
Bay17 to ZA
Bay21 to ZB
Bay22 to ZA
Bay23 to ZA
Bay23 to ZB

अनुलग्नक-4 / Annexure-4 Any other photographs from MSETCL- Nil

के विजय कुमार

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 400 के॰वी. न्यू कोयना उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400 kV New Koyna Sub Station of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 08.11.2024

1. **घटना का सारांश / Event Summary:** At 02:15 hrs / 25-10-2024, Busbar protection operated in 400 kV New Koyna-Bus-2 due to B phase CT blast of 400 kV New Koyna-Karad-1 at Koyna, resulting in tripping of all connected elements. 2 lines connected with Bus-1 also tripped i.e. 400 kV New Koyna-Karad-1 on R phase fault and 400 kV New Koyna- Dabhol on B phase fault due to spreading of arc. Two machines at Koyna (4) running in condenser mode also got tripped. No generation or load loss occurred due to the event.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 02:15 hrs / 25-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Incident (GI)-2
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area:** New Koyna, Maharashtra
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand (DDDNH)
घटना के पूर्व Pre Event	49.98	61231	53513	12168	20434
घटना के बाद Post Event	50.04	61284	53471	12141	20400

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Clear

6. Bus positions-

Sr. No.	400 KV Main Bus — 1		400 KV Main Bus — II	
	Name of bays (Feeder/ ICTs/TFs)	loads (MW)	Name ot bays (Feeder/ **ICTs/TFs)**	Loads (MW)
1	400/220 KV ICT-2	130	400/220 KV ICT 1	124
2	400 KV Jaigad 2	417	400/220 KV ICT-3	123
3	400 KV Karad 2	134	400 KV Jaigad I	416
4	400 KVSTG IV -1	-102	400 KV STG IV-2	-103
5	400 KV Dabhol 1	-263	400 KV Karad-1	134
6			400/220 KV Spare ICT	Nil
7			400 KV Dabhol 2	-257

7. लोड और जेनरेशन हानि / Load and Generation loss: Nil



Figure 1. 400 kV New Koyna-Lonikhand-1 Frequency Plot

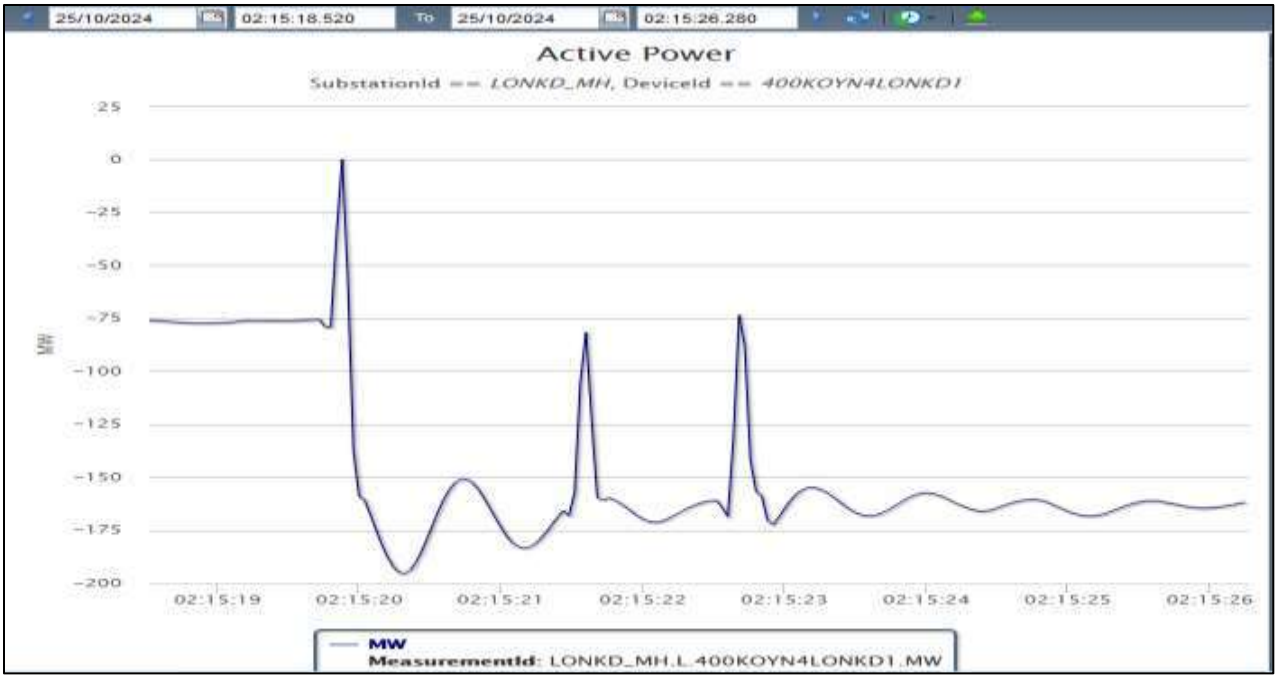


Figure 2. 400 kV New Koyna-Lonikhand-1 Active Power Plot

8. **रुकावट की अवधि / Duration of interruption:** 02 hrs 08 min.

9. **प्रभावित क्षेत्र का नक्शा / Network across the affected area**

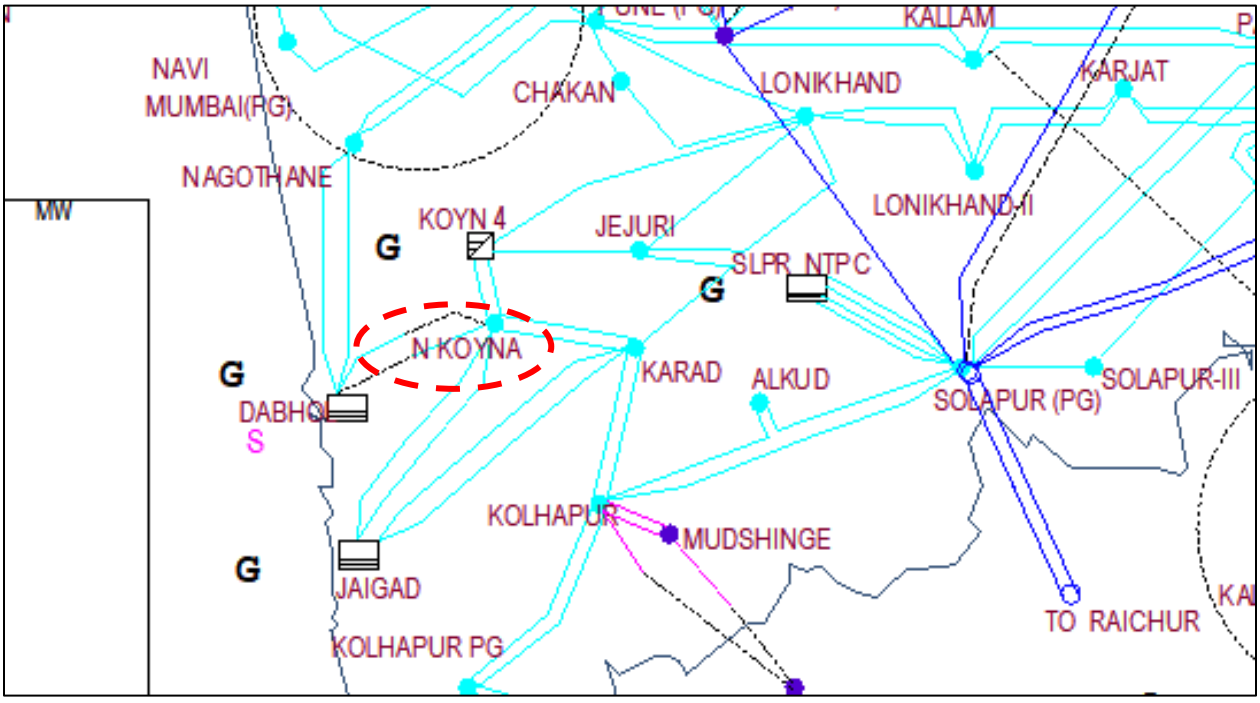


Figure 3. Network across the affected area

10. उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event): B phase CT on the 400 kV New Koyna-Karad Circuit 1 at New Koyna end

11. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Karad	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	400 kV New Koyna-Karad 2	02:15 hrs	Zone I Loc.— 117 Mtr, la= 14.29 kA (ABC) Fault resistance — 452. I md	R phase 1 rip, Z2 Carrier Aided Trip, lr- 2. 137 kA, Dist.- 72.5 Km, SOTF TOR	07:26 hrs
2	400 kV New Koyna-Karad I	02:15 hrs	Started phase B-N, Fault duration '45. I 8ms relay	B phase Trip. Z2 Carrier Aided Trip. Ic- 3. I SS kA. Dist.- 72.5 Km.	08:29 hrs on 26.10.2024
3	400 kV New Koyna-Dabhol-2	02:15 hrs	Started phase B Fault	Phase-B- N, Z- I. Dist'19.65km, lC'2. 136 kA	09:14 hrs
4	400/220 kV New Koyna-Dabhol 1	02:15 hrs	Zone 1, phase- B- N, Fault location= 0 Mtr, IC—2 kA	Phase-B- N, Dist.= 19.75kio, lC =2.137 kA	09:22 hrs
5	400 kV BUS-2 New Koyna	02:15 hrs	Zone B Optd.	NA	04:23 hrs
6	400 KV Bus Coupler New Koyna	02:15 hrs	86 Optd.	NA	04:23 hrs
7	400/220 kV ICT-1 New Koyna	02:15 hrs	Bus bar protection operated	NA	4:30 Hrs
8	400/220 kV ICT-3 New Koyna	02:15 hrs	Bus bar protection operated	NA	4:26 Hrs
9	400 kV New Koyna-Jaigad	02:15 hrs	Bus bar protection operated	Not given by MSETCL	4:42 Hrs

12. घटना का विश्लेषण / Event Analysis (Based on PMU, SCADA & DR) as explained by MSETCL:

- *"The failure of the B phase CT on the 400 kV New Koyna-Karad Circuit 1 resulted into the operation of the 400 kV Bus Bar protection Zone II, leading to the tripping of all bays connected to Bus II.*
- *The B phase CT of 400 kV New Koyna-Karad Circuit 1 caught fire and smoke from the fire reached the nearest phase of the 400kV New Koyna-Karad Circuit II (**On Bus-1)**, specifically the R phase stub bus insulator string after the CT location. This led to the tripping of the 400 kV New Koyna Circuit II on distance protection, with auto reclosing operation & lockout shot from both ends.*
- *400kV New Koyna Dabhol-1 (**On Bus-1)** line tripped on distance protection (B Phase, Z-I, Dist-0 Mtr) from New Koyna end. For previous faults relay distance protection operation is in order. Tripping date -14.10.2024@17:30 Hrs, Dist -2.956Km. R Phase, Ir-18.5 kA. Z-I. However, relay testing will be carried out in next Outage.*
- *400KV Dabhol New Koyna Ckt-I & II both lines tripped on distance protection from Dabhol end in Zone-I (Dist 19.75 Km & 19.65 km respect.). Further, after verification of settings parameters of MICOM P443 (M-1) relay of both lines, ground compensation factor (kZN) was incorrect, same was changed in both the relays and kept under observations."*

WRLDC observations-

- 2 lines connected with Bus-1 i.e. 400kV New Koyna Dabhol-1 & 400kV New Koyna-Karad Circuit II tripped on distance protection due to spreading of Arc/fire as informed by MSETCL telephonically. High Fault current is observant from DR.
- Bus Bar protection signal is not reflected in the DRs shared for lines which needs to be checked by MSETCL whether the signals are through or not.
- Dhabhol end A/R is not available as informed by MSETCL telephonically which should be in service.

- As informed by MSETCL, distance of fault in 400KV Dabhol New Koyna Ckt-I & II was wrong due to ground compensation factor (kZN) which is corrected.

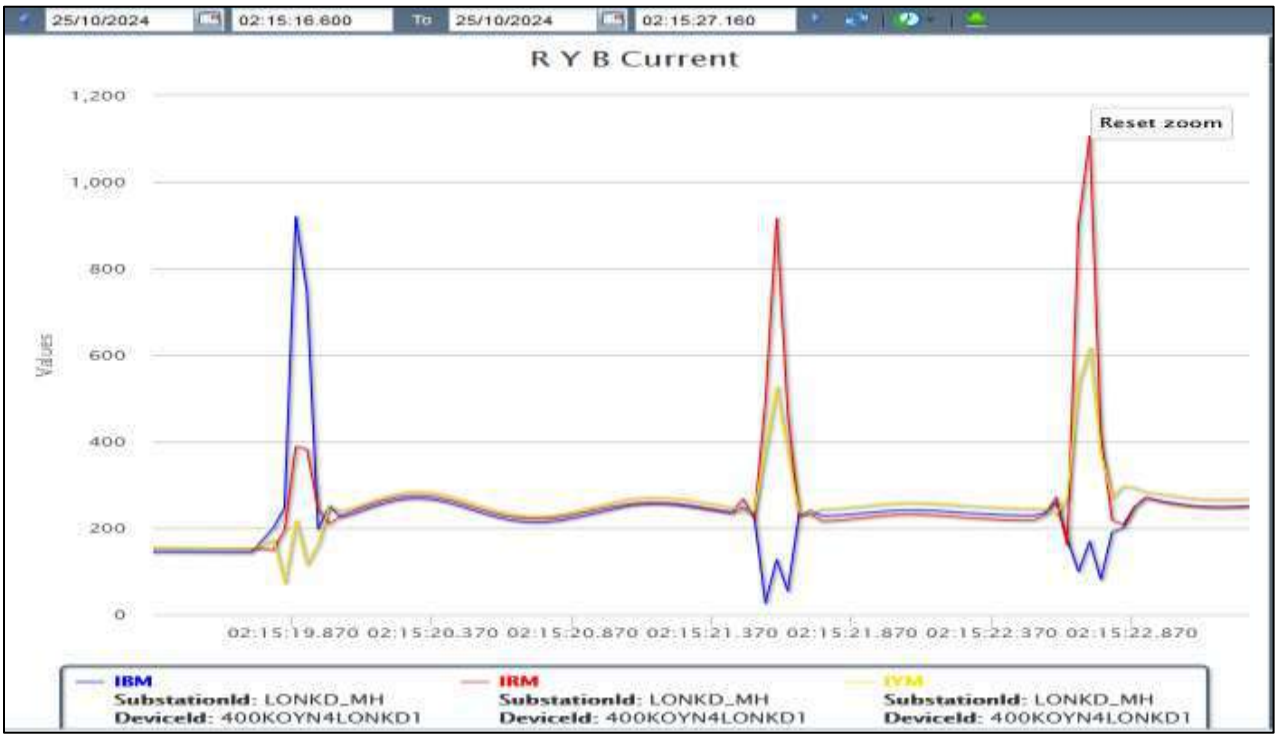


Figure 4. PMU Current plot of 400 kV New Koyna-Lonikhand-1

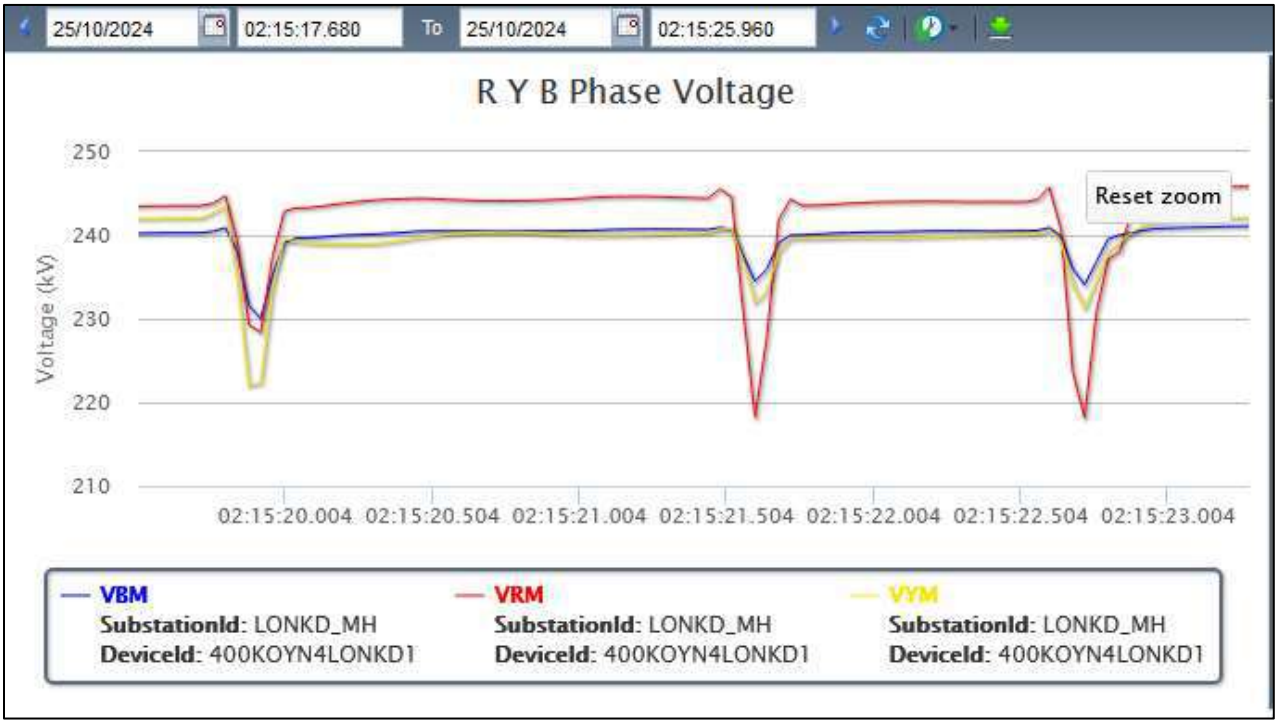


Figure 5. PMU Voltage plot of 400 kV New Koyna-Lonikhand-1

13. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Bus Bar protection signal is not reflected in the DRs shared for lines which needs to be checked by MSETCL whether the signals are through or not.
- Dhabhol end A/R is not available as informed by MSETCL telephonically which should be in service.
- As informed by MSETCL, distance of fault in 400KV Dabhol New Koyna Ckt-I & II was wrong due to ground compensation factor (kZN) which is corrected.

14. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Bus Bar protection signal is not reflected in the DRs shared for lines which needs to be checked by MSETCL whether the signals are through or not.
- Dhabhol end A/R is not available as informed by MSETCL telephonically which should be in service.
- MSETCL informed that, the distance protection relay of 400KV New Koyna Dabhol Ckt-1 line at New Koyna end will be tested in next outage.
- MSETCL informed that, 400 kV Dabhol New Koyna Ckt -1 &II distance protection relays at Dabhol end will be tested in outages for updated ground compensation factor.
- MSETCL informed that, Cleaning of equipment and insulator strings needs to be carried out, as algae formation has been observed due to heavy monsoon.
- MSETCL informed that, Equipment (C.B. CT. CVT. LA, CC) that has completed 25 years of service life needs to be replaced by preparing an L.E scheme.
- MSETCL informed that, Stub bus insulator strings & 220KV & 400 KV Bus strings that has completed 25 years of service life needs to be replaced, by antifog insulator strings.

15. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from MH
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	DR's received late.
3.	Detailed report not received in 7 days	IEGC section 37.2 (e)	Detailed report received late i.e. on 05.11.2024
3.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted at Dabhol end as it's not in service.

16. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

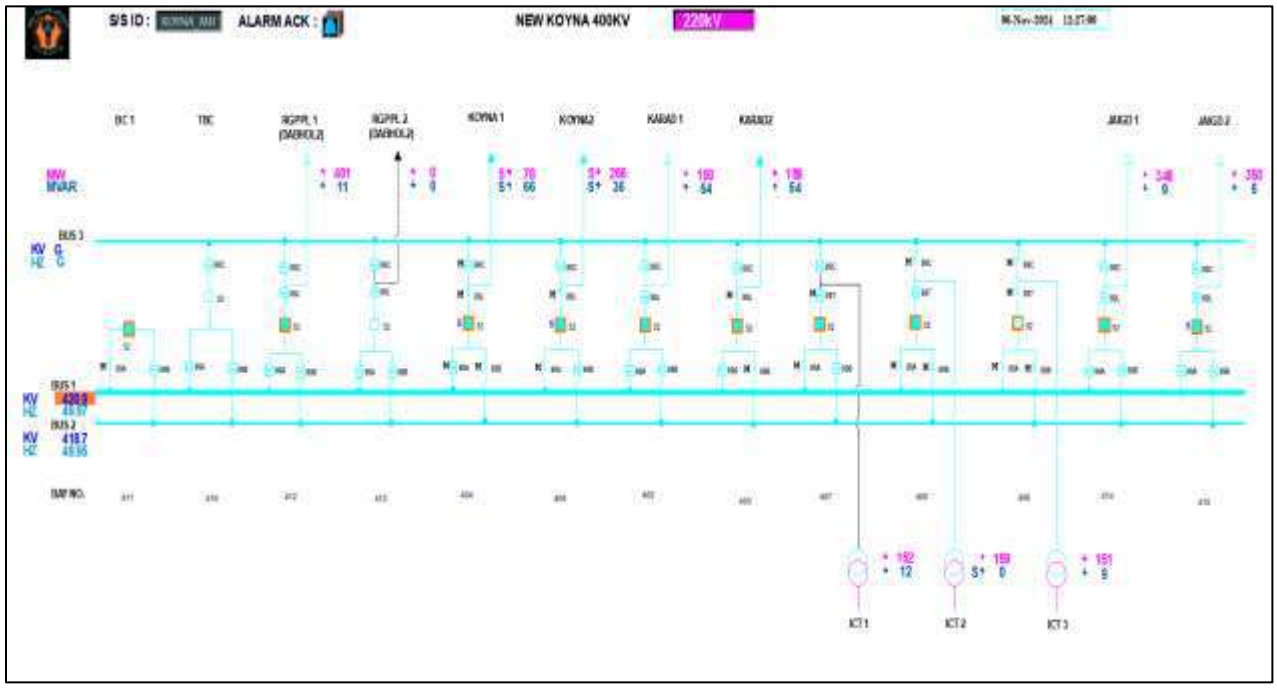
अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC –

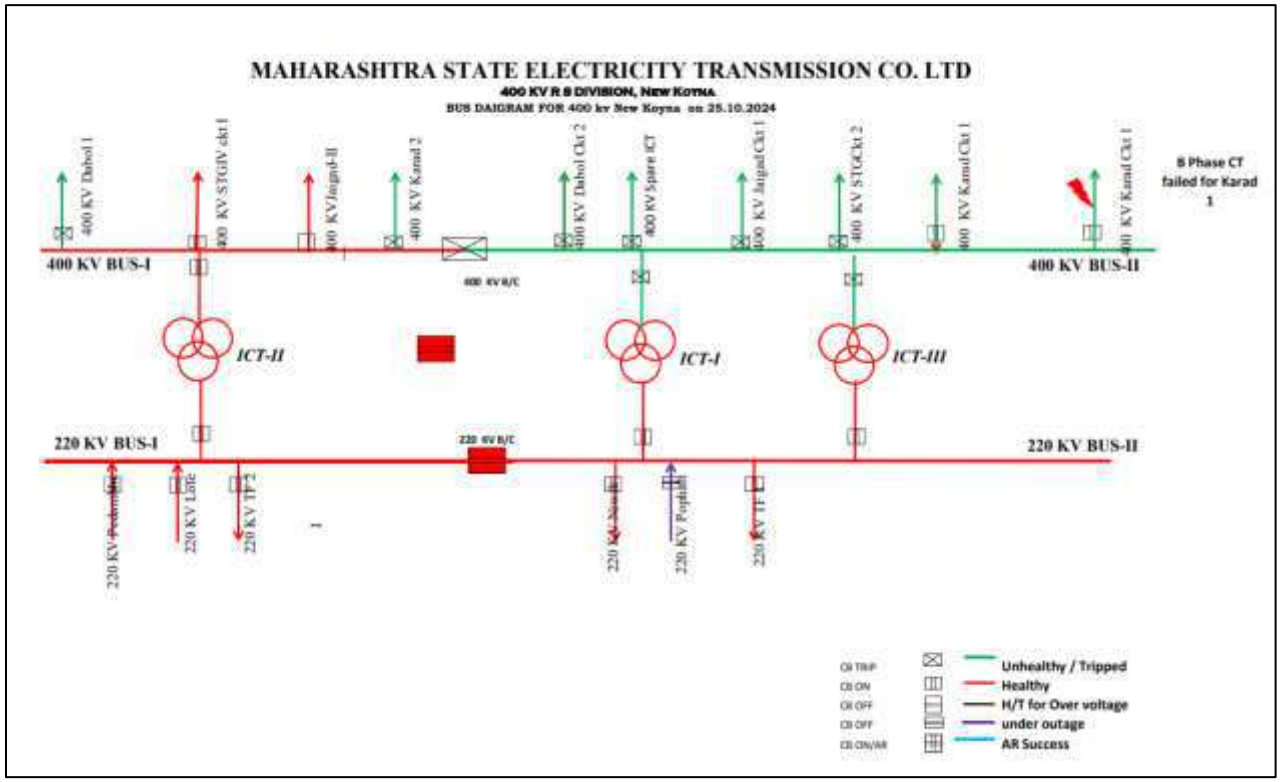
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	400KV-CB	KARD4_MH	KARAD 400 CB 40852 (KOYNA-1) OPEN	02:15:19	964
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 40752 (T1) FAULTY	02:15:20	195
WRLDC	400KV-CB	KOYN4_MH	KOYNA4 CB 40452 (KOYNA-2) OPEN	02:15:20	196
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB CB 41152 FAULTY	02:15:20	195
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 41452 (JAIGD-1) FAULTY	02:15:20	196
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 40752 (T1) OPEN	02:15:20	196
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB CB 41152 OPEN	02:15:20	196
WRLDC	400KV-CB	JAIGD_MH	JAIGAD 400KV CB 40152 (KOYNA-1) OPEN	02:15:20	446
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB CB T4_LD_XF1 OPEN	02:15:21	0
WRLDC	400KV-CB	RGPPL_GS	RGPPL NTPC GAIL CB TIE 22 - CB 42252 OPEN	02:15:21	499
WRLDC	400KV-CB	RGPPL_GS	RGPPL NTPC GAIL CB 44152 (KOYNA-2) OPEN	02:15:21	506
WRLDC	400KV-CB	RGPPL_GS	RGPPL NTPC GAIL CB TIE 42 - CB 44252 OPEN	02:15:21	511
WRLDC	400KV-CB	KARD4_MH	KARAD 400 CB 40952 (KOYNA-2) FAULTY	02:15:21	653
WRLDC	400-SOE	MAUDA_GS	MAUDA TPS XFMR_P 41_T1 (Primary) ACTED	02:15:26	206
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 41452 (JAIGD-1) OPEN	02:15:26	406
WRLDC	220KV-CB	KOYNA_MH	NEW KOYNA CB 20452 (T1) FAULTY	02:15:26	406
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 40252 (KARD4-1) OPEN	02:15:26	406
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 40852 (T3) OPEN	02:15:26	406
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 41352 (RGPPL-2) OPEN	02:15:26	406
WRLDC	220KV-CB	KOYNA_MH	NEW KOYNA CB 20452 (T1) OPEN	02:15:26	406
WRLDC	400KV-CB	KARD4_MH	KARAD 400 CB 40952 (KOYNA-2) OPEN	02:15:22	872
WRLDC	400KV-CB	KOYN4_MH	KOYNA4 CB CB 40752 (U1) OPEN	02:15:27	156
WRLDC	400KV-CB	KOYN4_MH	KOYNA4 CB CB 41052 (U4) OPEN	02:15:27	156
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB 40352 (KARD4-2) OPEN	02:15:27	156
WRLDC	400KV-CB	KOYNA_MH	NEW KOYNA CB CB T4_LD_XF3 OPEN	02:15:29	0

अनुलग्नक-2 / Annexure-2:

400 kV New Koyna SLD from WRLDC SCADA

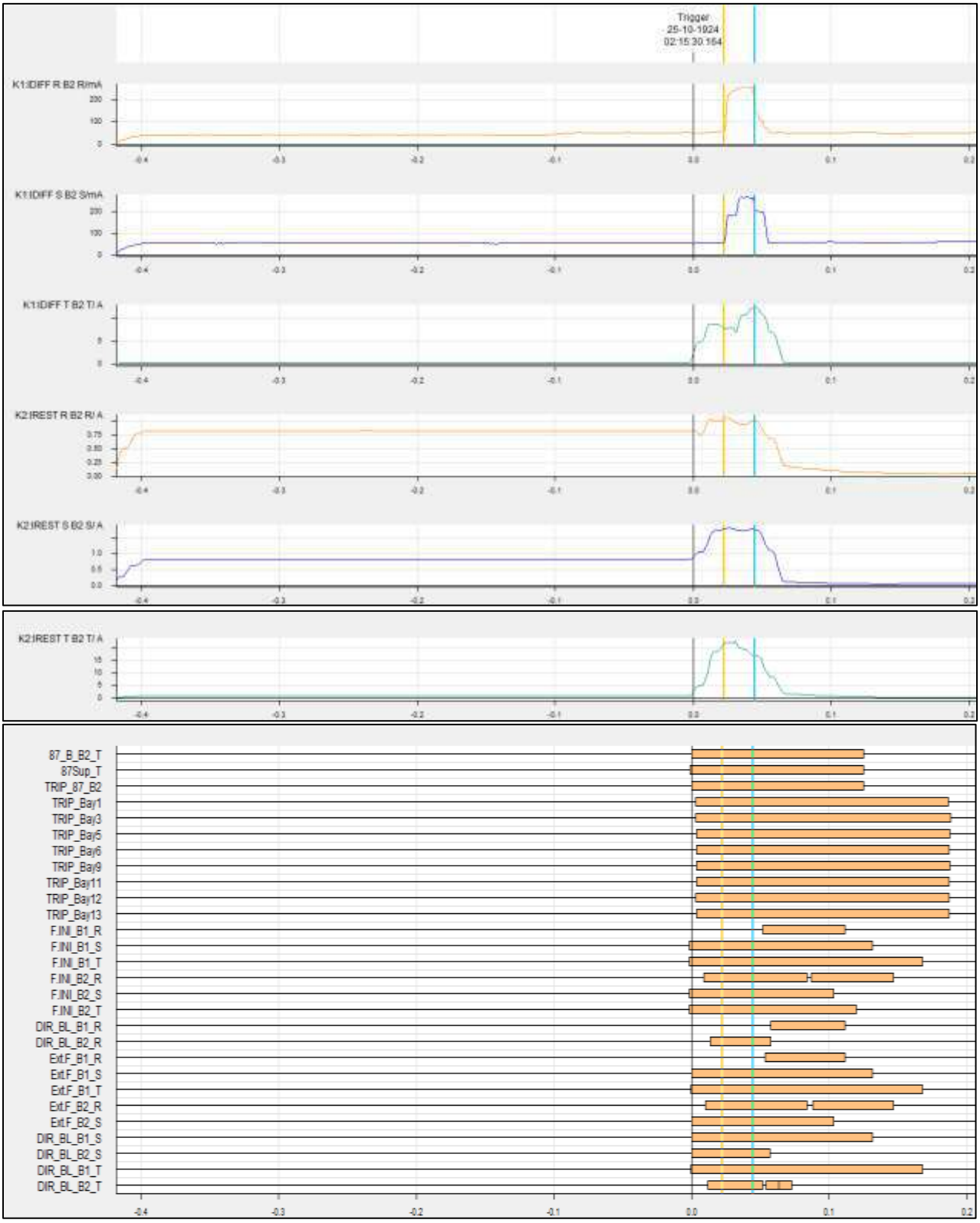


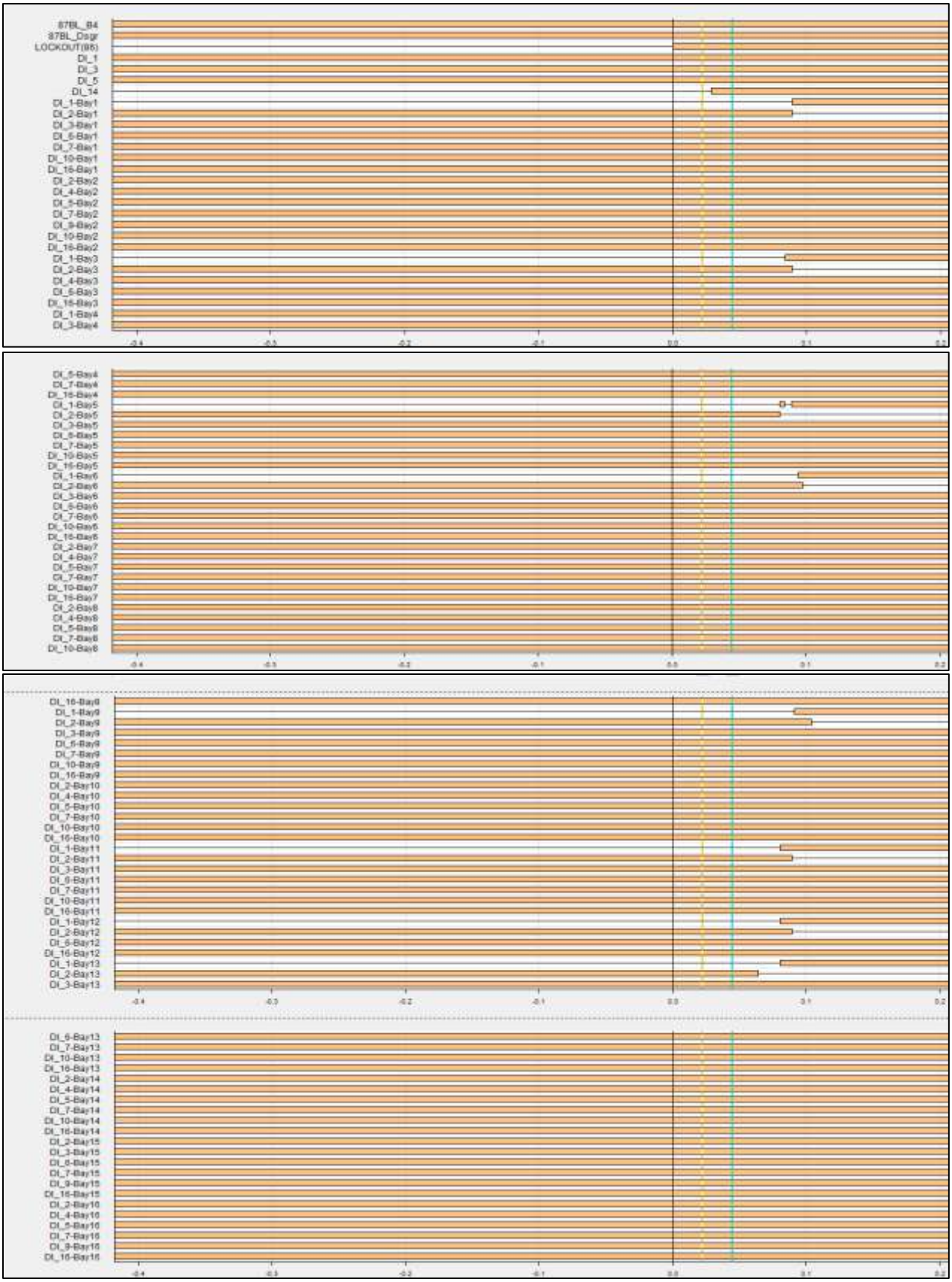
400 kV New Koyna SLD from SLDC Maharashtra



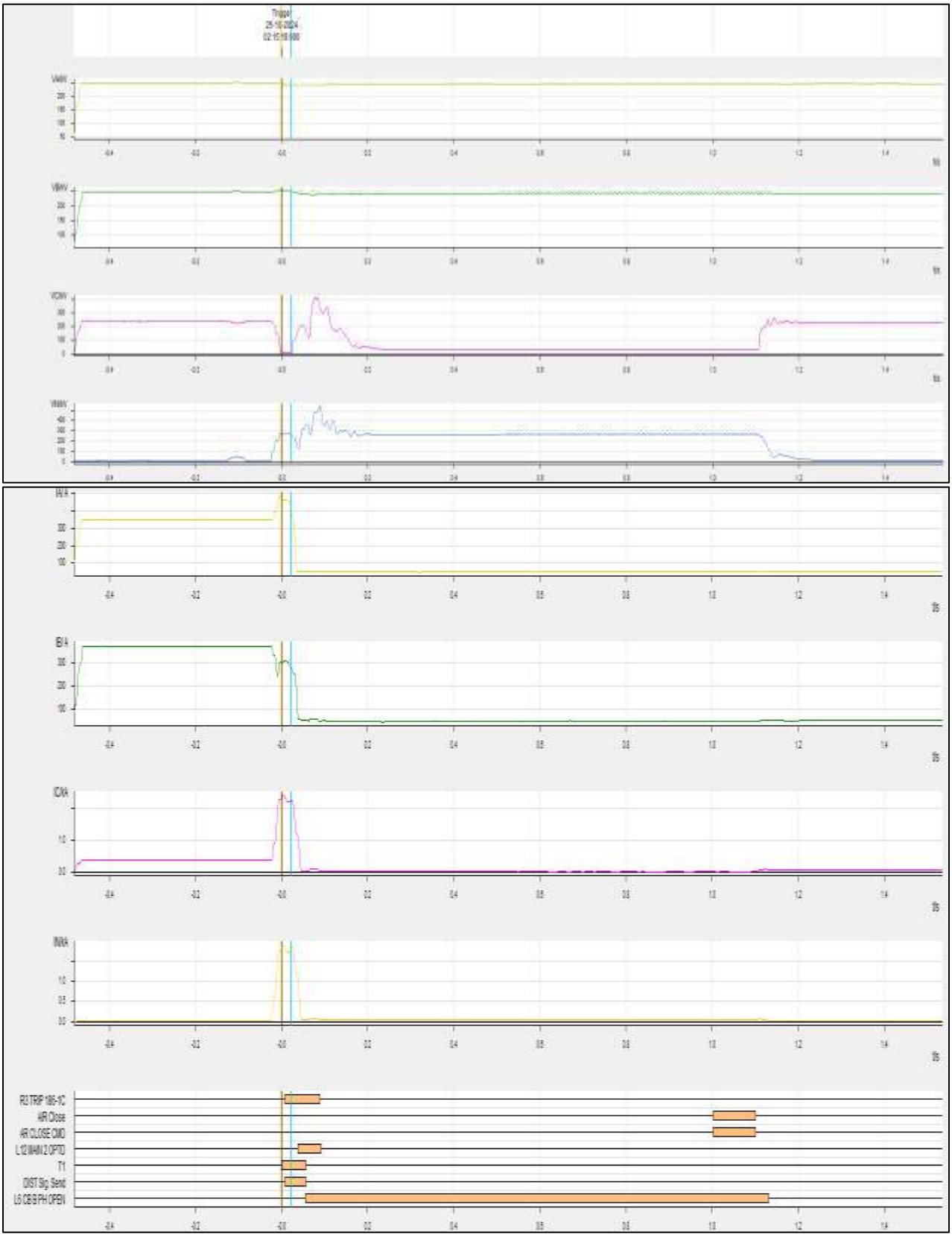
अनुलग्नक-3 / Annexure-3: Disturbance recorder –

A. DR (Event) for 400 kV New Koyna Bus-2

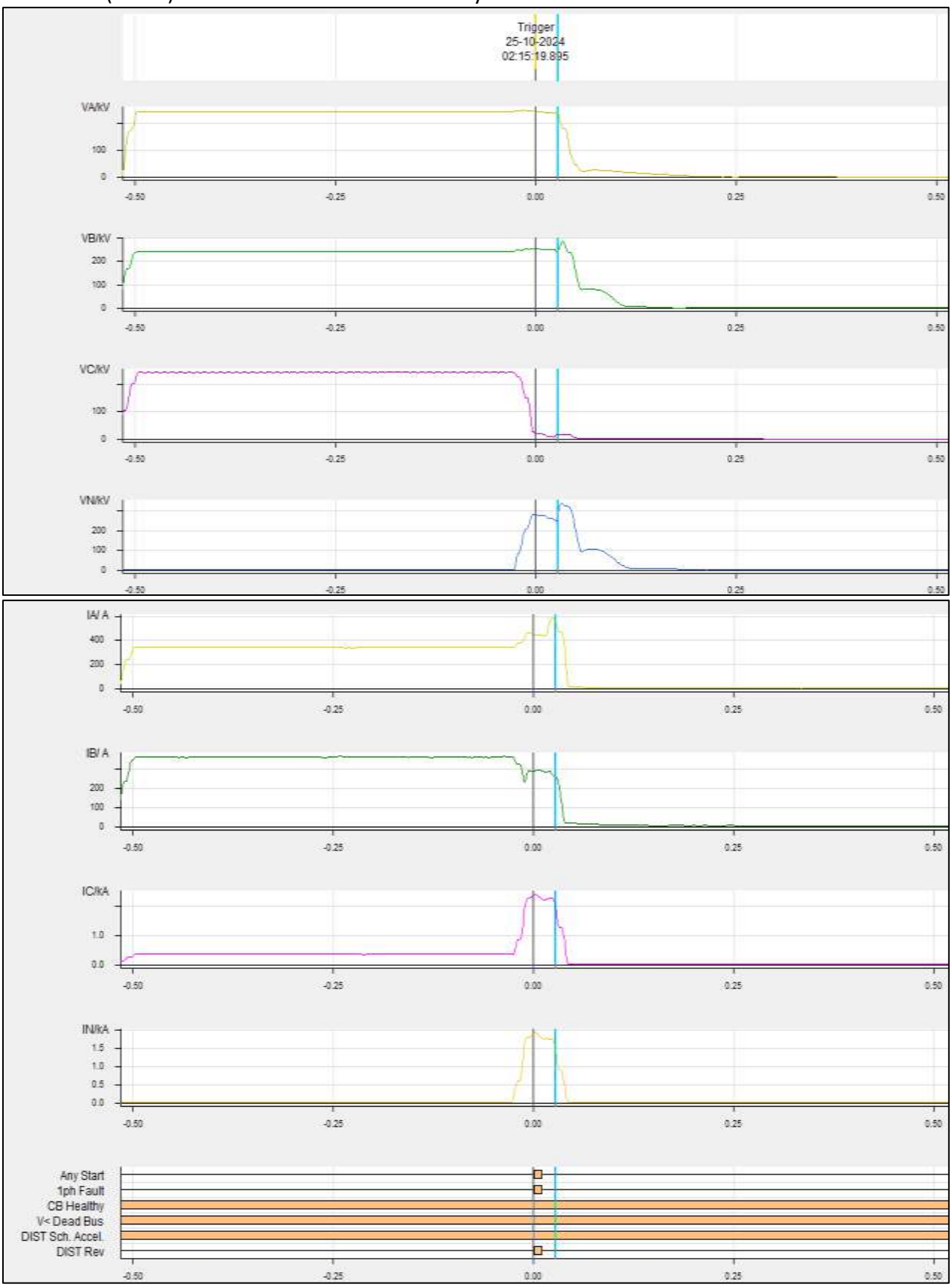



87BL_B4
87BL_Dsgr
LOCKOUT(86)
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DI_2-Bay1
DI_3-Bay1
DI_5-Bay1
DI_7-Bay1
DI_10-Bay1
DI_16-Bay1
DI_2-Bay2
DI_4-Bay2
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DI_7-Bay2
DI_9-Bay2
DI_10-Bay2
DI_16-Bay2
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DI_16-Bay16

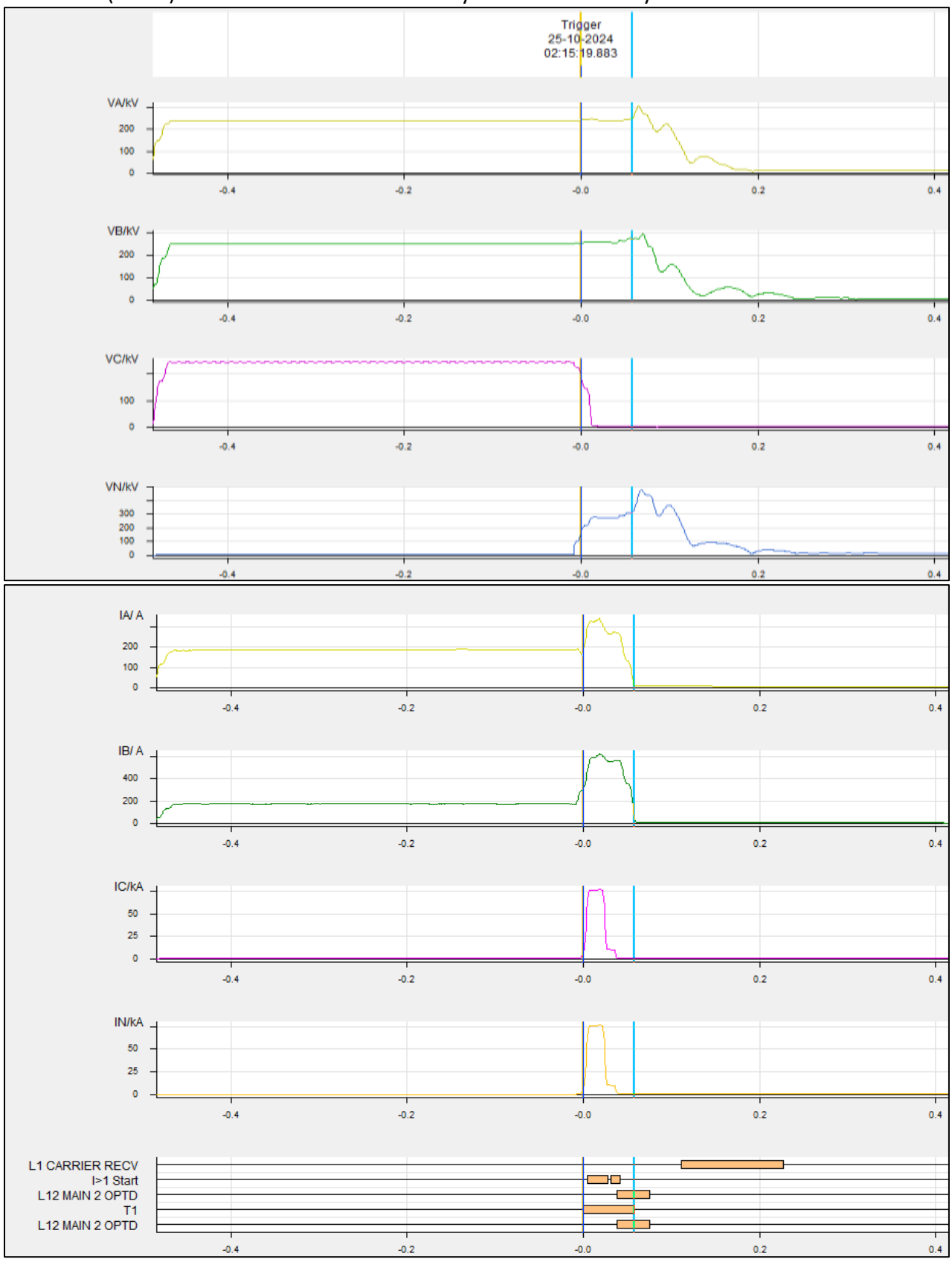
B. DR (Event) for 400kV Dhabol-1 at New Koyna end



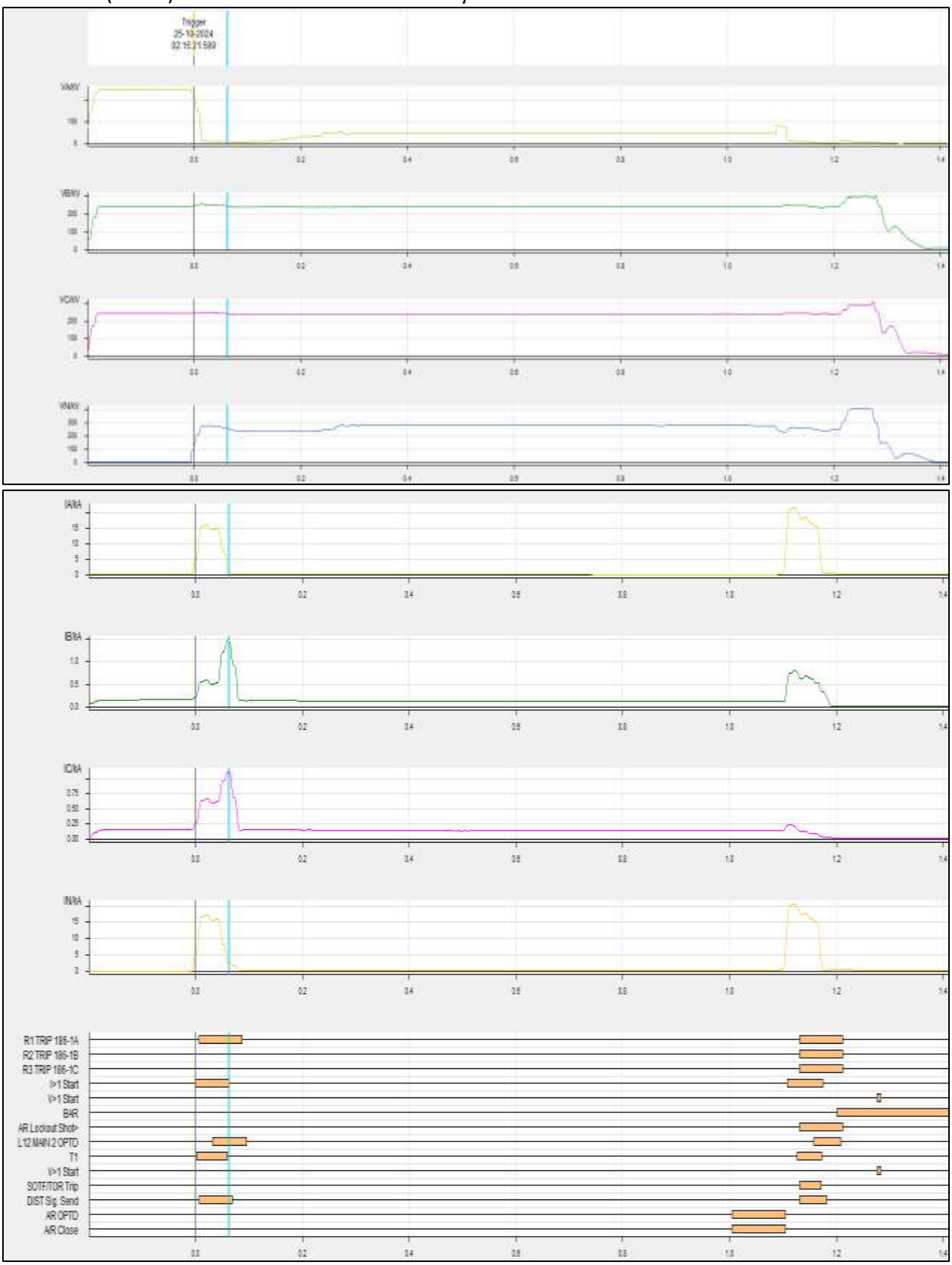
C. DR (Event) for 400kV Dhabol-2 at New Koyna end



D. DR (Event) for 400kV Karad-1 at New Koyna end at New Koyna end



E. DR (Event) for 400kV Karad-2 at New Koyna end



अनुलग्नक-4 / Annexure-4 Any other photograph-Nil.

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
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पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 400/220 के°वी. कलवा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400/220 kV Kalwa of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 08.11.2024

1. **घटना का सारांश / Event Summary** : At 16:22 hrs / 30.10.2024, 220 kV Borivali -CTRLS line tripped due to B phase LA failure on CTT (Cable termination tower). This LA fell under induction zone of 220 kV Kalwa-Pawne line lead to flowing of heavy fault current. 220 kV Kalwa-Pawane line B phase jumper between Line isolator and CB broken down and grounded & 220 kV Main Bus B and all connected elements tripped at Kalwa SS along with 400/220kV ICT 1& 2 at Kalwa. No load loss reported by MSLDC. However, during charging of 220kV Kalwa-Colorchem line, LTS operated at Colorchem at 16:56 Hrs & 47 MW load loss occurred as informed by MSLDC, Load restored at 17:16 hrs.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 16:22 hrs / 30.10.2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Incident (GI)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Kalwa, Maharashtra
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand	मुंबई मांग Mumbai Demand
घटना के पूर्व Pre Event	49.97	71442	62322	14097	25355	3569

घटना के बाद **Post Event**	50.03	71420	61985	14013	25033	3422

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Clear

6. **लोड और जेनरेशन हानि / Load and Generation loss**: MSLDC has reported nil load loss and 47 MW load loss reported due to LTS operation at Colorchem at 16:56 Hrs while charging the line.



Figure 1. 400 kV Kalwa- Padghe-2 Frequency Plot

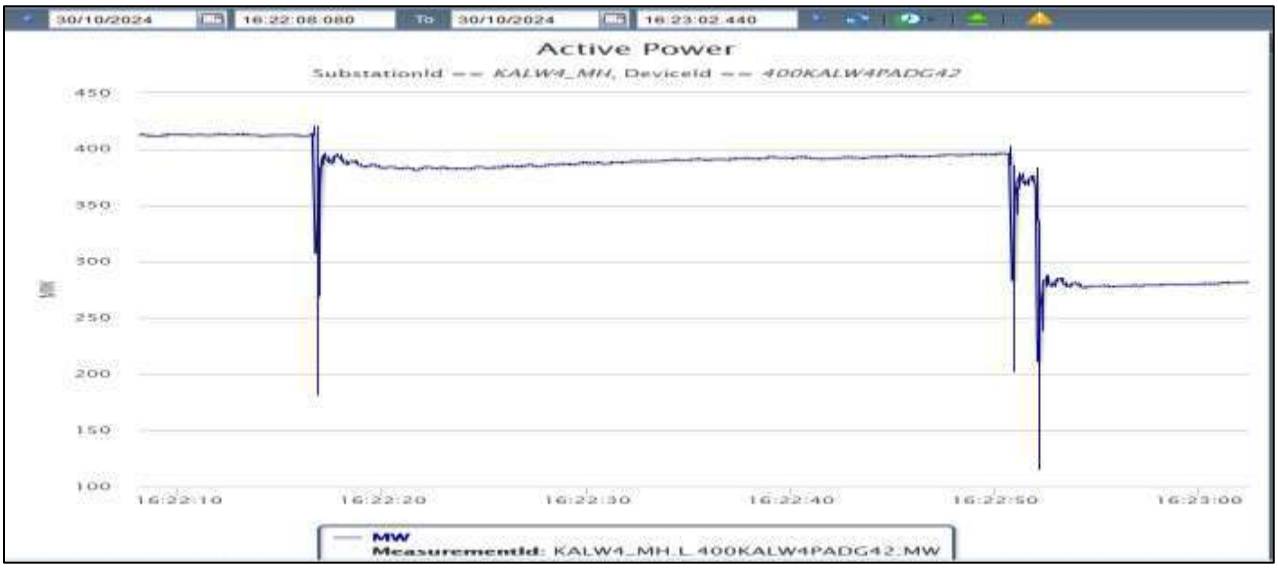


Figure 2. 400 kV Kalwa- Padghe-2 Active Power Plot

7. रुकावट की अवधि **/ Duration of interruption:** 15 Minutes

8. **प्रभावित क्षेत्र का नक्शा / Network across the affected area:**

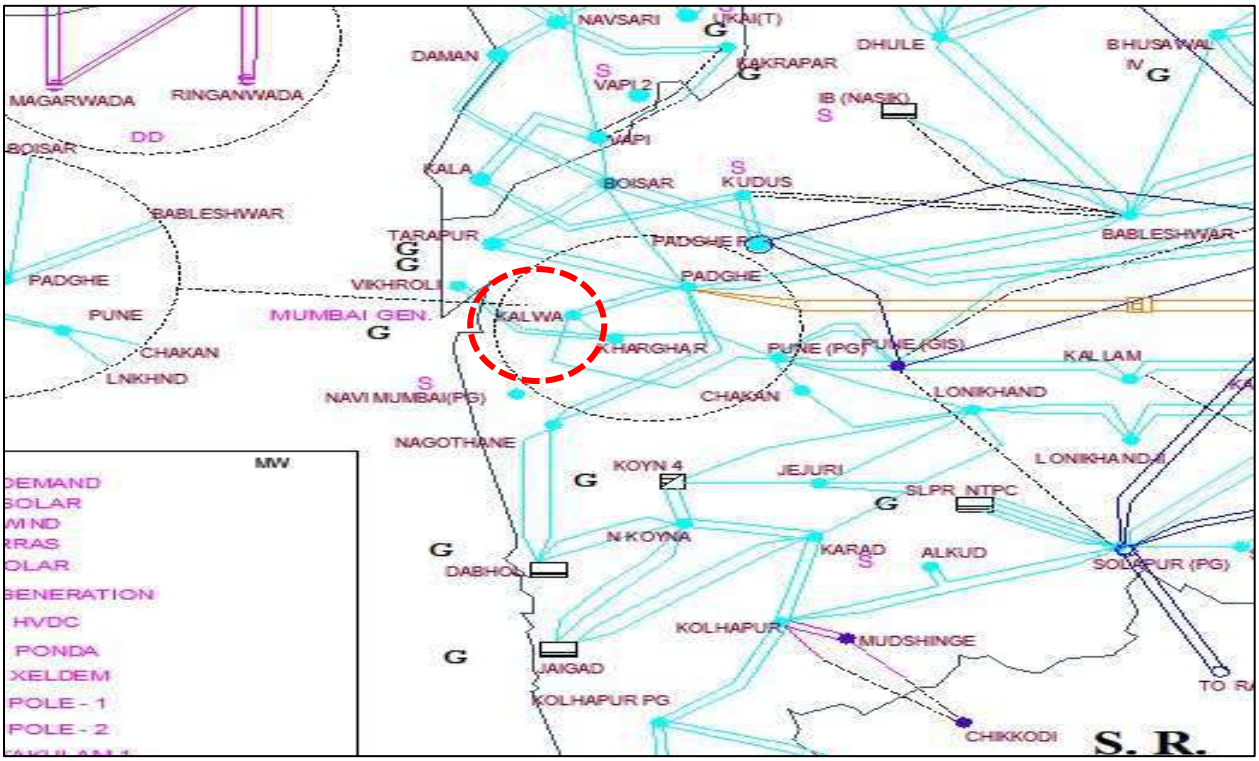


Figure 3. Network across the affected area

9. **उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event):** 220 kV Borivali -CTRLS B ph LA and Wave trap of 220 kV Kalwa Pawne failed .

10. **संचरण लाइन / उत्पादन इकाई जो घटना के दौरान बंद हो गयी Transmission/Generation element Tripped during the event** :

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220kV Pawane (Old TIFPIL LILO)	16:22	Diff./Dist. Prot. Optd. AR Optd. AR Lockout Diff. Comm. Fail 87L GE MiCom P545 LED Indication: B-ph Zone-1	Bus fault 87L GE MiCom P545 LED Indication: B-ph Zone-1 Trip	Under BD

			Trip Diff. Comm. Fail AR Block AR Optd. AR Lockout Reip Relay: 1-ph 86C 3-ph 87T	Diff. Comm. Fail AR Block AR Optd. AR Lockout	
2	500MVA ICT-1 at Kalwa	16:22	HV Side: Relays Tripped: 1) Tripping relay 86 ITC (5 elements) 2) Tripping relay 86 ITD (5 elements) 3) Tripping relay 86X (5 elements)		16:40
3	600MVA ICT-2 at Kalwa	16:22	HV Side: Relays Tripped: 1) Tripping relay 86 ITC (5 elements) 2) Tripping relay 86 ITD (5 elements) 3) Tripping relay 86X (5 elements)		16:37
4	220kV Borivali-Kalwa	16:22	No fault Tripped on B-Bus trip		17:03
5	220kV Mulund-Kalwa -1	16:22	No fault Tripped on B-Bus trip	NA	17:06
6	220kV Salsette-Kalwa -3	16:22	No fault Tripped on B-Bus trip	NA	17:03
7	220kV DCHI-Kalwa	16:22	No fault Tripped on B-Bus trip	NA	16:56
8	220kV Interconnector 52A	16:22	No fault Tripped on B-Bus trip	NA	16:56

11. घटना का विश्लेषण / Event Analysis (Based on PMU, SCADA & DR) as explained by MSETCL–

"220kV B-Bus tripped due to B-ph conductor snap and grounding of between D-isolator to CB.

The series event happened during this fault are as below:

- *In Kalwa complex, on multi-circuit CTT(Cable Terminating Tower) tower, B-ph LA of 220kV CTRLS-Borivali line broken and fell on B-ph cross arm of 220kV Kalwa-Pawane line on CTT in Kalwa complex.*
- *B-ph to Earth fault occurred on 220kV Kalwa-Pawane line and Line 87L Diff. Prot. Operated and AR operation was successful at both ends.*

- ***After 10.203 seconds from the first fault**, In between, Differential Communication fail recorded in 87L of 220kV Kalwa-Pawane line.*

- ***After approax 34 seconds from the first fault**, i.e. after CB reclaim time, again B-ph to Earth fault occurred on 220kV Kalwa-Pawane line but in this case Distance Zone-1 protection operated along with successful AR attempt and reclaim time started. However meanwhile B-Bus tripped.*

- *220kV B-Bus BB protection operated at 400kV Kalwa SS as jumper between 29D and CB along with 29D isolator jaw of 220kV Kalwa-Pawane line broken and grounded."*

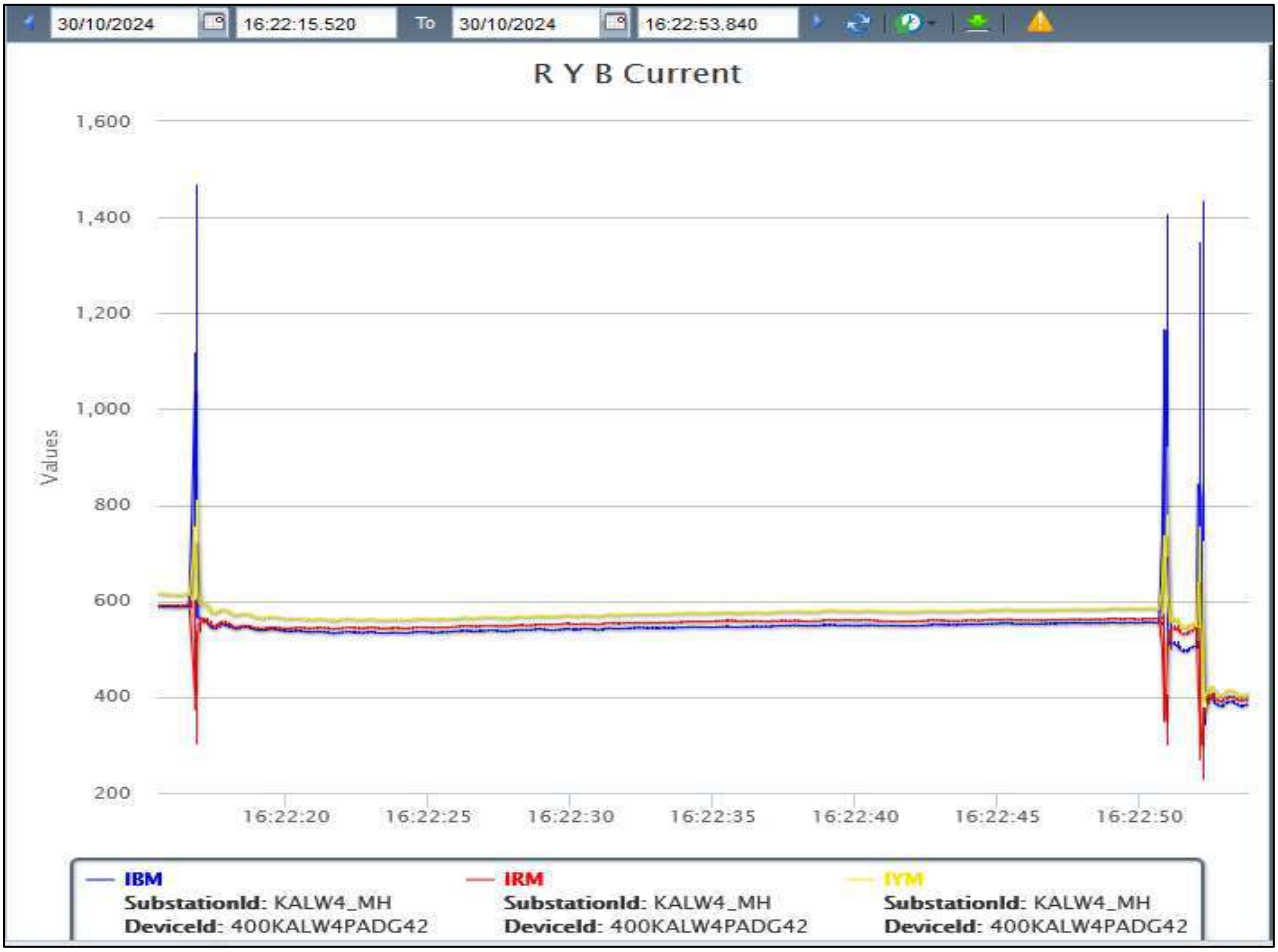


Figure 4. PMU Current plot of 400 kV Kalwa- Padghe-2

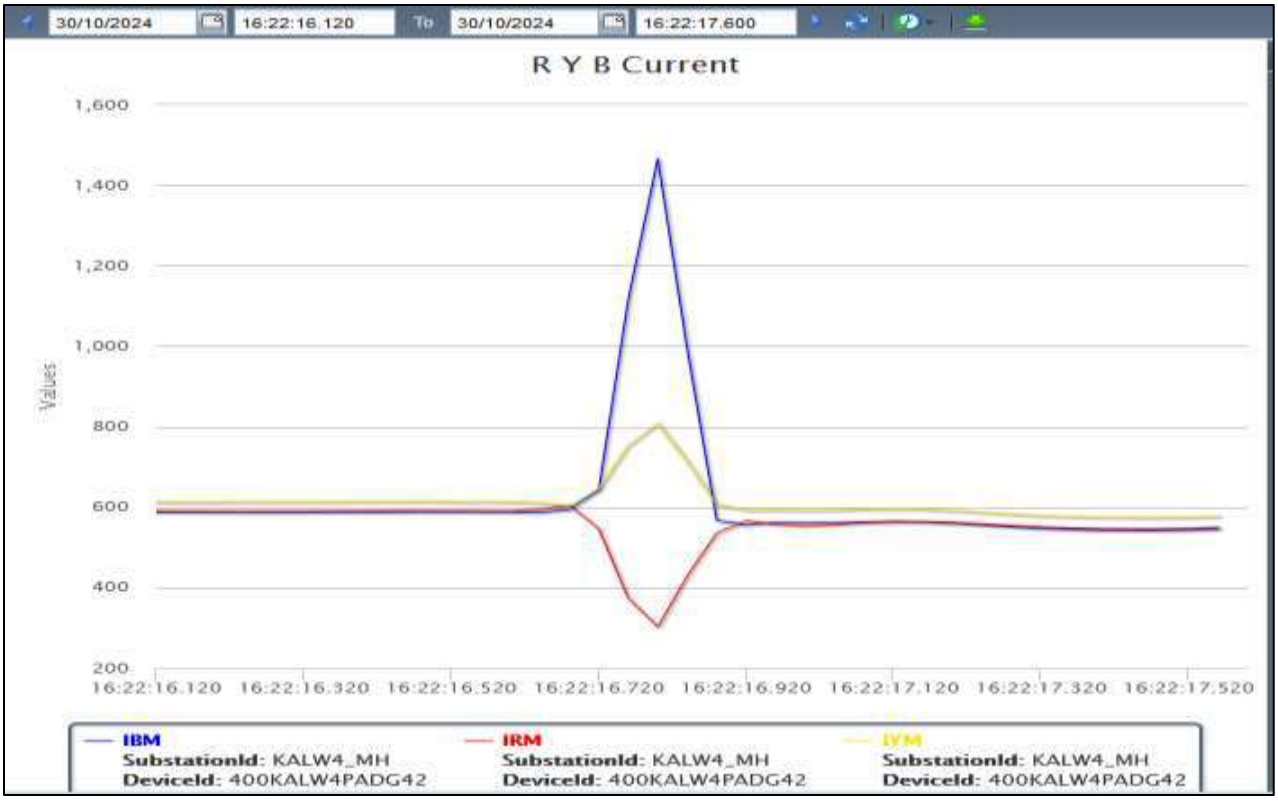


Figure 5. PMU Current plot of 400 kV Kalwa- Padghe-2, 1st fault

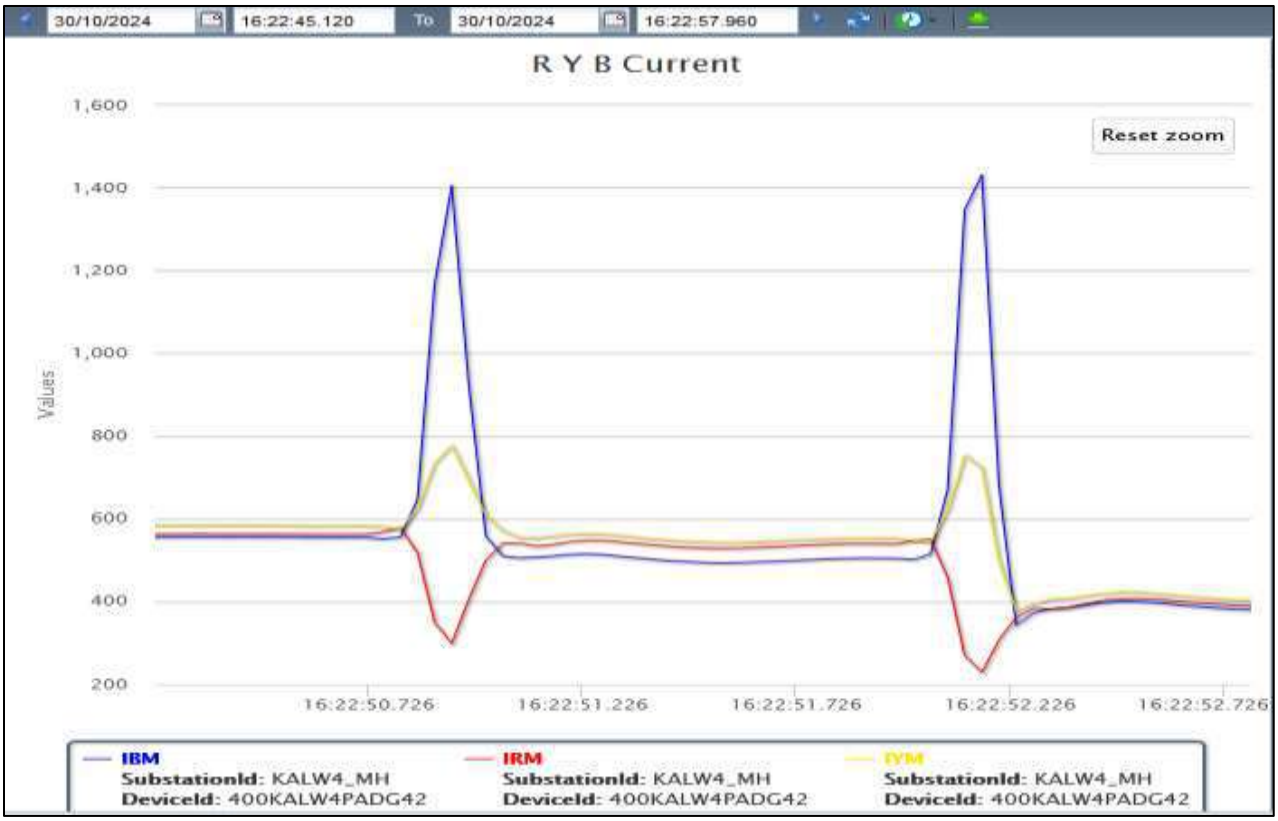


Figure 6. PMU Current plot of 400 kV Kalwa- Padghe-2, 2nd fault

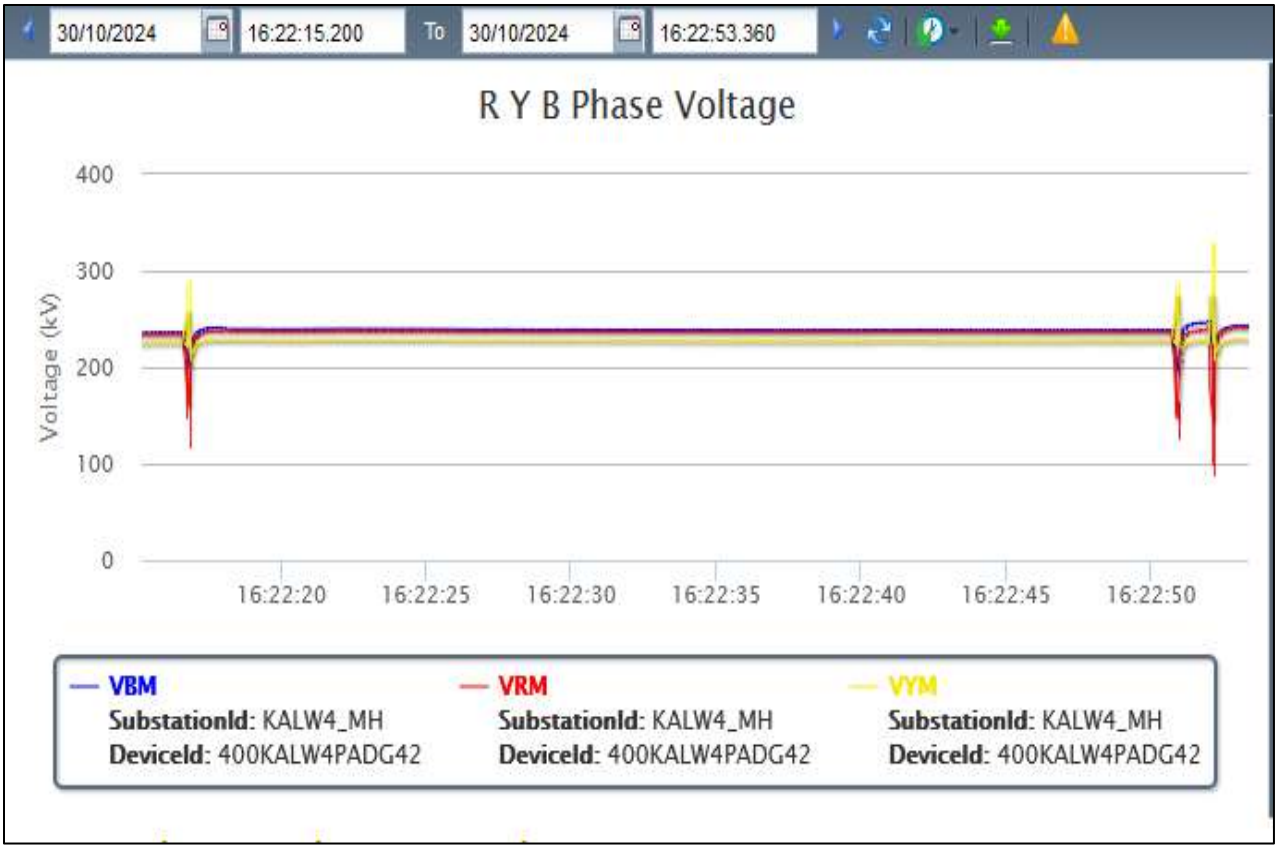


Figure 7. PMU Voltage plot of 400 kV Kalwa- Padghe-2

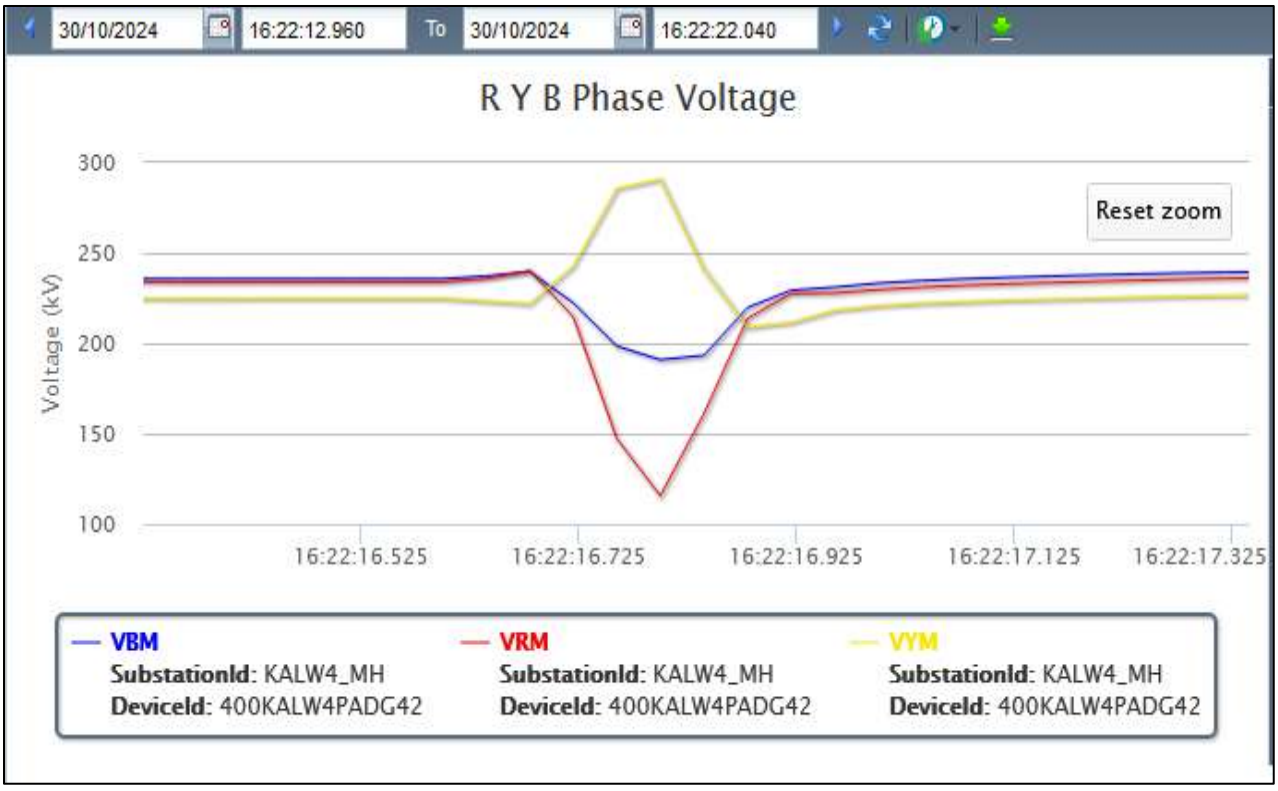


Figure 8. PMU Voltage plot of 400 kV Kalwa- Padghe-2, 1st fault

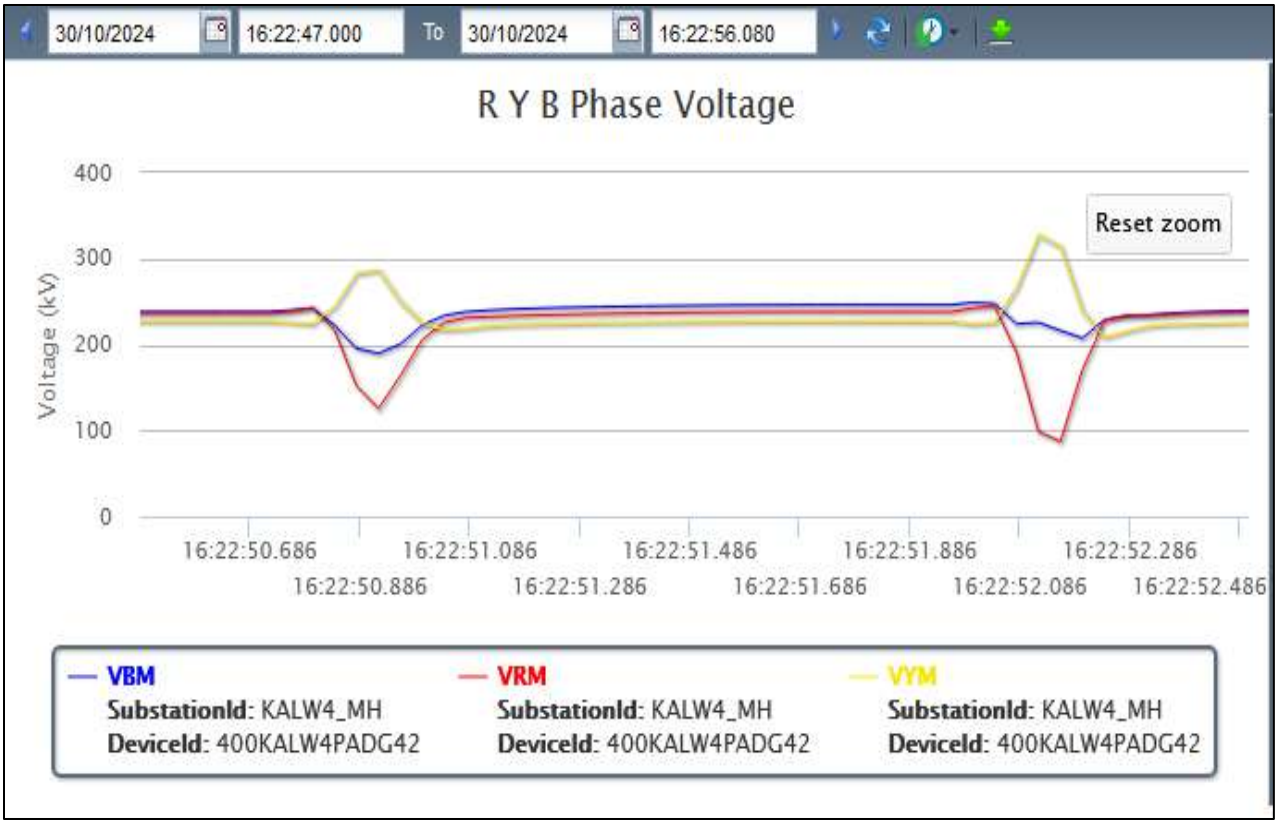


Figure 9. PMU Voltage plot of 400 kV Kalwa- Padghe-2, 2nd fault

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Differential protection signal failed after 10 second of the first fault. The reason for the same may kindly be find out by MSETCL.
- During the above Event at 16:22 Hrs, as per SCADA some load loss in Mumbai region is visible. However, MSLDC has reported nil load loss.
- DR are not time synced at Kalwa.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- MSLDC was advised to maximize Mumbai generation considering increased loading of ICT's at Vikhroli & Padghe in real time by WRLDC Control room.
- MSLDC may kindly further investigate on the quantum of load loss.
- 220 kV Borivali -CTRLS B phase LA was replaced and line restored.
- Wave trap of 220 kV Kalwa Pawne bypassed and line restored.
- MSLDC may kindly find out the load loss quantum in Mumbai area and reason for the same in detail.

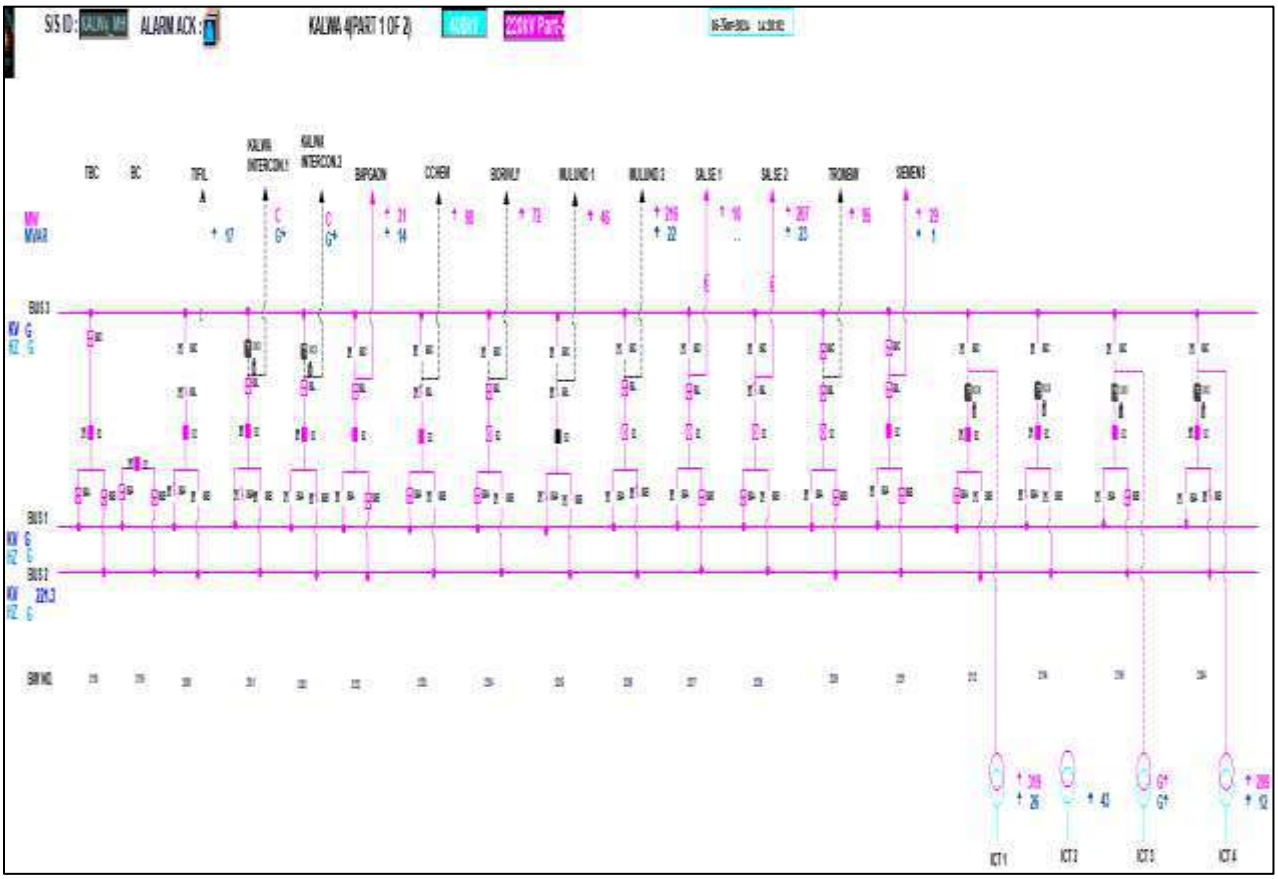
14. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received from MSETCL
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from MSETCL
3.	DR Time Synchronization Issues	IEGC section 17.3	DR not time sync at Kalwa

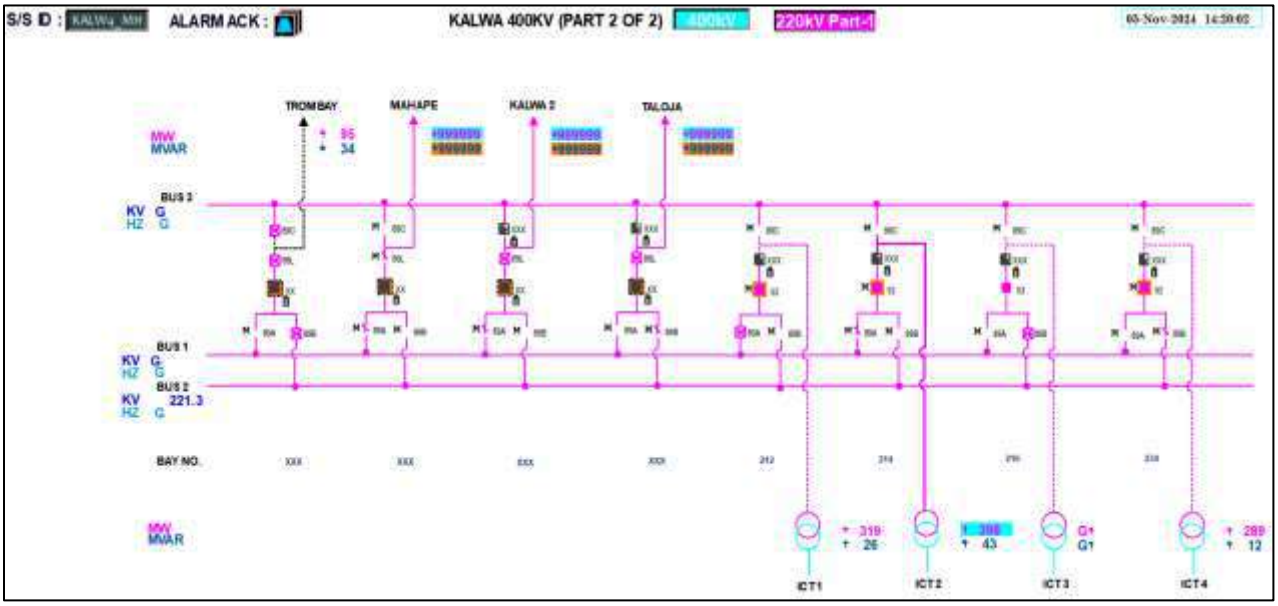
15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-A / Annexure-A: SLD of the affected Sub-station/Connectivity Diagram

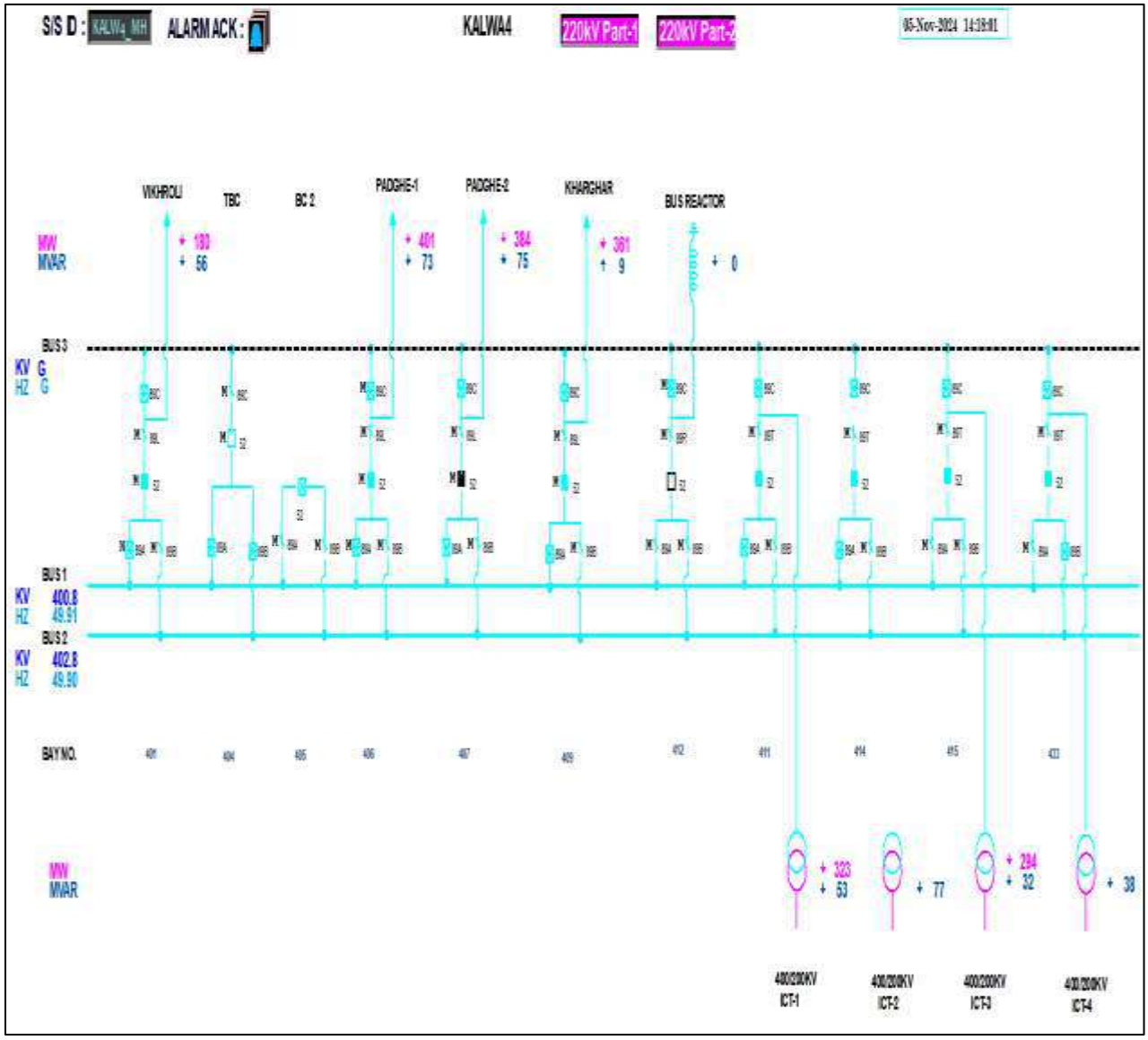
220 kV Kalwa SLD- Part 1



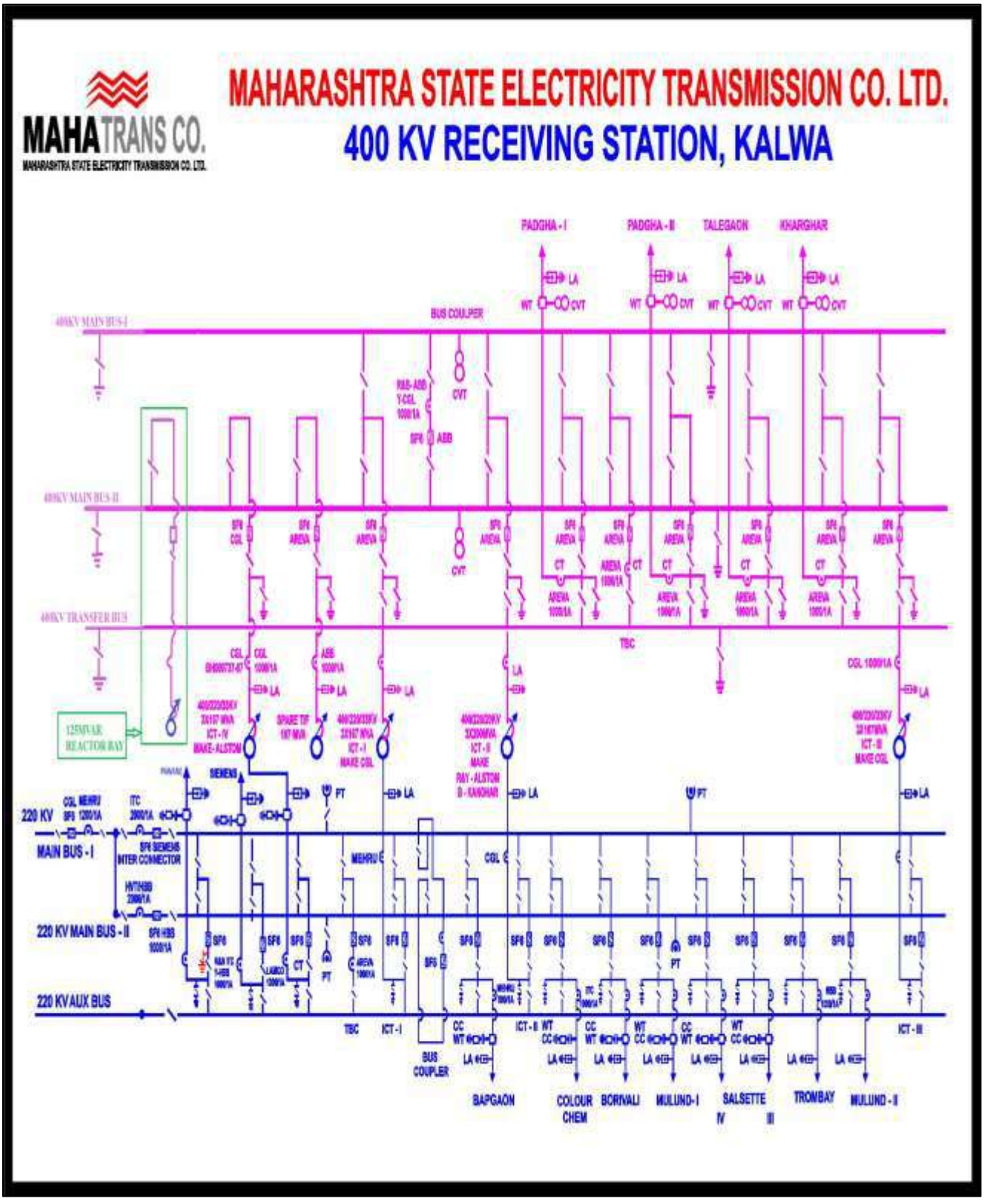
220 kV Kalwa SLD- Part 2



400 kV Kalwa SLD-



400 kV Kalwa SLD from MSETCL-



अनुलग्नक-B / Annexure-B: Sequence of Events as per SCADA:

SOE from WRLDC-

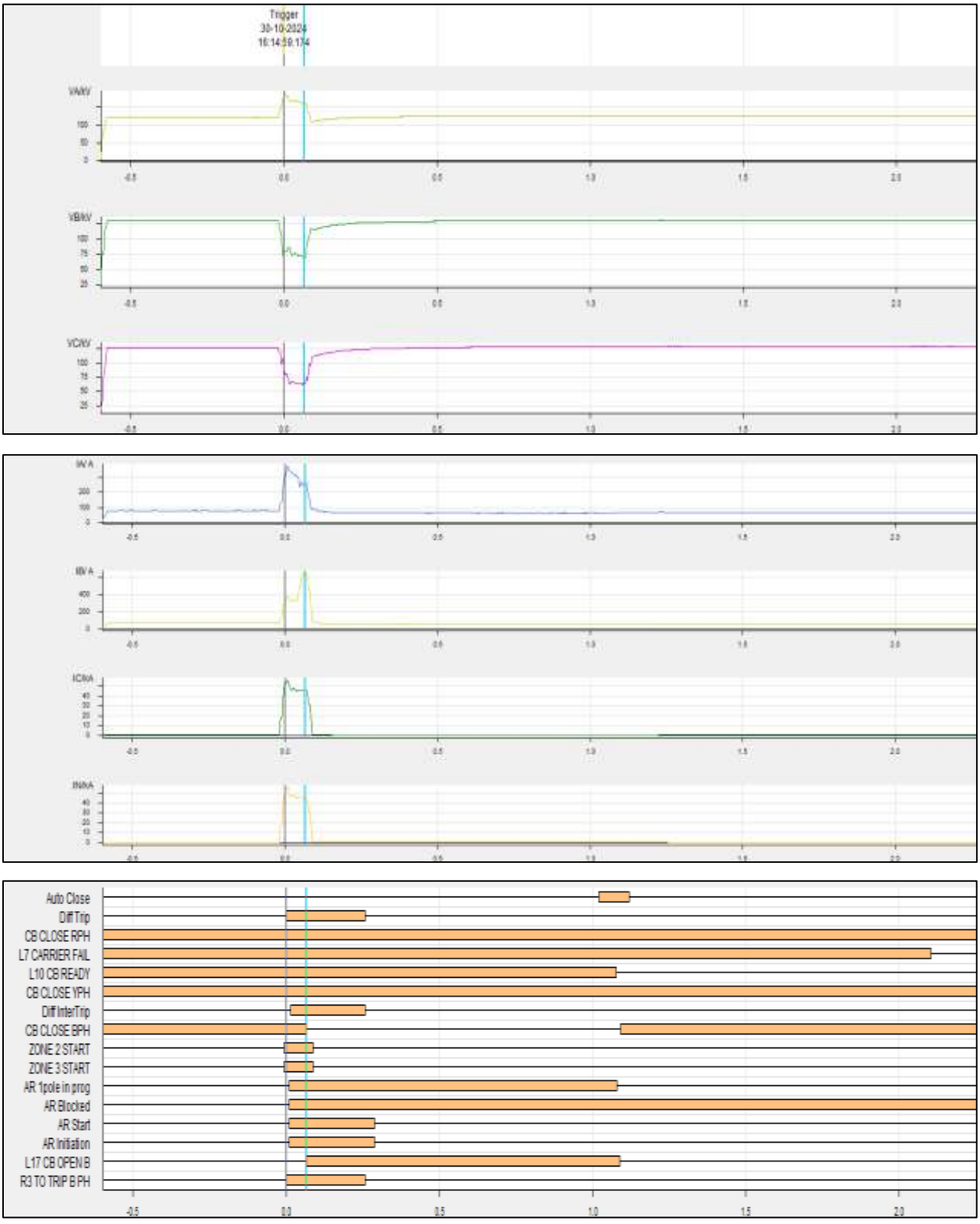
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	400KV-CB	KALW4_MH	KALWA 400 CB 41152 (T1) FAULTY	16:22:52	658
WRLDC	220KV-CB	KALW4_MH	KALWA 400 CB 22552 (MULUD-1) FAULTY	16:22:52	658
WRLDC	400KV-CB	KALW4_MH	KALWA 400 CB 41352 (T2) FAULTY	16:22:52	905
WRLDC	220KV-CB	KALW4_MH	KALWA 400 CB 22552 (MULUD-1) OPEN	16:22:52	906
WRLDC	400KV-CB	KALW4_MH	KALWA 400 CB 41152 (T1) OPEN	16:22:53	158
WRLDC	400KV-CB	KALW4_MH	KALWA 400 CB 41352 (T2) OPEN	16:22:53	158

SOE from MSETCL-

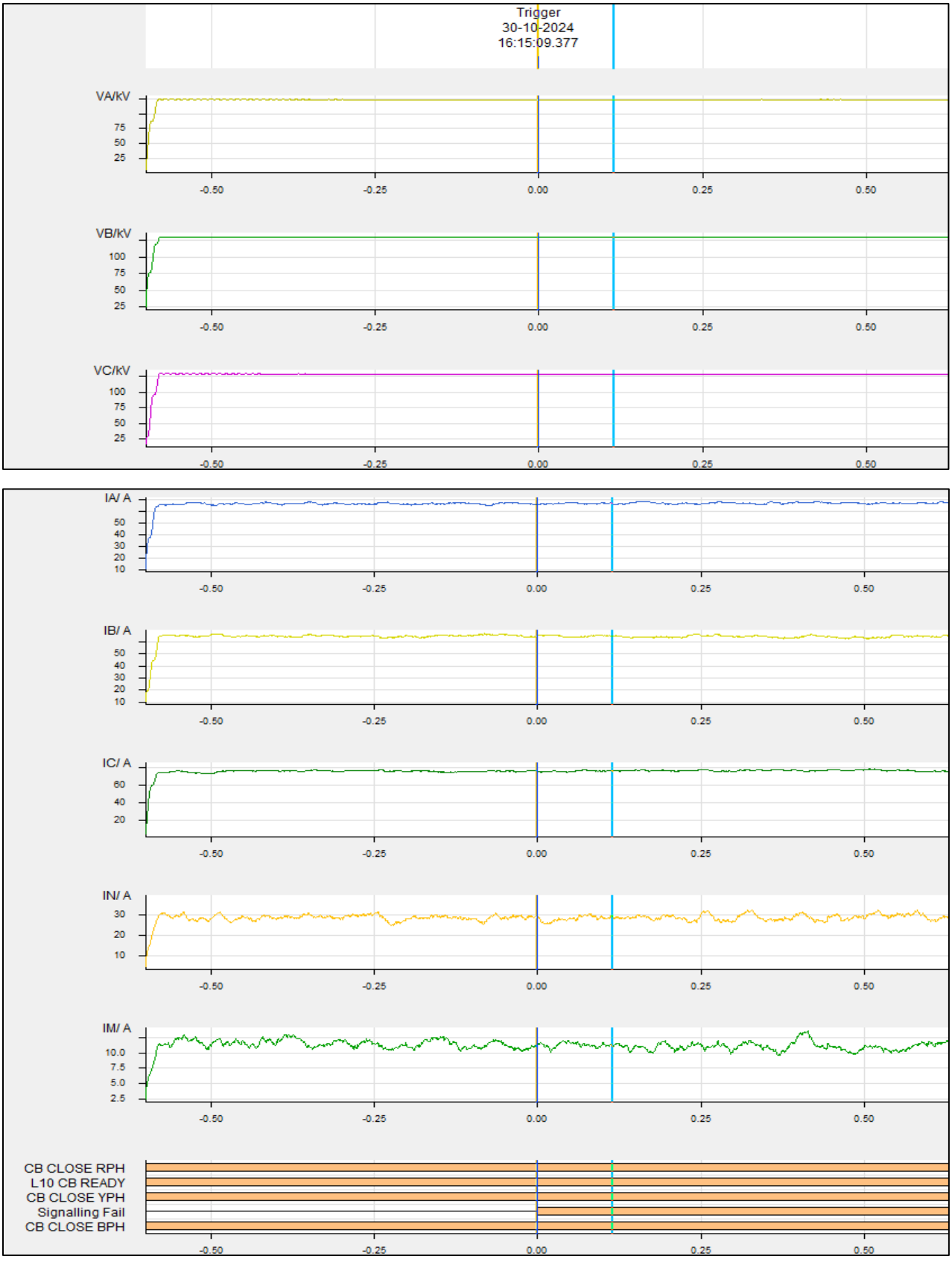
1	Type	Date & Time	Signal name	Status	Additional info
2	P	10/30/2024 4:30:39:146 PM	Bay15 to ZB	Off	24-10-30 16.30;39.146,Bay15 to ZB,0
3	P	10/30/2024 4:19:12:251 PM	Bay12 PROT TR	Off	24-10-30 16.19;12.251,Bay12 PROT TR,0
4	P	10/30/2024 4:19:12:227 PM	CHECKZON TRIP	Off	24-10-30 16.19;12.227,CHECKZON TRIP,0
5	P	10/30/2024 4:19:12:227 PM	ZB COMON TRIP	Off	24-10-30 16.19;12.227,ZB COMON TRIP,0
6	P	10/30/2024 4:19:12:125 PM	ZB lin ALARM	Off	24-10-30 16.19;12.125,ZB lin ALARM,0
7	P	10/30/2024 4:19:12:122 PM	ZA lin ALARM	Off	24-10-30 16.19;12.122,ZA lin ALARM,0
8	P	10/30/2024 4:19:12:038 PM	ZA lin ALARM	On	24-10-30 16.19;12.038,ZA lin ALARM,1
9	P	10/30/2024 4:19:12:017 PM	Bay12 PROT TR	On	24-10-30 16.19;12.017,Bay12 PROT TR,1
10	P	10/30/2024 4:19:12:017 PM	CHECKZON TRIP	On	24-10-30 16.19;12.017,CHECKZON TRIP,1
11	P	10/30/2024 4:19:12:017 PM	ZB COMON TRIP	On	24-10-30 16.19;12.017,ZB COMON TRIP,1
12	P	10/30/2024 4:19:12:017 PM	ZB lin ALARM	On	24-10-30 16.19;12.017,ZB lin ALARM,1
13	P	10/30/2024 4:19:10:931 PM	ZA lin ALARM	Off	24-10-30 16.19;10.931,ZA lin ALARM,0
14	P	10/30/2024 4:19:10:874 PM	ZB lin ALARM	Off	24-10-30 16.19;10.874,ZB lin ALARM,0
15	P	10/30/2024 4:19:10:790 PM	ZA lin ALARM	On	24-10-30 16.19;10.790,ZA lin ALARM,1
16	P	10/30/2024 4:19:10:787 PM	ZB lin ALARM	On	24-10-30 16.19;10.787,ZB lin ALARM,1
17	P	10/30/2024 4:18:36:773 PM	ZB lin ALARM	Off	24-10-30 16.18;36.773,ZB lin ALARM,0
18	P	10/30/2024 4:18:36:770 PM	ZA lin ALARM	Off	24-10-30 16.18;36.770,ZA lin ALARM,0
19	P	10/30/2024 4:18:36:674 PM	ZA lin ALARM	On	24-10-30 16.18;36.674,ZA lin ALARM,1
20	P	10/30/2024 4:18:36:668 PM	ZB lin ALARM	On	24-10-30 16.18;36.668,ZB lin ALARM,1
21	P	10/30/2024 4:17:09:841 PM	ZB lin ALARM	Off	24-10-30 16.17;09.841,ZB lin ALARM,0
22	P	10/30/2024 4:17:09:769 PM	ZB lin ALARM	On	24-10-30 16.17;09.769,ZB lin ALARM,1
23	P	10/25/2024 3:58:10:976 PM	ZA lin ALARM	Off	24-10-25 15.58;10.976,ZA lin ALARM,0
24	P	10/25/2024 3:58:10:973 PM	ZB lin ALARM	Off	24-10-25 15.58;10.973,ZB lin ALARM,0
25	P	10/25/2024 3:58:10:883 PM	ZA lin ALARM	On	24-10-25 15.58;10.883,ZA lin ALARM,1
26	P	10/25/2024 3:58:10:883 PM	ZB lin ALARM	On	24-10-25 15.58;10.883,ZB lin ALARM,1
27	P	10/20/2024 4:33:59:398 PM	ZB lin ALARM	Off	24-10-20 16.33;59.398,ZB lin ALARM,0
28	P	10/20/2024 4:33:59:311 PM	ZB lin ALARM	On	24-10-20 16.33;59.311,ZB lin ALARM,1
29	P	10/14/2024 5:32:20:047 PM	ZB lin ALARM	Off	24-10-14 17.32;20.047,ZB lin ALARM,0
30	P	10/14/2024 5:32:19:972 PM	ZB lin ALARM	On	24-10-14 17.32;19.972,ZB lin ALARM,1
31	P	10/13/2024 5:14:54:131 PM	ZB lin ALARM	Off	24-10-13 17.14;54.131,ZB lin ALARM,0
32	P	10/13/2024 5:14:53:672 PM	ZB lin ALARM	On	24-10-13 17.14;53.672,ZB lin ALARM,1
33	P	10/13/2024 12:51:43:288 PM	ZB lin ALARM	Off	24-10-13 12.51;43.288,ZB lin ALARM,0
34	P	10/13/2024 12:51:43:246 PM	ZB lin ALARM	On	24-10-13 12.51;43.246,ZB lin ALARM,1
35	P	10/10/2024 10:06:30:648 PM	ZB lin ALARM	Off	24-10-10 22.06;30.648,ZB lin ALARM,0
36	P	10/10/2024 10:06:30:588 PM	ZB lin ALARM	On	24-10-10 22.06;30.588,ZB lin ALARM,1
37	P	10/10/2024 9:06:06:876 PM	Bay16 to ZB	On	24-10-10 21.06;06.876,Bay16 to ZB,1
38	P	10/10/2024 9:05:50:246 PM	Bay12 to ZB	On	24-10-10 21.05;50.246,Bay12 to ZB,1
39	P	10/10/2024 6:26:54:928 PM	Bay12 to ZB	Off	24-10-10 18.26;54.928,Bay12 to ZB,0
40	P	10/10/2024 6:26:54:928 PM	Bay16 to ZB	Off	24-10-10 18.26;54.928,Bay16 to ZB,0
41	P	10/10/2024 2:06:30:775 AM	ZB lin ALARM	Off	24-10-10 02.06;30.775,ZB lin ALARM,0
42	P	10/10/2024 2:06:30:748 AM	ZB lin ALARM	On	24-10-10 02.06;30.748,ZB lin ALARM,1
43	P	10/9/2024 4:27:20:050 PM	ZB lin ALARM	Off	24-10-09 16.27;20.050,ZB lin ALARM,0
44	P	10/9/2024 4:27:20:008 PM	ZB lin ALARM	On	24-10-09 16.27;20.008,ZB lin ALARM,1
45	P	10/8/2024 6:16:42:430 PM	Bay12 to ZB	On	24-10-08 18.16;42.430,Bay12 to ZB,1
46	P	10/8/2024 6:16:42:430 PM	Bay16 to ZB	On	24-10-08 18.16;42.430,Bay16 to ZB,1
47	P	10/4/2024 5:22:15:886 PM	Bay09 to ZA	On	24-10-04 17.22;15.886,Bay09 to ZA,1
48	P	10/1/2024 1:24:02:103 AM	ZB lin ALARM	Off	24-10-01 01.24;02.103,ZB lin ALARM,0
49	P	10/1/2024 1:24:02:043 AM	ZB lin ALARM	On	24-10-01 01.24;02.043,ZB lin ALARM,1

अनुलग्नक-C / Annexure-C: Disturbance recorder

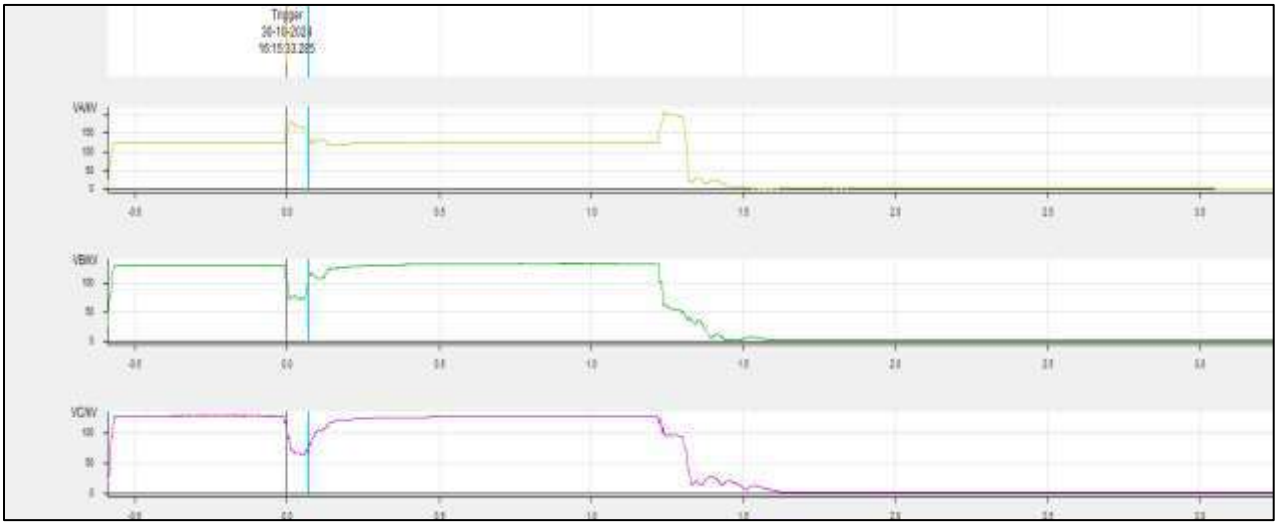
A. DR of 220 kV Kalwa- Pawane line from MSETCL, 1st AR

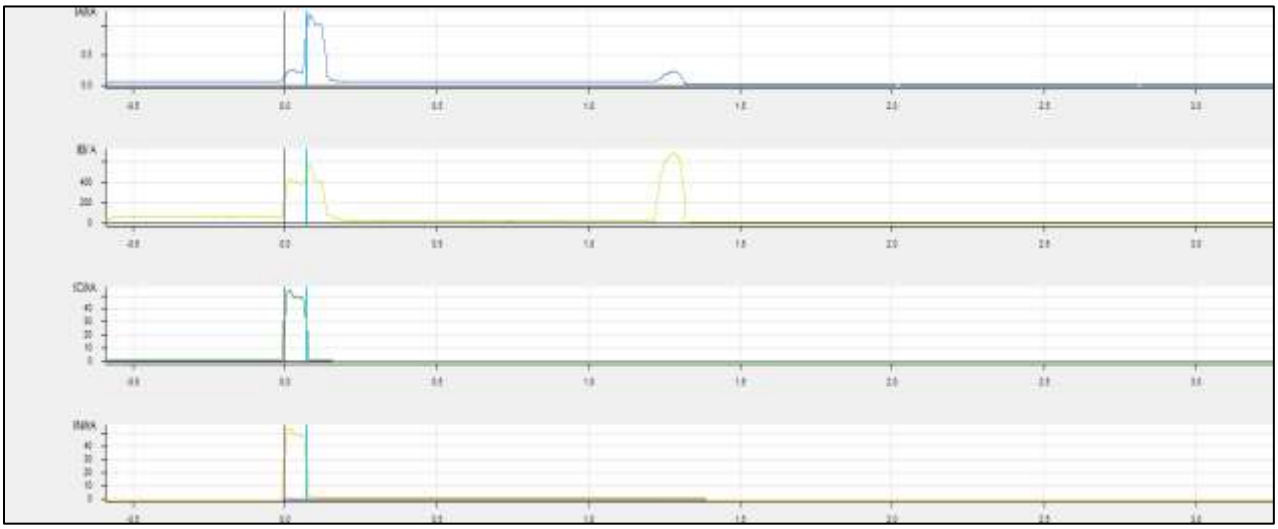


B. DR of 220 kV Kalwa- Pawane line from MSETCL, Diff. comm fail

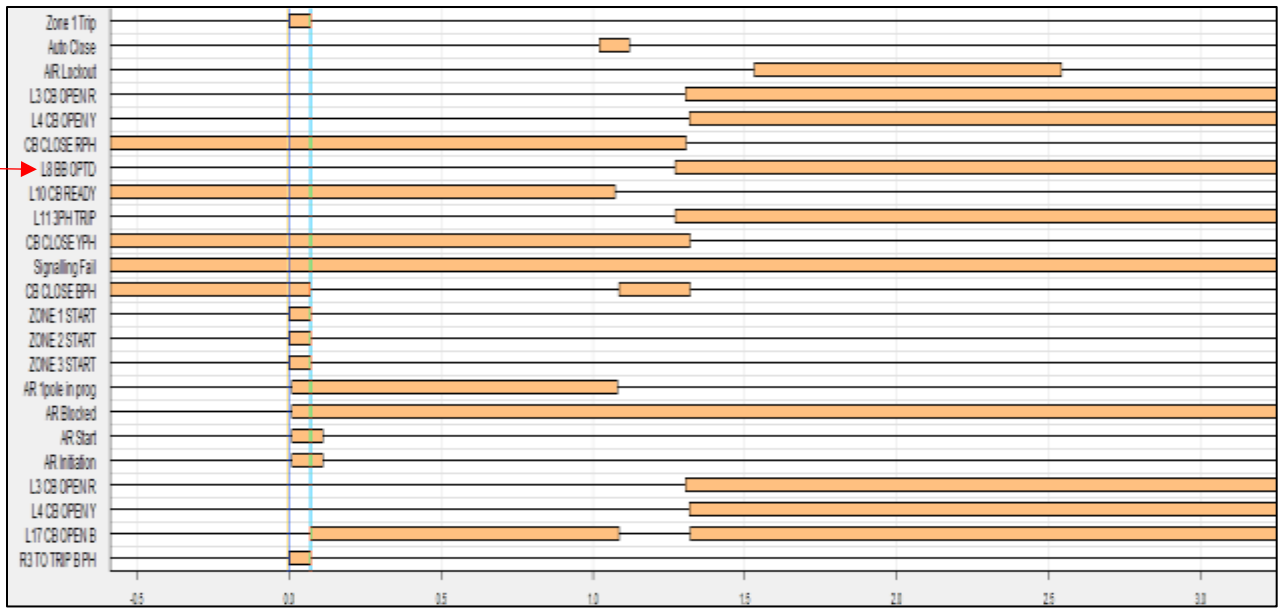


C. DR of 220 kV Kalwa- Pawane line from MSETCL, 2nd AR & BB optd

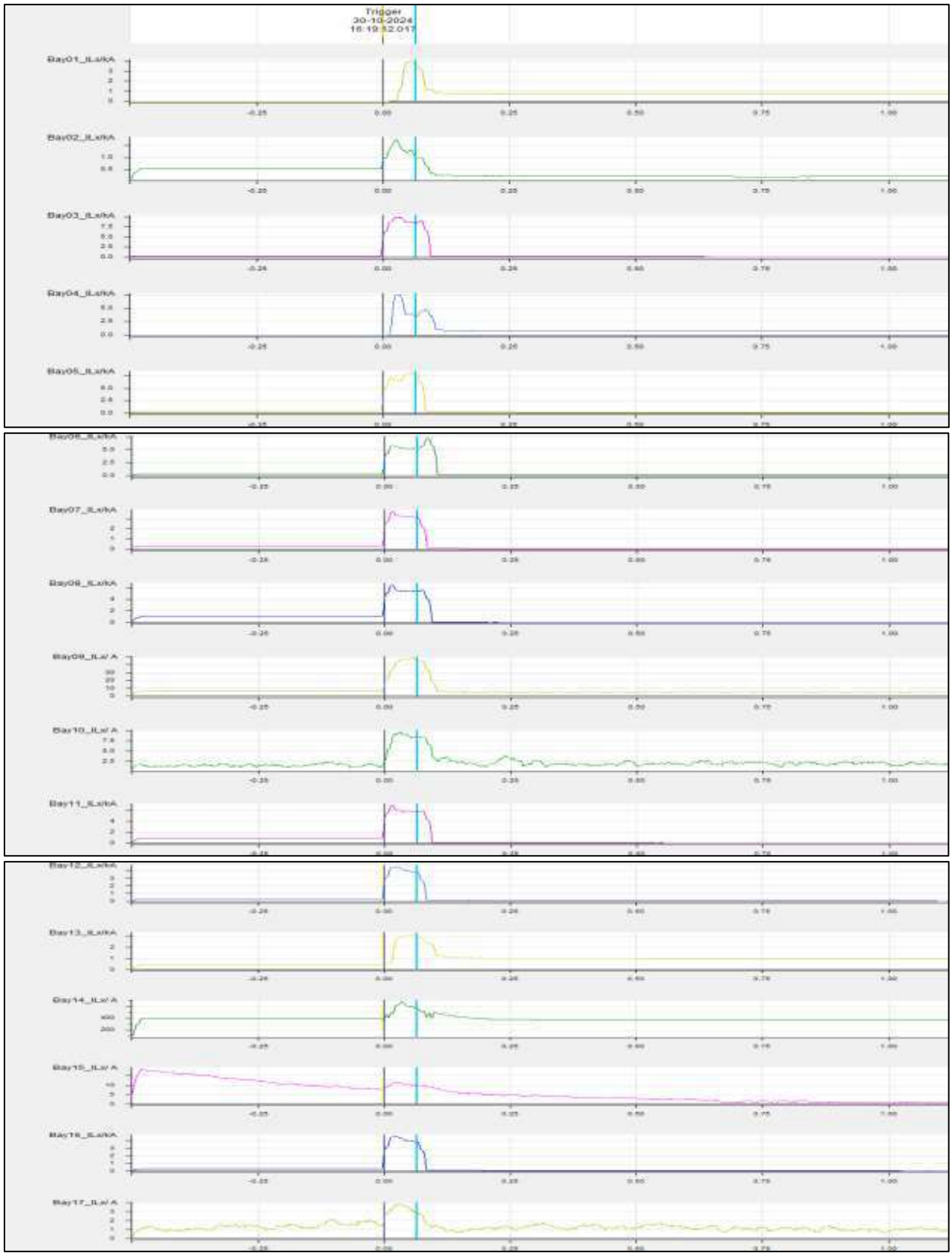


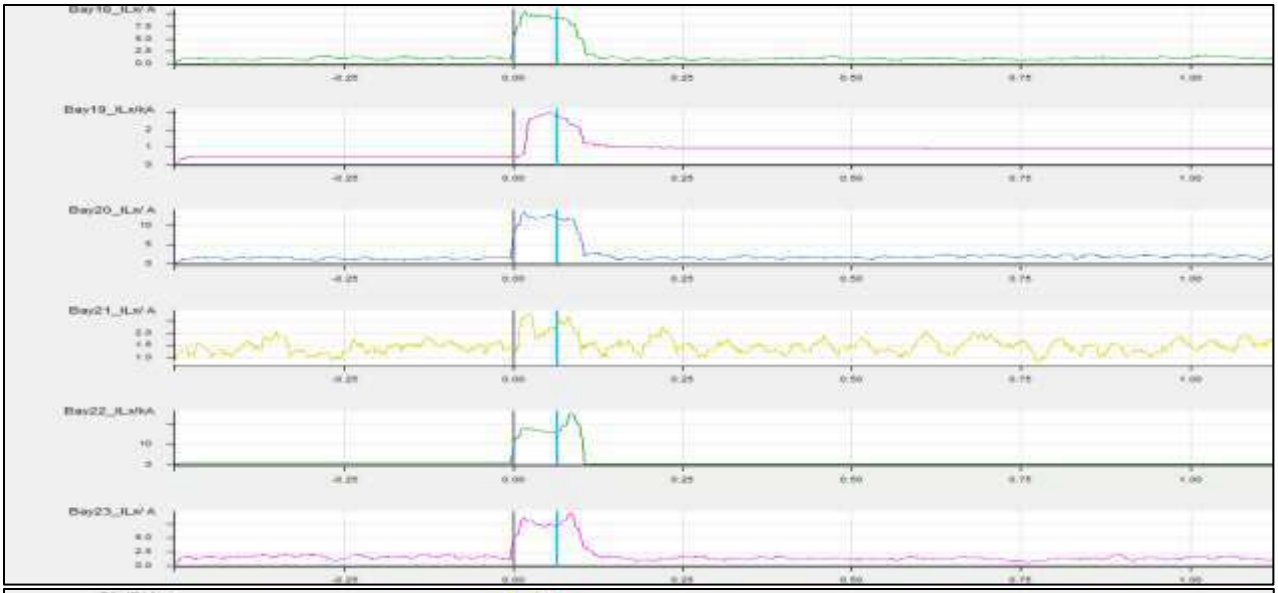


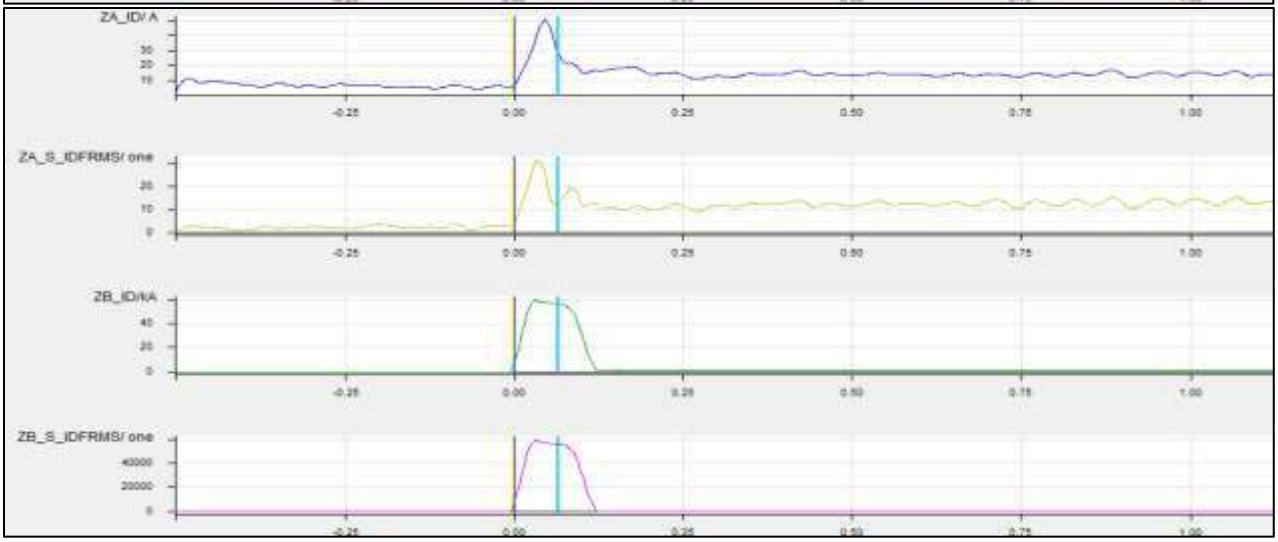
Bus Bar Protn

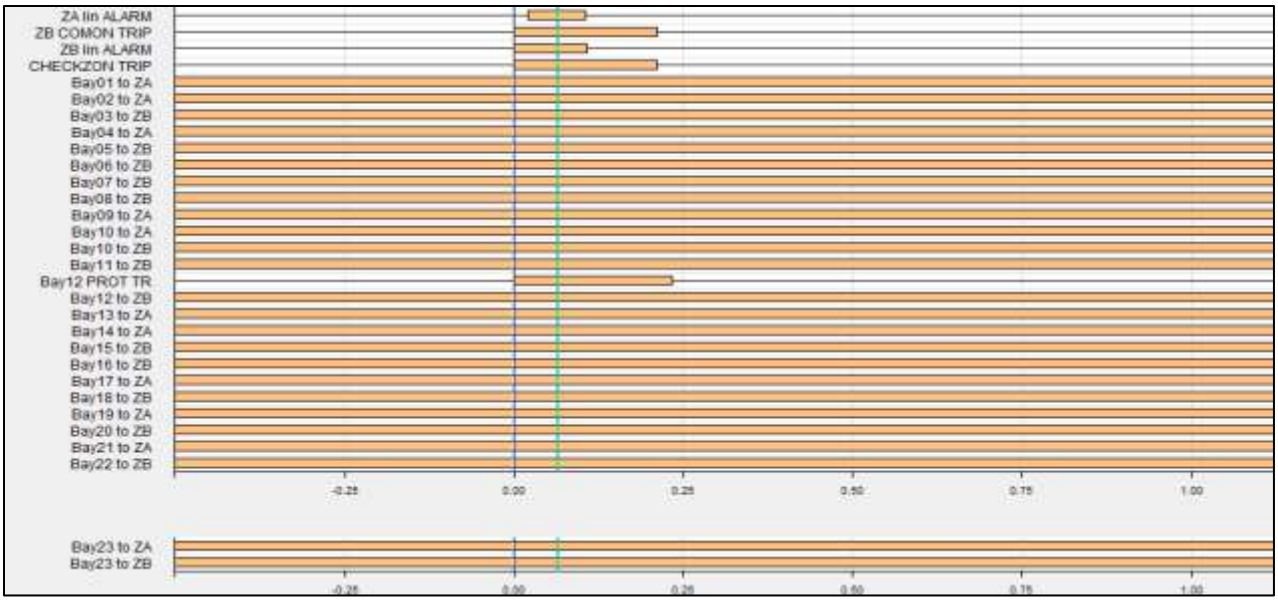


D. DR of 220 kV Kalwa Bus-2






ZA_ID/ A
ZA_S_IDFRMS/ one
ZB_ID/kA
ZB_S_IDFRMS/ one


ZA lin ALARM
ZB COMON TRIP
ZB lin ALARM
CHECKZON TRIP
Bay01 to ZA
Bay02 to ZA
Bay03 to ZB
Bay04 to ZA
Bay05 to ZB
Bay06 to ZB
Bay07 to ZB
Bay08 to ZB
Bay09 to ZA
Bay10 to ZA
Bay10 to ZB
Bay11 to ZB
Bay12 PROT TR
Bay12 to ZB
Bay13 to ZA
Bay14 to ZA
Bay15 to ZB
Bay16 to ZB
Bay17 to ZA
Bay18 to ZB
Bay19 to ZA
Bay20 to ZB
Bay21 to ZA
Bay22 to ZB
Bay23 to ZA
Bay23 to ZB

अनुलग्नक-D / Annexure-D: Site photographs shared by MSETCL- Nil

के विजय कुमार

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी॰ रायगढ़ (छत्तीसगढ़) उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Raigarh (CG) of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 12-11-2024

1. **घटना का सारांश / Event Summary**: At 07:23 Hrs / 18-10-2024, multiple elements at 220 kV Raigarh(CG) substation tripped due to Potential Transformer fuse failure of 220 kV Raigarh(CG)-Bus-1 during charging attempt of 220 kV Raigarh(CG)-Saraipalli-2 through 220 kV Raigarh(CG)-Bus-1. 220 kV Raigarh(CG)-Korba-1 and 220 kV Raigarh(CG)-JSPL-2 were hand tripped due to zero power flowssss. Ideally, fuse failure protection should have blocked the distance protection scheme.

   Prior to the incident, at 06:02 hrs / 18-10-2024, Y phase jumper of 220 kV Raigarh (CG)-JPL-1 opened resulting in tripping of 220 kV Raigarh (CG)-JPL-1 and 220 kV Raigarh (CG)-Saraipalli-2 from remote ends.

   Load loss of 532 MW occurred at Raigarh (CG), Saraipalli and associated downstream network (132 kV Raigarh, Baramkela, Kondatarai, Dabhra, Chaple, Adbhar) due to the event.

   Bus Configuration prior to the tripping:

220 kV Raigarh(CG)-Bus-1	220 kV Raigarh(CG)-Bus-2
220 kV Raigarh(CG)-Saraipalli-1	220 kV Raigarh(CG)-JPL-1
220 kV Raigarh(CG)-Raigarh(PG)-1,2&3	220 kV Raigarh(CG)-Saraipalli-2
220 kV Raigarh(CG)-JSPL-1&2	
220 kV Raigarh(CG)-Gerwani-1	
220 kV Raigarh(CG)-Korba-1	
220/132 kV Raigarh(CG)-ICT-1,2&3 (160 MVA)	

2. घटना का समय और दिनांक / Time and Date of the Event : 07:23 Hrs / 18-10-2024

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

4. स्थान/नियंत्रण क्षेत्र / Location/Control Area : Raigarh (CG), Chhattisgarh

5. पूर्ववर्ती स्थिति / Antecedent Conditions :

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.04	69466	60521	1720	5450
घटना के बाद Post Event	50.12	69249	59921	1715	4934

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	220 kV Raigarh(CG)-Gerwani-1 was under planned shutdown 220 kV Raigarh(CG)-JPL-1 and 220 kV Raigarh(CG)-Saraipalli-2 were under forced shutdown since 06:02 hrs / 18-10-2024
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Load loss of 532 MW occurred at Raigarh(CG), Saraipalli and associated downstream network due to the event.

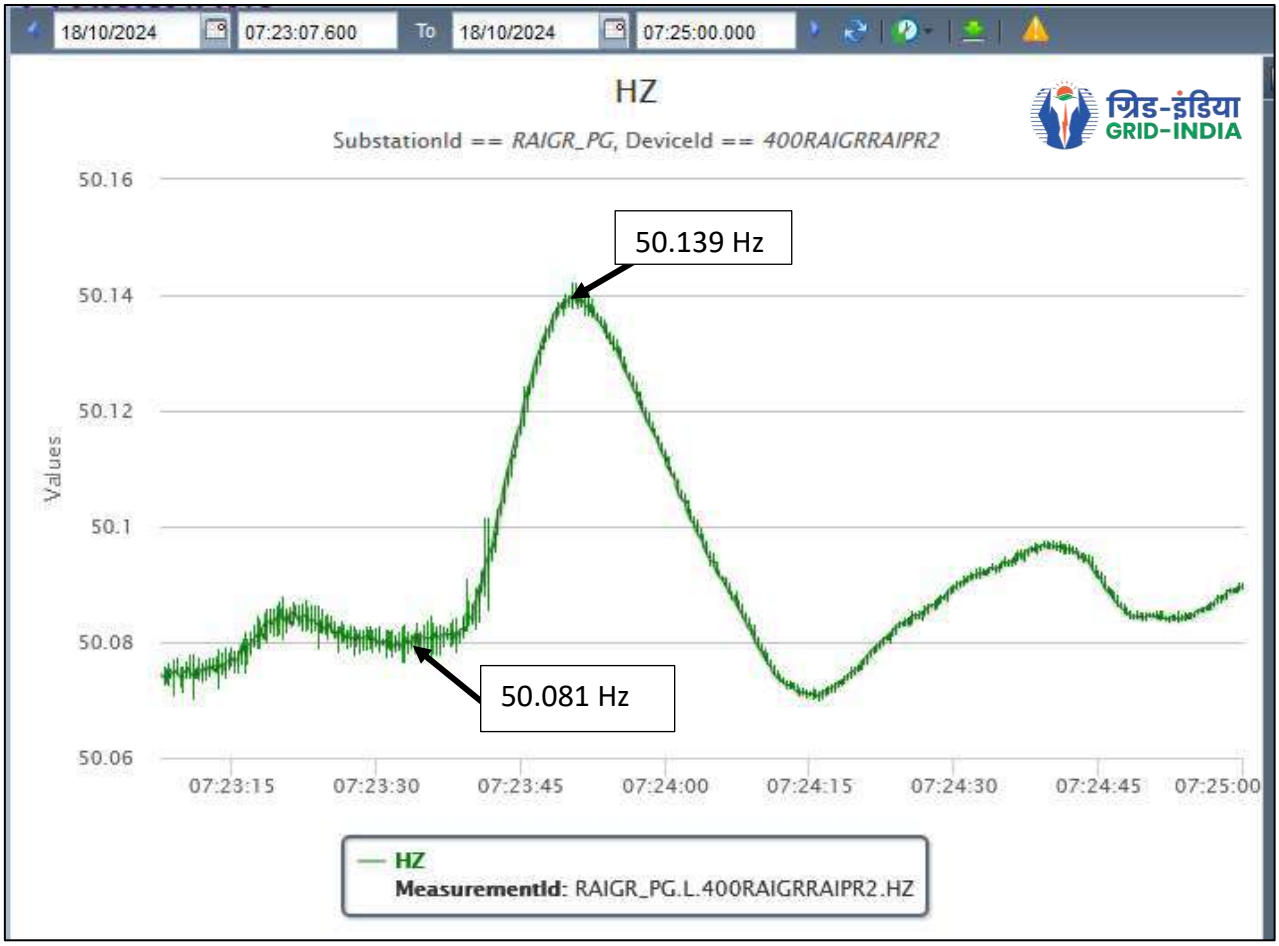


Figure 1. PMU Frequency Plot (400 kV Raipur-Raigarh-2)

7. रुकावट की अवधि / Duration of interruption: 01 Hours 44 Minutes (Time of revival of first element)

8. उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event): Nil

9. प्रभावित क्षेत्र का नक्शा / Network across the affected area

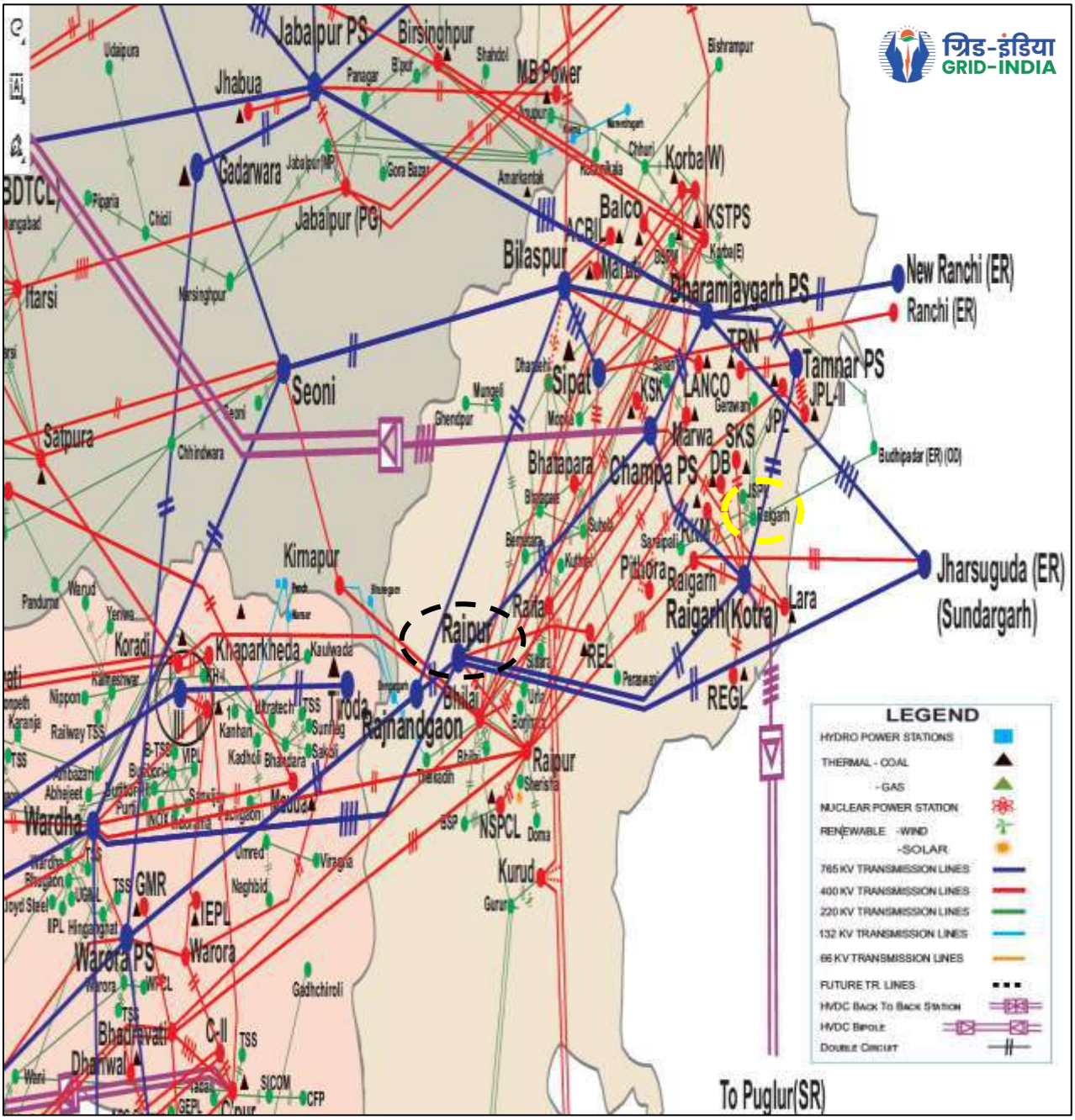


Figure 2. Network across the affected area

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time (All on 18-03-2024)
1.	220 kV Raigarh(CG)-JPL-1	06:02	No tripping	Non Standardized DRs Auto reclose not operated	16:37
2.	220 kV Raigarh(CG)-Saraipalli-2	06:02:04.051	No Tripping	Z-1	10:42
3.	220 kV Raigarh(CG)-Saraipalli-1	07:21:06.112	Z1 (3 phase trip)	No tripping	09:35
4.	220 kV Raigarh(CG)-Raigarh(PG)-1	07:23:41.130	Z-4 (800 msec)	Not Received from Powergrid WR-1	14:21
5.	220 kV Raigarh(CG)-Raigarh(PG)-2	07:23:41.331	Z-4 (800 msec)	Not Received from Powergrid WR-1	09:26
6.	220 kV Raigarh(CG)-Raigarh(PG)-3	07:23:40.623	Z-4 (800 msec)	Not Received from Powergrid WR-1	09:07
7.	220 kV Raigarh(CG)-JSPL-1	07:23:44.508	Z-1	Not Received from JSPL	09:57
8.	220/132 kV Raigarh(CG)-ICT-1 (160 MVA)	07:23	Not Received from SLDC Chhattisgarh	Not Received from SLDC Chhattisgarh	09:09
9.	220/132 kV Raigarh(CG)-ICT-2 (160 MVA)	07:23	Not Received from SLDC Chhattisgarh	Not Received from SLDC Chhattisgarh	09:24
10.	220/132 kV Raigarh(CG)-ICT-3 (160 MVA)	07:23	Not Received from SLDC Chhattisgarh	Not Received from SLDC Chhattisgarh	09:37

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

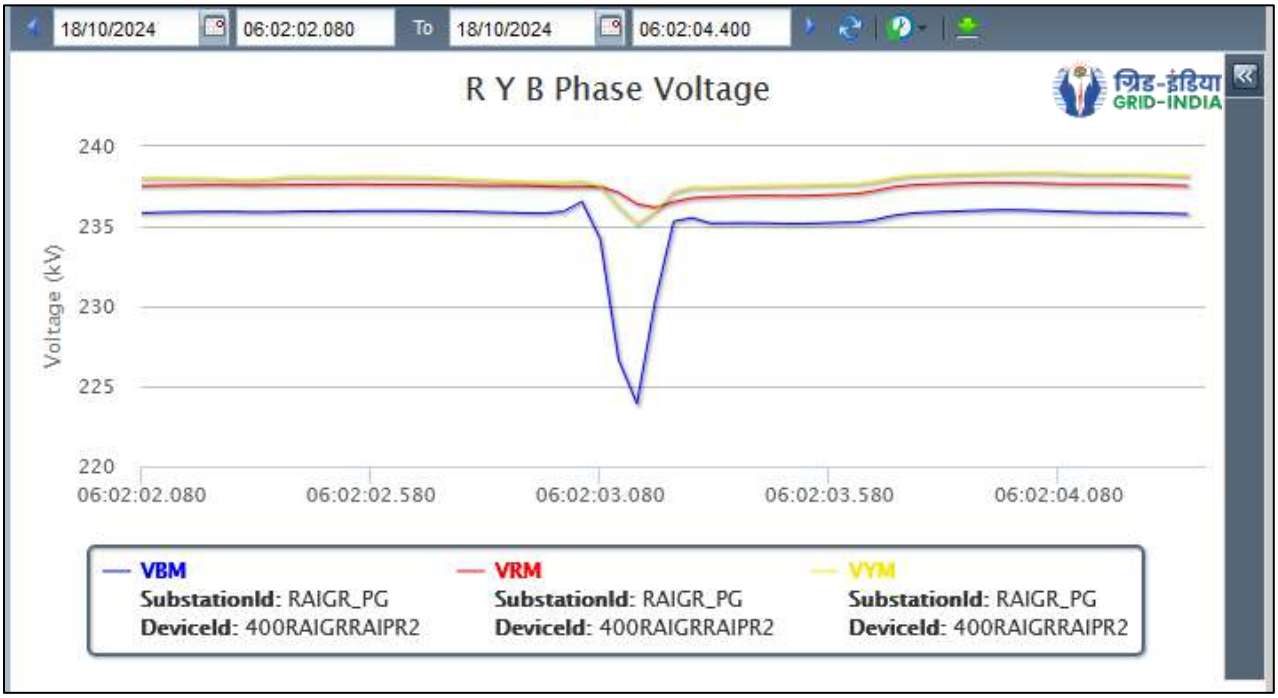


Figure 3. PMU Voltage Plot at 06:02 hrs (400 kV Raigarh-Raipur-2)

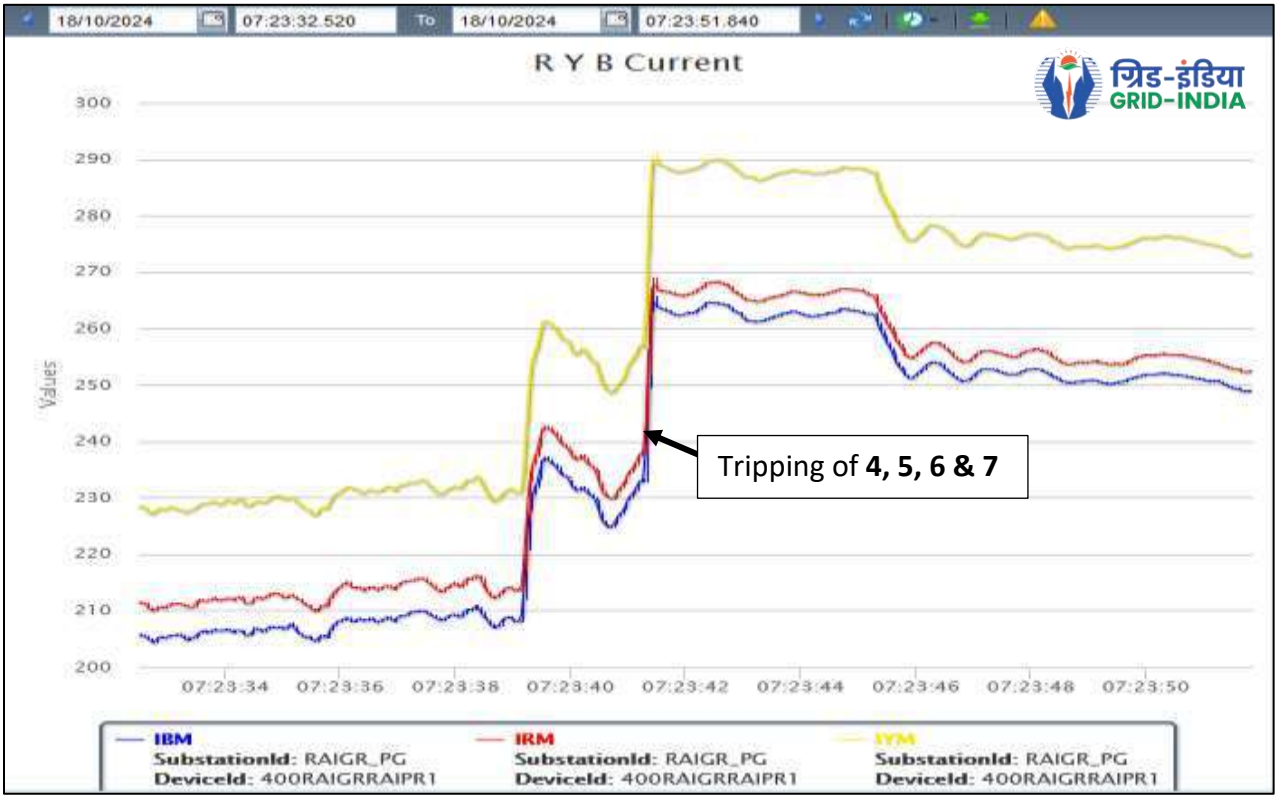


Figure 4. PMU Current Plot (400 kV Raigarh-Raipur-1)

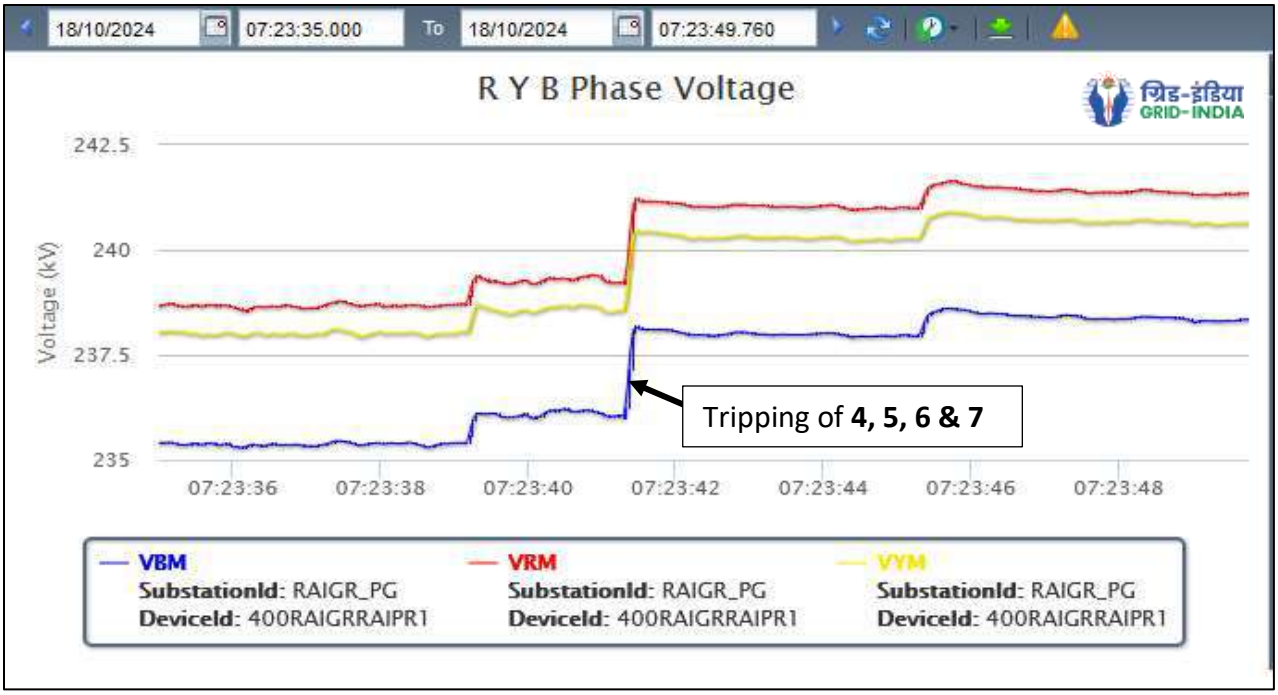


Figure 5. PMU Voltage Plot (400 kV Raigarh-Raipur-1)

12. प्रमुख अधिगम बिंदु / Protection and Operational issues observed:

- The 220 KV Main Bus-1 PT fuses failed during PT shifting of 220 kV Raigarh(CG)-Saraipalli-2 from Main Bus-2 to Main Bus-1 during the test charging of 220 kV Raigarh(CG)-Saraipalli-2. The PT supply of both the Main Bus 1&2 got paralleled from secondary side resulting in blowing of PT fuses. Ideally, fuse failure protection should have blocked the distance protection scheme.

  Due to this PT supply to DPR relays got missing. This condition was sensed by DPR relays of loaded feeders and consequently they tripped in Distance protection.

- It is seen that the bus configuration at 220 kV Raigarh (Chhattisgarh) is asymmetric.

- 220 kV Raigarh (CG)-Saraipalli-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase. Also, line didn't trip from remote end.

- 220 kV Raigarh (CG)-JSPL-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase.

- 220 kV Raigarh(CG)-Raigarh(PG)-1,2 & 3 tripped on Z-4 protection operation at Raigarh(CG), it is seen that the zone-4 timing for all 3 lines is around 800 msec which is not in order.

- Some of the disturbance recorders have not been submitted by utilities (प्रमुख ट्रिपिंग / Major Elements Tripped) making it difficult to visualize the sequence of tripping during the event.

- SCADA SoE at Raigarh Substations were not reported during the event

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- As informed by SLDC Chhattisgarh, for shifting of 220 KV PT of Main bus in 220 kV Raigarh(CG)-Saraipali-2 panel the PT selection switch will be used through separate PT cables connected to Bus-1 & Bus-2 and wiring will be done to 220 kV Raigarh(CG)-Saraipali-2 panel. This will avoid paralleling of PT from secondary side and therefore prevent blowing of PT fuses during PT supply shifting.

  PT supply of incoming 220 kV Raigarh(CG)-Raigarh(PG)-1,2&3 Feeders will be given from their respective Line CVTs instead of Bus PT.

  Ideally, fuse failure protection should have blocked the distance protection scheme. SLDC Chhattisgarh is requested to enable the fuse failure protection in distance protection scheme as per CEA guidelines.

- Suitable voltage balance relays shall be provided to monitor the fuse failure of three sets of potential transformer and to block the relays or other devices that may operate incorrectly on the absence of voltage due to fuse failure of potential transformers.

- It is seen that the bus configuration at 220 kV Raigarh (Chhattisgarh) is asymmetric. SLDC Chhattisgarh may share the reason for keeping this bus configuration and may change if possible.

- Voltage Transformer Supervision signal became high during tripping of 220 kV Raigarh (CG)-JPL-1 at JPL end same may be checked by SLDC Chhattisgarh and Jindal Power.

- SLDC Chhattisgarh is requested to attend the following mal-operation of relays and communicate the same:

  - 220 kV Raigarh (CG)-Saraipalli-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase. Also, line didn't trip from remote end.

  - 220 kV Raigarh (CG)-JSPL-1 tripped on Zone-1, it is seen that all 3 phases tripped even tough fault was seen in a single phase.

  - 220 kV Raigarh(CG)-Raigarh(PG)-1,2 & 3 tripped on Z-4 protection operation at Raigarh(CG), it is seen that the zone-4 timing for all 3 lines is around 800 msec which is not in order.

- Powergrid WR-1 and Jindal Power are requested to share the DRs of Raigarh (PG) and JSPL respectively.

- The digital signal in DRs of 220 kV Raigarh (CG)-JPL-1 at JPL end are not standardized making it difficult to read. As per IEGC-2023, 17.2 : *"The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals which shall be included in the guidelines issued by the respective RPCs."* Jindal Power and SLDC Chhattisgarh are requested to update the signals.

- DR of 220 kV Raigarh (CG)-JPL-1 at JPL end is not time synchronized. As per IEGC-2023, 17.2 : *"The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals which shall be included in the guidelines issued by the respective RPCs."* Jindal Power and SLDC Chhattisgarh are requested to attend the time synchronisation issue.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	उपयोगकर्ता Utilities	टिप्पणी Remarks
1.	DR/EL not uploaded in 24 Hrs	IEGC section 37.2 (c)	SLDC Chhattisgarh POWERGRID WR-1	DRs uploaded after 24 Hrs by SLDC Chhattisgarh DRs not uploaded by Powergrid WR-1
2.	Flash Report received after 8hrs	IEGC section 37.2 (b)	SLDC Chhattisgarh	Received after 8 hours
3.	Detailed Report received after 7 days	IEGC section 37.2 (e)	SLDC Chhattisgarh	Received after 13 days
5.	DR Time Synchronization Issues	IEGC section 17.3	SLDC Chhattisgarh Jindal Power	220 kV Raigarh(CG)-JPL-1 at JPL end

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- As informed by SLDC Chhattisgarh, for shifting of 220 KV PT of Main bus in 220 kV Raigarh(CG)-Saraipali-2 panel the PT selection switch will be used through separate PT cables connected to Bus-1 & Bus-2 and wiring will be done to 220 kV Raigarh(CG)-Saraipali-2 panel. This will avoid paralleling of PT from secondary side and therefore prevent blowing of PT fuses during PT supply shifting. Ideally, fuse failure protection should have blocked the distance protection scheme.

- Suitable voltage balance relays shall be provided to monitor the fuse failure of three sets of potential transformer and to block the relays or other devices that may operate incorrectly on the absence of voltage due to fuse failure of potential transformers. ssssss

-x-x-x-x-x-

के विजय कुमार

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

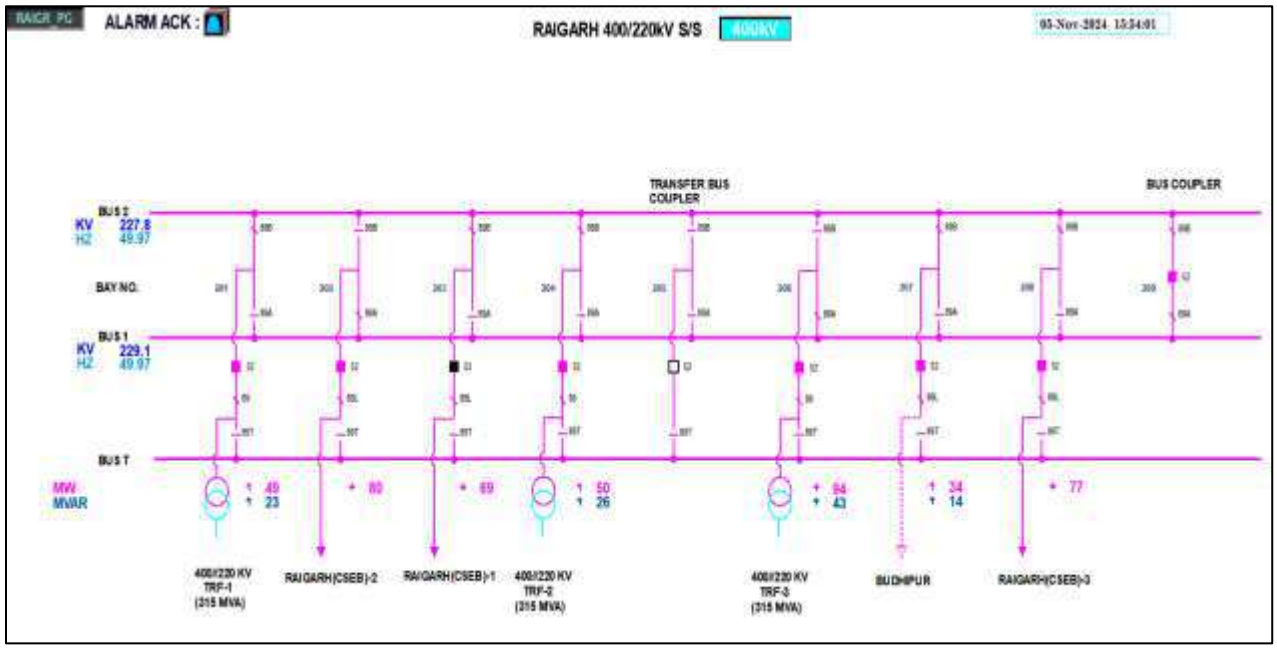
अनुलग्नक - 1 / Annexure-1: Sequence of Events as per SCADA

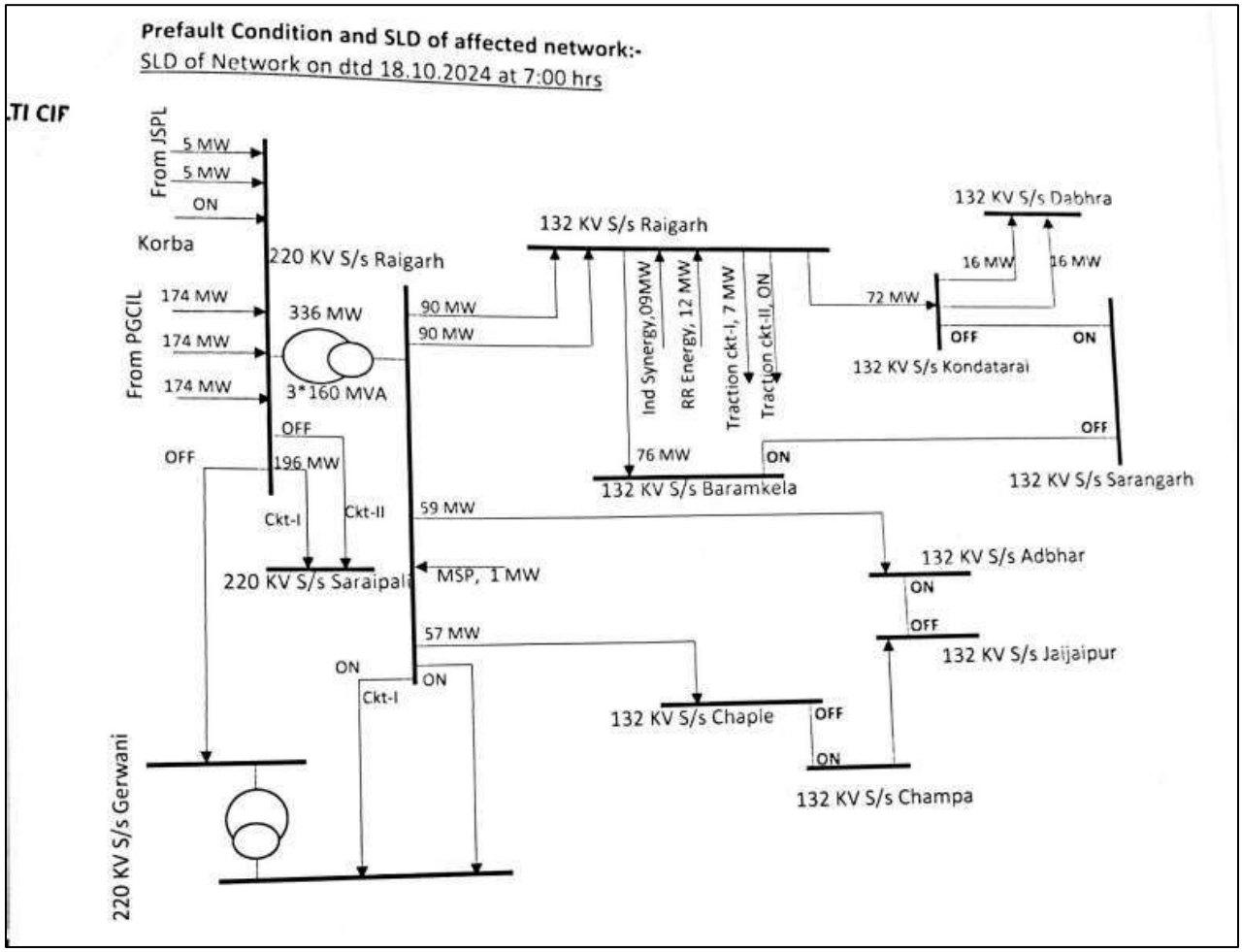
SoE at Raigarh substations not reported

Area	CATEGORY	LOCATION	TEXT	hh:mm:ss	ms
WRLDC	220KV-CB	JINDL_IP	JINDAL CB 20952 (RGARH) OPEN	06:02:03	165
CSPTCL	220KV-CB	SRPLI_CG	SARAIPALI CB 20652 (T3_P) OPEN	07:26:26	740
CSPTCL	220KV-CB	SRPLI_CG	SARAIPALI CB 20252 (T1_P) OPEN	07:26:28	559
CSPTCL	220KV-CB	SRPLI_CG	SARAIPALI CB 20452 (T2_P) OPEN	07:26:30	1

s

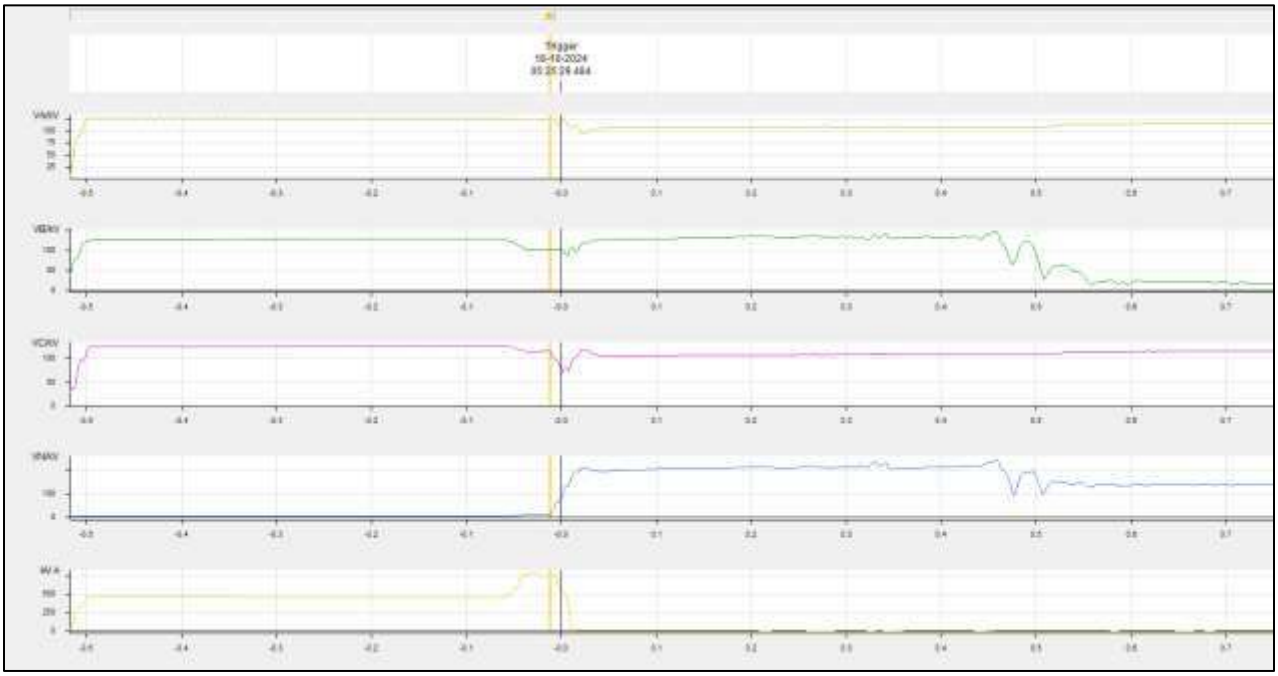
अनुलग्नक - 2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

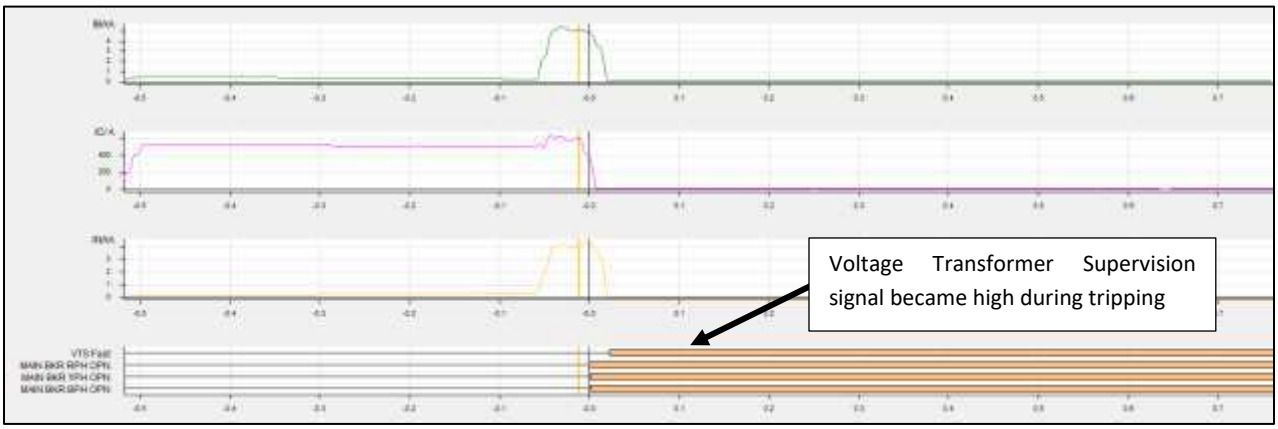




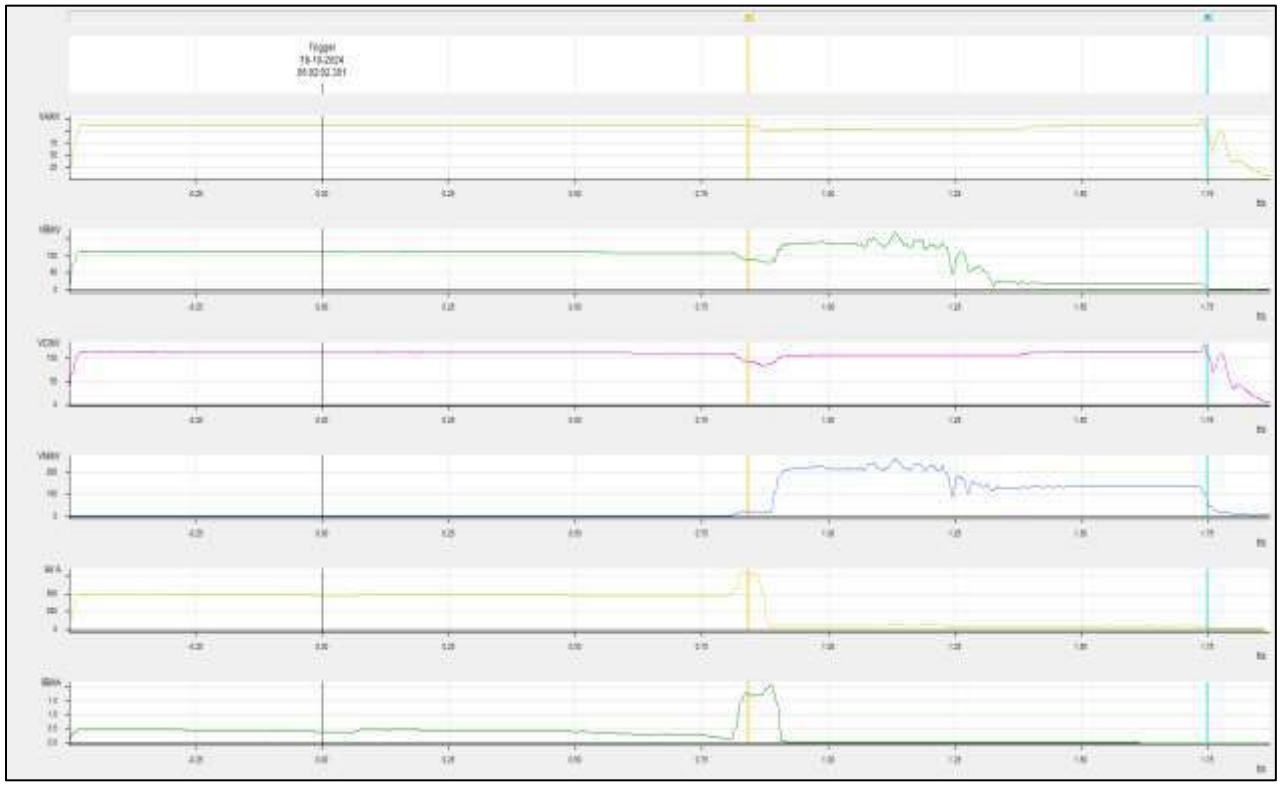
अनुलग्नक - 3 / Annexure-3: Disturbance recorder

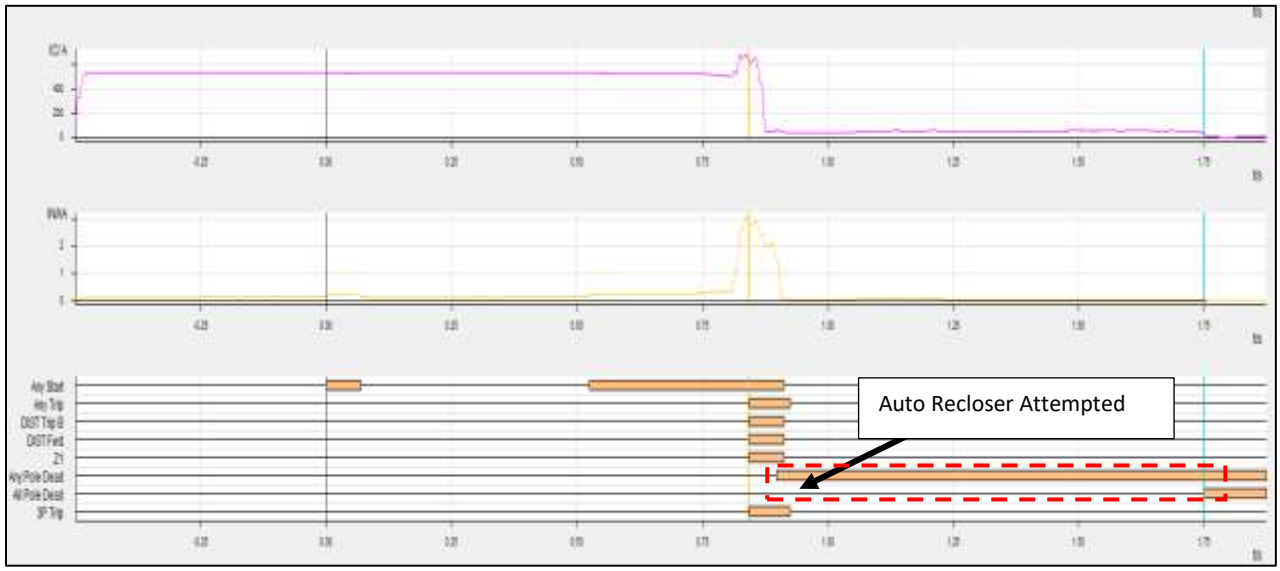
220 kV Raigarh (CG)-JPL-1 DR at JPL end



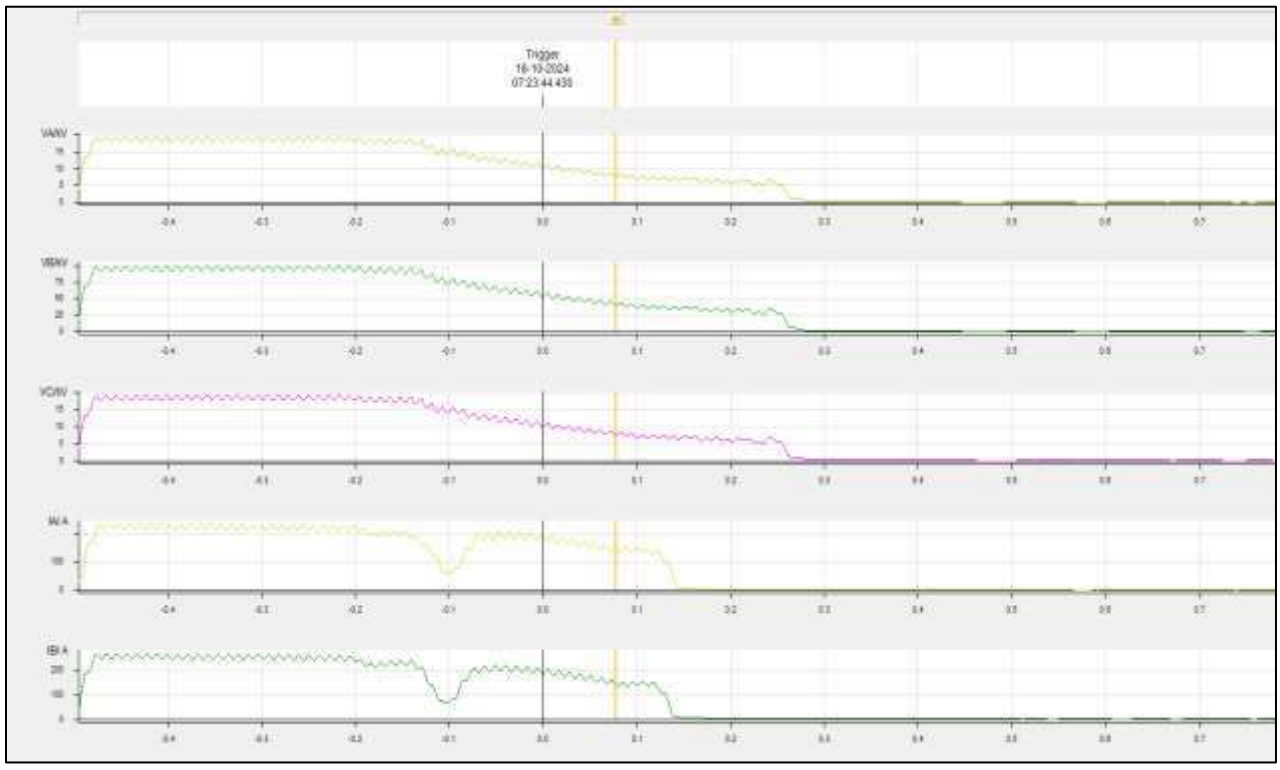


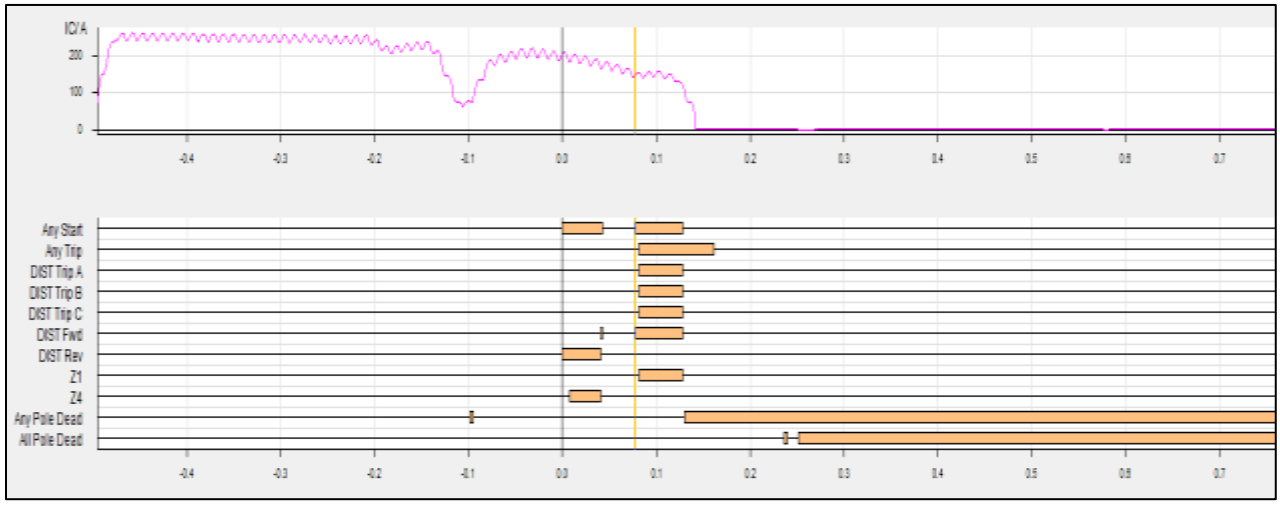
220 kV Raigarh (CG)-Saraipalli-2 at Saraipalli End



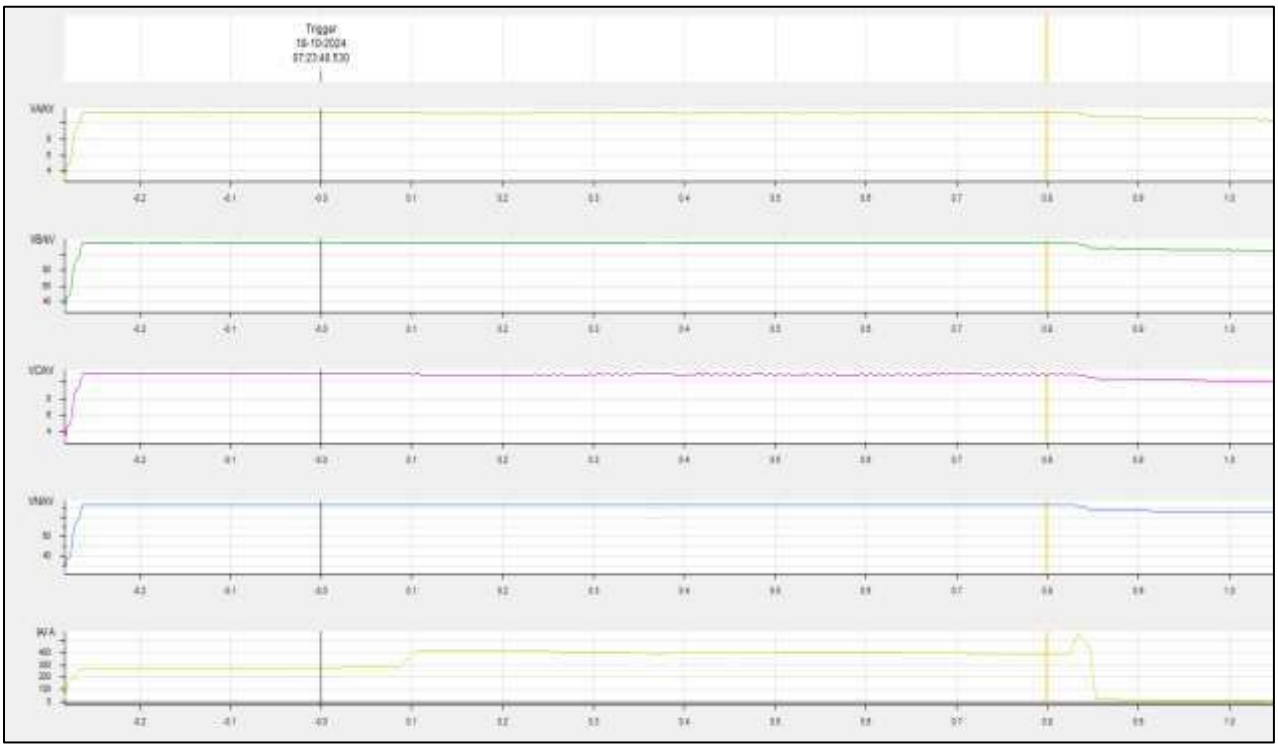


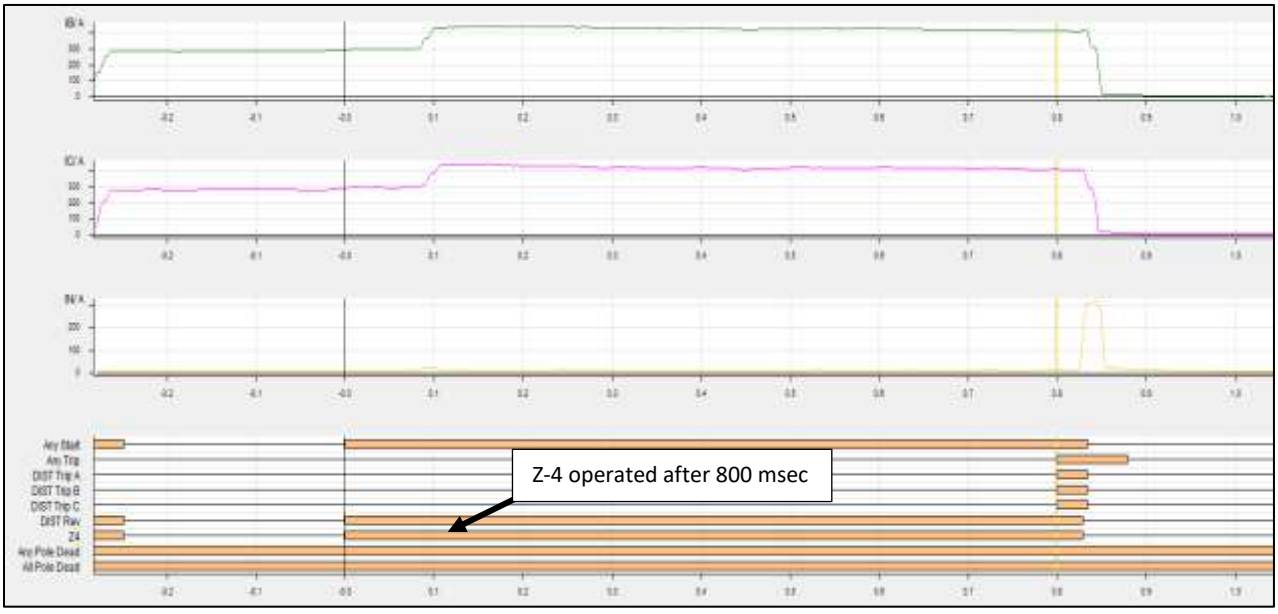
220 kV Raigarh (CG)-JSPL-1 at JSPL end



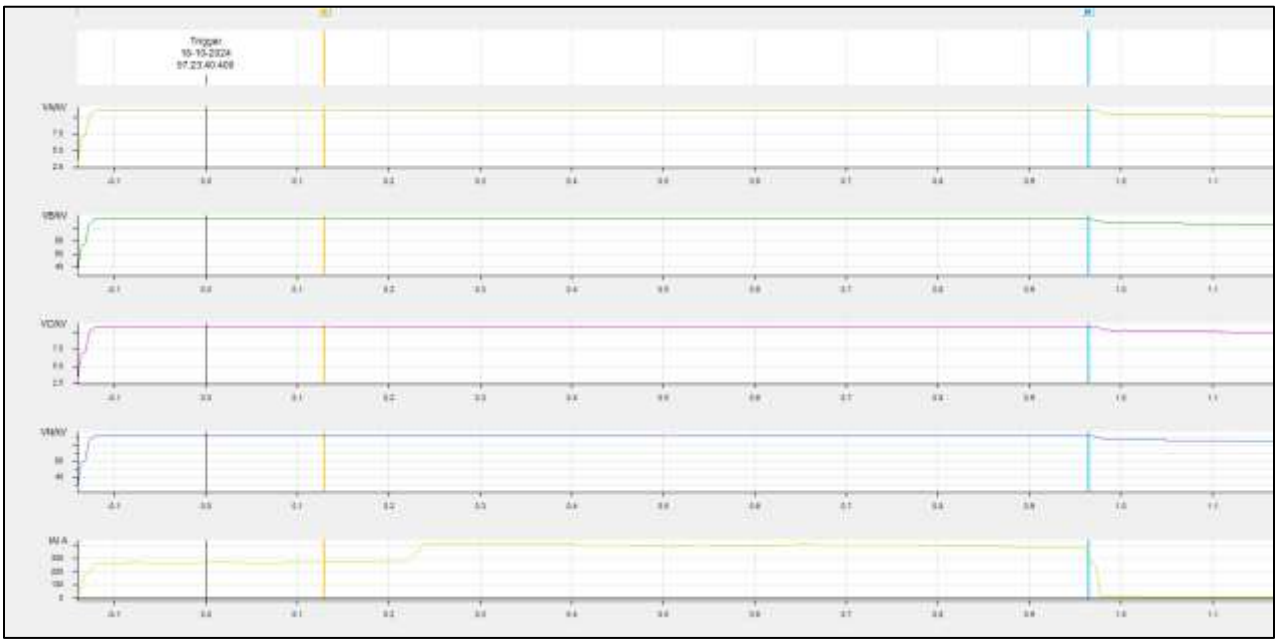


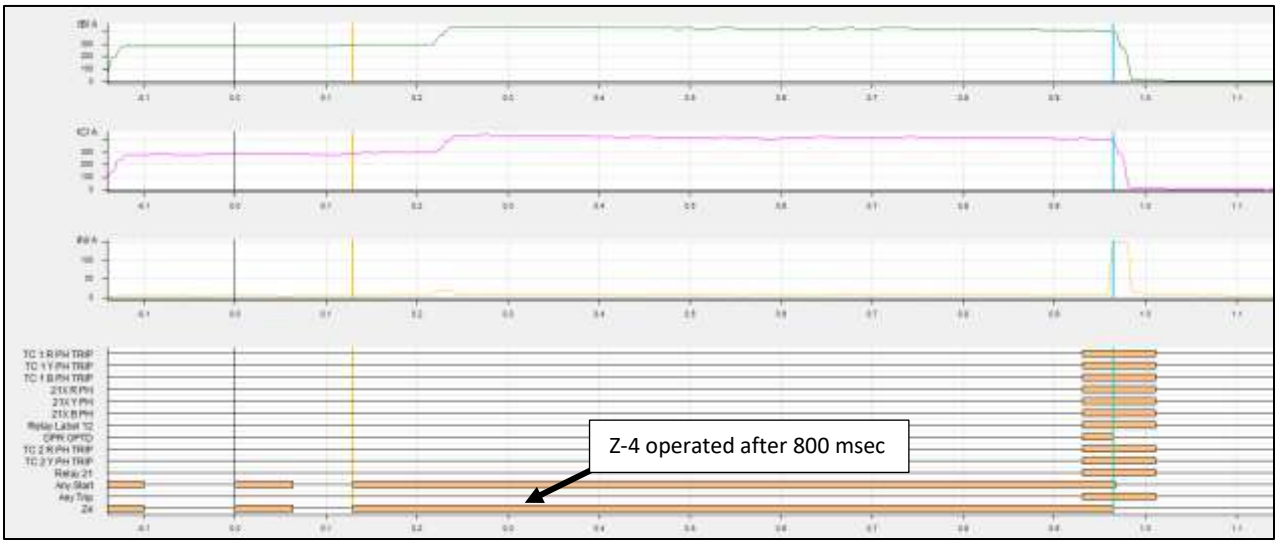
220 kV Raigarh (CG)-Raigarh (PG)-1 at Raigarh (CG) end



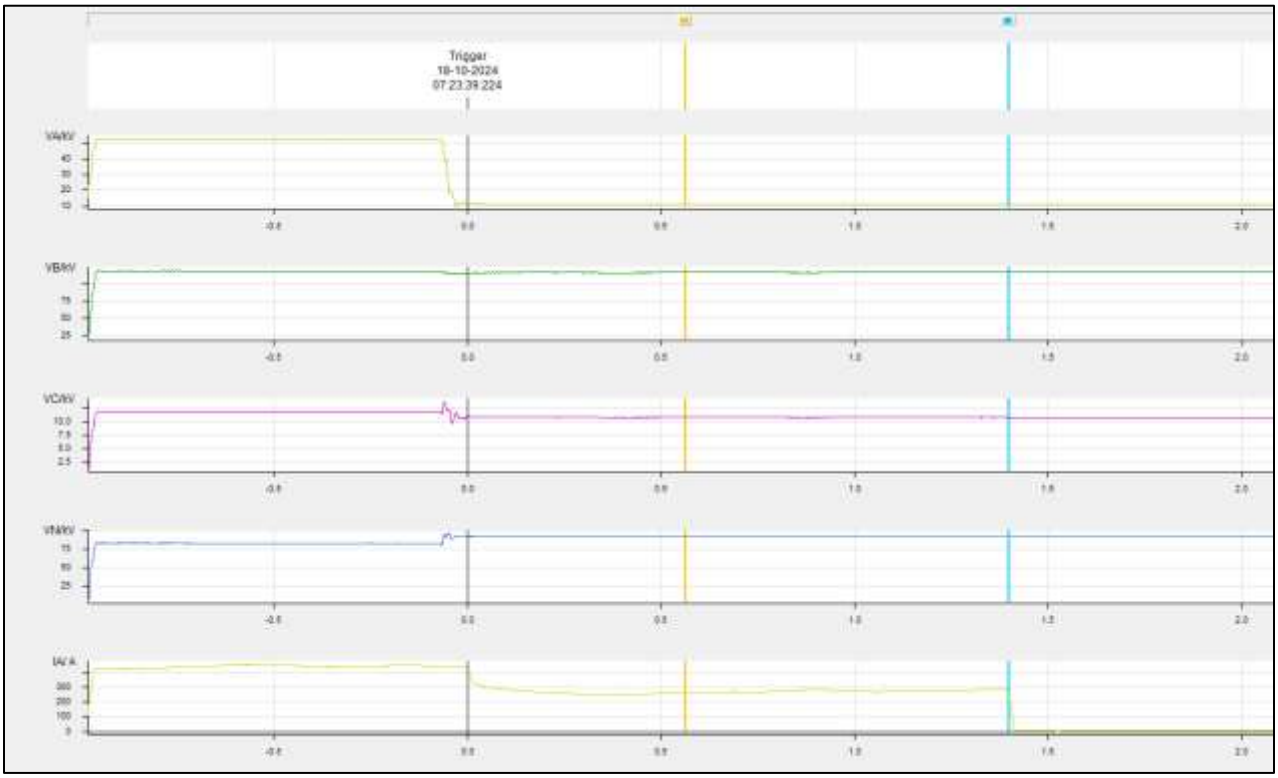


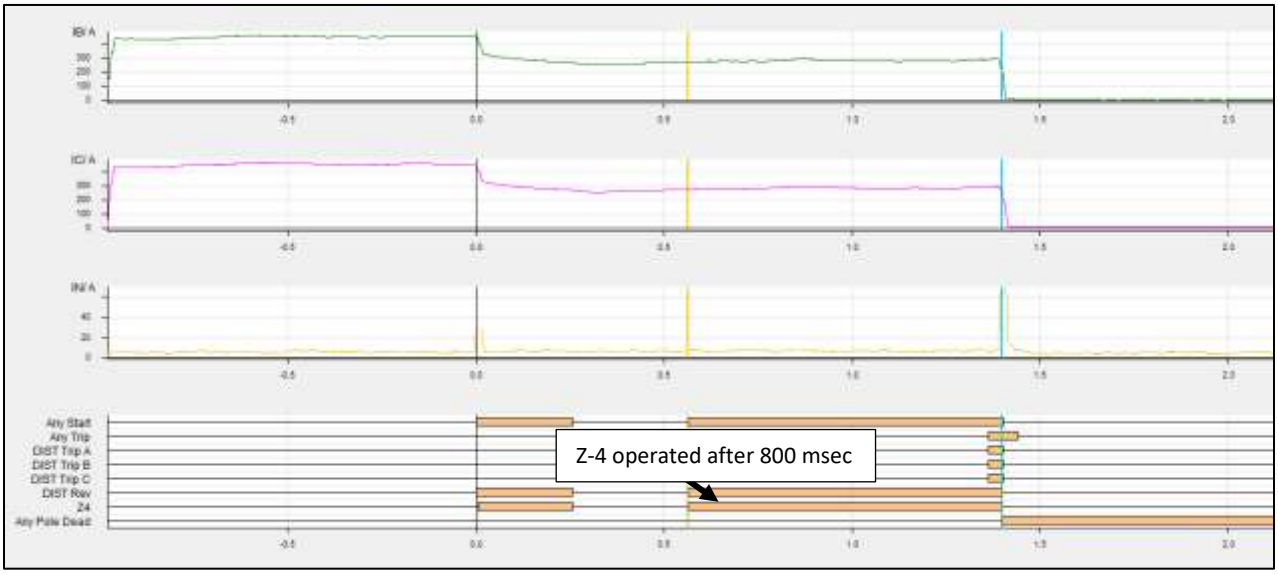
220 kV Raigarh (CG)-Raigarh (PG)-2 at Raigarh (CG) end



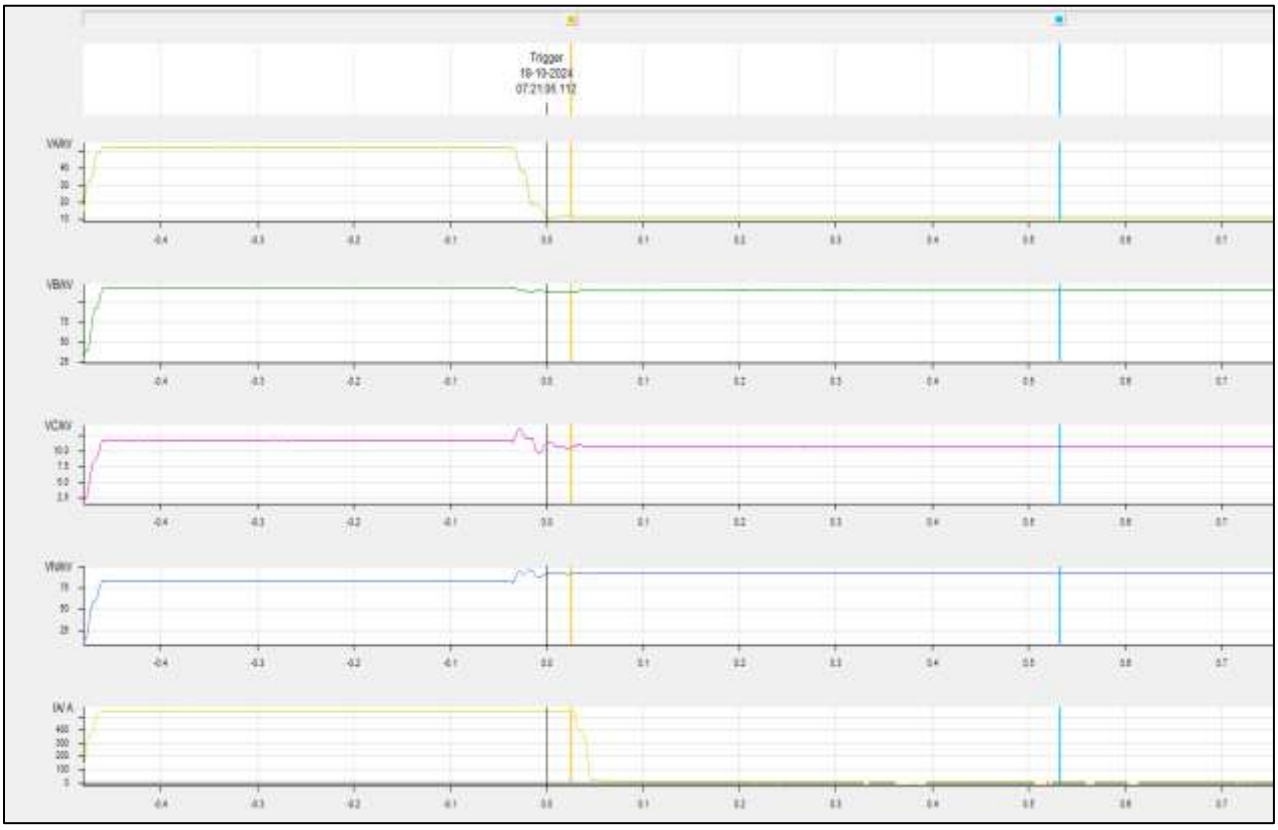


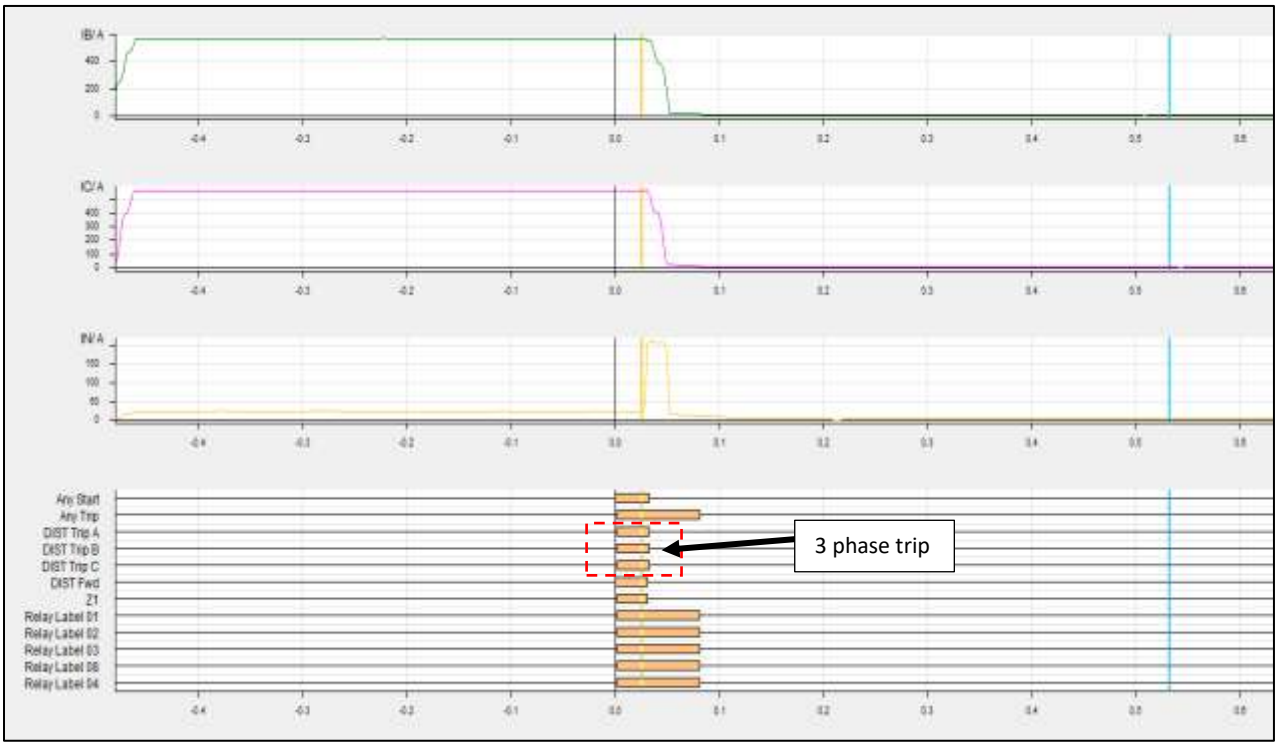
220 kV Raigarh (CG)-Raigarh (PG)-3 at Raigarh (CG) end





220 kV Raigarh (CG)-Saraipalli-1 at Saraipalli end





अनुलग्नक - 4 / Annexure-4: Report from SLDC Chhattisgarh

CIN – U40108CT2003SGC015820

CHHATTISGARH STATE POWER TRANSMISSION CO. LTD.

(A Govt. of Chhattisgarh Undertaking)

O/o Superintending Engineer (Sub-station) Circle,

C.S.P.T.C.L., Bilaspur (Tifra) – 495223

CSPTCL

Website – www.cseb.gov.in, E-mail – sessombilaspur@gmail.com, Phone – 07752-127060, Fax – 07752-127060

No./SE/S/s /BSP/Tech./.....1107 Bilaspur / Date 30/10/2024

To,

The Chief. Engineer
Sub-station
CSPTCL, Bilaspur

Sub: - Tripping analysis of grid event on dtd. 18.10.2024 at 220 KV S/S Raigarh.

1) Brief details of Incidences and reason for occurence :-

On dtd. 18.10.2024 at 07:23 hrs total interruption occurred at 220 KV SS Raigarh and connected 132 KV substations because of tripping of incoming feeders i.e. 220 KV PGCIL Ckt -1, 2 & 3 at 220 KV S/s Raigarh. This resulted in total interruption at 220 KV S/s Raigarh, 132 KV S/s Raigarh, Baramkela, Kondatarai, Dabhra, Chaple, Adbhar. This tripping took place due to 220 KV Main Bus-I PT fuse failure occurred during shifting of 220 KV PT supply from Main Bus-II to Main Bus-I of 220 KV Saraipali-II feeder at 220 KV S/s Raigarh. Load loss of about **532 MW**.

2) Detailed analysis of the event

The series of event which took place is as stated under:

i) Normally all 8 No. 220 KV feeders and 3 No 220/132 KV 160 MVA Xmers are connected to 220 KV Main Bus-I. Only 2 No. 220 KV feeders i.e. JPL-I and Saraipali-II were connected to 220 KV Main Bus-II.

ii) On Dtd 18.10.2024 at 06:02 hrs 220 KV JPL-I feeder's Y-Ph conductor got open near Line CT. Due to which 220 KV JPL-1 line tripped from M/s JPL end in DPR and simultaneously 220 KV Raigarh -Saraipali ckt-II feeder tripped from Saraipali end in DPR.

iii) In order to restore supply of 220 KV Saraipali-II line it got connected to Main Bus-I (by closing MB-I isolator and opening MB-II isolator). Further shifting of PT supply from Main Bus-II to Main Bus-I for 220 KV Saraipali-II panel was undergoing.

iv) During above shifting of PT supply the existing 220 KV Main Bus-I PT fuses got failed at 07:23 hrs resulting in Tripping of 5 No. 220 KV feeders namely 220 KV PGCIL I, II & III, 220 KV Saraipali-I and 220 KV JSPL-II feeders got tripped in DPR indication causing total interruption. (220 KV JPL-I feeder, 220 KV Saraipali-II and 220 KV Gerwani feeders were already in OFF condition and 220 KV JSPL-I and 220 KV Korba feeers were hand tripped)

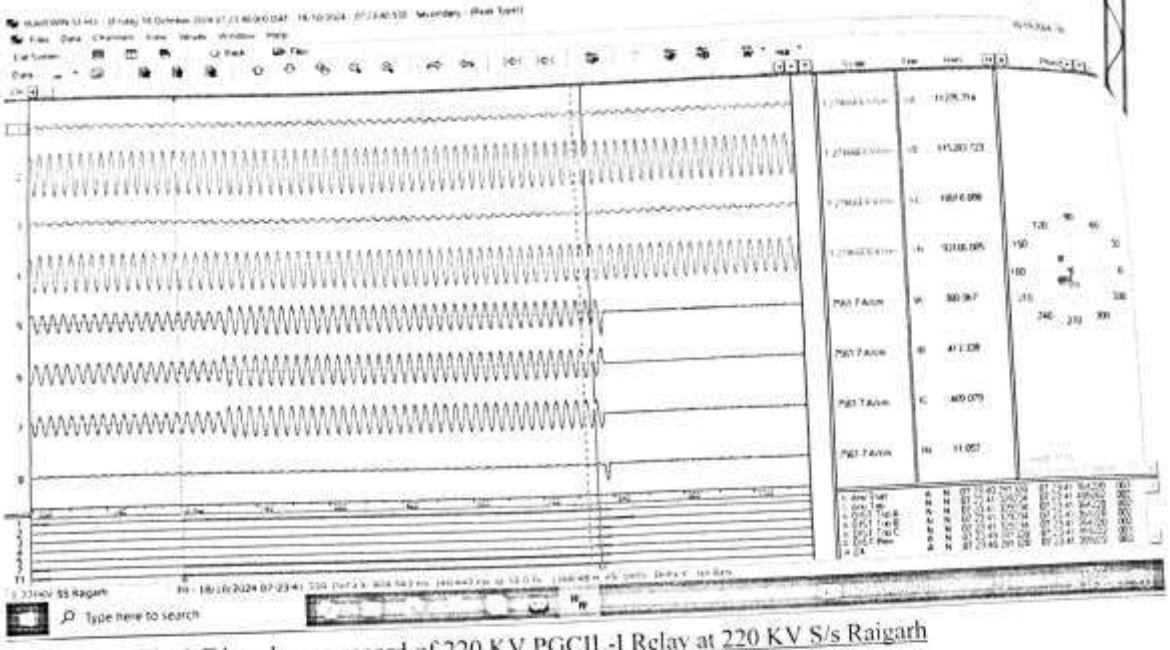


Fig.1 Disturbance record of 220 KV PGCIL-I Relay at 220 KV S/s Raigarh

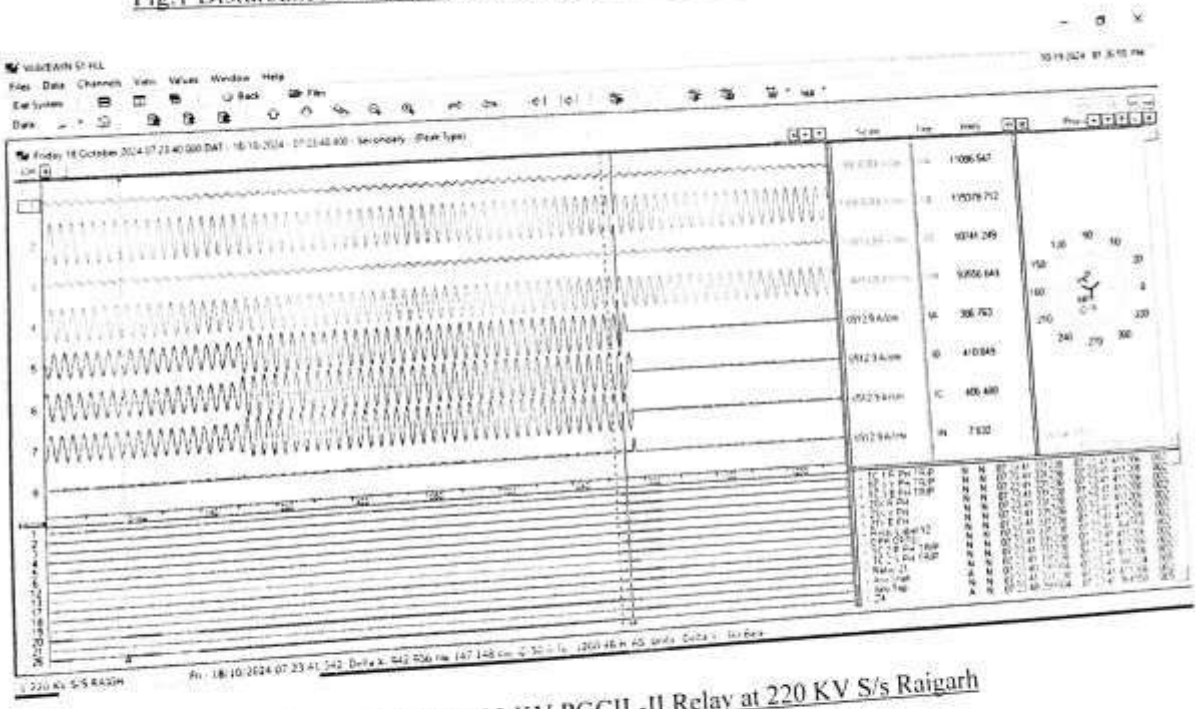


Fig.2 Disturbance record of 220 KV PGCIL-II Relay at 220 KV S/s Raigarh

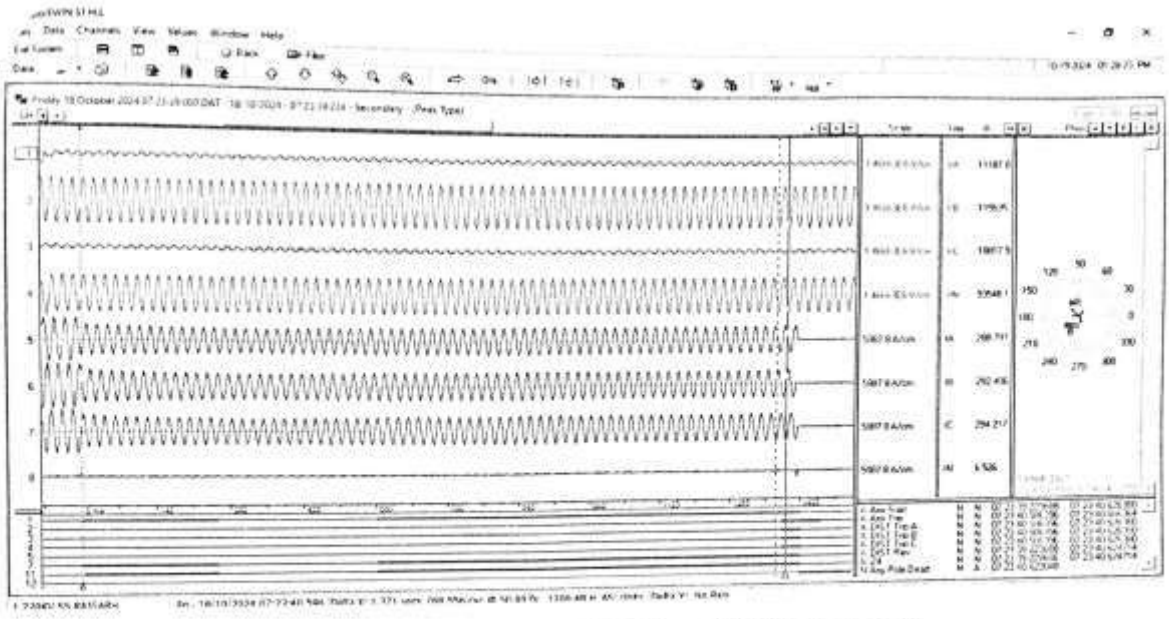


Fig.3 Disturbance record of 220 KV PGCIL-III Relay at 220 KV S/s Raigarh

3) Observation:-

The 220 KV Main Bus-I PT fuses failed because during PT shifting from Main Bus-II to Main Bus-I of 220 KV Saraipali-II panel, the PT supply of both the Main Bus I&II got paralleled from secondary side. Due to which MB-II PT supply got reverse charged from secondary while Primary of MB-II was dead. This caused blowing of PT fuses. Due to this PT supply to DPR relays got missing. This condition was sensed by DPR relays of Loaded feeders and consequently they tripped in Distance protection.

4) Remedial action need to be taken:-

i) For shifting of 220 KV PT of Main bus in 220 KV Saraipali-II panel the PT selection switch will be used. For this separate PT cables from Bus-I and Bus-II will be connected and wiring will be done to 220 KV Saraipali-II panel. This will avoid paralleling of PT from secondary side and therefore prevent blowing of PT fuses during PT supply shifting.

ii) Further PT supply of incoming 220 KV PGCIL-I,II&III Feeders' PT supply will be given from there respective Line CVTs instead of Main Bus PT.

5) Restoration Details:18.10.2024

S.No.	Name of Substation	Restoration time
1	220 kV S/S Raigarh	220KV PGCIL-3: 09:07 Hrs 220KV PGCIL-2: 09:26 Hrs 220KV PGCIL-1: 14:21 (via TBC) 220KV Saraipal-1: 09:35 Hrs 220KV Saraipali-2: 10:42 hrs 220KV JPL-1: 16:37 (after maintenance) 220KV JSPL-1: 09:57 Hrs 220KV JSPL-2: 09:57 Hrs 160MVA Xmer-1: 09:09 Hrs 160MVA Xmer-2: 09:24 Hrs 160MVA Xmer-3: 09:37 Hrs
2	132 kV S/S Raigarh	9:22 Hrs
3	132 kV S/S Kondatarai	9:22 Hrs
4	132 kV S/S Dabhra	9:28 Hrs
5	132 kV S/S Baramkela	9:22 Hrs
6	132 kV S/S Chaple	08:31 Hrs (From Champa S/s)
7	132 kV S/S Adbhar	07:58 Hrs (From Jaijaipur S/s)
8	132 kV S/S Sarangarh	09:58 Hrs

This is for your kind information.

Enclosure: 1) Prefault condition with SLD of affected network.

30.10.24

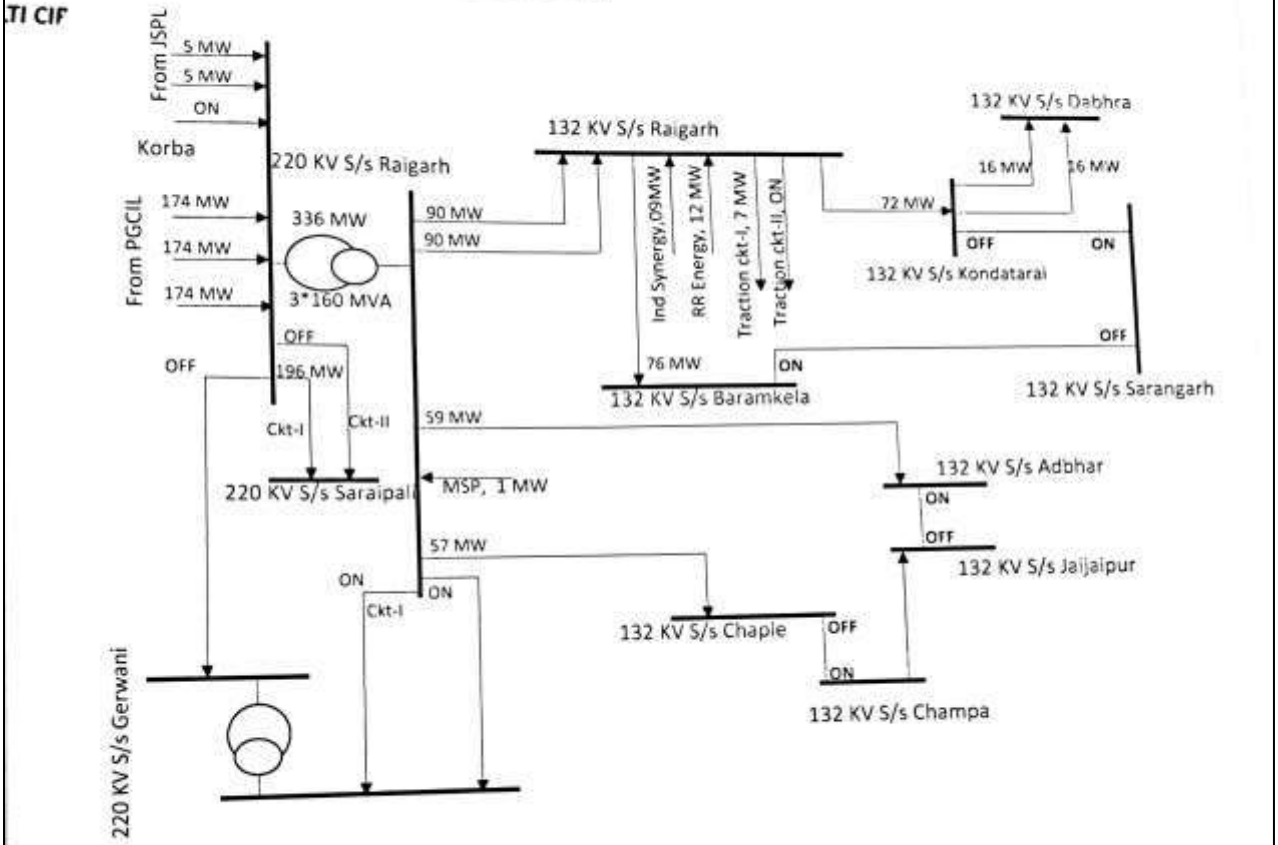
SE (sub-station)
CSPTCL, Bilaspur

Copy to:-

1. Superintending Engineer (SLDC), CSPTCL. Raipur.
2. EE (Sub-station) / (MRT) Dn. CSPTCL Raigarh is instructed to implement the remedial action regarding separation of Bus PT at earliest.
3. AE 220KV S/S CSPTCL Raigarh.

Prefault Condition and SLD of affected network:-

SLD of Network on dtd 18.10.2024 at 7:00 hrs



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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. सयाली उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220kV Sayali Sub Station of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 18.10.2024

1. **घटना का सारांश / Event Summary:** At 02:37 Hrs / 03-09-2024, 220kV Sayali-Vapi II-1 & 2 tripped on R-E fault (ckt-1 tripped from Vapi II end only due to faulty relay at Sayali end) and 220kV Sayali Switching Substation became dead. As informed by sterlite fault was in Z-1 220 kV Sayali-Vapi II-1 (1.1 km from Vapi II end).

   As seen from DRs, 3 phase trip issued for a single phase fault at Vapi II end of 220 kV Sayali-Vapi II-1 circuit and line tripped from Vapi end only. Also, 220 kV Sayali-Vapi II-2 tripped on Z-3 distance protection operation at Vapi end without any time delay. The trippings were not in order. Load loss of 73 MW occurred at of 220kV Alok Industries Ltd (which is being fed radially through 220 kV Sayali) due to the event.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 02:37 Hrs / 03-09-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area:** Sayali Sub Station/Dadra and Nagar Haveli
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand (DNH)
घटना के पूर्व Pre Event	49.96	59110	49851	-	884
घटना के बाद Post Event	49.97	59094	49786	-	811

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Rainy

6. **लोड और जेनरेशन हानि / Load and Generation loss:** Load loss of 73 MW occurred at of 220kV Alok Industries Ltd due to the event.



Figure 1. 400 kV Boisar-Vapi-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 03 hrs 53 min.

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

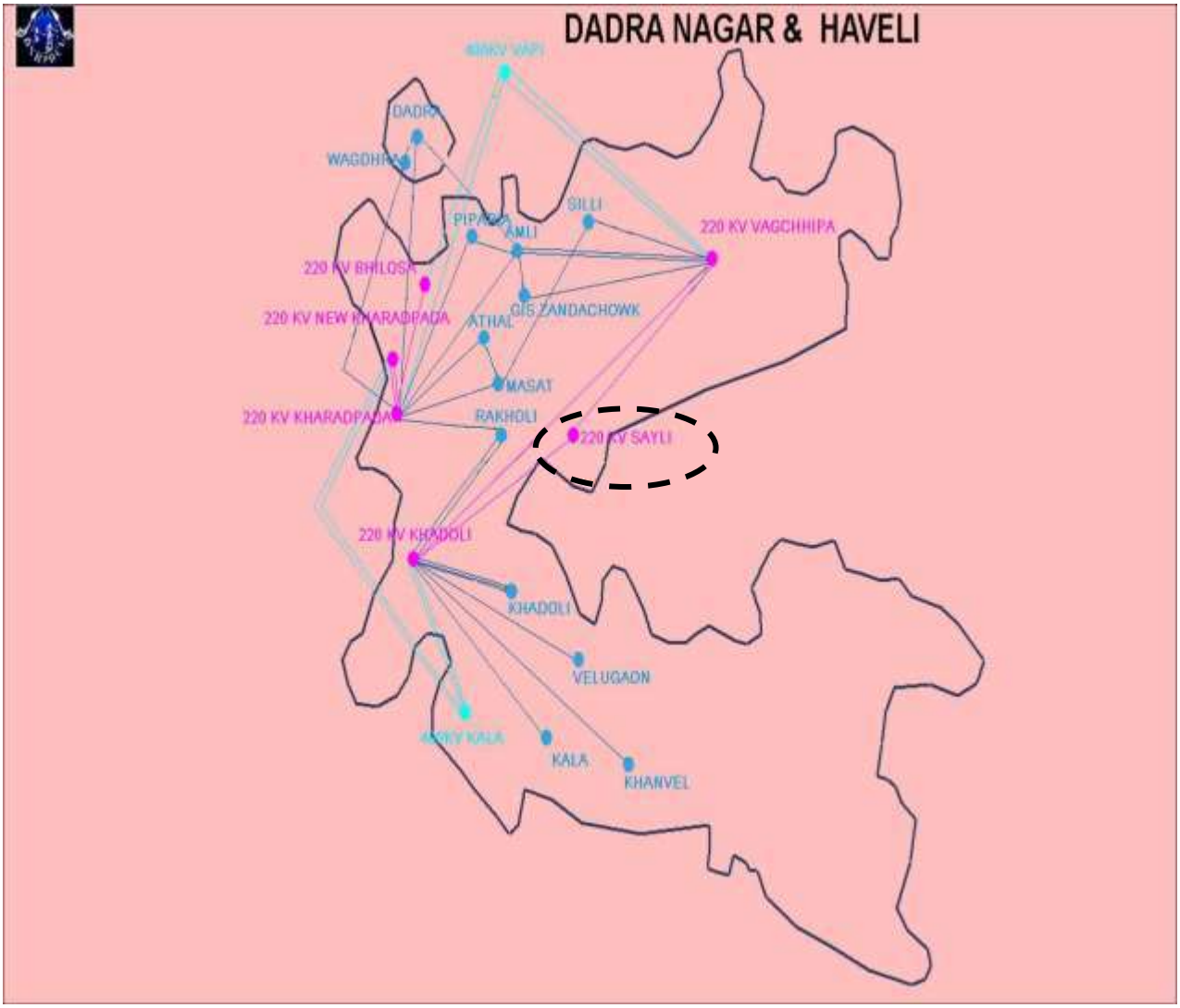


Figure 2. Network across the affected area

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

Nil

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Sayali	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time

1	220 kV Vapi II Sayali-1	02:37	Not tripped	Rph-e/f, Vapi II, Vapi II end- 1.1 km, 2.694 kA.	06:56
2	220 kV Vapi II Sayali-2	02:37	DT received	30.3 km, 4.111 kA. Z-3	06:30
3	Sayli – 220kV – Bus 2	02:37	-	-	06:30
4	220kV Alok Industries Ltd.	02:37	-	-	06:30

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

- 3 phase trip issued for a single phase fault (R-N fault) at Vapi II end of 220 kV Sayali-Vapi II-1 circuit and line tripped from Vapi II end and did not trip at Sayali end, as the relay was faulty at Sayali end.
- 220 kV Sayali-Vapi II-2 tripped on Z-3 distance protection operation at Vapi end without any time delay and tripped at Sayali end due to DT received.
- The trippings were not in order.

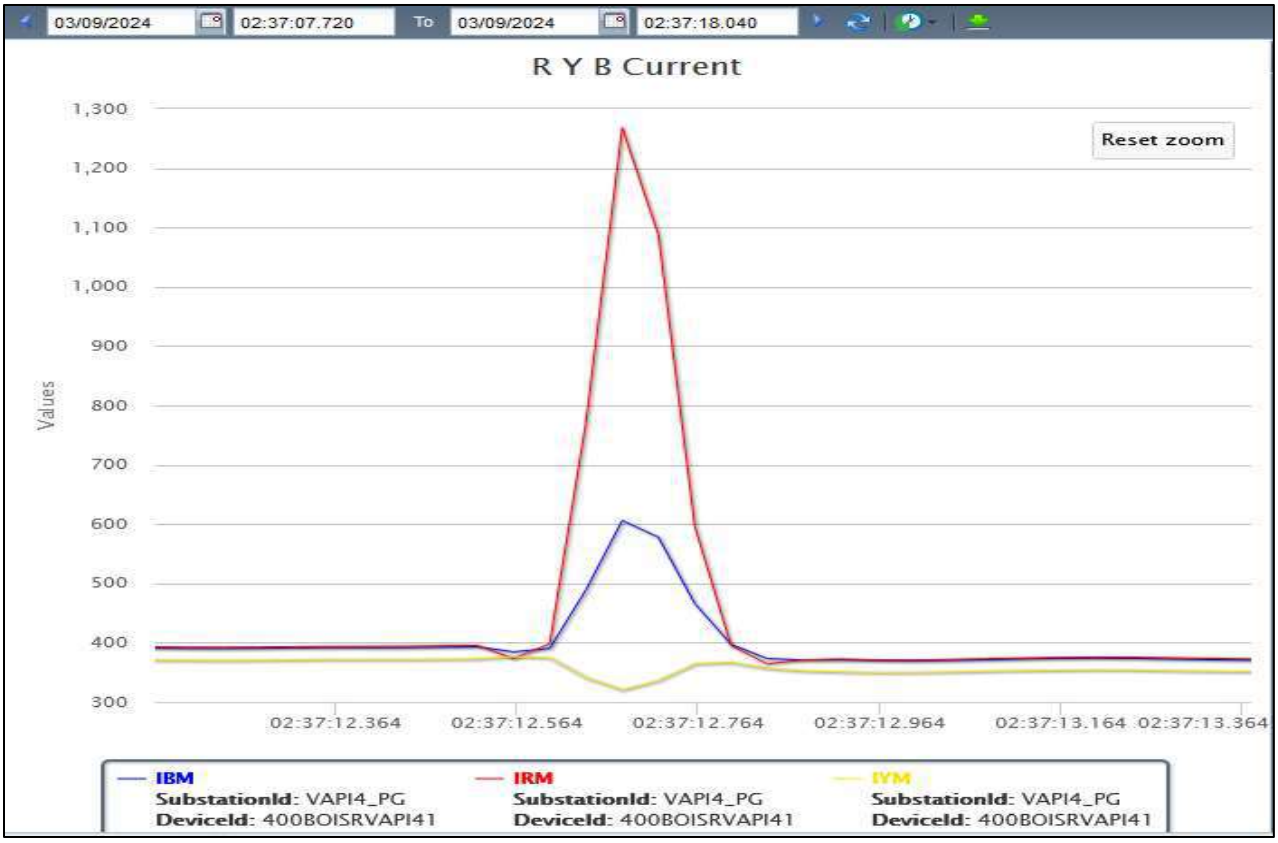


Figure 3. PMU Current plot of 400 kV Boisar-Vapi-1

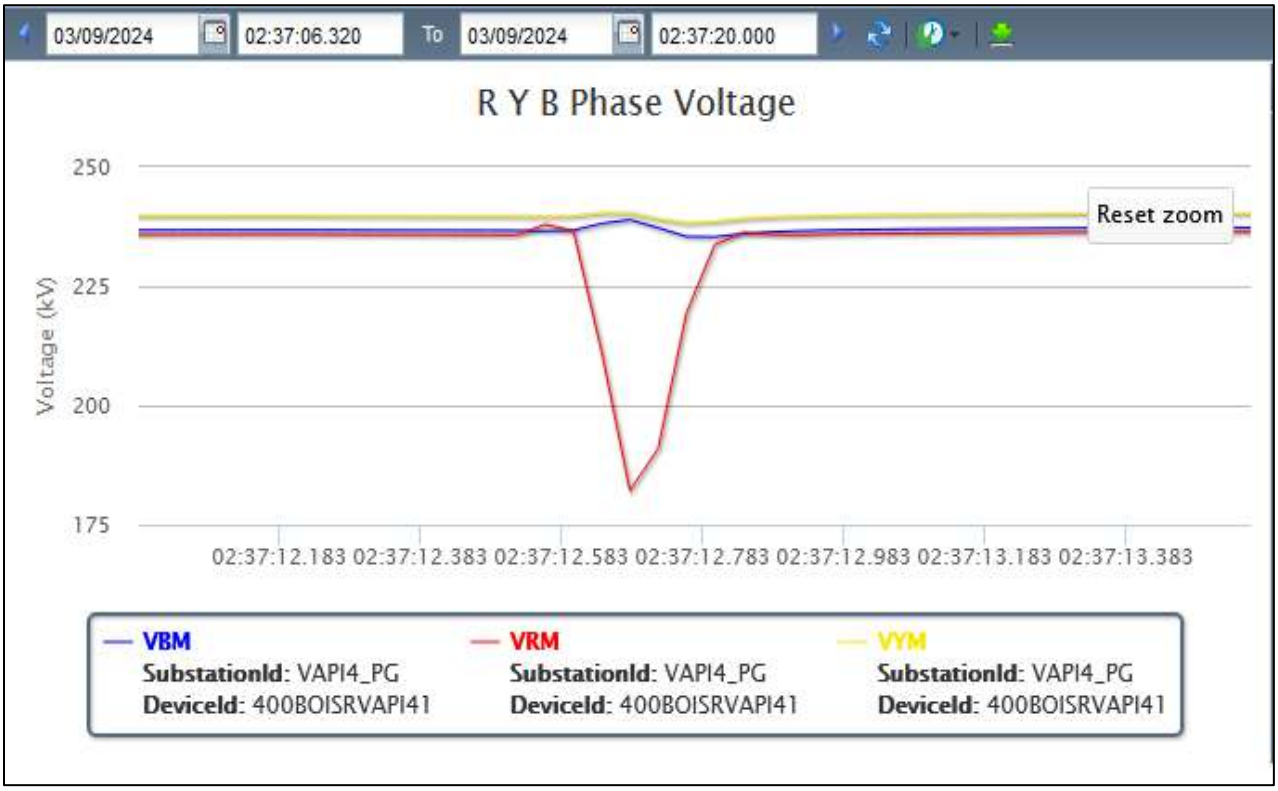


Figure 4. PMU Voltage plot of 400 kV Boisar-Vapi-1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- 3 phase trip issued for a single phase fault (R-N fault) at Vapi II end for 220 kV Sayali-Vapi II-1 circuit and line tripped from Vapi II end only. Line did not trip at Sayali end due to faulty relay at Sayali end.
- 220 kV Sayali-Vapi II-2 tripped on Z-3 distance protection operation at Vapi end without any time delay after relay pick up.
- The trippings were not in order.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Status of rectification/ replacement of unhealthy relay at Sayali to be updated by SLDC DNH to WRLDC
- Incorrect relay operations as mentioned in point no. 12 needs to be investigated and explained by SLDC DNH and MUML.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from Sayali, DNH.
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Sayali, DNH in .cfg and .dat format and received late from Vapi II, Sterlite.
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Sayali, DNH.

4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	3 phase trip issued for a single phase fault (R-N fault) at Vapi II end of 220 kV Sayali-Vapi II-1 circuit. Line tripped from Vapi II end only due to unhealthy relay at Sayali end. 220 kV Sayali-Vapi II-2 tripped on Z-3 distance protection operation at Vapi end without any time delay after relay pick up.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- At the 220kV Sayli substation, the relay was found to be out of order (220kV vapi2-Sayli ckt-1 at sayli end Relay faulty). The rectification work to taken up on a priority basis and status needs to be furnished.

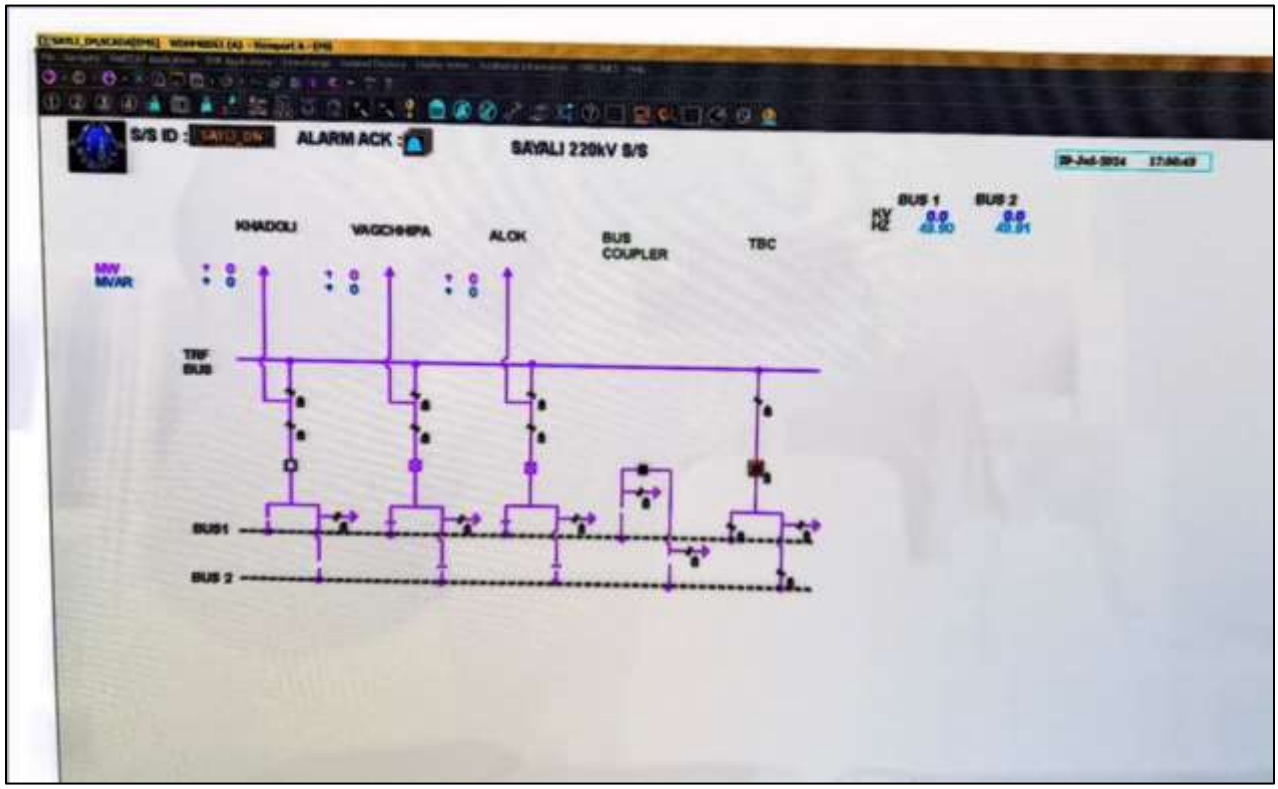
अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC-

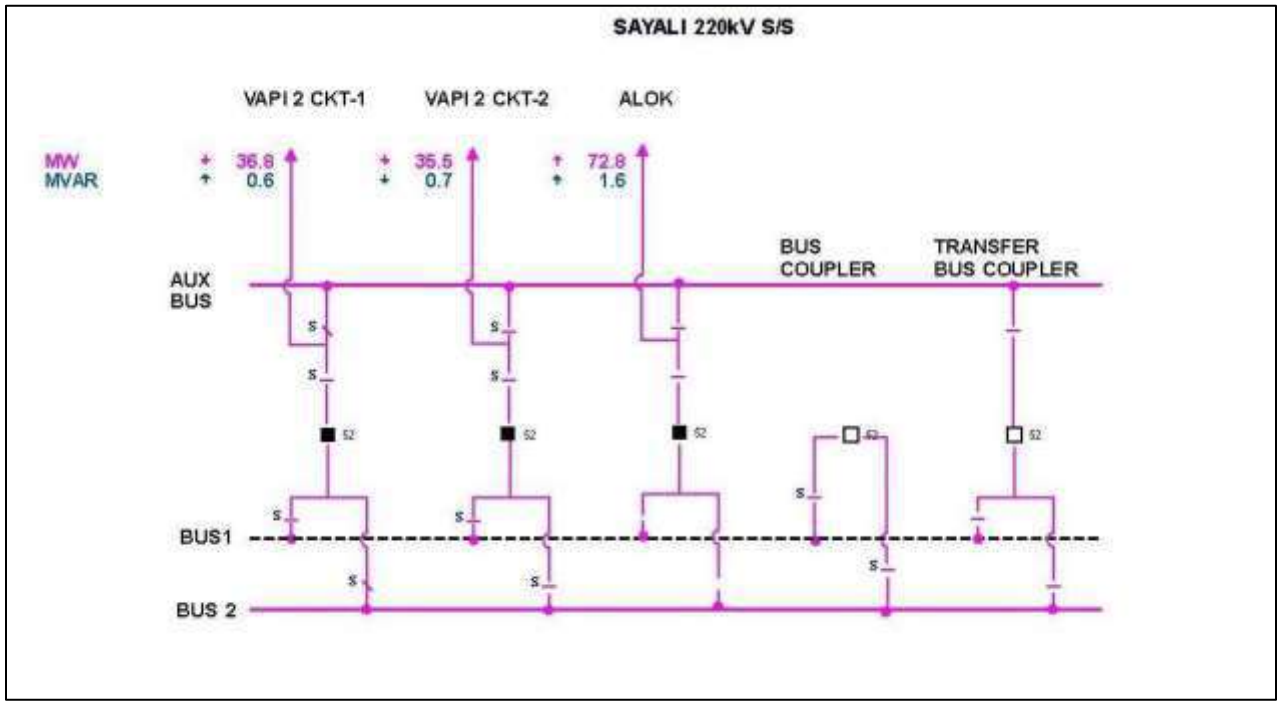
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	VAP24_PG	VAPI 2 PG CB 20852 (SAYLI-1) ACTED	02:37:12	673
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20852 (SAYLI-1) FAULTY	02:37:12	701
WRLDC	220-SOE	VAP24_PG	VAPI 2 PG CB 20952 (SAYLI-2) ACTED	02:37:12	763
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20852 (SAYLI-1) OPEN	02:37:12	727
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20952 (SAYLI-2) FAULTY	02:37:12	769
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20952 (SAYLI-2) OPEN	02:37:12	813

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Sayali SLD:

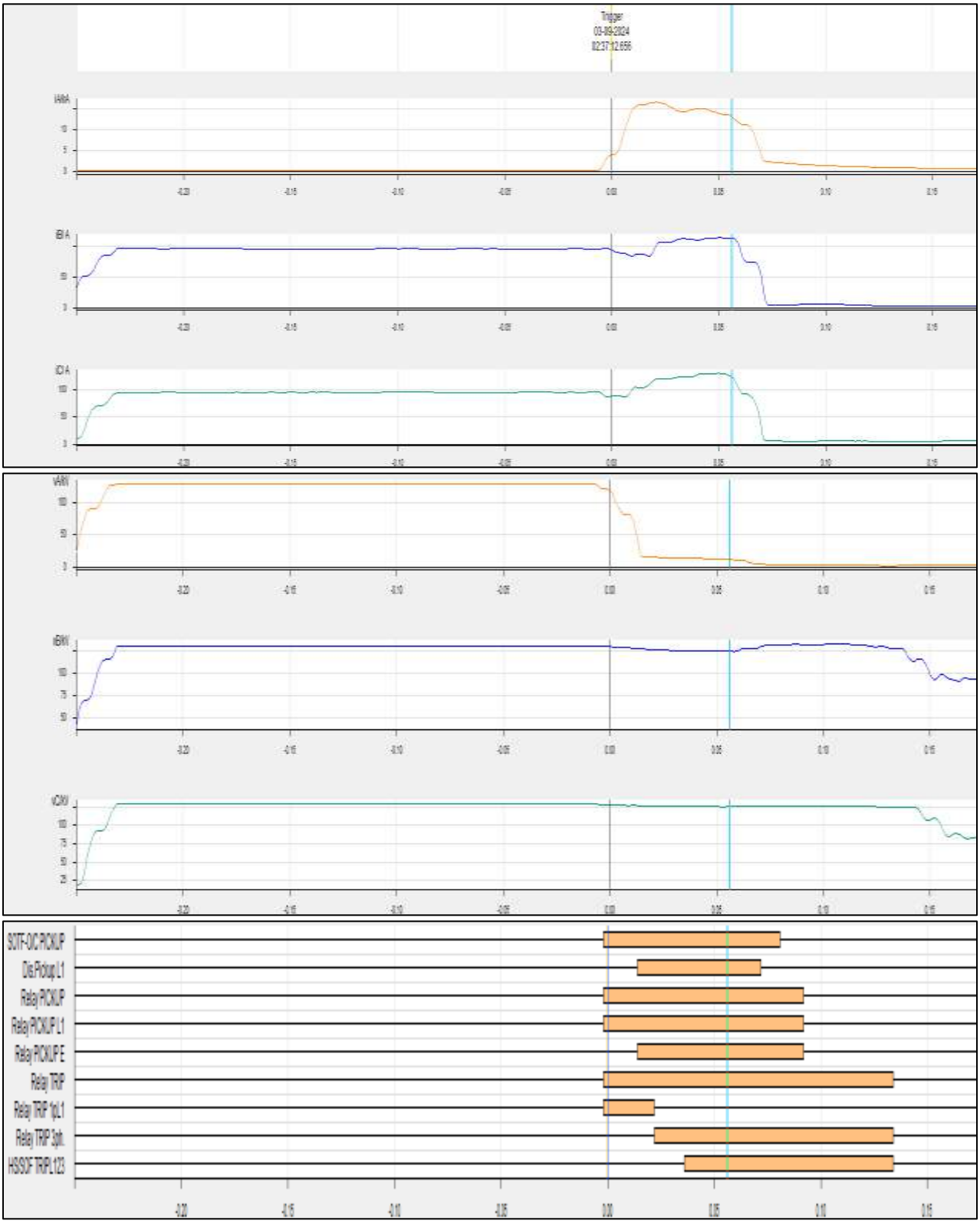


220 kV Sayali SLD from DNH-

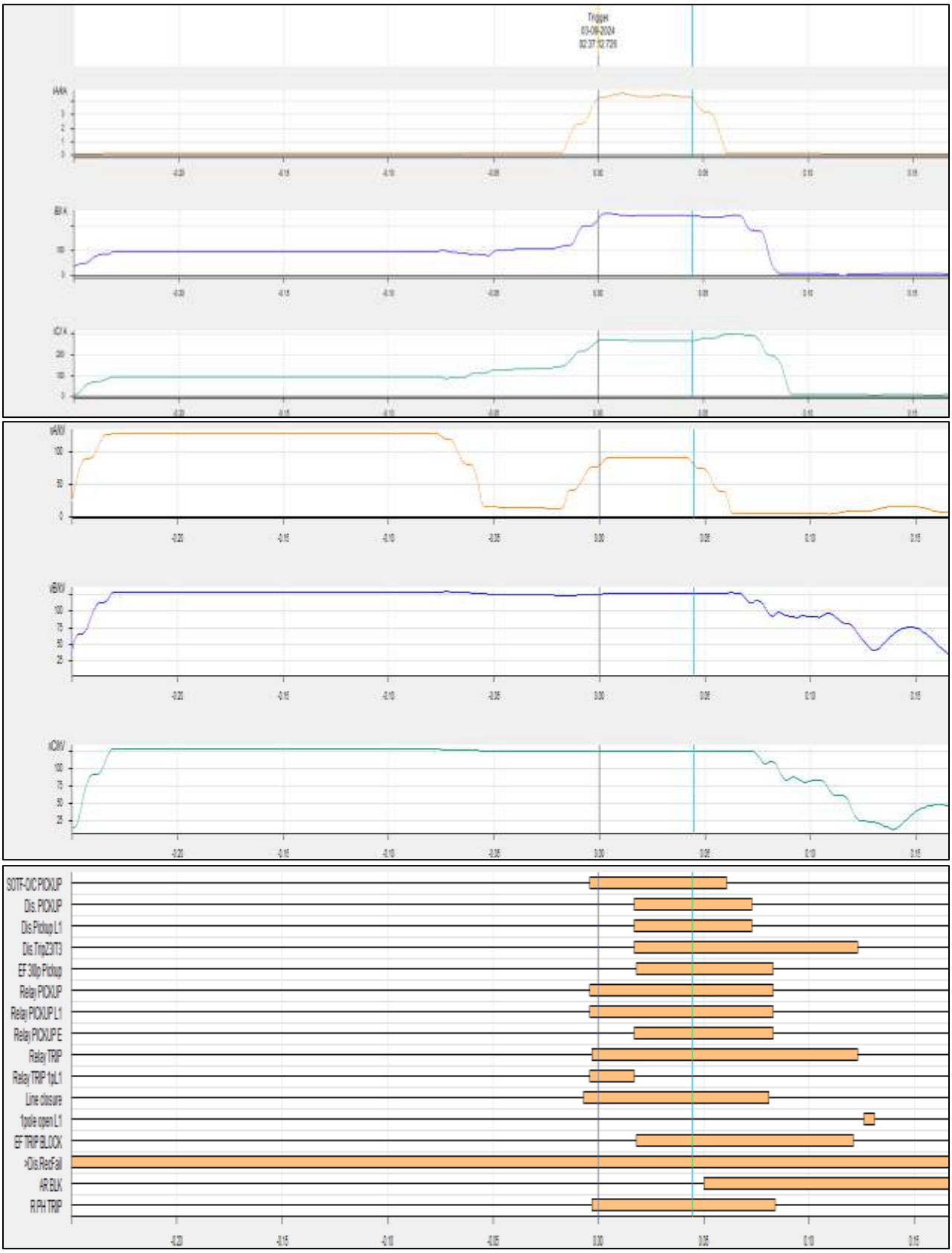


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Vapi II Sayali-1 Line from Vapi II end



B. DR of 220 kV Vapi II Sayali-2 Line from Vapi II end



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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. वापी & सयाली उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220kV Vapi & Sayali Sub Station of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 18.10.2024

1. **घटना का सारांश / Event Summary:** At 17:29 hrs / 11-09-2024, 400 kV Vapi II-Bus-1&2 tripped on bus bar protection operation due to maloperation of Main Control Unit-2 relay and all elements connected tripped from 400 kkV Vapi II side only. As informed by Sterlite, no abnormalities were found during inspection and the tripping may be due to moisture ingress due to heavy rainfall. 220 kV Sayali station connected to Vapi II became dark due to tripping of 220 kV Vapi II-Sayali-1&2. Load loss of 80 MW occurred at of 220kV Alok Industries Ltd (which is being fed radially through 220 kV Sayali) due to the event.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 17:29 hrs / 11-09-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area:** Sayali Sub Station/Dadra and Nagar Haveli
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand

घटना के पूर्व Pre Event	49.96	65997	55692	-	1323
घटना के बाद Post Event	49.96	66016	55475	-	1237

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Rainy

6. लोड और जेनरेशन हानि / Load and Generation loss: Load loss of 80 MW of 220kV Alok Industries Ltd occurred due to the event.

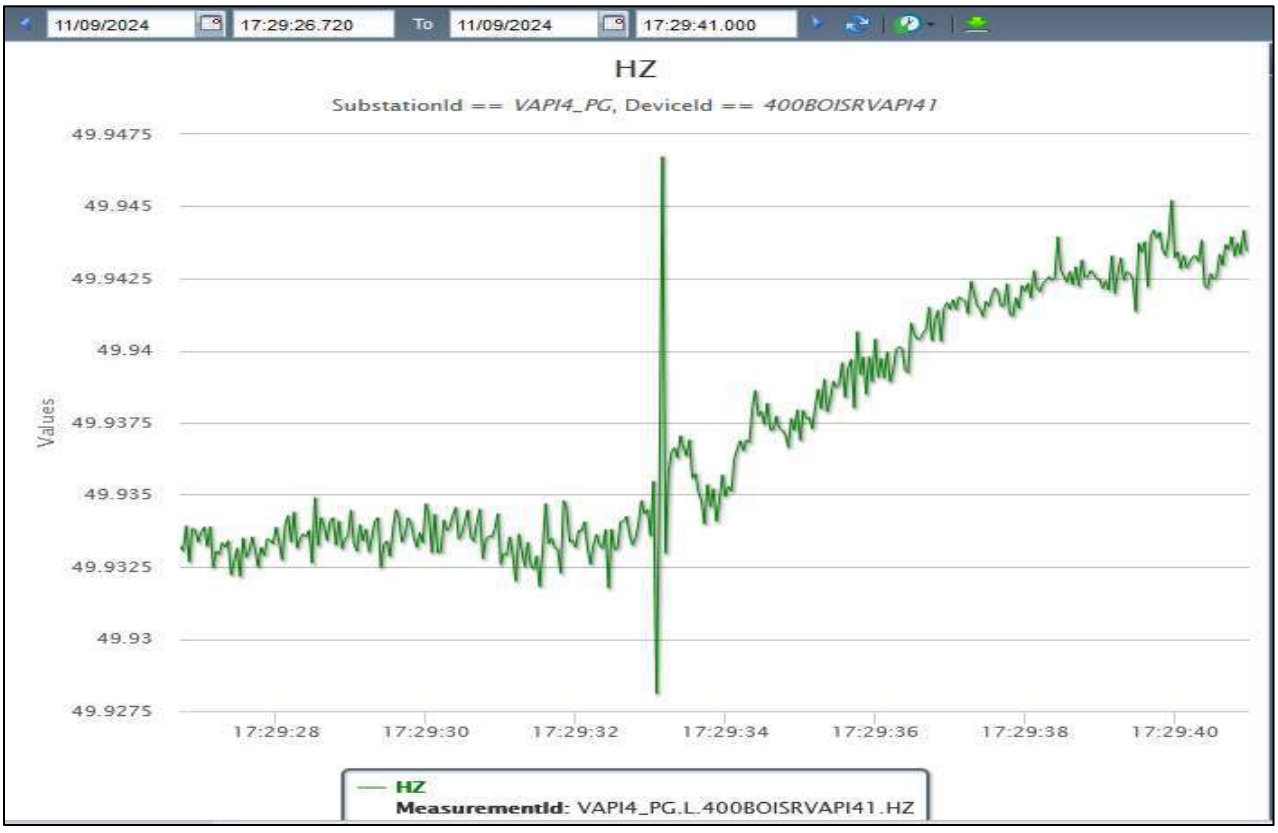


Figure 1. 400 kV Boisar-Vapi-1 Frequency Plot

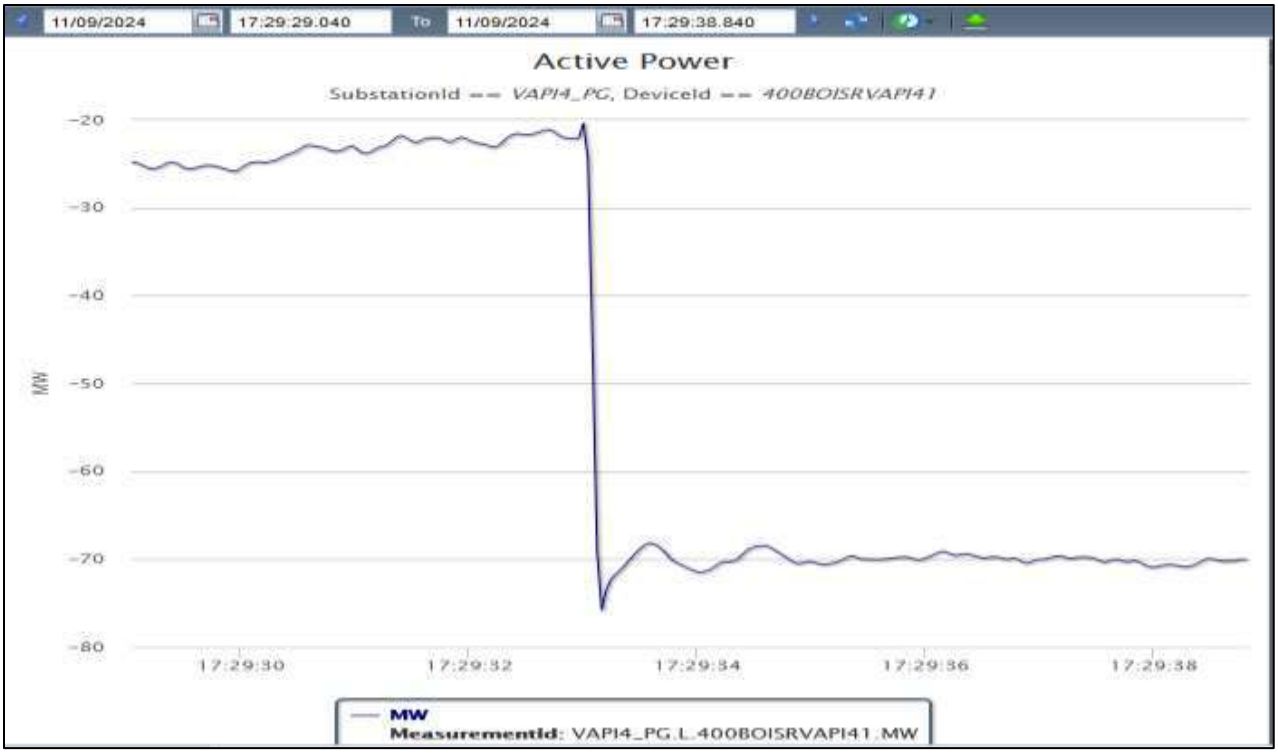


Figure 2. 400 kV Boisar-Vapi-1 Active Power Line Plot

7. **रुकावट की अवधि / Duration of interruption:** 01 hrs 01 min.

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

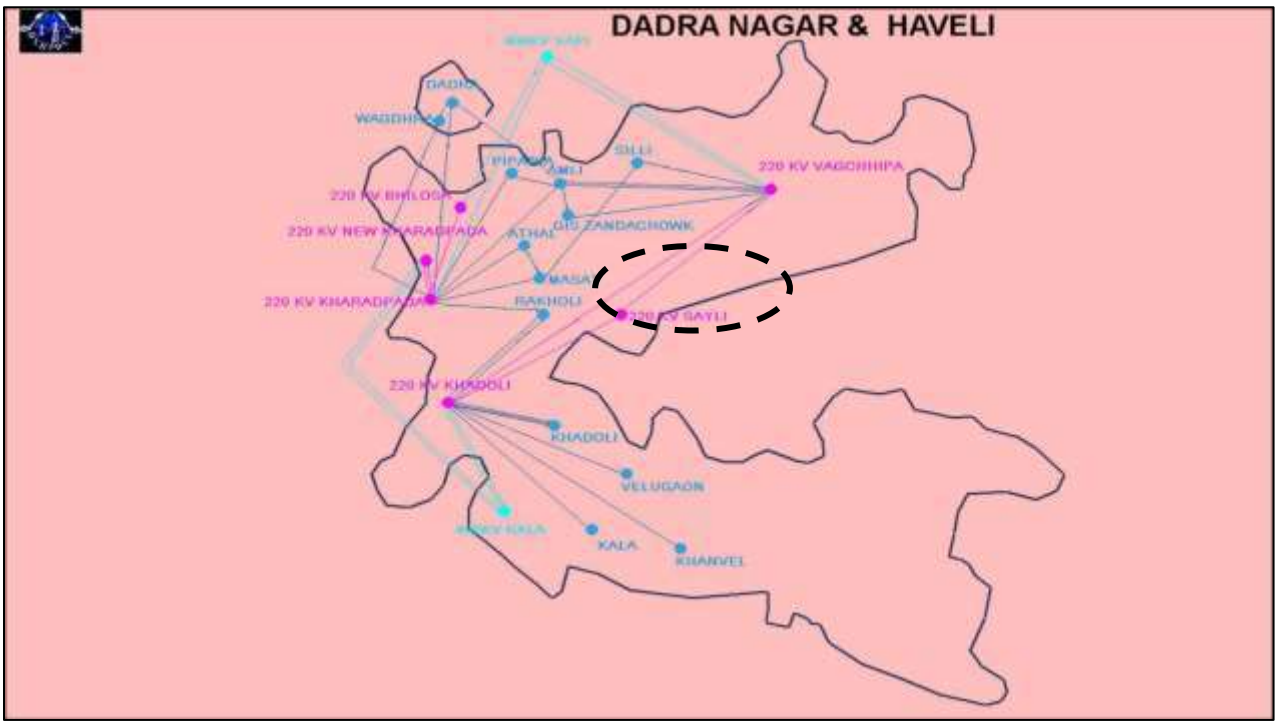


Figure 3. Network across the affected area

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

Nil

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Sayali	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1.	400 kV Bay 404 Main Bay for VAPI-II & KAKRPAR 3 4 -1& Bay 405 TIE Bay	17:29:33:014	B1 Gas Zone Trip	Not Applicable	20:43
2.	400 kV Bay 405 Tie Bay for KAKRPAR-1 and Main Bus-II	17:29:33:085	B2 Gas Zone Trip	Not Applicable	20:45
3.	400 kV Bay 401 Main Bay for VAPI-II & VAPI (PG) -2 & Bay 403 TIE Bay	17:29:33:012	B1 Gas Zone Trip	Not Applicable	18:58
4.	400 kV Bay 407 Main Bay for VAPI-II & KAKRPAR 3 4-2 & Bay 408 TIE Bay	17:29:33:011	B1 Gas Zone Trip	Not Applicable	20:30
5.	400 kV Bay 410 Main Bay for VAPI-II & VAPI (PG) -1 & Bay 411 TIE Bay	17:29:33:011	B1 Gas Zone Trip	Not Applicable	20:36
6.	400 kV Bay 403 Main Bay for ICT-1 & Bay 402 TIE Bay	17:29:33:086	B2 Gas Zone Trip	Not Applicable	20:21
7.	400 kV Bay 409 Main Bay for ICT-2 & Bay 408 TIE Bay	17:29:33:086	B2 Gas Zone Trip	Not Applicable	20:46
8.	400 kV Bay 412 Main Bay for 125 MVAR Reactor & Bay 411 TIE Bay	17:29:33:085	B2 Gas Zone Trip	Not Applicable	20:46
9.	220 kV Bay 204 Main Bay for ICT-1 & Main BUS -1 & 2	17:29:33:142	Inter tripping	Not Applicable	19:30
10.	220 kV Bay 207 Main Bay for ICT-2 & Main BUS -1 & 2	17:29:33:145	Inter tripping	Not Applicable	20:46
11.	220kV Vapi II- Sayali- 1	17:29	No Voltage in Bus-1	Not Applicable	19:52
12.	220kV Vapi II- Sayali- 2	17:29	No Voltage in Bus -2	Not Applicable	20:18

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

- 400 kV Vapi II-Bus-1&2 tripped on bus bar protection operation due to maloperation of Main Control Unit-2 relay and all elements connected tripped from 400 kV Vapi II side only.
- 220 kV Sayali station connected to Vapi II became dark due to tripping of 220 kV Vapi II-Sayali-1&2.
- No indication of fault from PMU.

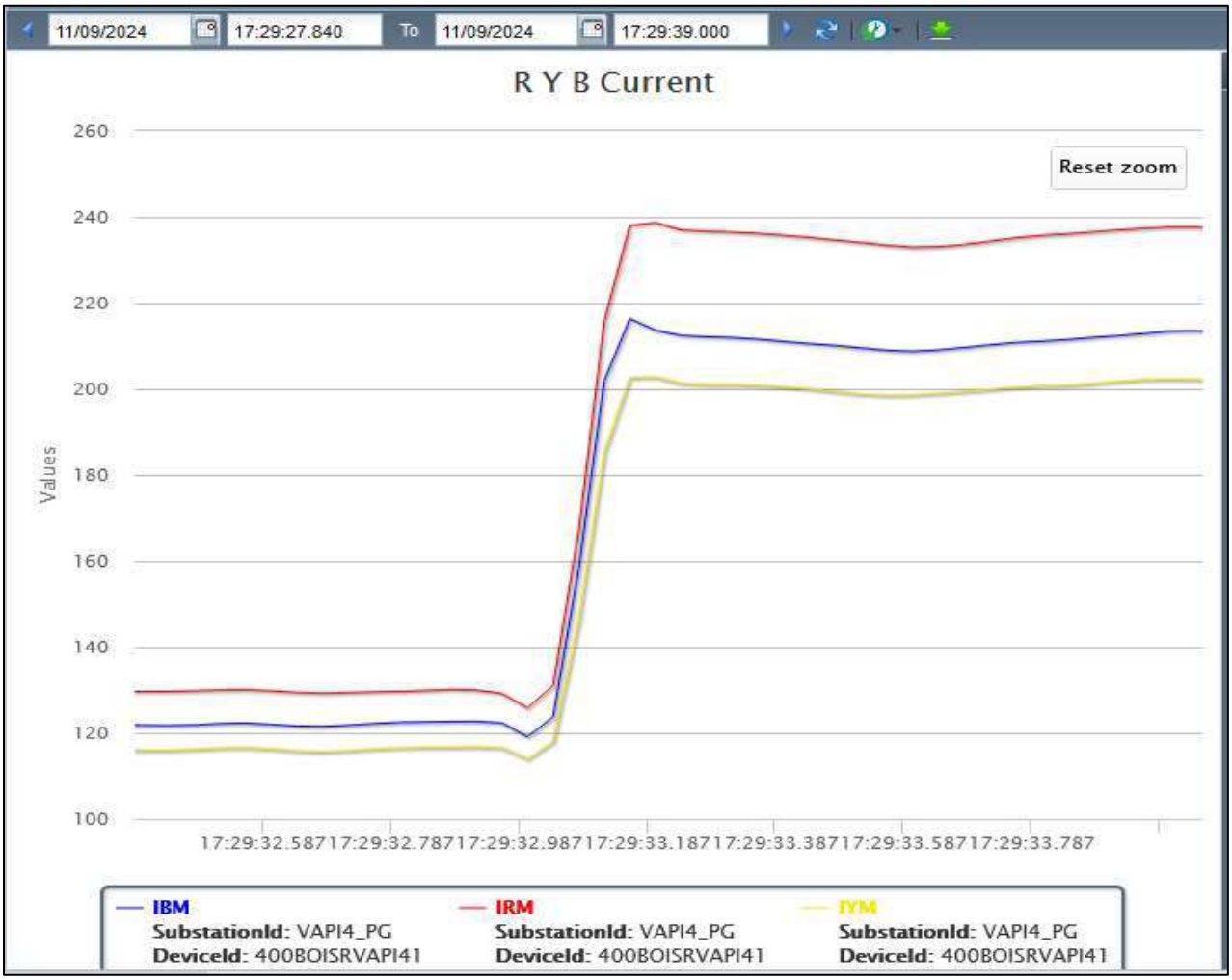


Figure 4. PMU Current plot of 400 kV Boisar-Vapi-1

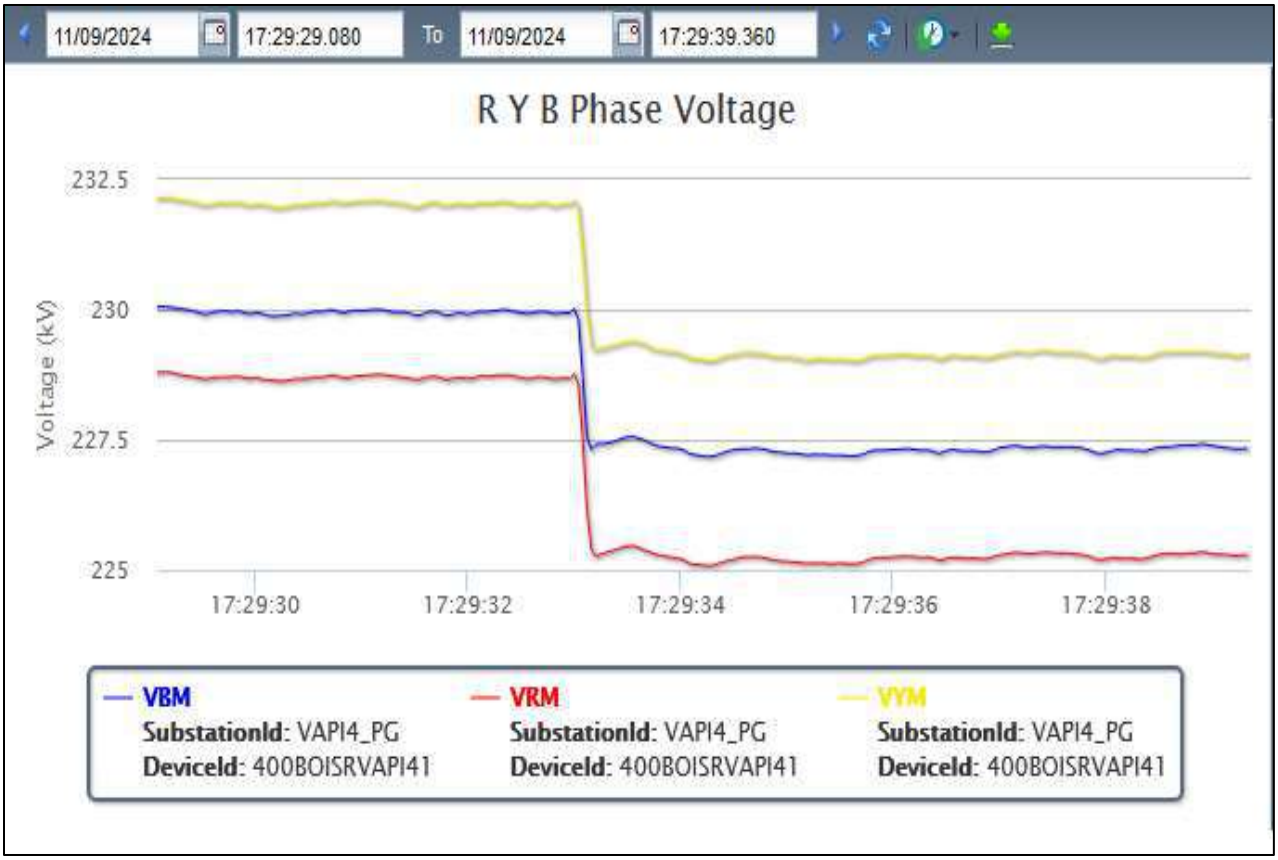


Figure 5. PMU Voltage plot of 400 kV Boisar-Vapi-1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- 400 kV Vapi II-Bus-1&2 tripped on bus bar protection operation due to maloperation of Main Control Unit-2 relay.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- MUML may kindly investigate the reason for maloperation.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from KAPS and DNH

2.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from DNH and received late from MUML, Sterlite on 23.09.2024
3.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	400 kV Vapi II-Bus-1&2 tripped on bus bar protection operation due to maloperation of Main Control Unit-2 relay.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- 400 kV Vapi II-Bus-1&2 tripped on bus bar protection operation due to maloperation of Main Control Unit-2 relay. MUML may kindly investigate the reason for maloperation.

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

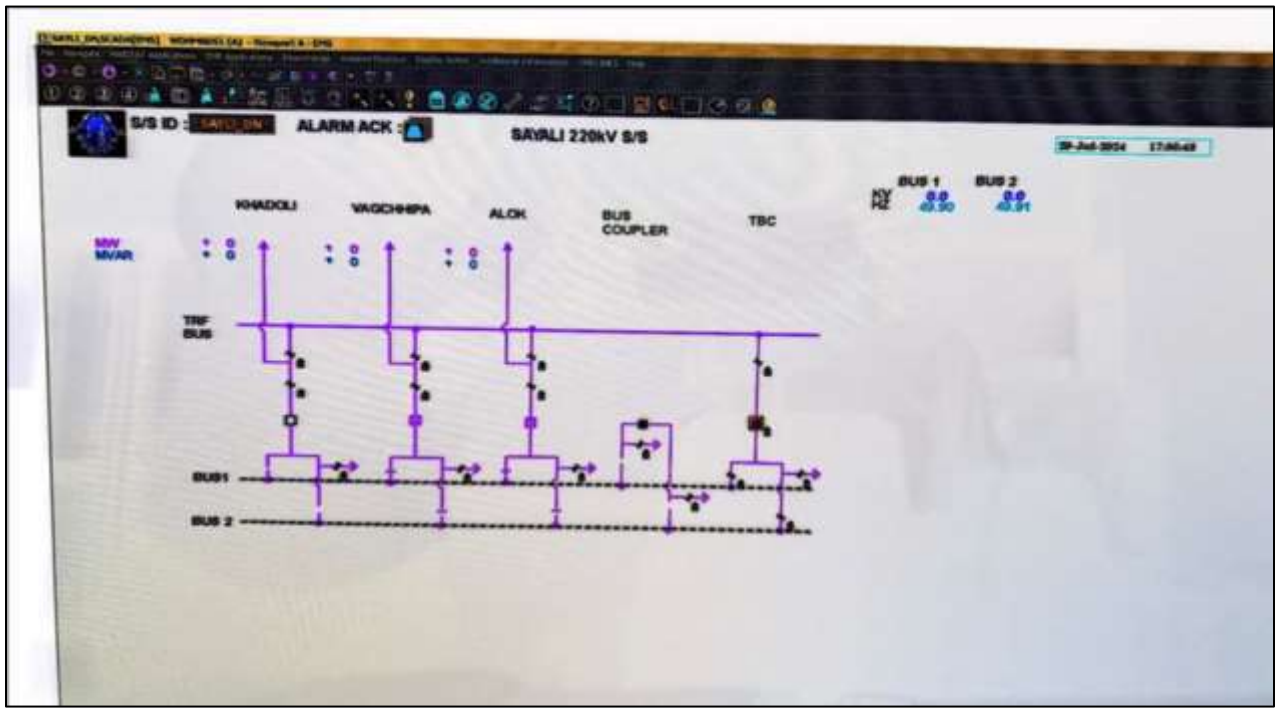
SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20452 (T1_S) FAULTY	17:29:32	933
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20452 (T1_S) CLOSED	17:29:32	935
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20452 (T1_S) FAULTY	17:29:32	944
WRLDC	400-SOE	VAP24_PG	VAPI 2 PG CB 40452 (KAP34-1) ACTED	17:29:32	997
WRLDC	400-SOE	VAP24_PG	VAPI 2 PG CB 40752 (KAP34-2) ACTED	17:29:32	997
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40452 (KAP34-1) FAULTY	17:29:32	997
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40752 (KAP34-2) FAULTY	17:29:32	995
WRLDC	400-SOE	VAP24_PG	VAPI 2 PG CB 41052 (VAPI4-1) ACTED	17:29:32	996
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 41052 (VAPI4-1) FAULTY	17:29:32	996
WRLDC	400-SOE	VAP24_PG	VAPI 2 PG CB 40152 (VAPI4-2) ACTED	17:29:32	996
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40152 (VAPI4-2) FAULTY	17:29:32	995
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40352 (T1_P) FAULTY	17:29:33	85
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40352 (T1_P) OPEN	17:29:33	86
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40152 (VAPI4-2) OPEN	17:29:33	12
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40952 (T2_P) FAULTY	17:29:33	71
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20752 (T2_S) FAULTY	17:29:33	131
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40952 (T2_P) CLOSED	17:29:33	79
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40952 (T2_P) FAULTY	17:29:33	83
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB TIE 05 - CB 40552 CLOSED	17:29:33	78
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20452 (T1_S) OPEN	17:29:33	142
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB TIE 05 - CB 40552 FAULTY	17:29:33	84
WRLDC	400-SOE	VAP24_PG	VAPI 2 PG CB REACTOR CB 41252 ACTED	17:29:33	75
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40452 (KAP34-1) OPEN	17:29:33	14
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB REACTOR CB 41252 FAULTY	17:29:33	70
WRLDC	220KV-CB	VAP24_PG	VAPI 2 PG CB 20752 (T2_S) OPEN	17:29:33	145
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40952 (T2_P) OPEN	17:29:33	86
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB REACTOR CB 41252 CLOSED	17:29:33	78
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 41052 (VAPI4-1) OPEN	17:29:33	11

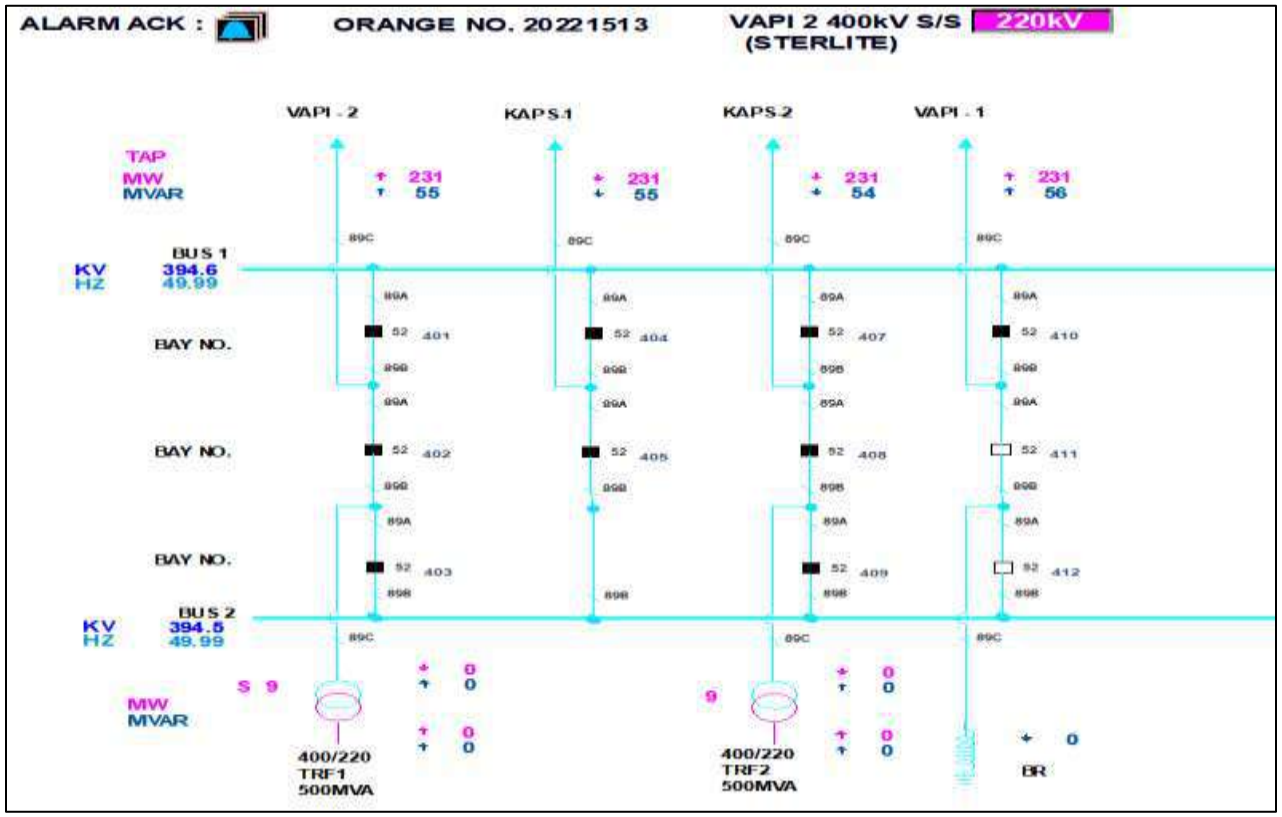
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40752 (KAP34-2) OPEN	17:29:33	11
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB TIE 05 - CB 40552 OPEN	17:29:33	85
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB REACTOR CB 41252 OPEN	17:29:33	85
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40352 (T1_P) FAULTY	17:29:33	71
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB 40352 (T1_P) CLOSED	17:29:33	80
WRLDC	220-SOE	VAP24_PG	VAPI 2 PG CB 20452 (T1_S) ACTED	17:29:33	98
WRLDC	220-SOE	VAP24_PG	VAPI 2 PG CB 20752 (T2_S) ACTED	17:29:33	98
WRLDC	400-SOE	VAP24_PG	VAPI 2 PG CB TIE 05 - CB 40552 ACTED	17:29:33	73
WRLDC	400KV-CB	VAP24_PG	VAPI 2 PG CB TIE 05 - CB 40552 FAULTY	17:29:33	70

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Sayali SLD:

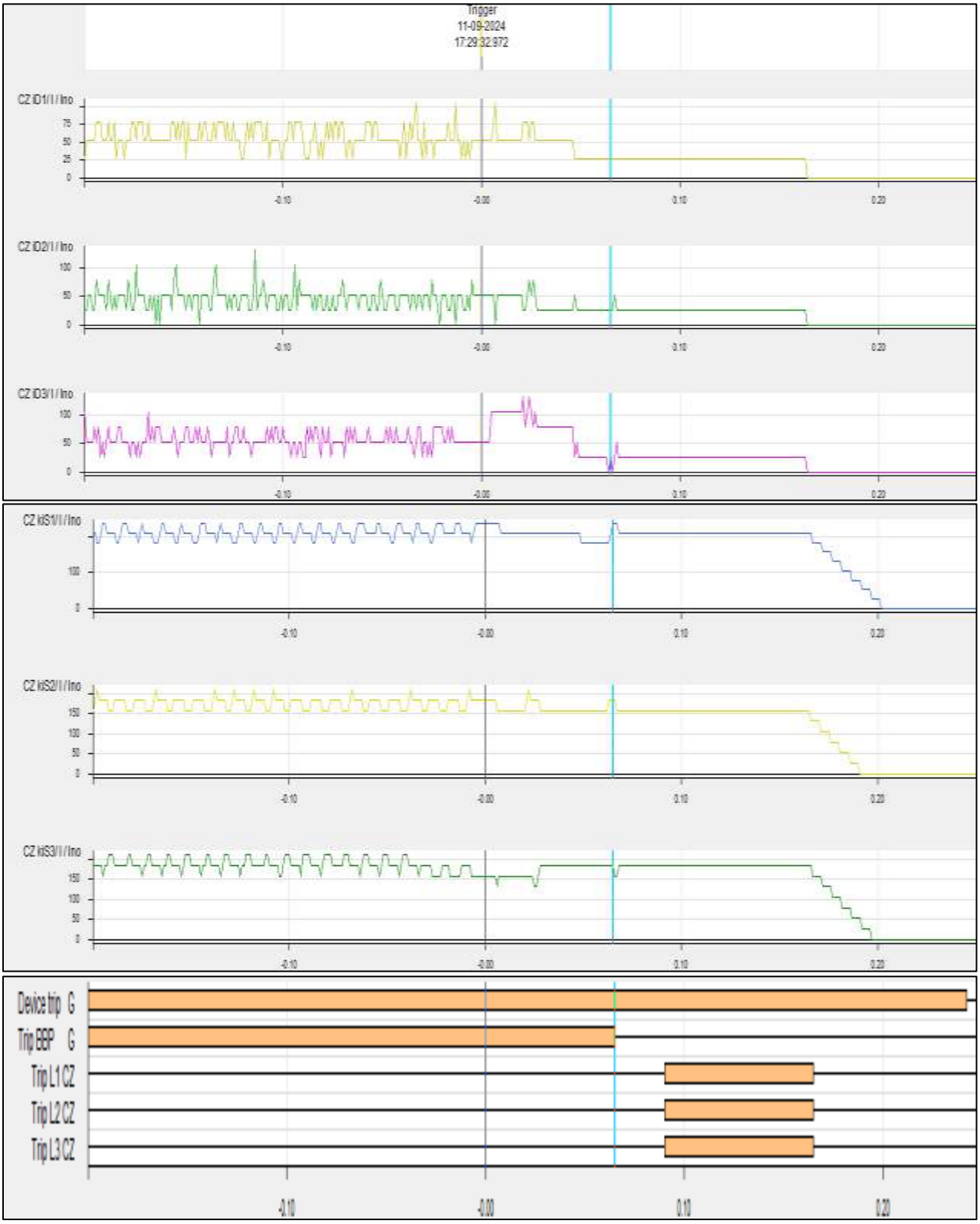


220 kV Vapi-II SLD:



अनुलग्नक-3 / Annexure-3: Disturbance recorder-

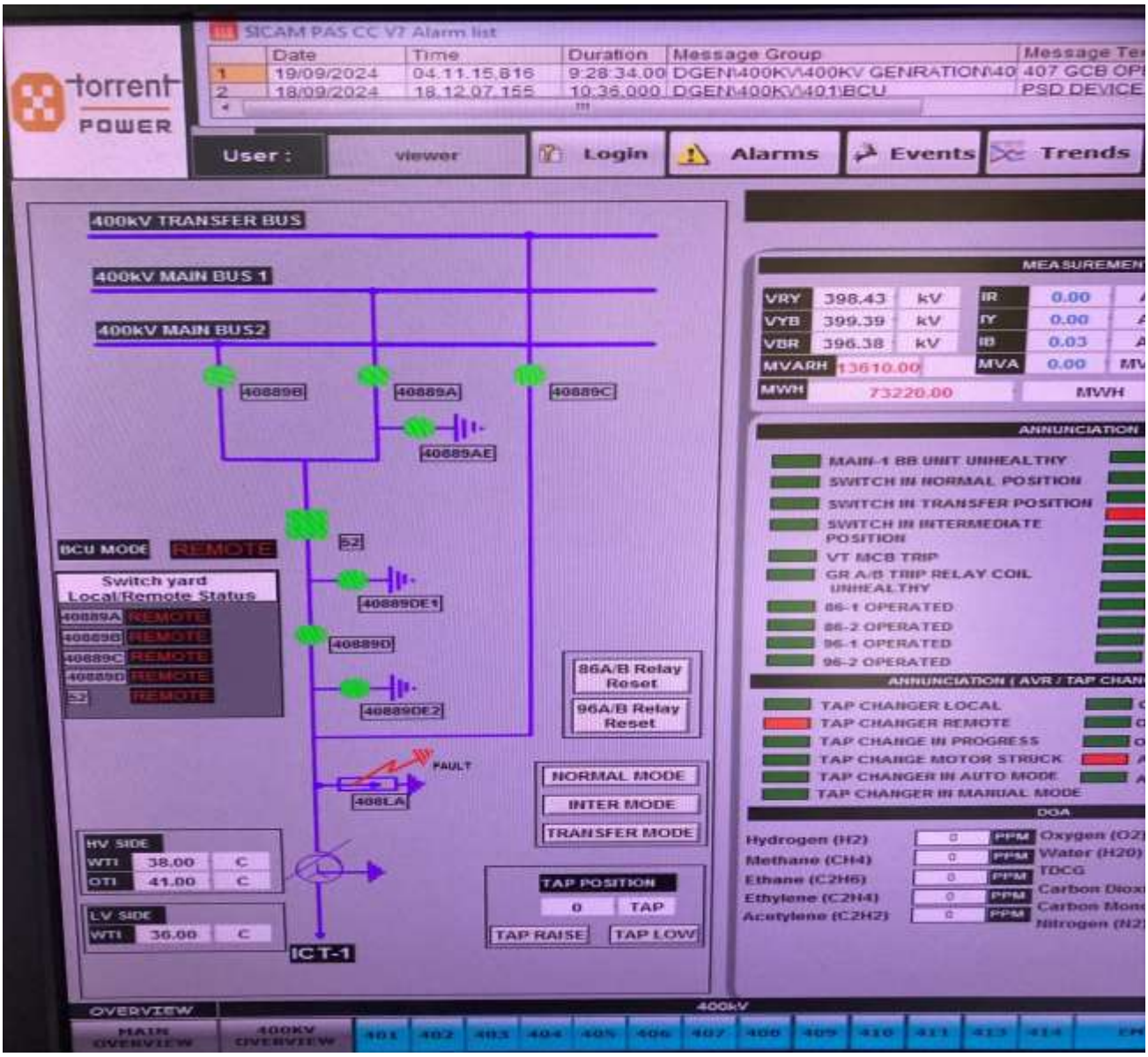
A. DR of 220 kV Vapi-II-Bus-1 Line from Vapi end



अनुलग्नक-4 / Annexure-4 Any other photographs from DNH- Nil

DGM (SO), WRLDC

अनुलग्नक-4 / Annexure-4: - Site photographs by DGEN-





विजय कुमार

Vijay Kumar Kodali

DGM, SO, WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी॰ खडोली (दादर और नागर हवेली) उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Khadoli (DNH) of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 08-11-2024

1. **घटना का सारांश / Event Summary**: At 23:37 Hrs / 08-10-2024, 220/66 kV Khadoli-ICT-2 tripped due to bursting of 66 kV side Y phase CT causing damage to R and Y phase circuit breakers. After 80 msec, 220/66 kV Khadoli-ICT-1&3 tripped on Earth Fault protection operation. Due to the above trippings of ICTs, flow on 220 kV lines connected to Khadoli became zero due to load loss of 444 MW in Khadoli downstream and DNHDD network.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 23:37 hrs / 08-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Incident (GI)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Khadoli (DNHDD), Dadar and Nagar Haveli

5. पूर्ववर्ती स्थिति / Antecedent Conditions :

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.02	74186	61690	-	1326 (DNHDD)
घटना के बाद Post Event	50.08	73944	61119	-	878 (DNHDD)

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

s

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Load loss of 444 MW in Khadoli downstream and DNHDD network

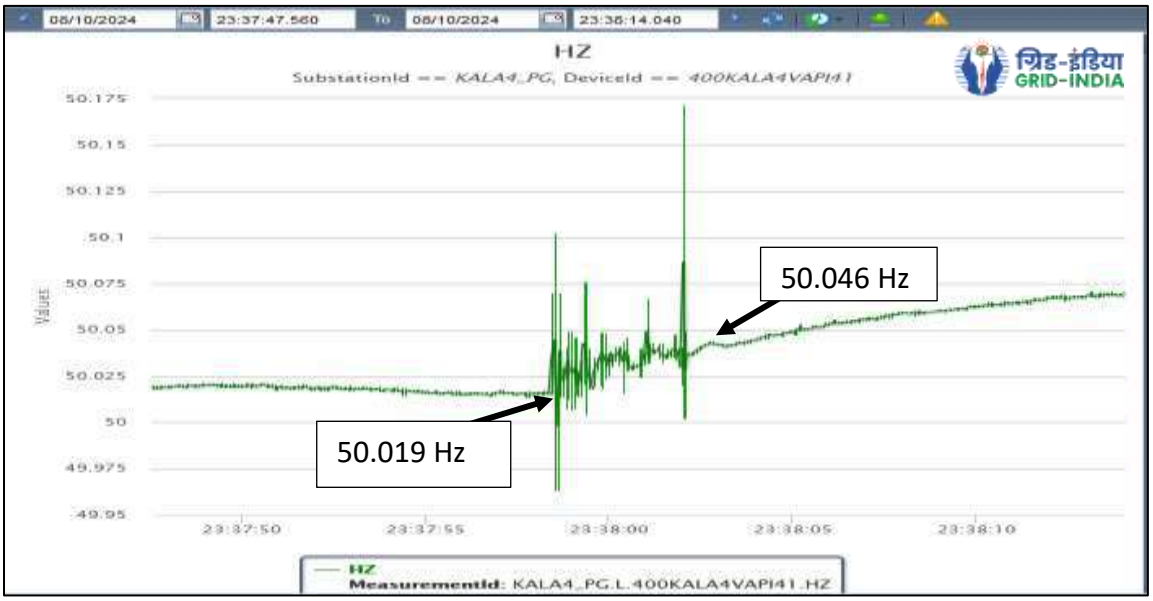


Figure 1. PMU Frequency Plot (400 kV Kala-Vapi-1)

7. **रुकावट की अवधि / Duration of interruption:** 05 Hours 43 Minutes (Time of revival of first element)

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

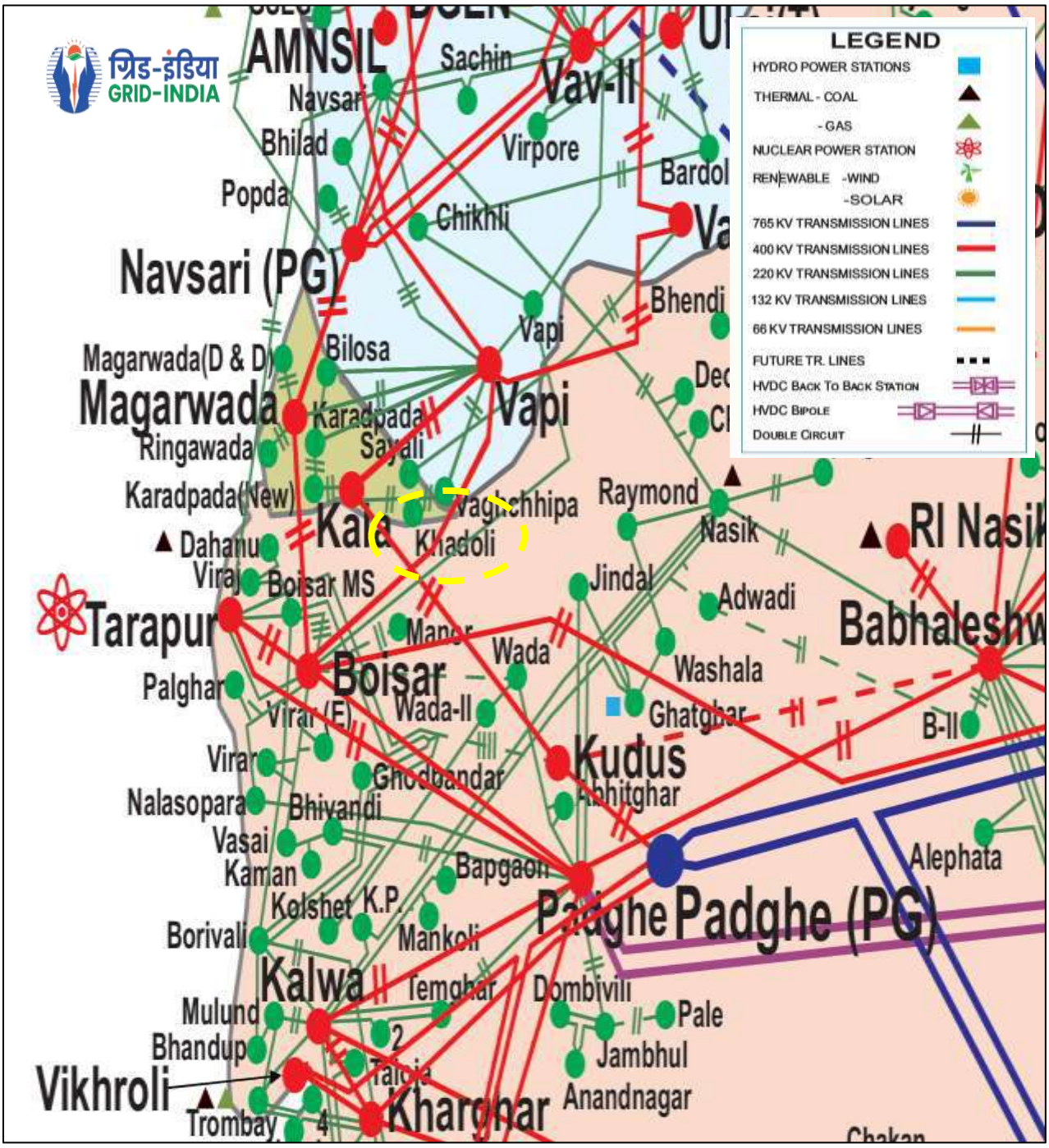


Figure 2. Network across the affected area

9. **उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event):** Y-phase CT failure of 66 kV side of 220/66 kV Khadoli-ICT-2

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1.	220/66 kV Khadoli-ICT-2	23:37:58.552	TEF Start	TEF start Only 500 msec duration Disturbance Recorder provided	14:17 13-10-2024
2.	220/66 kV Khadoli-ICT-1	23:38:00.365	TOC Stage-1	TOC and TEF start B phase Current reduced for 616 msec during TEF start	05:20 hrs 09-10-2024
3.	220/66 kV Khadoli-ICT-3	23:38:00.965	TOC Stage-1	TEF start Only 500 msec duration Disturbance Recorder provided	04:42 hrs 09-10-2024

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

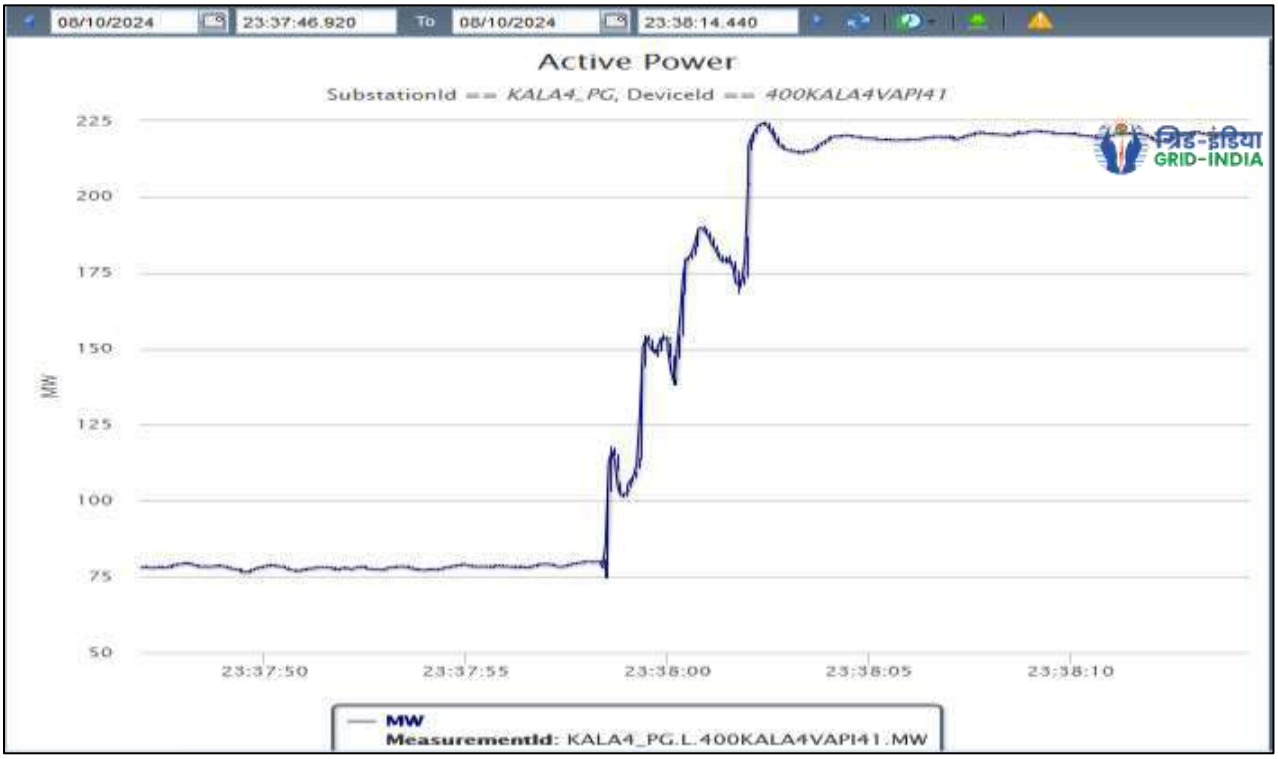


Figure 3. PMU Active Power Plot (400 kV Kala-Vapi-1)

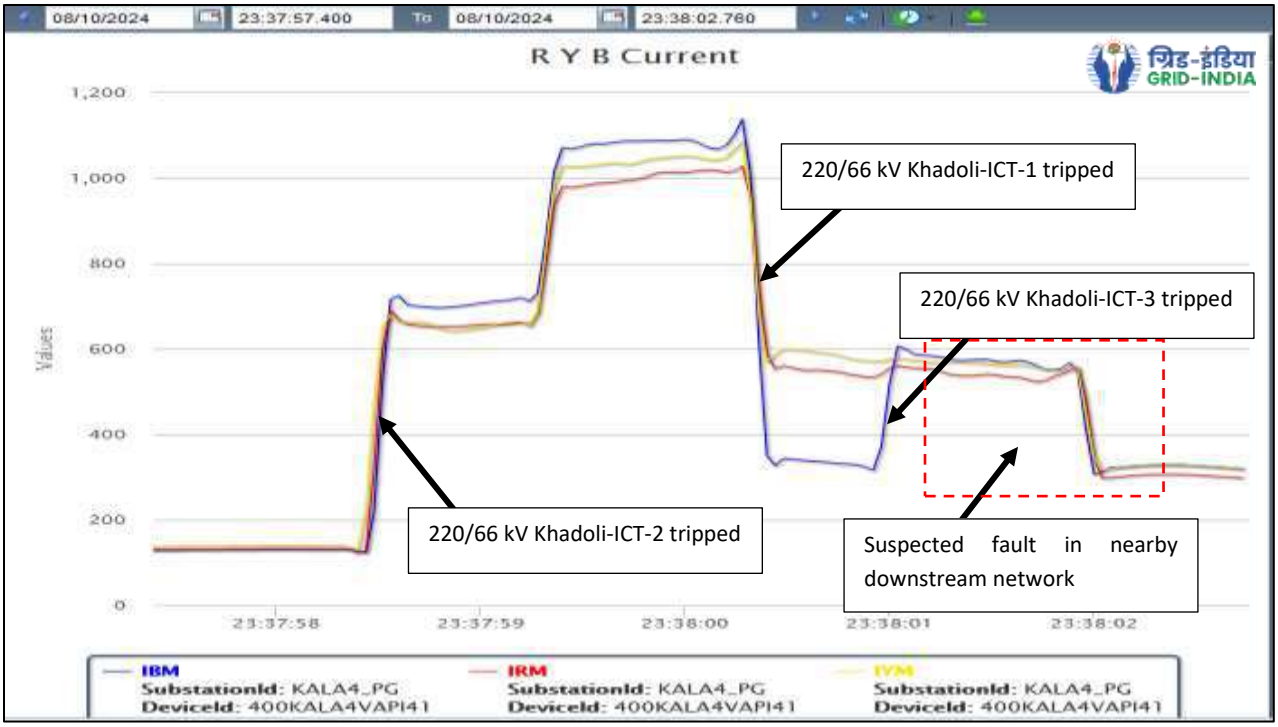


Figure 4. PMU Current Plot (400 kV Kala-Vapi-1)

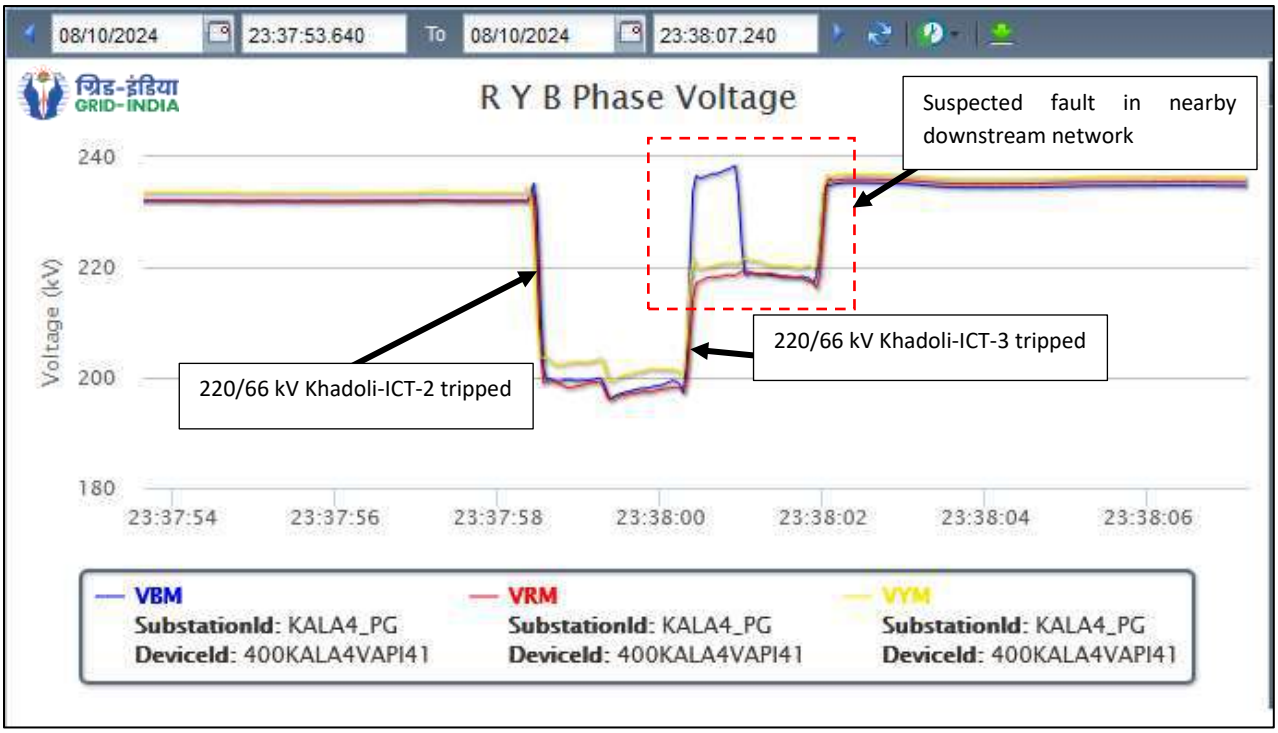


Figure 5. PMU Voltage Plot (400 kV Kala-Vapi-1)

12. प्रमुख अधिगम बिंदु / Protection and Operational issues observed:

- 220/66 kV Khadoli-ICT-1&3 tripped on TOC time over current operation after around 1.8 seconds of tripping of 220/66 kV Khadoli-ICT-2.
- From PMU plots fault is suspected in nearby area of 400 kV Kala-Vapi-D/C after tripping of 220/66 kV Khadoli-ICT-3. No tripping in 400 kV network at that instance had occurred. The trippings may be in 220 kV and other downstream network may be present which was not reported to WRLDC.
- No SCADA SOE reported during the event.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- 220/66 kV Khadoli-ICT-1&3 tripped on TOC time over current operation after around 1.8 seconds of tripping of 220/66 kV Khadoli-ICT-2. LTS scheme at Khadoli may be implemented by DNH for tripping of Khadoli ICTs.
- No SCADA SOE reported during the event. SLDC DNH may kindly coordinate with WRLDC SCADA team and resolve the issue.
- The 220/66 kV Khadoli-ICT-1, 2 & 3 ICTs load was around 300 MW before the tripping. But, load loss reported by SLDC DNH was around 444 MW. SLDC DNH may kindly furnish the details of trippings at downstream network and load loss during the event.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	उपयोगकर्ता Utilities	टिप्पणी Remarks
1.	DR/EL not uploaded in 24 Hrs	IEGC section 37.2 (c)	DNH	Received Late
2.	Flash Report received after 8hrs	IEGC section 37.2 (b)	DNH	Received late

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- LTS scheme at Khadoli may be implemented by DNH for tripping of Khadoli ICTs

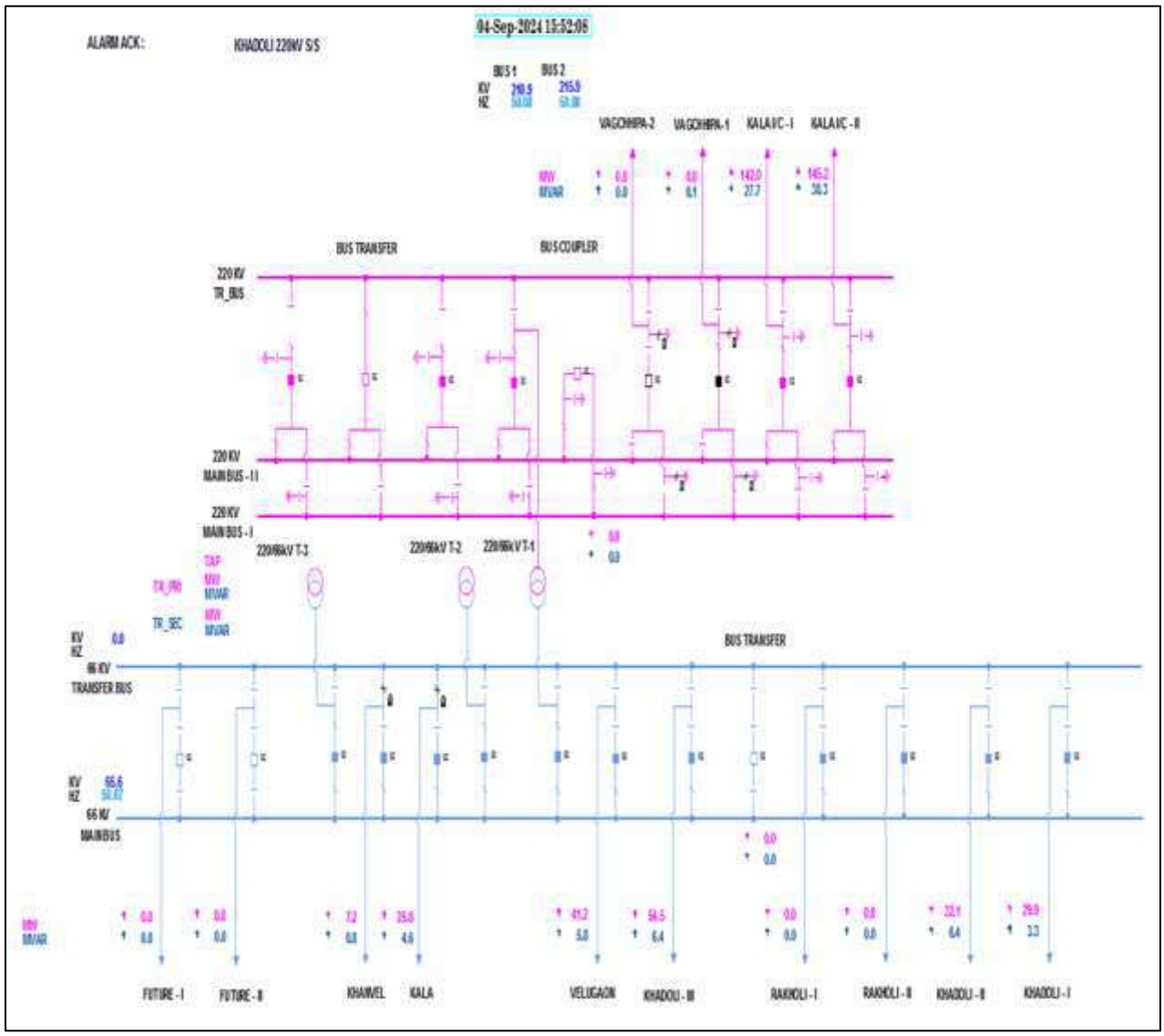
-x-x-x-x-x-

विजय कुमार कोडाली Vijay Kumar Kodali
उप महाप्रबंधक Deputy General Manager
प्रणाली प्रचालन System Operation

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA

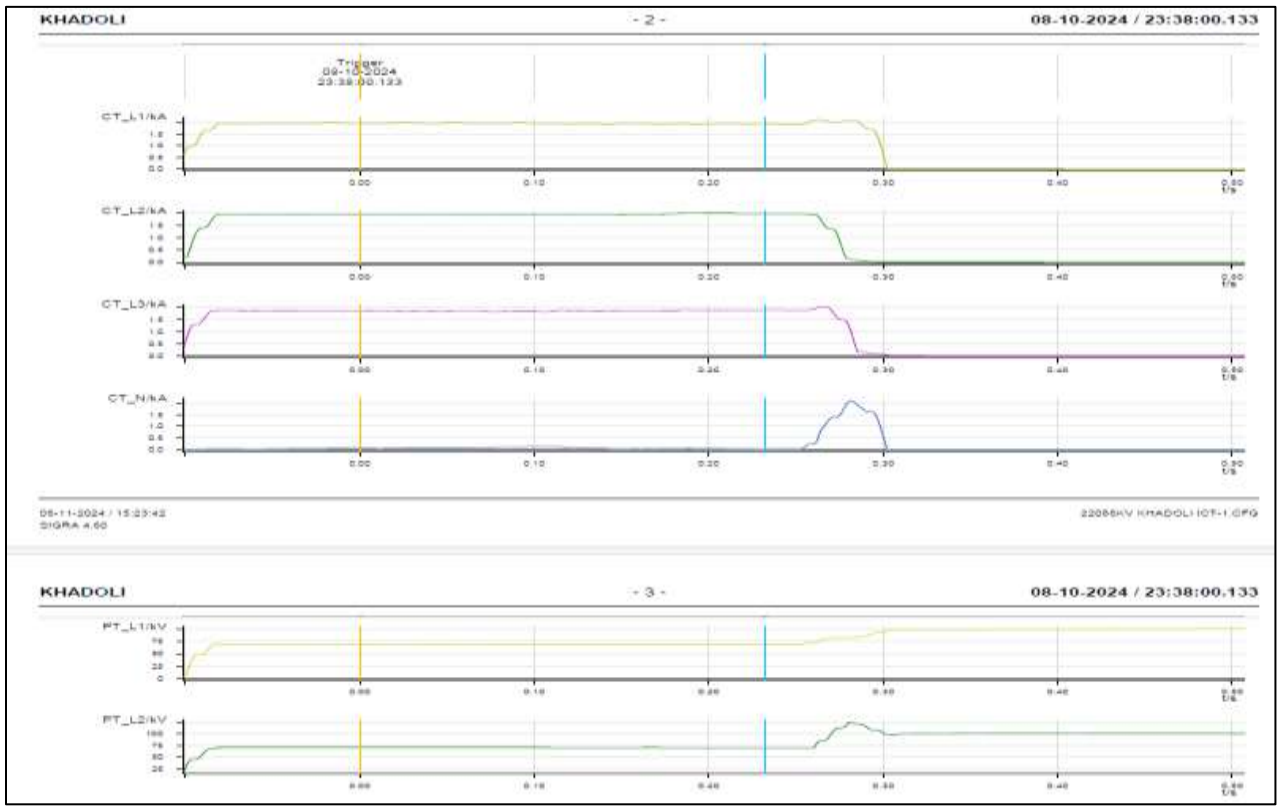
SoE Not Generated

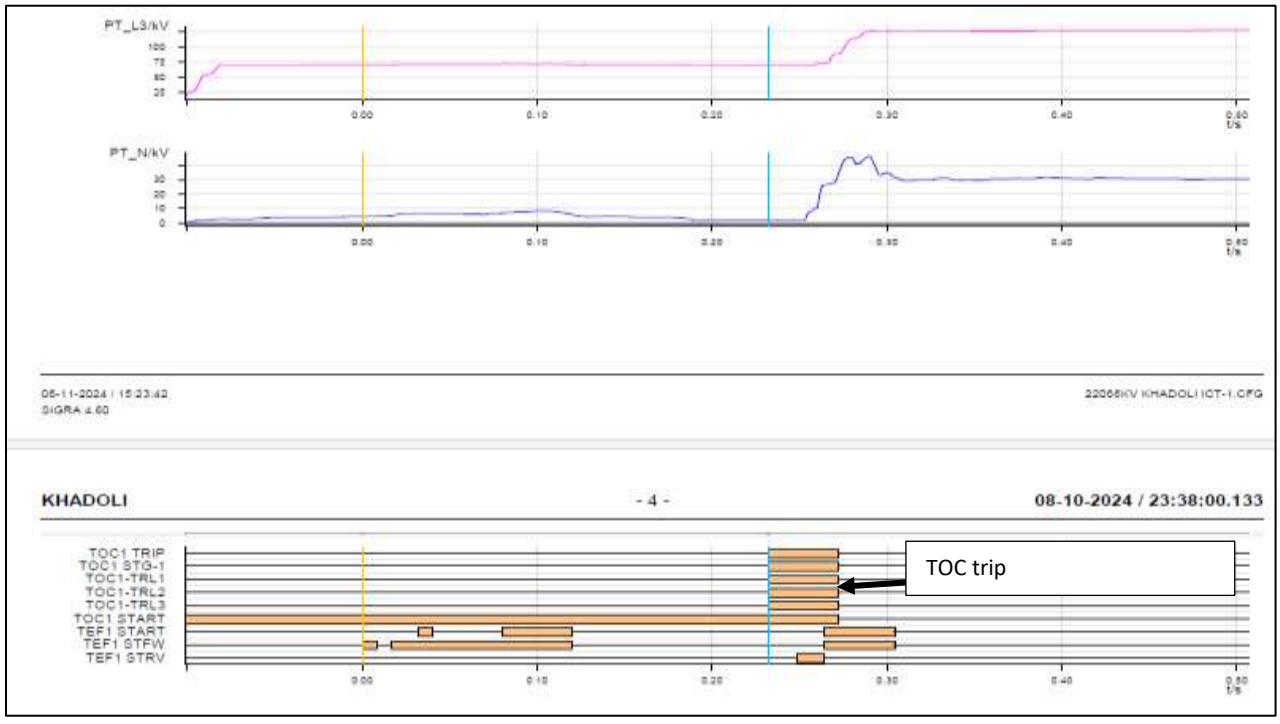
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram



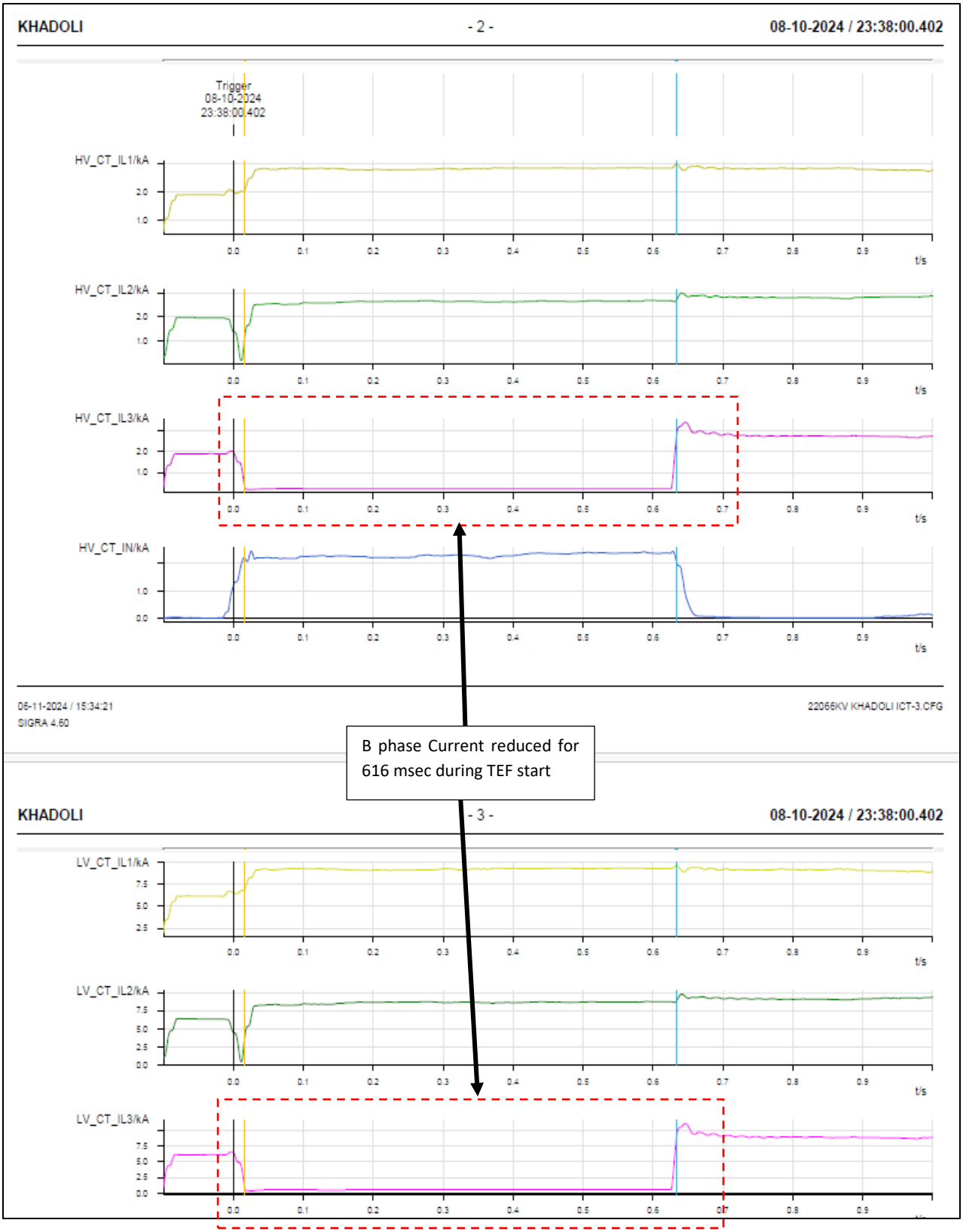
अनुलग्नक-3 / Annexure-3: Disturbance recorder

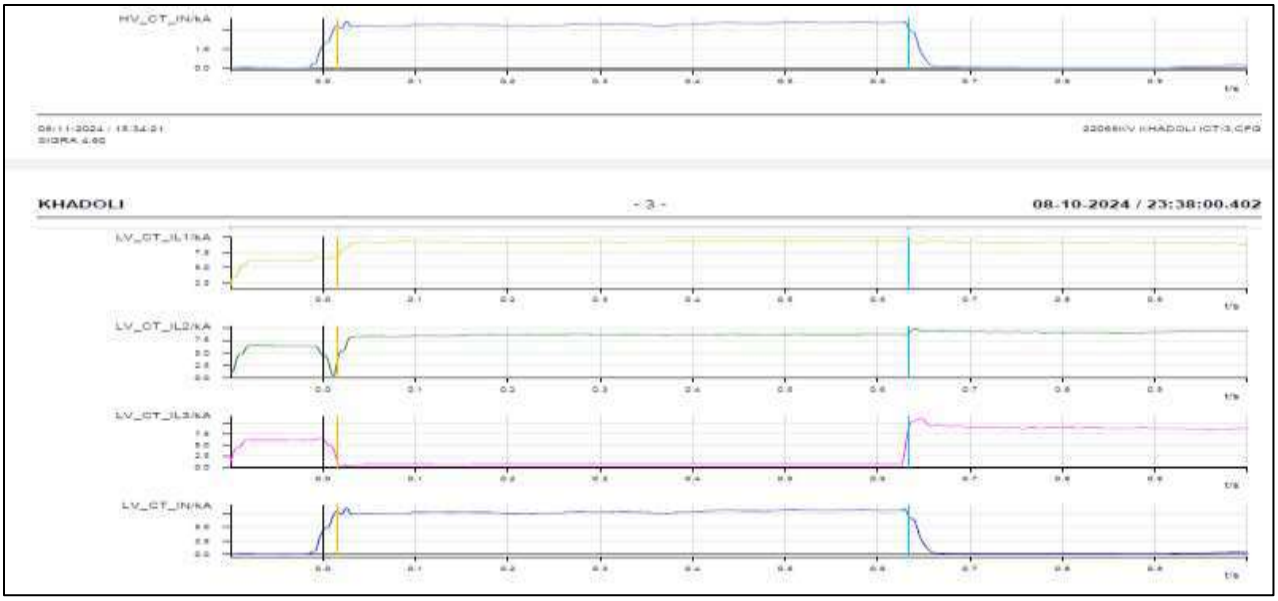
220/66 kV Khadoli-ICT-1 at 220 kV side

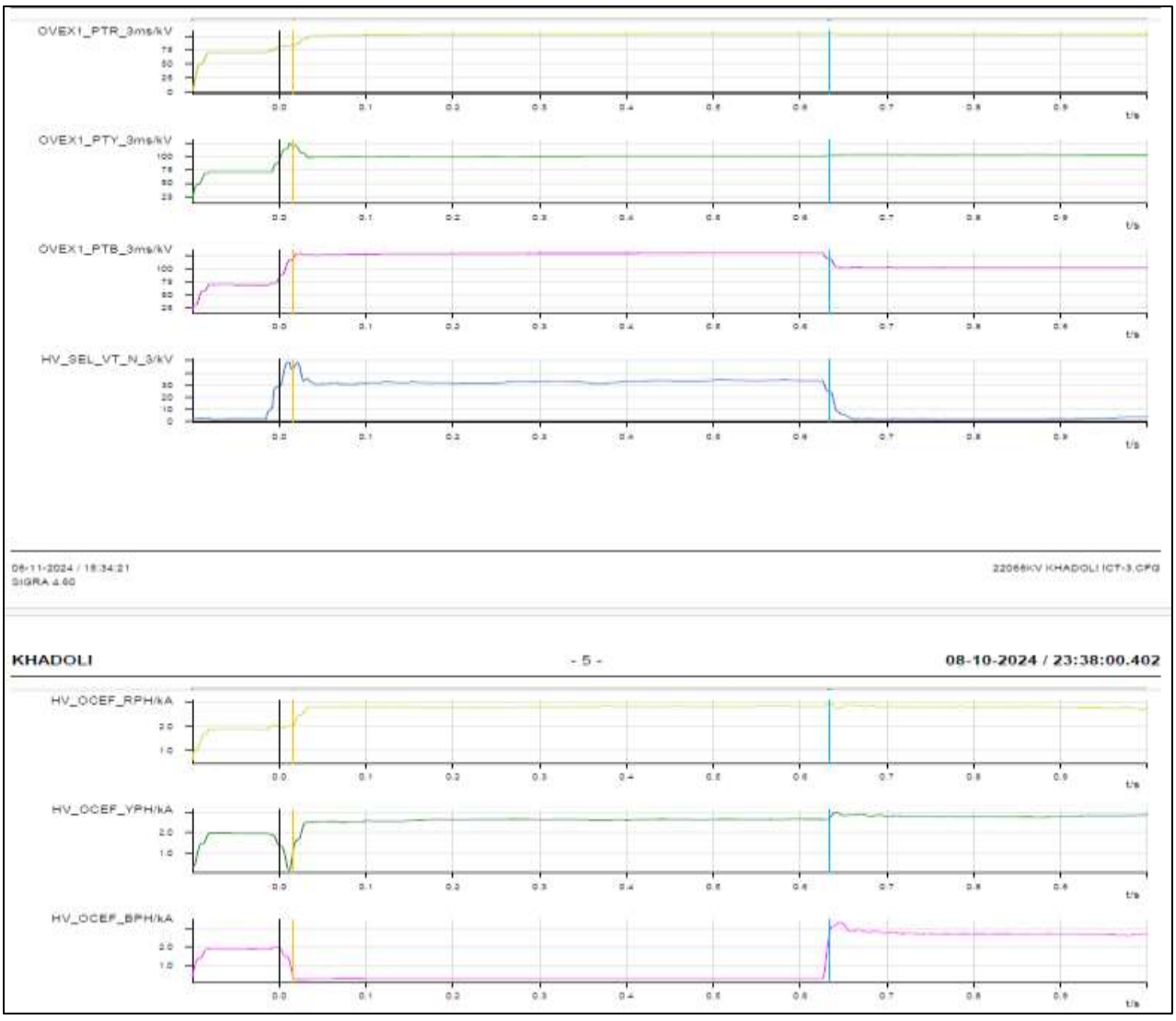


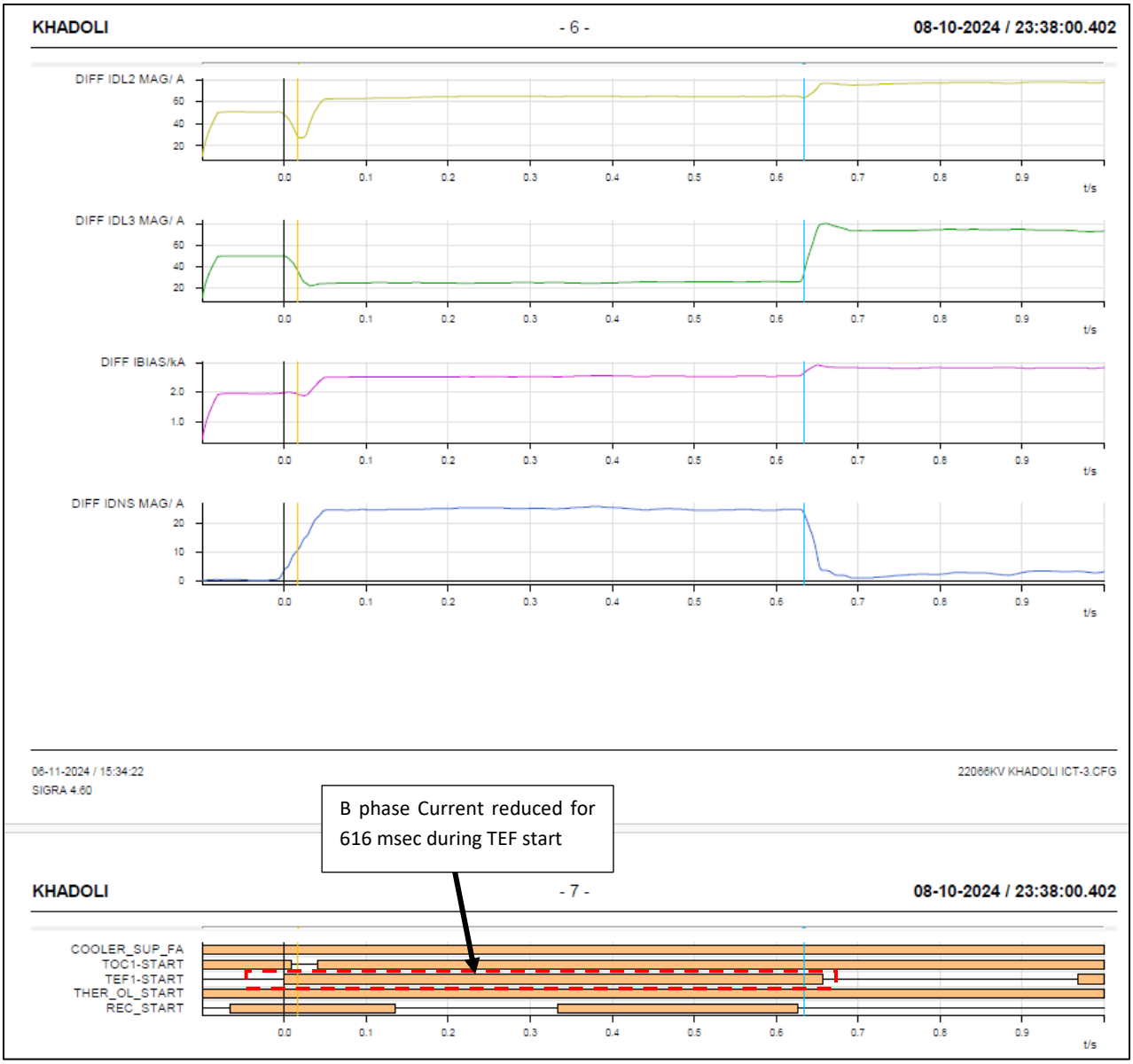


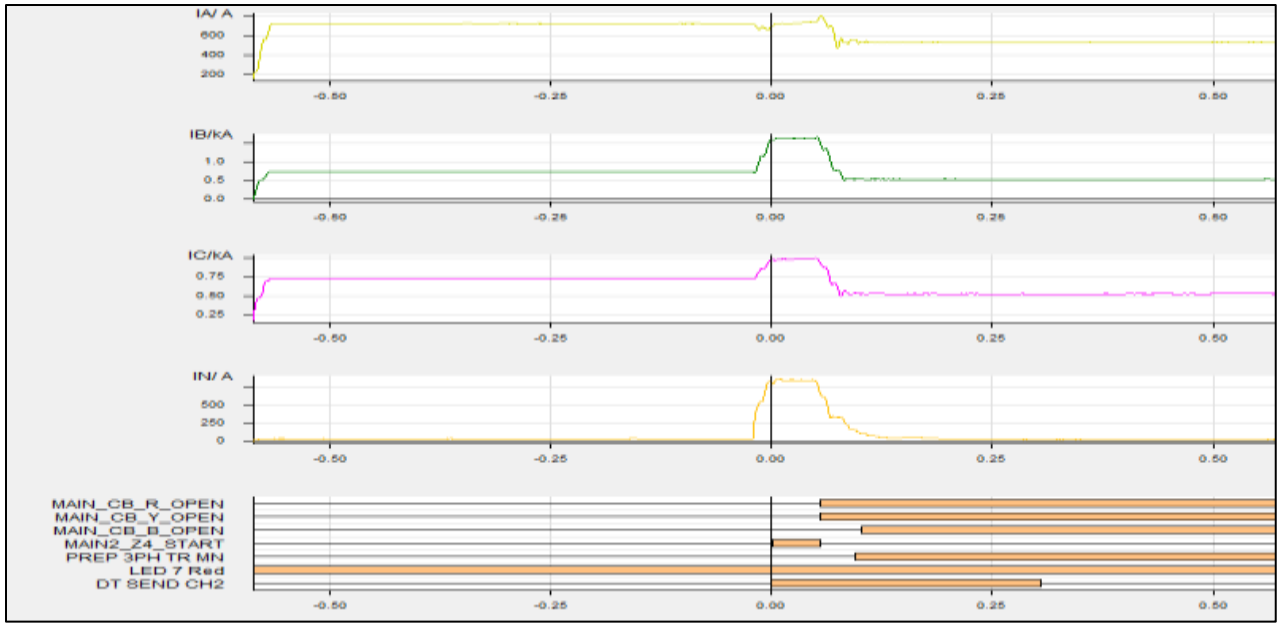
220/66 kV Khadoli-ICT-1 at 66 kV side



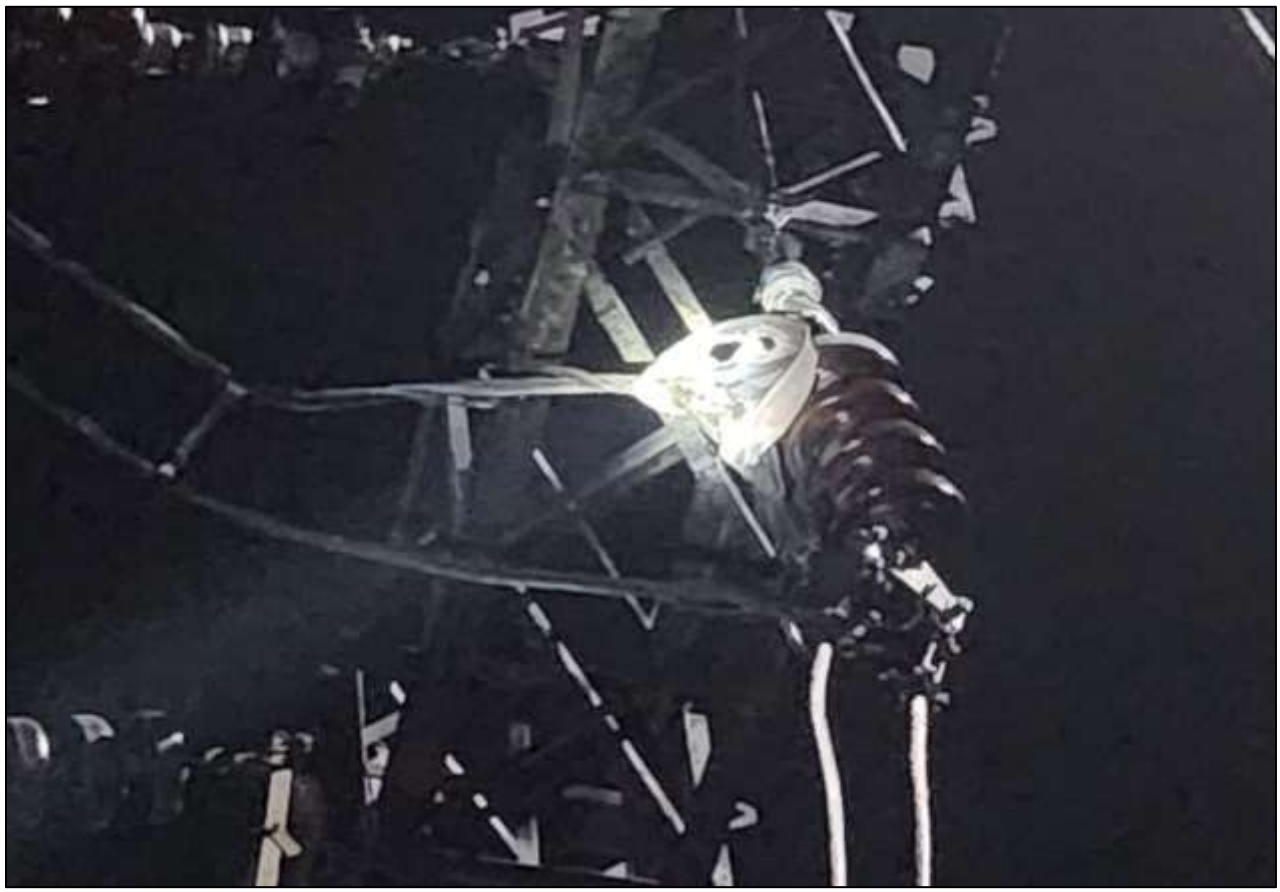

HV_CT_IN/kA
KHADOLI
- 3 -
08-10-2024 / 23:38:00.402
LV_CT_IL1/kA
LV_CT_IL2/kA
LV_CT_IL3/kA
LV_CT_IN/kA


OVEX1_PTR_3ms/kV
OVEX1_PTY_3ms/kV
OVEX1_PTB_3ms/kV
HV_SEL_VT_N_3/kV
KHADOLI
- 5 -
08-10-2024 / 23:38:00.402
HV_OCEF_RPH/kA
HV_OCEF_YPH/kA
HV_OCEF_BPH/kA


KHADOLI
- 6 -
08-10-2024 / 23:38:00.402
DIFF IDL2 MAG/ A
DIFF IDL3 MAG/ A
DIFF IBIAS/kA
DIFF IDNS MAG/ A
t/s
06-11-2024 / 15:34:22
SIGRA 4.60
22066KV KHADOLI ICT-3.CFG
B phase Current reduced for 616 msec during TEF start
KHADOLI
- 7 -
08-10-2024 / 23:38:00.402
COOLER_SUP_FA
TOC1-START
TEF1-START
THER_OL_START
REC_START
t/s



अनुलग्नक-4 / Annexure-4: Site Photographs









अनुलग्नक-5 / Annexure-5: Report from DNH

पश्चिमी क्षेत्र के …… उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220/66kV Khadoli S/s of Western Region

(आई.ई.जी.सी 37.2 (ई) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (e))

दिनांक / Date: 12-10-2024

- **घटना का सारांश** / **Event Summary**: At 23:37hrs, the load on 220kV Kala-Khadoli Circuit 1 and 2 became zero due to the tripping of 220/66kV 160MVA ICT 1, 2, and 3 at the 220kV Khadoli substation. It was observed that the tripping of the 220/66kV 160 MVA ICT-2 was caused by the bursting of the Y phase 66kV CT and damage of the R and Y phase circuit breakers for 220/66kV 160MVA ICT -2, resulting in a load loss of approximately 444 MW.

- **घटना का समय और दिनांक / Time and Date of the Event :** 08-10-2024 at 23:37hrs.

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

. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : DNH

. **पूर्ववर्ती स्थिति / Antecedent Conditions**:

	आवृत्ति Frequency (Hz)	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.03	-	966MW
घटना के बाद Post Event	50.06	-	522MW

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	सामान्य Normal

1. **लोड और जेनरेशन हानि / Load and Generation loss**:

Total load loss of around 444MW.

2. **रुकावट की अवधि / Duration of interruption:**

Around 05:43hrs.

3. **प्रभावित क्षेत्र का नक्शा / Network across the affected area**

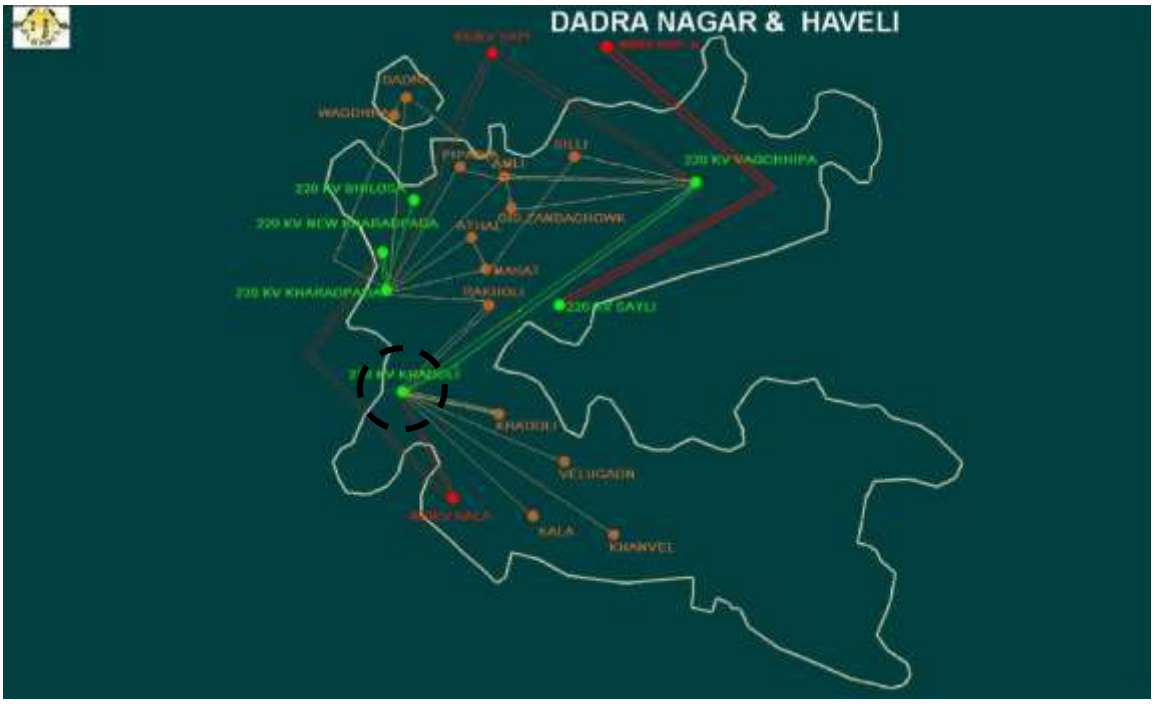


Figure 6. Network across the affected area

4. **उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event):**
   - At 23:37hrs, the load on 220kV Kala-Khadoli Circuit 1 and 2 became zero due to the tripping of 220/66kV 160 MVA ICT 1, 2, and 3 at the 220kV Khadoli substation.
   - It was observed that the tripping of the 220/66kV 160 MVA ICT-2 was caused by the bursting of the Y phase 66kV CT and the R and Y phase circuit breakers for 220/66kV 160 MVA ICT-2, resulting in a load loss of approximately 444 MW.

5. **प्रमुख ट्रिपिंग / Major Elements Tripped** :

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time

1.	220/66kV 160MVA ICT-1	23:37:00	Master tripped relay 86	Master tripped relay 86	05:20hrs/09-10-2024
2.	220/66kV 160MVA ICT-2	23:37:00	O/C optd & Master tripped relay 86	O/C optd & Master tripped relay 86	**Pending**
3.	220/66kV 160MVA ICT-3	23:37:00	Master tripped relay 86	Master tripped relay 86	04:42hrs/09-10-2024

- **Elements affected:** The following elements load decrease:

Sr. No.	Substation Name	Name of Element	Before Tripping (MW)	After Tripping (MW)	Remark
1	220/66kV Khadoli S/s	220/66kV 160MVA ICT-1	99	0	The following elements load decreased during 220/66kV 160MVA ICT-1, 2 &3 tripped at 220kV Khadoli S/s.
2		220/66kV 160MVA ICT-2	100	0	
3		220/66kV 160MVA ICT-3	99	0	
4	220/66/11kV Kharadpada S/s	220/66kV 160MVA ICT-1	114	82	
5		220/66kV 100MVA ICT-2	46	43	
6		220/66kV 100MVA ICT-3	46	43	
7		220/66kV 160MVA ICT-4	114	82	
8	220kV New Kharadpada S/s	220kV Reliance Ckt-1	31	13	
9		220kV Reliance Ckt-2	31	13	
10	220kV Bhilosa S/s	220kV Bhilosa Ckt-1	50	46	
11		220kV Bhilosa Ckt-2	51	50	

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

……

7. प्रमुख अधिगम बिंदु / Protection/Operational issues observed: -

8. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- After Isolation of 220/66 kV 160MVA ICT -2 at Khadoli S/s, 220/66kV 160MVA ICT - 1 & 3 charged at 05:20Hrs & 04:42Hrs respectively.
- 220/66kV 160MVA ICT – 2, 66kV Y-Phase burst CT & damage circuit breakers replacement work is under progress.

9. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- Circuit Breaker operated correctly, Tripping was in order.
- CT may be failed due to ageing effect.

10. घटना प्रभावित उपकरण /Event Photos :

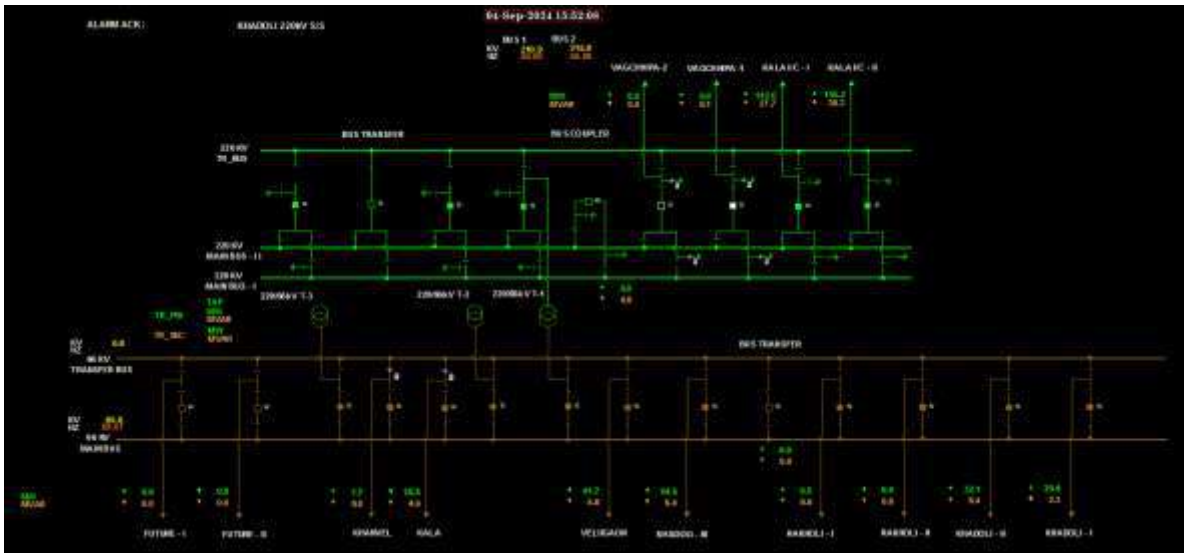






अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA: **- SOE not reported**

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram



अनुलग्नक-3 / Annexure-3: Disturbance recorder (Event) for 220/66kV 160MVA ICT-1 (HV Side)

Disturbance Short Report

Disturbance Recordings Information

Device Information

Recorder ID	1
IED type	L67I11 01
IED version	1.101
Station name	KHADOLI
Object name	67/67N-HV
IED name	REL670

Fault Information

Trig date and time	10.08.2024 23:38:00:133
Trigger signal name	TEF1 STFW
Recording number	382
Total recording time	608 ms
Pre-trig recording time	100 ms
Post trig recording time	499 ms
Max. recording time	1000 ms

General Recordings Information

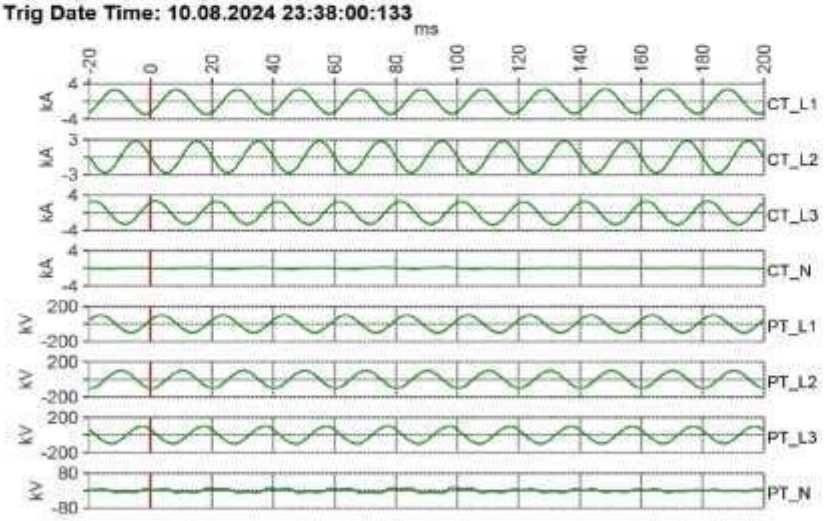
Disturbance recorder	Installed
Event recorder	Installed
System frequency	50 Hz
Sampling frequency	1 kHz
Active setting group during recording	1

Fault Location Information

Fault loop type	Not applicable
Fault location	Not applicable
Status of fault calculation	Not applicable
Fault direction	Not applicable

Analog Time Diagram

Trig Date Time: 10.08.2024 23:38:00:133

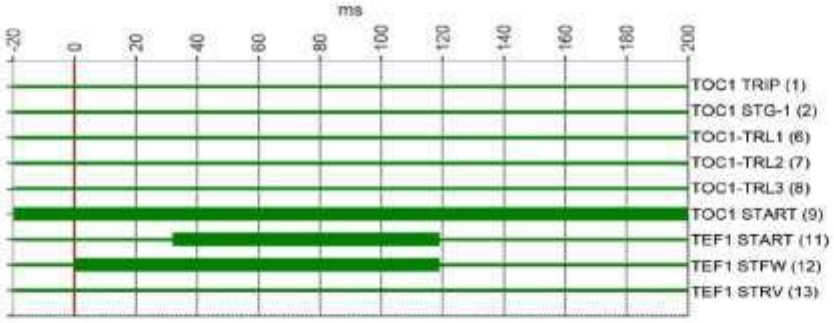


Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\CT#1 (206)_Q06\AA1D1Q06FP3-HV_AA1D1Q06FP3\AA1D1Q06FP32024100617e

ABB

Binary Time Diagram

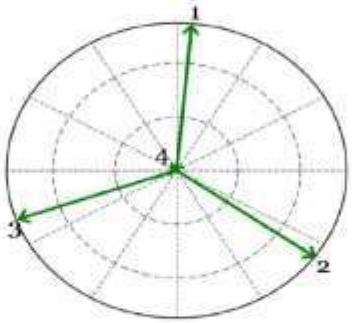
Trig Date Time: 10.08.2024 23:38:00:133



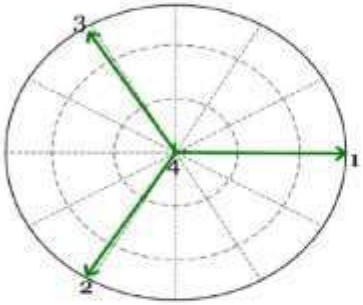
Vector Diagrams

Calculation Interval : -50 ms to -32 ms

Voltages



Currents



No.	Name	RMS	Angle	No.	Name	RMS	Angle
1	PT_L1	69956.84(V)	84.9°	1	CT_L1	1963.429(A)	359.6°
2	PT_L2	71005.2(V)	324.2°	2	CT_L2	1911.346(A)	237.9°
3	PT_L3	70929.97(V)	199.5°	3	CT_L3	1864.849(A)	122.0°
4	PT_N	5374.663(V)	125.1°	4	CT_N	65.509(A)	232.8°

Events List

Channel Number	Name	Status	Time
12	TEF1 STFW	On	10.08.2024 23:38:00:133
12	TEF1 STFW	Off	10.08.2024 23:38:00:141
12	TEF1 STFW	On	10.08.2024 23:38:00:149
11	TEF1 START	On	10.08.2024 23:38:00:165
11	TEF1 START	Off	10.08.2024 23:38:00:173
11	TEF1 START	On	10.08.2024 23:38:00:213
11	TEF1 START	Off	10.08.2024 23:38:00:253
12	TEF1 STFW	Off	10.08.2024 23:38:00:253
1	TOC1 TRIP	On	10.08.2024 23:38:00:365
2	TOC1 STG-1	On	10.08.2024 23:38:00:365
6	TOC1-TRL1	On	10.08.2024 23:38:00:365
7	TOC1-TRL2	On	10.08.2024 23:38:00:365
8	TOC1-TRL3	On	10.08.2024 23:38:00:365
13	TEF1 STRV	On	10.08.2024 23:38:00:381

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_DT\ICT#1 (206)_Q06\AA1D1Q06FP3-HV_AA1D1Q06FP3\AA1D1Q06FP32024100617e

11	TEF1 START	On	10.08.2024 23:38:00:397
12	TEF1 STFW	On	10.08.2024 23:38:00:397
13	TEF1 STRV	Off	10.08.2024 23:38:00:397
1	TOC1 TRIP	Off	10.08.2024 23:38:00:405
2	TOC1 STG-1	Off	10.08.2024 23:38:00:405
6	TOC1-TRL1	Off	10.08.2024 23:38:00:405
7	TOC1-TRL2	Off	10.08.2024 23:38:00:405
8	TOC1-TRL3	Off	10.08.2024 23:38:00:405
9	TOC1 START	Off	10.08.2024 23:38:00:405
11	TEF1 START	Off	10.08.2024 23:38:00:437
12	TEF1 STFW	Off	10.08.2024 23:38:00:437

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\CT#1 (206)_Q06AA1D1Q06FP3-HV_AA1D1Q06FP3\AA1D1Q06FP32024100817e

Page 3 of 3

अनुलग्नक-4 / Annexure-4: Disturbance recorder (Event) for 220/66kV 160MVA ICT-2 (HV Side)

ABB

Disturbance Short Report

Disturbance Recordings Information

Device Information

Recorder ID	1
IED type	L67I11 01
IED version	1.101
Station name	PGCIL Khadoli
Object name	ICT-2
IED name	67/67N HV REL670

Fault Information

Trig date and time	10.08.2024 23:37:59:634
Trigger signal name	TEF1 STRV
Recording number	895
Total recording time	680 ms
Pre-trig recording time	100 ms
Post trig recording time	499 ms
Max. recording time	1000 ms

General Recordings Information

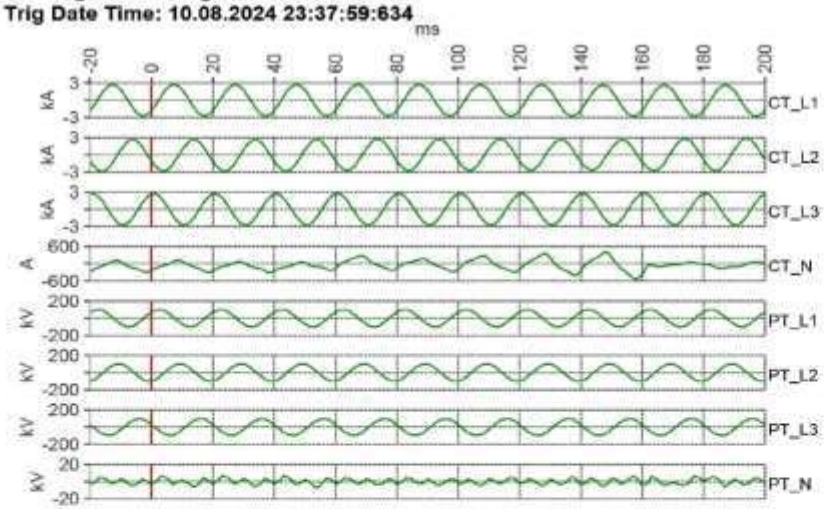
Disturbance recorder	Installed
Event recorder	Installed
System frequency	50 Hz
Sampling frequency	1 kHz
Active setting group during recording	1

Fault Location Information

Fault loop type	Not applicable
Fault location	Not applicable
Status of fault calculation	Not applicable
Fault direction	Not applicable

Analog Time Diagram

Trig Date Time: 10.08.2024 23:37:59:634

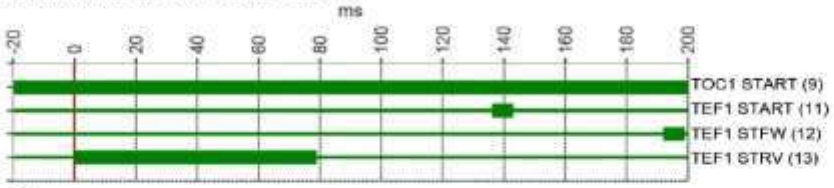


Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\CT#2 (207)_Q07\AA1D1Q07FP3-HV_AA1D1Q07FP3\AA1D1Q07FP320241008371

ABB

Binary Time Diagram

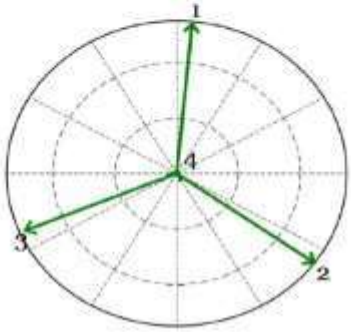
Trig Date Time: 10.08.2024 23:37:59:634



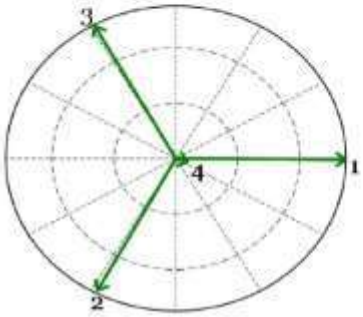
Vector Diagrams

Calculation Interval : -50 ms to -32 ms

Voltages



Currents



No.	Name	RMS	Angle	No.	Name	RMS	Angle
1	PT_L1	70240.63(V)	84.7°	1	CT_L1	1948.433(A)	359.6°
2	PT_L2	71214.85(V)	324.1°	2	CT_L2	1933.61(A)	242.0°
3	PT_L3	68803.27(V)	202.8°	3	CT_L3	1915.484(A)	118.7°
4	PT_N	1757.034(V)	65.6°	4	CT_N	126.833(A)	341.8°

Events List

Channel Number	Name	Status	Time
13	TEF1 STRV	On	10.08.2024 23:37:59:538
13	TEF1 STRV	Off	10.08.2024 23:37:59:610
13	TEF1 STRV	On	10.08.2024 23:37:59:634
13	TEF1 STRV	Off	10.08.2024 23:37:59:714
11	TEF1 START	On	10.08.2024 23:37:59:770
11	TEF1 START	Off	10.08.2024 23:37:59:778
12	TEF1 STFW	On	10.08.2024 23:37:59:826
12	TEF1 STFW	Off	10.08.2024 23:37:59:834
12	TEF1 STFW	On	10.08.2024 23:37:59:874
12	TEF1 STFW	Off	10.08.2024 23:37:59:882
12	TEF1 STFW	On	10.08.2024 23:38:00:002
12	TEF1 STFW	Off	10.08.2024 23:38:00:010
12	TEF1 STFW	On	10.08.2024 23:38:00:082
11	TEF1 START	On	10.08.2024 23:38:00:138
11	TEF1 START	Off	10.08.2024 23:38:00:146
11	TEF1 START	On	10.08.2024 23:38:00:154

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\CT#2 (207)_Q07\AA1D1Q07FP3-HV_AA1D1Q07FP3\AA1D1Q07FP320241006371

अनुलग्नक-5 / Annexure-5: Disturbance recorder (Event) for 220/66kV 160MVA ICT-2 (LV Side)

ABB

Disturbance Short Report

Disturbance Recordings Information

Device Information

Recorder ID	1
IED type	L67I11 01
IED version	1.101
Station name	Khadoli
Object name	ICT-2
IED name	67/67N LV REL670

Fault Information

Trig date and time	10.08.2024 23:38:00:076
Trigger signal name	TEF1 STRV
Recording number	419
Total recording time	847 ms
Pre-trig recording time	99 ms
Post trig recording time	499 ms
Max. recording time	1000 ms

General Recordings Information

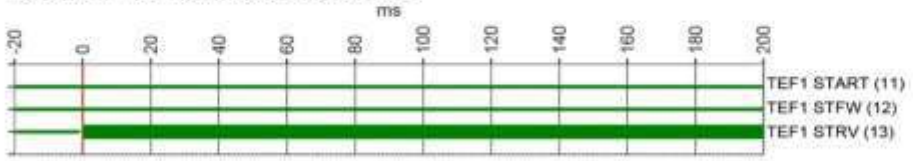
Disturbance recorder	Installed
Event recorder	Installed
System frequency	50 Hz
Sampling frequency	1 kHz
Active setting group during recording	1

Fault Location Information

Fault loop type	Not applicable
Fault location	Not applicable
Status of fault calculation	Not applicable
Fault direction	Not applicable

Binary Time Diagram

Trig Date Time: 10.08.2024 23:38:00:076



Events List

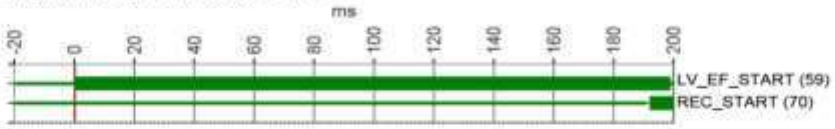
Channel Number	Name	Status	Time
11	TEF1 START	On	10.08.2024 23:37:59:988
12	TEF1 STFW	On	10.08.2024 23:37:59:988
11	TEF1 START	Off	10.08.2024 23:38:00:020
12	TEF1 STFW	Off	10.08.2024 23:38:00:020
13	TEF1 STRV	On	10.08.2024 23:38:00:028
13	TEF1 STRV	Off	10.08.2024 23:38:00:036
13	TEF1 STRV	On	10.08.2024 23:38:00:044
13	TEF1 STRV	Off	10.08.2024 23:38:00:052
13	TEF1 STRV	On	10.08.2024 23:38:00:076
13	TEF1 STRV	Off	10.08.2024 23:38:00:324
11	TEF1 START	On	10.08.2024 23:38:00:332
12	TEF1 STFW	On	10.08.2024 23:38:00:332
11	TEF1 START	Off	10.08.2024 23:38:00:396
12	TEF1 STFW	Off	10.08.2024 23:38:00:396
13	TEF1 STRV	On	10.08.2024 23:38:00:396
13	TEF1 STRV	Off	10.08.2024 23:38:00:412

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\ICT#2 (207)_Q07\AA1D1Q07FP4-LV_AA1D1Q07FP4\AA1D1Q07FP4202410081a3

ABB

Binary Time Diagram

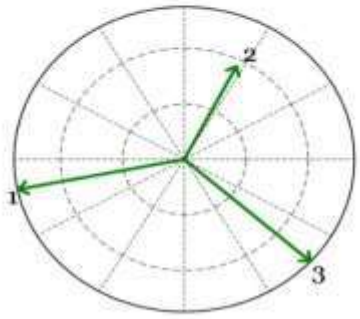
Trig Date Time: 10.08.2024 23:37:59:438



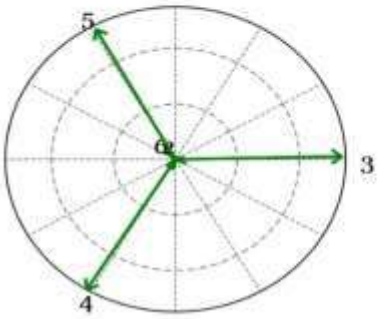
Vector Diagrams

Calculation Interval : -50 ms to -32 ms

Voltages



Currents



No.	Name	RMS	Angle
1	OVEX1_PTR_3ms	1071.99(V)	191.4°
2	OVEX1_PTY_3ms	883.018(V)	63.3°
3	OVEX1_PTB_3ms	1362.452(V)	317.9°

No.	Name	RMS	Angle
1	HV_HZD_CT_3ms	0.002(A)	358.1°
2	LV_HZD_CT_3ms	0.002(A)	126.2°
3	LV_CT_IL1_3MS	6137.159(A)	1.1°
4	LV_CT_IL2_3MS	6293.095(A)	238.6°
5	LV_CT_IL3_3MS	6124.284(A)	118.7°
6	LV_CT_ILN_3MS	131.437(A)	130.5°

Events List

Channel Number	Name	Status	Time
59	LV_EF_START	On	10.08.2024 23:37:59:438
59	LV_EF_START	Off	10.08.2024 23:37:59:446
59	LV_EF_START	On	10.08.2024 23:37:59:454
59	LV_EF_START	Off	10.08.2024 23:37:59:462
59	LV_EF_START	On	10.08.2024 23:37:59:486
59	LV_EF_START	Off	10.08.2024 23:37:59:510
59	LV_EF_START	On	10.08.2024 23:37:59:526
59	LV_EF_START	Off	10.08.2024 23:37:59:542
59	LV_EF_START	On	10.08.2024 23:37:59:566
59	LV_EF_START	Off	10.08.2024 23:37:59:590
59	LV_EF_START	On	10.08.2024 23:37:59:606
70	REC_START	On	10.08.2024 23:37:59:630
59	LV_EF_START	Off	10.08.2024 23:37:59:638
59	LV_EF_START	On	10.08.2024 23:37:59:710
59	LV_EF_START	Off	10.08.2024 23:37:59:718
70	REC_START	Off	10.08.2024 23:37:59:830

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\ICT#3 (209)_Q09\AA1D1Q09FP2-LV_AA1D1Q09FP2\AA1D1Q09FP220241008263

अनुलग्नक-6 / Annexure-6: Disturbance recorder (Event) for 220/66kV 160MVA ICT-3 (HV Side)

ABB

Disturbance Short Report

Disturbance Recordings Information

Device Information

Recorder ID	1
IED type	RET670
IED version	1p1r25
Station name	KHADOLI
Object name	ICT-3
IED name	DIFF RET670

Fault Information

Trig date and time	10.08.2024 23:38:00:161
Trigger signal name	TEF1-START
Recording number	111
Total recording time	632 ms
Pre-trig recording time	100 ms
Post trig recording time	499 ms
Max. recording time	1000 ms

General Recordings Information

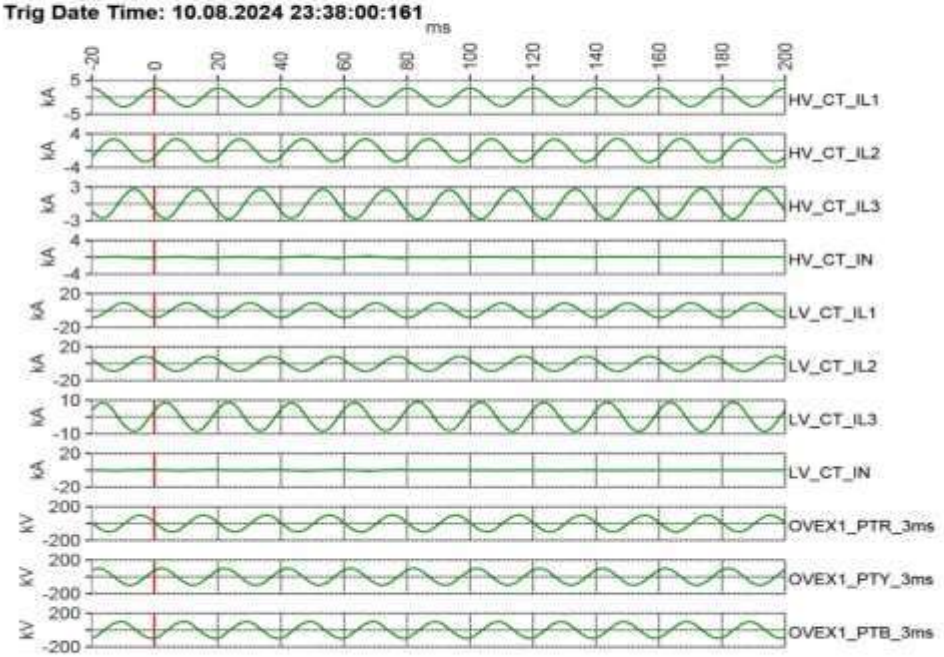
Disturbance recorder	Installed
Event recorder	Installed
System frequency	50 Hz
Sampling frequency	1 kHz
Active setting group during recording	1

Fault Location Information

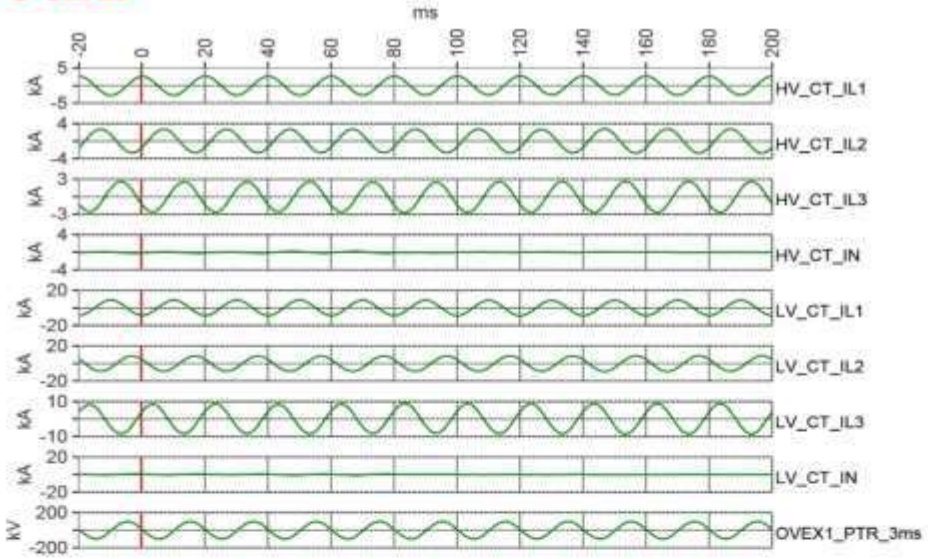
Fault loop type	Not applicable
Fault location	Not applicable
Status of fault calculation	Not applicable
Fault direction	Not applicable

Analog Time Diagram

Trig Date Time: 10.08.2024 23:38:00:161

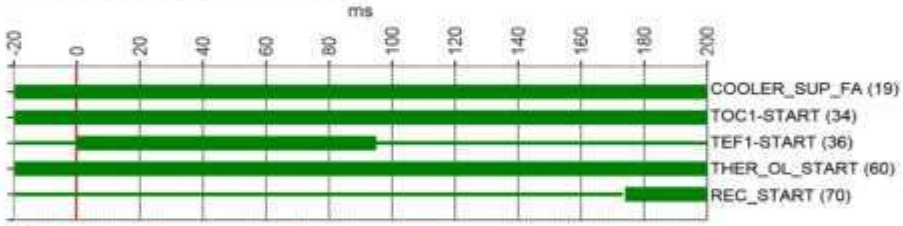


Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\ICT#3 (209)_Q09\AA1D1Q09FP1-HV_AA1D1Q09FP1\AA1D1Q09FP1202410086f



Binary Time Diagram

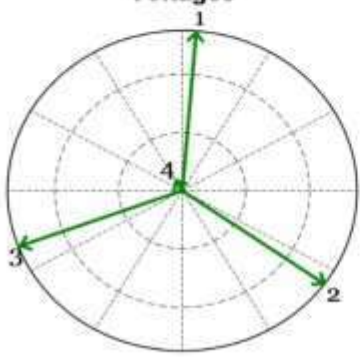
Trig Date Time: 10.08.2024 23:38:00:161



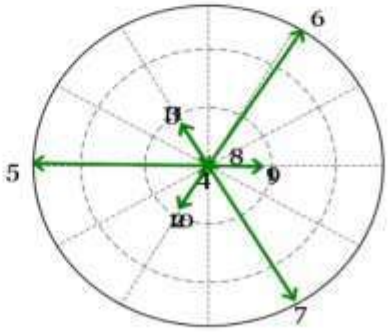
Vector Diagrams

Calculation Interval : -33 ms to -15 ms

Voltages



Currents



No.	Name	RMS	Angle	No.	Name	RMS	Angle
1	OVEX1_PTR_3ms	70231.34(V)	85.4°	1	HV_CT_IL1	1914.616(A)	359.1°

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\ICT#3 (209)_Q09\AA1D1Q09FP1-HV_AA1D1Q09FP1\AA1D1Q09FP12024100861

2	OVEX1_PTY_3ms 70823.55(V)	324.4°	2	HV_CT_IL2	1907.327(A)	237.7°
3	OVEX1_PTB_3ms 70091.31(V)	200.4°	3	HV_CT_IL3	1858.735(A)	120.5°
4	HV_SEL_VT_N_3 5050.032(V)	119.0°	4	HV_CT_IN	64.013(A)	218.6°
			5	LV_CT_IL1	6204.391(A)	179.1°
			6	LV_CT_IL2	6196.004(A)	57.6°
			7	LV_CT_IL3	6037.551(A)	300.5°
			8	LV_CT_IN	221.111(A)	34.4°
			9	HV_OCEF_RPH	1917.861(A)	359.2°
			10	HV_OCEF_YPH	1907.181(A)	237.7°
			11	HV_OCEF_BPH	1858.822(A)	120.6°
			12	DIFF IDL1 MAG	0.0(A)	0.0°
			13	DIFF IDL2 MAG	0.0(A)	0.0°
			14	DIFF IDL3 MAG	0.0(A)	0.0°
			15	DIFF IBIAS	0.0(A)	0.0°
			16	DIFF IDNS MAG	0.0(A)	0.0°

Events List

Channel Number	Name	Status	Time
36	TEF1-START	On	10.08.2024 23:38:00:161
36	TEF1-START	Off	10.08.2024 23:38:00:193
36	TEF1-START	On	10.08.2024 23:38:00:209
36	TEF1-START	Off	10.08.2024 23:38:00:257
70	REC_START	On	10.08.2024 23:38:00:335
36	TEF1-START	On	10.08.2024 23:38:00:401
34	TOC1-START	Off	10.08.2024 23:38:00:409
34	TOC1-START	On	10.08.2024 23:38:00:441
70	REC_START	Off	10.08.2024 23:38:00:536

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\ICT#3 (209)_Q09\AA1D1Q09FP1-HV_AA1D1Q09FP1\AA1D1Q09FP1202410086f

अनुलग्नक-7 / Annexure-7: Disturbance recorder (Event) for 220/66kV 160MVA ICT-3 (LV Side)

ABB

Disturbance Short Report

Disturbance Recordings Information

Device Information

Recorder ID	1
IED type	RET670
IED version	1p1r25
Station name	KHADOLI
Object name	ICT-3
IED name	RET670-2_REF

Fault Information

Trig date and time	10.08.2024 23:37:59:438
Trigger signal name	LV_EF_START
Recording number	611
Total recording time	608 ms
Pre-trig recording time	100 ms
Post trig recording time	499 ms
Max. recording time	1000 ms

General Recordings Information

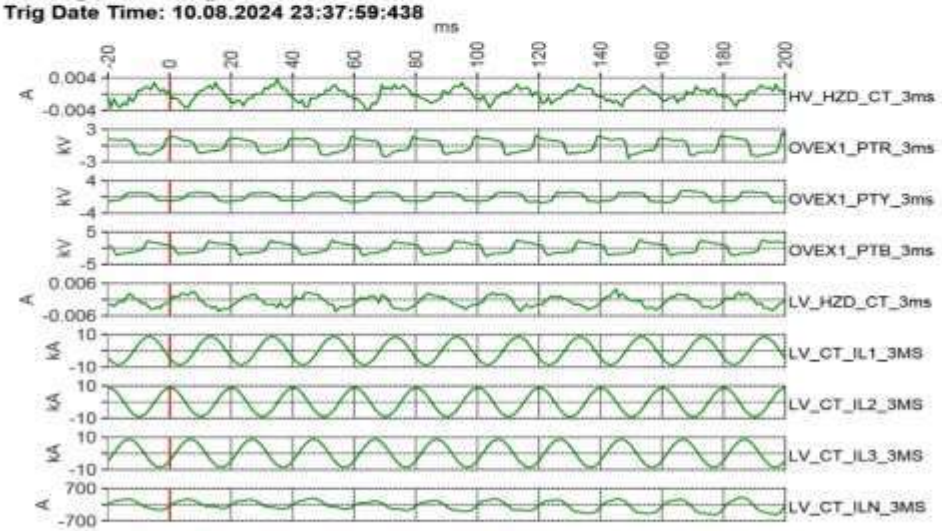
Disturbance recorder	Installed
Event recorder	Installed
System frequency	50 Hz
Sampling frequency	1 kHz
Active setting group during recording	1

Fault Location Information

Fault loop type	Not applicable
Fault location	Not applicable
Status of fault calculation	Not applicable
Fault direction	Not applicable

Analog Time Diagram

Trig Date Time: 10.08.2024 23:37:59:438



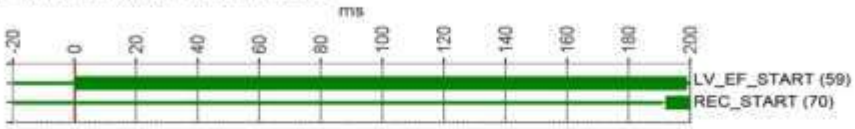
Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\ICT#3 (209)_Q09AA1D1Q09FP2-LV_AA1D1Q09FP2\AA1D1Q09FP220241008263

s

ABB

Binary Time Diagram

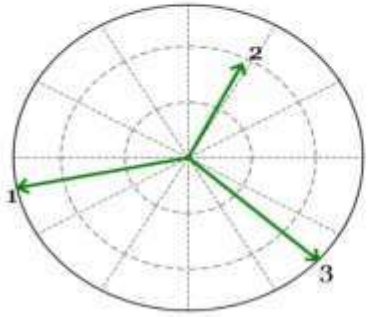
Trig Date Time: 10.08.2024 23:37:59:438



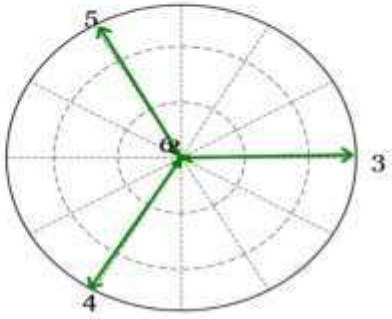
Vector Diagrams

Calculation Interval : -50 ms to -32 ms

Voltages



Currents



No.	Name	RMS	Angle
1	OVEX1_PTR_3ms	1071.99(V)	191.4°
2	OVEX1_PTY_3ms	883.018(V)	63.3°
3	OVEX1_PTB_3ms	1362.452(V)	317.9°

No.	Name	RMS	Angle
1	HV_HZD_CT_3ms	0.002(A)	358.1°
2	LV_HZD_CT_3ms	0.002(A)	126.2°
3	LV_CT_IL1_3MS	6137.159(A)	1.1°
4	LV_CT_IL2_3MS	6293.095(A)	238.6°
5	LV_CT_IL3_3MS	6124.284(A)	118.7°
6	LV_CT_ILN_3MS	131.437(A)	130.5°

Events List

Channel Number	Name	Status	Time
59	LV_EF_START	On	10.08.2024 23:37:59:438
59	LV_EF_START	Off	10.08.2024 23:37:59:446
59	LV_EF_START	On	10.08.2024 23:37:59:454
59	LV_EF_START	Off	10.08.2024 23:37:59:462
59	LV_EF_START	On	10.08.2024 23:37:59:486
59	LV_EF_START	Off	10.08.2024 23:37:59:510
59	LV_EF_START	On	10.08.2024 23:37:59:526
59	LV_EF_START	Off	10.08.2024 23:37:59:542
59	LV_EF_START	On	10.08.2024 23:37:59:566
59	LV_EF_START	Off	10.08.2024 23:37:59:590
59	LV_EF_START	On	10.08.2024 23:37:59:606
70	REC_START	On	10.08.2024 23:37:59:630
59	LV_EF_START	Off	10.08.2024 23:37:59:638
59	LV_EF_START	On	10.08.2024 23:37:59:710
59	LV_EF_START	Off	10.08.2024 23:37:59:718
70	REC_START	Off	10.08.2024 23:37:59:830

Recording File Name:C:\PCMDataBases\DisturbanceRecordings\KHADOLI_220kV_SS\220kV & 66kV BAYS\220kV LINEs_ICTs_D1\ICT#3 (209)_Q09\AA1D1Q09FP2-LV_AA1D1Q09FP2\AA1D1Q09FP220241006263

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 400 के॰वी॰ कोरबा(एन.टी.पी.सी.) उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400 kV Korba (NTPC) of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 15-10-2024

1. **घटना का सारांश / Event Summary**: At 09:14 Hrs/ 08-08-2024, 400/33 kV KSTPS-Tie Transformer-4 tripped from LV (33 kV) side on Restricted Earth Fault, smoke observed in LV (33 kV) side terminal box. Due to non-opening of R phase breaker at 400 kV side, LBB protection operated resulting in tripping of 400 kV KSTPS-Bus-2 (Double Main and Transfer Bus) and all connected elements.

   KSTPS-Unit-1 (210 MW) tripped on Generating Transformer Backup Earth Fault protection operation. As informed by NTPC Korba, the unit didn't tripped on LBB protection operation even though the GRP trip relays 186A and 286A relays initiated 3-phase LBB initiation in the LBB relay. KSTPS-Unit-2&3 (210 MW) tripped on Class-B Protection. Generation loss of 560 MW occurred at Korba NTPC Thermal Power Plant due to the event. Bus connectivity is shown below:

400 kV KSTPS-Bus-1 Connectivity	400 kV KSTPS-Bus-2 Connectivity
400/33 kV KSTPS-Tie Transformer-1	400/33 kV KSTPS-Tie Transformer-4
KSTPS-Unit-4 (210 MW)	KSTPS-Unit-1,2&3 (210 MW)
400kV KSTPS-Bhilai-1	400kV KSTPS-Bhilai-2

2. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	उपयोगकर्ता Utilities	टिप्पणी Remarks
1.	DR/EL not uploaded in 24 Hrs	IEGC section 37.2 (c)	NTPC Korba	DRs uploaded after 24 Hrs
2.	Flash Report received after 8hrs	IEGC section 37.2 (b)	NTPC Korba	Flash Report received after 8 Hrs
3	Detailed Report received after 7 days	IEGC section 37.2 (e)	NTPC Korba	Detailed Report received after 7 Days

3. घटना का समय और दिनांक / Time and Date of the Event : 09:14 hrs / 08-08-2024

4. ग्रिड घटना का प्रकार / Event Category : Grid Incident (GI)-2

5. स्थान/नियंत्रण क्षेत्र / Location/Control Area : Korba (NTPC), Chhattisgarh

6. पूर्ववर्ती स्थिति / Antecedent Conditions :

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.95	561861	56200	1630	3793

घटना के बाद **Post Event**	49.94	68167	58142	1623	3780

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	400kV KSTPS – KORBA WEST is kept open for Fault level control.
मौसम की स्थिति **Weather Condition**	Normal

7. लोड और जेनरेशन हानि / Load and Generation loss: Generation loss of 560 MW occurred at NTPC) Korba Thermal Power Plant



Figure 1. PMU Frequency Plot (400 kV KSTPS-Bhilai-2)

8. रुकावट की अवधि / Duration of interruption: 02 Hours 34 Minutes (Time of revival of first element)

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

400/33 kV KSTPS-Tie Transformer-4

10. प्रभावित क्षेत्र का नक्शा / Network across the affected area

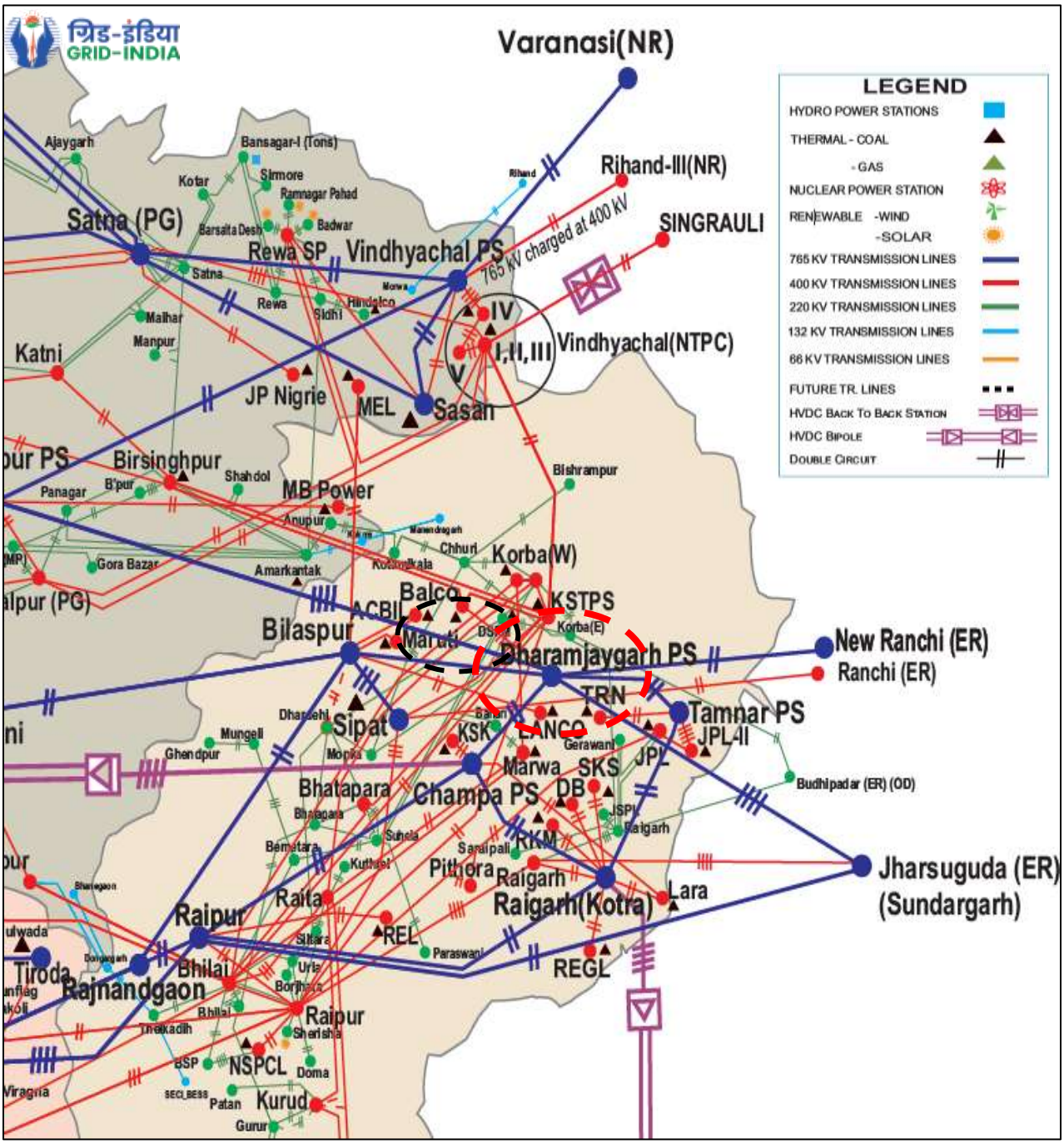


Figure 2. Network across the affected area

11. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Korba-NTPC	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1.	400/33 kV KSTPS-Tie Transformer-4	09:14:18	LBB operation due to non-opening of R phase pole	Restricted Earth Fault	Not Available
2.	400 kV KSTPS-Bus-2	09:14:18	DRs not provided by NTPC Korba	Not Applicable	11:48
3.	400kV KSTPS-Bhilai-2	09:14:18	DRs not provided by NTPC Korba	No tripping at Bhilai end	11:48
4.	KSTPS-Unit-1 (210 MW)	09:14:18	L1 3 phase Initiation L2 3 phase Initiation **Other Signals not present in DR provided**	Not Applicable	14:12
5.	KSTPS-Unit-2 (210 MW)	09:14:18	L1 3 phase Initiation L2 3 phase Initiation **Other Signals not present in DR provided**	Not Applicable	15:21
6.	KSTPS-Unit-3 (210 MW)	09:14:18	L1 3 phase Initiation L2 3 phase Initiation **Other Signals not present in DR provided**	Not Applicable	12:30

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

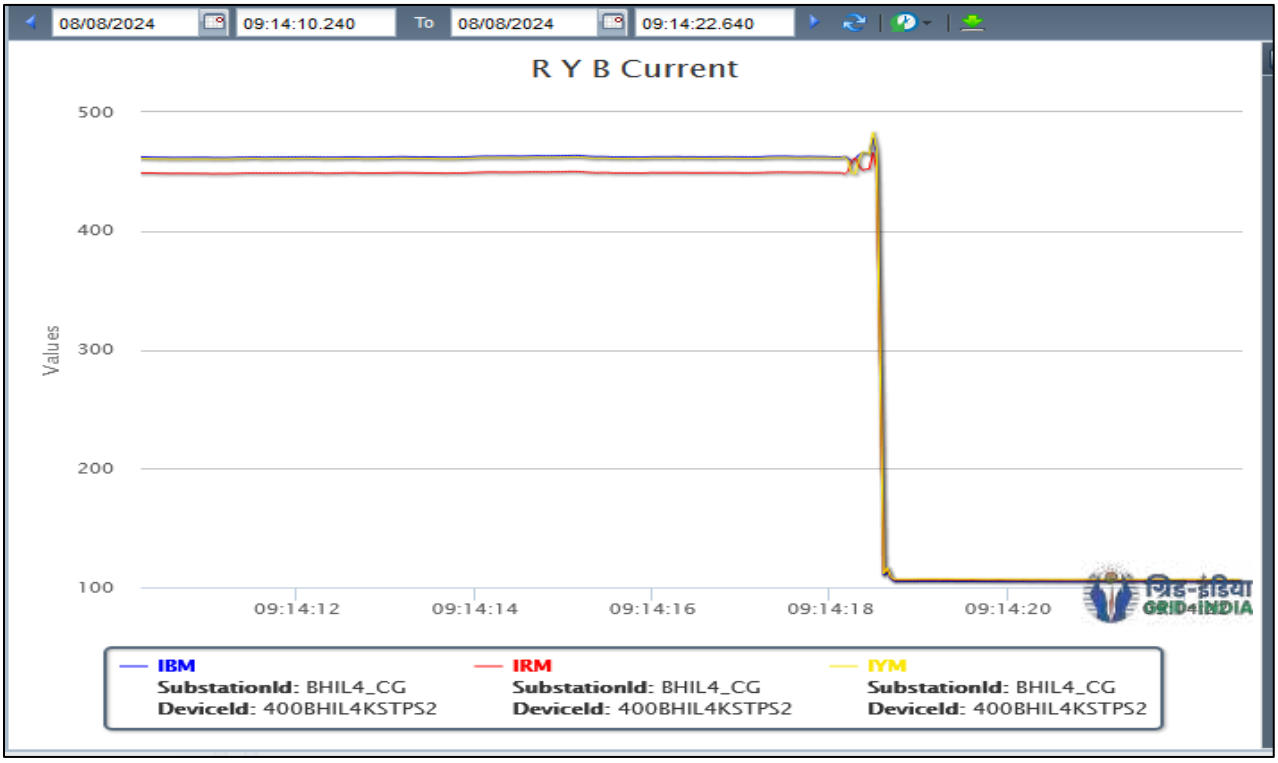


Figure 3. PMU Current Plot (400 kV KSTPS-Bhilai-2)

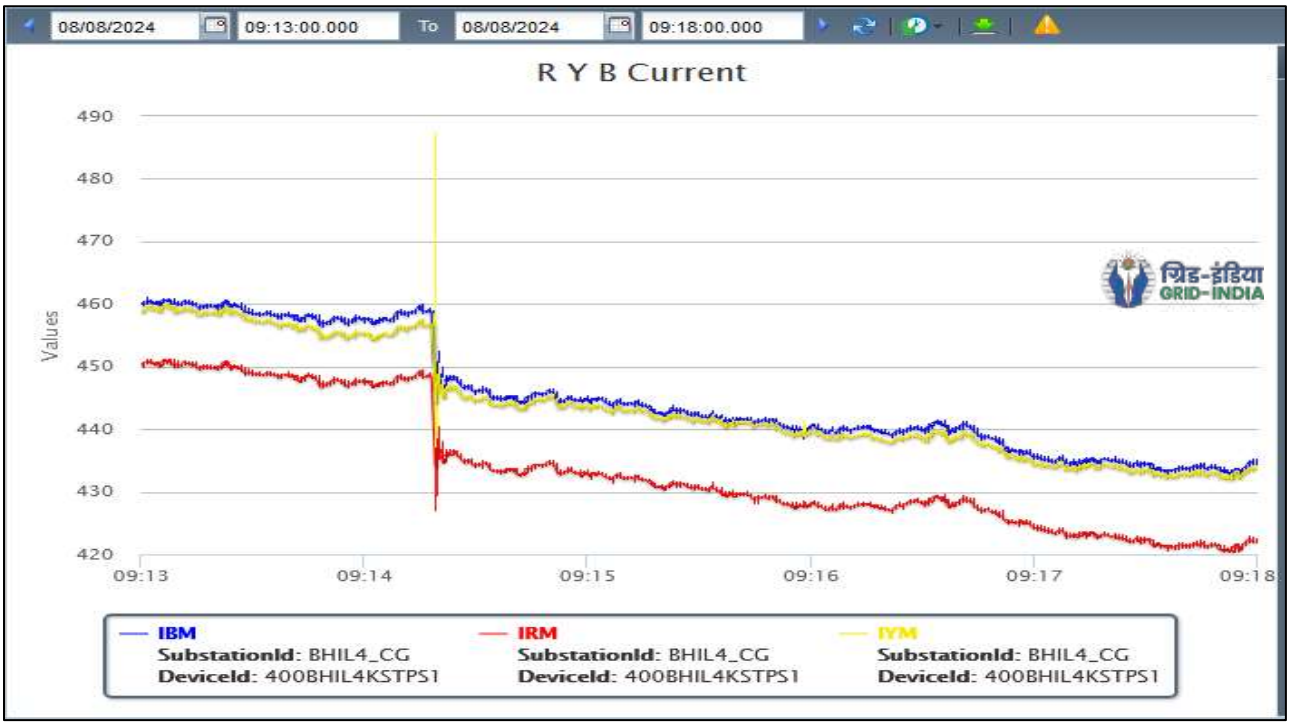


Figure 4. PMU Current Plot (400 kV KSTPS-Bhilai-1)

13. प्रमुख अधिगम बिंदु / Protection and Operational issues observed:

- KSTPS-Unit-1 (210 MW) tripped on Generating Transformer Backup Earth Fault protection operation. As informed by NTPC Korba, the unit didn't tripped on LBB protection operation even though the GRP trip relays 186A and 286A relays initiated 3-phase LBB initiation in the LBB relay.

14. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- NTPC Korba may share the Root Cause Analysis of flashover on 33kV side of Tie Transformer.
- NTPC Korba may investigate the KSTPS-Unit-1 (210 MW) tripping and share the findings

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- KSTPS-Unit-1 (210 MW) tripped on Generating Transformer Backup Earth Fault protection operation. As informed by NTPC Korba, the unit didn't tripped on LBB protection operation even though the GRP trip relays 186A and 286A relays initiated 3-phase LBB initiation in the LBB relay. NTPC Korba may investigate the KSTPS-Unit-1 (210 MW) tripping and share the findings

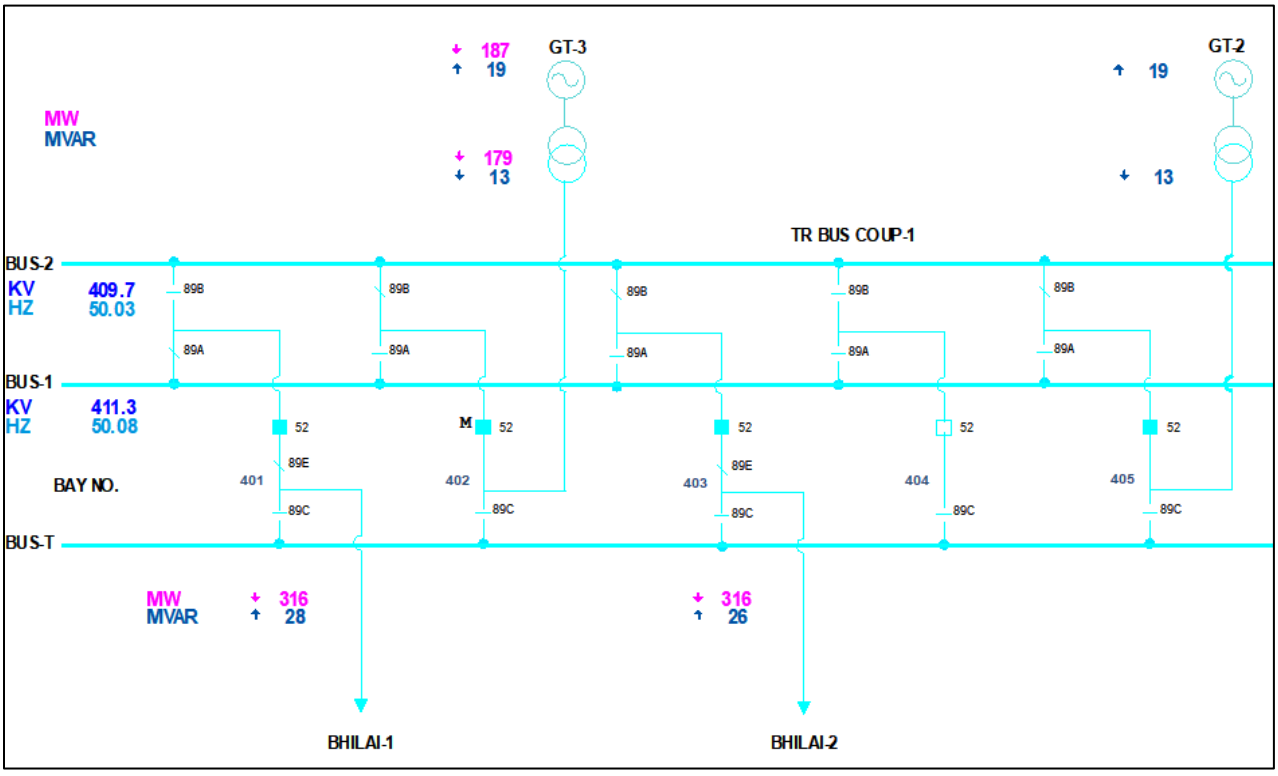
-x-x-x-x-x-

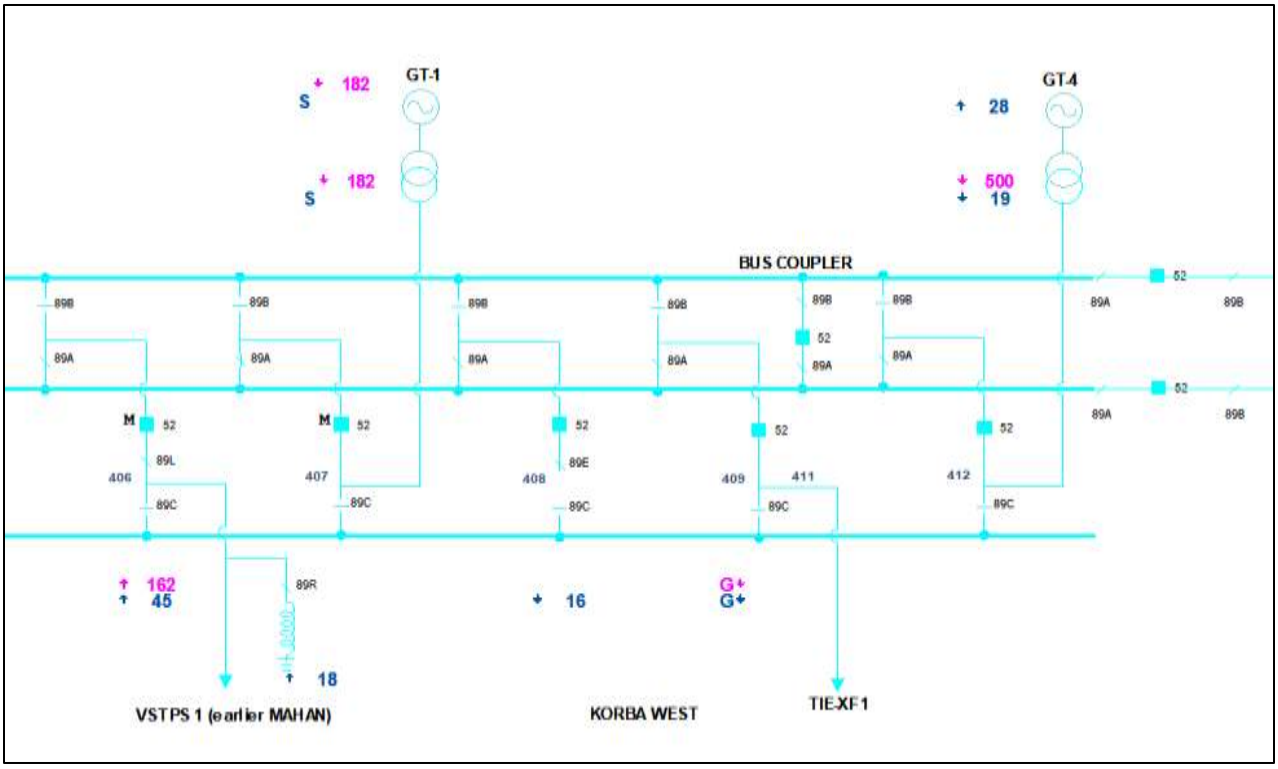
विजय कुमार कोडाली Vijay Kumar Kodali
उप महाप्रबंधक Deputy General Manager
प्रणाली प्रचालन System Operation

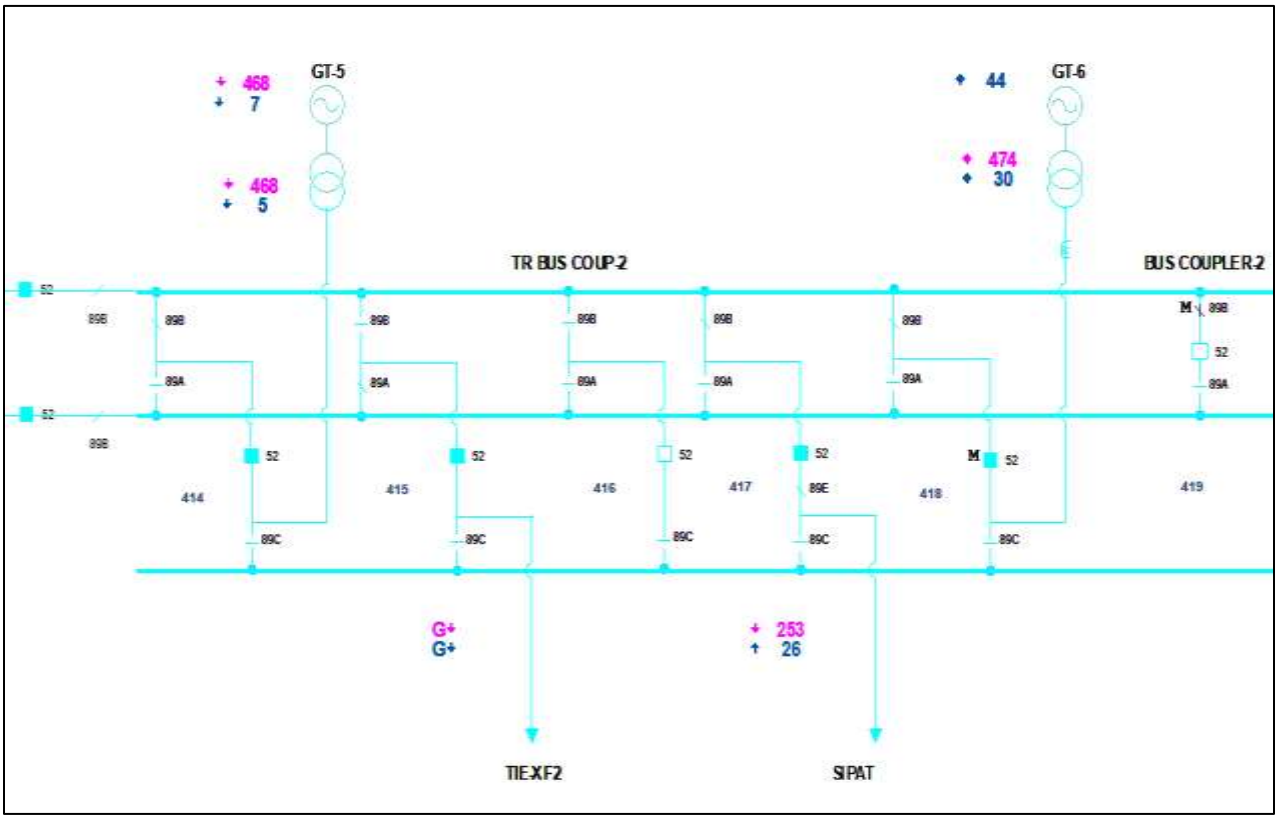
अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA

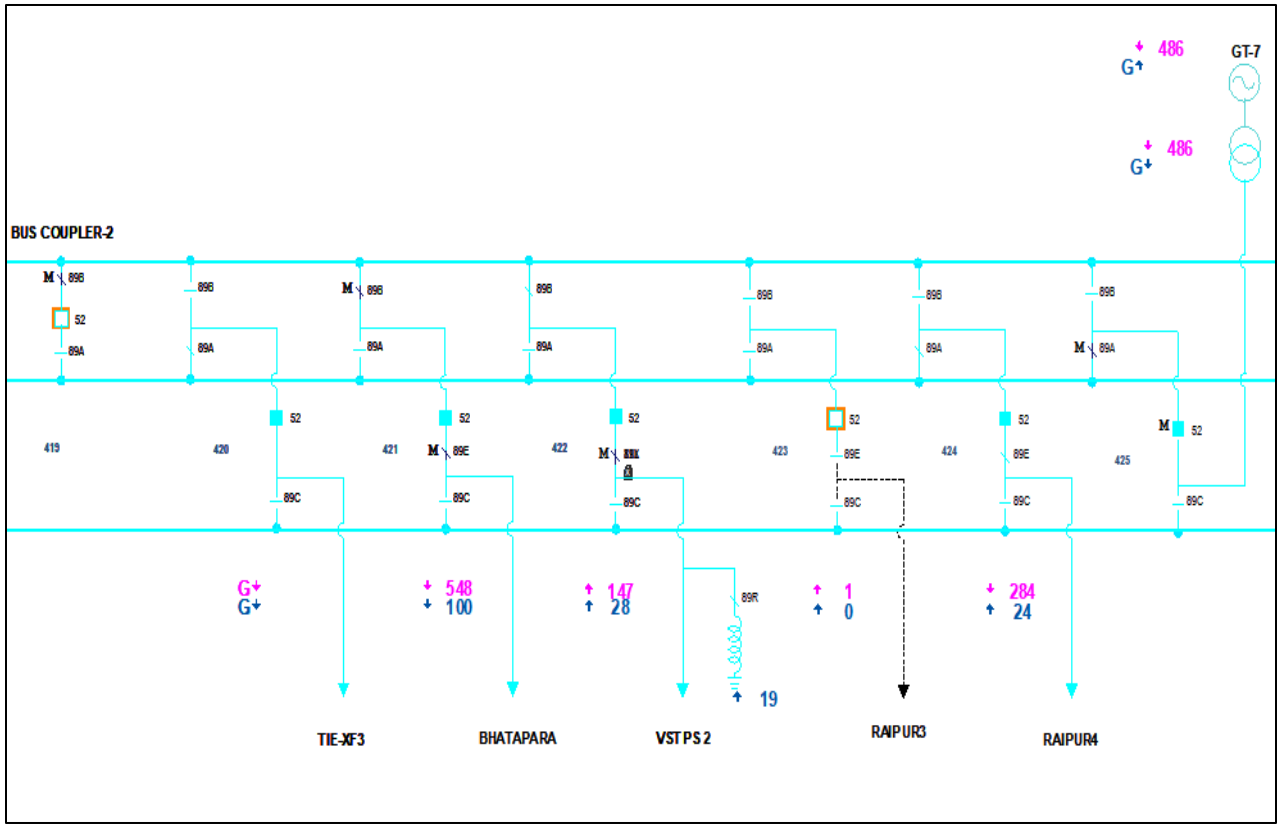
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
No SOE reported during the instance of tripping's i.e. 09:14 hrs / 08-08-2024					
WRLDC	400-SOE	KSTPS_GS	KORBA STPS XFMR_P UNIT XF HV G1 NORMAL	11:16:20	161
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB 40352 (BHIL4-2) OPEN	11:16:21	146
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB CB 40552 (G2) OPEN	11:16:21	146
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB COUPLER CB 41152 OPEN	11:16:21	146
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB COUPLER CB 42852 OPEN	11:16:21	146
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB 40352 (BHIL4-2) CLOSED	11:48:23	374
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB COUPLER CB 41152 CLOSED	11:51:31	377
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB COUPLER CB 42852 CLOSED	11:52:53	546
WRLDC	400-SOE	KSTPS_GS	KORBA STPS XFMR_P UNIT XF HV G4 NORMAL	13:03:06	650
WRLDC	400KV-CB	KSTPS_GS	KORBA STPS CB CB 40552 (G2) CLOSED	15:21:36	543
WRLDC	400-SOE	KSTPS_GS	KORBA STPS XFMR_P UNIT XF HV G1 ACTED	16:52:13	866

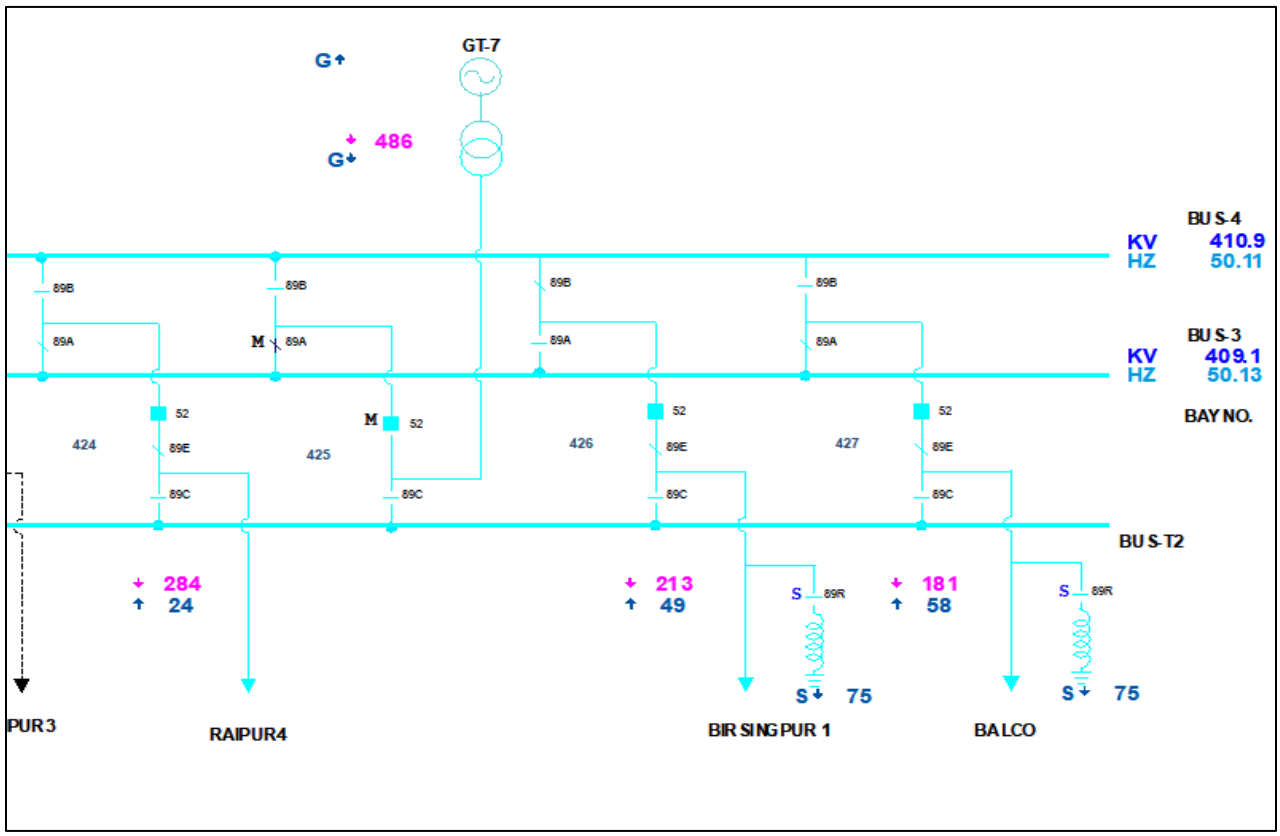
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram




GT-1
S 182
S 182
GT-4
28
500
19
BUS COUPLER
52
89B
89A
M
89L
89E
89C
89R
406
407
408
409
411
412
162
45
16
18
G
VSTPS 1 (earlier MAHAN)
KORBA WEST
TIE-XF1

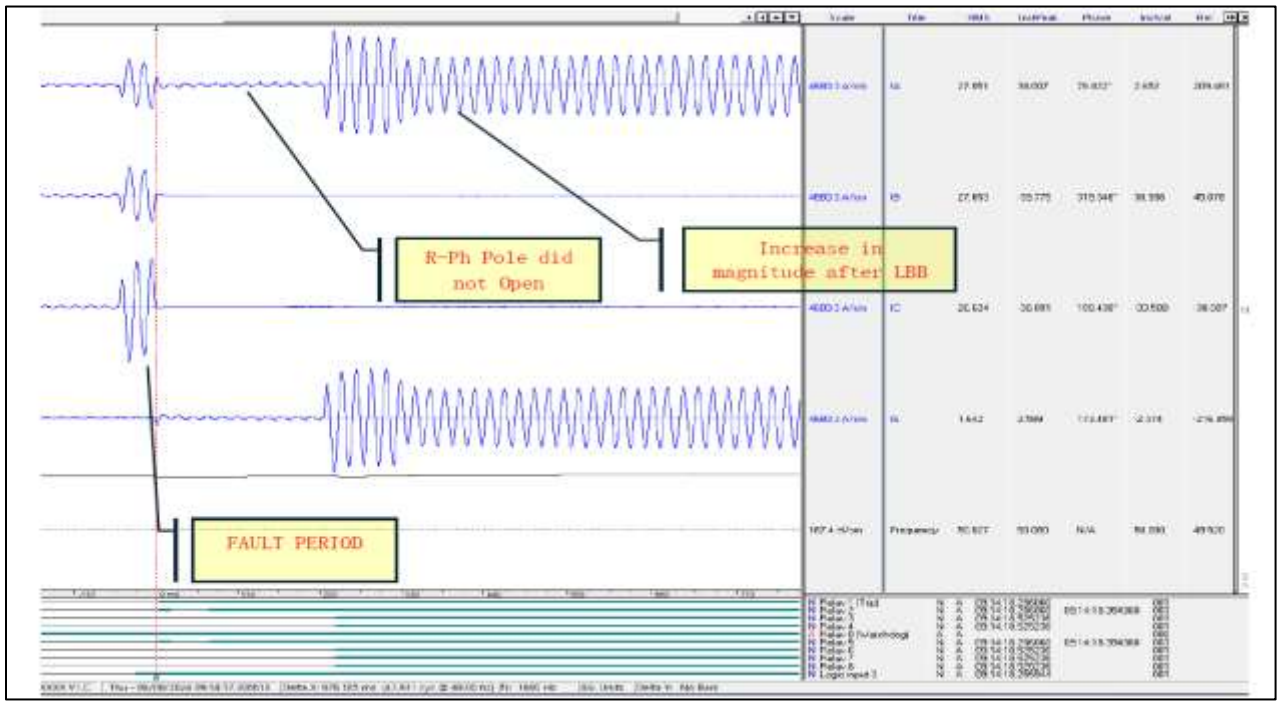

GT-5
468
7
468
5
GT-6
44
474
30
TR BUS COUP-2
BUS COUPLER-2
52
89B
89A
M
89E
89C
414
415
416
417
418
419
G
253
26
TIE-XF2
SIPAT


BUS COUPLER-2
GT-7
G 486
G 486
419
420
421
422
423
424
425
G
G
548
100
147
28
1
0
284
24
19
TIE-XF3
BHATAPARA
VSTPS 2
RAIPUR3
RAIPUR4

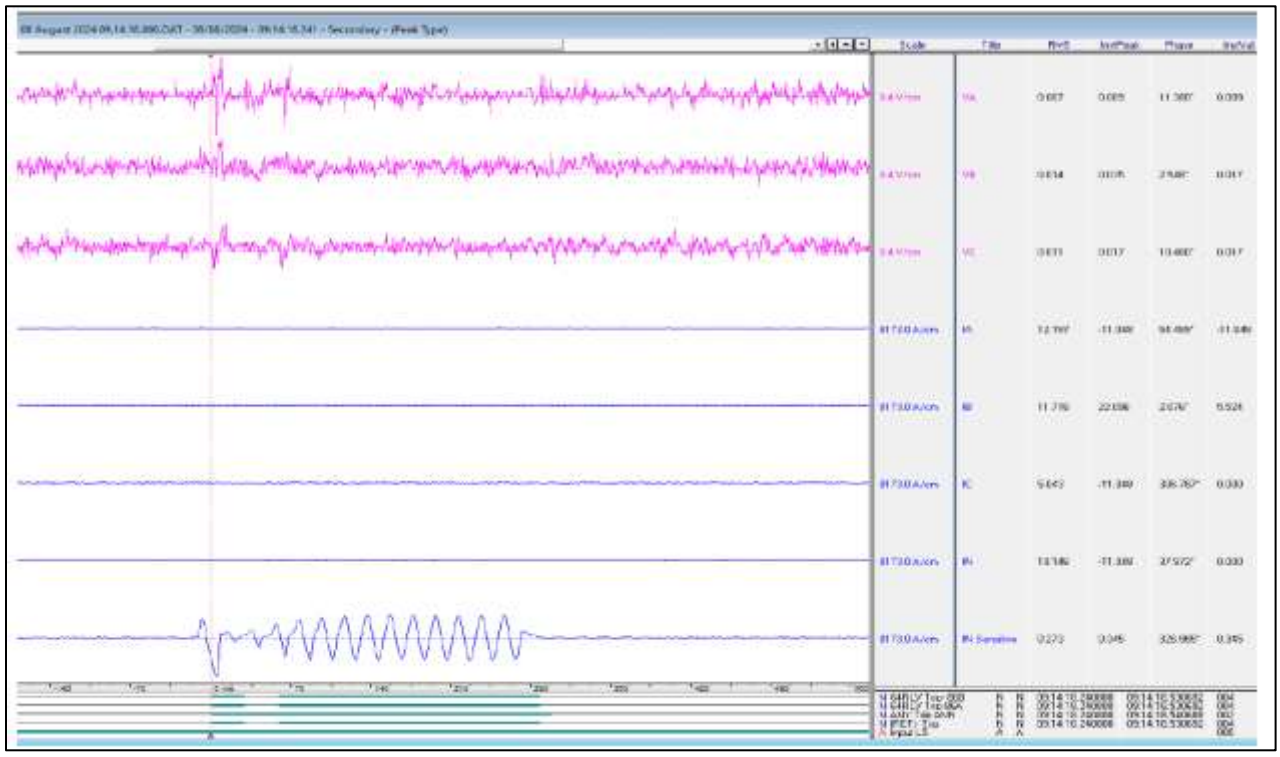

GT-7
G
G 486
BUS-4
KV 410.9
HZ 50.11
BUS-3
KV 409.1
HZ 50.13
BAY NO.
424
425
426
427
BUS-T2
284
24
213
49
181
58
S 75
S 75
PUR 3
RAIPUR4
BIR SINGPUR 1
BALCO

अनुलग्नक-3 / Annexure-3: Disturbance recorder (As submitted by NTPC)

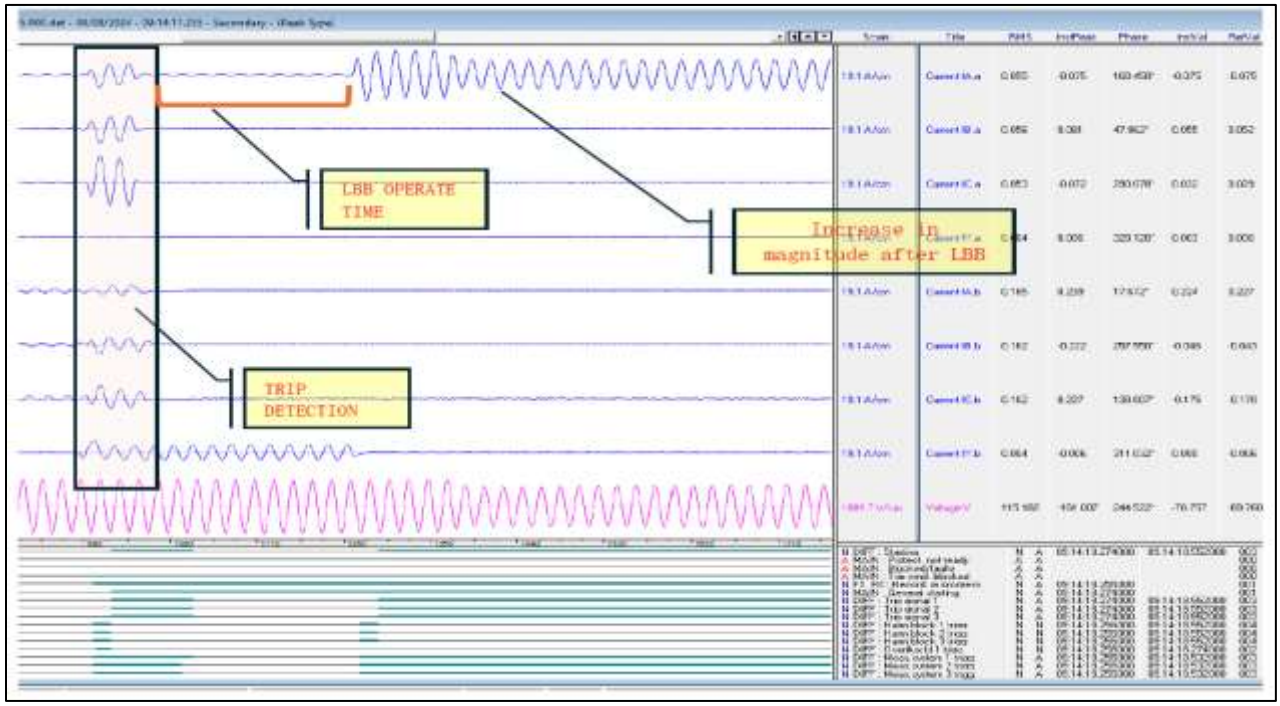
A. Tie Transformer LBB#1



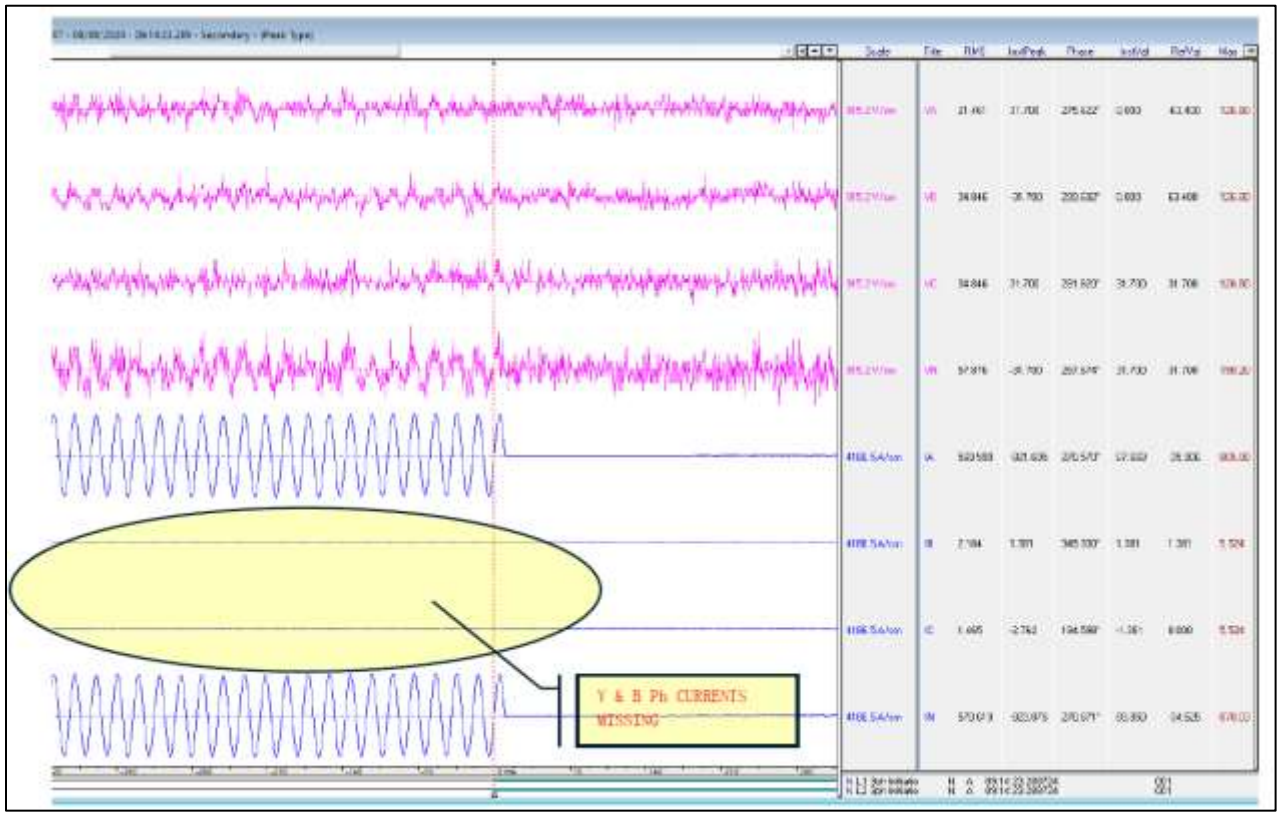
B. TIE TRANSFORMER LV REF RELAY



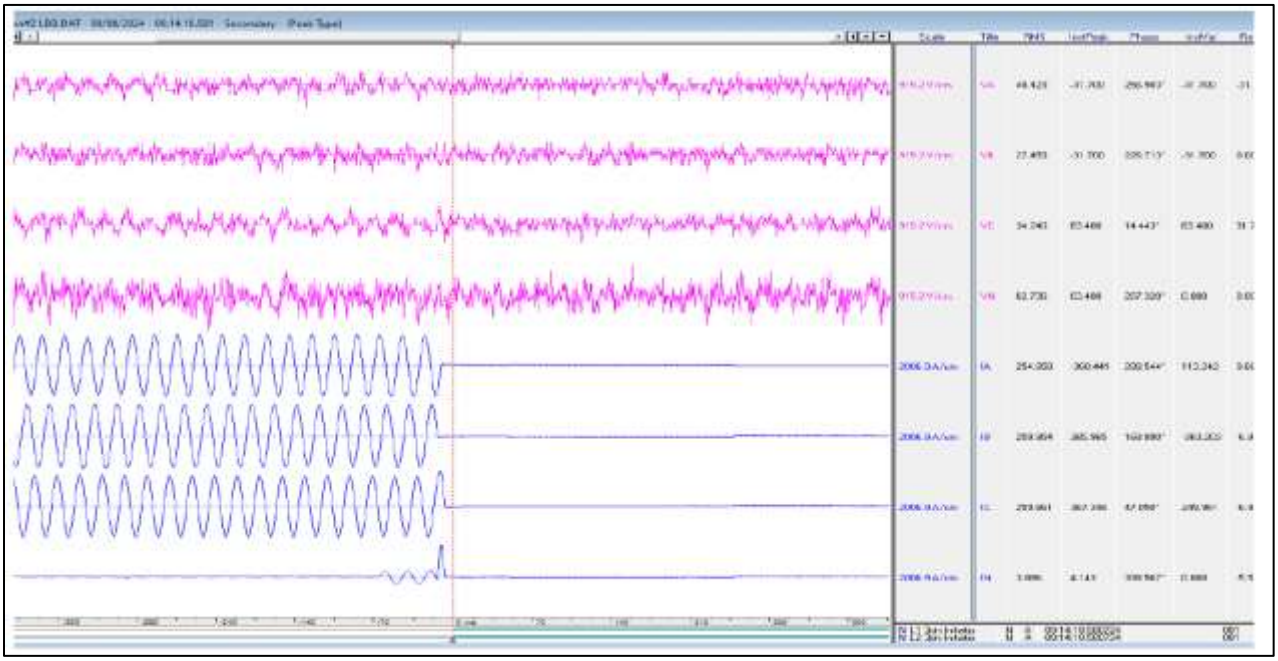
C. TIE TRANSFORMER DIFF RELAY (87T)



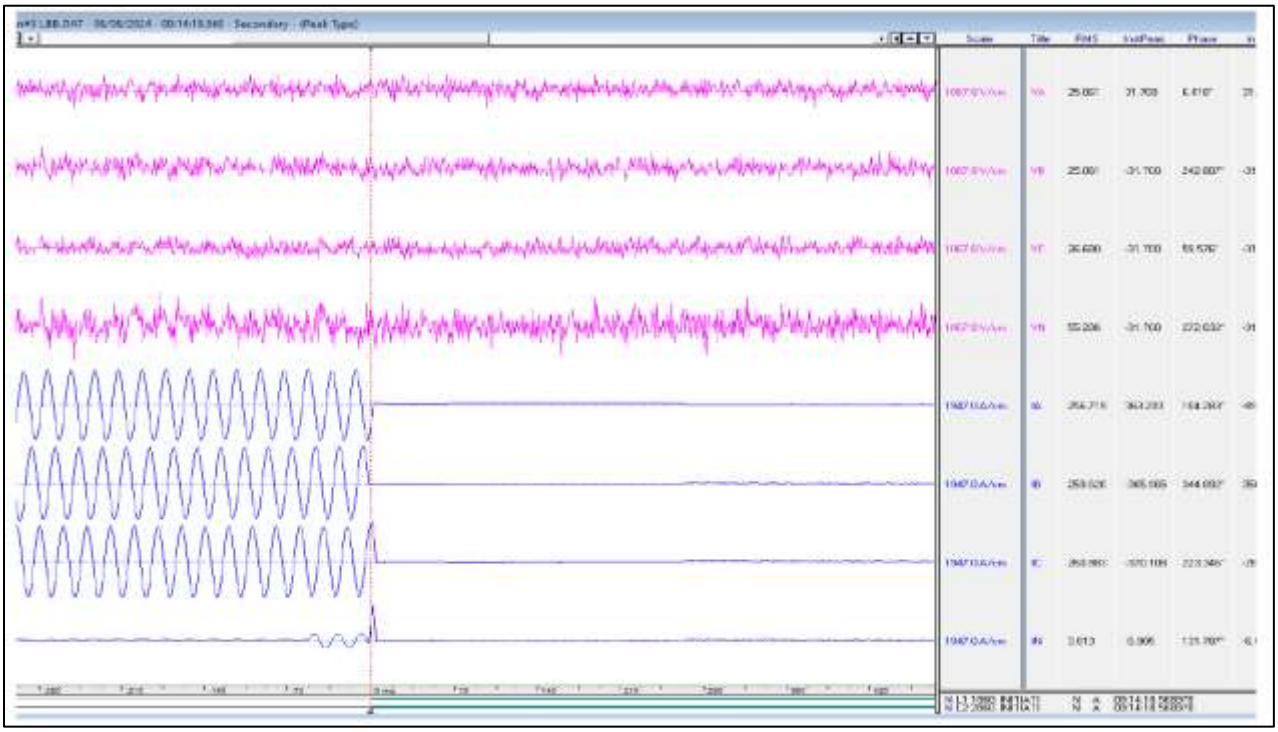
D. GEN#1 LBB RELAY



E. GEN#2 LBB RELAY



F. GEN#3 LBB RELAY



अनुलग्नक-4 / Annexure-4: Site Photographs - Nil

अनुलग्नक-5 / Annexure-5: Report from NTPC Korba

TRIP REPORT

NTPC KORBA STAGE#1 TRIP DTD 08.08.2024 at 09:14:18am

BEFORE THE INCIDENT.

1. All stage#1 units were running on full load.
2. In 400kV Switchyard, Gen#1, 2, 3 and Tie Transformer#4 and Bhilai#2 line were on Bus#2 while Gen#4, Tie Transformer#1, bhilai#1 were on Bus#1. 400kV bus coupler and Bus sectionalizer was in closed condition.

INCIDENT.

1. On 08.08.2024 at 09:10:18am 100MVA Tie Transformer#4 relays sensed REF (Restricted Earth Fault) protection on LV side. This initiated tripping on both HV and LV side.
2. On LV side, Tie Transformer#4 is connected to 33kV BUS-P. The incomer breaker tripped as per the protection scheme.
3. On HV side, 400kV Tie Transformer#4 breaker 1052 received trip command as per protection scheme, however, only Y and B phase of breaker pole operated while the R-phase pole did not operate mechanically. Due to this, LBB#1 and 2 protection operated thereby tripping 400kV BUS#2 on bus-bar protection.
4. 400kV Bus coupler breaker and bus#2 - Bus#4 Bus sectionalizer breaker tripped as per protection scheme.
5. On Unit side, Generator#1 Tripped on GT BKUP E/F 51NGT protection (Class-A) protection. Generator#2 and 3 tripped on Class-B protection.
6. 48V DC Power supply to TEJAS panel (relaying KORBA data to WRLDC) was interrupted.
7. Complete Lighting and AC failure occurred in swyd control room building.

AFTER THE INCIDENT:

1. Smoke was observed to be coming from 33kV side (cable terminal box) of Tie Transformer#4. Detailed examination shall be taken after completion of restoration works.
2. TT#4 400kV side CB 1052 R phase breaker had to be opened by mechanical intervention.

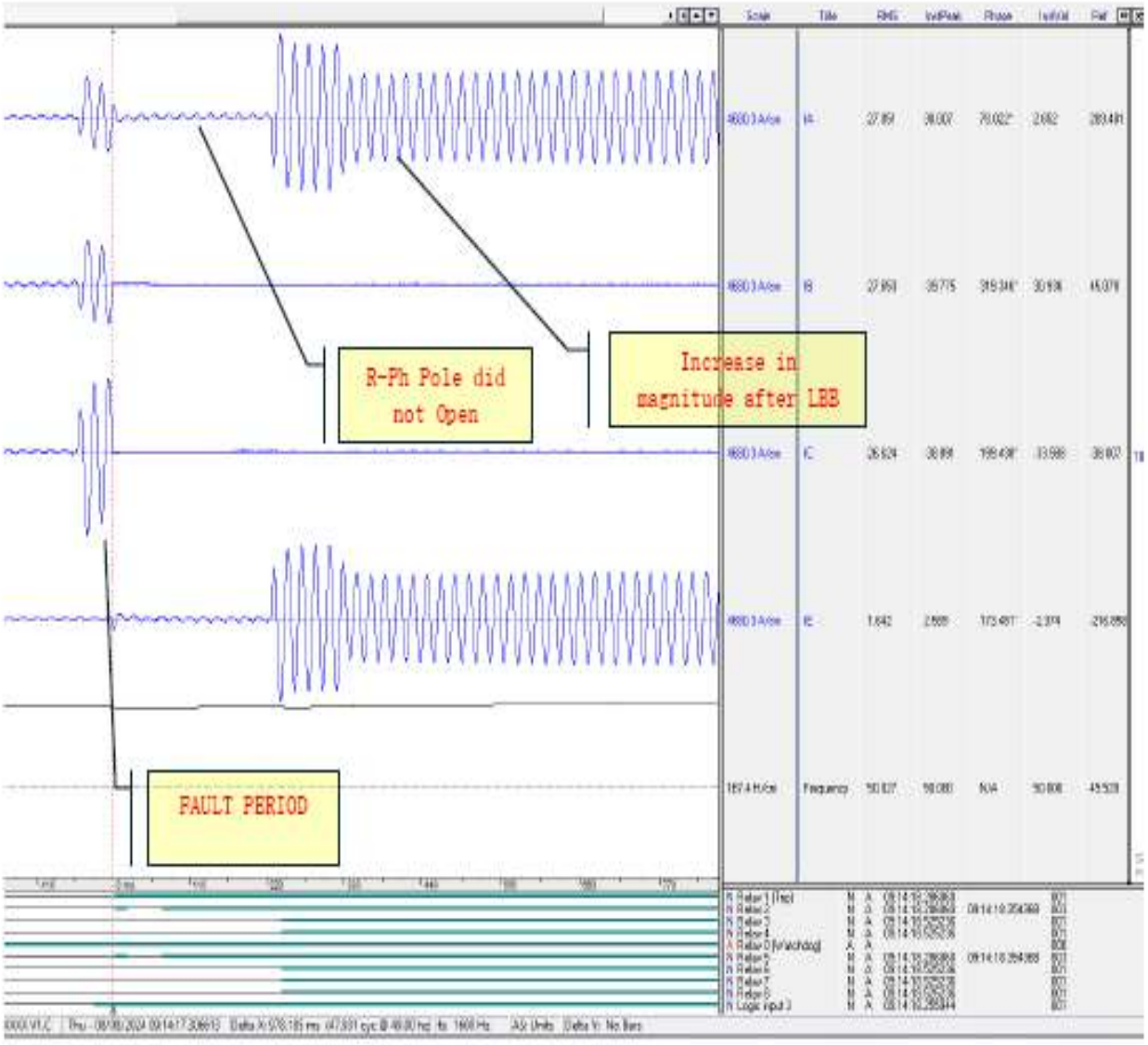
TRIPPINGS RECORDED IN E/L

1. BUS BAR TRIP RELAY 296 OPERATED (Gen#3)
2. BUS BAR TRIP RELAY 596 OPERATED (Gen#2)
3. BUS BAR TRIP RELAY 796 OPERATED (Gen#1)
4. BUS BAR TRIP RELAY 1096 OPERATED (Bus Coupler#1)
5. BUS BAR TRIP RELAY 1396B OPERATED (Bus Section#2-4)
6. 400kV Bkr 352 OPEN (BHILAI#2)
7. 400kV Bkr 1352B OPEN (Bus Section#2-4)

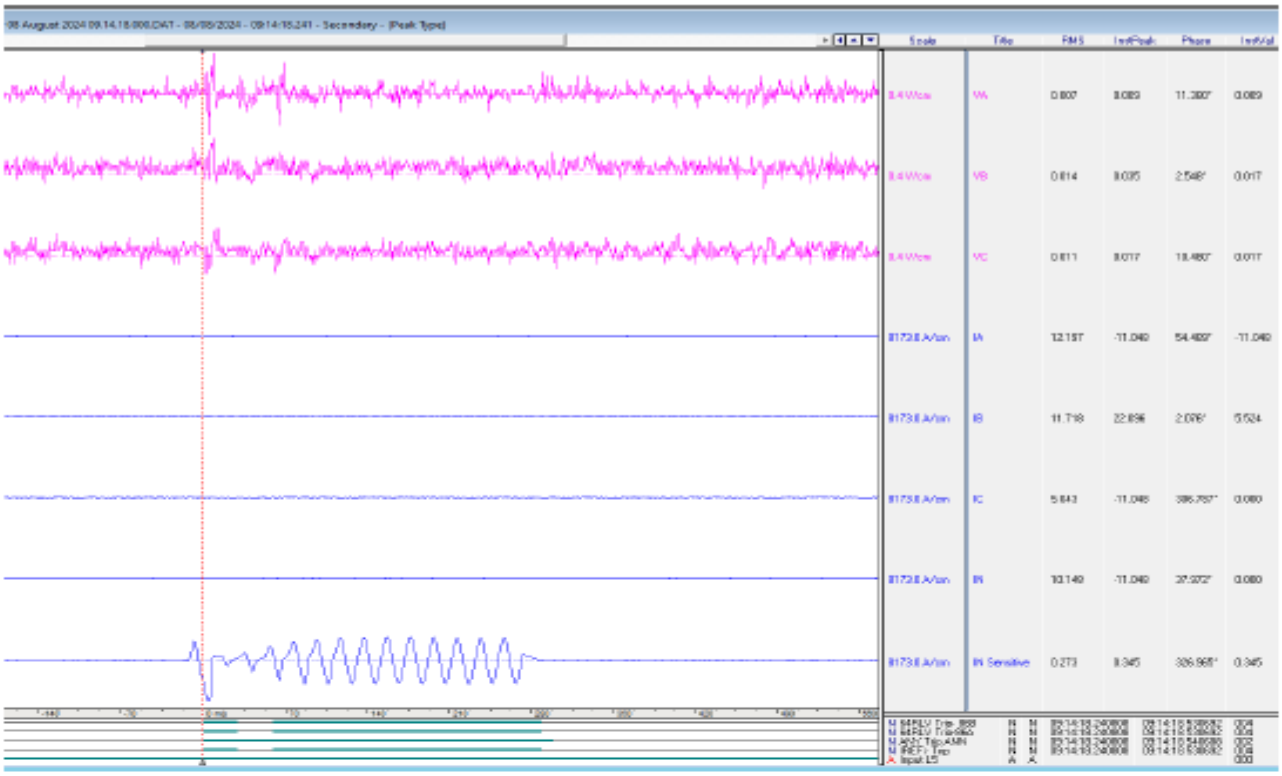
8. 400kV Bkr 252 OPEN (Gen#3)
9. 400kV Bkr 552 OPEN (Gen#2)
10. 400kV Bkr 752 OPEN (Gen#1)
11. BUS BAR TRIP RELAY 396 OPERATED (BHILAI#2)

DISTURBANCE RECORDS

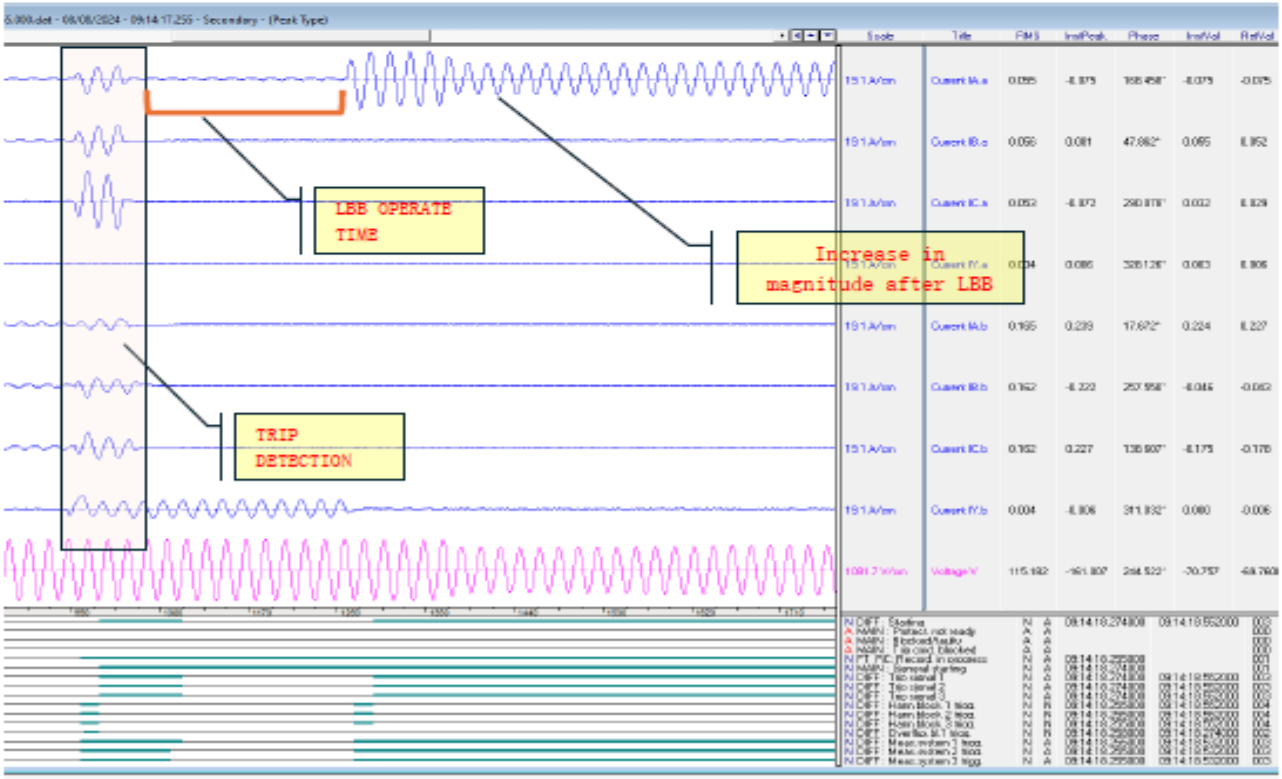
A. Tie Transformer LBB#1



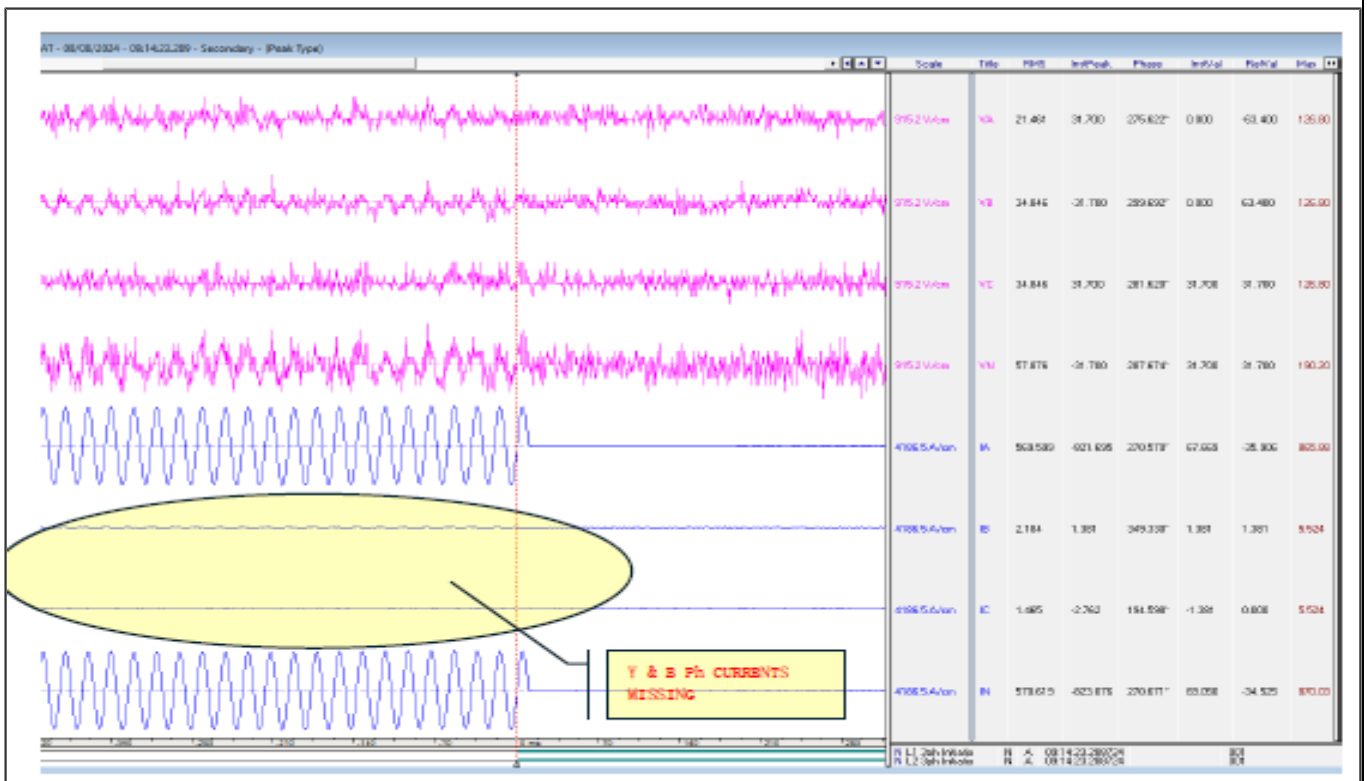
B. TIE TRANSFORMER LV REF RELAY



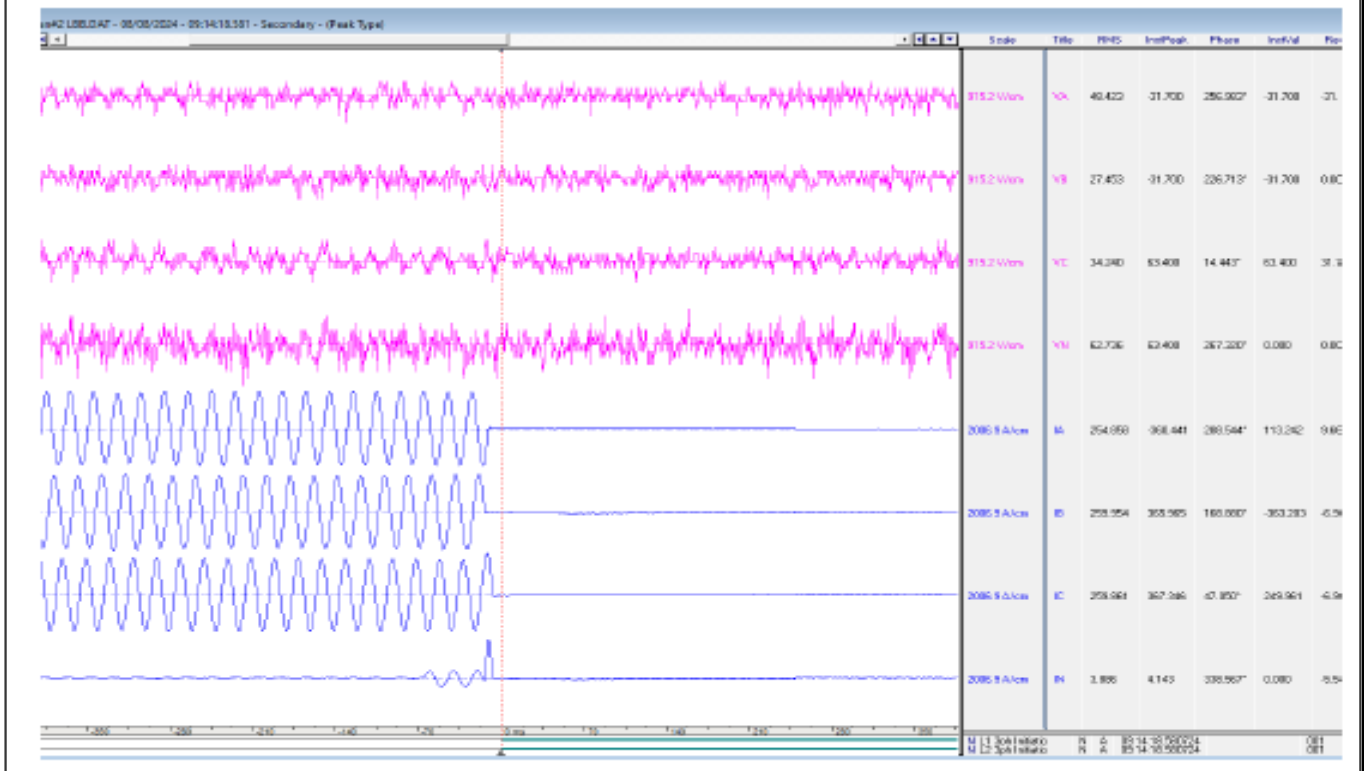
C. TIE TRANSPORMER DIFF RELAY (87T)



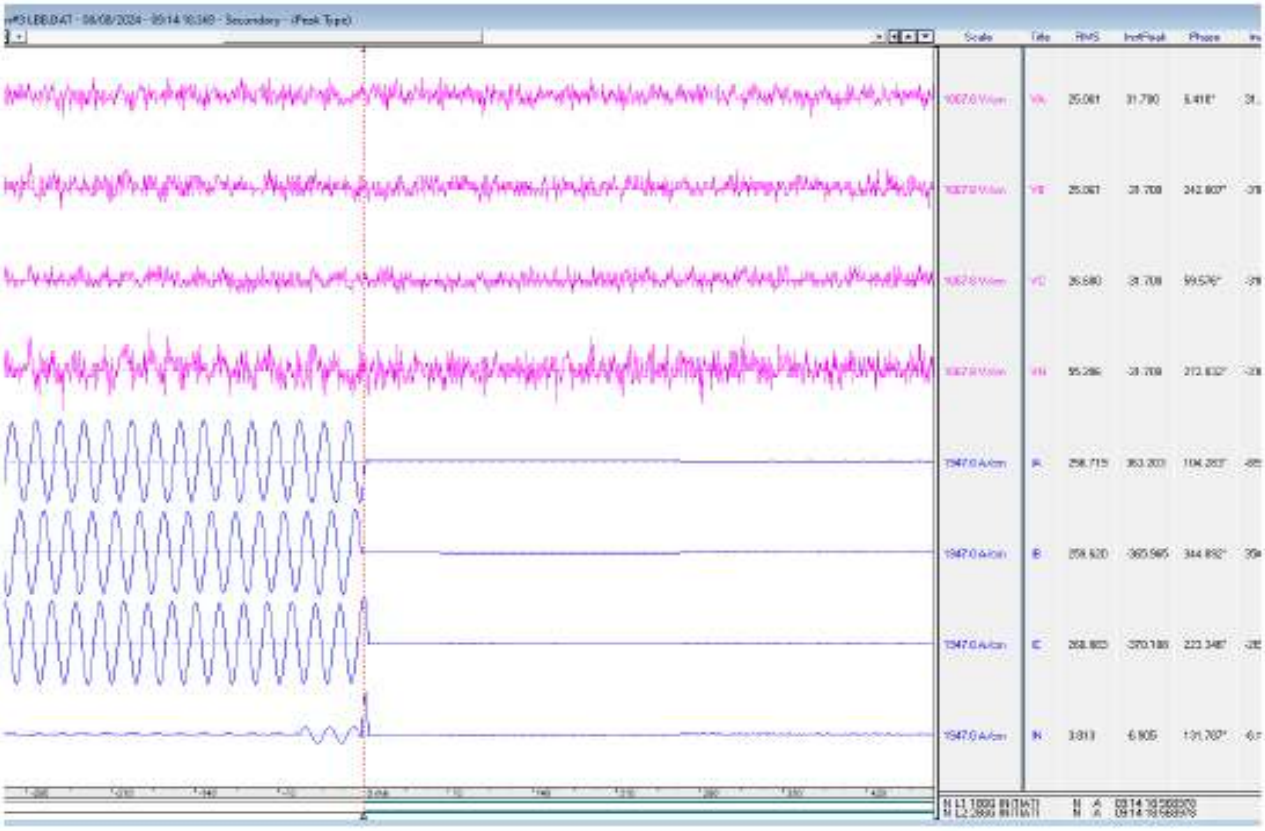
D. GEN#1 LBB RELAY



E. GEN#2 LBB RELAY



F. GEN#3 LBB RELAY



TRIP ANALYSIS:

Based on the DR and SoE mentioned above, the following can be concluded:

1. A fault appeared on 33kV side of Tie Transformer#4. LV REF relay sensed the fault and issued trip command to 400kV and 33kv side breakers.
2. 33kV side breaker opened, on 400kV side, TT#4 breaker 1052 Y and B phase opened. Since R-phase pole did not open due to mechanism problem, LBB Stage#2 operated after 200ms and all the bus#2 connected feeders 96 relay tripped. This tripped all the Bus #2 connected feeders EXCEPT Gen#1. Moreover, 3-ph initiation was also not received by Gen#1 LBB relay.
3. Gen#1 tripped on 51NGT protection (Due to presence of R-N connection in TT#4 side) as per scheme. The GRP trip relays 186A and 286A relays initiated 3-ph LBB initiation in the LBB relay which is visible in the DR also.

CONCLUSION:

1. Cause of flashover on 33kV side of Tie Transformer needs to be investigated.
2. 400kV breaker 1052 all 3 phases servicing to be done by AREVA (CB OEM)
3. Gen#1 3-ph initiation from 796 to LBB relay to be checked on opportunity.
4. Gen#1 tripping through TC#1 and TC#2 from 796 relay to be checked on opportunity.
5. Contingent 48V DC supply to TEJAS panels to be ensured.

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 400 के°वी. असोज उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400 kV Asoj of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 14:52 Hrs/08-08-2024, 400kV Asoj Main Bus-2 tripped in R-Ph to Earth fault by Busbar Protection Scheme and all 400kV Main Bus-2 bays including 220kV Buscoupler tripped. A/R operated successfully at Kosamba end only in 400kV Asoj-Kosamba line connected with Bus 1 due to DPS relay overreach. Loud blast sound was heard but no physical cause of occurrence could be found by GETCO. No load loss reported by GETCO.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 14:52 Hrs / 08-08-2024

3. **ग्रिड घटना का प्रकार / Event Category :** Grid Incident (GI)-2

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Asoj, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.93	66552	53507	13106	17563

घटना के बाद **Post Event**	49.98	66690	53499	12979	17605

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Normal.

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Nil

7. **रुकावट की अवधि / Duration of interruption:** 01 hours 48 minutes

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

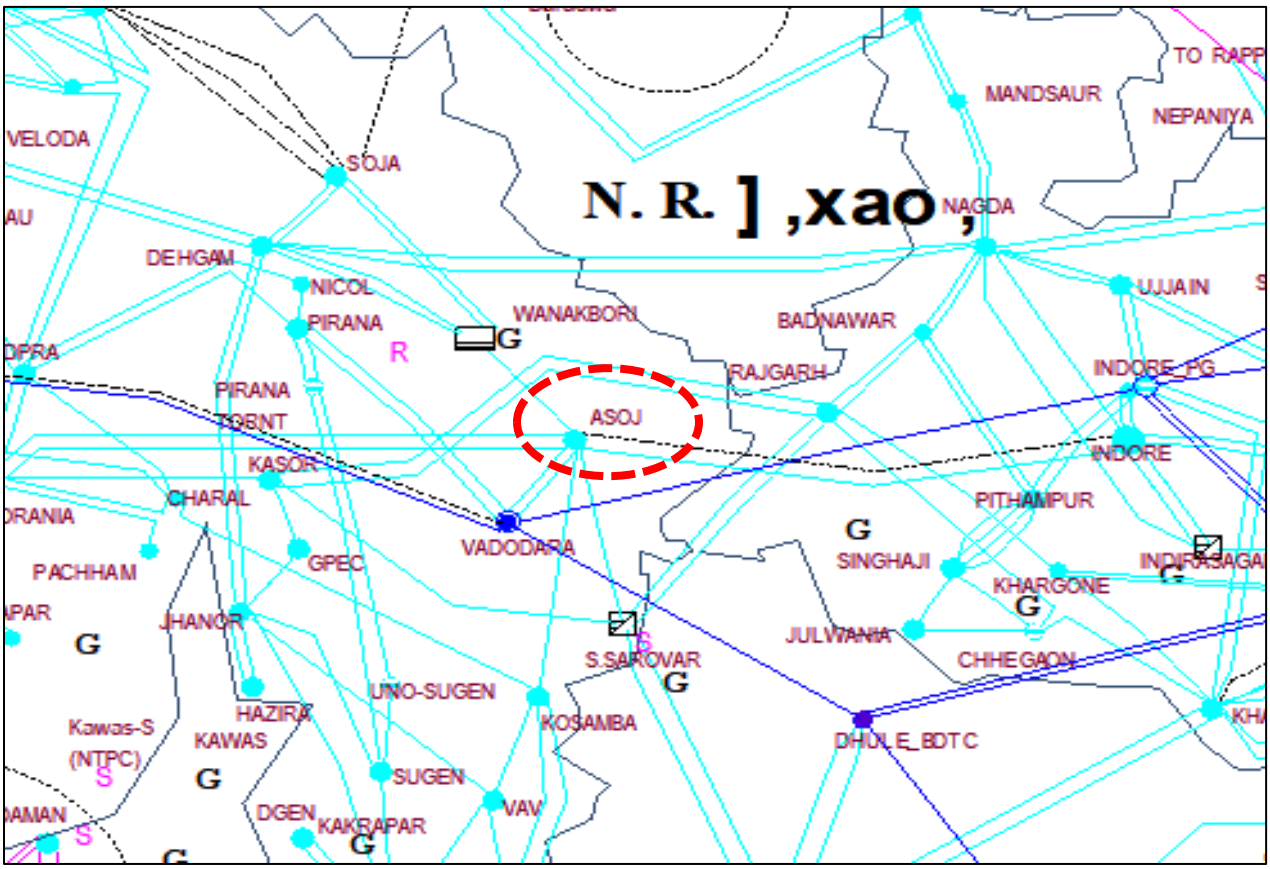


Figure 1. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰ सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Asoj	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	400kV Indore Line-2	14:52	87BB Zone-2 Trip & DT Send	DT Received	16:40
2	400kV Choraniya Line-2	14:52	87BB Zone-2 Trip & DT Send	DT Received	17:10
3	400kV Vadodara Line-2	14:52	87BB Zone-2 Trip & DT Send	DT Received	17:30
4	400/220kV,500MVA ICT-2	14:52	87BB Zone-2 Trip	Inter Trip	18:27
5	400/220kV,500MVA ICT-4	14:52	87BB Zone-2 Trip	Inter Trip	19:08
6	400kV Bus Coupler	14:52	87BB Zone-2 Trip	N.A.	09-08-2024/ 14:53

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

- From DR of 400kV Busbar Protection Scheme Central Unit, 400kV Main Bus-2 tripped under R-Ph to Earth fault. Refer **Annx 3A**.
- All 400kV Main Bus-2 elements including 400kV Bus Coupler tripped.
- Maximum Fault current recorded for 400kV Main Bus-2 R-Ph. to Earth fault was 43.95kA. Refer **Annx 3B**.
- 400kV Busbar Protection Scheme cleared the fault within 3 cycles.

- From DRs of 400kV Asoj-Kosamba line, overreaching of DPS schemes was observed at Kosamba end resulting in A/R operation. Even though line was connected to 400kV Main Bus-1 at 400kV Asoj End, A/R operated in R-phase from Remote end. Refer **Annx 3C**.

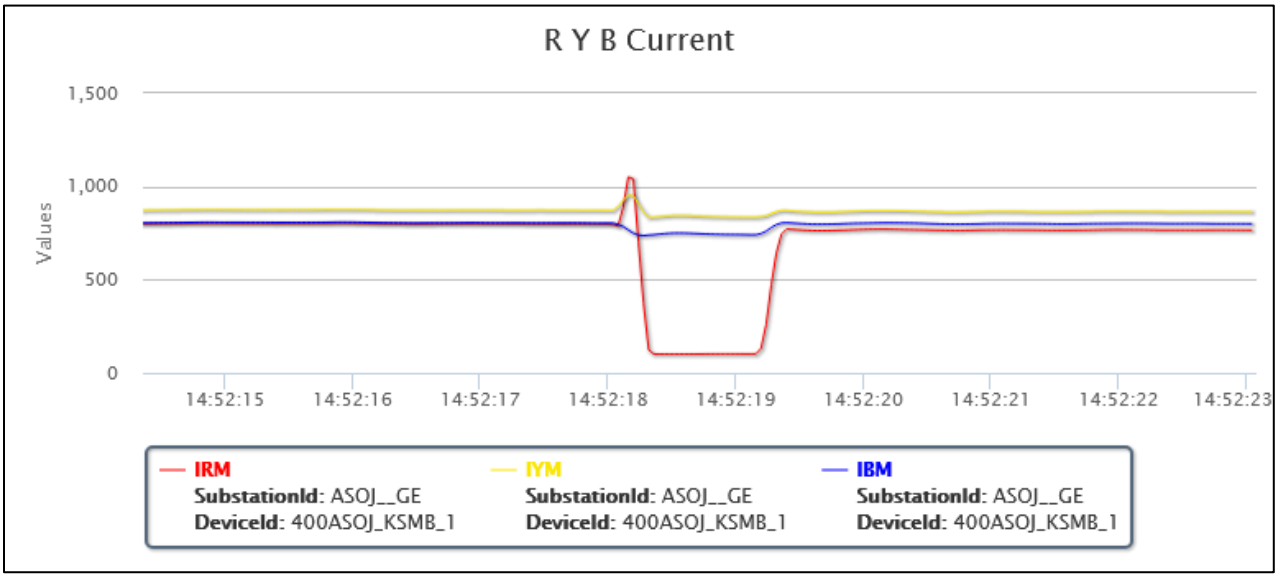


Figure 2. 400kV Asoj- Kosamba Current Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Undesirable operation of A/R at Kosamba end for 400 kV Asoj-Kosamba due to DPS over-reached.
- DR not time sync for 400 kV Asoj Vadodara-2 line at Asoj.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- DPS schemes will be kept under supervision by GETCO and if future occurrence observed of similar nature, Z1 Settings will be reduced to 75%.
- No physical cause of occurrence could be found by GETCO after switchyard inspection, thermovision scanning and PID. It is suspected that transient type of bus fault might have caused by any foreign object which was cleared (Burnt Out) during

Bus Fault or it is also possible that any R-phase silicon rubber insulator of 400kV Main Bus-2 might have flashed and regained its property later on.

- 400kV Main Bus-2 was charged from 400kV Choraniya Line-2 at 16:40 Hrs.
- 400kV Bus Coupler made ON at 17:10 Hrs.
- While taking 500MVA 400/220kV ICT-4 in service, it is observed that its 220kV side breaker Y-Pole was stuck-up. Hence ICT-4 was taken out from H.V side and again taken into service on 09-08-2024 at 14:53 Hrs after attending 220kV side CB mechanism problem.
- DR not time sync for 400 kV Asoj Vadodara-2 line at Asoj. GETCO may kindly resolve.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Undesirable operation of A/R at Kosamba end for 400 kV Asoj-Kosamba due to DPS over-reached.
2.	DR Time Synchronization Issues	IEGC section 17.3	DR of 400kV Asoj-Vadodara-2 line not time synced.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- Undesirable operation of A/R at Kosamba end for 400 kV Asoj-Kosamba due to DPS over-reached. DPS schemes will be kept under supervision by GETCO and if future occurrence observed of similar nature, Z1 Settings will be reduced to 75%.

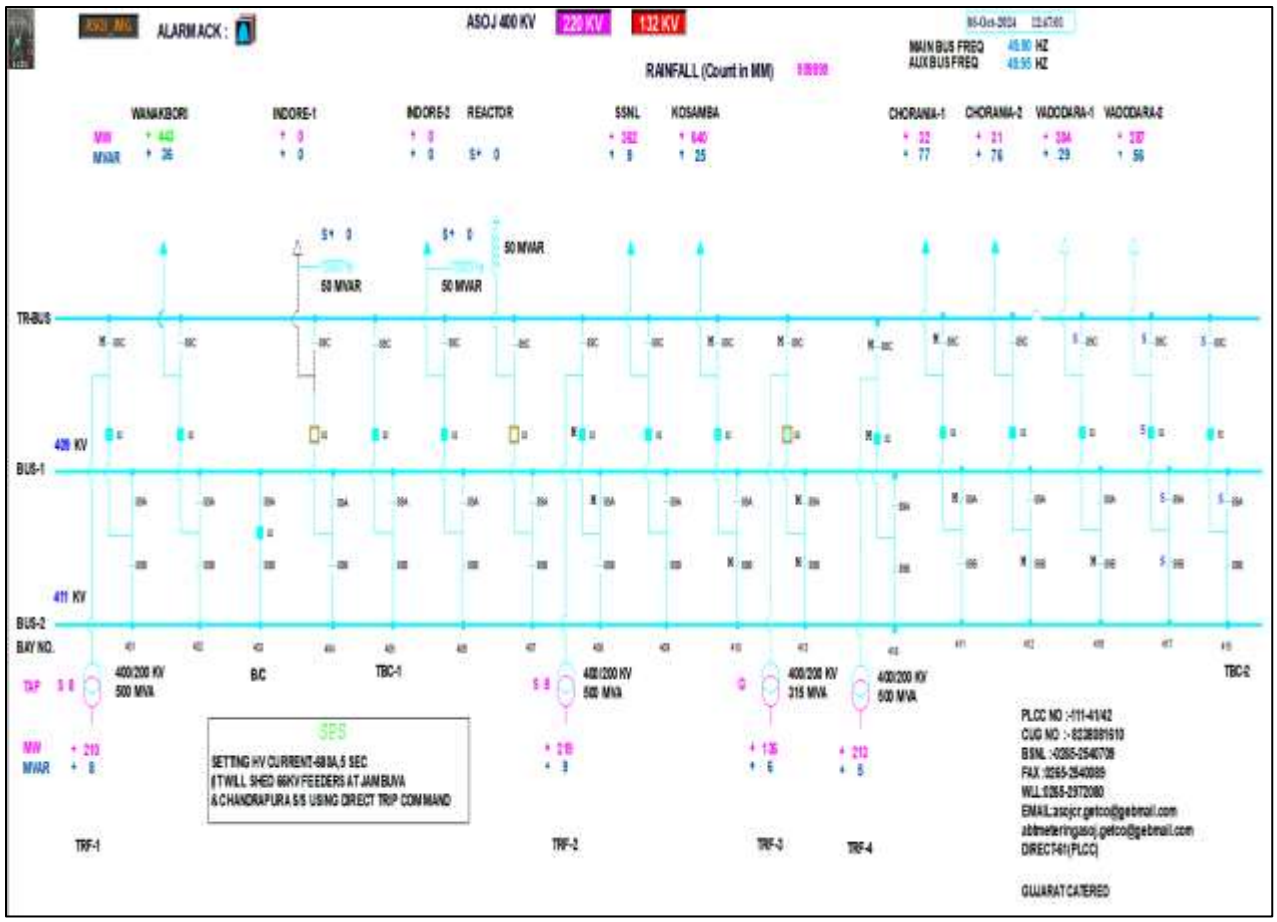
- No physical cause of occurrence could be found by GETCO after switchyard inspection, thermovision scanning and PID. It is suspected that transient type of bus fault might have caused by any foreign object which was cleared (Burnt Out) during Bus Fault or it is also possible that any R-phase silicon rubber insulator of 400kV Main Bus-2 might have flashed and regained its property later on.

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC- SOE not generated

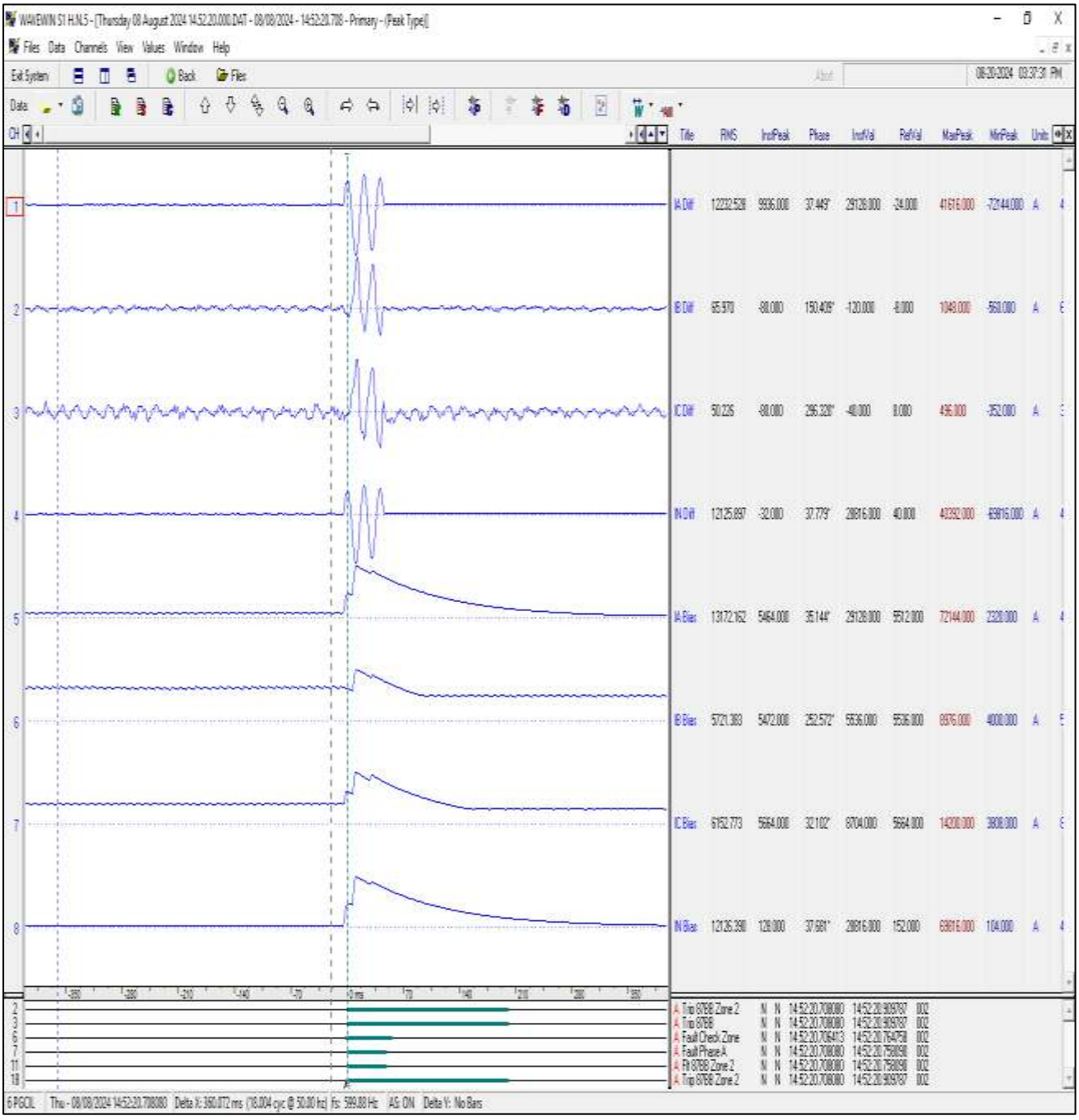
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Asoj SLD:

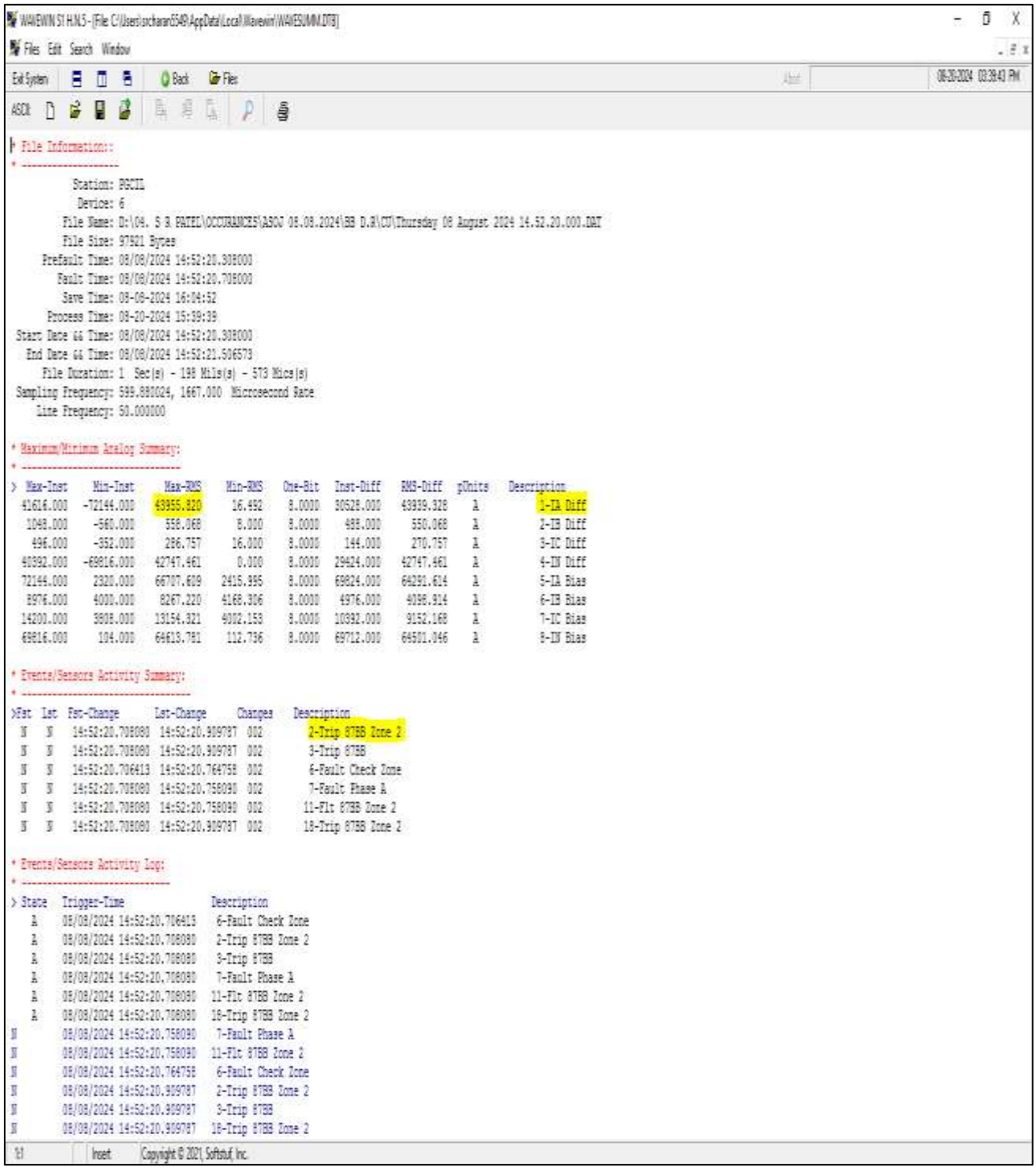


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Asoj Substation 08/08/2024 14:52 hrs		Busbar Zone-2 R-ph to Earth Fault	A
	Busbar Protection Scheme	BB CU P741	14:52.20 hrs	



	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Asoj Substation 08/08/2024 14:52 hrs	BB CU P741	Busbar Zone-2 R-ph to Earth Fault	B
	400kV Main Bus -2		Maximum Fault Current : 43.95kA.	



WAVEWIN ST H.N.3 - [File C:\Users\acharan0549\AppData\Local\Wavewin\WAVESUMM.DTB]

Files Edit Search Window

Exit System | Back | Files | 08-30-2024 03:39:43 PM

ASCII

File Information::

Station: PGCIL
Device: 6
File Name: D:\09. S B PATEL\OCCURRANCES\ASOJ 08.08.2024\BB D.R\CU\Thursday 08 August 2024 14.52.20.000.DAT
File Size: 97921 Bytes
Prefault Time: 08/08/2024 14:52:20.308000
Fault Time: 08/08/2024 14:52:20.708000
Save Time: 08-08-2024 16:04:52
Process Time: 08-30-2024 15:39:39
Start Date && Time: 08/08/2024 14:52:20.308000
End Date && Time: 08/08/2024 14:52:21.506573
File Duration: 1 Sec(s) - 198 Mils(s) - 573 Micx(s)
Sampling Frequency: 599.880024, 1667.000 Microsecond Rate
Line Frequency: 50.000000

* Maximum/Minimum Analog Summary:

> Max-Inst	Min-Inst	Max-RMS	Min-RMS	One-Bit	Inst-Diff	RMS-Diff	pUnits	Description
41616.000	-72144.000	43955.820	16.492	8.0000	30528.000	43939.328	A	1-IA Diff
1048.000	-560.000	558.068	8.000	8.0000	488.000	550.068	A	2-IB Diff
496.000	-352.000	286.757	16.000	8.0000	144.000	270.757	A	3-IC Diff
90392.000	-69816.000	42747.461	0.000	8.0000	29424.000	42747.461	A	4-IN Diff
72144.000	2320.000	66707.609	2416.995	8.0000	69824.000	64291.614	A	5-IA Bias
8976.000	4000.000	8267.220	4168.306	8.0000	4976.000	4098.914	A	6-IB Bias
14200.000	3808.000	13154.321	4002.153	8.0000	10392.000	9152.168	A	7-IC Bias
69816.000	104.000	69613.781	112.736	8.0000	69712.000	69501.046	A	8-IN Bias

* Events/Sensors Activity Summary:

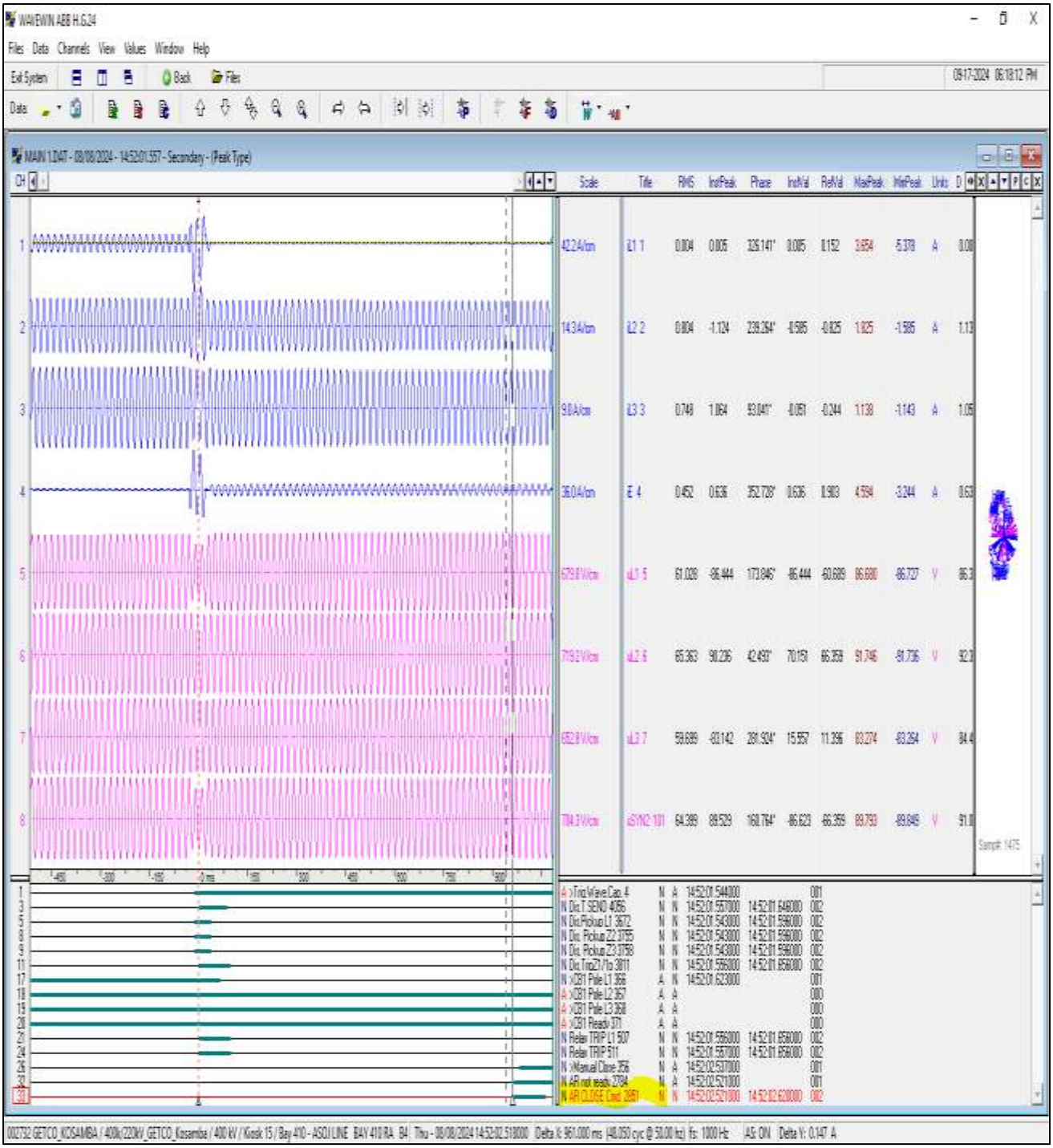
>Pat	Int	Pat-Change	Int-Change	Changes	Description
N	N	14:52:20.708080	14:52:20.909787	002	2-Trip 87BB Zone 2
N	N	14:52:20.708080	14:52:20.909787	002	3-Trip 87BB
N	N	14:52:20.706413	14:52:20.764758	002	6-Fault Check Zone
N	N	14:52:20.708080	14:52:20.758090	002	7-Fault Phase A
N	N	14:52:20.708080	14:52:20.758090	002	11-Flt 87BB Zone 2
N	N	14:52:20.708080	14:52:20.909787	002	18-Trip 87BB Zone 2

* Events/Sensors Activity Log:

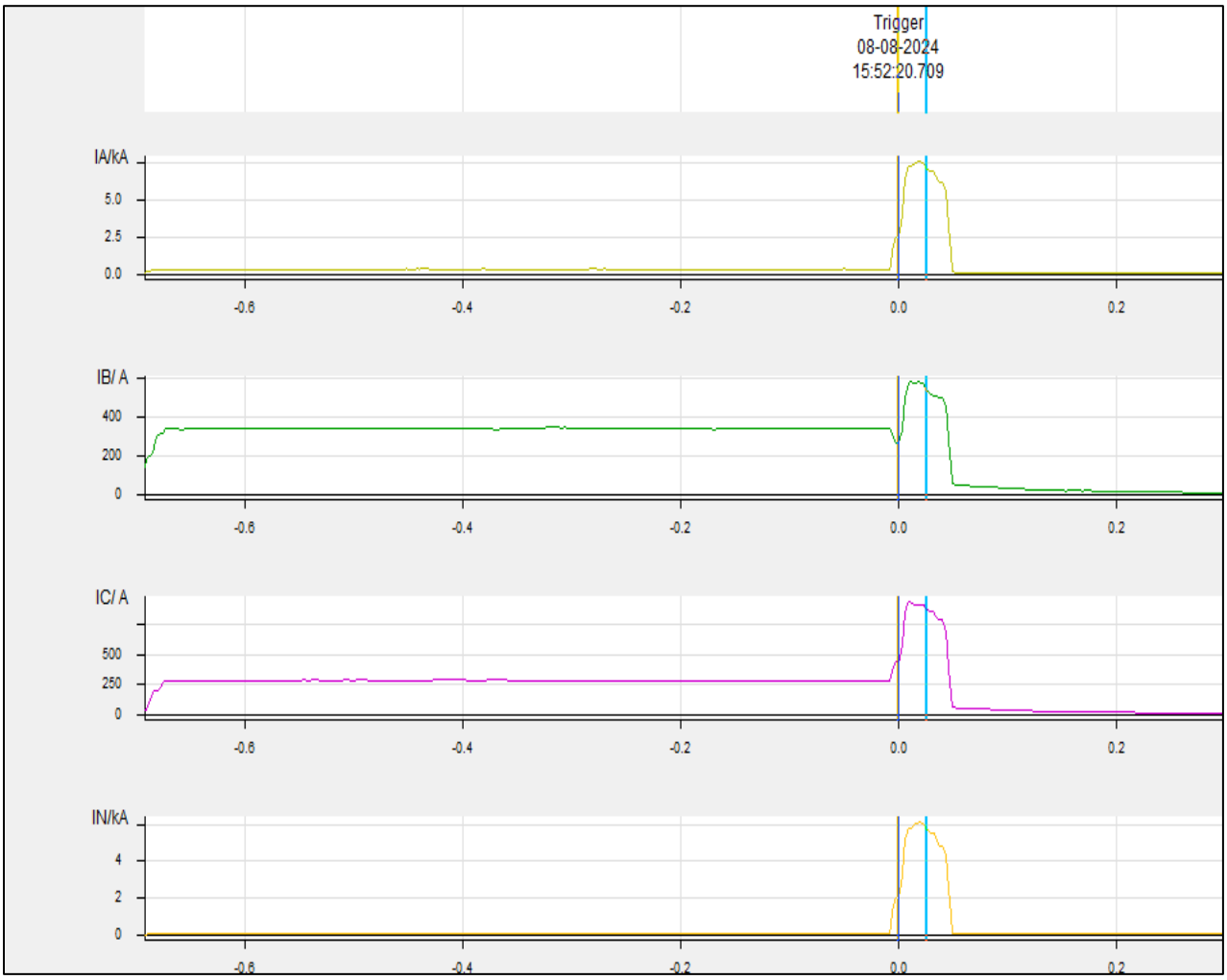
> State	Trigger-Time	Description
A	08/08/2024 14:52:20.706413	6-Fault Check Zone
A	08/08/2024 14:52:20.708080	2-Trip 87BB Zone 2
A	08/08/2024 14:52:20.708080	3-Trip 87BB
A	08/08/2024 14:52:20.708080	7-Fault Phase A
A	08/08/2024 14:52:20.708080	11-Flt 87BB Zone 2
A	08/08/2024 14:52:20.708080	18-Trip 87BB Zone 2
N	08/08/2024 14:52:20.758090	7-Fault Phase A
N	08/08/2024 14:52:20.758090	11-Flt 87BB Zone 2
N	08/08/2024 14:52:20.764758	6-Fault Check Zone
N	08/08/2024 14:52:20.909787	2-Trip 87BB Zone 2
N	08/08/2024 14:52:20.909787	3-Trip 87BB
N	08/08/2024 14:52:20.909787	18-Trip 87BB Zone 2

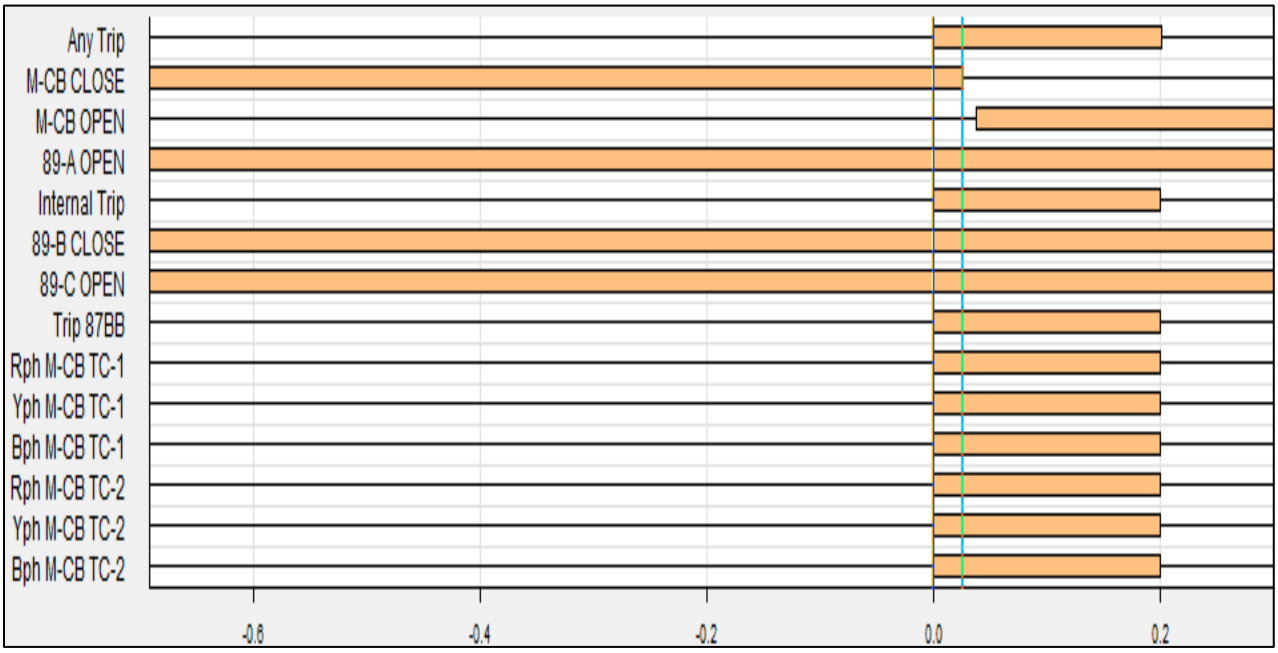
1:1 | Insert | Copyright © 2021 Softstuf, Inc.

	OCCURRENCE DETAIL	RELAY TYPE	DR ANALYSIS / CONCLUSION	DR NO.
	400kV Asoj Substation 08/08/2024 14:52 hrs	BB PU P743	400kV Kosamba Line [On 400kV Bus-1]	C
	400kV Main Bus -2		DPS Over Reached and A/R operated from Kosamba End.	

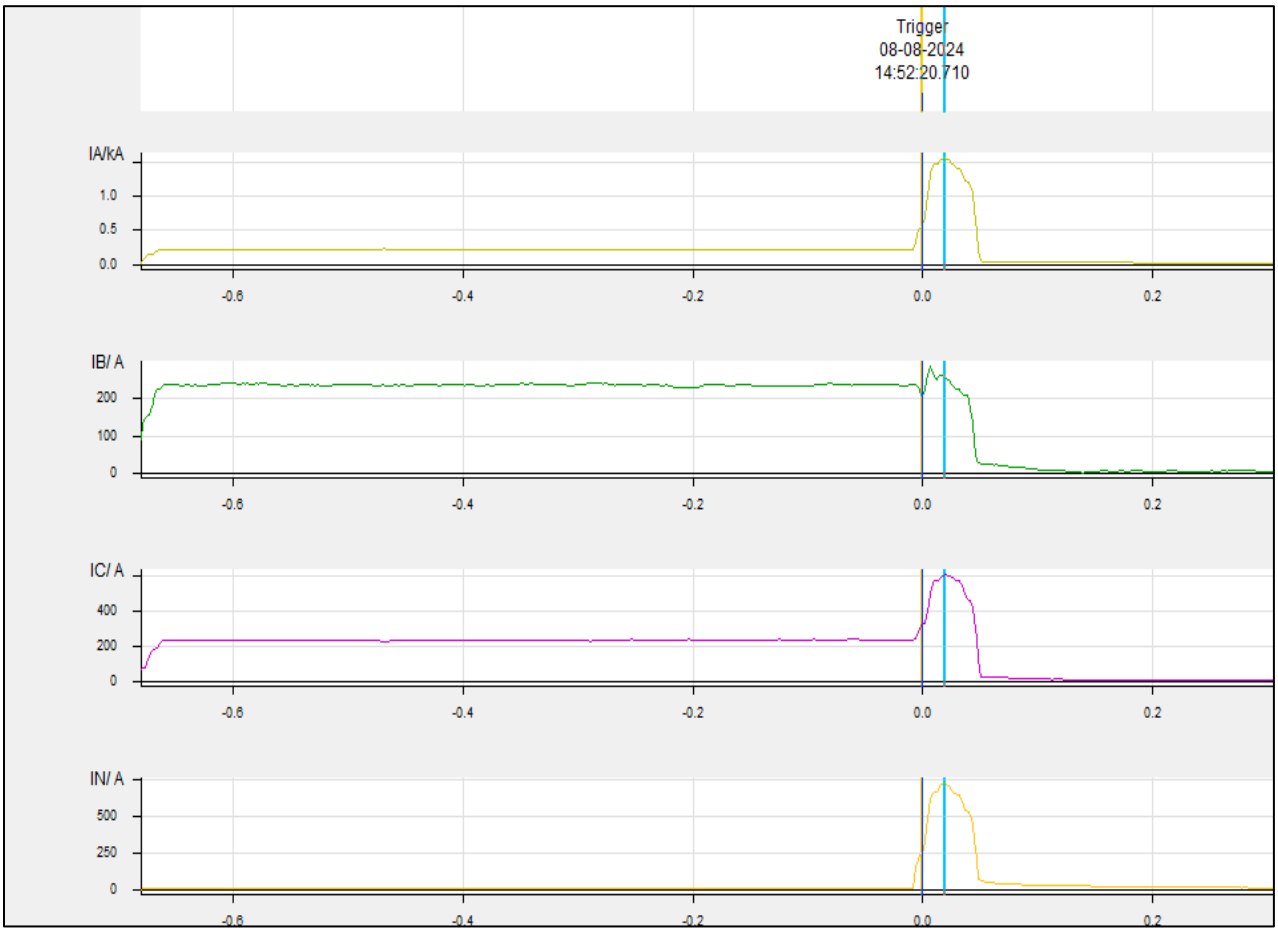


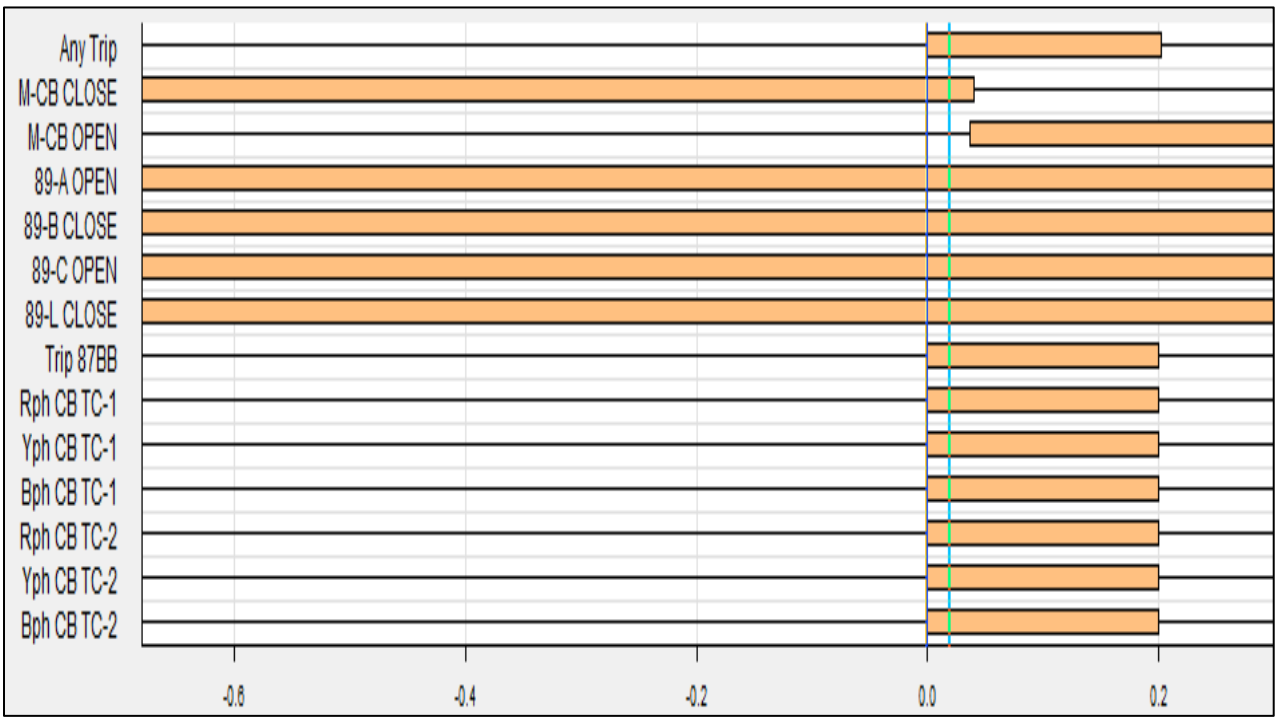
A. DR of 400 kV Asoj-Vadodra-2 line from Asoj end



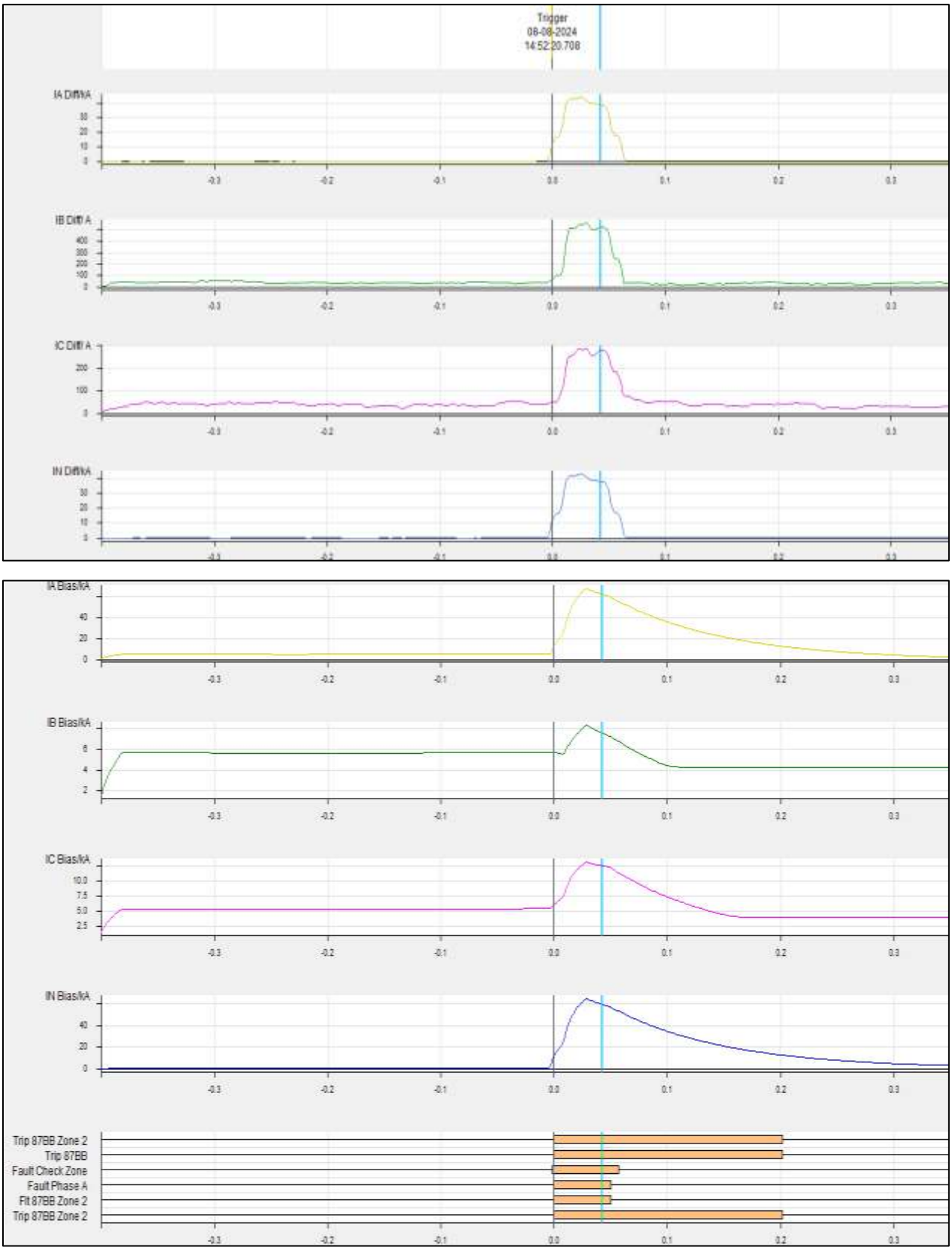


B. DR of 400 kV ASOJ-INDORE-2 line from Asoj end

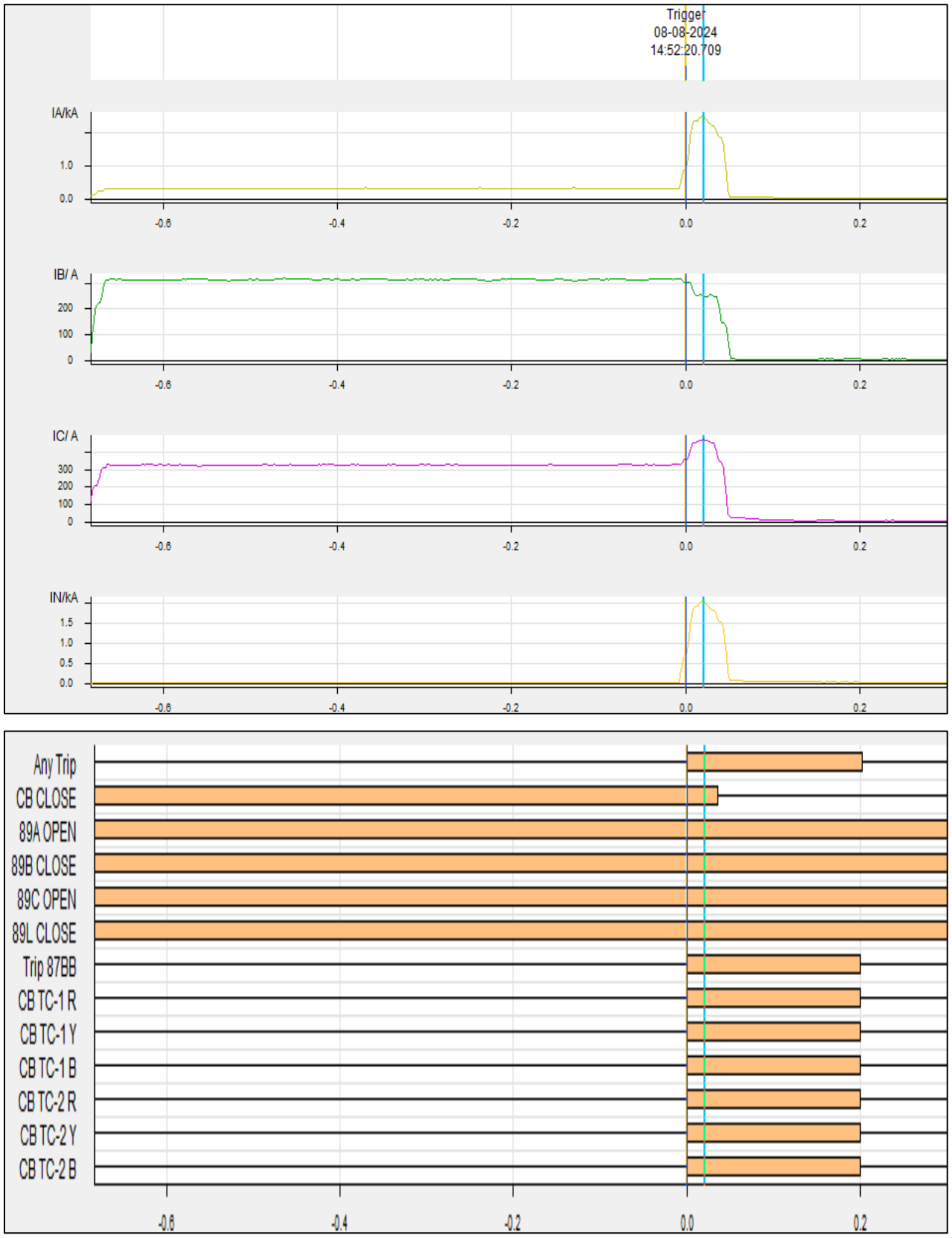




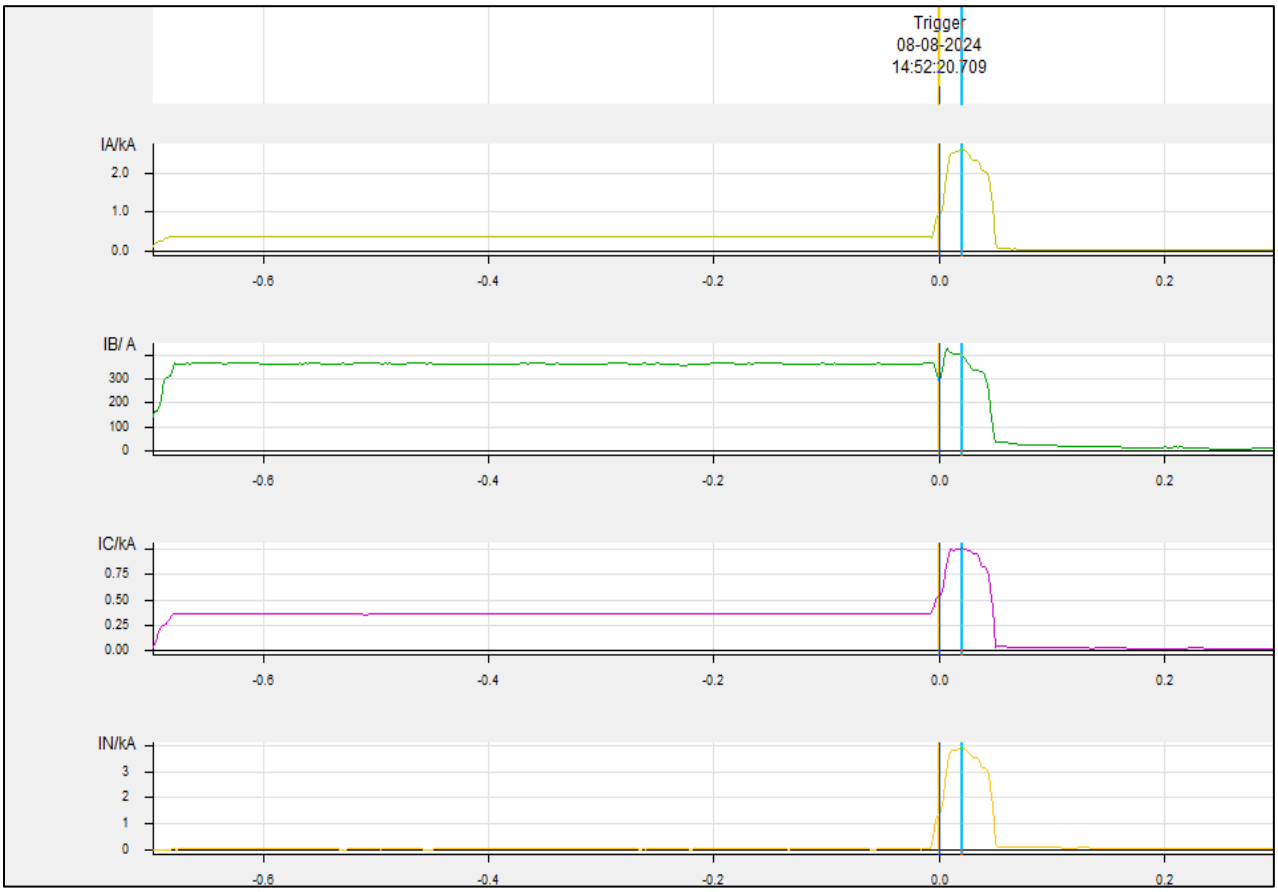
C. DR of 400 kV Asoj Bus 2 from Asoj end

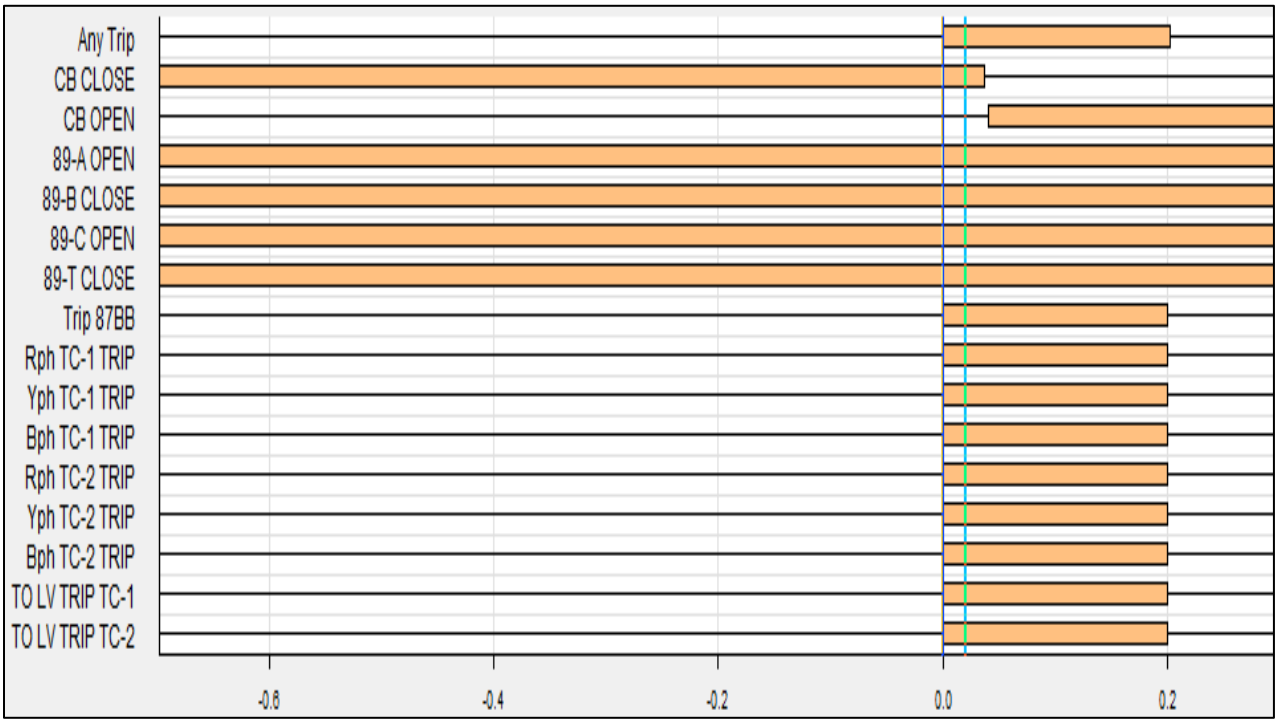


D. DR of 400 kV ASOJ- CHORANIA-II line from Asoj end

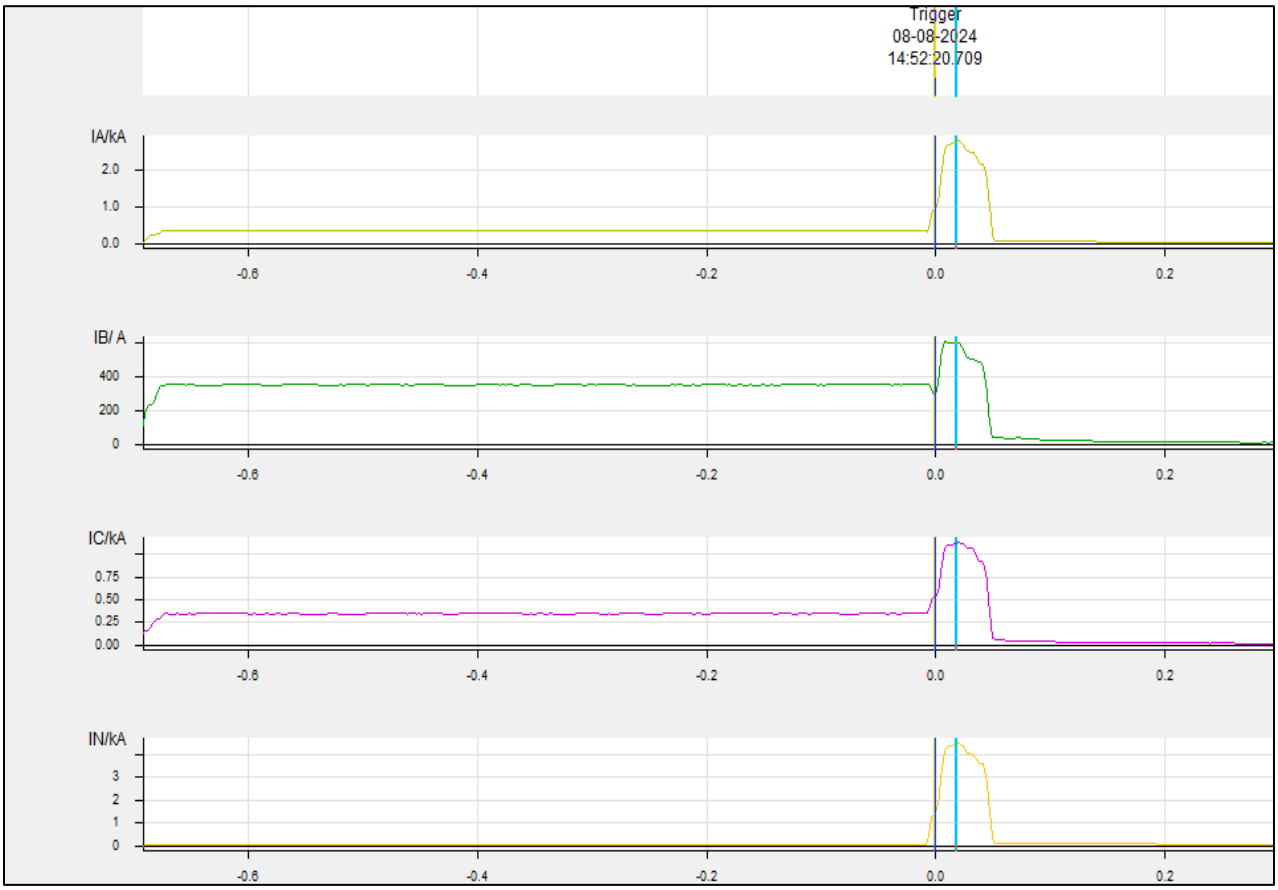


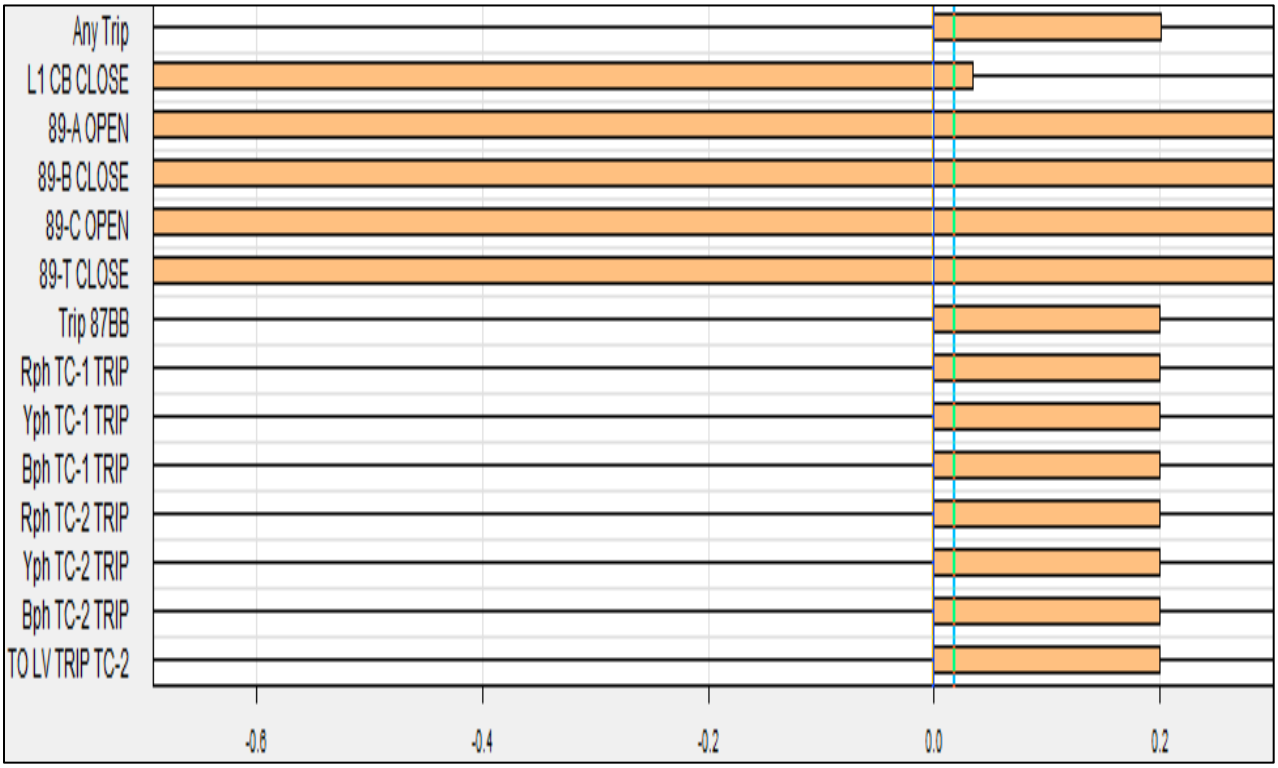
E. DR of ASOJ ICT-2 from Asoj end





F. DR of ASOJ(GETCO) 500MVA ICT-IV





अनुलग्नक-4 / Annexure-D: Site photographs – Nil

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 400 के°वी° काकरापार(3&4) (एनपीसीआईएल) उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400 kV Kakrapar(3&4) (NPCIL) Substation of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 25-10-2024

1. **घटना का सारांश / Event Summary**: At 06:50 hrs / 03-09-2024, 400 kV Kakrapar(3&4)-Navsari-ckt-1 tripped on R-E fault at 400 kV Navsari end. Simultaneously, at 400 kV Kakrapar(3&4), 400 kV Kakrapar(3&4)-Navsari-ckt-1 and 400 kV Kakrapar(3&4)-Bus2 tripped on LBB protection operation. As seen from PMU plot, fault did not persist for 200 msec, hence LBB protection operation was not in-order.

   As informed by Kakrapar(3&4), the operation of LBB relay was not as per intent. The LBB current element is set at 20 % of CT primary = 20 % of 2000 A = 400 A with a time delay of 200 millisecond.

   During R-E fault on 400 kV Kakrapar(3&4)-Navsari-ckt-1 at 06:50 Hrs, R phase fault got cleared in 95 milliseconds. However, due to relay's internal CB fail element logic issue, by seeing the other 2 phases (Y&B phases) current more than the set value, the relay has initiated LBB trip after 200 milliseconds of LBB initiation.

At 07:03 hrs / 03-09-2024, during the outage of 400 kV Kakrapar(3&4)-Navsari-1 (forced outage from 06:50hrs/03.09.2024), loading on 400 kV Kakrapar(3&4)-Navsari-ckt-2 was around 1400 A and Y-Phase dropper melted at KAPS (3&4). 400 kV Kakrapar(3&4)-Navsari-ckt-2 tripped on TEE-protection. As informed by NPCIL Kakrapar, 400 kV Kakrapar(3&4)-GT-4 R-phase DS jumper also melted during the event and Turbine-3 tripped due to power swing during the disturbance, resulting in trippings of Kakrapar(3&4)-Unit-4&3 (700 MW each) respectively. As informed by NPCIL, fire was observed in the swithcyard.

Generation loss of 1267 MW occurred at Kakrapar(3&4) Nuclear Power Plant due the event.

2. घटना का समय और दिनांक / Time and Date of the Event : Incident1: 06:50 hrs / 03-09-2024

Incident2: 07:03 hrs / 03-09-2024

3. ग्रिड घटना का प्रकार / Event Category : Grid Incident (GI)-2

4. स्थान/नियंत्रण क्षेत्र / Location/Control Area : Kakrapar(3&4), NPCIL, Gujarat

5. पूर्ववर्ती स्थिति / Antecedent Conditions :

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
Incident1: 06:50 hrs / 03-09-2024					
घटना के पूर्व Pre Event	49.95	60893	55006	6016	14172
घटना के बाद Post Event	50.00	60072	55003	6009	14252
Incident2: 07:03 hrs / 03-09-2024					
घटना के पूर्व Pre Event	50.05	60071	55361	5996	14354
घटना के बाद Post Event	50.03	59697	55456	5988	14391

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Clear

6. **लोड और जेनरेशन हानि / Load and Generation loss:** Generation loss of **1267 MW** occurred at Kakrapar(3&4) Nuclear Power Plant, NPCIL
7. **रुकावट की अवधि / Duration of interruption:** 02 Hours 52 Minutes (Time of revival of first element)

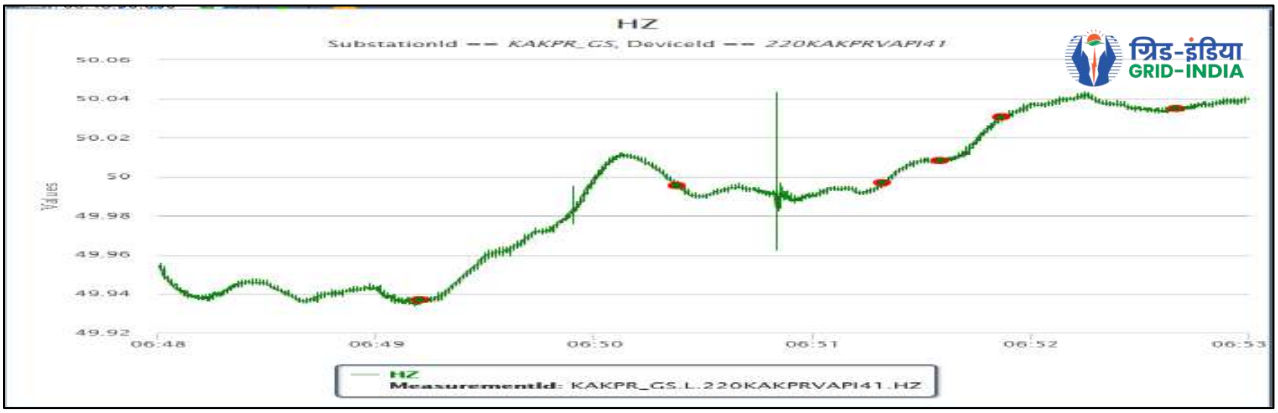


Figure 1. PMU Frequency Plot (220 kV Kakrapar-Vapi-1) Incident1: 06:50 hrs / 03-09-2024

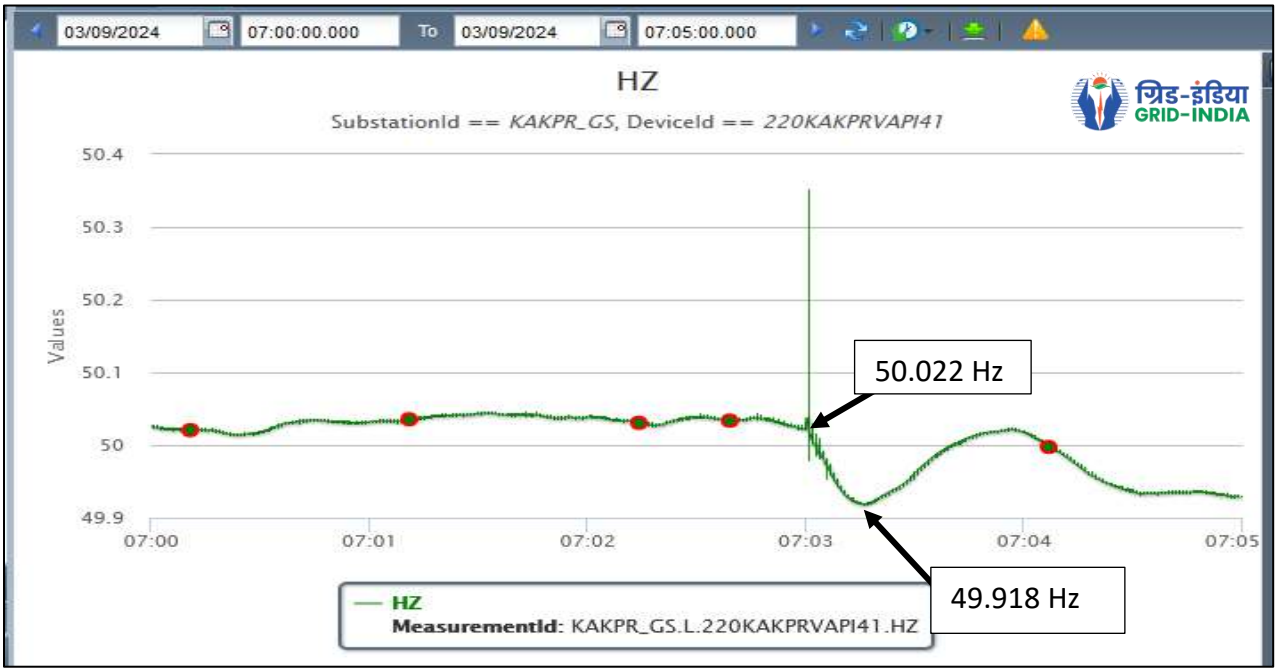


Figure 2. PMU Frequency Plot (220 kV Kakrapar-Vapi-1) Incident2: 07:03 hrs / 03-09-2024

8. प्रभावित क्षेत्र का नक्शा / Network across the affected area

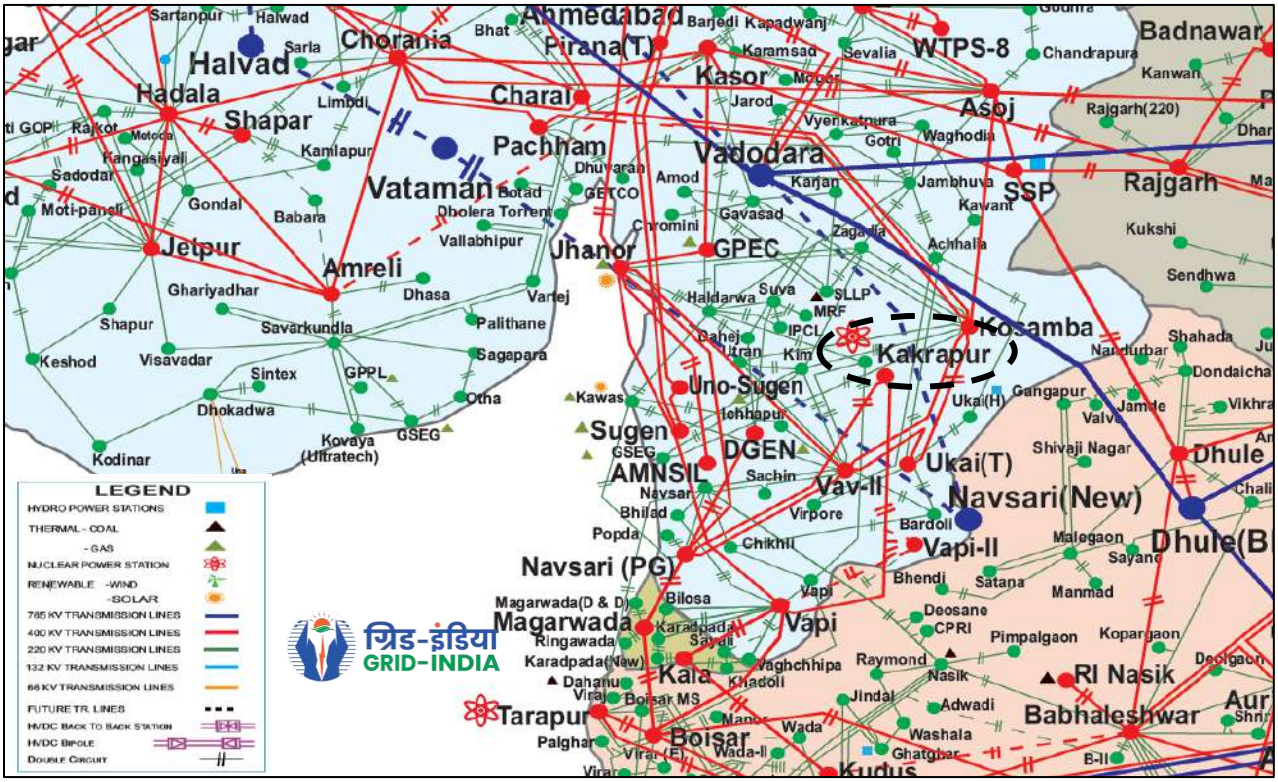


Figure 3. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time (All on 18-03-2024)
Incident1: 06:50 hrs / 03-09-2024					
1.	400 kV Kakrapar(3&4)-Bus2	06:50:50.114	LBB operation	Not Applicable	11:27
2.	400 kV Kakrapar(3&4)-Navsari-1	06:50:49.828	Z-1 Operation on R-E fault	DT received	11:27

Incident2: 07:03 hrs / 03-09-2024					
1.	400 kV Kakrapar(3&4)-Navsari-2	07:03:00.310	DT received	DT received	18:57
2.	Kakrapar(3&4)-Unit-3 (700 MW)	07:03	DRs not provided by NPCIL Kakrapar(3&4)	DRs not provided by NPCIL Kakrapar(3&4)	19:26
3.	Kakrapar(3&4)-Unit-4 (700 MW)	07:03	DRs not provided by NPCIL Kakrapar(3&4)	DRs not provided by NPCIL Kakrapar(3&4)	17:29

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

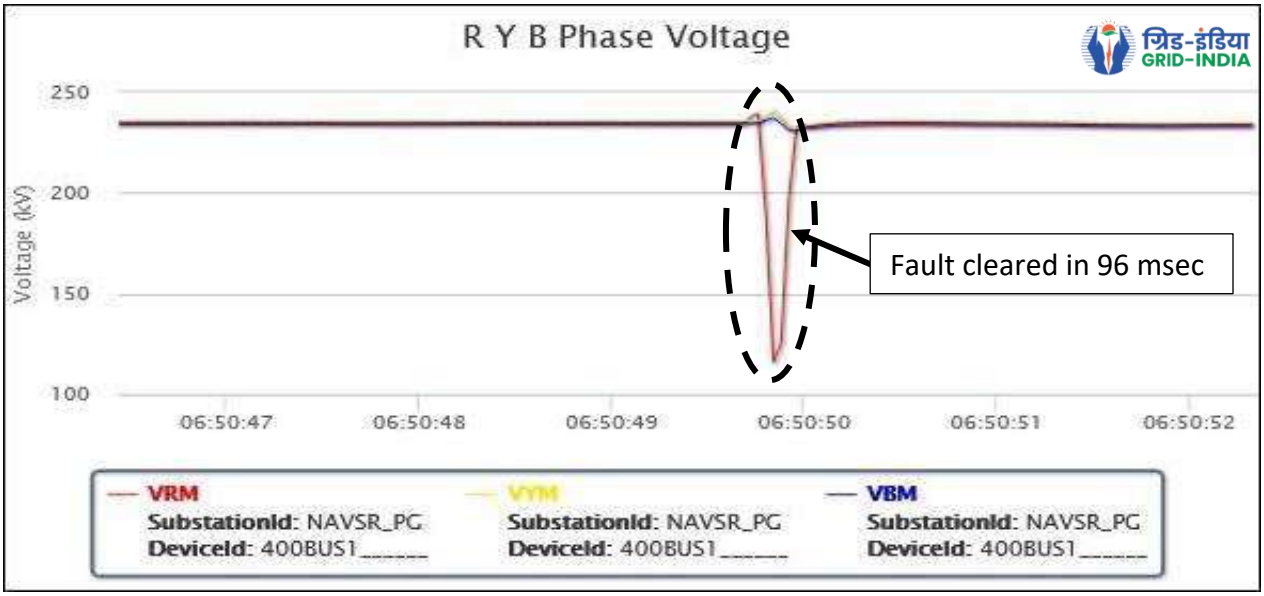


Figure 4. PMU Voltage Plot (400 kV Navsari(PG)-Bus-1)

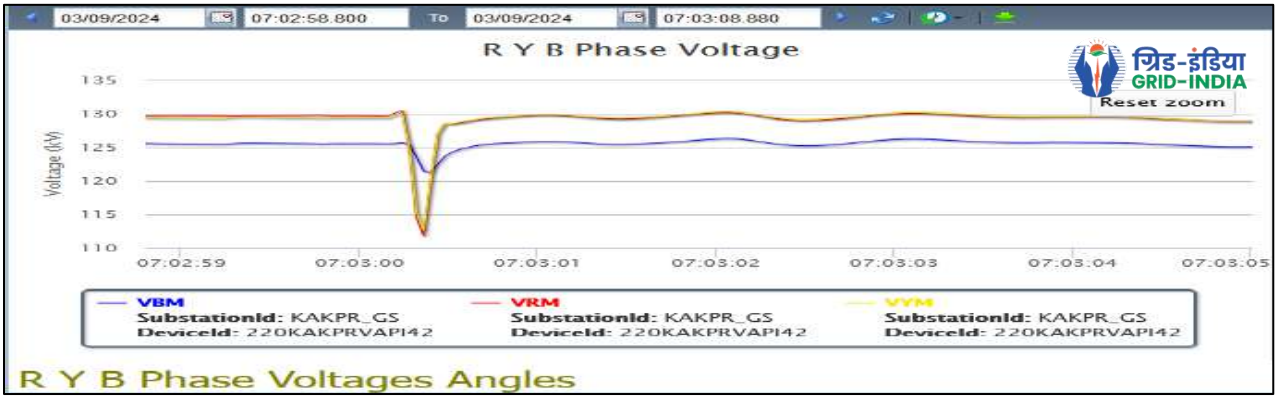


Figure 5. PMU Voltage Plot (220 kV Kakrapar-Vapi-2)

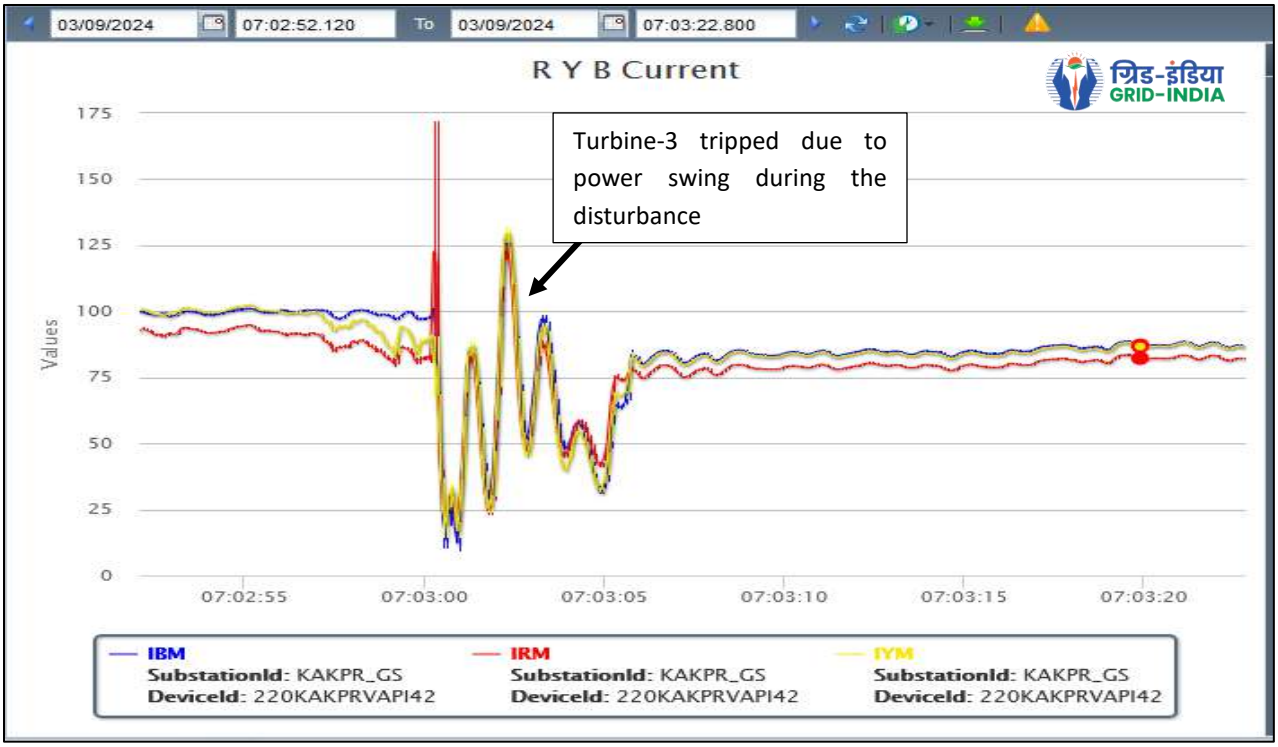


Figure 6. PMU Current Plot (220 kV Kakrapar-Vapi-2)

12. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	उपयोगकर्ता Utilities	टिप्पणी Remarks
1.	DR/EL not uploaded in 24 Hrs	IEGC section 37.2 (c)	NPCIL Kakrapar(3&4)	DRs received after 24 hours DRs of units not submitted by NPCIL
2.	Flash Report received after 8hrs	IEGC section 37.2 (b)	NPCIL Kakrapar(3&4)	Report not received
3.	Detailed report received after 7 days	IEGC section 37.2 (e)	NPCIL Kakrapar(3&4)	Report received after 7 days

13. प्रमुख अधिगम बिंदु / Protection and Operational issues observed:

- 400 kV Kakrapar(3&4)-Navsari-1 and 400 kV Kakrapar(3&4)-Bus2 tripped on LBB protection operation, even though the fault got cleared within 96 msec

14. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Following are the corrective Actions taken by KAPS(3&4)
    a. The internal CB fail element that caused the incorrect tripping has been disabled.
    b. The PSL (Programmable Scheme Logic) has been modified, and the LBB scheme is now implemented solely via the PSL, ensuring that tripping will only occur when the current in the corresponding phase is detected, rather than in the other two phases.
    c. These modifications have been implemented in all LBB relays at KAPS-3&4 by NPCIL

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- The implementation logic for the LBB (Local Breaker Backup) scheme has been modified across all LBB relays to enhance system reliability. This adjustment aims to prevent mal operation during future fault conditions.

-x-x-x-x-x-

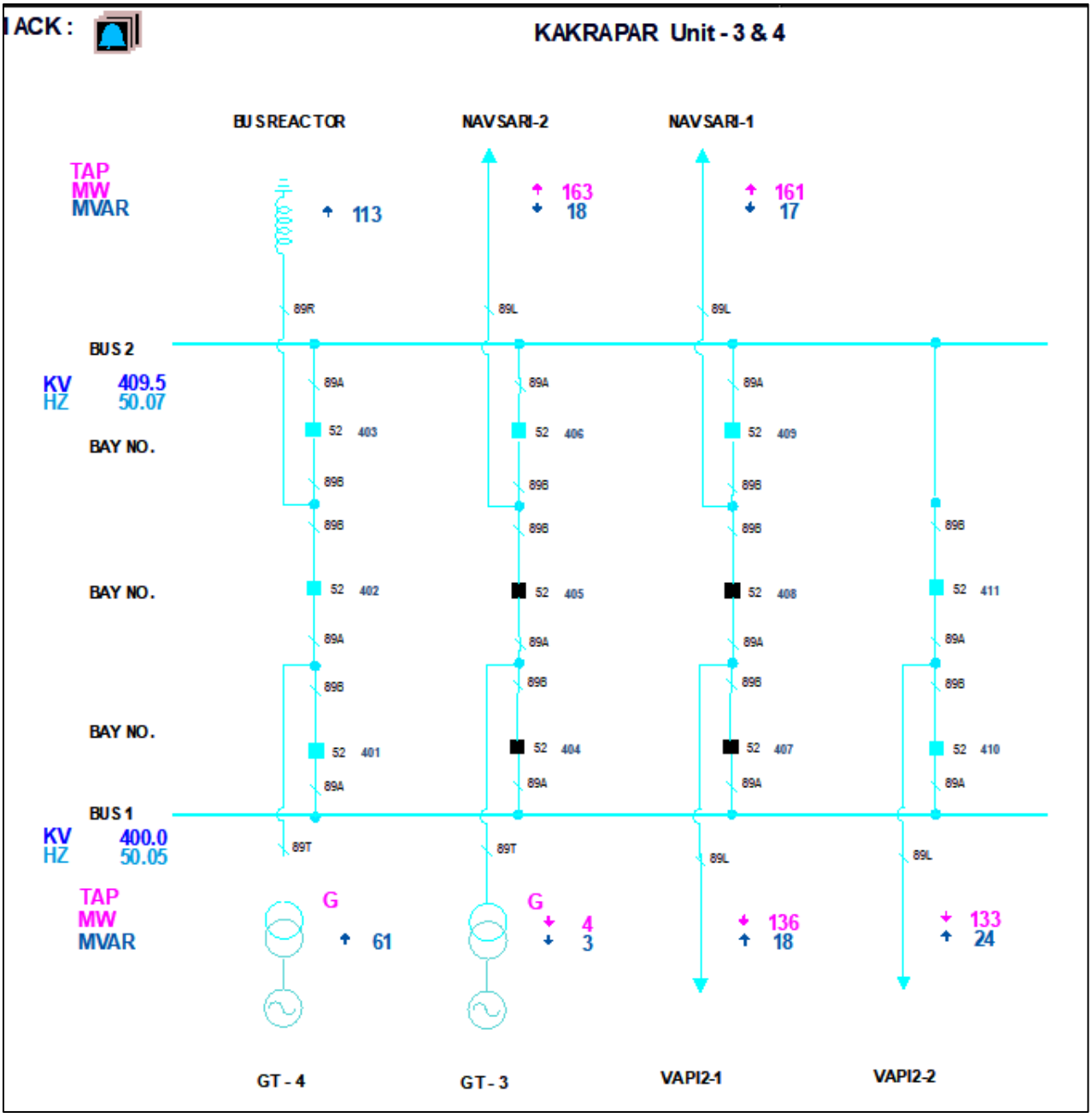
विजय कुमार कोडाली Vijay Kumar Kodali
उप महाप्रबंधक Deputy General Manager
प्रणाली प्रचालन System Operation

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA

Area	CATEGORY	LOCATION	TEXT	hh:mm:ss	ms
Incident1: 06:50 hrs / 03-09-2024					
WRLDC	400-SOE	KAP34_GS	KAPS 34 TPS CB REACTOR CB 40352 NORMAL	06:48:18	607
WRLDC	400-SOE	KAP34_GS	KAPS 34 TPS CB 40652 (NAVSR-2) NORMAL	06:48:18	607
WRLDC	400-SOE	KAP34_GS	KAPS 34 TPS CB TIE 08 - CB 40852 NORMAL	06:48:18	607
WRLDC	400-SOE	KAP34_GS	KAPS 34 TPS CB 40952 (NAVSR-1) NORMAL	06:48:18	607
WRLDC	400-SOE	KAP34_GS	KAPS 34 TPS CB TIE 11 - CB 41152 NORMAL	06:48:18	607
WRLDC	400-SOE	KAP34_GS	KAPS 34 TPS LINE 400Kv LINE 1 to NAVSR ACTED	06:48:18	734
WRLDC	400KV-CB	KAP34_GS	KAPS 34 TPS CB REACTOR CB 40352 OPEN	06:48:18	607
WRLDC	400KV-CB	KAP34_GS	KAPS 34 TPS CB 40652 (NAVSR-2) OPEN	06:48:18	607
WRLDC	400KV-CB	KAP34_GS	KAPS 34 TPS CB TIE 08 - CB 40852 OPEN	06:48:18	607
WRLDC	400KV-CB	KAP34_GS	KAPS 34 TPS CB 40952 (NAVSR-1) OPEN	06:48:18	607
WRLDC	400KV-CB	KAP34_GS	KAPS 34 TPS CB TIE 11 - CB 41152 OPEN	06:48:18	607
WRLDC	400KV-CB	NAVSR_PG	NAVSARI CB 41352 (KAP34-1) OPEN	06:50:50	191

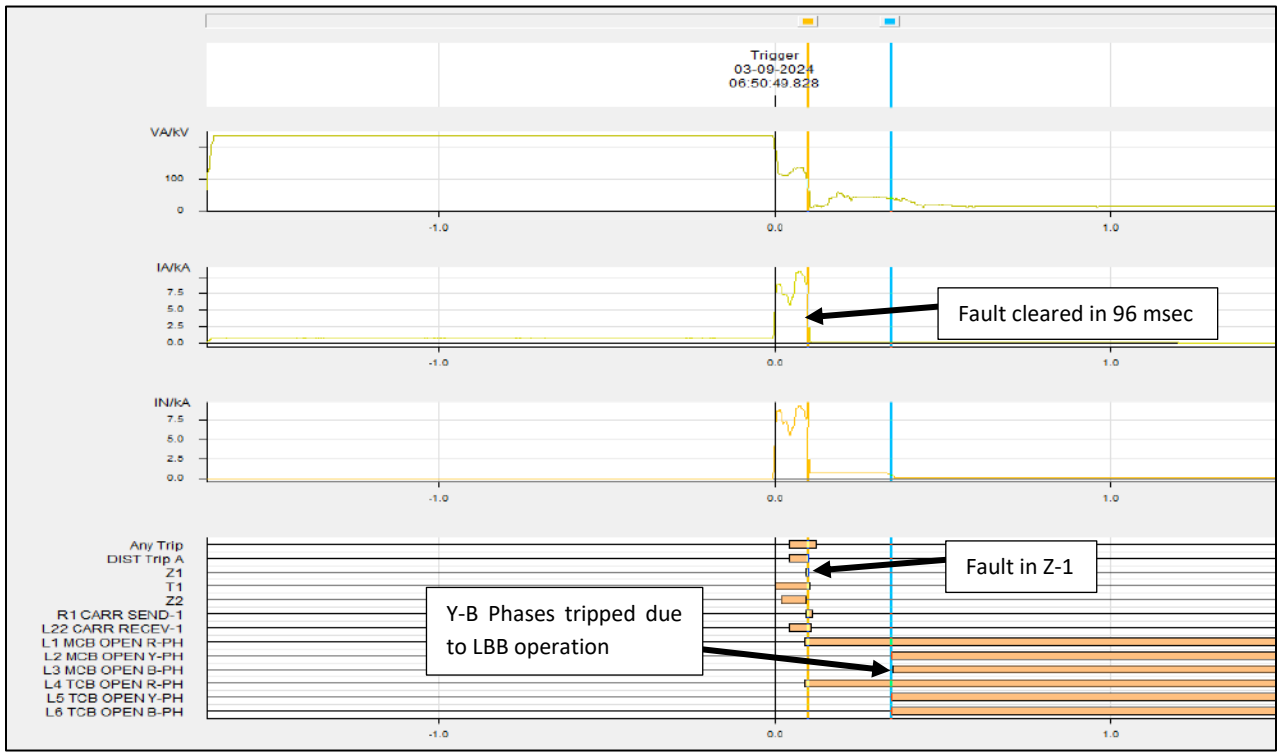
Area	CATEGORY	LOCATION	TEXT	hh:mm:ss	ms
Incident2: 07:03 hrs / 03-09-2024					
WRLDC	KAP34_GS	KAPS 34 TPS CB TIE 05 - CB 40552 NORMAL	07:00:28	780	WRLDC
WRLDC	KAP34_GS	KAPS 34 TPS LINE 400Kv LINE 2 to NAVSR ACTED	07:00:28	922	WRLDC
WRLDC	KAP34_GS	KAPS 34 TPS LINE 400Kv LINE 2 to NAVSR ACTED	07:00:28	922	WRLDC
WRLDC	KAP34_GS	KAPS 34 TPS CB TIE 05 - CB 40552 OPEN	07:00:28	780	WRLDC
WRLDC	KAP34_GS	KAPS 34 TPS CB CB 40152 (G4) NORMAL	07:00:34	115	WRLDC
WRLDC	KAP34_GS	KAPS 34 TPS CB TIE 02 - CB 40252 NORMAL	07:00:34	115	WRLDC
WRLDC	KAP34_GS	KAPS 34 TPS CB CB 40152 (G4) OPEN	07:00:34	115	WRLDC
WRLDC	KAP34_GS	KAPS 34 TPS CB TIE 02 - CB 40252 OPEN	07:00:34	115	WRLDC
WRLDC	NAVSR_PG	NAVSARI CB 41252 (KAP34-2) OPEN	07:03:00	390	WRLDC

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

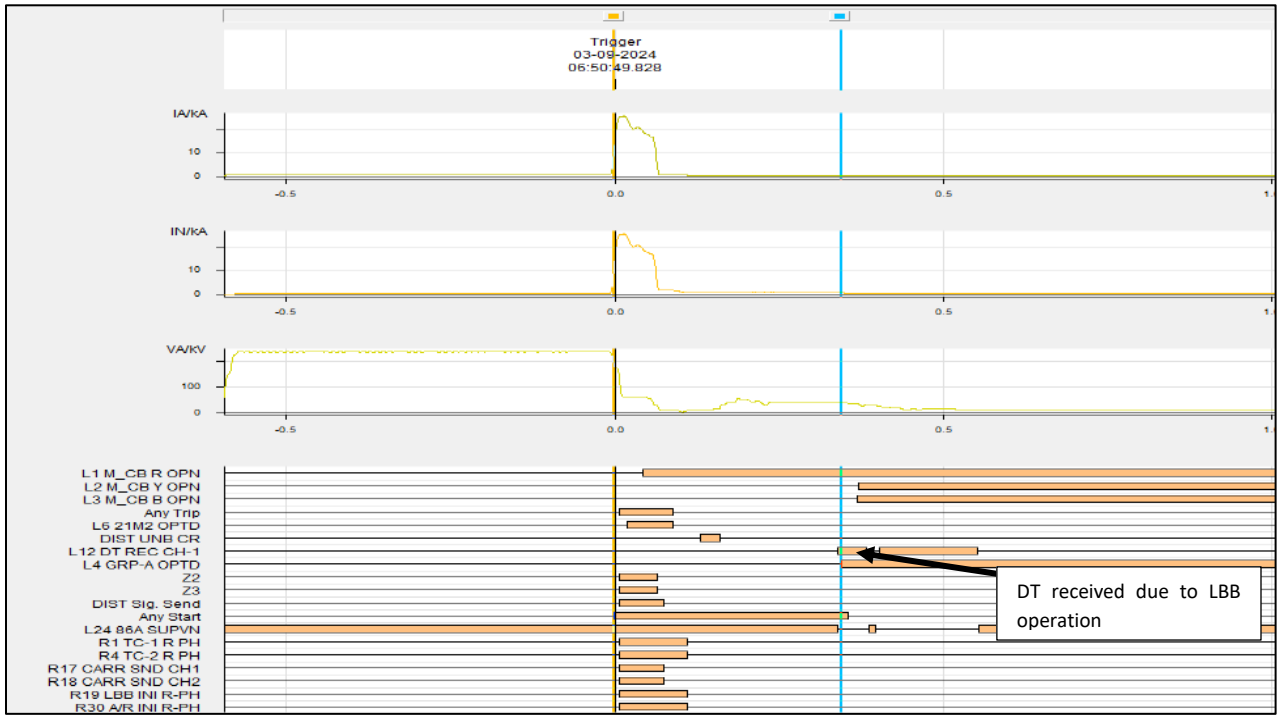


अनुलग्नक-3 / Annexure-3: Disturbance recorder

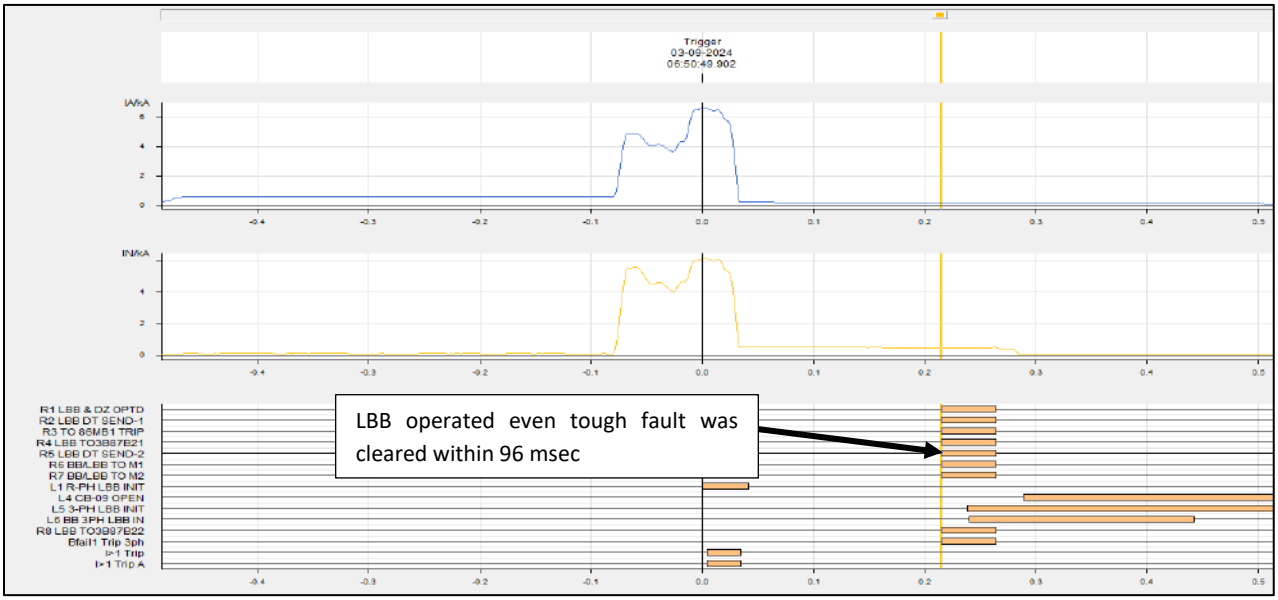
400 kV Kakrapar(3&4)-Navsari-1 DR at Kakrapar



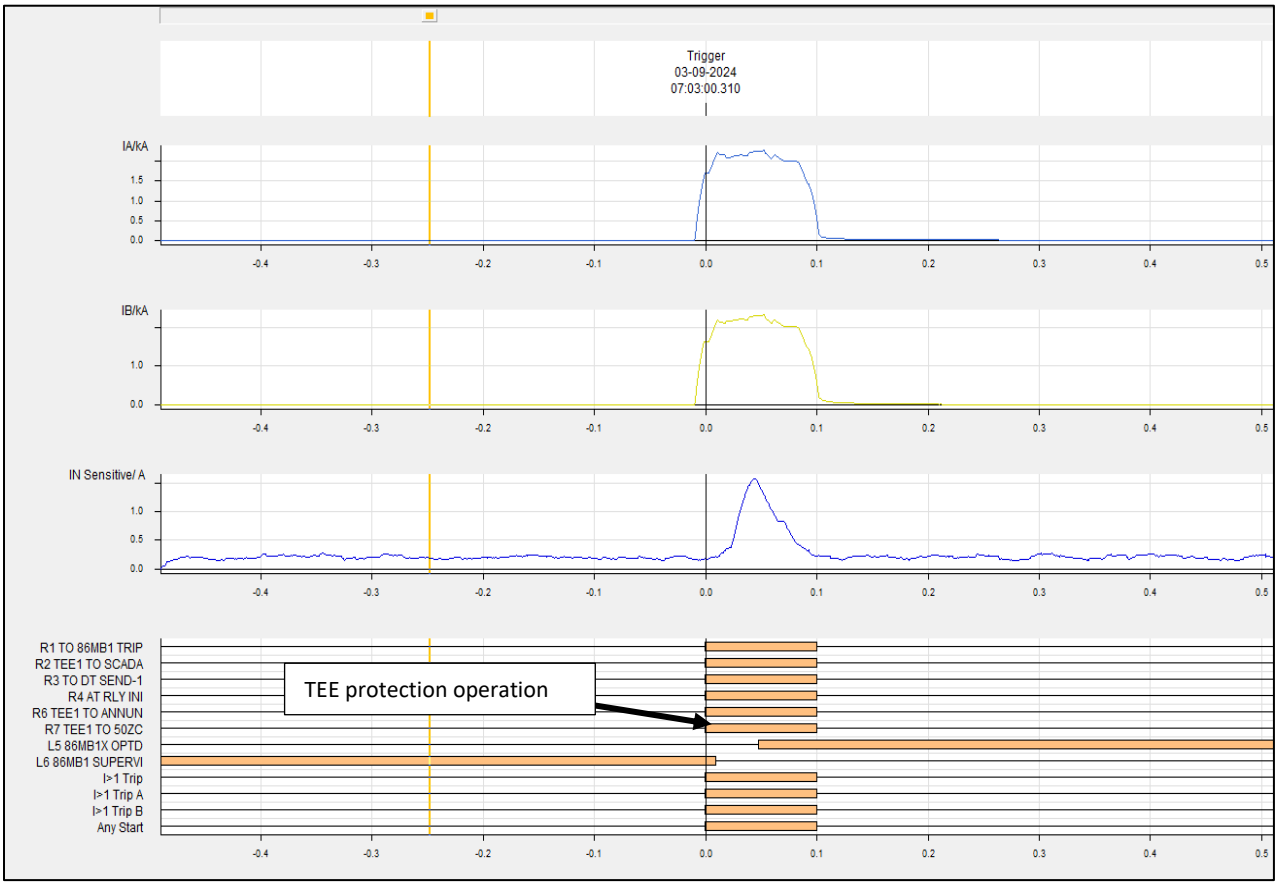
400 kV Kakrapar(3&4)-Navsari-1 DR at Navsari



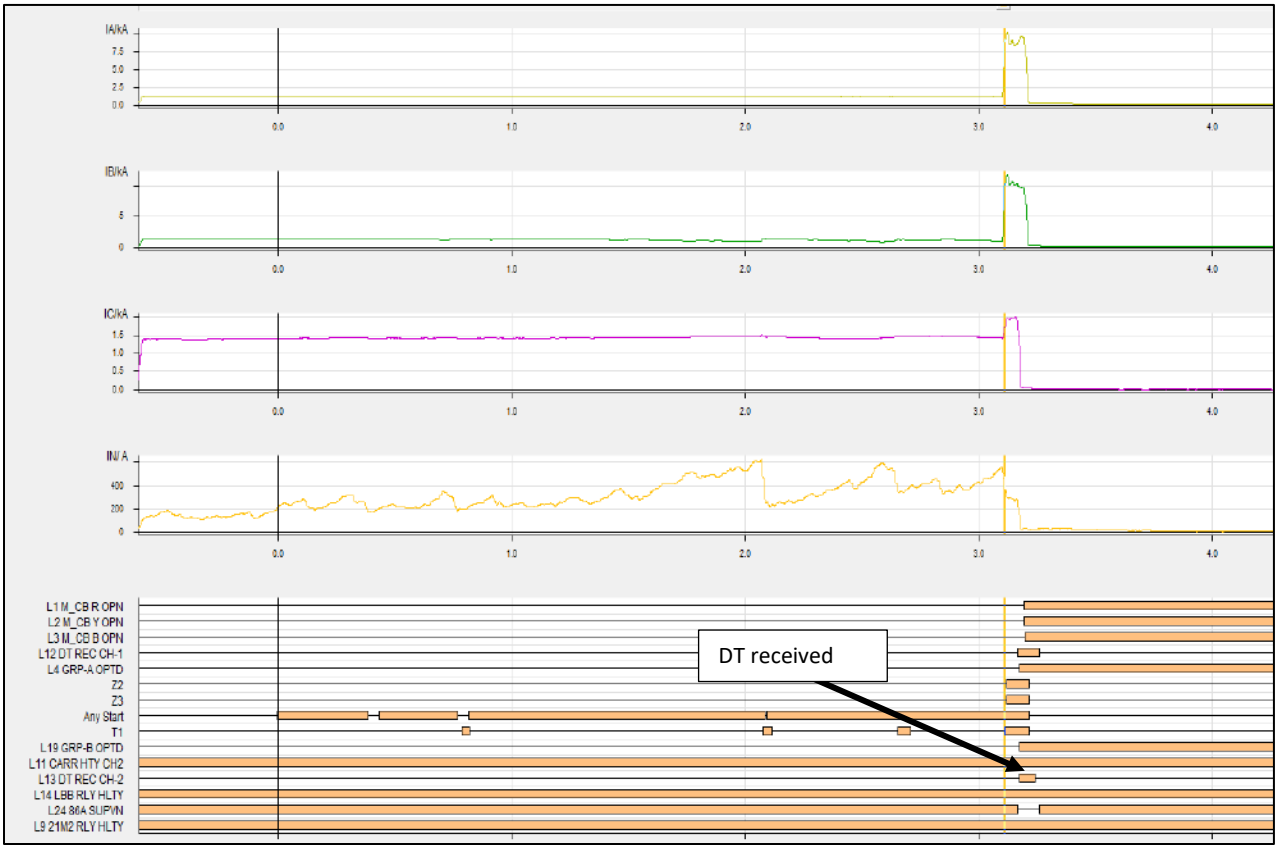
400 kV Kakrapar(3&4)-Bus-2 DR



400 kV Kakrapar(3&4)-Navsari-2 DR at Kakrapar



400 kV Kakrapar(3&4)-Navsari-2 DR at Navsari



अनुलग्नक-4 / Annexure-4: Site Photographs



Fig-3: Bus bar joint failure- DS-01 towards bus side

Fig-1: Snapped Y-phase conductor of NAVSARI-II resulted in actuation of STUB/TEE diffrential

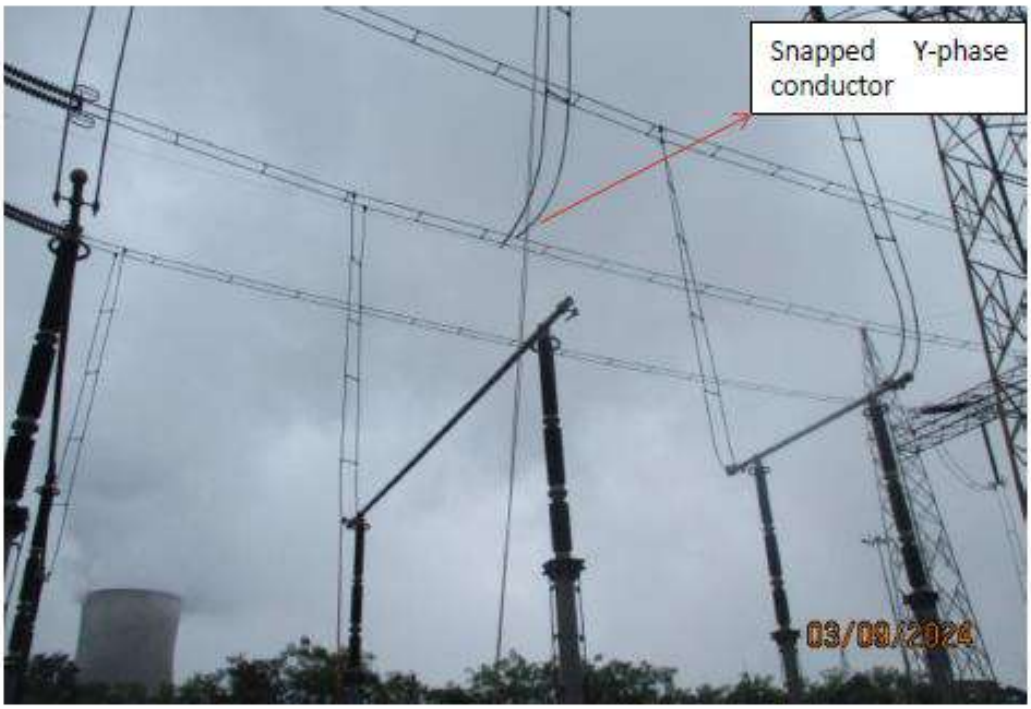


Fig-2: Bus bar joint failure- DS-01 towards bus side



अनुलग्नक-4 / Annexure-5: Report from NPCIL Kakrapar(3&4)

From Next Page

न्यूक्लियर पावर कार्पोरेशन ऑफ इंडिया लिमिटेड
NUCLEAR POWER CORPORATION OF INDIA LIMITED
(भारत सरकार का उद्यम) (A Government of India Enterprise)
काकरापार परमाणु विद्युत परियोजना 3 एंव 4 Kakrapar Atomic Power Project -3&
डाक: अणुमाला, जिला: तापी, गुजरात - ३९४६५१, PO: Anumala, Dist.: Tapi, Gujarat-394651

कापविकें-3व4/MR/07/2024 KAPS-3&4/MR/07/2024

४०० केवी बसबार विफलता के लिए अनुरक्षण रिपोर्ट

Maintenance Report on 400kV Switchyard Bus bar Failure

Date – 18 September 2024

तैयार कर्ता Prepared By	जांच कर्ता Checked By	समीक्षा कर्ता Reviewed By	अनुमोदन कर्ता Approved By
18/sept/2024. Nisith Ghatuari, SO/E	Dpatel 18/sept/24 Devang Patel,SO/F 18/09/24 Anant Mishra, SO/F	18.9.24 A K Sahu SME(E)	18.9.24 A K Sahu SME(E)

यह पृष्ट जानबूझ कर खाली छोड़ा गया है।

1.0 Unit:

KAPP-3 & 4

2.0 Equipment Tag:

513-Bus-A1, A2, CB-09, Navsari – II Line

3.0 Equipment Serial Number:

513-Bus-A1, A2, CB-09, Navsari – II Line

4.0 Title:

Maintenance Report on 400kV Switchyard Bus bar Failure Busbar Failure

5.0 Category of Maintenance:

Breakdown Maintenance

6.0 Executive Summary:

- On 03/09/2024, KAPS-3 was operating at 94 % FP with TG output 669 MWe and KAPS-4 was operating at 99 % FP with TG output 710 MWe. Heavy rain fall was persisting. following WAN was observed at 06:50 in MCR:
  - WAN-716, “400 KV SWYD TROUBLE” appeared in MCRP 6610-PL-7 (Unit-3).
  - WAN-534, “400 KV line NAV-2/VAPI-1/VAPI-2/NAV-1 tripped” appeared in MCRP 6610-PL-5 hrs(Unit-4).
- Navsari-1 got de-energized and Line charging LED got disappeared. During this time, "400kV KAKRAPAR-VAPI-II Circuit-1" and "400 kV KAKRAPAR-VAPI-II Circuit-2" did not get load hence "400 kV KAKRAPAR-NAVSARI Circuit-2" loaded upto 1400Amps.
- At 06:56 Heavy flash over in switchyard was reported by CISF and subsequently it is also seen from SCE cabin CCTV display
- At 07:03:00 hrs Navsari-II line got tripped, as Y-phase line conductor got snapped and R-Y phase shorting occurred which resulted in STUB/TEE differential protection.
- At 07:03:05 hrs, R-phase of BUS-1 got snapped due to hotspot towards bus side and U-4 got tripped on class-A2 protection as GT standby protection got actuated. (Annexure: 8).
- At 07:03:05 hrs U-3 got tripped on class-B protection due to turbine trip on Grid disturbance

7.0 Introduction:

7.1 Equipment Description:

513-Bus-A1, A2, CB-09, Navsari – II Line

7.2 Problem and Investigation:

Following three cause of fault and component failure.

BUS-II got de-energized:

1. Disturbance Recording was extracted from relay of CB-9 and following are observation:

   - At 06:50:49 hrs Navsari line-1, R Ph-E fault (18.6 KA) occurred at distance around 6 km at navsari end. Line was tripped on carrier aided protection (Annexure: 6).
   - Remaining two phases(Y-B) where in service and power evacuation was done through remaining two phases.
   - R-phase CB got opened, and Y& B phase CB was closed as per logic. However, as per existing LBB logic, Y& B phase LBB got actuated, since current was more than the LBB current setting of 400A. Thus, R-Phase fault resulted in actuation of three phase LBB.
   - Subsequently LBB got initiated which resulted in BUS-II de energization

Bus-Bar failure

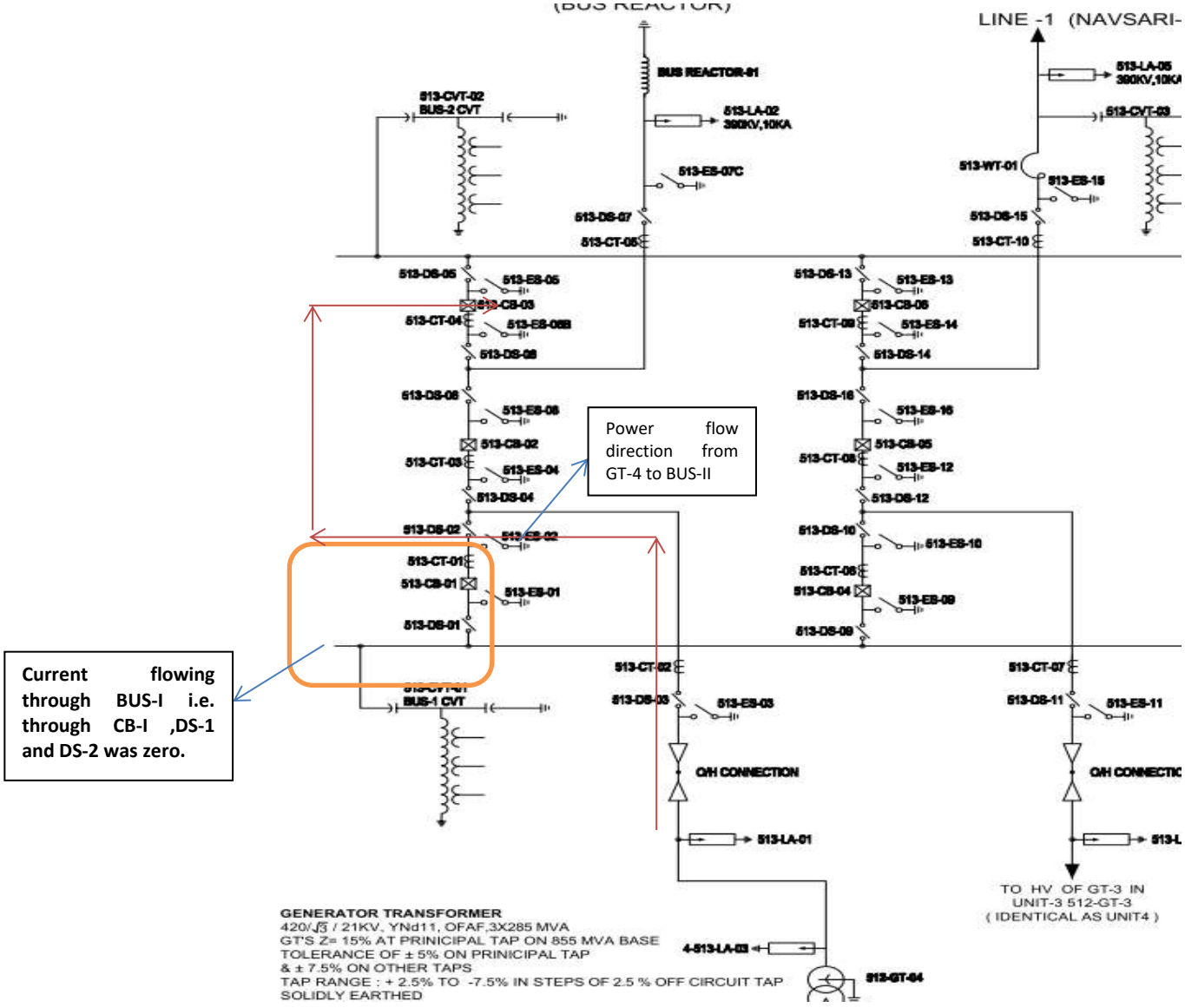
KAPS-3&4 switchyard has one & half breaker scheme.

During conditioning monitoring, it was found that GT-4 R-phase current was going through CB-2 path (BUS-II) but no current was going through CB-1(BUS-I) path. Suspected joint has high resistance in CB-1(BUS-I) path. Other two phase's current was equally distributed in each path.

Following activities were carried out for trouble shooting:

a. CT joints are checked and found healthy

b. CB-1(CRM,DCRM) and CT-1(CRM) healthiness checked and found healthy



c. During Unit-4 Turbine S/D, DS-2 CRM checked and found ok.

d. For DS-1 and clamps checking, bus bar shut down permit was approved in OCC and planned on 03/09/24.

e. During the event, as Bus-II got de energised, power flow from GT-4 got established through BUS-1 i.e. through CB-I, DS-1 and DS-2. Thus power evacuation of KAPS-4 through this path resulted in heating and failure of bus bar joint, BPI and Bus bar IPS aluminium tube.

Navsari Line-II tripped on STUB/TEE differential protection

- Y-phase line conductor got snapped due to overheating of joint and R-Y phase shorting occurred which resulted in Navsari-II line tripping on actuation of STUB/TEE differential protection. (Annexure:7)

8.0 Reference of similar incidents & maintenance carried out in the past:

Not Applicable.

9.0 Action Taken:

1. 400 kV CB-09 Healthiness was checked & found all breaker parameters within range (Annexture-02). Navsari -1 was charged.
2. Navsari-II line-Y phase moose conductor, corona bell was replaced and Navsari-II line charged again
3. Turbine synchronized with grid.
4. BUS-I isolation was done and following jobs were carried out:
    a. 4.5 and 4 inch IPS tube bus bar was repaired. CRM was taken and found value within range. Tests are attached as per Annexture-03.
    b. Two Bus post Insulator modules were replaced
    c. Corona ring ,corona bell connector was replaced
5. BUS-I was normalized.

<u>Modification implemented:</u>

400 kV CBs LBB logic was modified. In the existing logic, internal LBB generated from relay was used, which was initiating three phase LBB on single phase fault. This has been modified, internal Relay generated LBB signal has not been used, and logic has been implemented physically by mapping current input to Trip relay. (Annexure-4&5)

10.0 Man Rem Consumption:

Not Applicable

11.0 Man Hours:

Approx. 4 departmental and 10 contract Manpower for 10 hours i.e. 4 man-days were consumed for rectifying the above problem and for functional testing.

12.0 Spares Used:

- 4.5 " IPS tube
- 4.0 " IPS tube
- Two corona ring
- Two corona bell
- BPI insulator
- Bus connector and clamp

13.0 Post Maintenance Tests:

Post maintenance test CRM was taken

14.0 Root cause Analysis

Probable causes for fault are as follows:

Sr.No.	Probable cause	Analysis/justification
1.	Navsari-II Line Y- phase connector failure	Due to heavy current flow approx. 1400 A during loading of Navsari-II line, as both VAPI lines were lightly loaded. Therefore high heating was observed across joint.
2.	Bus-I and BPI failure of Diagonal-1	High resistance path between CB-1 to bus-I was persisting and was identified during condition monitoring. Hence R phase current was flowing from Bus-I path. R phase current passing through high resistance path made temperature increase and joint failure.
3.	Bus-II de-energization due to LBB actuation of CB-09	LBB mal operated due to relay internal logic. Logic has been modified as attached in annexure

15.0 Action to be taken to avoid similar occurrences in future

1. Thermography of all the bus bar joints, CT clamps will be monitored. Hotspots identified during the CM, will be promptly attended.
2. During maintenance of Joints, conducting paste to be applied in joints and same to be implemented in PM procedure.

16.0 Conclusion:

- LBB Protection logic modified to avoid LBB mal operation in concurrence with Designer.
- VAPI Line remains lightly loaded during power evacuation of both the units, in this scenario as one Navsari Line trips other Navsari line gets overloaded; therefore it is important to maintain uniform loading in all four lines i.e. 400KV D/C Navsari and D/C Vapi. This has been referred to PGCIL.
- This event shall be discussed with OEM/Designer and maintenance practices regarding PM of joints/ clamps etc. shall be strengthened accordingly.

17.0 References:

Nil

18.0 Annexure:

Attached

वितरण सूची Distribution List

Sr. No.	Copy to
1.	**Original:** Centralized Documentation Cell
2.	**Copy :** Author, library
3.	**Intimation:** Station Director Office/Chief Superintendent Office/MS Office/OS Office/TSS Office/All Section heads

End of the Document

Annexure: 1 400 KV Equipment failure report

Fig-1: Snapped Y-phase conductor of NAVSARI-II resulted in actuation of STUB/TEE diffrential

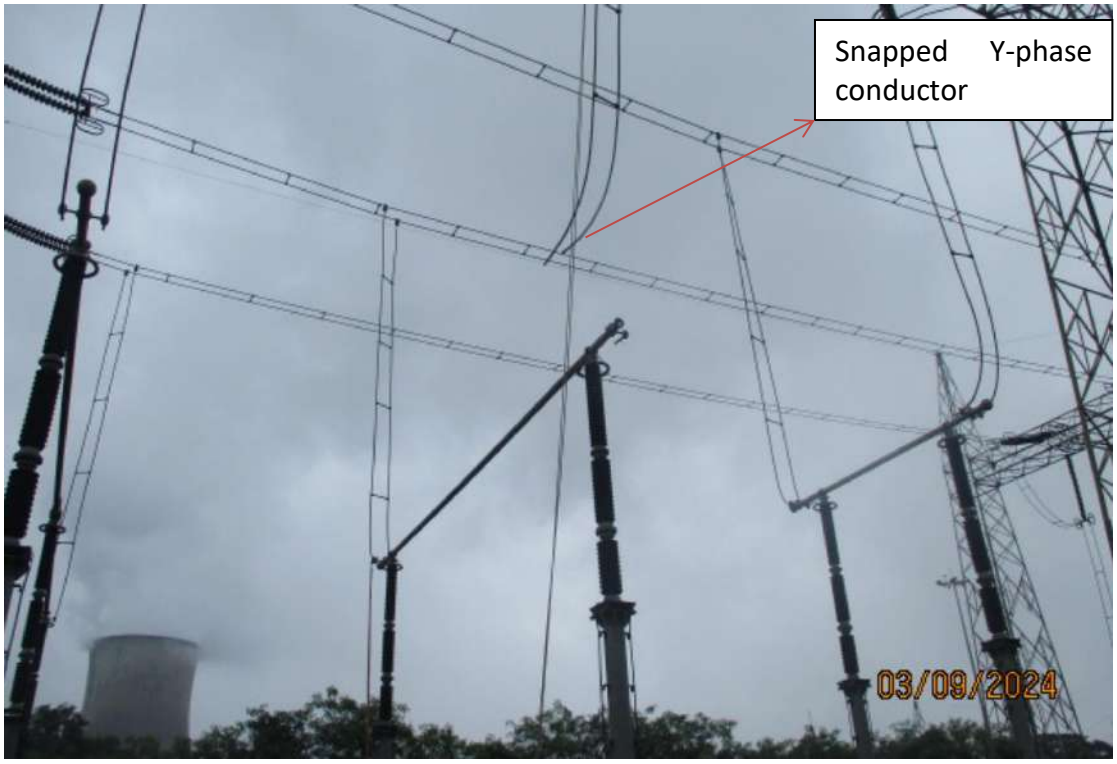


Fig-2: Bus bar joint failure- DS-01 towards bus side





Fig-3: Bus bar joint failure- DS-01 towards bus side

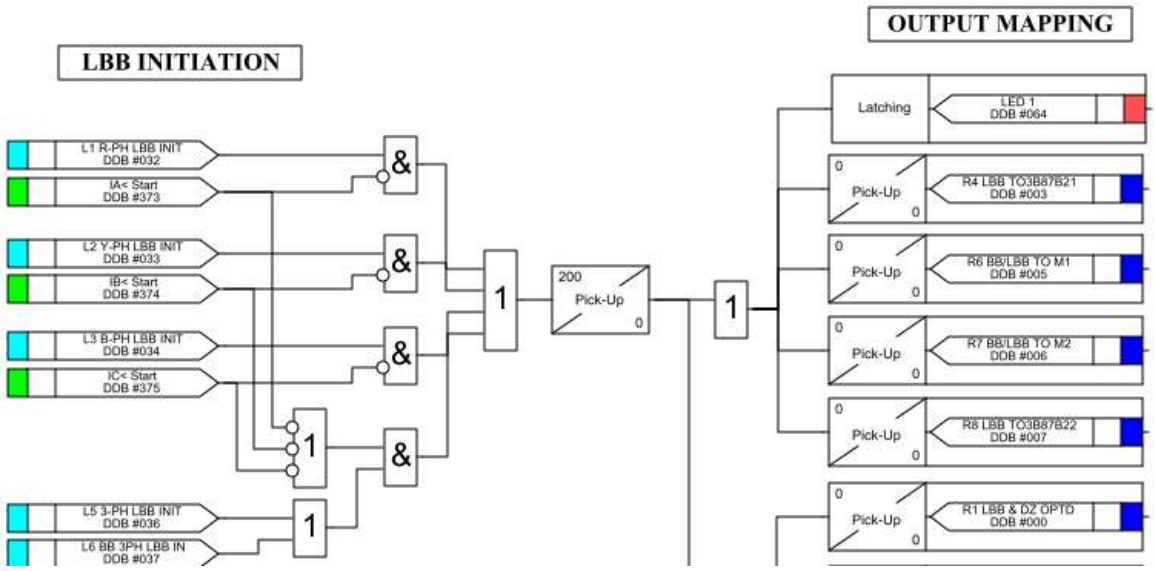
Annexure:2 0-513-CB-09, R-Phase Test reports

400 kV CB (0-513-CB-09, R-Phase) Test reports			
Description		**Expected Value**	**Observed value (R-Phase)**
CB closing time (ms)		< 80 ms (Max)	65.6 ms
CB opening time (ms)		25-31 ms	29.2 ms
CRM value (μΩ)	Interpture-01	≤100 μΩ	30 μΩ
	Interpture-02		32 μΩ
SF_6 gas dew point		<-10 ^{0}C	-24 ^{0}C
DCRM		No bouncing	AS per DCRM test graph no bouncing has been observed for closing and opening of CB.

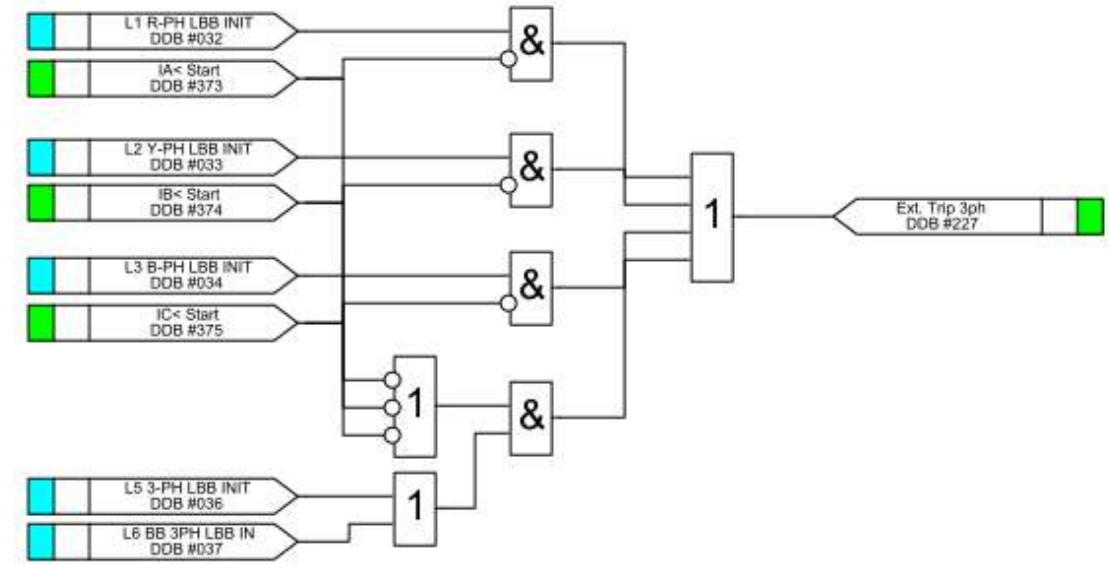
Annexure:3 Switchyard Busbar CRM test report

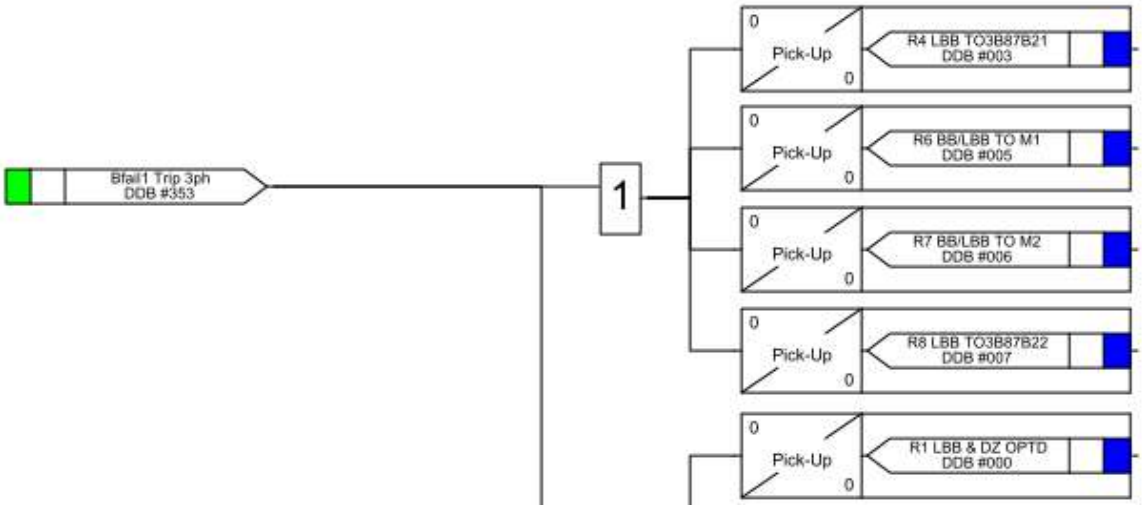
Description	Injected current	Expected value	Measured value
R-Phase Main bus bar 4.5 " IPS tube	**200 A**	**<10** μΩ/meter	**9** μΩ (Around 1 meter)
R-Phase Main bus bar 4.0 " IPS tube	**200 A**	**<10** μΩ/meter	**8** μΩ (Around 1 meter)
R-Phase, Joint between BPI to Main bus (DS-01 side)	**200 A**	**<10** μΩ/Joint	**27** μΩ(four joints)
R-Phase, Main bus T-connecter	**200 A**	**<10** μΩ/Joint	**10** μΩ(two joints)

Annexure-4: LBB modified logic of 400Kv CBs

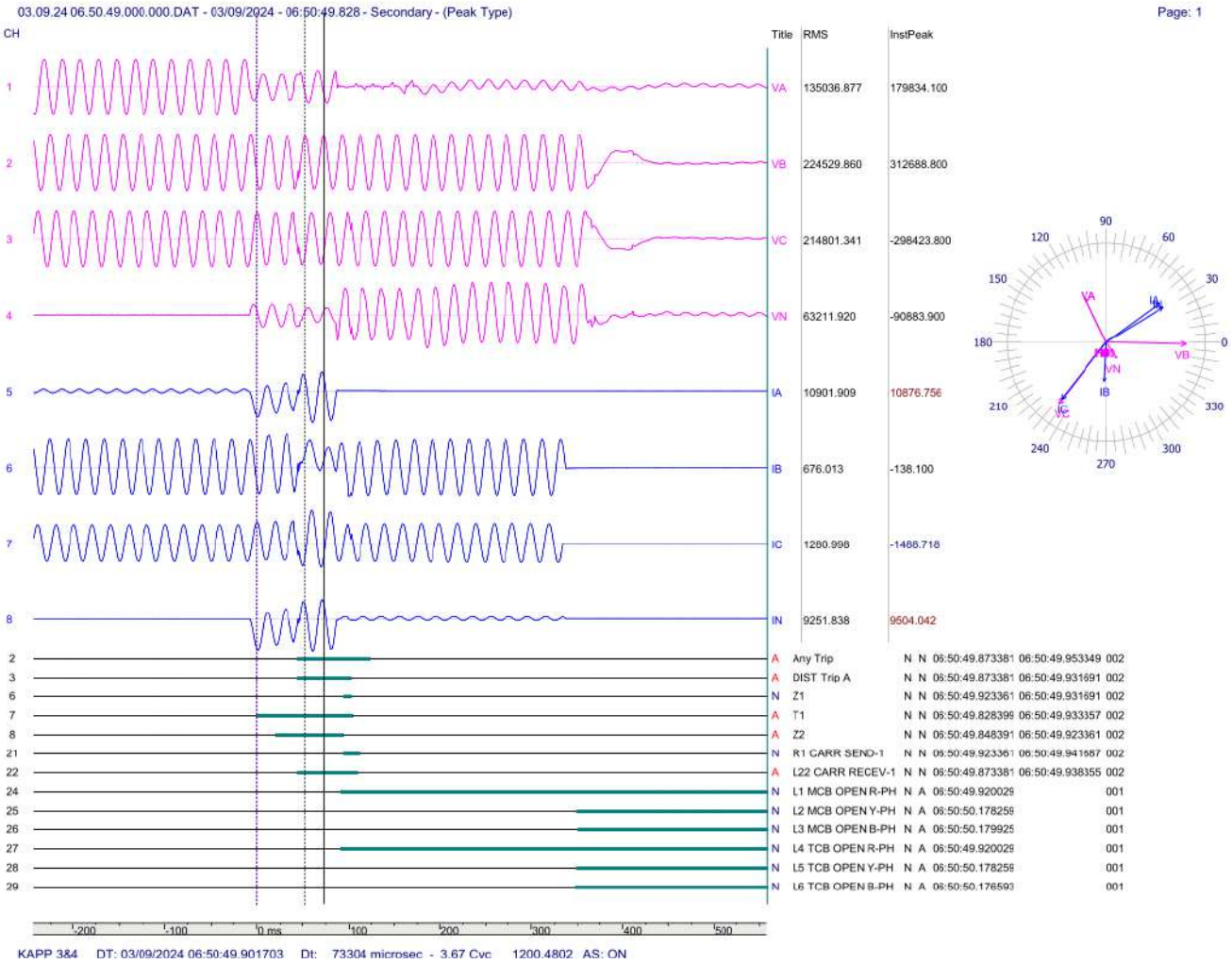


Annexure-5: Existing PSL of 400Kv CBs

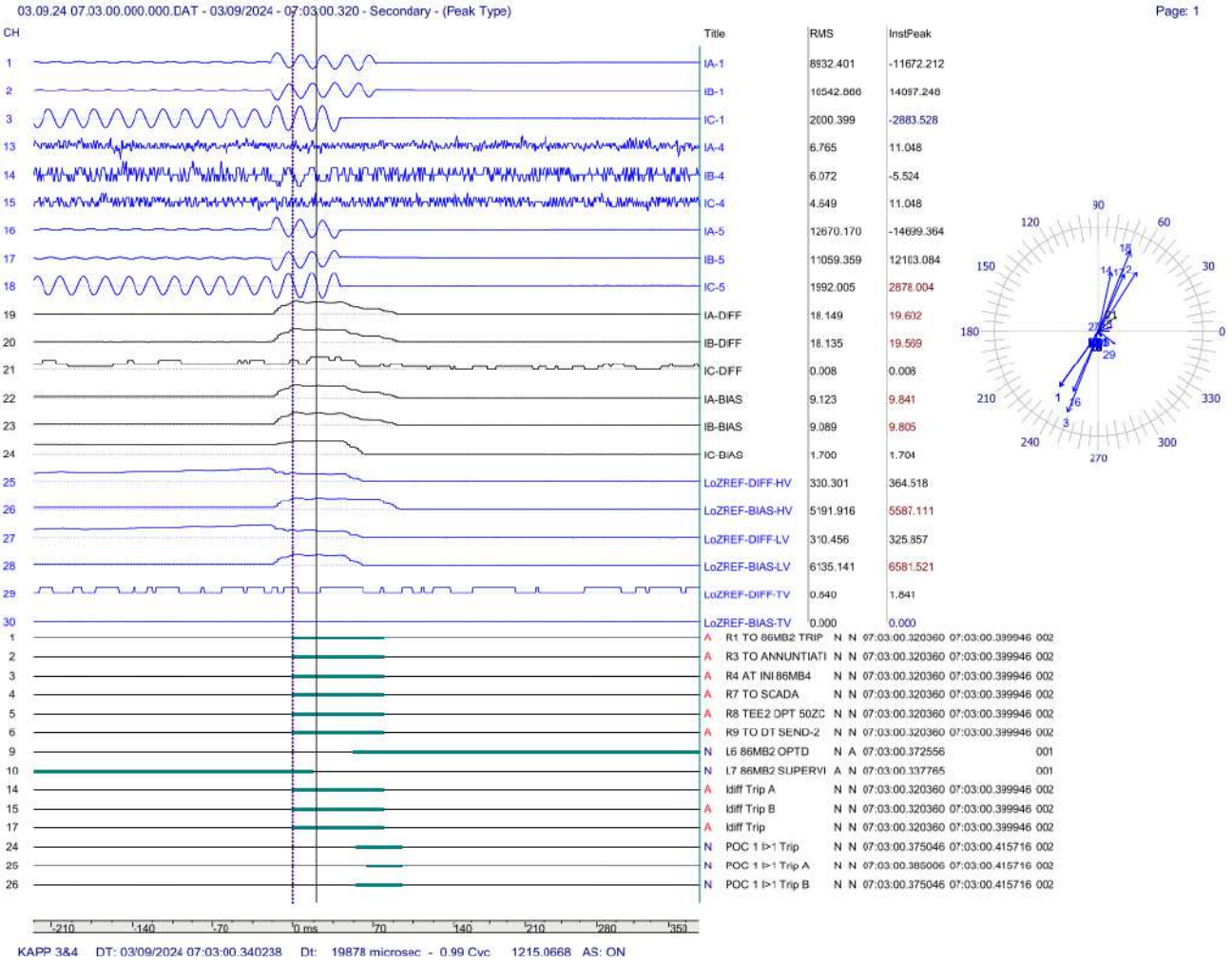




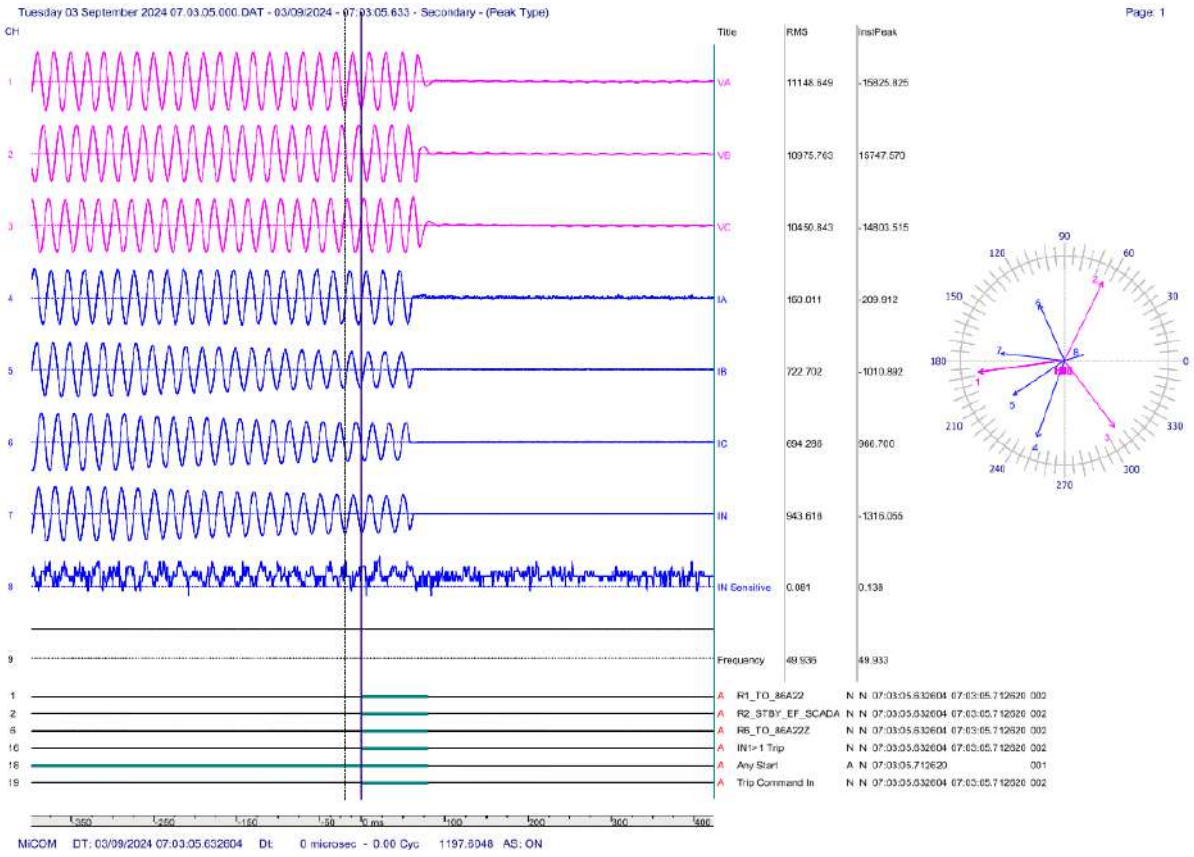
Annexure:6 Distance protection actuated DR of NAVSARI-1



Annexure:7 Stub/TEE actuated of NAVSARI-II bay



Annexure: 8 KAPS-4 class-A2 trip



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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 400 के. वी. डीजेन उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 400 kV DGEN S/S of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 18.10.2024

1. **घटना का सारांश / Event Summary:** At 15:31 Hrs/ 17-09-2024, Bus bar protection operated in 400 kV DGEN-Bus-2 due to failure of LA of 400/220 kV DGEN-ICT-1, resulting in tripping of all connected elements to 400 kV DGEN-Bus-2. As seen from the DR, differential protection operated in ICT-1, hence bus bar protection operation is undesirable. No generation loss occurred due to the event.
2. **घटना का समय और दिनांक / Time and Date of the Event** : 15:31 hrs / 17-09-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** DGEN, Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.05	65953	55355	11251	19306
घटना के बाद Post Event	50.06	65998	55390	11256	19270

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Nil

7. **रुकावट की अवधि / Duration of interruption:** 02 Hours 43 Minutes

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

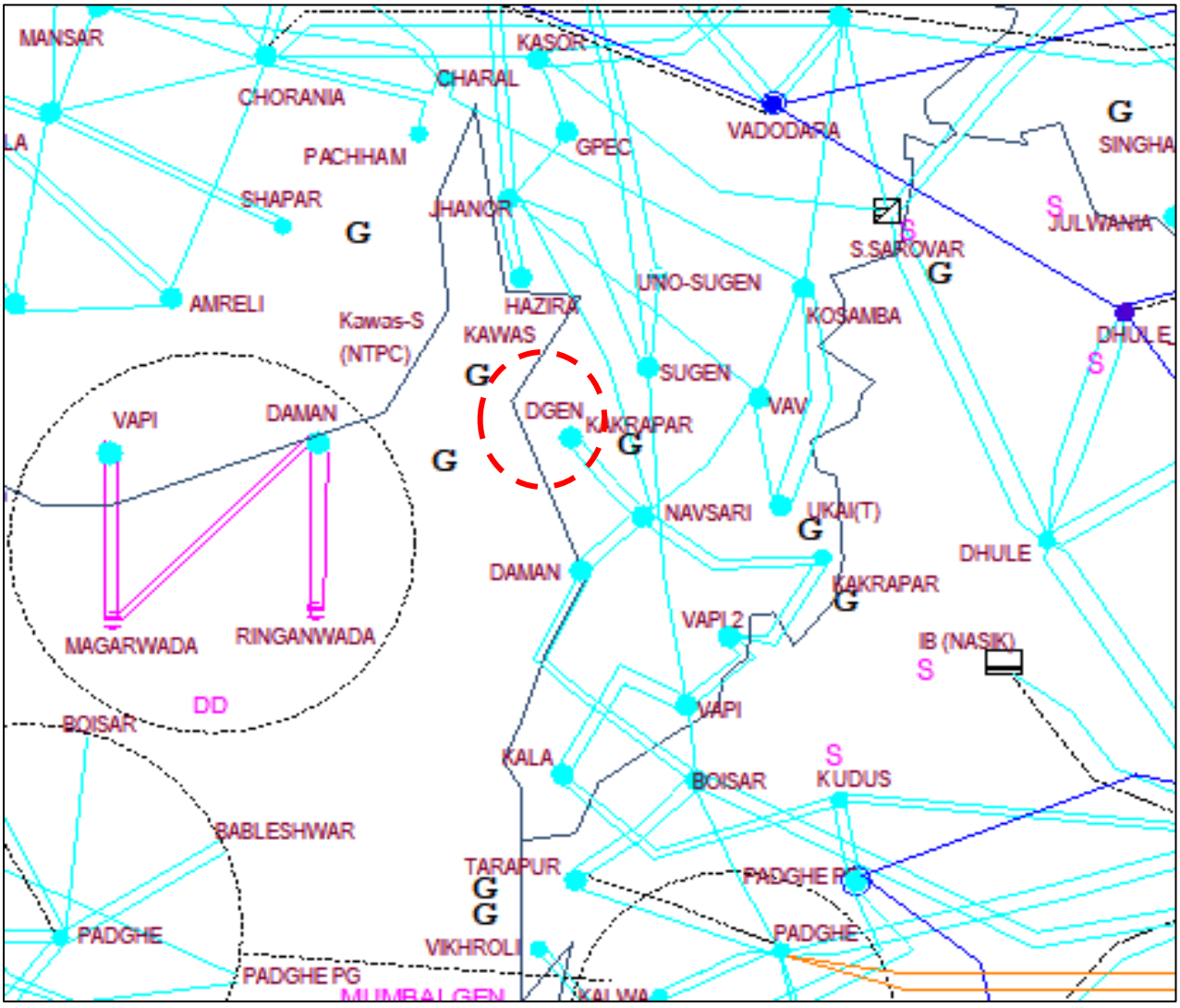


Figure 1. Network across the affected area

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

400KV/220KV DGEN-ICT-1 R-Phase Lightening Arrester, LAMCO make LMAS type , Rating-360KV,20kA, MCOV- 288 kV RMS, PRC-40kA, BIL-1550 kVp

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (DGEN)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (remote end)	वापसी का समय Restoration time
1.	400KV/220KV DGEN-ICT-1	15:31:12.739	ICT-1 Direction time overcurrent PH L1 picked up. ICT-1 Differential protection picked up Bus bar protection operated	Not Applicable	Still out
2.	DGEN - 400KV - BUS 2	15:31:12.739	Tripped on Bus Bar Protection	Not Applicable	18:14:02.542
3.	DGEN - 400KV B/R 1	15:31:12.762			18:00/18.09.2024
4.	400KV/22KV DGEN-GT-1	15:31:12.763			Still out
5.	400KV-NAVSARI-DGEN-1	15:31:12.763		–	18:14:02.542

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

- Bus bar protection operated in 400 kV DGEN-Bus-2 due to failure of R phase LA of 400/220 kV DGEN-ICT-1, resulting in tripping of all connected elements to 400 kV DGEN-Bus-2.

- As seen from the DR, differential protection operated in ICT-1. Therefore, Bus bar protection operation is undesirable as the fault cleared through differential protection relay.

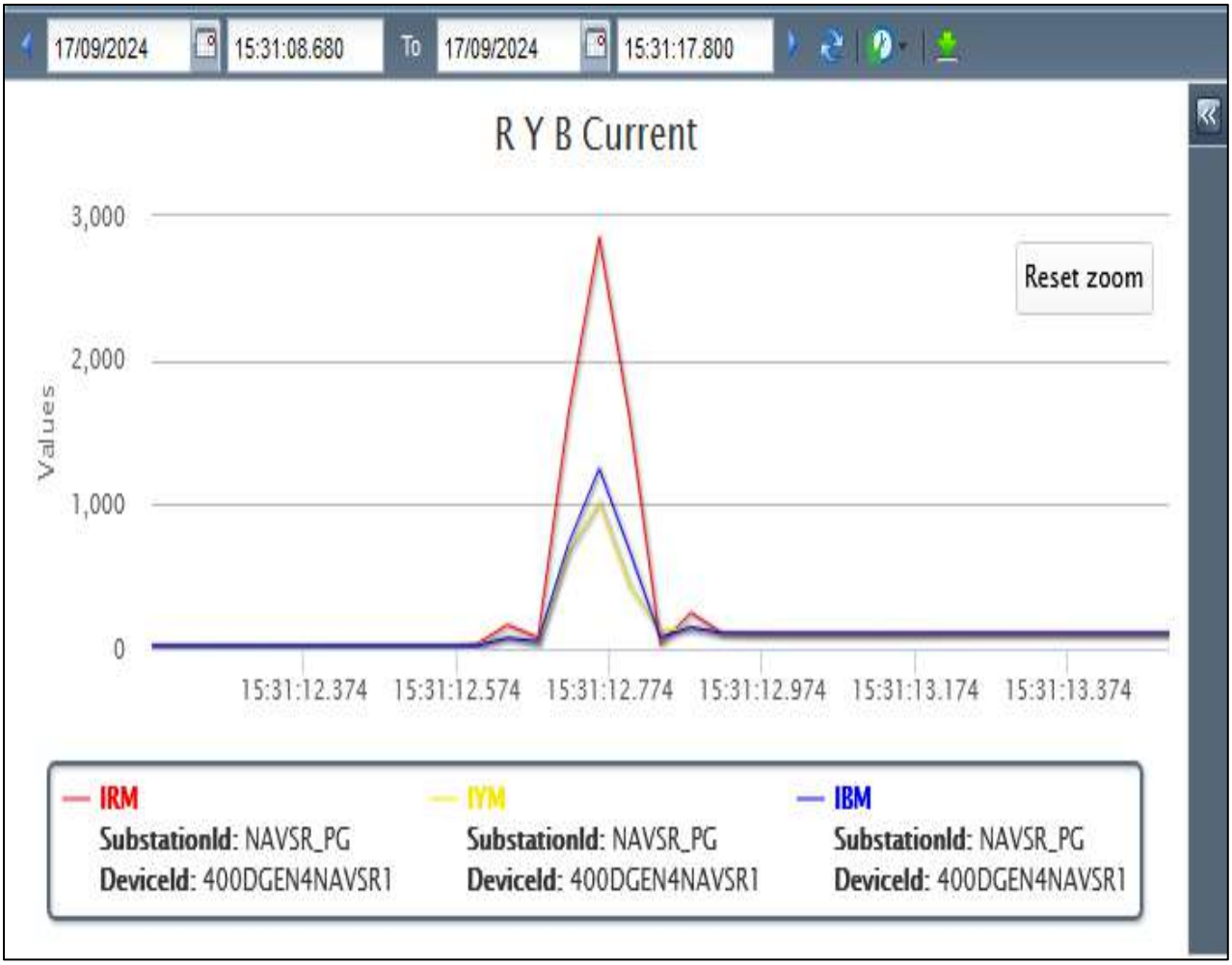


Figure 2. 400 kV DGEN-Navsari Current Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Periodic maintenance and testing activities to be carried out to avoid such events in future and to ensure healthiness of equipments.
- Bus bar protection operation is undesirable as the fault cleared through differential protection relay of ICT-1.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- DGEN - 400KV B/R 1 was first charged at 18:51 hrs/17.09.2024. But after charging bus reactor, heavy spark observed in its R-phase bushing. So again, bus reactor discharged and taken into service next day after rectification.
- DGEN-ICT-ICT-1 R-Phase LA replacement is pending and expected to be finish by December 2024 as per telephonic information by DGEN.

14. नियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received from DGEN
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from POWERGRID and received late from DGEN
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late i.e. on 15.10.2024 from DGEN
4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Bus bar protection operation is undesirable as the fault cleared through differential protection relay of ICT-1

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

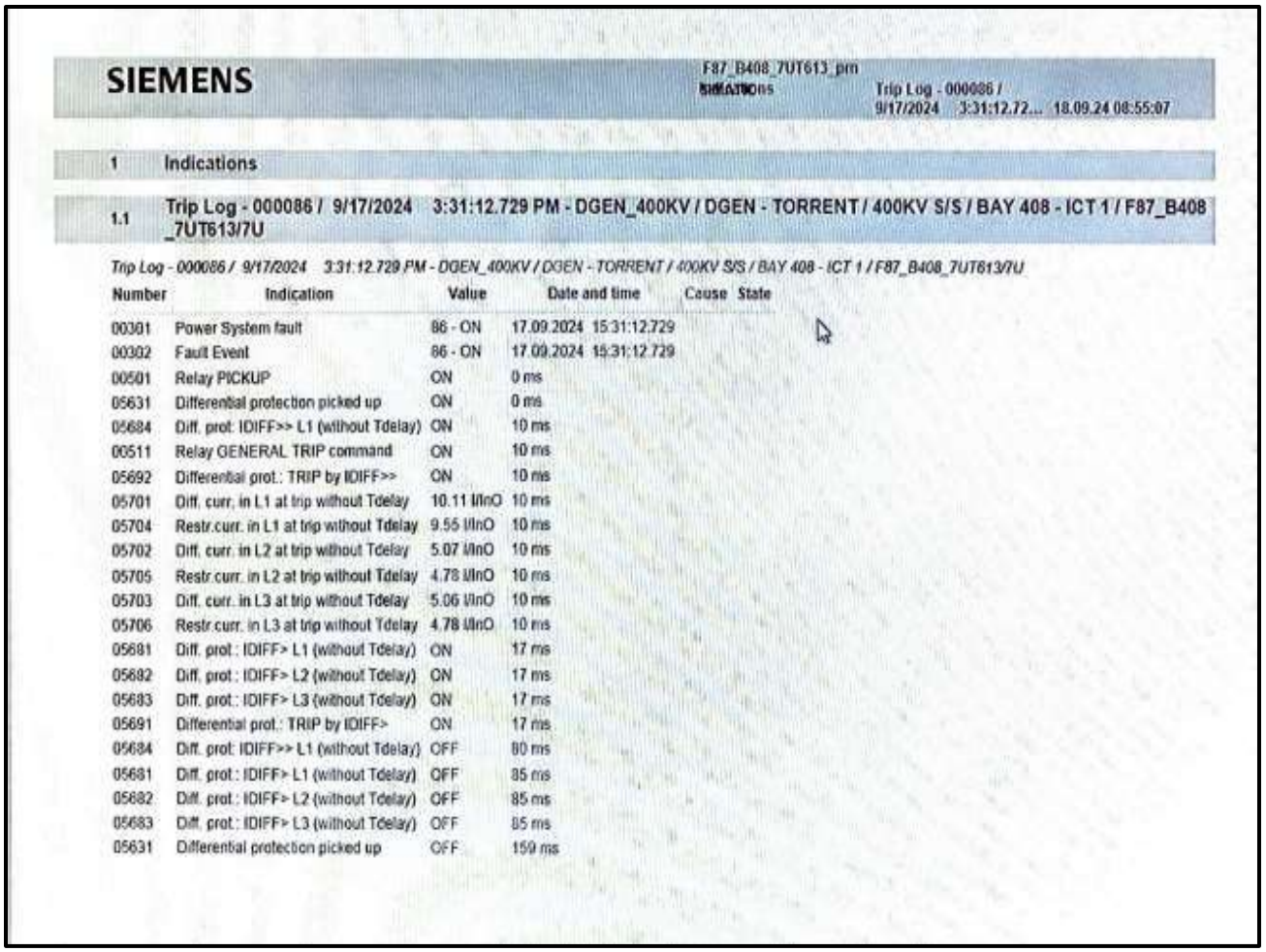
- Replacement of the Identified LA at switchyard is planned by DGEN in phase manner which needs to be expedited and updated to WRLDC.
- DGEN may kindly explain the reason for Bus bar protection operation.

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE from WRLDC SCADA-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	400-SOE	DGEN4_PG	DGEN XFMR_P 42_T1 (Primary) ACTED	15:31:12	759
WRLDC	400KV-CB	DGEN4_PG	DGEN CB REACTOR CB 40152 TRANSIT	15:31:12	789
WRLDC	400KV-CB	DGEN4_PG	DGEN CB REACTOR CB 40152 OPEN	15:31:12	810
WRLDC	400KV-CB	DGEN4_PG	DGEN CB CB 40452 (G1) OPEN	15:31:12	977
WRLDC	400KV-CB	DGEN4_PG	DGEN CB 40852 (T1_P) OPEN	15:31:12	863
WRLDC	400KV-CB	DGEN4_PG	DGEN CB COUPLER CB 41352 OPEN	15:31:12	961
WRLDC	400KV-CB	DGEN4_PG	DGEN CB 40352 (NAVSR-1) OPEN	15:31:13	69

SOE from DGEN-



SIEMENS

F87_B408_7UT613_pm
Trip Log - 000086 /
9/17/2024 3:31:12.72... 18.09.24 08:55:07

1 Indications

1.1 Trip Log - 000086 / 9/17/2024 3:31:12.729 PM - DGEN_400KV / DGEN - TORRENT / 400KV S/S / BAY 408 - ICT 1 / F87_B408_7UT613/7U

Trip Log - 000086 / 9/17/2024 3:31:12.729 PM - DGEN_400KV / DGEN - TORRENT / 400KV S/S / BAY 408 - ICT 1 / F87_B408_7UT613/7U

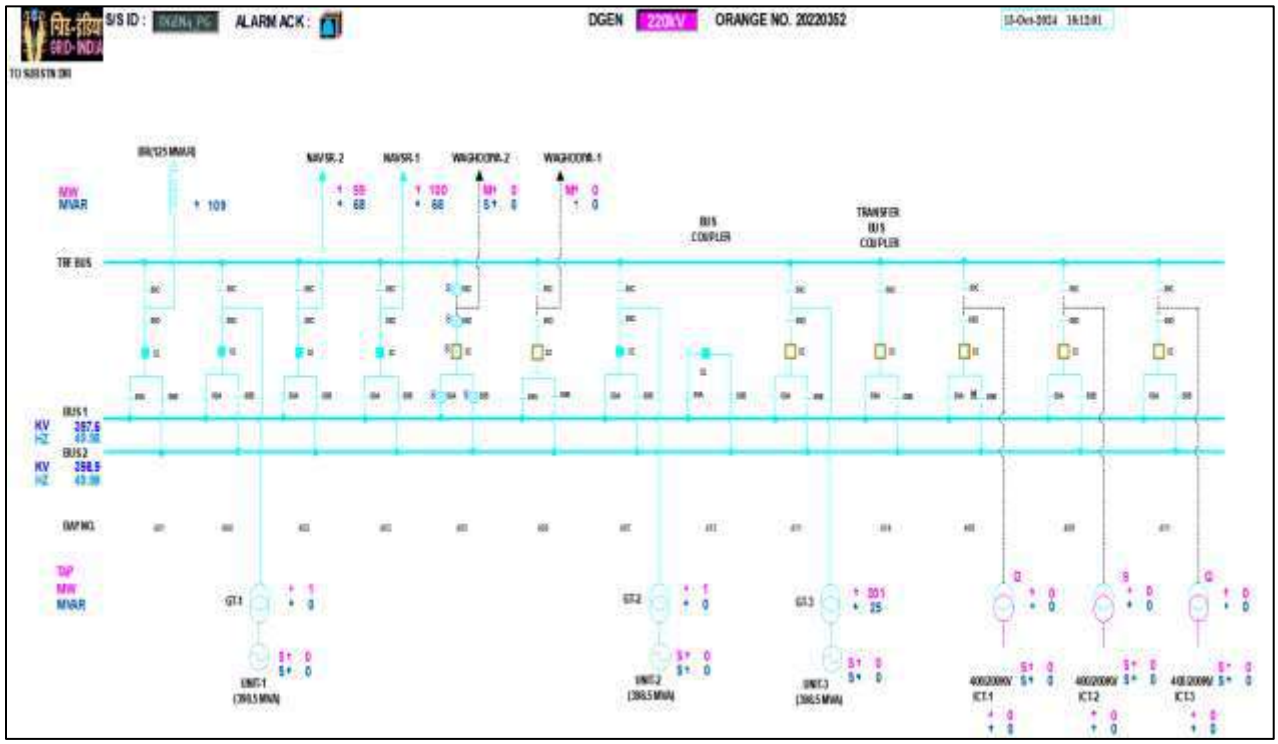
Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	86 - ON	17.09.2024 15:31:12.729		
00302	Fault Event	86 - ON	17.09.2024 15:31:12.729		
00501	Relay PICKUP	ON	0 ms		
05631	Differential protection picked up	ON	0 ms		
05684	Diff. prot: IDIFF>> L1 (without Tdelay)	ON	10 ms		
00511	Relay GENERAL TRIP command	ON	10 ms		
05692	Differential prot.: TRIP by IDIFF>>	ON	10 ms		
05701	Diff. curr. in L1 at trip without Tdelay	10.11 IInO	10 ms		
05704	Restr.curr. in L1 at trip without Tdelay	9.55 IInO	10 ms		
05702	Diff. curr. in L2 at trip without Tdelay	5.07 IInO	10 ms		
05705	Restr.curr. in L2 at trip without Tdelay	4.78 IInO	10 ms		
05703	Diff. curr. in L3 at trip without Tdelay	5.06 IInO	10 ms		
05706	Restr.curr. in L3 at trip without Tdelay	4.78 IInO	10 ms		
05681	Diff. prot.: IDIFF> L1 (without Tdelay)	ON	17 ms		
05682	Diff. prot.: IDIFF> L2 (without Tdelay)	ON	17 ms		
05683	Diff. prot.: IDIFF> L3 (without Tdelay)	ON	17 ms		
05691	Differential prot.: TRIP by IDIFF>	ON	17 ms		
05684	Diff. prot: IDIFF>> L1 (without Tdelay)	OFF	80 ms		
05681	Diff. prot.: IDIFF> L1 (without Tdelay)	OFF	85 ms		
05682	Diff. prot.: IDIFF> L2 (without Tdelay)	OFF	85 ms		
05683	Diff. prot.: IDIFF> L3 (without Tdelay)	OFF	85 ms		
05631	Differential protection picked up	OFF	159 ms		

Following alarms received on SCADA:

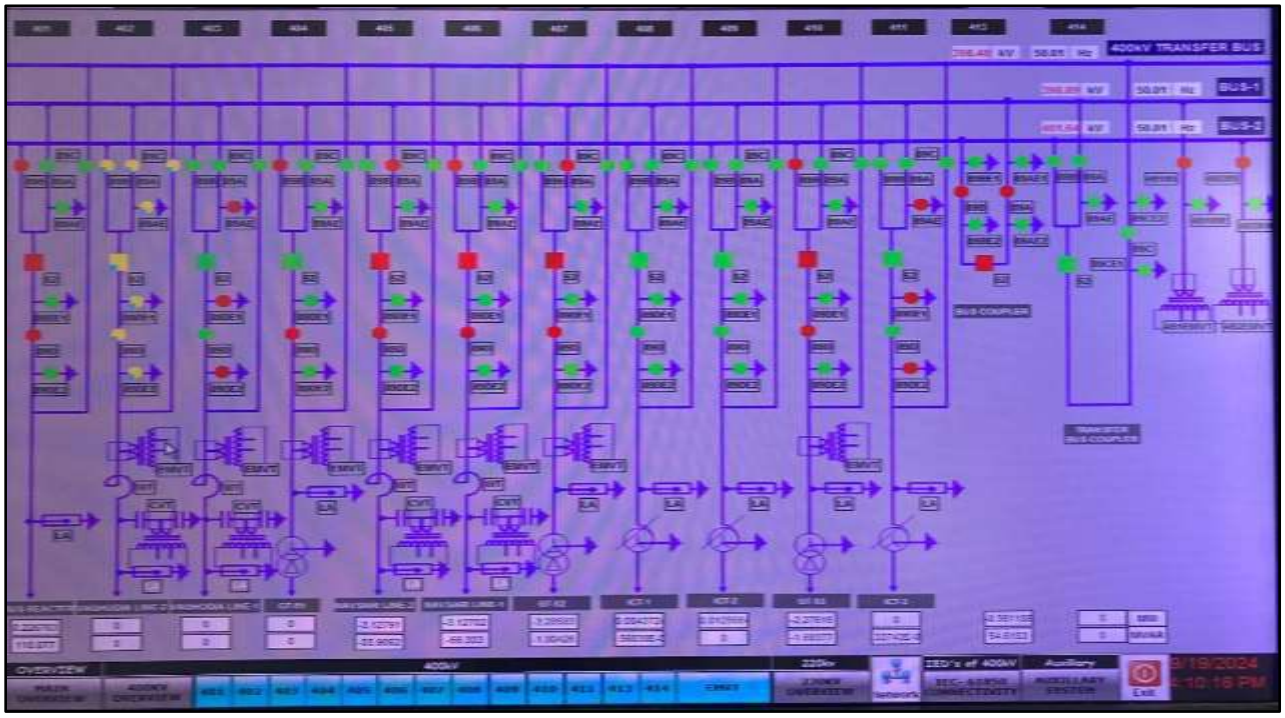
15:31:12:739	DGEN\400KV\400\MCU-2 Trip command L1 Check zone
15:31:12:739	DGEN\400KV\408\F67_67N Dir. Time overcurrent Ph L1 picked up
15:31:12:742	DGEN\400KV\400\MCU-2 Protection/DIFF.TRIP
15:31:12:742	DGEN\400KV\400\MCU-2 Protection/Total TRIP phsA
15:31:12:759	DGEN\400KV\408\BCU 86.1 Optd.
15:31:12:759	DGEN\400KV\408\BCU 86.1 LV OPTD.
15:31:12:760	DGEN\400KV\408\BCU 96.2 Optd.
15:31:12:760	DGEN\400KV\413\BCU 96.2 Optd.
15:31:12:761	DGEN\400KV\408\BCU 86.1 LV OPTD.
15:31:12:762	DGEN\400KV\406\21.1 96.2 Optd
15:31:12:763	DGEN\400KV\404\BCU 96.2 Optd
15:31:12:763	DGEN\400KV\401\BCU 96.2 Optd

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220 kV DGEN SLD-

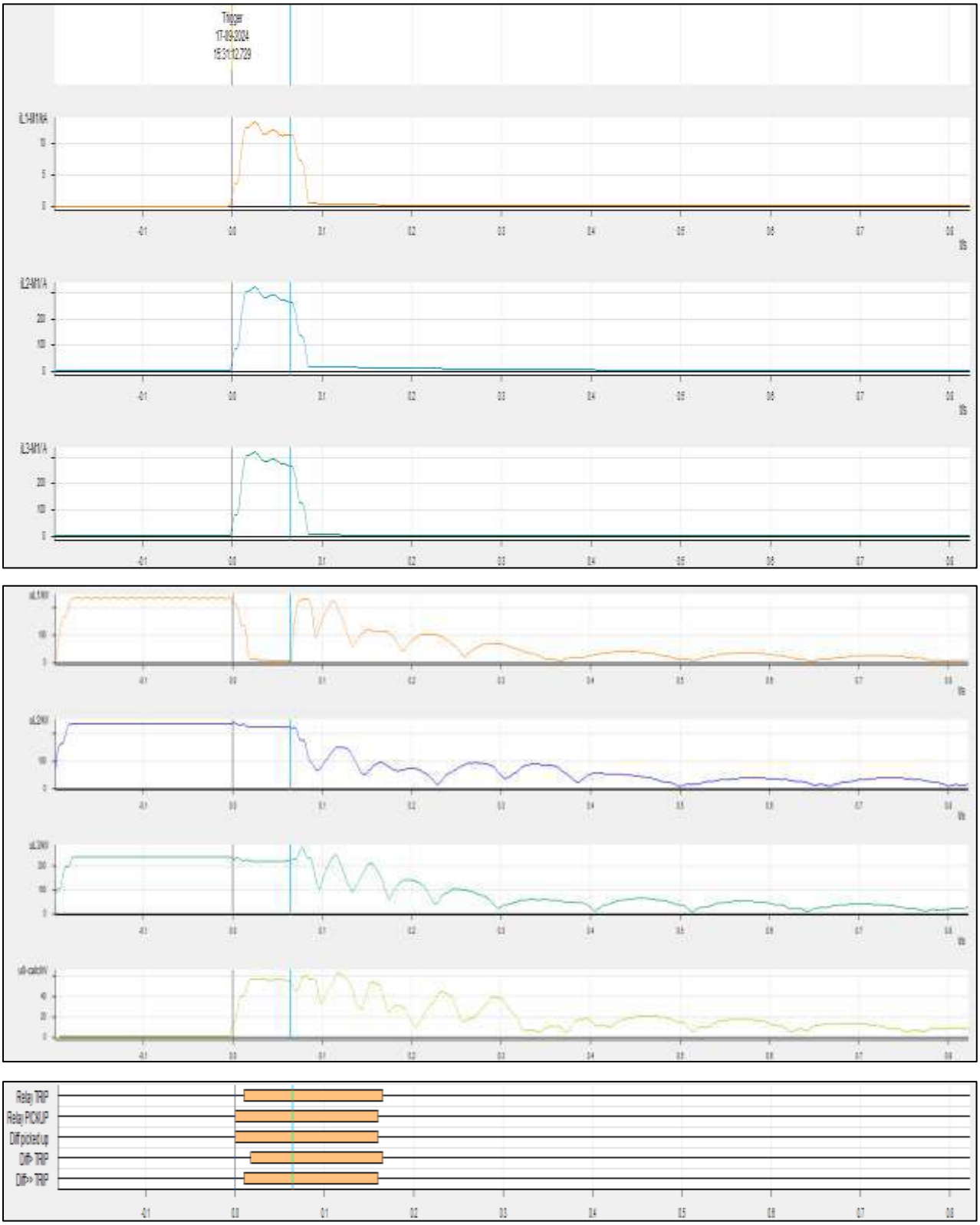


SLD from DGEN-

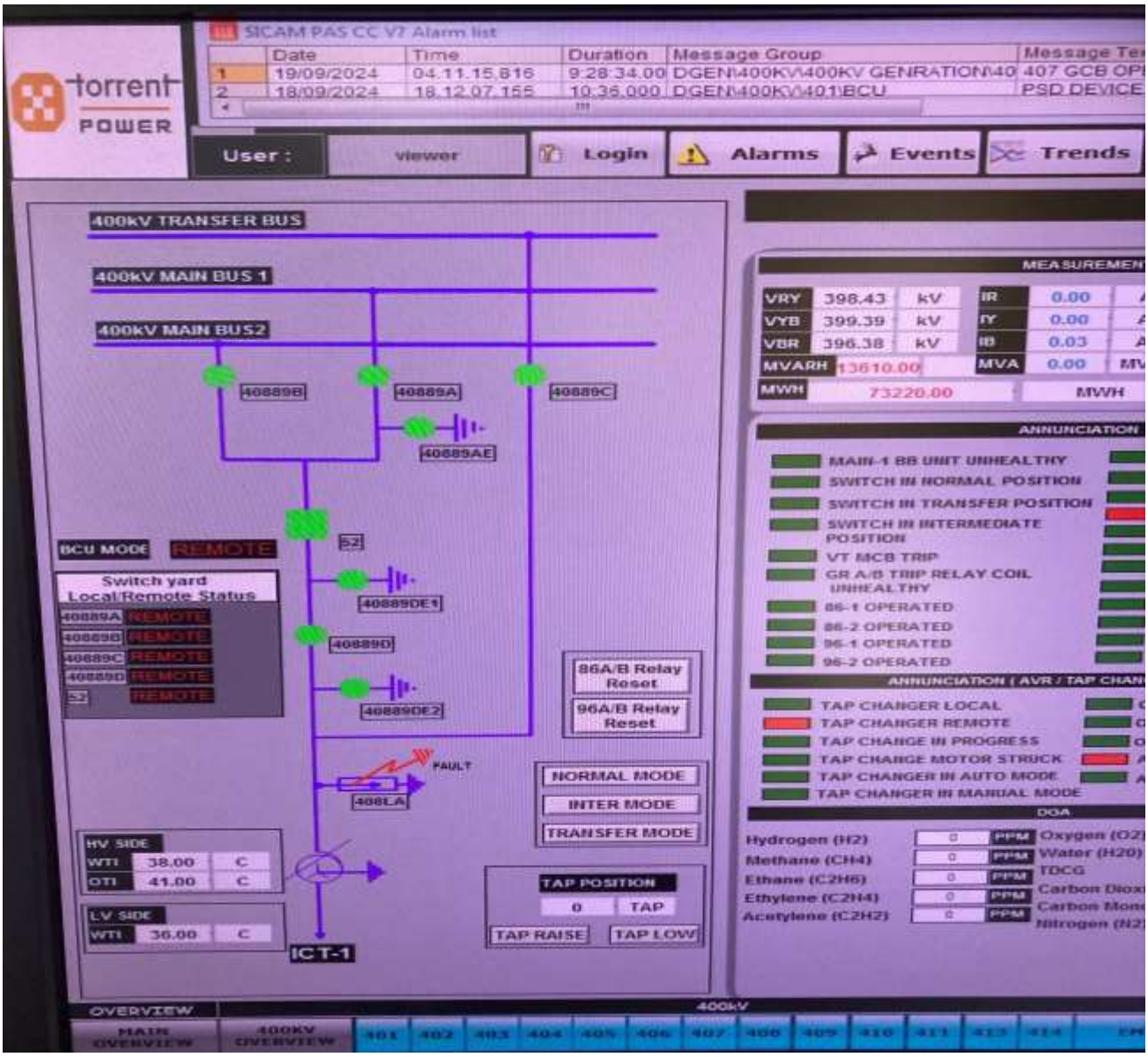


अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below-

A. DR of 400KV/220KV DGEN-ICT-1 from DGEN



अनुलग्नक-4 / Annexure-4: - Site photographs by DGEN-





विजय कुमार

Vijay Kumar Kodali

DGM, SO, WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. नानावल्का उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nanavalka of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 18.09.2024

1. **घटना का सारांश / Event Summary**: At 16:41 Hrs / 01-08-2024, 220 kV Bhuj-Nanavalka tripped on R-E fault due to suspension insulator failure at loc 16/11 after auto recloser attempt. It is seen that Auto recloser attempt taken from Bhuj End only and three phase trip issued at Nanavalka end for single phase fault. Generation loss of 230 MW occurred at Nanavalka (Alfanar) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 16:41 Hrs/ 01.08.2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nanavalka, (Gujarat)
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.00	68722	52712	12387	17313
घटना के बाद Post Event	49.97	68766	52747	12389	17332

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Heavy Rain & Lightening

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 230 MW occurred at Nanavalka (Alfanar) Wind Power plant.

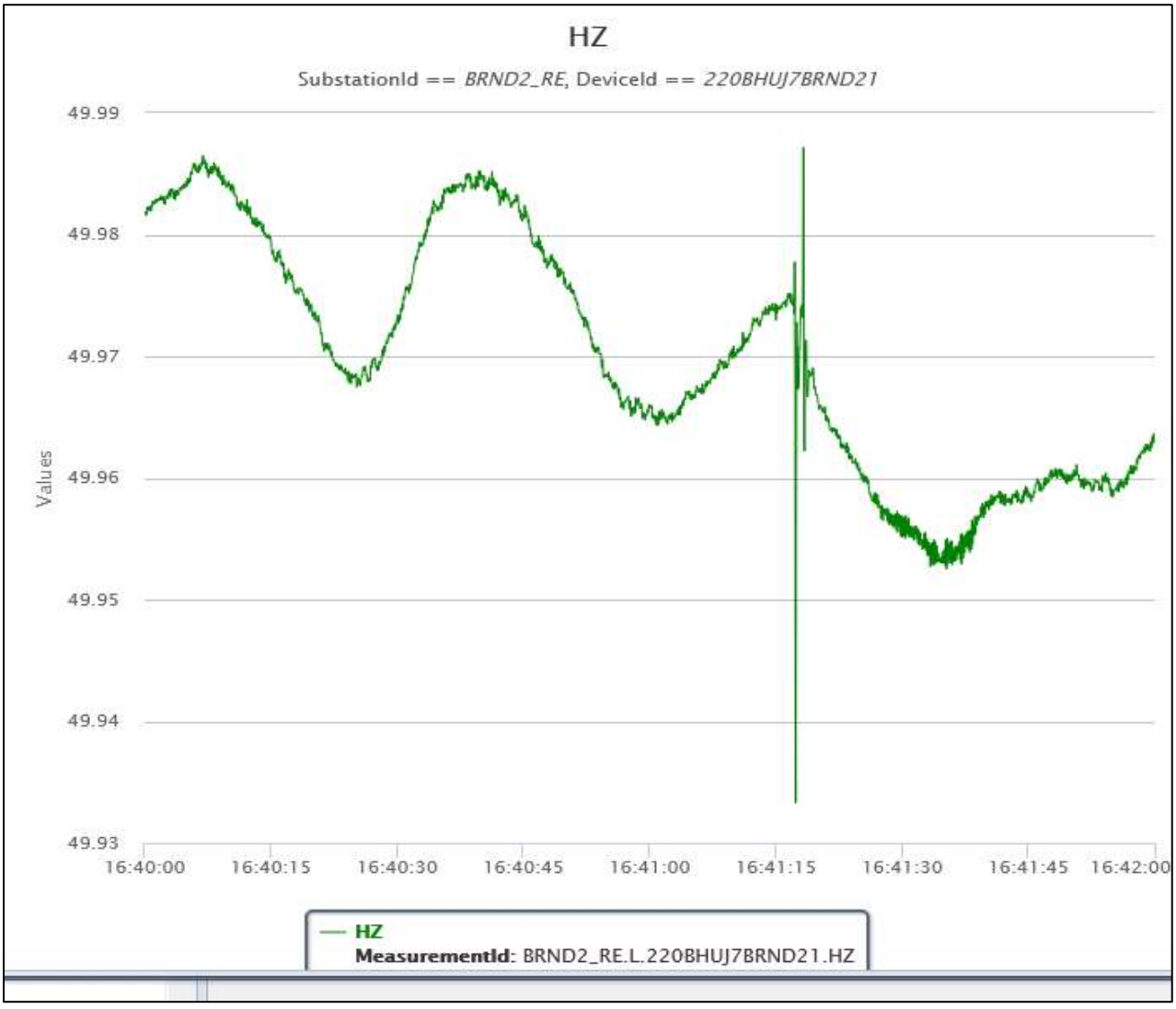


Figure 1. 220 kV Bhuj-Baranda-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 9 hours 17 minutes.

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

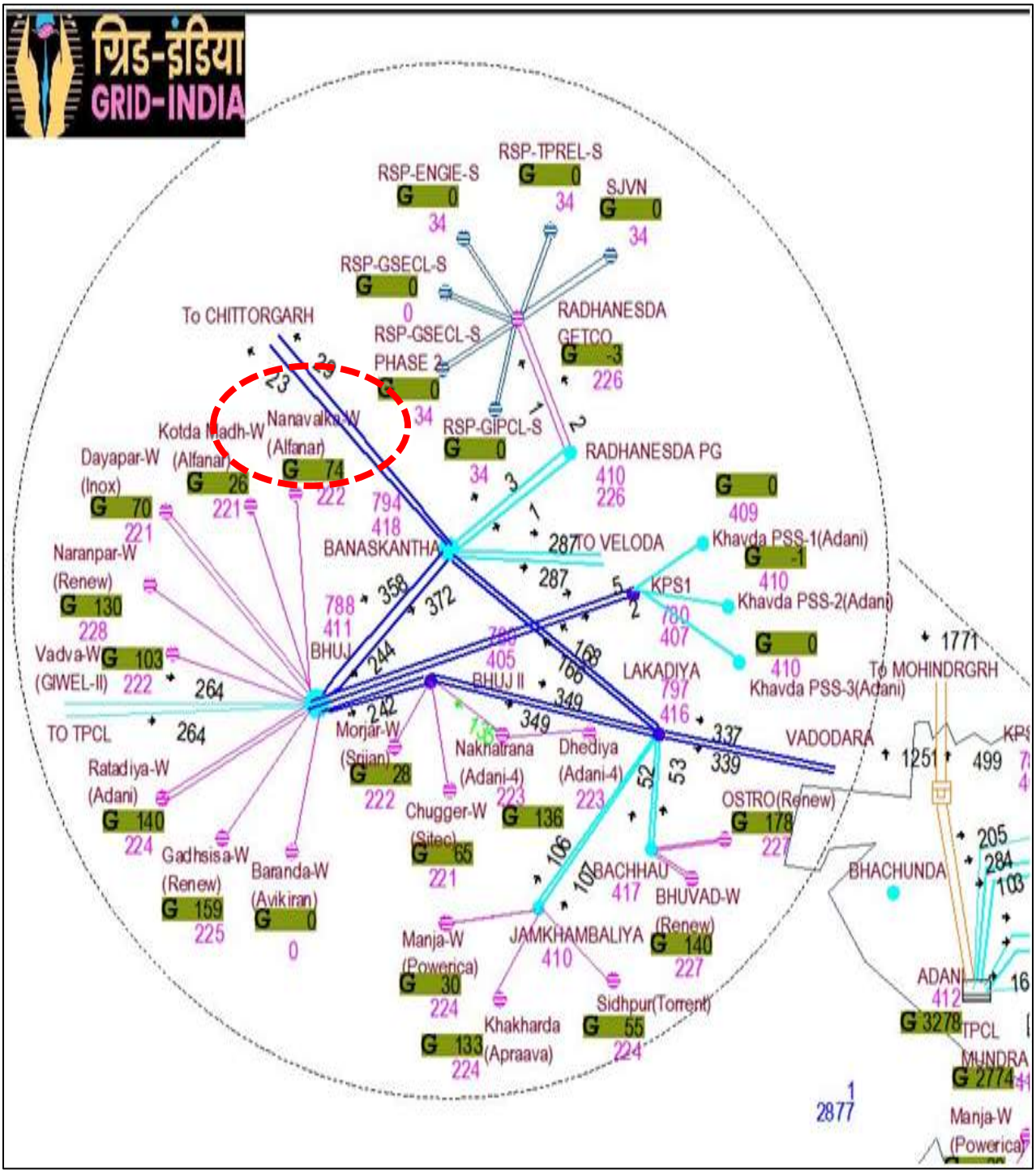


Figure 2. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nanavalka	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1	220 kV Bhuj-Nanavalka(Alfanar) S/C	16:41 / 01-08-2024	Tripped on R-E fault Nanavalka end: 26.23 km/ 0.91 kA Suspension insulator on Tower No. 16/11 R phase had failed.	Bhuj end: 32.2 km/ 4.6 kA	01:58 / 02-08-2024

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

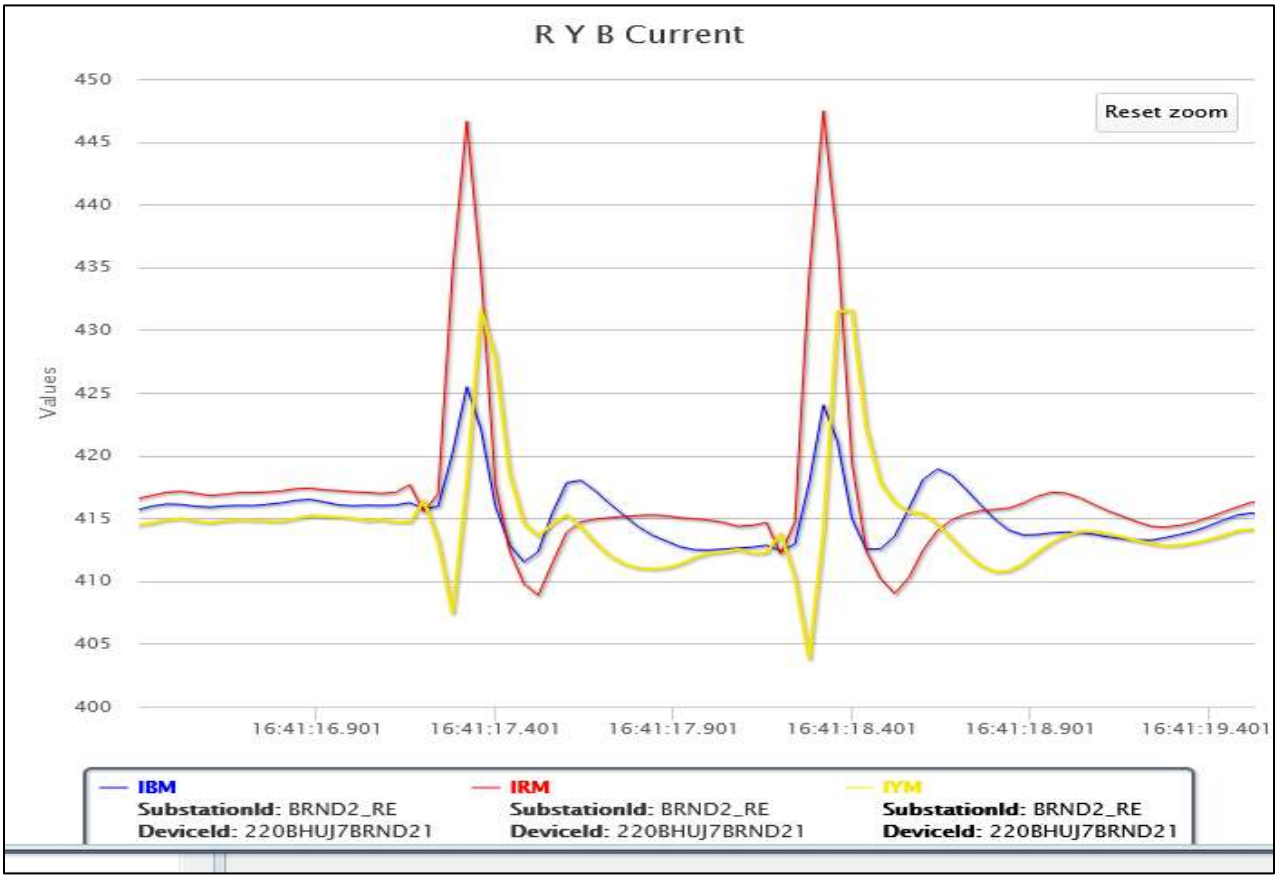


Figure 3. 220 kV Bhuj-Baranda-1 Current Plot

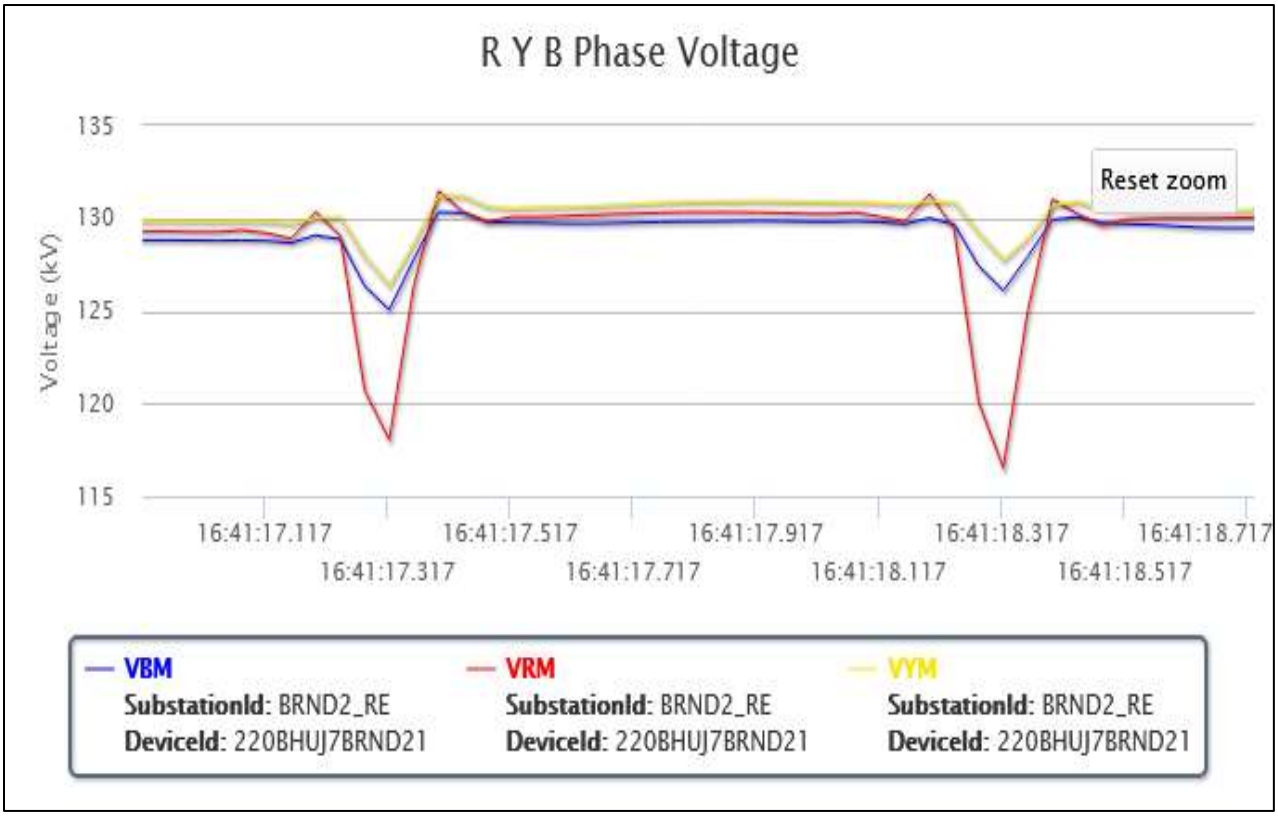


Figure 4. 220 kV Bhuj-Baranda-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- A/R not attempted at Nanavalka end for single phase fault
- D/R not time sync at Bhuj end
- SOE of Nanavalka end not reported at WRLDC Scada.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- DR not time sync at Bhuj end. POWERGRID –WR2 may kindly resolve
- A/R not attempted at 220 Nanavalka for single phase fault. Alfanar may kindly investigate the reason for the same
- SOE of Nanavalka end not reported at WRLDC Scada. Alfanar may kindly resolve the issue in coordination with WRLDC-SCADA.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1	Whether Flash report provided within 08 Hours?	IEGC section 37.2 (b)	Received late from Nanavalka, Alfanar
2	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted at 220 Nanavalka for single phase fault. Alfanar may kindly investigate the reason for the same
3	DR Time Synchronization Issues	IEGC section 17.3	DR not time sync at Bhuj end. POWERGRID –WR2 may kindly resolve

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

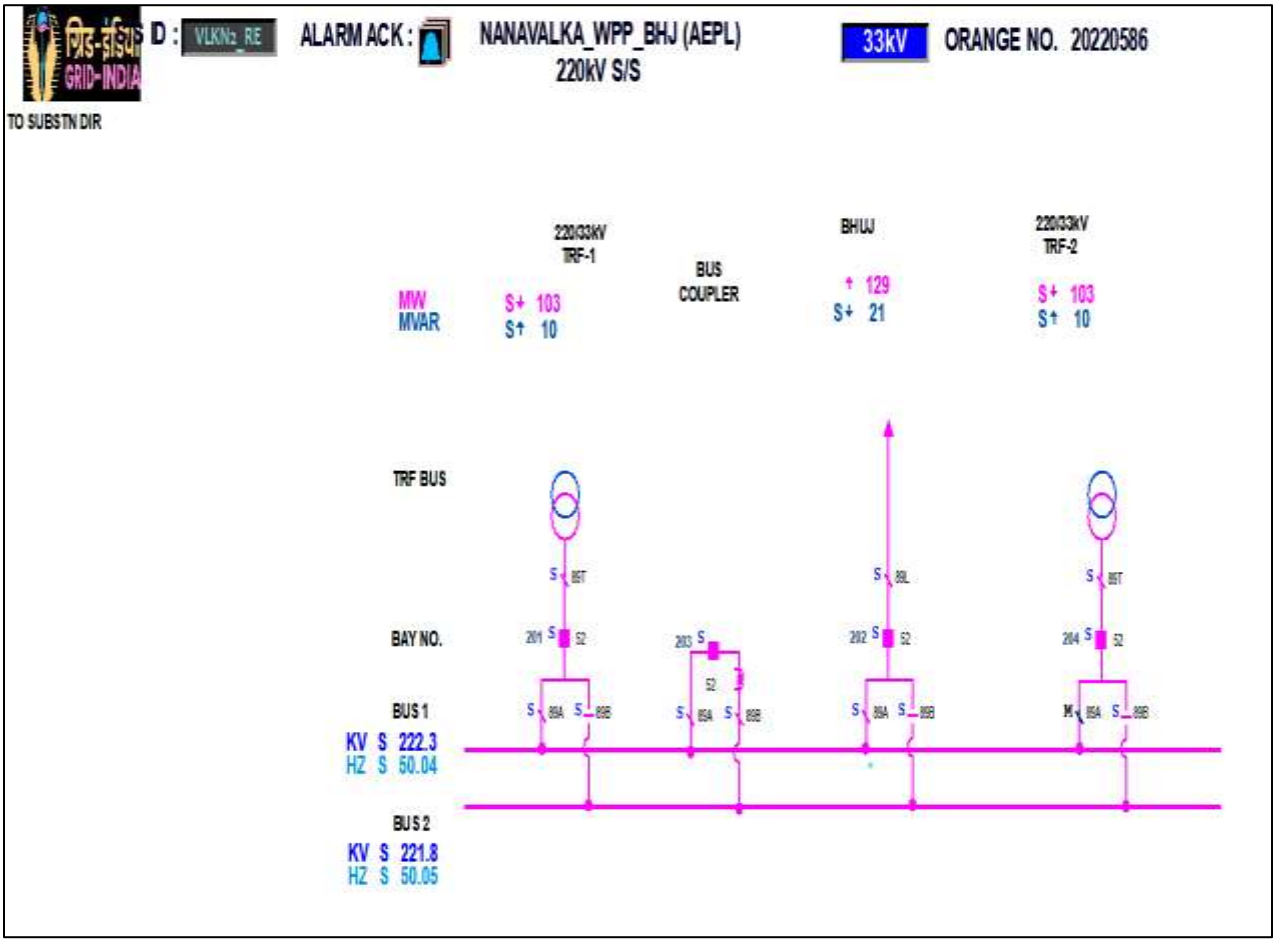
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) TRANSIT	16:41:17	334
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 23052 (VLKN2) ACTED	16:41:18	331
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) CLOSED	16:41:18	273
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) OPEN	16:41:18	344

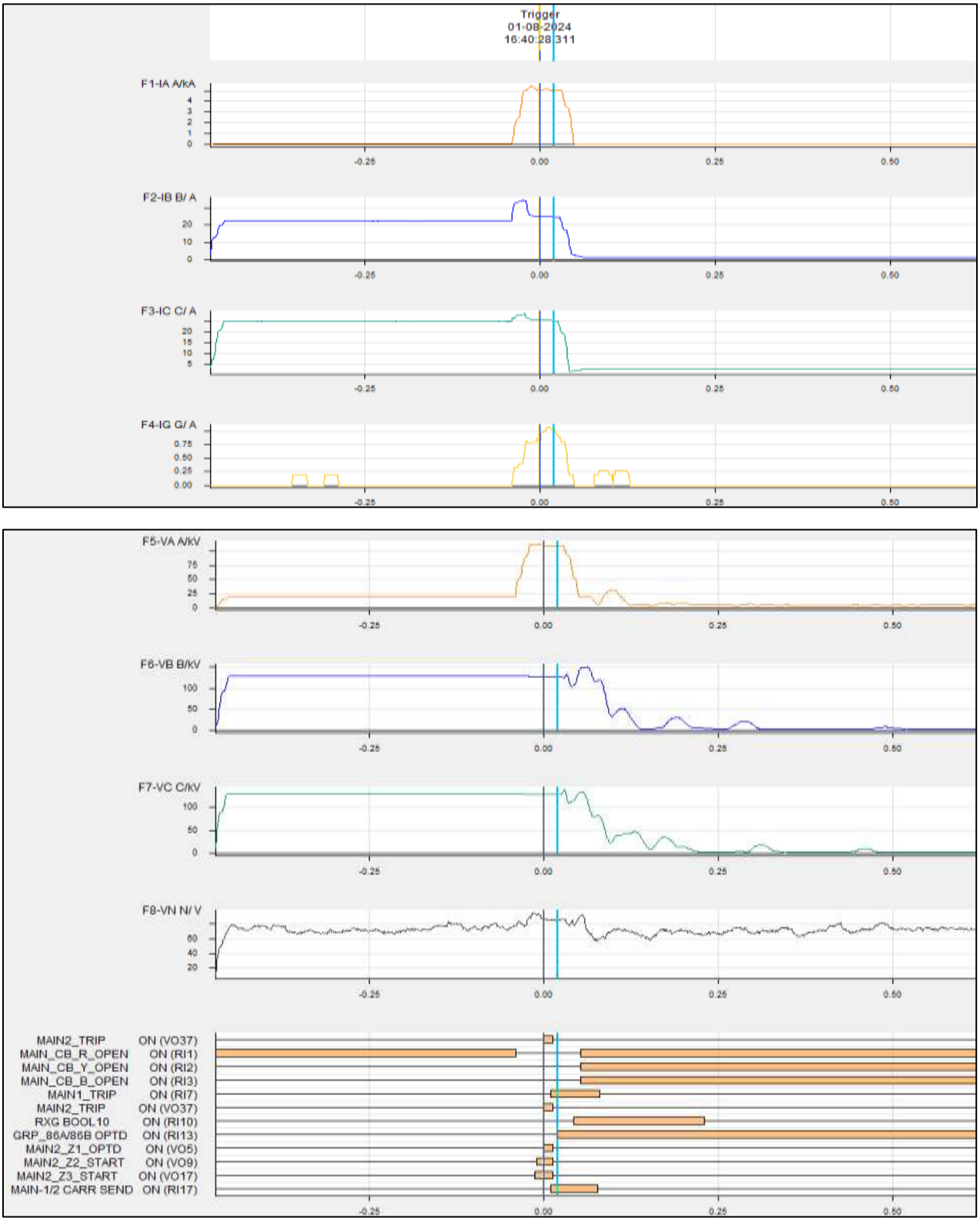
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220 kV Nanavlka SLD-

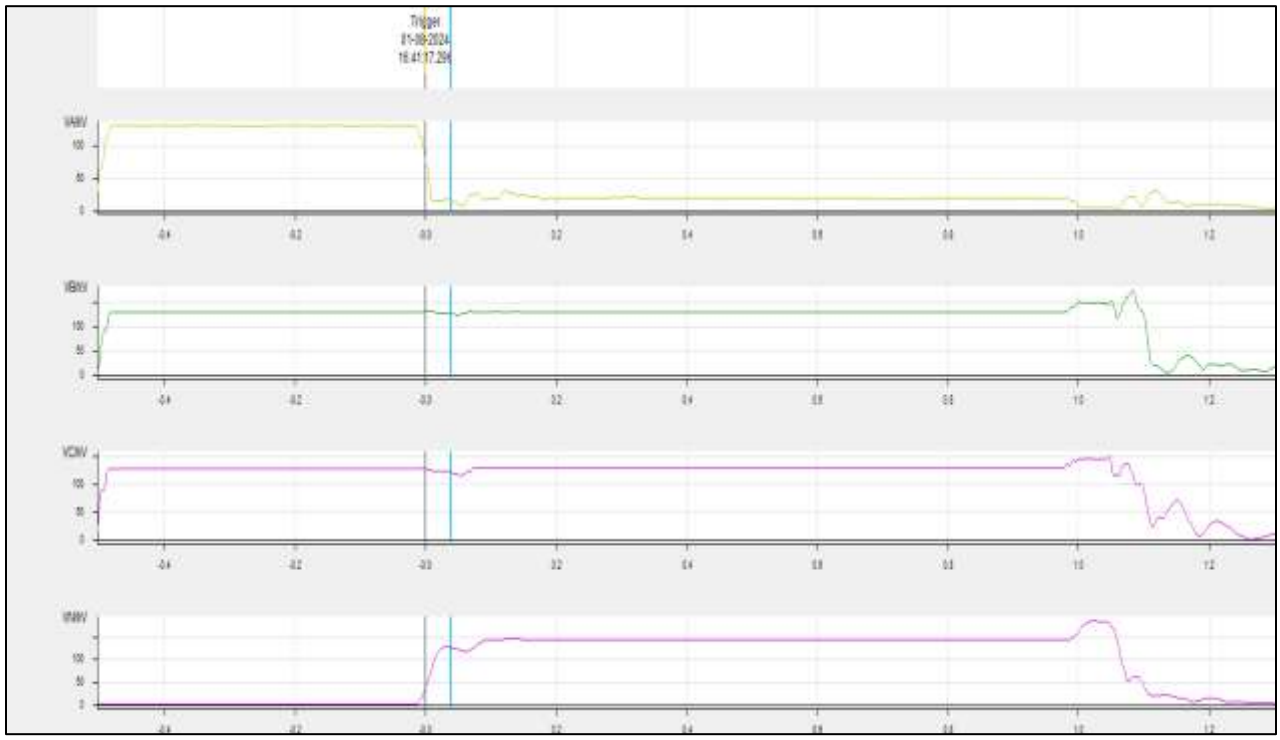


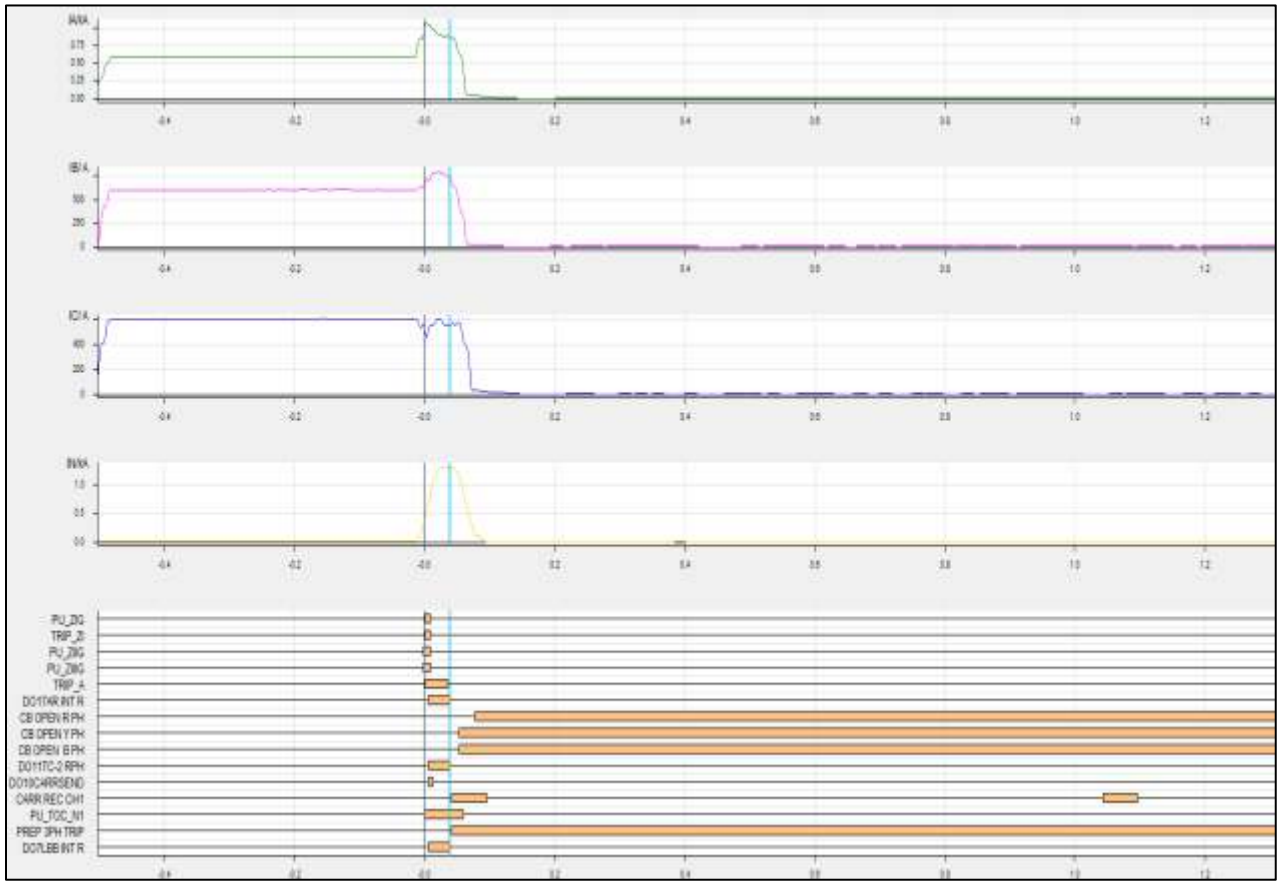
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Bhuj-Nanavalka -1 at Bhuj end-



B. DR of 220 kV Bhuj-Nanavalka -1 at Nanavalka end-





अनुलग्नक-D / Annexure-D: Site photographs – (Insulator failure)



विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. नारंपार उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Naranpar of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 24.09.2024

1. **घटना का सारांश / Event Summary**: At 03:47 Hrs / 02-08-2024, 220 kV Bhuj-Naranpar tripped on 3 phase fault on Z-3 protection at Bhuj end only, indicating the fault within the plant itself. Generation loss of 238 MW occurred at Naranpar (GIWEL-3) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 03:47 Hrs / 02-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Naranpar, Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.99	66009	47638	11021	14835
घटना के बाद Post Event	49.95	65745	47636	11017	14858

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति Weather Condition	Rain & Lightening

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 238 MW Gen loss.

7. **रुकावट की अवधि / Duration of interruption:** 3 hours 6 minutes

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

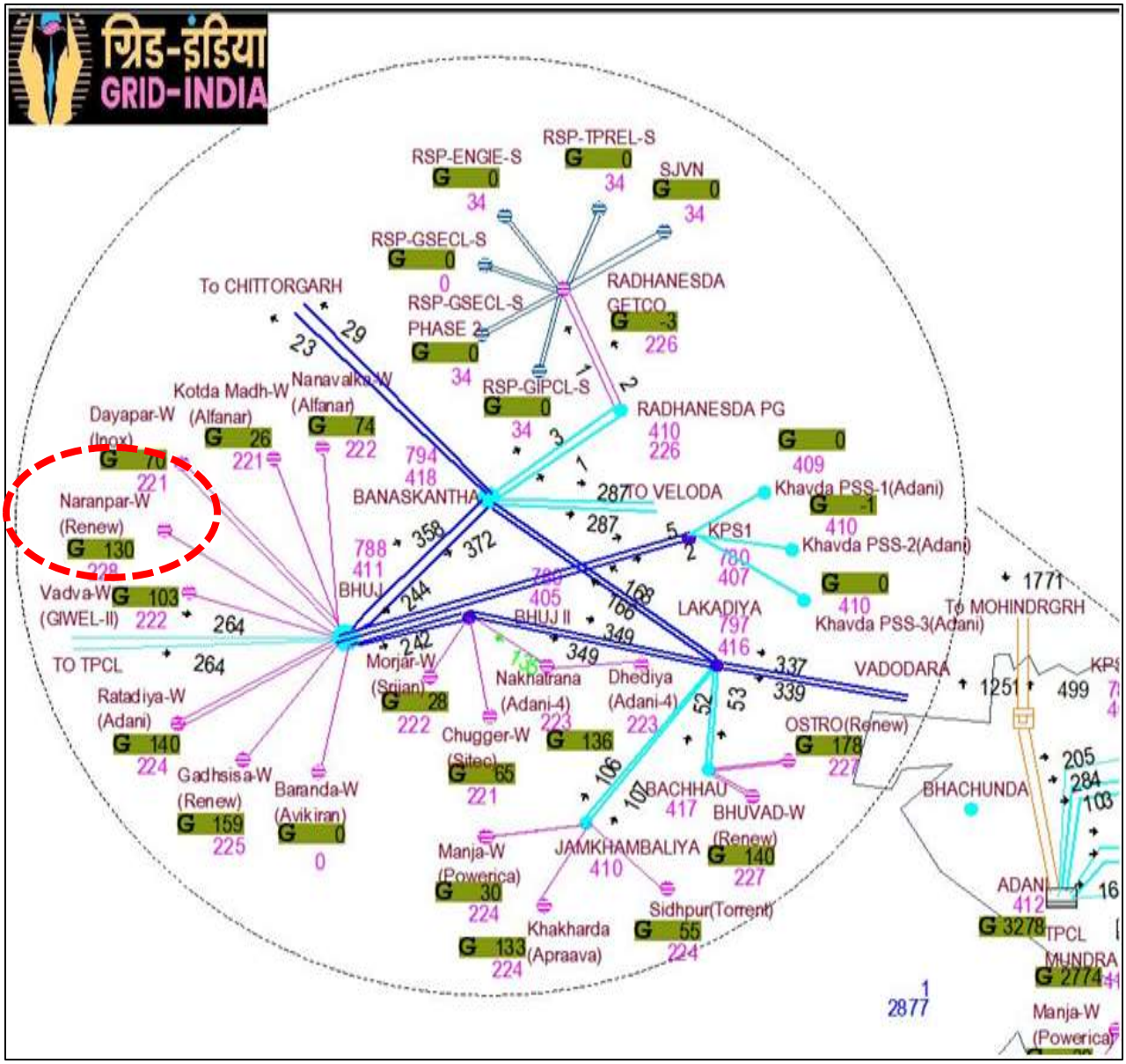


Figure 1. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Naranpar	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220 kV Bhuj-Naranpar ckt	03:47	No relay indications	3 phase fault 118.8 km,	06:53

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

- 220 kV Bhuj-Naranpar tripped on 3 phase fault on Z-3 protection at Bhuj end only.

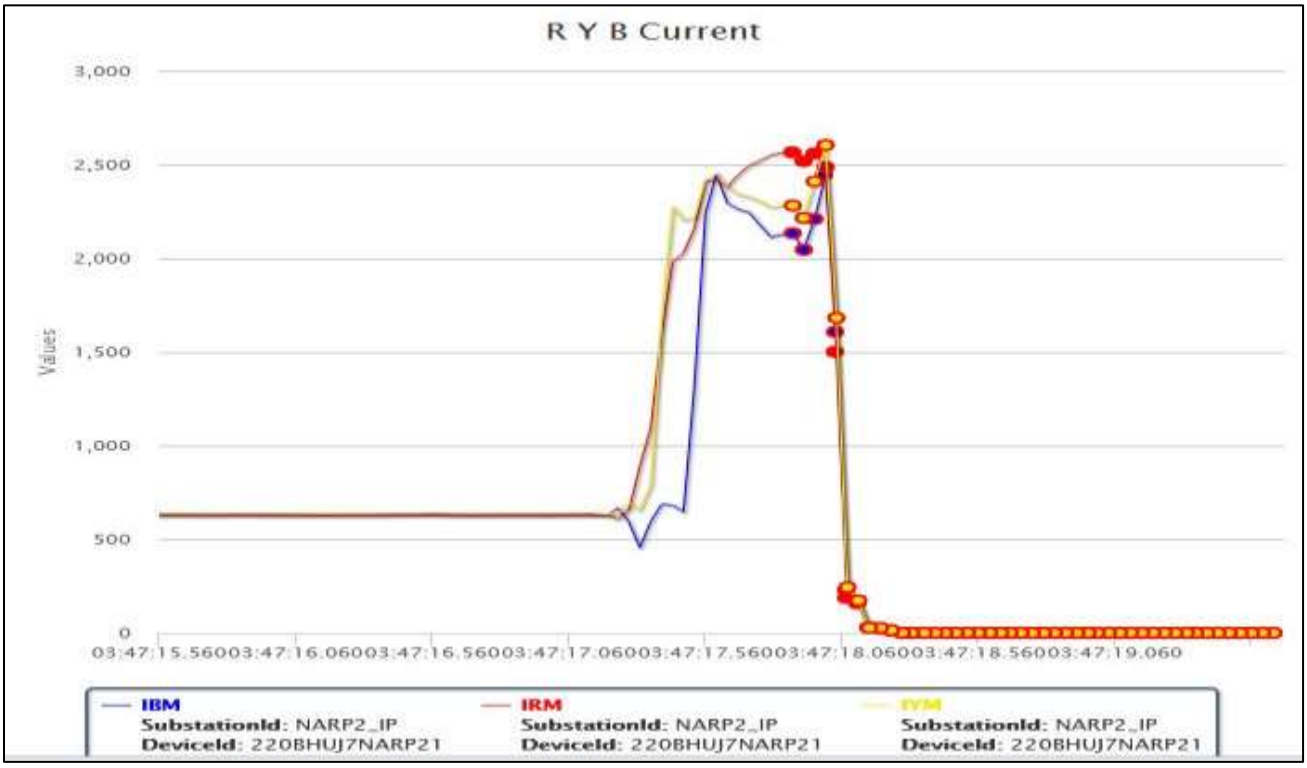


Figure 2. 220 kV Bhuj- Naranpar-1 Current Plot

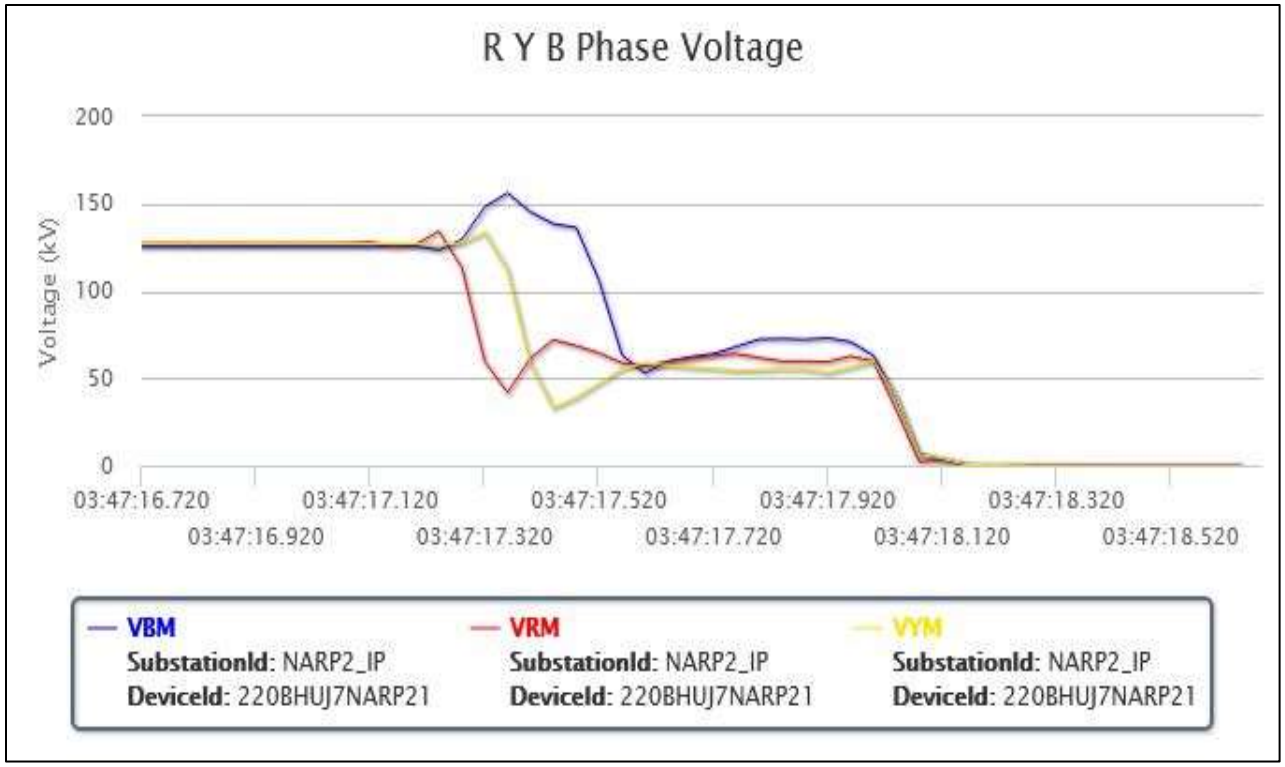


Figure 3. 220 kV Bhuj- Naranpar -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- 3 phase Fault not sensed at Naranpar end.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- GIWEL-Naranpar may kindly investigate the reason for not sensing fault and not tripping at Naranpar end.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र°सं° S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late

2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	received late from POWERGRID WR-2
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Naranpar (GIWEL-3)
4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Line not tripped for 3 phase fault at Naranpar end. GIWEL may kindly investigate

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

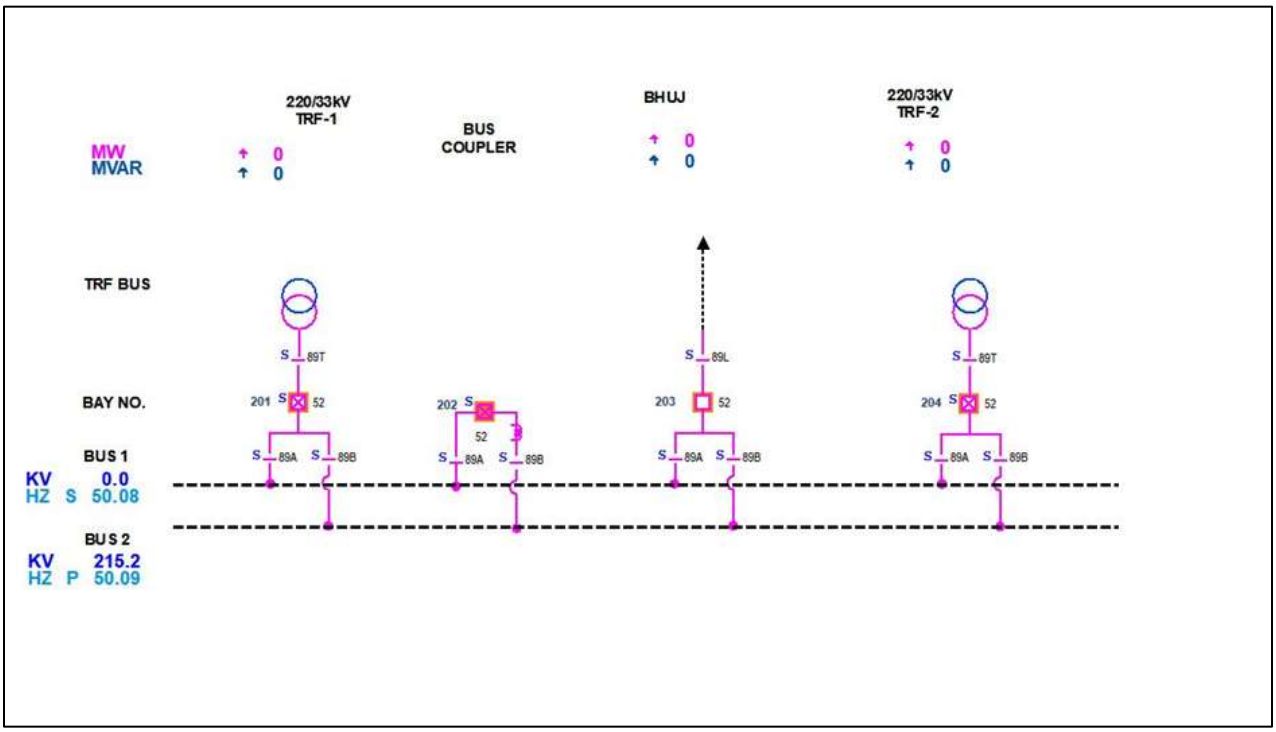
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 21552 (NARP2) ACTED	03:47:18	28
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) OPEN	03:47:18	107

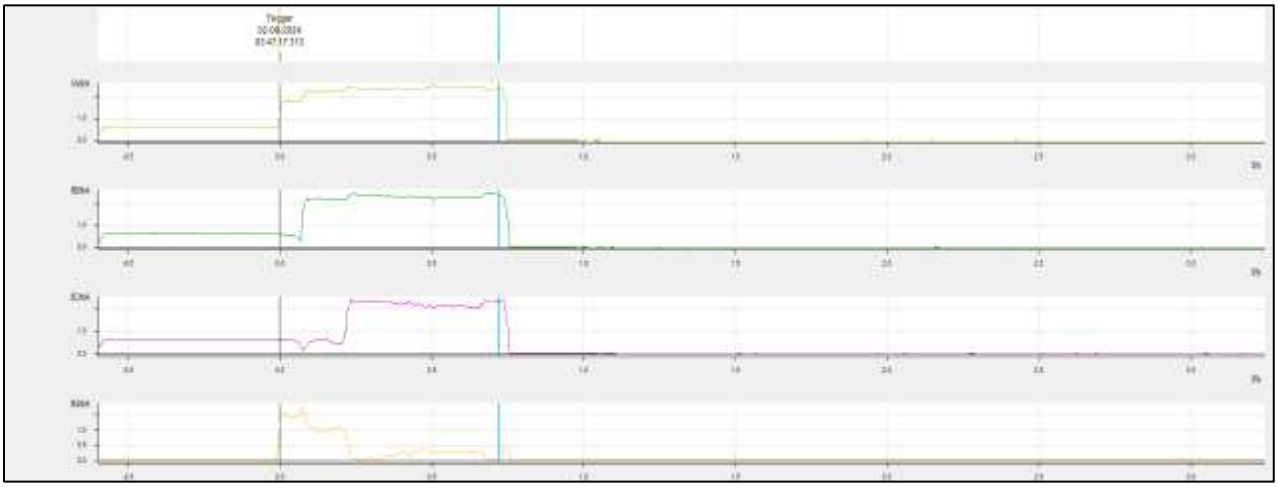
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

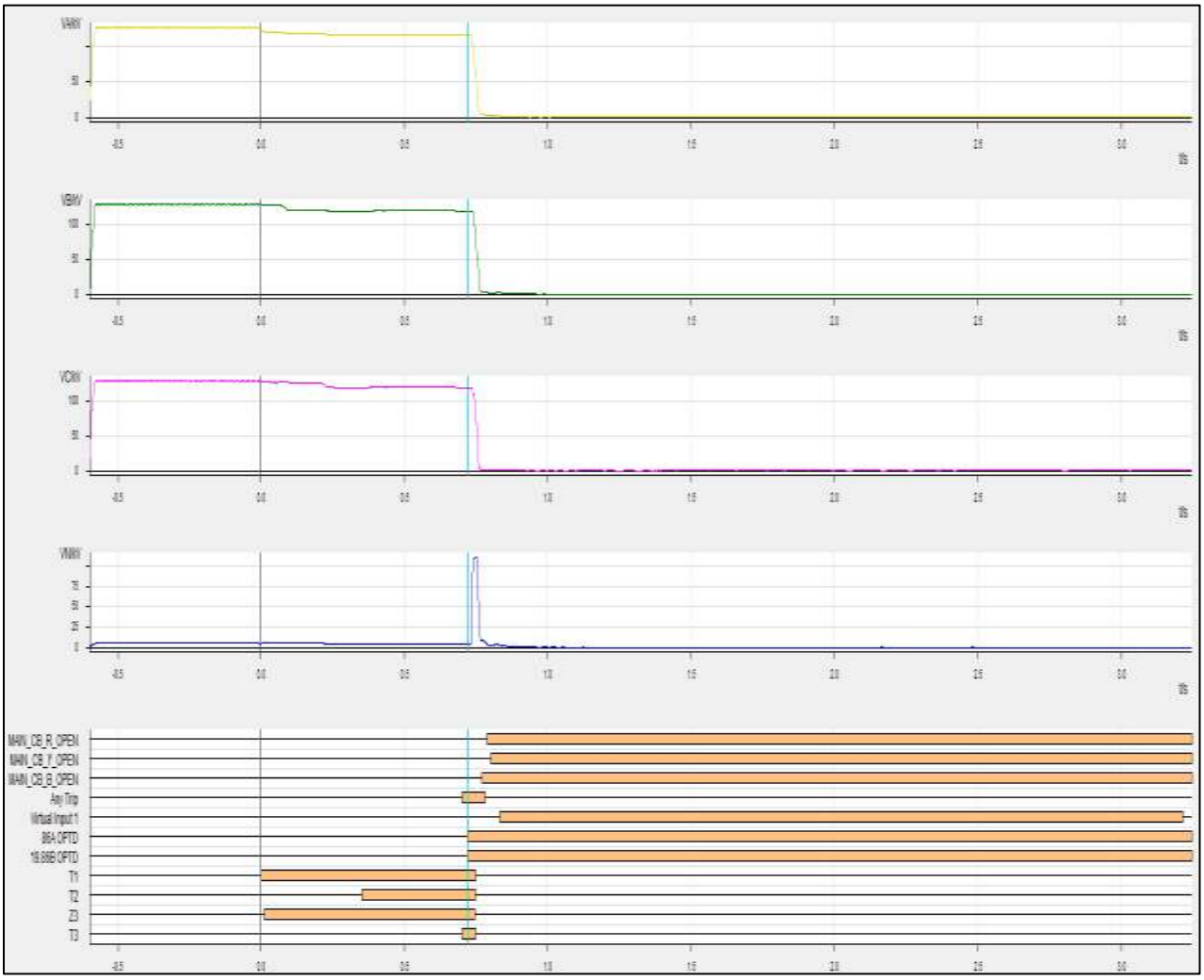
220kV Naranpar SLD:



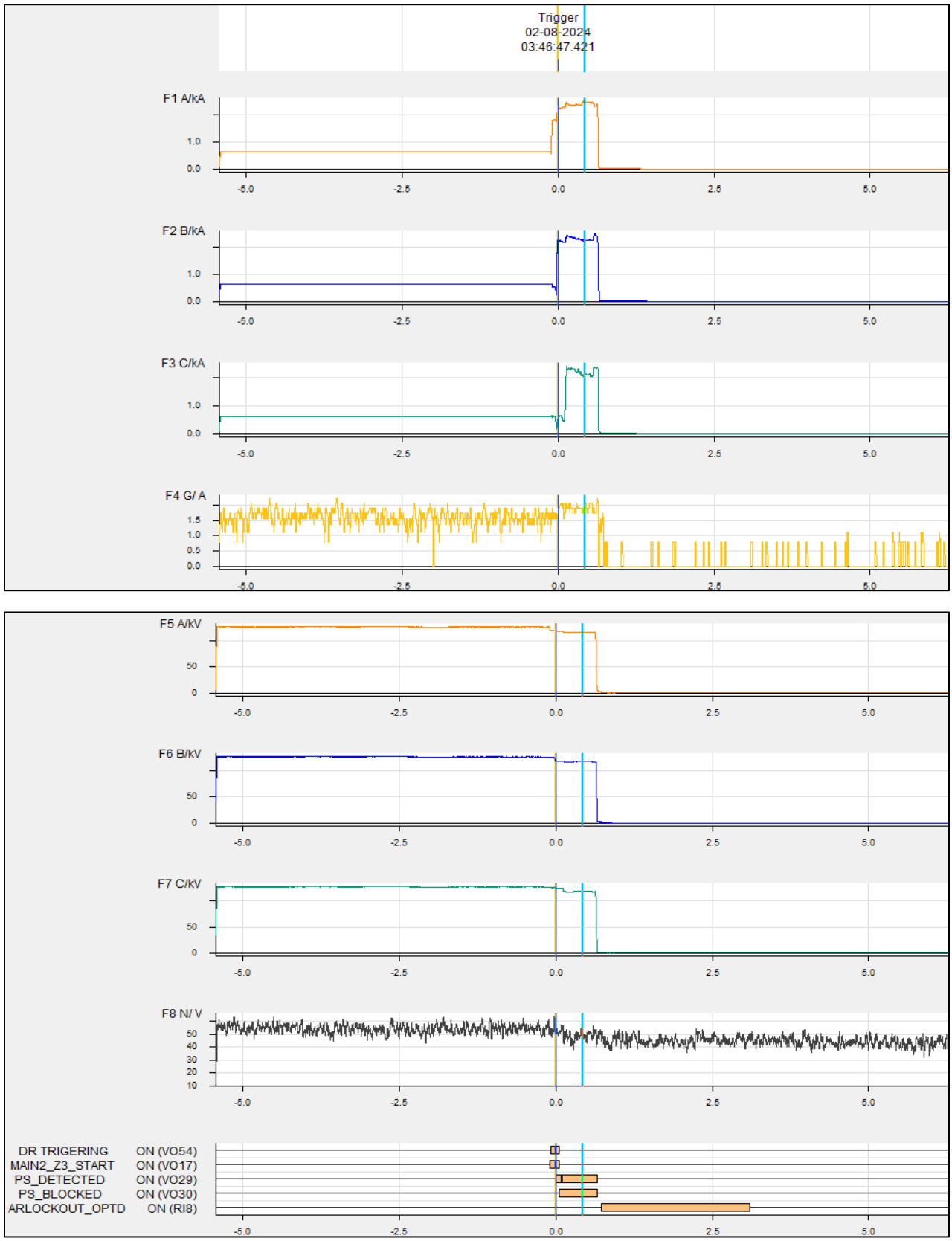
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 KV Bhuj – Naranpar line from Bhuj end, Main-1 relay

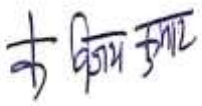




B. DR of 220 KV Bhuj – Naranpar line from Bhuj end, Main-2 relay



अनुलग्नक-D / Annexure-D: Site photographs- Nil



Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. नखत्राना उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nakhatrana of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 18.09.2024

1. **घटना का सारांश / Event Summary**: At 09:36 Hrs / 06-08-2024, 220 kV Bhuj II-Nakhatrana tripped on R-E fault after unsuccessful Auto recloser attempt. At the time of patrolling, R Phase disc insulator failure observed at location 45. Generation loss of 219.74 MW occurred at Nakhatrana and Dedhiya (Adani) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 09:36 Hrs / 06-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nakatrana, Dedhiya , Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.08	70536	55325	11314	17010
घटना के बाद Post Event	50.05	70358	55172	11317	16856

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Cloudy/Rainy

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 219.74 MW Gen loss.

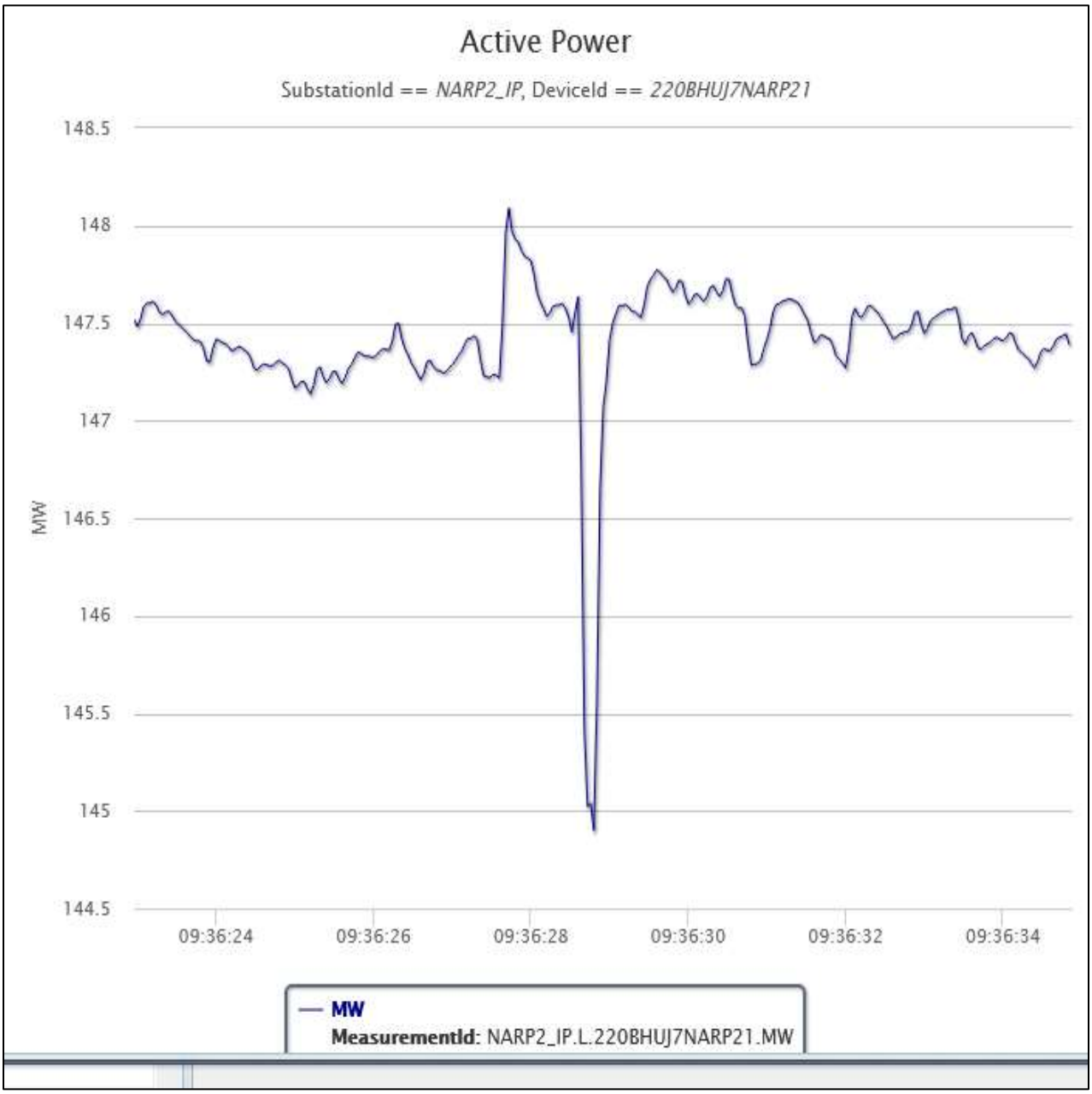


Figure 1. 220 kV Bhuj- Naranpar-1 Active Power Line Plot

7. **रुकावट की अवधि / Duration of interruption:** 6 hours 24 minutes

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

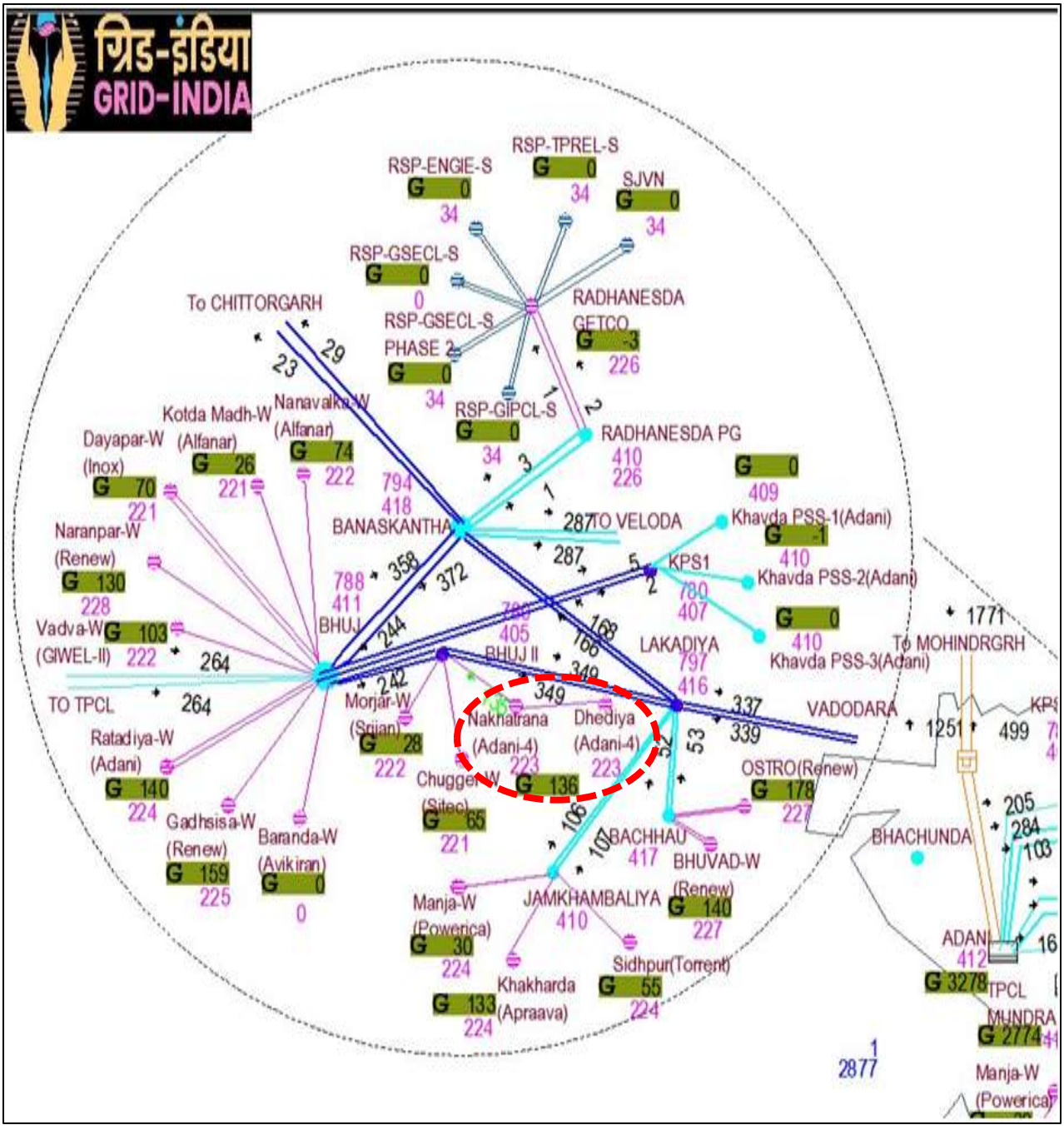


Figure 2. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nakhatrana	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220kV Nakhatrana – Bhuj-II Ckt#1	09:36	ZONE-1 OPTD, ZCOM TRIP, DIR E/F TRIP, PSB OPTD, R-PH Trip R-1065.822 A Y- 540.238 A B- 571.355 A N- 1114.835 A Fault Distance = 12.2 KM from Nakhatrana PSS end.	Zone-Z1, PH-R-N, Fault Distance = 5 KM from Bhuj-2 PGCIL PSS end	16:00

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

- 220KV Nakhatrana-Bhuj-II Line Tripped due to R-N fault.

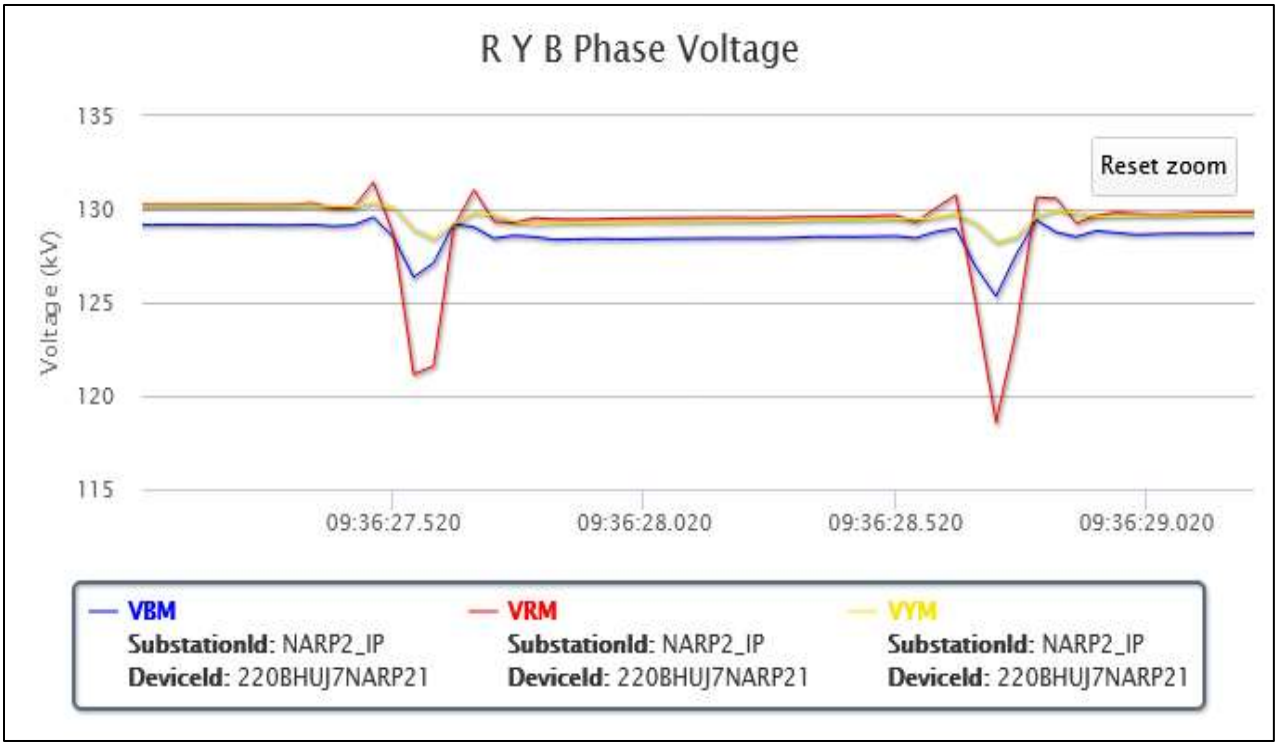


Figure 3. 220 kV Bhuj- Naranpar-1 Voltage Plot

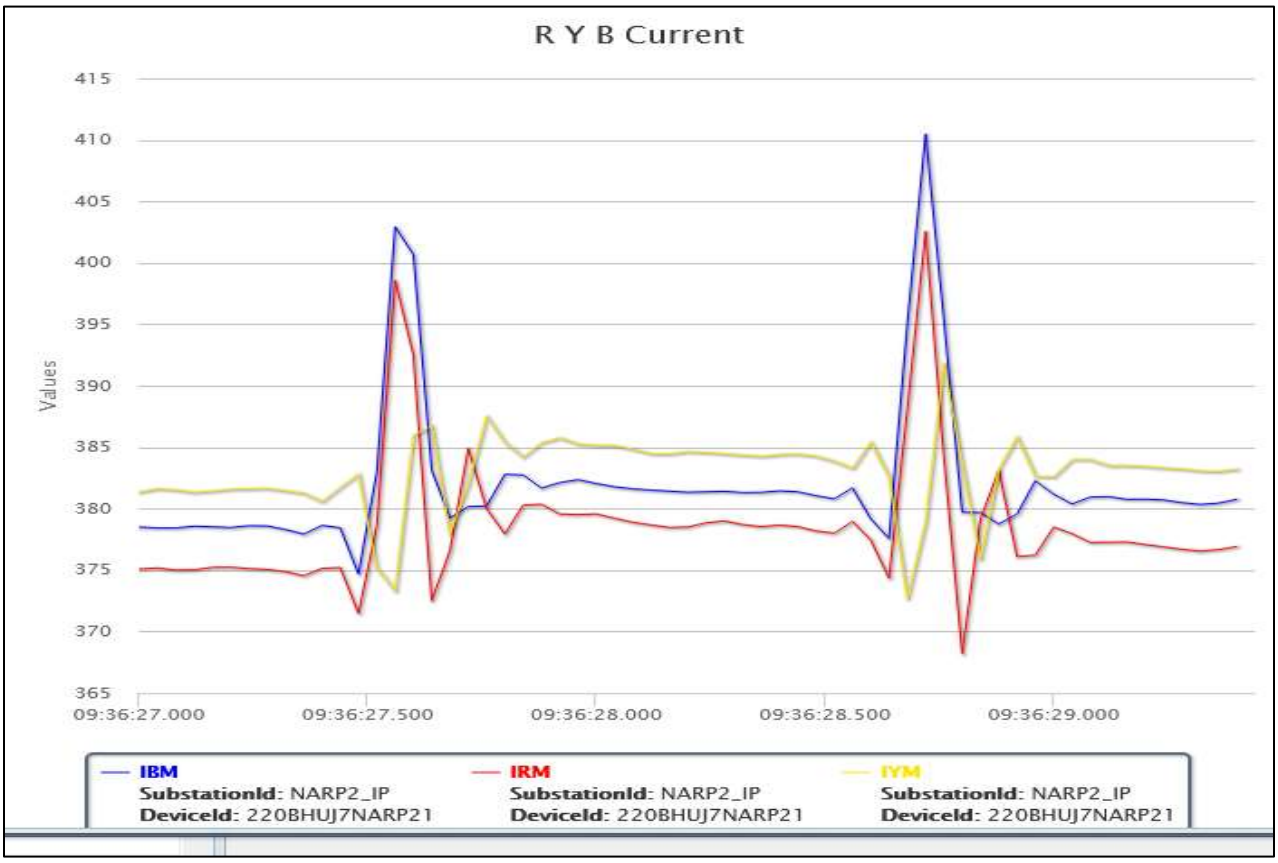


Figure 4. 220 kV Bhuj- Naranpar -1 Current Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- SOE of Nakhatrana end not reported correctly at WRLDC Scada.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- During Patrolling R-Phase Disc Insulator Failure at Tower No.45 From Nakhatrana PSS was found. Line charged after insulator replacement.
- SOE of Nakhatrana end not reported correctly at WRLDC Scada. ADANI, Nakahtrana may kindly resolve the issue in coordination with WRLDC-SCADA.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	DR/EL not received from POWERGRID WR-2

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) FAULTY	09:36:27	590
WRLDC	220KV-CB	DHDY2_RE	DEDHIYA CB COUPLER CB 20252 OPEN	09:36:27	0
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) FAULTY	09:36:27	590
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) CLOSED	09:36:28	700
WRLDC	220-SOE	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) ACTED	09:36:28	732
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) FAULTY	09:36:28	741
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) OPEN	09:36:28	764
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB 20352 (DHDY2) FAULTY	09:36:28	600
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) CLOSED	09:36:28	700
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) FAULTY	09:36:28	741
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) OPEN	09:36:28	764
WRLDC	220-SOE	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) ACTED	09:36:28	732
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB 20452 (BHJ72) FAULTY	09:36:29	0

SOE from Nakhatrana-

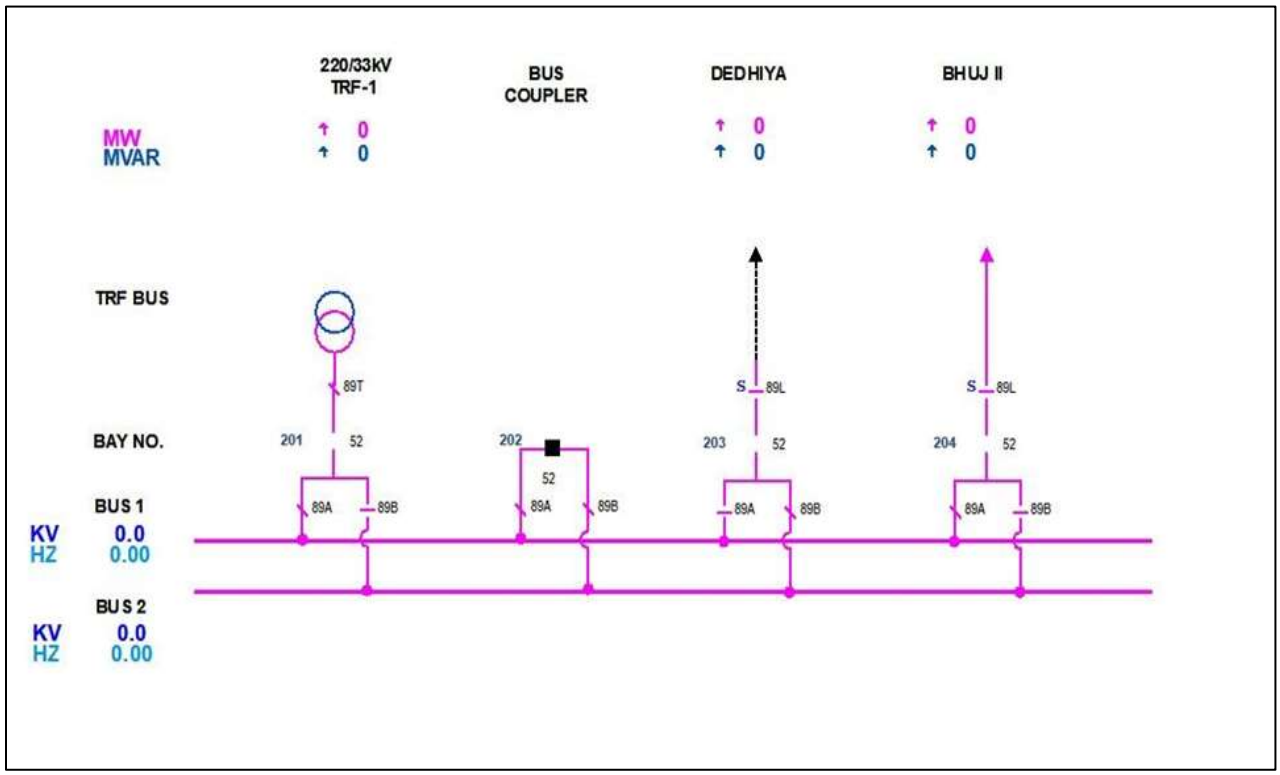
P	06-Aug-24 9:36:27:556 AM	PHS-STFWL1	On
P	06-Aug-24 9:36:27:557 AM	TEF1_START	On
P	06-Aug-24 9:36:27:559 AM	ZM03-START	On
P	06-Aug-24 9:36:27:559 AM	ZM02-START	On
P	06-Aug-24 9:36:27:574 AM	ZM01-TRIP	On
P	06-Aug-24 9:36:27:574 AM	ZM01-START	On
P	06-Aug-24 9:36:27:574 AM	ZCOM_CS	On
P	06-Aug-24 9:36:27:574 AM	TRIP_TRIP	On
P	06-Aug-24 9:36:27:574 AM	TRIP L1	On
P	06-Aug-24 9:36:27:574 AM	AR-START	On
P	06-Aug-24 9:36:27:575 AM	AR_START_M-2	On
P	06-Aug-24 9:36:27:581 AM	AR_IN_PROGRES	On
P	06-Aug-24 9:36:27:581 AM	AR_1PT1	On
P	06-Aug-24 9:36:27:591 AM	CAR_RCV_CH-2	On
P	06-Aug-24 9:36:27:595 AM	ZCOM_TRIP	On
P	06-Aug-24 9:36:27:595 AM	CAR_RCV_CH-1	On
P	06-Aug-24 9:36:27:605 AM	CB_CLOSE_R-PH	Off
P	06-Aug-24 9:36:27:620 AM	CB_OPEN_R-PH	On
P	06-Aug-24 9:36:27:629 AM	AR_START_M-2	Off
P	06-Aug-24 9:36:27:631 AM	ZM01-TRIP	Off
P	06-Aug-24 9:36:27:631 AM	ZM01-START	Off
P	06-Aug-24 9:36:27:637 AM	TEF1_START	Off
P	06-Aug-24 9:36:27:637 AM	BRC_START	On
P	06-Aug-24 9:36:27:640 AM	ZM02-START	Off
P	06-Aug-24 9:36:27:646 AM	ZM03-START	Off
P	06-Aug-24 9:36:27:646 AM	PHS-STFWPE	Off
P	06-Aug-24 9:36:27:646 AM	PHS-STFWL1	Off
P	06-Aug-24 9:36:27:657 AM	CAR_RCV_CH-2	Off
P	06-Aug-24 9:36:27:667 AM	ZCOM_TRIP	Off
P	06-Aug-24 9:36:27:667 AM	AR-START	Off
P	06-Aug-24 9:36:27:676 AM	ZCOM_CS	Off
P	06-Aug-24 9:36:27:701 AM	AR-PREP3P	On
P	06-Aug-24 9:36:27:724 AM	TRIP_TRIP	Off
P	06-Aug-24 9:36:27:724 AM	TRIP L1	Off

P	06-Aug-24 9:36:27:732 AM	CAR_RCV_CH-1	Off
P	06-Aug-24 9:36:27:757 AM	BRC_START	Off
P	06-Aug-24 9:36:28:254 AM	DRP_RECSTART	On
P	06-Aug-24 9:36:28:589 AM	AR_OPTD	On
P	06-Aug-24 9:36:28:597 AM	AR_IN_PROGRES	Off
P	06-Aug-24 9:36:28:597 AM	AR_1PT1	Off
P	06-Aug-24 9:36:28:649 AM	CB_OPEN_R-PH	Off
P	06-Aug-24 9:36:28:672 AM	CB_CLOSE_R-PH	On
P	06-Aug-24 9:36:28:677 AM	TEF1_START	On
P	06-Aug-24 9:36:28:678 AM	PHS-STFWPE	On
P	06-Aug-24 9:36:28:678 AM	PHS-STFWL1	On
P	06-Aug-24 9:36:28:689 AM	CB_SPRNG_CHRG	Off
P	06-Aug-24 9:36:28:690 AM	ZM03-START	On
P	06-Aug-24 9:36:28:701 AM	BRC_START	On
P	06-Aug-24 9:36:28:714 AM	ZM02-START	On
P	06-Aug-24 9:36:28:715 AM	3PH_TRIP_M-2	On
P	06-Aug-24 9:36:28:720 AM	AR_BLOCK_M-2	On
P	06-Aug-24 9:36:28:723 AM	AR-BLOCK	On
P	06-Aug-24 9:36:28:726 AM	ZM01-TRIP	On
P	06-Aug-24 9:36:28:726 AM	ZM01-START	On
P	06-Aug-24 9:36:28:726 AM	ZCOM_CS	On
P	06-Aug-24 9:36:28:726 AM	TRIP_TRIP	On
P	06-Aug-24 9:36:28:726 AM	TRIP L3	On
P	06-Aug-24 9:36:28:726 AM	TRIP L2	On
P	06-Aug-24 9:36:28:726 AM	TRIP L1	On
P	06-Aug-24 9:36:28:726 AM	AR-START	On
P	06-Aug-24 9:36:28:735 AM	86A/86B_OPTD	On
P	06-Aug-24 9:36:28:736 AM	CAR_RCV_CH-2	On
P	06-Aug-24 9:36:28:741 AM	ZCOM_TRIP	On
P	06-Aug-24 9:36:28:741 AM	AR_UNSUCCESS	On
P	06-Aug-24 9:36:28:744 AM	CB_CLOSE_R-PH	Off
P	06-Aug-24 9:36:28:745 AM	CB_CLOSE_B-PH	Off
P	06-Aug-24 9:36:28:746 AM	CB_CLOSE_Y-PH	Off
P	06-Aug-24 9:36:28:746 AM	AR_START_M-2	On
P	06-Aug-24 9:36:28:749 AM	CAR_RCV_CH-1	On
P	06-Aug-24 9:36:28:759 AM	CB_OPEN_R-PH	On
P	06-Aug-24 9:36:28:759 AM	CB_OPEN_B-PH	On
P	06-Aug-24 9:36:28:760 AM	CB_OPEN_Y-PH	On
P	06-Aug-24 9:36:28:769 AM	AR_BLOCK_M-2	Off
P	06-Aug-24 9:36:28:770 AM	AR_START_M-2	Off
P	06-Aug-24 9:36:28:773 AM	TEF1_START	Off
P	06-Aug-24 9:36:28:789 AM	ZM03-START	Off
P	06-Aug-24 9:36:28:789 AM	ZM02-START	Off
P	06-Aug-24 9:36:28:789 AM	ZM01-TRIP	Off
P	06-Aug-24 9:36:28:789 AM	ZM01-START	Off
P	06-Aug-24 9:36:28:789 AM	PHS-STFWPE	Off
P	06-Aug-24 9:36:28:789 AM	PHS-STFWL1	Off
P	06-Aug-24 9:36:28:794 AM	3PH_TRIP_M-2	Off
P	06-Aug-24 9:36:28:797 AM	CAR_RCV_CH-2	Off
P	06-Aug-24 9:36:28:816 AM	ZCOM_TRIP	Off
P	06-Aug-24 9:36:28:816 AM	AR-START	Off
P	06-Aug-24 9:36:28:819 AM	DRP_RECSTART	Off
P	06-Aug-24 9:36:28:828 AM	ZCOM_CS	Off

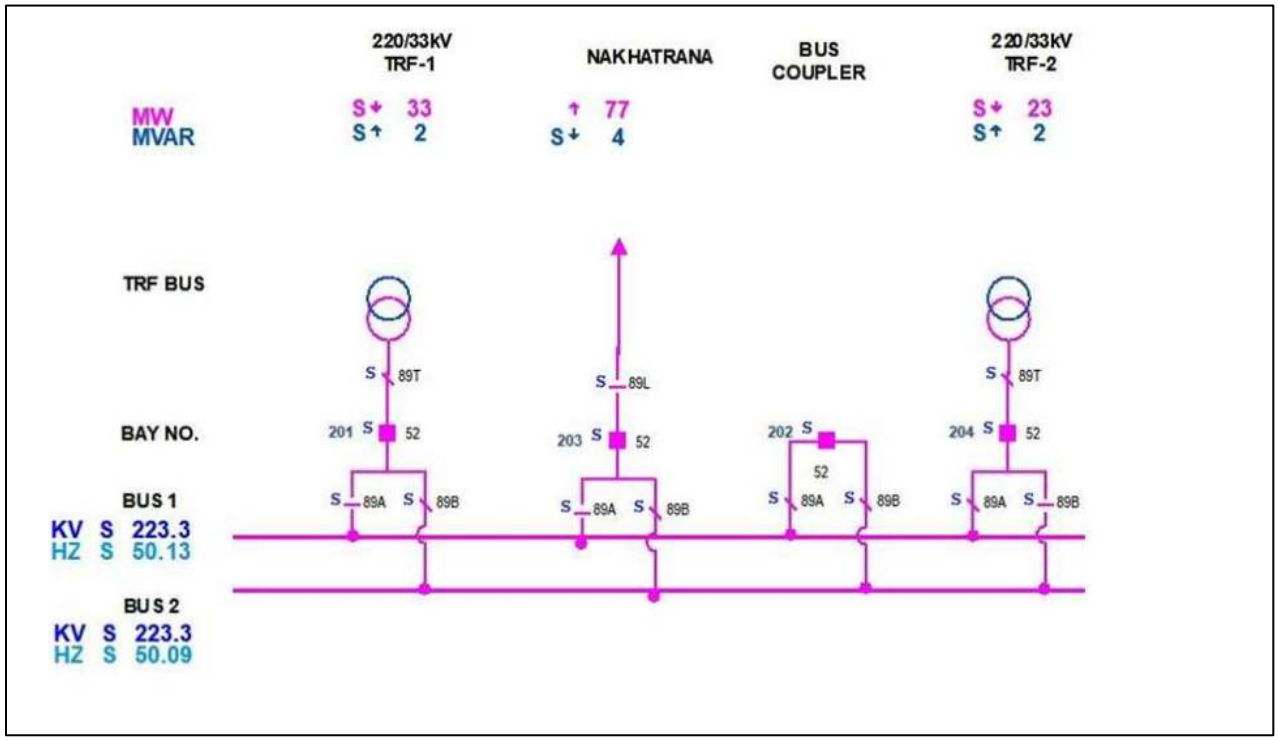
P	06-Aug-24	9:36:28:869 AM	BRC_START	Off
P	06-Aug-24	9:36:28:879 AM	TRIP_TRIP	Off
P	06-Aug-24	9:36:28:879 AM	TRIP L3	Off
P	06-Aug-24	9:36:28:879 AM	TRIP L2	Off
P	06-Aug-24	9:36:28:879 AM	TRIP L1	Off
P	06-Aug-24	9:36:28:882 AM	CAR_RCV_CH-1	Off
P	06-Aug-24	9:36:31:016 AM	DRP_RECSTART	On
P	06-Aug-24	9:36:31:420 AM	DRP_RECSTART	Off
P	06-Aug-24	9:36:33:597 AM	AR_OPTD	Off
P	06-Aug-24	9:36:38:605 AM	AR_UNSUCCESS	Off
P	06-Aug-24	9:36:47:994 AM	DRP_RECMADE	On
P	06-Aug-24	9:36:48:403 AM	DRP_RECMADE	Off
P	06-Aug-24	9:37:04:009 AM	DRP_RECMADE	On
P	06-Aug-24	9:37:04:621 AM	DRP_RECMADE	Off
P	06-Aug-24	9:43:22:339 AM	LOGGEDON	On
P	06-Aug-24 AM	10:08:20:386	CB_SPRNG_CHRG	On
P	06-Aug-24 AM	10:56:42:348	LOGGEDON	Off
P	06-Aug-24	2:01:40:293 PM	86A/86B_OPTD	Off
P	06-Aug-24	2:01:40:297 PM	AR-BLOCK	Off
P	06-Aug-24	3:38:18:613 PM	CB_MAN_OPEN	On
P	06-Aug-24	3:38:18:783 PM	CB_MAN_OPEN	Off
P	06-Aug-24	4:01:25:637 PM	CB_MAN_CLOSE	On
P	06-Aug-24	4:01:25:642 PM	AR-BLOCK	On
P	06-Aug-24	4:01:25:680 PM	CB_OPEN_R-PH	Off
P	06-Aug-24	4:01:25:685 PM	CB_OPEN_Y-PH	Off
P	06-Aug-24	4:01:25:689 PM	CB_OPEN_B-PH	Off
P	06-Aug-24	4:01:25:702 PM	CB_CLOSE_R-PH	On
P	06-Aug-24	4:01:25:705 PM	CB_CLOSE_Y-PH	On
P	06-Aug-24	4:01:25:709 PM	CB_CLOSE_B-PH	On
P	06-Aug-24	4:01:25:719 PM	CB_SPRNG_CHRG	Off
P	06-Aug-24	4:01:25:985 PM	CB_MAN_CLOSE	Off
P	06-Aug-24	4:01:25:990 PM	AR-BLOCK	Off
P	06-Aug-24	4:01:26:057 PM	DRP_RECSTART	On
P	06-Aug-24	4:01:26:461 PM	DRP_RECSTART	Off
P	06-Aug-24	4:01:44:260 PM	DRP_RECMADE	On
P	06-Aug-24	4:01:44:672 PM	DRP_RECMADE	Off
P	06-Aug-24	4:04:29:837 PM	BRC_START	On
P	06-Aug-24	4:04:29:957 PM	BRC_START	Off
P	06-Aug-24	4:04:30:269 PM	DRP_RECSTART	On
P	06-Aug-24	4:04:30:827 PM	DRP_RECSTART	Off
P	06-Aug-24	4:04:47:860 PM	DRP_RECMADE	On
P	06-Aug-24	4:04:48:472 PM	DRP_RECMADE	Off
P	06-Aug-24	4:05:30:257 PM	CB_SPRNG_CHRG	On

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Nakhatrana SLD:

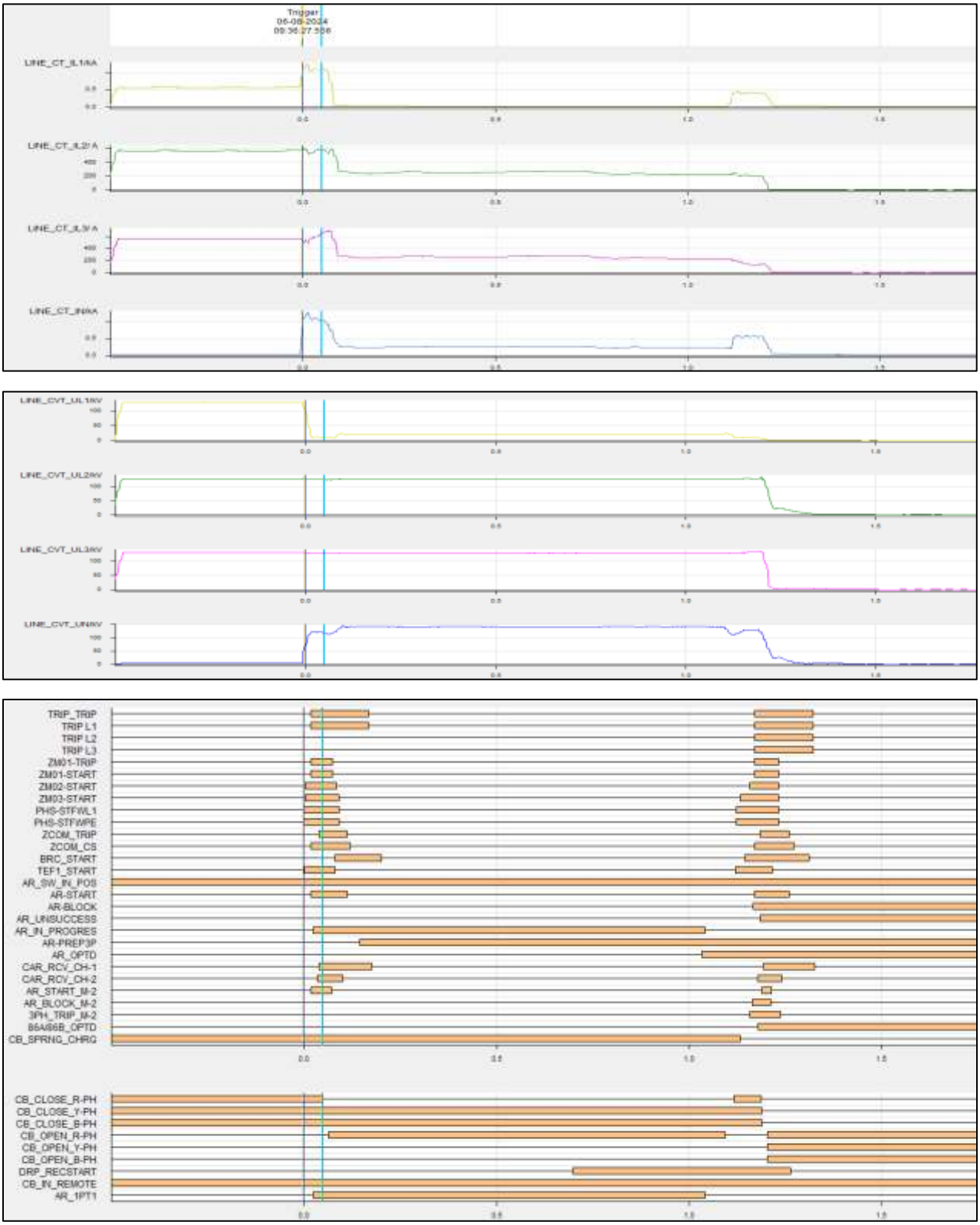


220kV Dedhiya SLD:



अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Nakhatrana-Dedhiya-1 for Nakhatrana end



अनुलग्नक-D / Annexure-D: Site photographs –



FAILED INSULATOR



NEW INSULATOR

विजय कुमार

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. रताड़िया उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Ratadiya of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 13:59 Hrs / 07-08-2024, 220 kV Bhuj-Ratadiya-1 tripped on Y-E fault. A/R not attempted at Bhuj end in Ckt-1. After few seconds, 220kV Bhuj-Ratadiya-2 tripped on overloading at Ratadiya end. At the time of patrolling, Y phase jumper found open at location 165. Generation loss of 406 MW occurred at Ratadiya (Adani) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 13:59 Hrs / 07-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Ratadiya, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.04	66351	51170	13149	16021

घटना के बाद **Post Event**	50.02	65682	51108	13106	16017

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Cloudy

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 406 MW occurred at Ratadiya (Adani) Wind Power plant

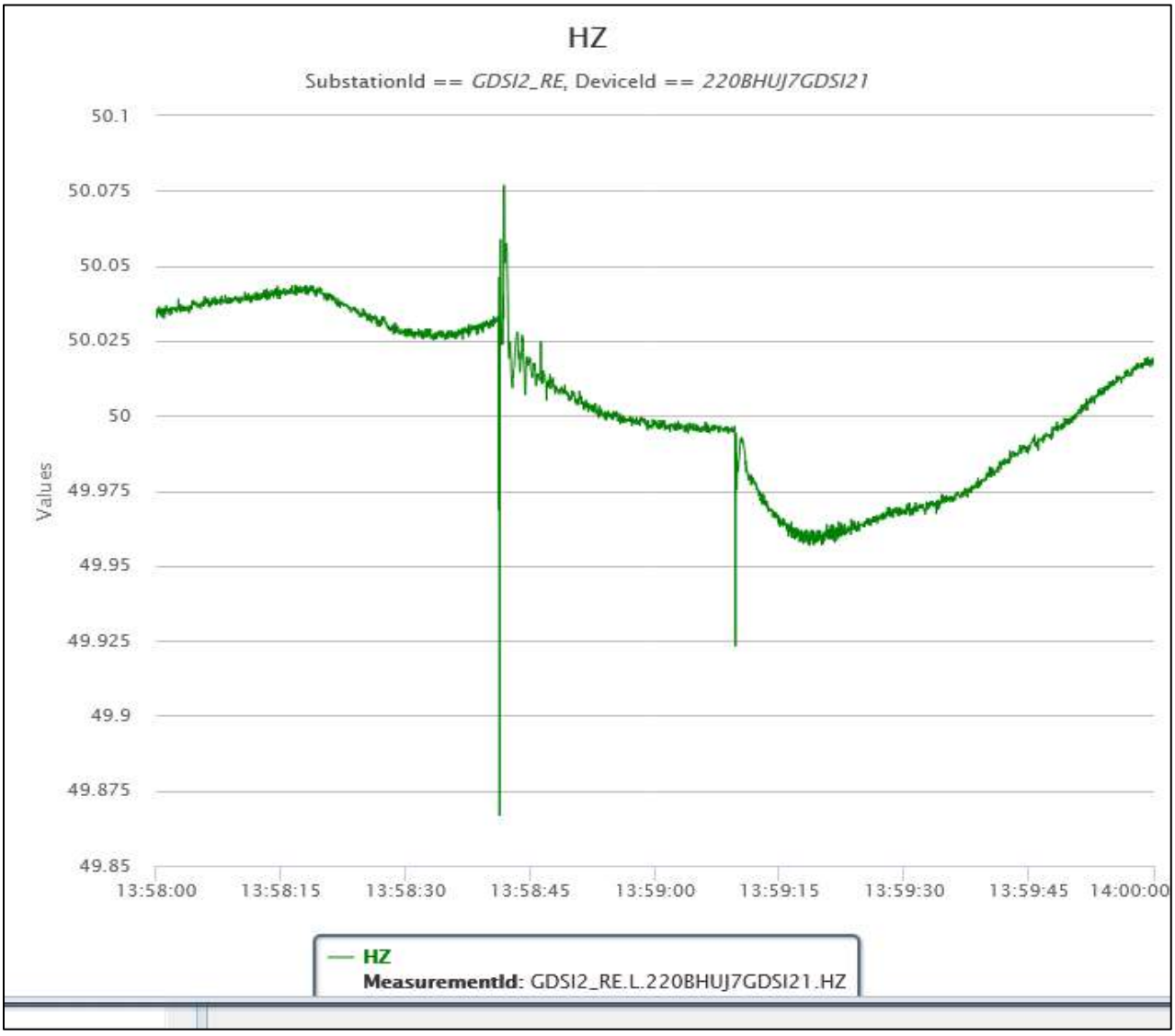


Figure 1. 220 kV Bhuj- Gadhsisa-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 6 hours 55 minutes

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

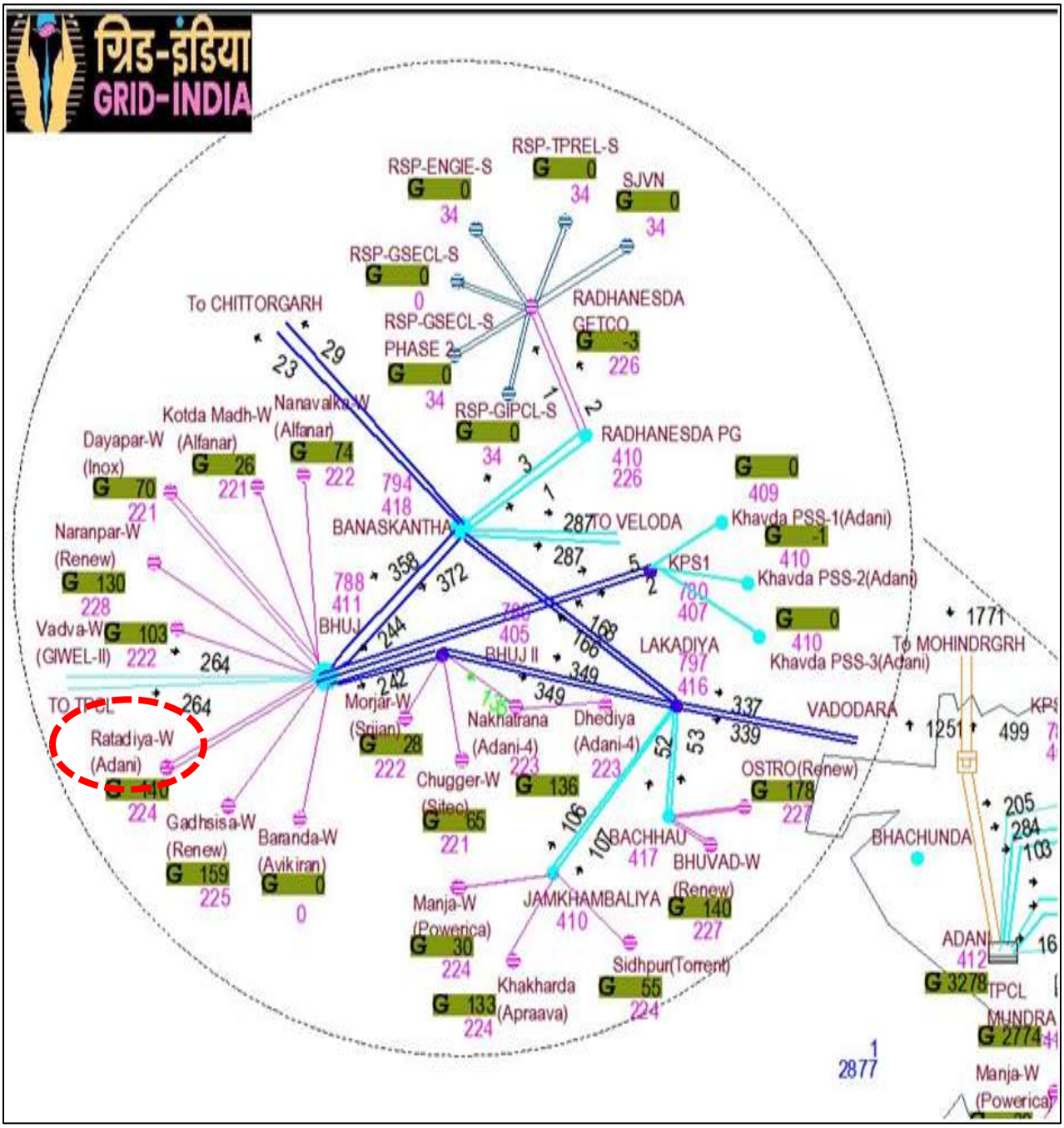


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Ratadiya	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220kV Bhuj-Ratadiya#1	13:59 / 07-08-2024	Tripped on Y-N Fault 36.49 km, 1.66kA OVUVOFUF-TRIP R- 635.662A Y- 1642.291A B- 681.894A N- 1.167A	7.4 km, 13kA	00:49 / 08-08-2024
2	220kV Bhuj-Ratadiya#2	13:59 / 07-08-2024	Due to Overloading OVUVOFUF TUV1-TRIP R-957.549 A Y-1853.901 A B-826.992 A N-1378.964 A	Not tripped at this end	20:53 / 07-08-2024

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

- 220 kV Bhuj-Ratadiya-1 tripped on Y-E fault without A/R attempt at Bhuj end, A/R attempted at Ratadiya end.
- After few seconds, 220kV Bhuj-Ratadiya-2 tripped on overloading at Ratadiya end as bus coupler was in on condition.

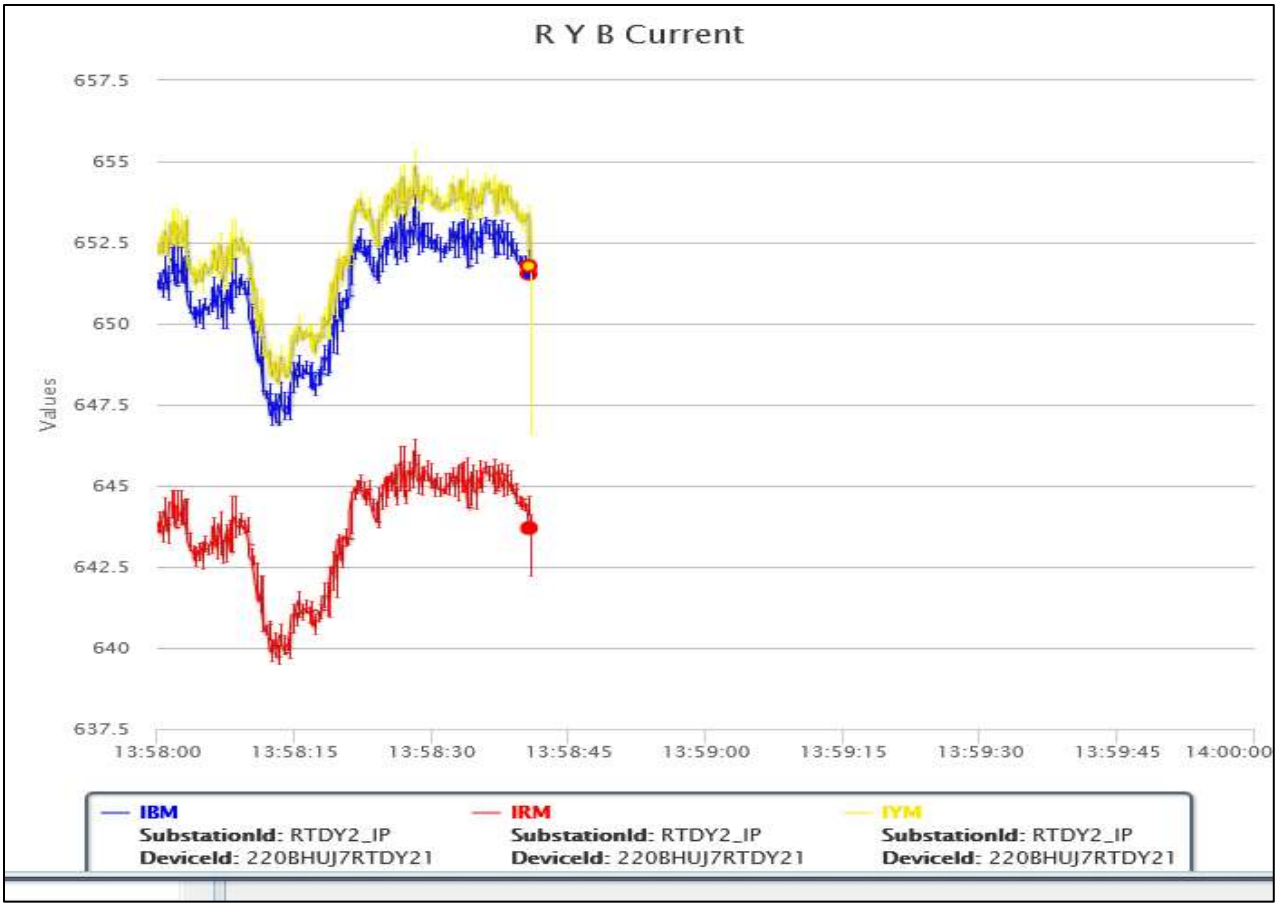


Figure 3. 220 kV Bhuj- Ratadiya -1 Current Plot

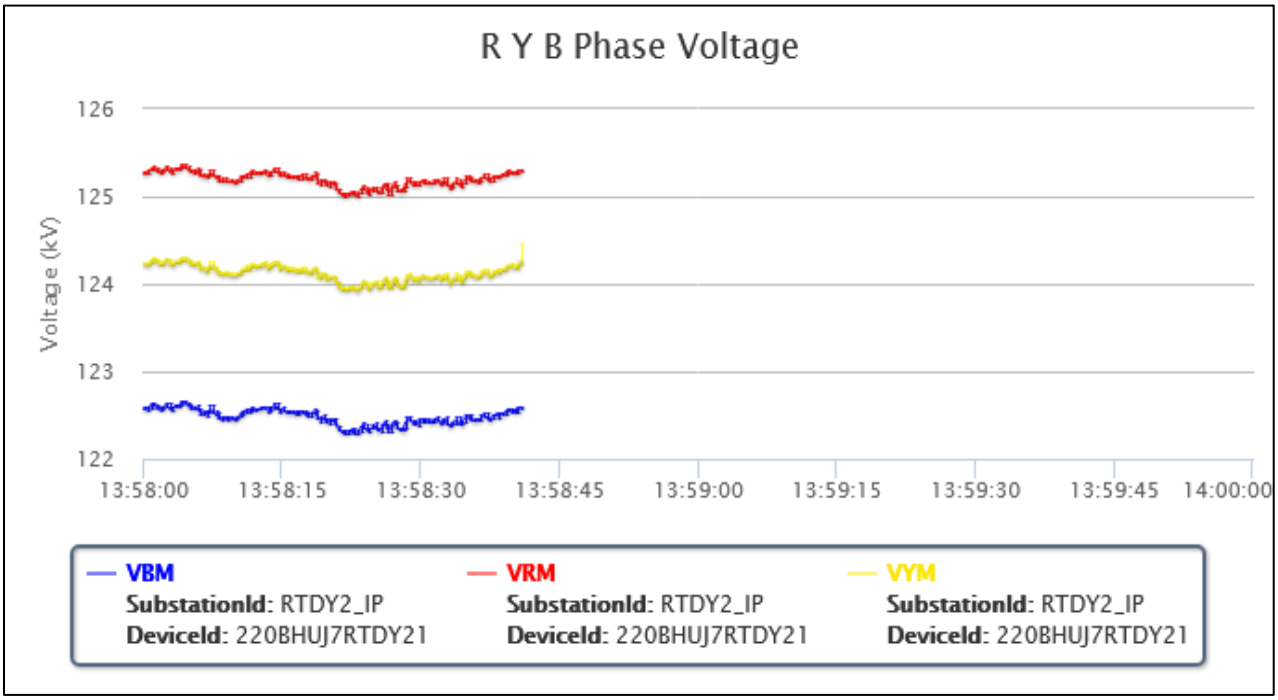


Figure 4. 220 kV Bhuj- Ratadiya -1 Voltage Plot

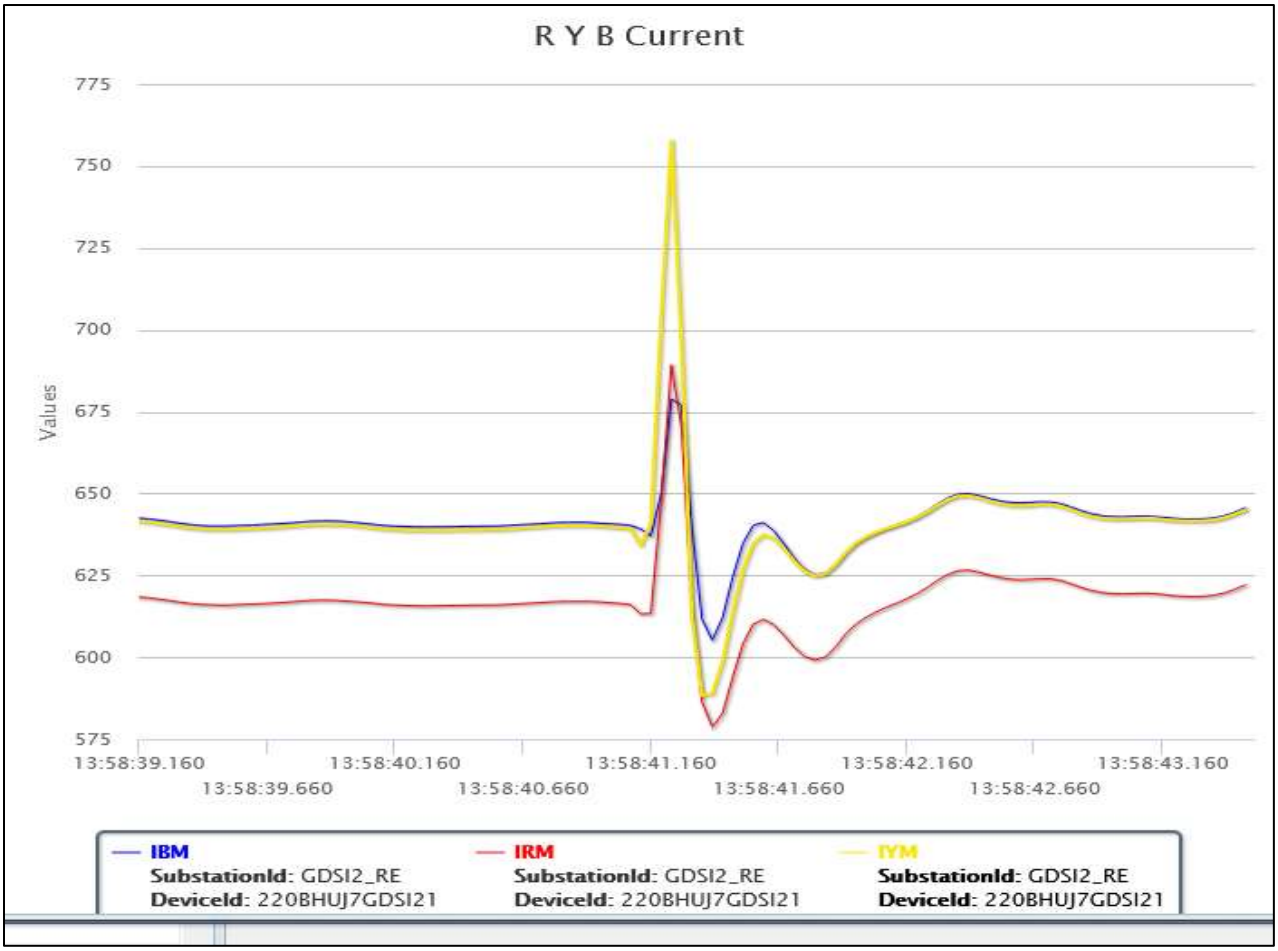


Figure 5. 220 kV Bhuj- Gadhsisa-1 Current Plot

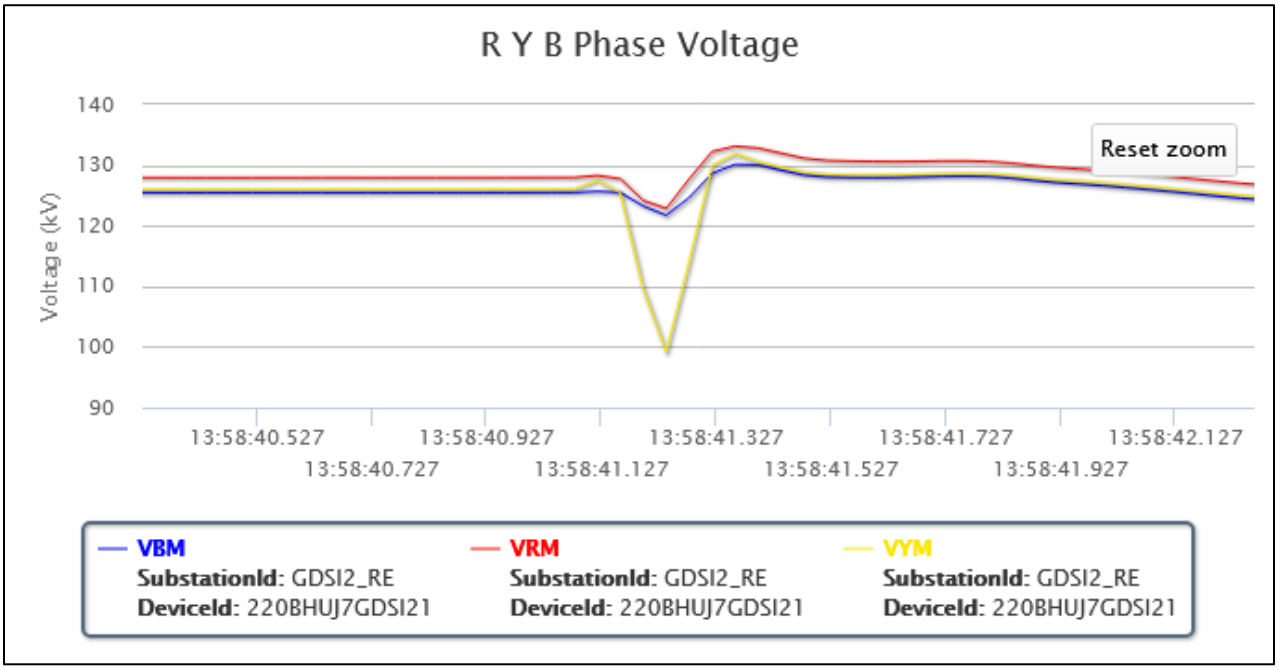


Figure 6. 220 kV Bhuj- Gadhsisa-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- PMU data stopped at the time of tripping. Ratadiya (Adani) may kindly resolve this issue.
- A/R not attempted at Bhuj end for Ckt-1
- 220KV Ratadiya-Bhuj-2 Line couldn't be charged immediately due to some issue in the closing circuit of circuit breaker.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Test charge of Ckt-1 got failed. During Line Patrolling Found that Tower No. 165 Y Phase Jumper is Open which was rectified and line restored by Adani.
- Ckt-2 was restored after closing circuit of the circuit breaker was reconnected.
- PMU data stopped at the time of tripping. Ratadiya (Adani) may kindly resolve this issue. This issue has been flagged multiple times by WRLDC.
- To avoid single line overload during any 220 KV line 1 or 2 tripping SPS scheme proposed to WRPC for further approval.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Powergrid
2.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Adani

ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
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पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. सृजन मोरझर पवन आर ई उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Srijan Morjhar Wind RE of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 11:17 Hrs / 11-08-2024, 220 kV Bhuj II-Morjar (Srijan) tripped on Zone-2 distance protection operation on Y-E fault indication AT Srijan end only which was a maloperation. During inspection it was found that, Y phase voltage was not seen by relay. The same was corrected and line was charged. PMU data stopped immediately after the line tripping indicating failure of back supply or absence of backup supply at station. Generation loss of 131 MW occurred at Morjar (Srijan) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 11:17 Hrs / 11-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Srijan Morjhar, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand

घटना के पूर्व Pre Event	50.13	62057	53428	12022	16203
घटना के बाद Post Event	50.11	61979	53473	12025	16282

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 131 MW at Srijan Morjhar RE.

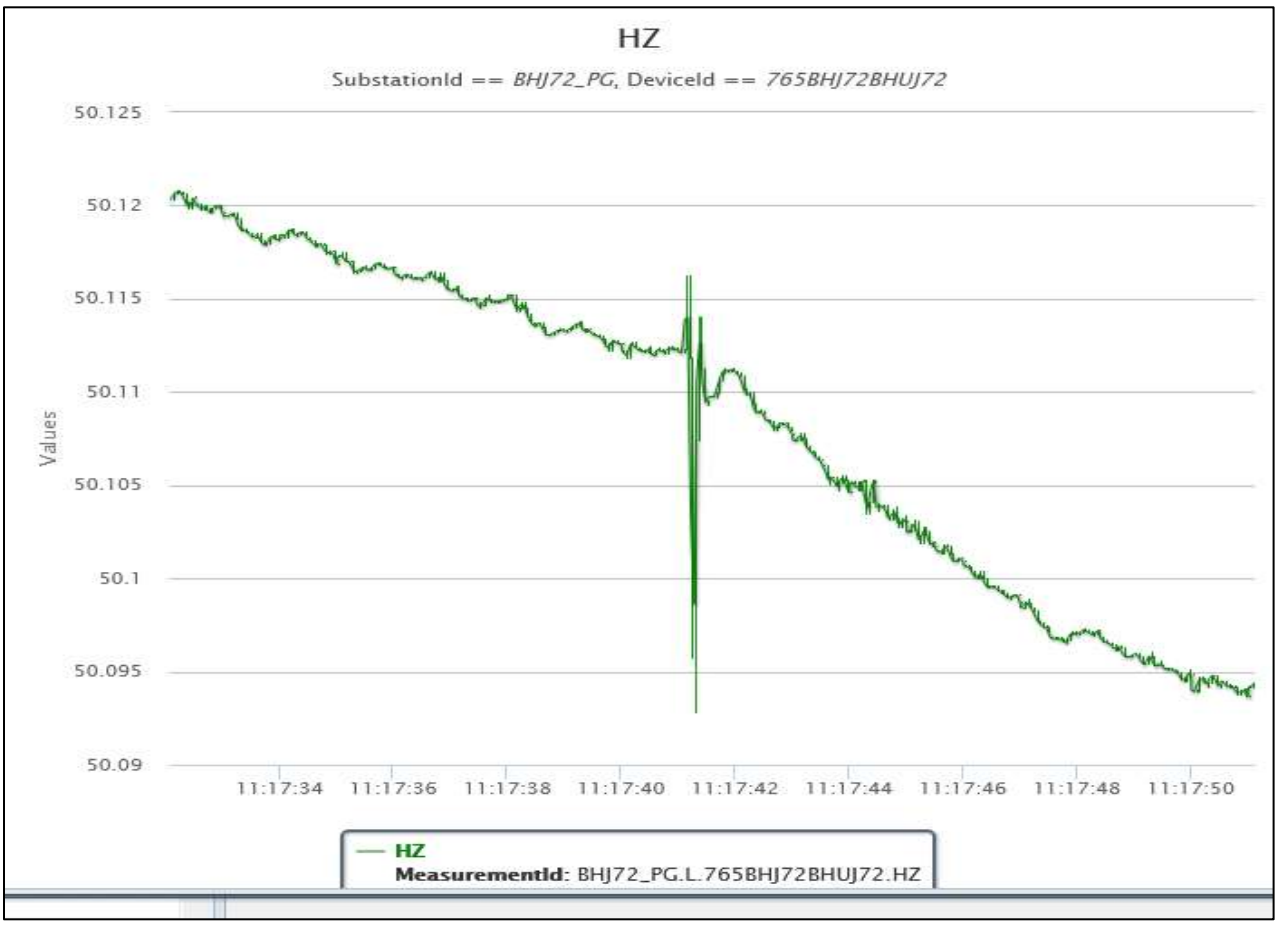


Figure 1. 220 kV Bhuj – Bhuj-II- 2 Frequency Plot

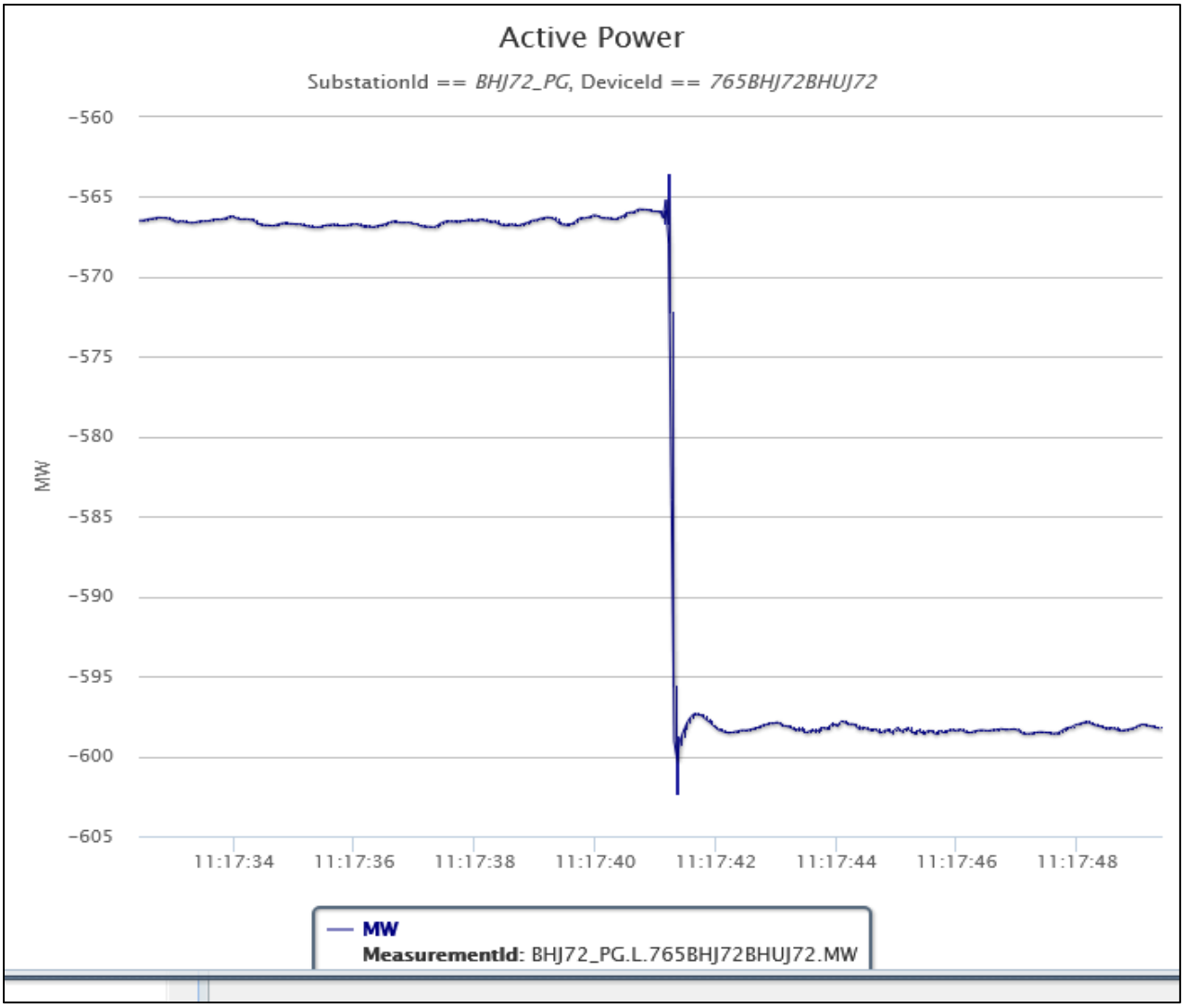


Figure 2. 220 kV Bhuj – Bhuj-II- 2 Active Power Line Plot

7. **रुकावट की अवधि / Duration of interruption:** 2 hours 22 minutes

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

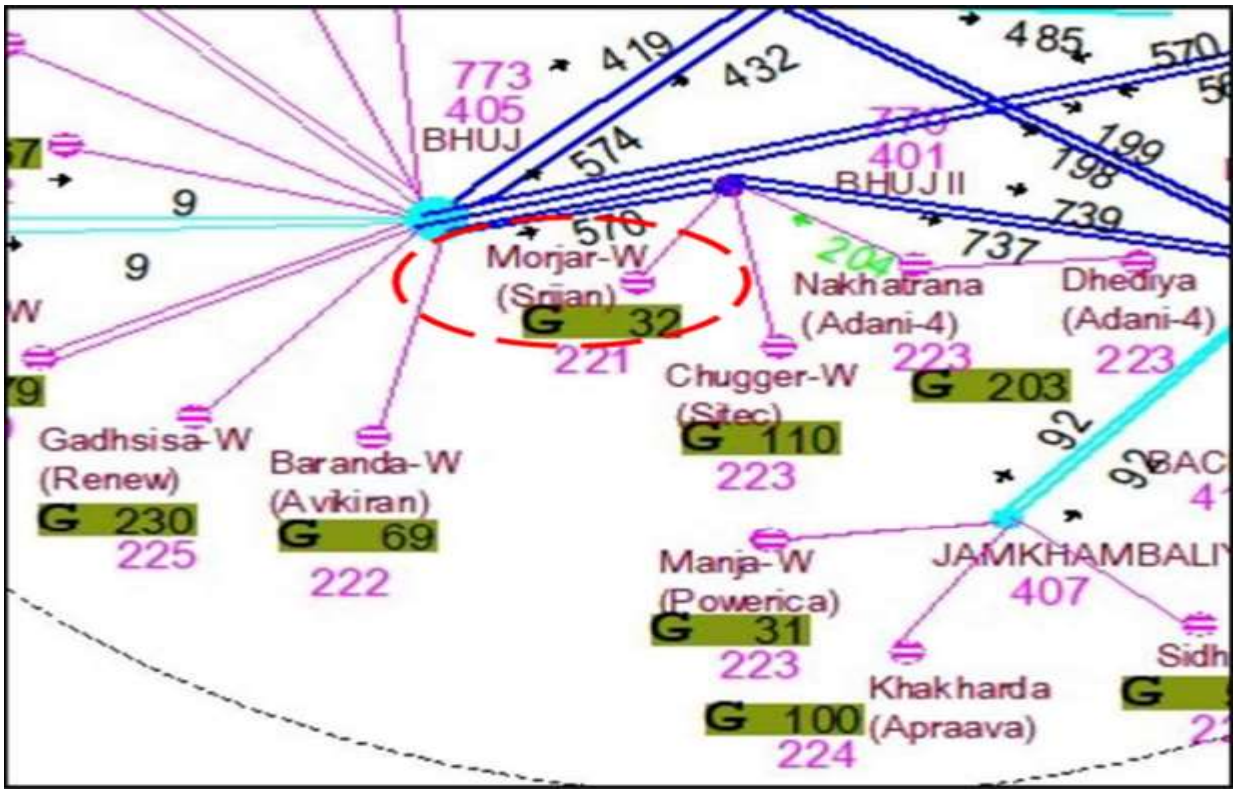


Figure 3. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Srijan Morjhar	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1.	220kV Srijan Morjhar – Bhuj-II Ckt#1	11:17 / 11-08-2024	Y phase Zone 2 trip at Srijan end		13:39 / 11-08-2024

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

- 220 kV Bhuj II-Morjar (Srijan) tripped on Zone-2 distance protection operation on Y-E fault which was a maloperation. During inspection it was found that, Y phase voltage was not seen by relay. The same was corrected and line was charged.

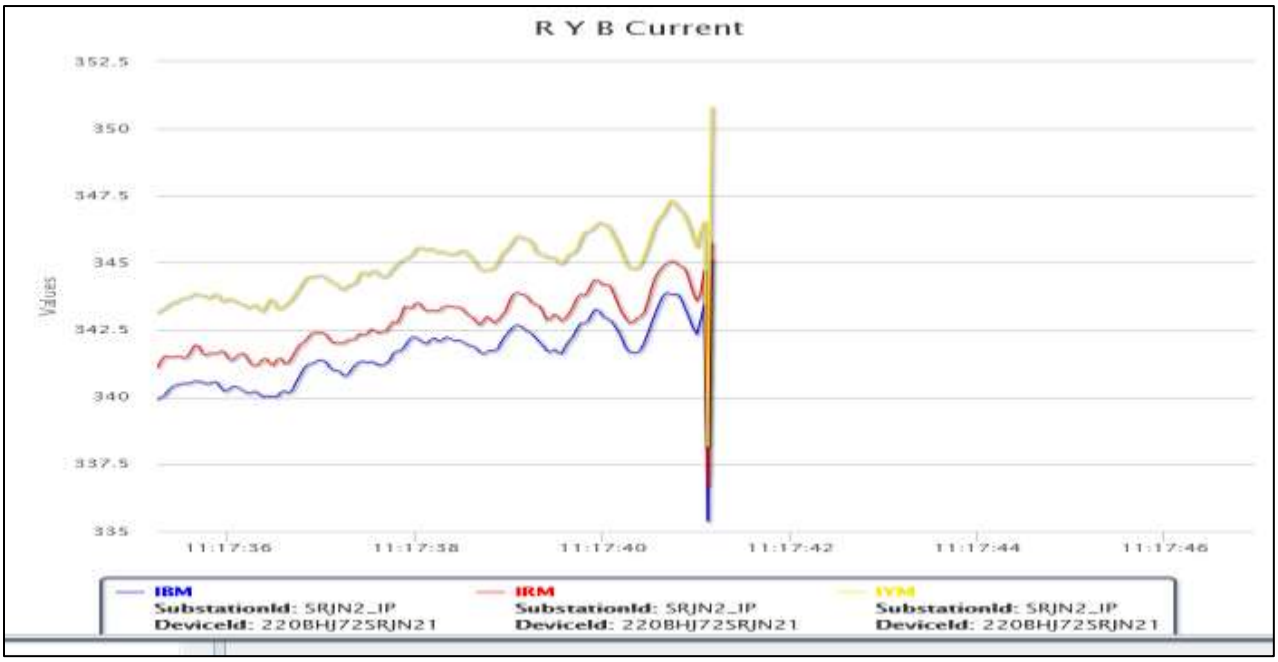


Figure 4. 220 kV Bhuj- Srijan-1 Current Plot

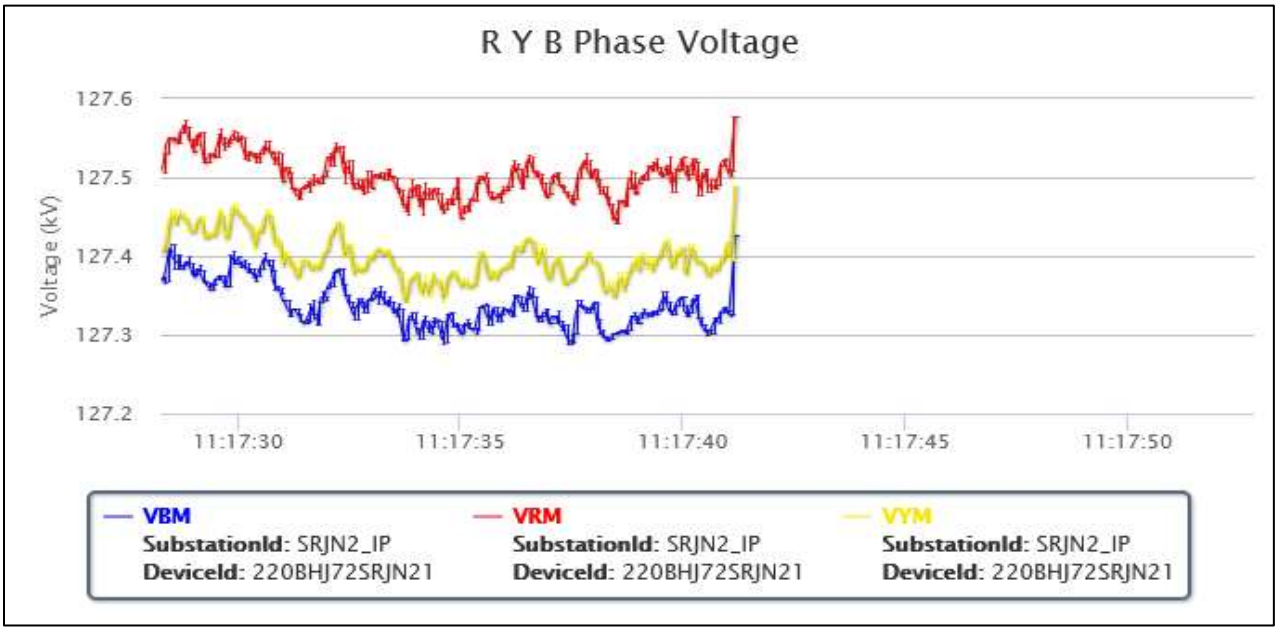


Figure 5. 220 kV Bhuj- Srijan -1 Voltage Plot

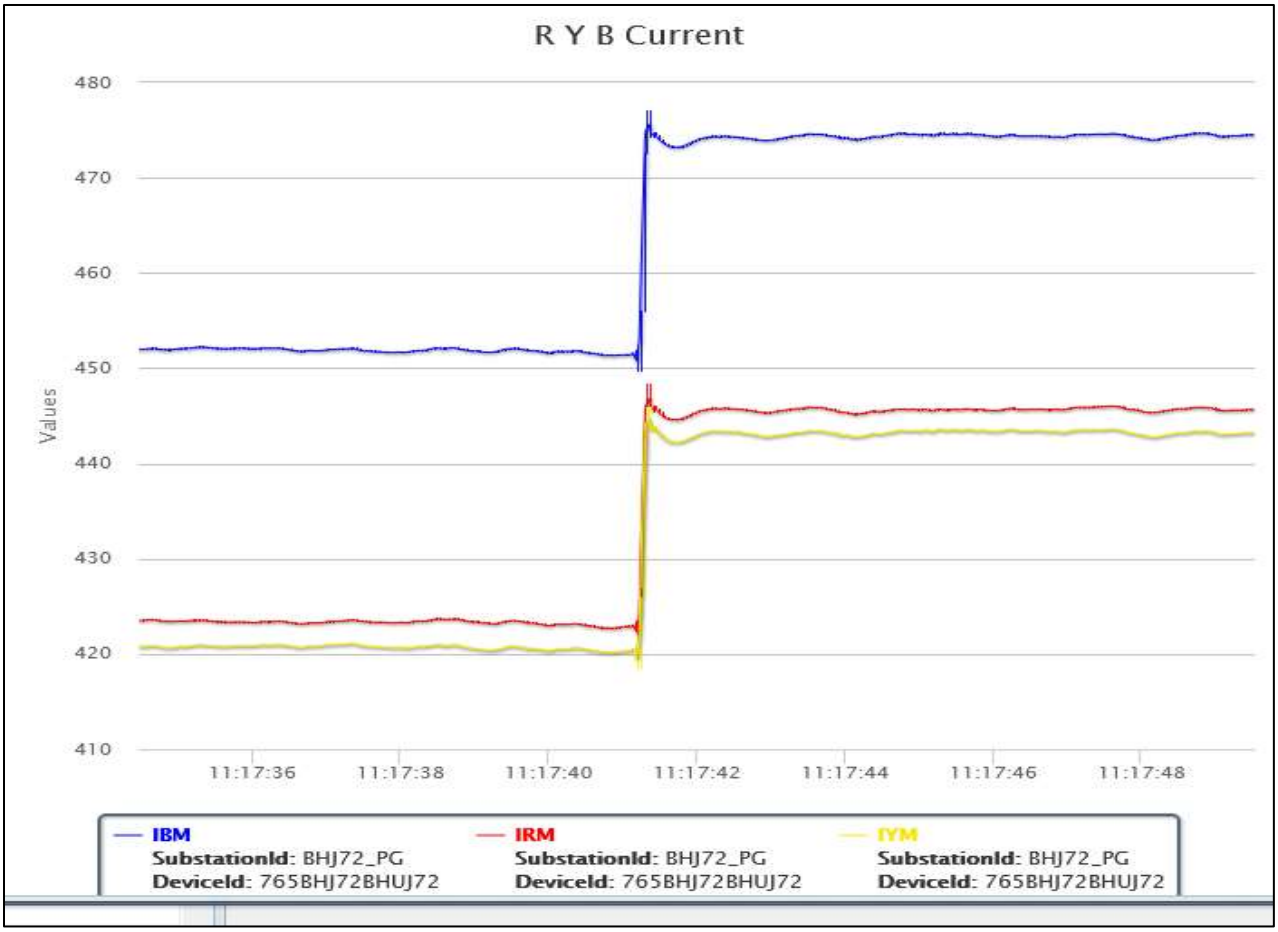


Figure 6. 220 kV Bhuj – Bhuj-II- 2 Current Plot

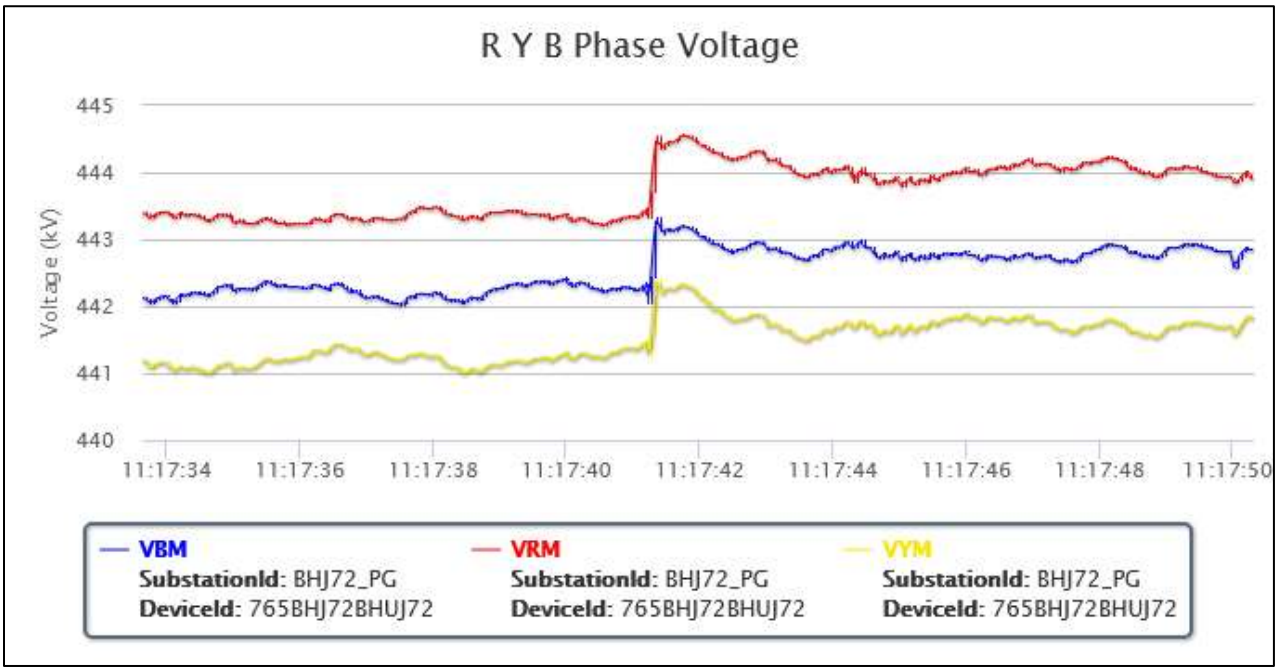


Figure 7. 220 kV Bhuj – Bhuj-II- 2 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- PMU data stopped at the time of tripping. Morjar (Srijan) may kindly resolve this issue.
- Line tripped on maloperation due to Y phase voltage was not coming in main 2.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- PMU data stopped at the time of tripping. Morjar (Srijan) may kindly resolve this issue. This issue has been flagged multiple times by WRLDC.
- During inspection Morjar (Srijan) observed that, Y phase voltage was not coming in main 2, so they rectified the issue in the related CKT.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Line tripped without any fault indicating Maloperation

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- The issue of stopping of PMU data has been flagged multiple times by WRLDC. This needs to be addressed & resolved by Morjar (Srijan).
- Line tripped on maloperation due to Y phase voltage was not coming in main 2.

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	SRJN2_RE	SRIJAN CB 20452 (BHJ72) ACTED	11:17:16	303
WRLDC	220KV-CB	SRJN2_RE	SRIJAN CB 20452 (BHJ72) CLOSED	11:17:16	330

SOE from Srijan Morjhar -

Events List

Channel Number	Name	Status	Time
22	PHS-STFWL2	On	8/11/2024 11:17:15.918 AM
14	ZMF03-START	On	8/11/2024 11:17:15.927 AM
12	ZMF02-START	On	8/11/2024 11:17:15.930 AM
89	HMILED NT CLR	On	8/11/2024 11:17:16.145 AM
1	TRIP1_TRIP	On	8/11/2024 11:17:16.281 AM

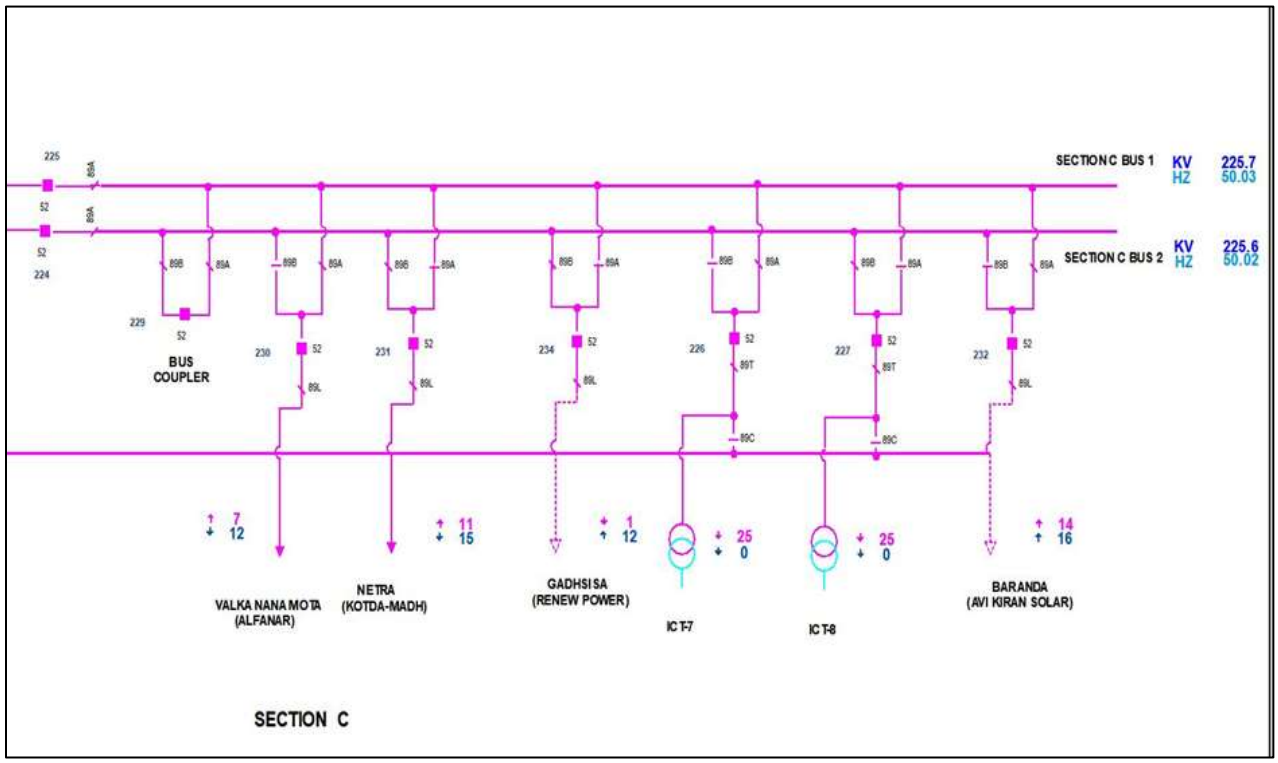
Recording File Name:C:\ProgramData\ABB\PCMDataBases\DisturbanceRecordings\KINTECH_SRIJAN_MORJAR(2)\AA1\D1
\AA1D1Q04FN2_AA1D1Q04FN2\AA1D1Q04FN2_DR178_20240811111715

ABB

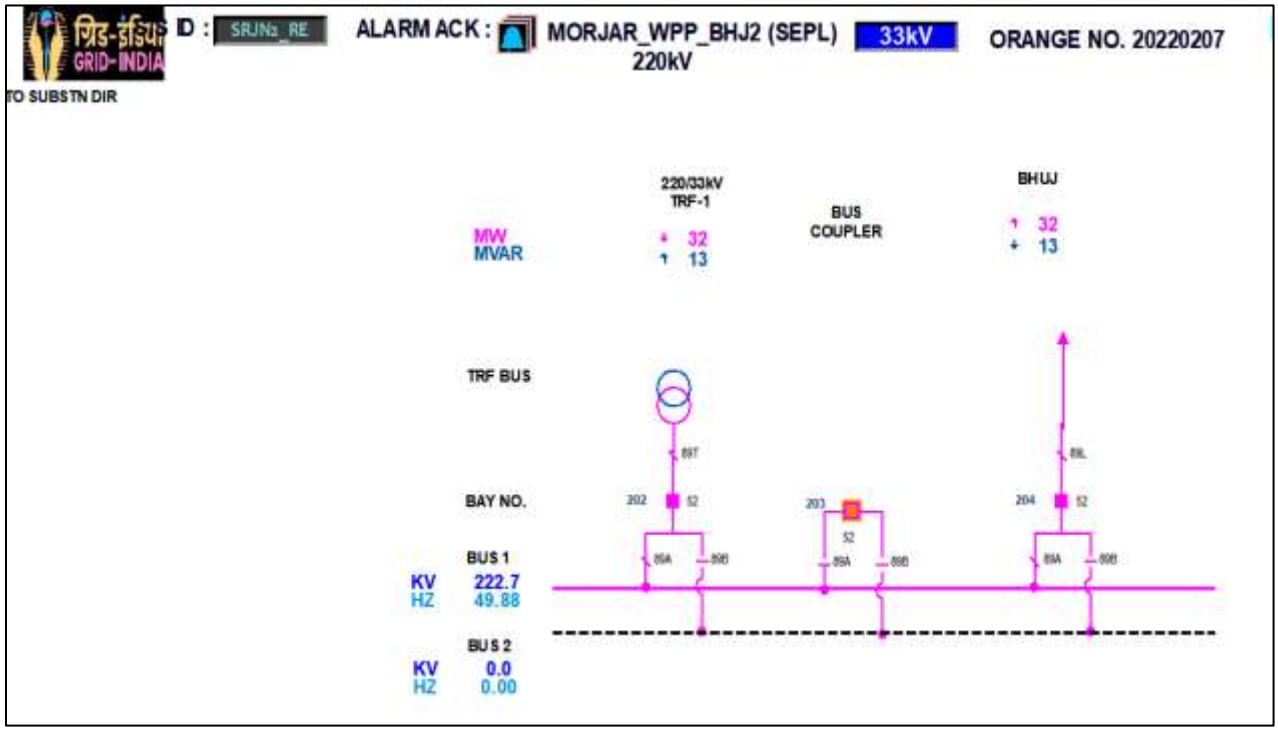
2	TRIP1 L1	On	8/11/2024 11:17:16.281 AM
3	TRIP1 L2	On	8/11/2024 11:17:16.281 AM
4	TRIP1 L3	On	8/11/2024 11:17:16.281 AM
11	ZMF02-TRIP	On	8/11/2024 11:17:16.281 AM
55	AR BLOCK	On	8/11/2024 11:17:16.281 AM
58	FAULT LOOP Y	On	8/11/2024 11:17:16.284 AM
73	86A/B OPTD	On	8/11/2024 11:17:16.298 AM
11	ZMF02-TRIP	Off	8/11/2024 11:17:16.344 AM
12	ZMF02-START	Off	8/11/2024 11:17:16.344 AM
14	ZMF03-START	Off	8/11/2024 11:17:16.344 AM
22	PHS-STFWL2	Off	8/11/2024 11:17:16.344 AM
55	AR BLOCK	Off	8/11/2024 11:17:16.344 AM
58	FAULT LOOP Y	Off	8/11/2024 11:17:16.347 AM
1	TRIP1_TRIP	Off	8/11/2024 11:17:16.431 AM
2	TRIP1 L1	Off	8/11/2024 11:17:16.431 AM
3	TRIP1 L2	Off	8/11/2024 11:17:16.431 AM
4	TRIP1 L3	Off	8/11/2024 11:17:16.431 AM

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

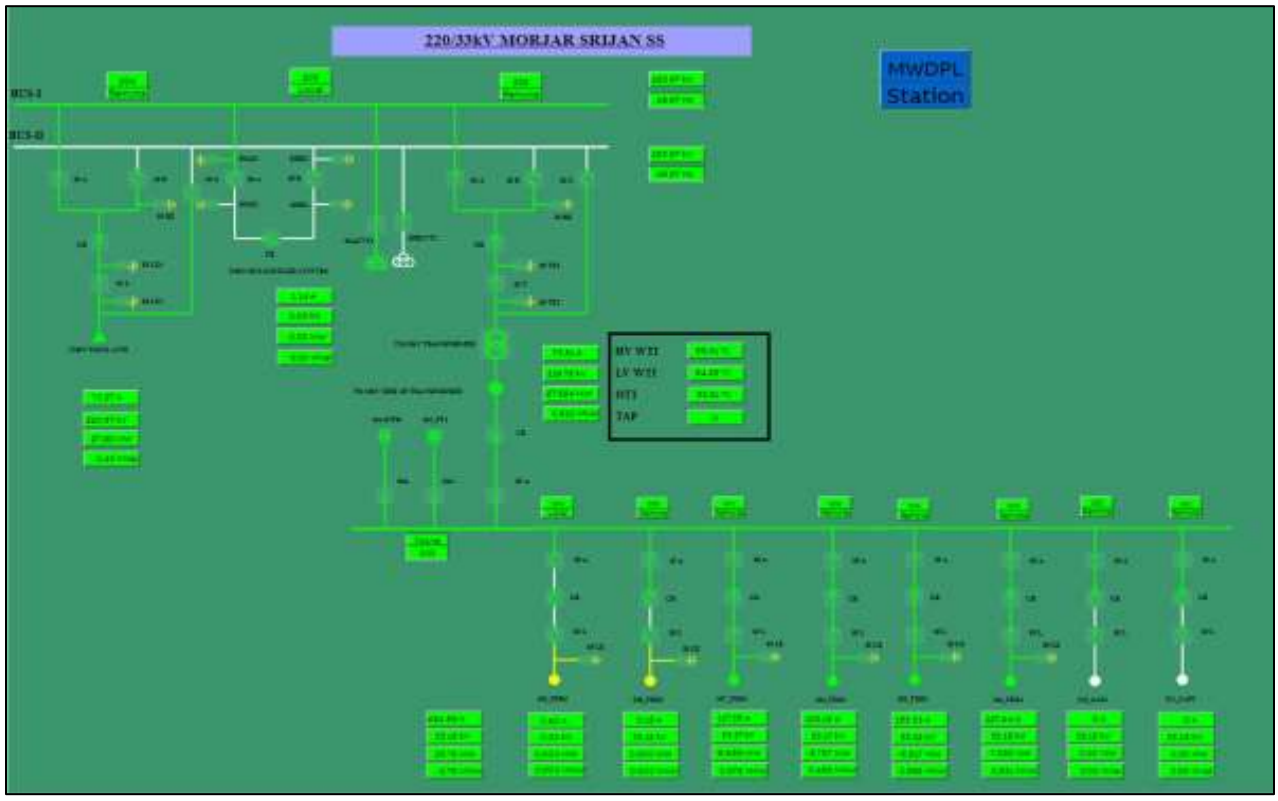
220kV Bhuj SLD:



220 kV Srijan Morjhar SLD:

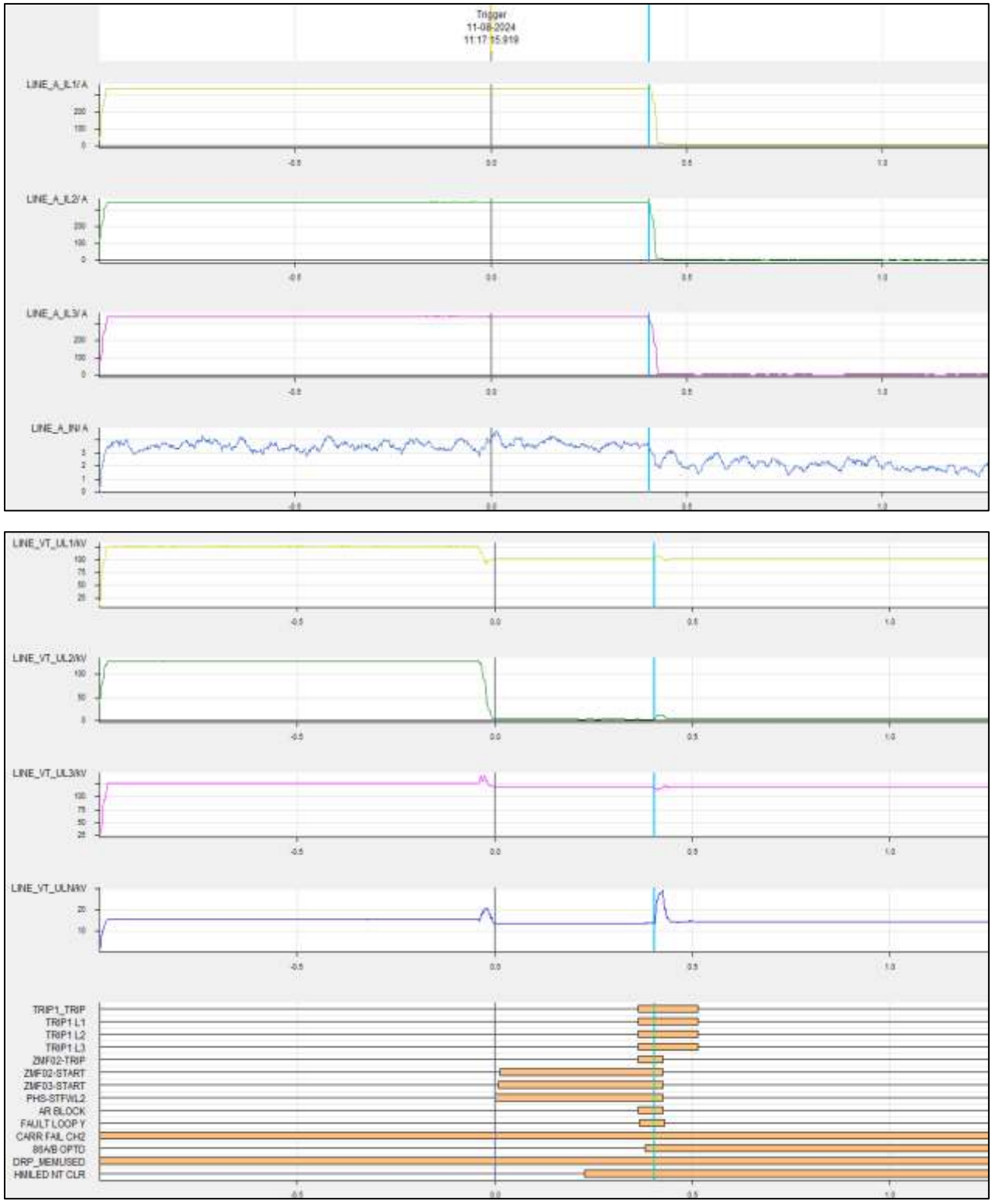


SLD from Srijan Morjhar-

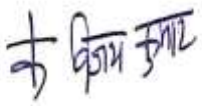


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Morjar- Bhuj II Line from Srijan end



अनुलग्नक-D / Annexure-D: Site photographs – Nil



Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के. वी. खाखरडा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Khakharda S/S of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary:** At 11:42 Hrs/ 17-08-2024, 220 kV Jamkhambaliya-Khakharda tripped on R-E fault. During patrolling R phase insulator failure was observed. Generation loss of 187 MW occurred at Khakharda (Apraava) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event** : 11:42 Hrs / 17-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Khakharda (Gujarat)
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.08	60131	71333	11680	18581
घटना के बाद Post Event	50.02	59950	70835	11710	18454

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Inclement weather conditions with Rain

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 187 MW generation loss.

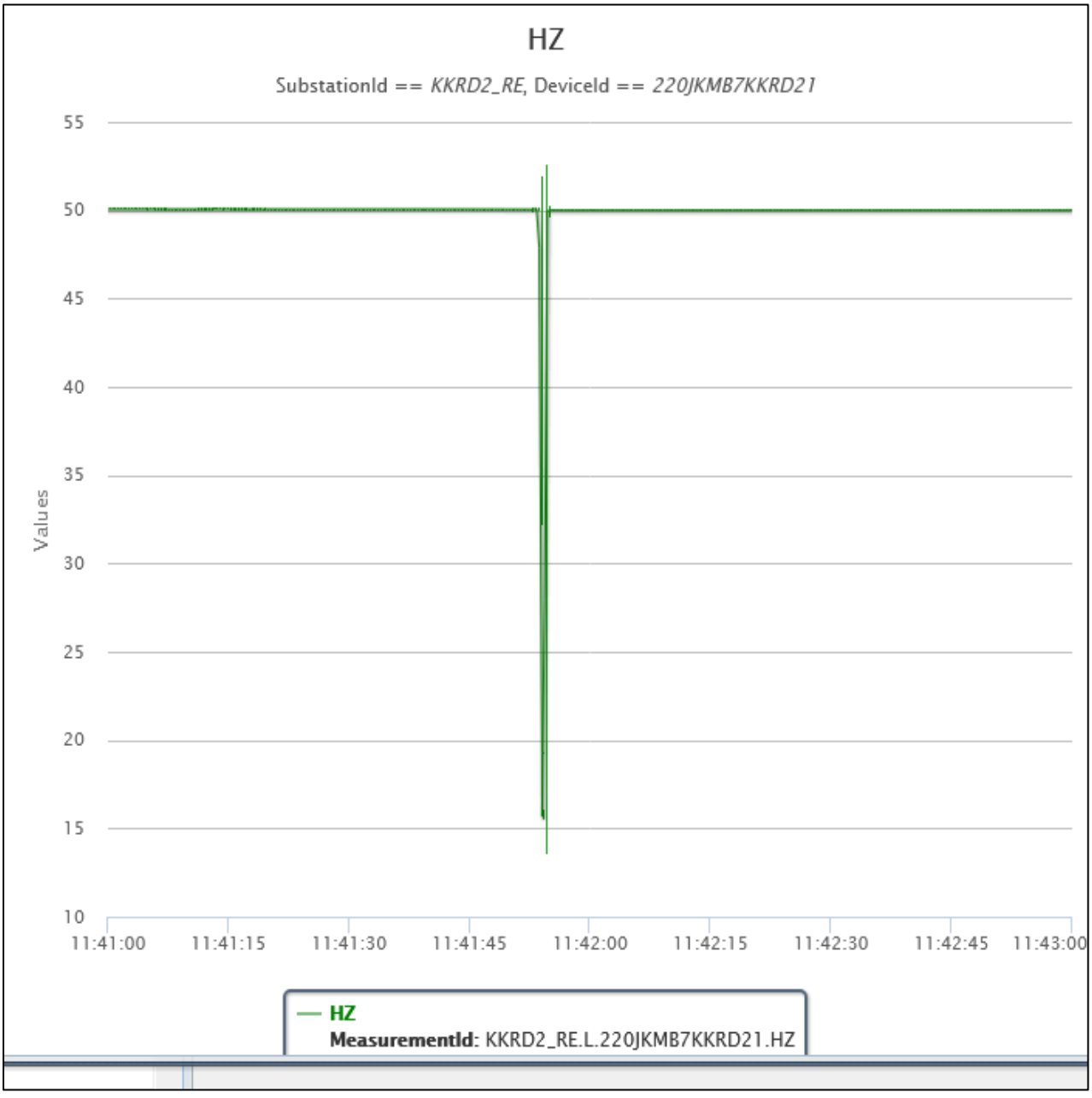


Figure 1. 220 kV Jamkhambaliya-Khakharda-1 Current Plot

7. **रुकावट की अवधि / Duration of interruption:** 08 Hours 12 Minutes

8. प्रभावित क्षेत्र का नक्शा / Network across the affected area

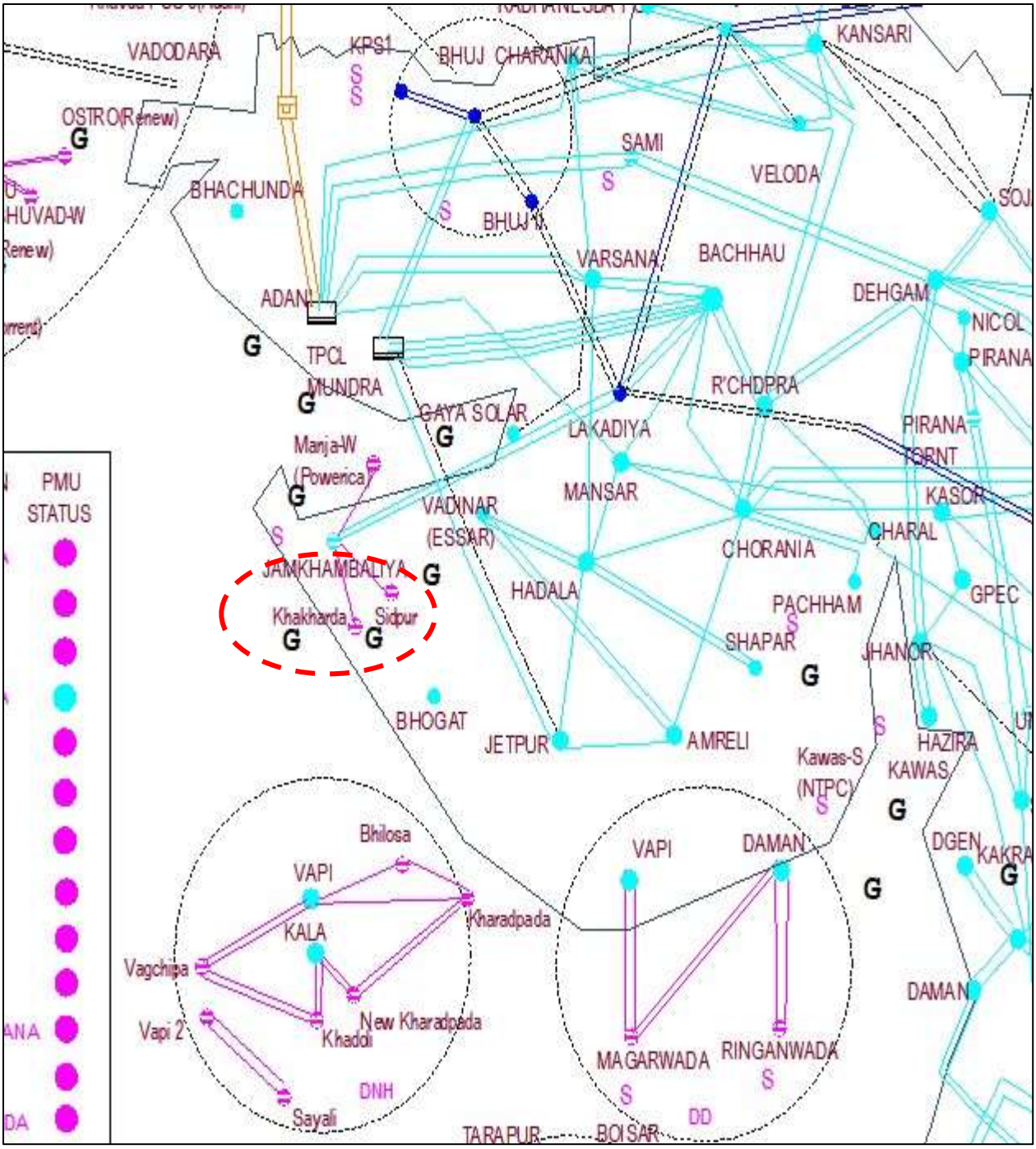


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (Khakharda)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (remote end)	वापसी का समय Restoration time
1	220KV-JAMKHAMBALIYA-KHAKHARDA-1	11:42 / 17.08.2024	Rph-E fault, 1.3 km, Ir:-2.06 kA	39.45 km, 3.038 kA.	19:54 / 17.08.2024

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

- 220 kV Jamkhambaliya-Khakharda tripped on R-E fault due to insulator failure.

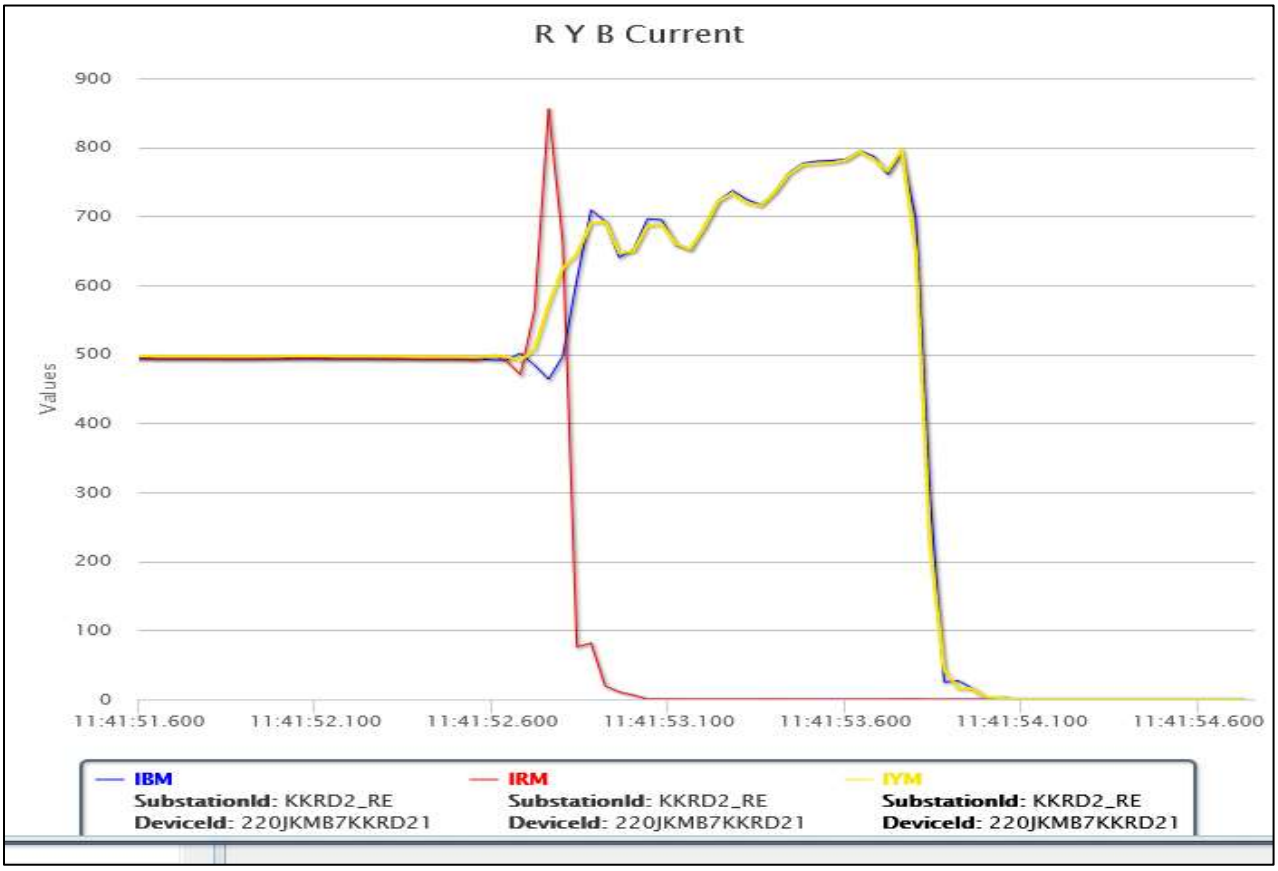


Figure 3. 220 kV Jamkhambaliya-Khakharda-1 Current Plot

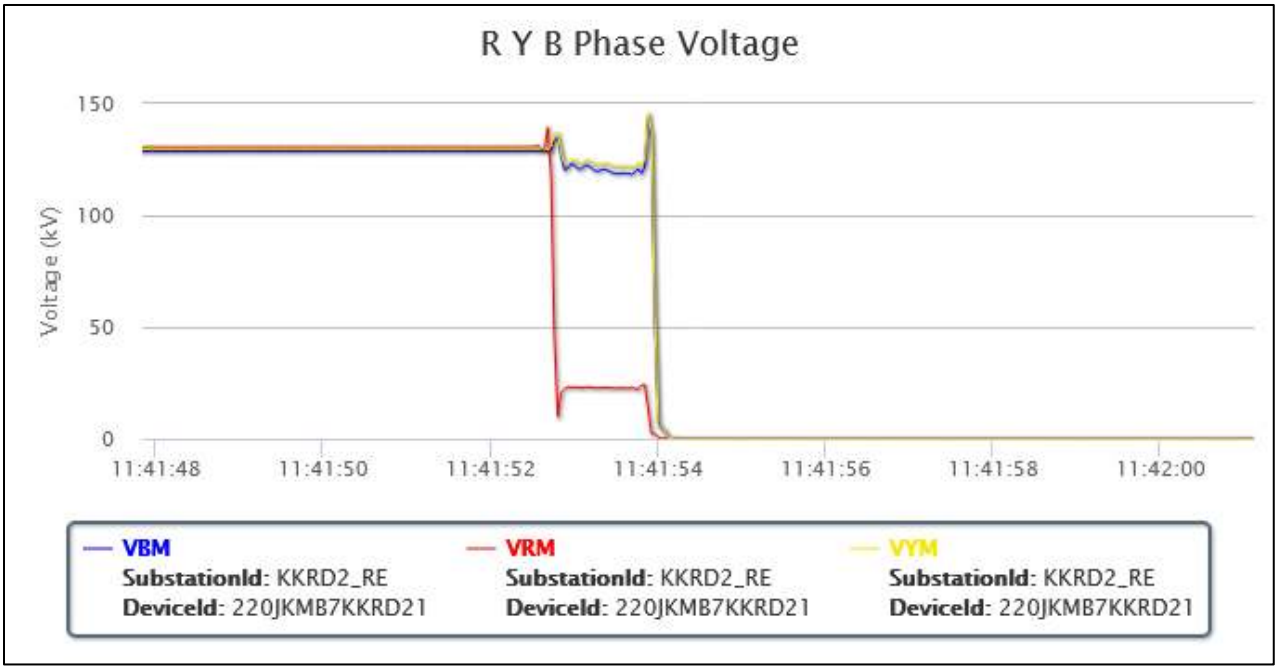


Figure 4. 220 kV Jamkhambaliya-Khakharda-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed: Nil

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- System restored after insulator replacement.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Aprava, Khakahrda
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Adani-Jamkhambaliya .

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE from WRLDC SCADA-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	JKMB7_PG	JAM KHAMBALIYA CB 20152 (KKRD2) FAULTY	11:41:52	817
WRLDC	220KV-CB	JKMB7_PG	JAM KHAMBALIYA CB 20152 (KKRD2) CLOSED	11:41:53	906
WRLDC	220KV-CB	JKMB7_PG	JAM KHAMBALIYA CB 20152 (KKRD2) OPEN	11:41:53	951
WRLDC	220-SOE	JKMB7_PG	JAM KHAMBALIYA CB 20152 (KKRD2) ACTED	11:41:54	496

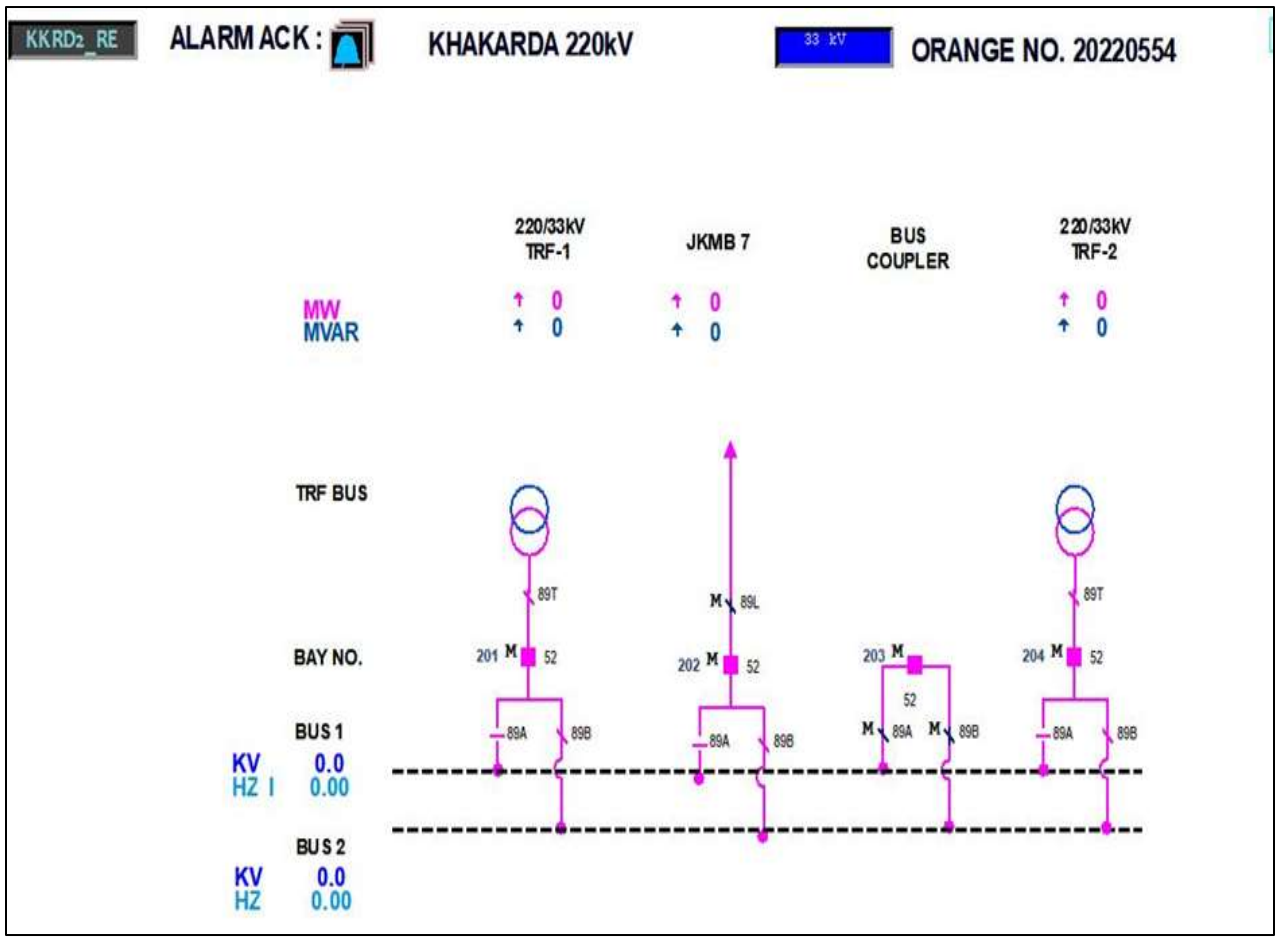
SOE from Khakharda-

Events List

Channel Number	Name	Status	Time
117	AR_CLS_CMD	On	8/17/2024 11:41:53.795 AM
118	AR_IN_PROGRES	Off	8/17/2024 11:41:53.803 AM
67	Q52_CLOSE_POS	On	8/17/2024 11:41:53.908 AM
57	CB_SPR_NOT CH	On	8/17/2024 11:41:53.911 AM
14	BLOCK AR M1	On	8/17/2024 11:41:53.919 AM
15	3PH_TRIP_M1/2	On	8/17/2024 11:41:53.919 AM
121	BLOCK_AR	On	8/17/2024 11:41:53.923 AM
10	86A OPTD	On	8/17/2024 11:41:53.931 AM
11	86B OPTD	On	8/17/2024 11:41:53.932 AM
65	CB_NOT_READY	On	8/17/2024 11:41:53.935 AM
67	Q52_CLOSE_POS	Off	8/17/2024 11:41:53.947 AM
113	LINE_U/V_ST	Off	8/17/2024 11:41:53.947 AM
51	RP MTR NT RE	Off	8/17/2024 11:41:53.951 AM
66	Q52_OPEN_POS	On	8/17/2024 11:41:53.953 AM
113	LINE_U/V_ST	On	8/17/2024 11:41:53.963 AM
117	AR_CLS_CMD	Off	8/17/2024 11:41:53.995 AM
15	3PH_TRIP_M1/2	Off	8/17/2024 11:41:54.070 AM
116	SYNC_OK_MAN	On	8/17/2024 11:41:54.133 AM

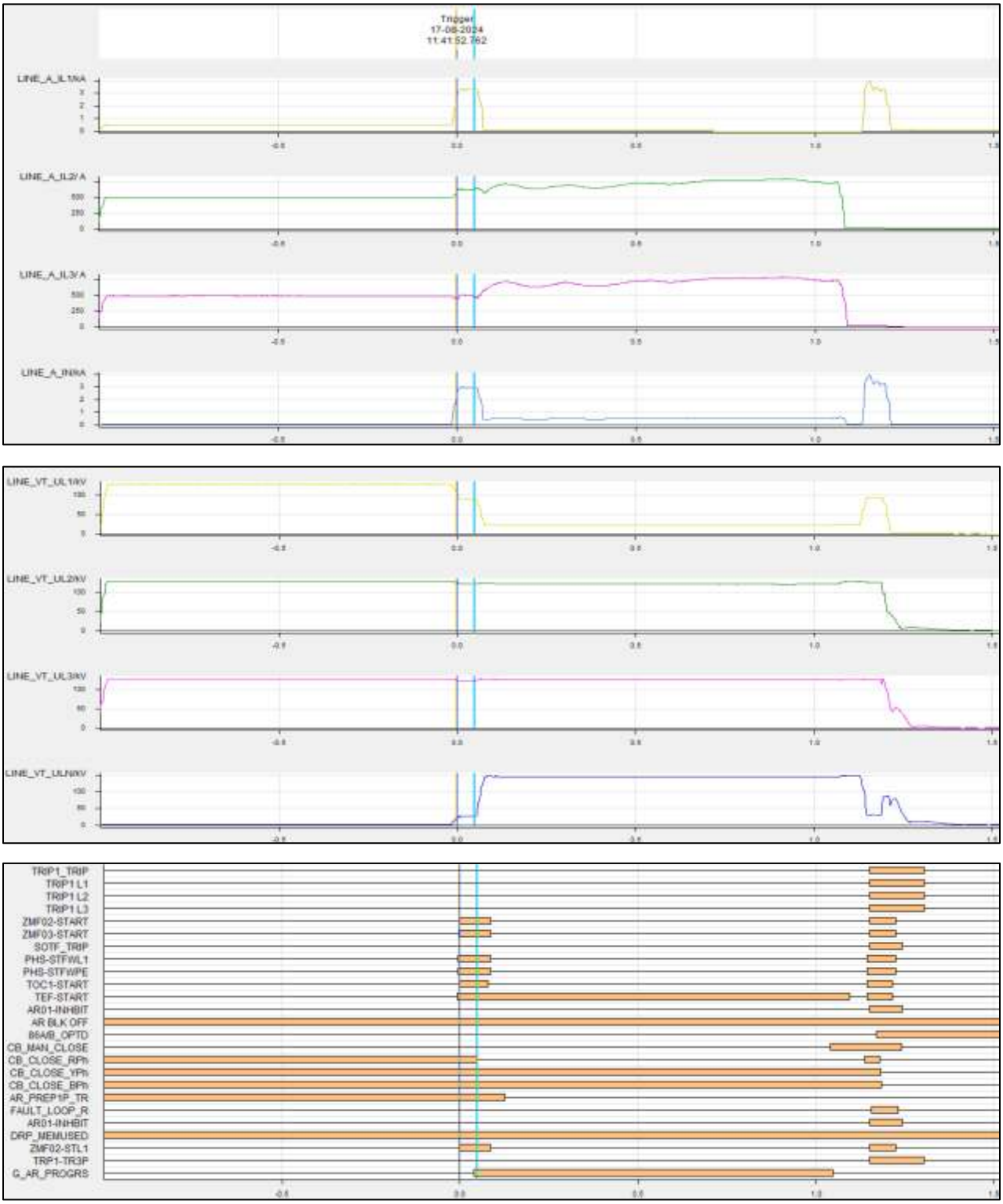
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kkV Khakharda SLD.

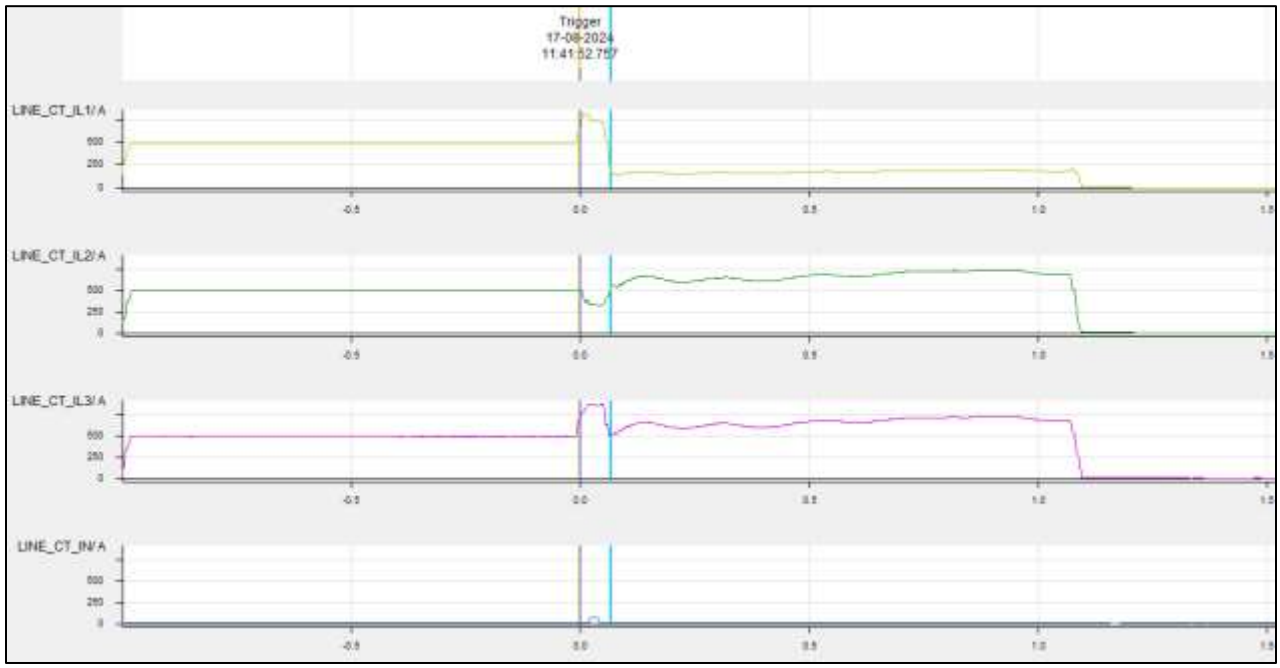


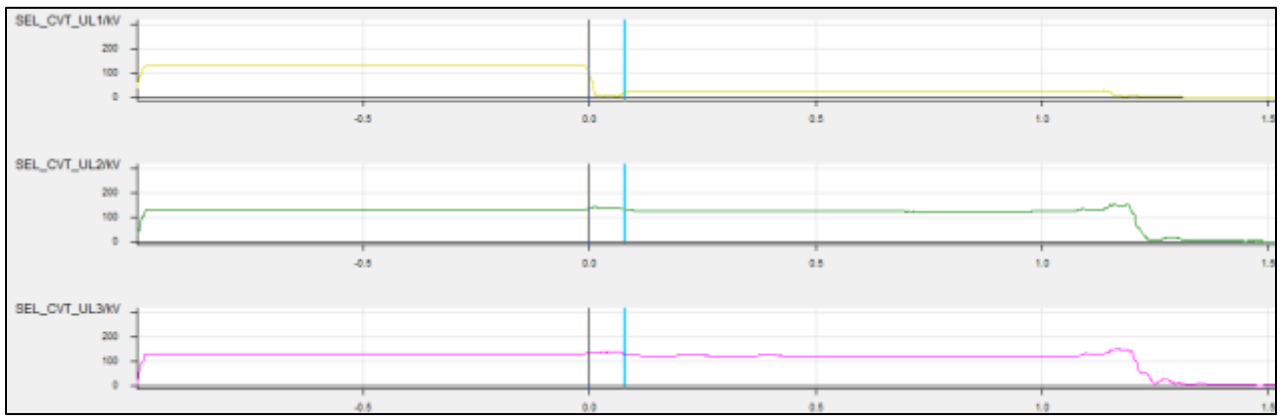
अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below-

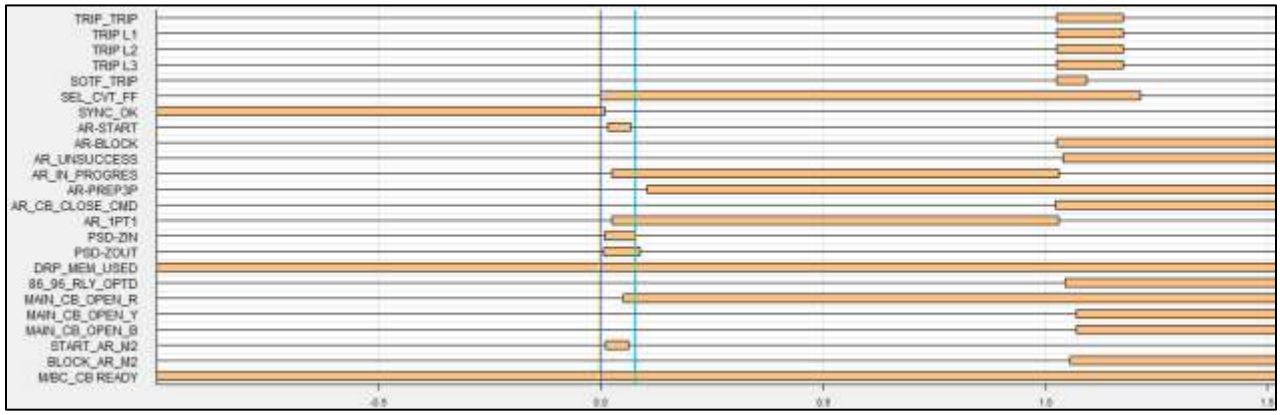
A. DR of 220 kV Jamkhambaliya-Khakharda line from JKTL end.



B. DR of 220 kV Jamkhambaliya-Khakharda line from Khakharda end







अनुलग्नक-4 / Annexure-4: - Site photographs- Nil

के विजय कुमार

Vijay Kumar Kodali

DGM, SO, WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. नखत्राना उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nakhatrana of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 18.09.2024

1. **घटना का सारांश / Event Summary**: At 02:24 Hrs / 19-08-2024, 220 kV Bhuj II-Nakhatrana tripped on Y-E fault after unsuccessful autoreclose attempt. During patrolling Y phase insulator failure was observed at Tower location 51. Generation loss of 47 MW occurred at Nakhatrana and Dedhiya (Adani) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 02:24 Hrs / 19-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nakatrana, Dedhiya , Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.00	67246	53497	8509	16074
घटना के बाद Post Event	49.98	67181	53468	8508	16058

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Cloudy/Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 47 MW Gen loss.

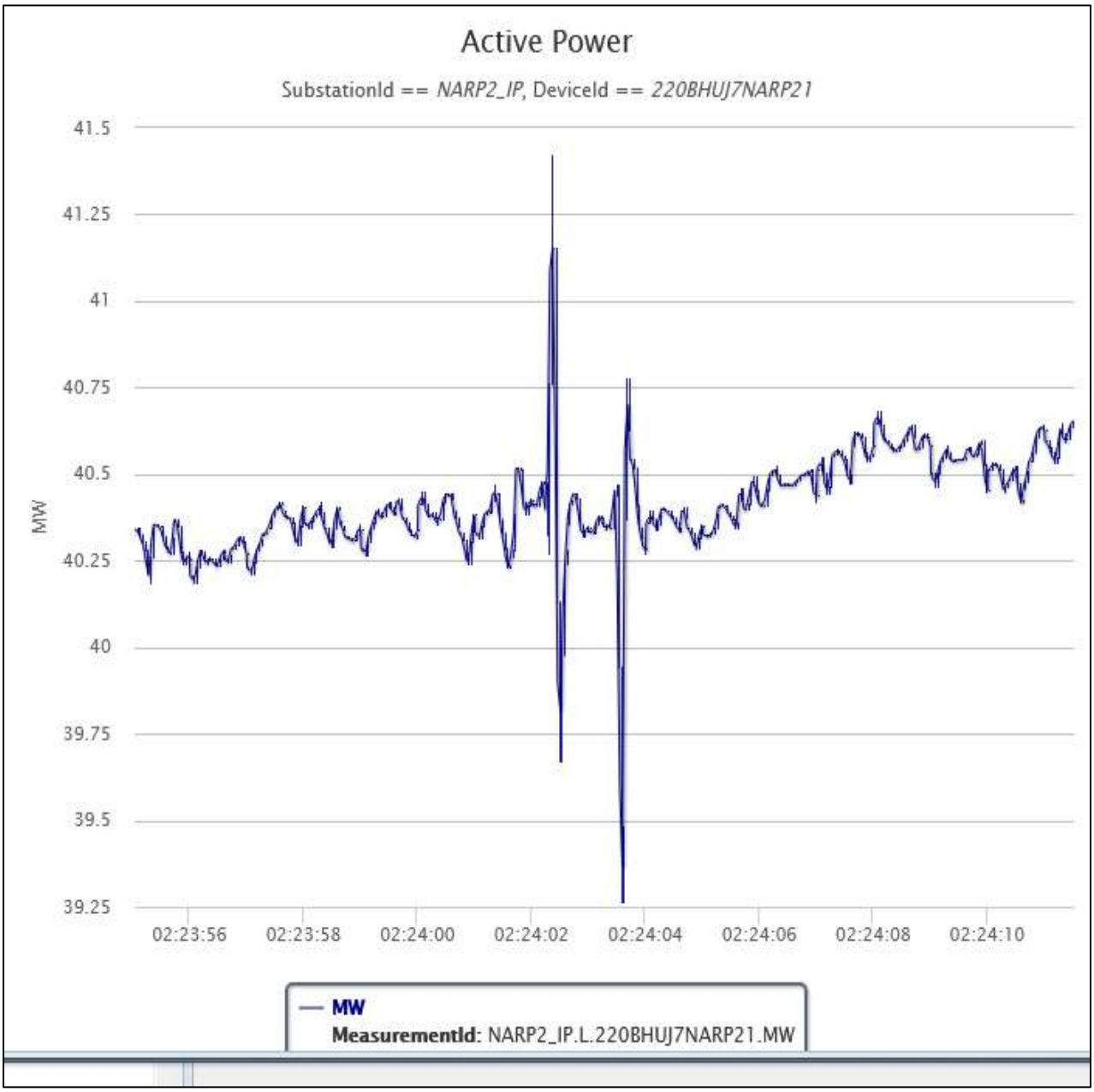


Figure 1. 220 kV Bhuj- Nakhatrana-1 Active Power Line Plot

7. **रुकावट की अवधि / Duration of interruption:** 6 hours 38 minutes

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

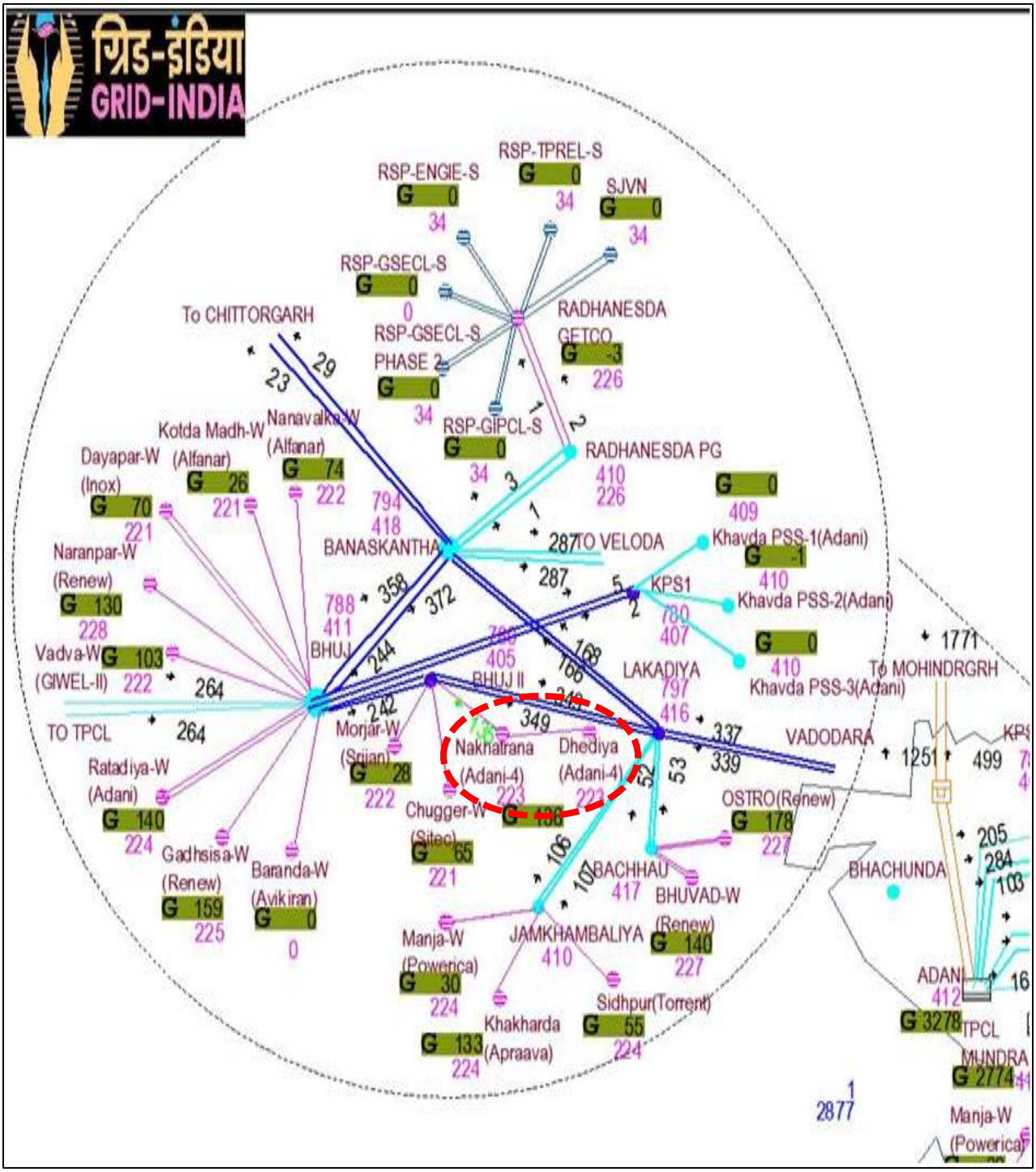


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nakhatrana	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220KV Bhuj-II-Nakhtrana	02:24	ZONE-1 OPTD, ZCOM TRIP, DIR E/F TRIP, PSB OPTD, Y-PH Trip R-236.202 A Y- 974.369 A B-115.66 A N- 1013.407 A Fault Distance = 14.6 KM from Nakhatrana PSS end	Zone-Z1, PH-Y-N, Fault Distance = 3.8 KM from Bhuj-2 PGCIL PSS end	09:02

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

Line Tripped on persisting Y-N fault.

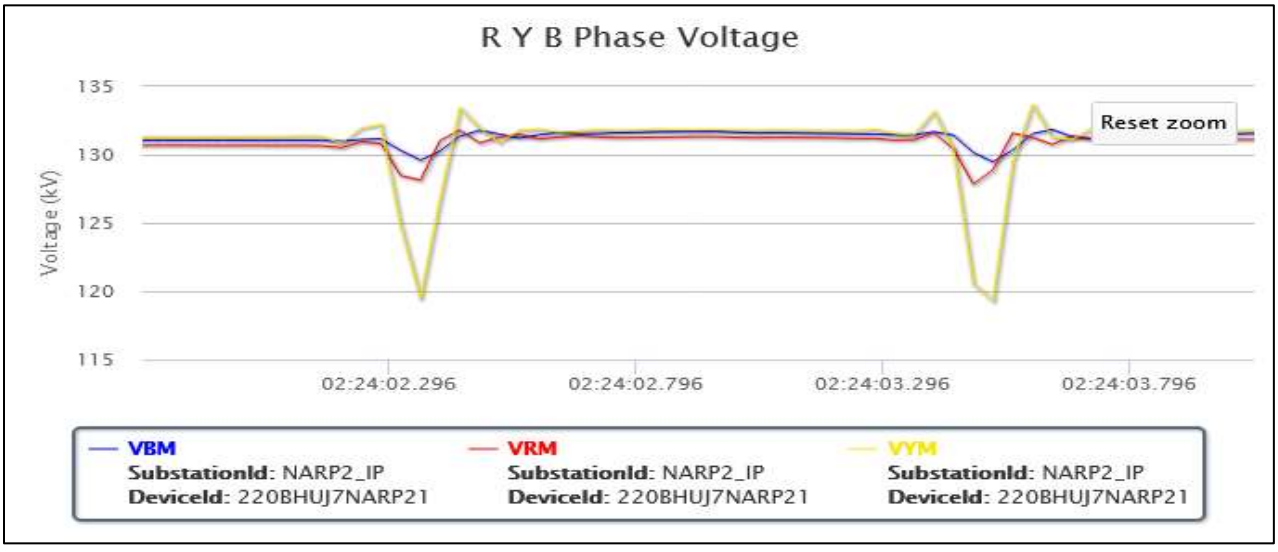


Figure 3. 220 kV Bhuj- Naranpar-1 Voltage Plot

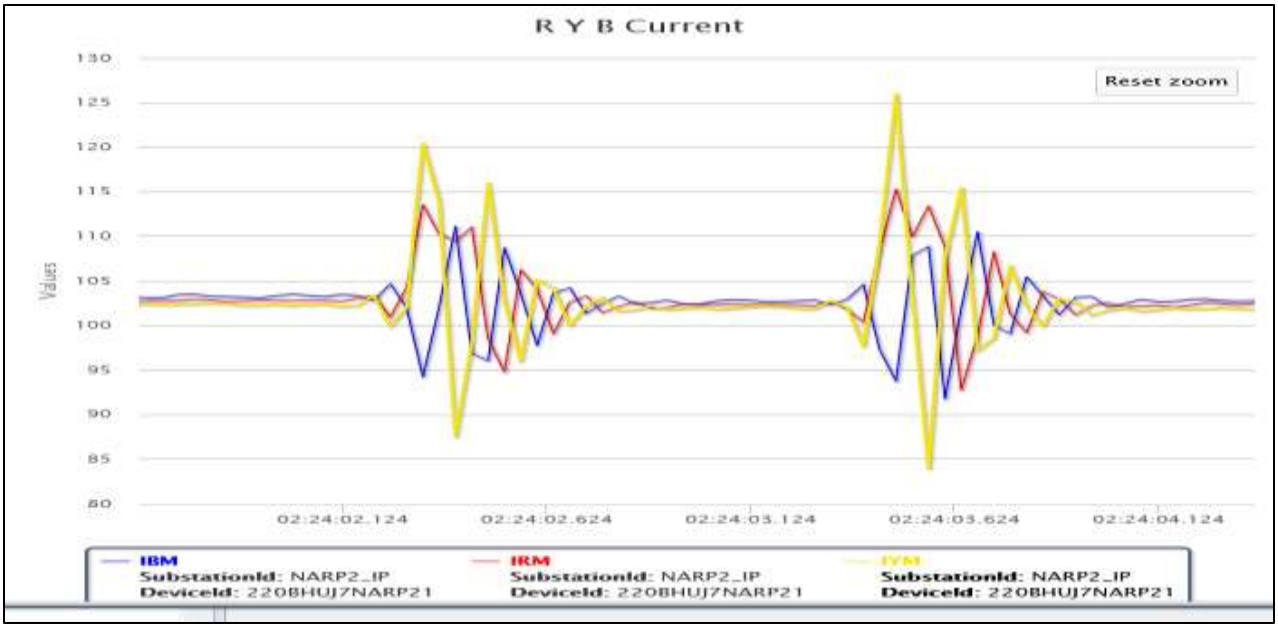


Figure 4. 220 kV Bhuj- Naranpar -1 Current Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- SOE of Nakhatrana end not reported correctly at WRLDC Scada.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- 220KV Nakhatrana-Bhuj 2 PGCIL Line Tripped in Y Phase E/F and During Patrolling found out that Tower No.51 From Nakhatrana PSS, Y-Phase Disc Insulator Failed. System restored after insulator replacement.
- SOE of Nakhatrana end not reported correctly at WRLDC Scada. ADANI, Nakahtrana may kindly resolve the issue in coordination with WRLDC-SCADA.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1	Whether DR/EL provided within 24 Hours?	IEGC section 37.2 (c) 2. CEA grid Standard 15.3	DR/EL received late from Nakhatrana (ADANI) and not received from POWERGRID WR-2

2	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Nakhatrana (ADANI)

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) FAULTY	02:24:02	370
WRLDC	220KV-CB	DHDY2_RE	DEDHIYA CB COUPLER CB 20252 OPEN	02:24:02	0
WRLDC	220KV-CB	DHDY2_RE	DEDHIYA CB CB 304_10_1 OPEN	02:24:03	0
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) OPEN	02:24:03	544
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) CLOSED	02:24:03	483
WRLDC	220-SOE	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) ACTED	02:24:03	512
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20152 (NKTR2) FAULTY	02:24:03	515
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB 20452 (BHJ72) FAULTY	02:24:04	200

SOE from Nakhatrana-

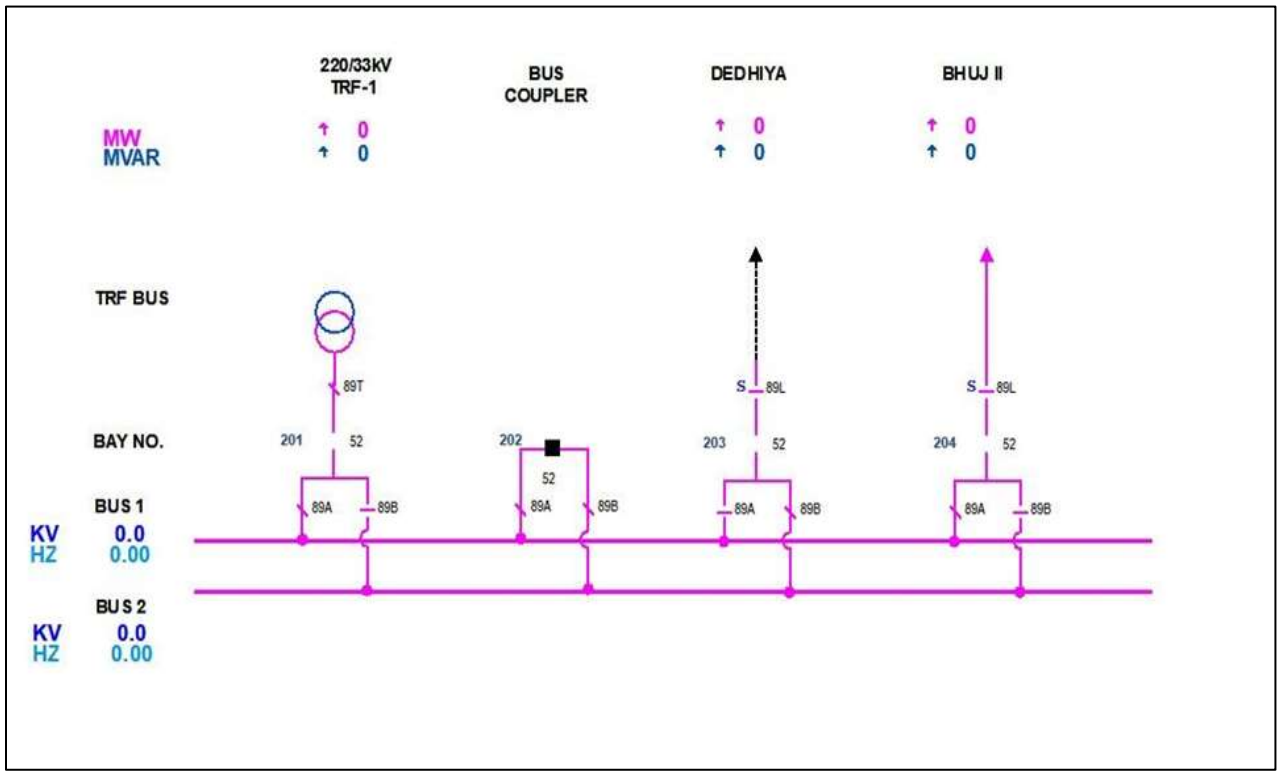
Type	Date & Time	Signal name	Status
P	18-Aug-24 1:16:40:377 PM	DRP_RECMADE	On
P	18-Aug-24 1:16:40:989 PM	DRP_RECMADE	Off
P	19-Aug-24 2:24:02:337 AM	PHS-STFWPE	On
P	19-Aug-24 2:24:02:337 AM	PHS-STFWL2	On
P	19-Aug-24 2:24:02:340 AM	ZM03-START	On
P	19-Aug-24 2:24:02:341 AM	TEF1_START	On
P	19-Aug-24 2:24:02:341 AM	BRC_START	On
P	19-Aug-24 2:24:02:349 AM	ZM02-START	On
P	19-Aug-24 2:24:02:358 AM	AR_START_M-2	On
P	19-Aug-24 2:24:02:364 AM	AR-START	On
P	19-Aug-24 2:24:02:370 AM	CAR_RCV_CH-2	On
P	19-Aug-24 2:24:02:373 AM	ZCOM_TRIP	On
P	19-Aug-24 2:24:02:373 AM	TRIP_TRIP	On
P	19-Aug-24 2:24:02:373 AM	TRIP L2	On
P	19-Aug-24 2:24:02:373 AM	AR_IN_PROGRES	On
P	19-Aug-24 2:24:02:373 AM	AR_1PT1	On
P	19-Aug-24 2:24:02:375 AM	CAR_RCV_CH-1	On
P	19-Aug-24 2:24:02:389 AM	CB_CLOSE_Y-PH	Off
P	19-Aug-24 2:24:02:402 AM	CB_OPEN_Y-PH	On
P	19-Aug-24 2:24:02:410 AM	AR_START_M-2	Off
P	19-Aug-24 2:24:02:418 AM	ZM03-START	Off
P	19-Aug-24 2:24:02:418 AM	ZM02-START	Off
P	19-Aug-24 2:24:02:418 AM	PHS-STFWPE	Off
P	19-Aug-24 2:24:02:418 AM	PHS-STFWL2	Off
P	19-Aug-24 2:24:02:421 AM	TEF1_START	Off
P	19-Aug-24 2:24:02:431 AM	CAR_RCV_CH-2	Off
P	19-Aug-24 2:24:02:445 AM	ZCOM_TRIP	Off
P	19-Aug-24 2:24:02:445 AM	AR-START	Off
P	19-Aug-24 2:24:02:485 AM	AR-PREP3P	On
P	19-Aug-24 2:24:02:492 AM	CAR_RCV_CH-1	Off
P	19-Aug-24 2:24:02:523 AM	TRIP_TRIP	Off
P	19-Aug-24 2:24:02:523 AM	TRIP L2	Off
P	19-Aug-24 2:24:02:525 AM	BRC_START	Off
P	19-Aug-24 2:24:02:621 AM	LINE_CVT_FF	On
P	19-Aug-24 2:24:02:735 AM	LINE_CVT_FF	Off
P	19-Aug-24 2:24:02:804 AM	LINE_CVT_FF	On
P	19-Aug-24 2:24:03:283 AM	DRP_RECSTART	On
P	19-Aug-24 2:24:03:380 AM	AR_OPTD	On
P	19-Aug-24 2:24:03:388 AM	AR_IN_PROGRES	Off
P	19-Aug-24 2:24:03:388 AM	AR_1PT1	Off
P	19-Aug-24 2:24:03:445 AM	CB_OPEN_Y-PH	Off
P	19-Aug-24 2:24:03:464 AM	LINE_CVT_FF	Off
P	19-Aug-24 2:24:03:465 AM	CB_CLOSE_Y-PH	On
P	19-Aug-24 2:24:03:467 AM	PHS-STFWPE	On
P	19-Aug-24 2:24:03:467 AM	PHS-STFWL2	On
P	19-Aug-24 2:24:03:468 AM	TEF1_START	On
P	19-Aug-24 2:24:03:468 AM	BRC_START	On
P	19-Aug-24 2:24:03:476 AM	ZM03-START	On
P	19-Aug-24 2:24:03:481 AM	CB_SPRNG_CHRG	Off

P	19-Aug-24 2:24:03:482 AM	ZM02-START	On
P	19-Aug-24 2:24:03:508 AM	AR_START_M-2	On
P	19-Aug-24 2:24:03:508 AM	AR_BLOCK_M-2	On
P	19-Aug-24 2:24:03:508 AM	3PH_TRIP_M-2	On
P	19-Aug-24 2:24:03:512 AM	AR-START	On
P	19-Aug-24 2:24:03:512 AM	AR-BLOCK	On
P	19-Aug-24 2:24:03:513 AM	CAR_RCV_CH-2	On
P	19-Aug-24 2:24:03:514 AM	AR_START_M-2	Off
P	19-Aug-24 2:24:03:518 AM	ZCOM_TRIP	On
P	19-Aug-24 2:24:03:518 AM	TRIP_TRIP	On
P	19-Aug-24 2:24:03:518 AM	TRIP L3	On
P	19-Aug-24 2:24:03:518 AM	TRIP L2	On
P	19-Aug-24 2:24:03:518 AM	TRIP L1	On
P	19-Aug-24 2:24:03:522 AM	86A/86B_OPTD	On
P	19-Aug-24 2:24:03:524 AM	AR_UNSUCCESS	On
P	19-Aug-24 2:24:03:525 AM	AR_START_M-2	On
P	19-Aug-24 2:24:03:534 AM	CAR_RCV_CH-1	On
P	19-Aug-24 2:24:03:537 AM	CB_CLOSE_B-PH	Off
P	19-Aug-24 2:24:03:538 AM	CB_CLOSE_Y-PH	Off
P	19-Aug-24 2:24:03:538 AM	CB_CLOSE_R-PH	Off
P	19-Aug-24 2:24:03:551 AM	CB_OPEN_B-PH	On
P	19-Aug-24 2:24:03:552 AM	CB_OPEN_Y-PH	On
P	19-Aug-24 2:24:03:553 AM	CB_OPEN_R-PH	On
P	19-Aug-24 2:24:03:560 AM	AR_START_M-2	Off
P	19-Aug-24 2:24:03:560 AM	AR_BLOCK_M-2	Off
P	19-Aug-24 2:24:03:572 AM	TEF1_START	Off
P	19-Aug-24 2:24:03:581 AM	ZM03-START	Off
P	19-Aug-24 2:24:03:581 AM	ZM02-START	Off
P	19-Aug-24 2:24:03:581 AM	PHS-STFWPE	Off
P	19-Aug-24 2:24:03:581 AM	PHS-STFWL2	Off
P	19-Aug-24 2:24:03:586 AM	CAR_RCV_CH-2	Off
P	19-Aug-24 2:24:03:586 AM	3PH_TRIP_M-2	Off
P	19-Aug-24 2:24:03:608 AM	ZCOM_TRIP	Off
P	19-Aug-24 2:24:03:608 AM	AR-START	Off
P	19-Aug-24 2:24:03:662 AM	CAR_RCV_CH-1	Off
P	19-Aug-24 2:24:03:668 AM	TRIP_TRIP	Off
P	19-Aug-24 2:24:03:668 AM	TRIP L3	Off
P	19-Aug-24 2:24:03:668 AM	TRIP L2	Off
P	19-Aug-24 2:24:03:668 AM	TRIP L1	Off
P	19-Aug-24 2:24:03:668 AM	BRC_START	Off
P	19-Aug-24 2:24:03:870 AM	DRP_RECSTART	Off
P	19-Aug-24 2:24:05:743 AM	DRP_RECSTART	On
P	19-Aug-24 2:24:06:268 AM	DRP_RECSTART	Off
P	19-Aug-24 2:24:08:380 AM	AR_OPTD	Off
P	19-Aug-24 2:24:13:389 AM	AR_UNSUCCESS	Off
P	19-Aug-24 2:24:21:309 AM	DRP_RECMADE	On
P	19-Aug-24 2:24:21:870 AM	DRP_RECMADE	Off
P	19-Aug-24 2:24:36:303 AM	DRP_RECMADE	On
P	19-Aug-24 2:24:36:868 AM	DRP_RECMADE	Off
P	19-Aug-24 2:50:06:629 AM	LOGGEDON	On
P	19-Aug-24 3:34:00:635 AM	LOGGEDON	Off
P	19-Aug-24 3:34:01:635 AM	LOGGEDON	On
P	19-Aug-24 4:03:26:393 AM	86A/86B_OPTD	Off

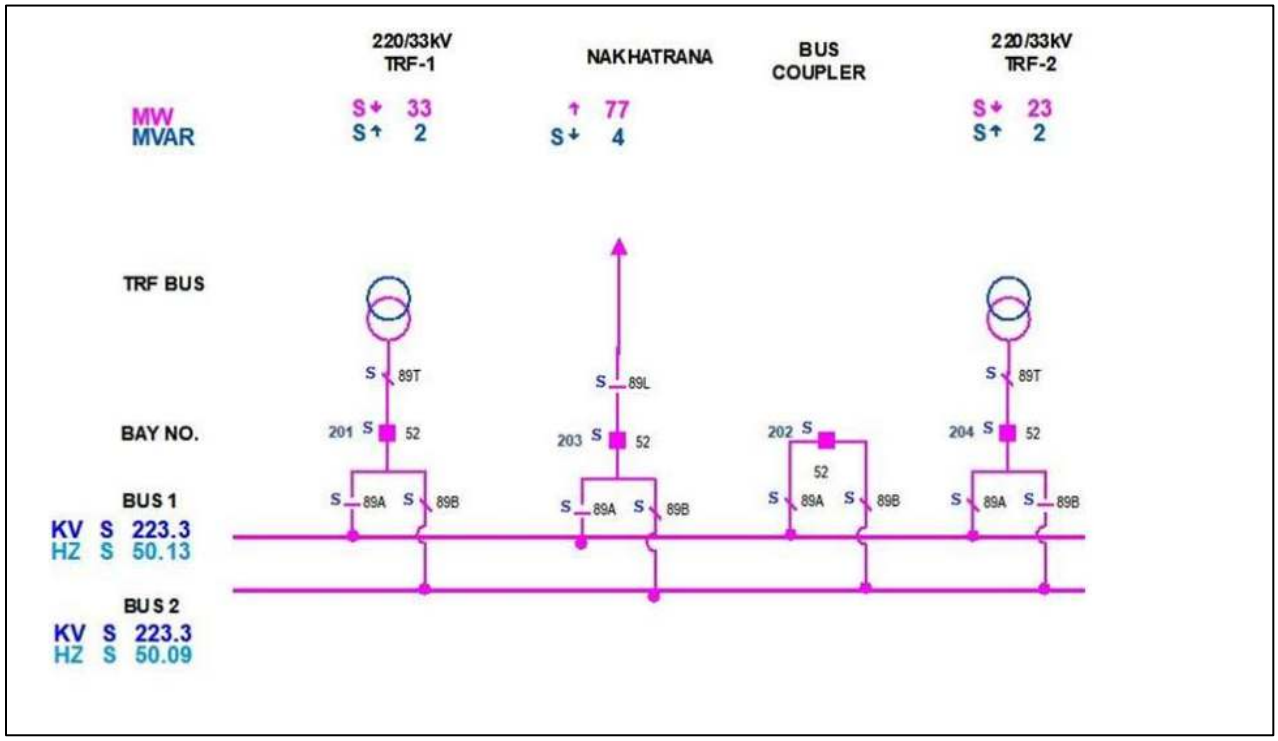
P	19-Aug-24 4:03:26:396 AM	AR-BLOCK	Off
P	19-Aug-24 4:15:10:316 AM	CB_SPRNG_CHRG	On
P	19-Aug-24 4:34:12:642 AM	LOGGEDON	Off
P	19-Aug-24 7:39:17:665 AM	LOGGEDON	On
P	19-Aug-24 8:39:26:673 AM	LOGGEDON	Off
P	19-Aug-24 9:02:25:961 AM	CB_MAN_CLOSE	On
P	19-Aug-24 9:02:25:965 AM	AR-BLOCK	On
P	19-Aug-24 9:02:25:999 AM	CB_OPEN_R-PH	Off
P	19-Aug-24 9:02:26:004 AM	CB_OPEN_Y-PH	Off
P	19-Aug-24 9:02:26:008 AM	CB_OPEN_B-PH	Off
P	19-Aug-24 9:02:26:021 AM	CB_CLOSE_R-PH	On
P	19-Aug-24 9:02:26:023 AM	CB_CLOSE_Y-PH	On
P	19-Aug-24 9:02:26:028 AM	CB_CLOSE_B-PH	On
P	19-Aug-24 9:02:26:038 AM	CB_SPRNG_CHRG	Off
P	19-Aug-24 9:02:26:135 AM	CB_MAN_CLOSE	Off
P	19-Aug-24 9:02:26:139 AM	AR-BLOCK	Off
P	19-Aug-24 9:02:26:345 AM	DRP_RECSTART	On
P	19-Aug-24 9:02:26:749 AM	DRP_RECSTART	Off
P	19-Aug-24 9:02:44:345 AM	DRP_RECMADE	On
P	19-Aug-24 9:02:44:957 AM	DRP_RECMADE	Off
P	19-Aug-24 9:19:24:912 AM	BRC_START	On
P	19-Aug-24 9:19:25:123 AM	DRP_RECSTART	On
P	19-Aug-24 9:19:25:360 AM	BRC_START	Off
P	19-Aug-24 9:19:25:527 AM	DRP_RECSTART	Off
P	19-Aug-24 9:19:44:141 AM	DRP_RECMADE	On
P	19-Aug-24 9:19:44:754 AM	DRP_RECMADE	Off
P	19-Aug-24 9:29:12:927 AM	CB_SPRNG_CHRG	On
P	19-Aug-24 9:29:12:938 AM	AR-PREP3P	Off
P	19-Aug-24 9:31:52:482 AM	BRC_START	On
P	19-Aug-24 9:31:52:594 AM	BRC_START	Off
P	19-Aug-24 9:31:52:734 AM	DRP_RECSTART	On
P	19-Aug-24 9:31:53:138 AM	DRP_RECSTART	Off
P	19-Aug-24 9:32:10:937 AM	DRP_RECMADE	On
P	19-Aug-24 9:32:11:548 AM	DRP_RECMADE	Off
P	19-Aug-24 11:48:19:975 PM	PHS-STFWL2	On
P	19-Aug-24 11:48:19:978 PM	PHS-STFWPE	On
P	19-Aug-24 11:48:19:996 PM	PHS-STFWPE	Off
P	19-Aug-24 11:48:19:999 PM	PHS-STFWL2	Off
P	19-Aug-24 11:48:20:669 PM	DRP_RECSTART	On
P	19-Aug-24 11:48:21:253 PM	DRP_RECSTART	Off
P	19-Aug-24 11:48:22:072 PM	PHS-STFWL2	On
P	19-Aug-24 11:48:22:072 PM	PHS-STFWL1	On
P	19-Aug-24 11:48:22:096 PM	PHS-STFWL2	Off
P	19-Aug-24 11:48:22:096 PM	PHS-STFWL1	Off
P	19-Aug-24 11:48:38:032 PM	DRP_RECMADE	On

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Nakhatrana SLD:

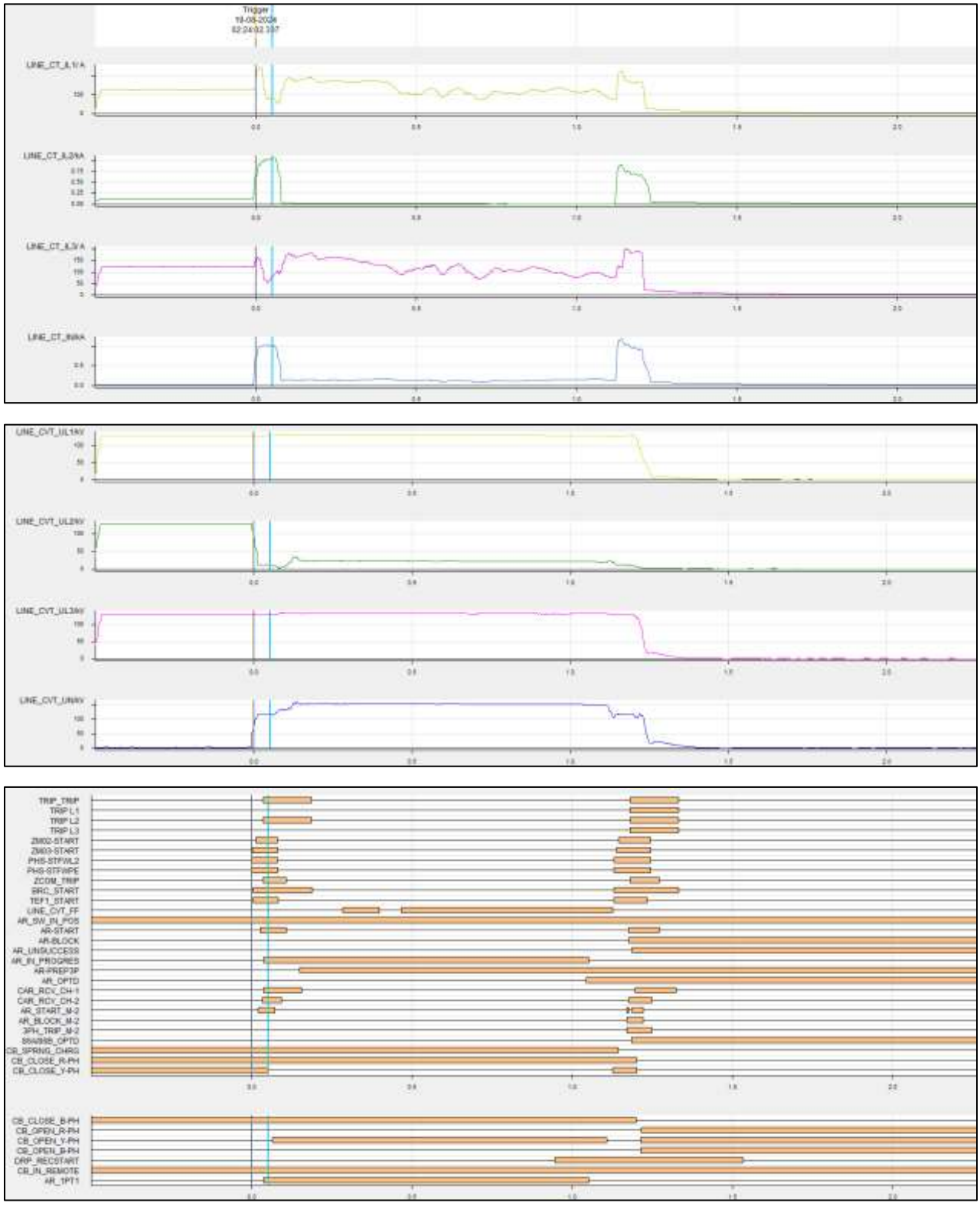


220kV Dedhiya SLD:



अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Nakhatrana-Dedhiya-1 for Nakhatrana end



अनुलग्नक-D / Annexure-D: Site photographs –(Insulator failure)



FAILED INSULATOR

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के. वी. सिधपुर उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Sidhpur S/S of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary:** At 12:24 Hrs / 19-08-2024, 220 kV Jamkhambaliya-Sidhpur tripped on Y-E fault. All 3 phases tripped for fault in single phase which is undesirable, also Auto Recloser block signal was active. During patrolling Y phase insulator failure was observed at Tower location 59. Generation loss of 9 MW occurred at Sidhpur (Torrent) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 12:24 Hrs / 19-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Sidhpur (Gujarat)
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.03	67063	55507	10694	15374
घटना के बाद Post Event	50.05	67161	55376	10704	15378

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Normal.

6. लोड और जेनरेशन हानि / Load and Generation loss: 9 MW generation loss.

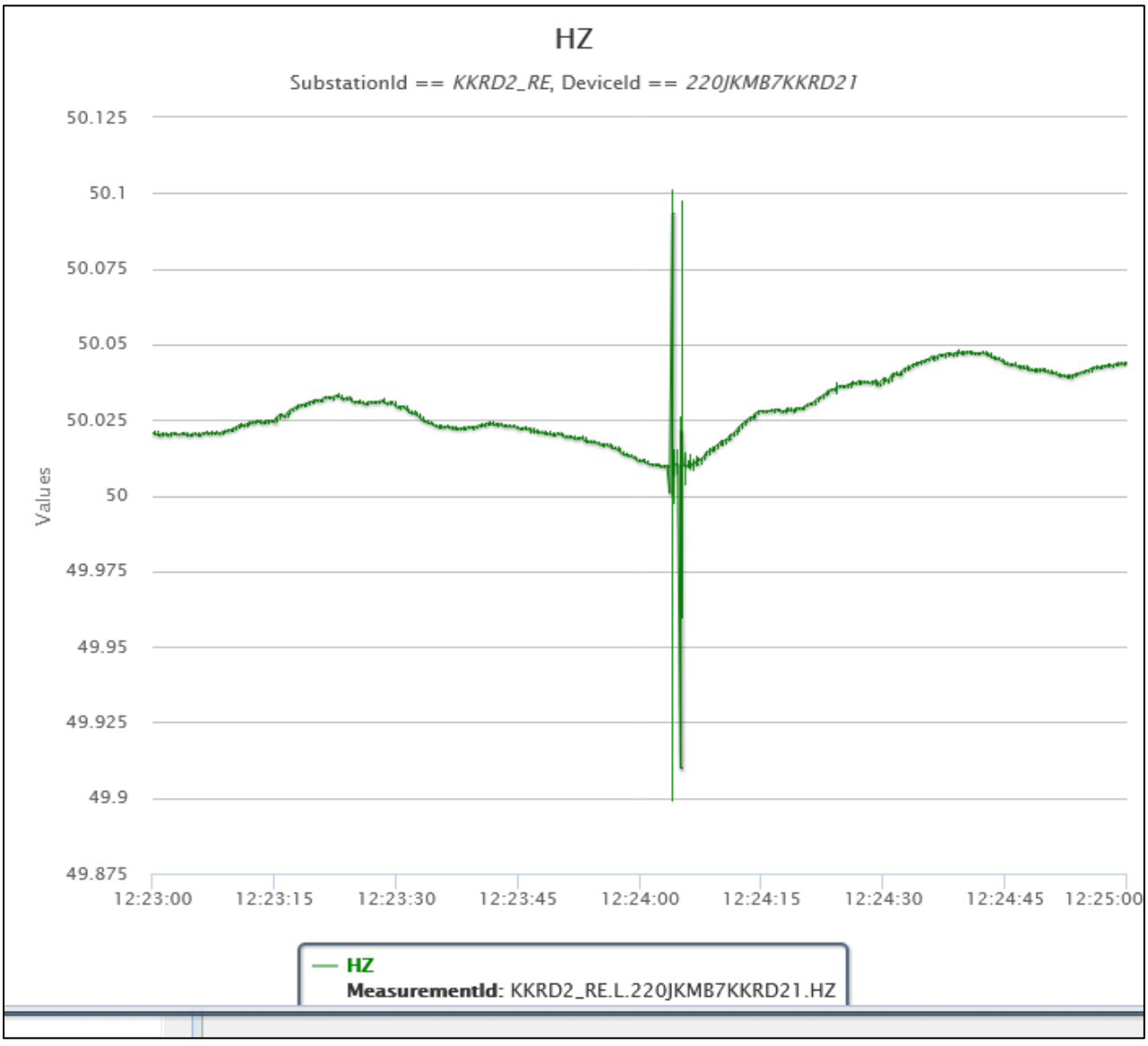


Figure 1. 220 kV Jamkhambaliya-Khakharda-1 Frequency Plot

7. रुकावट की अवधि / Duration of interruption: 19 Hours 18 Minutes

8. प्रभावित क्षेत्र का नक्शा / Network across the affected area

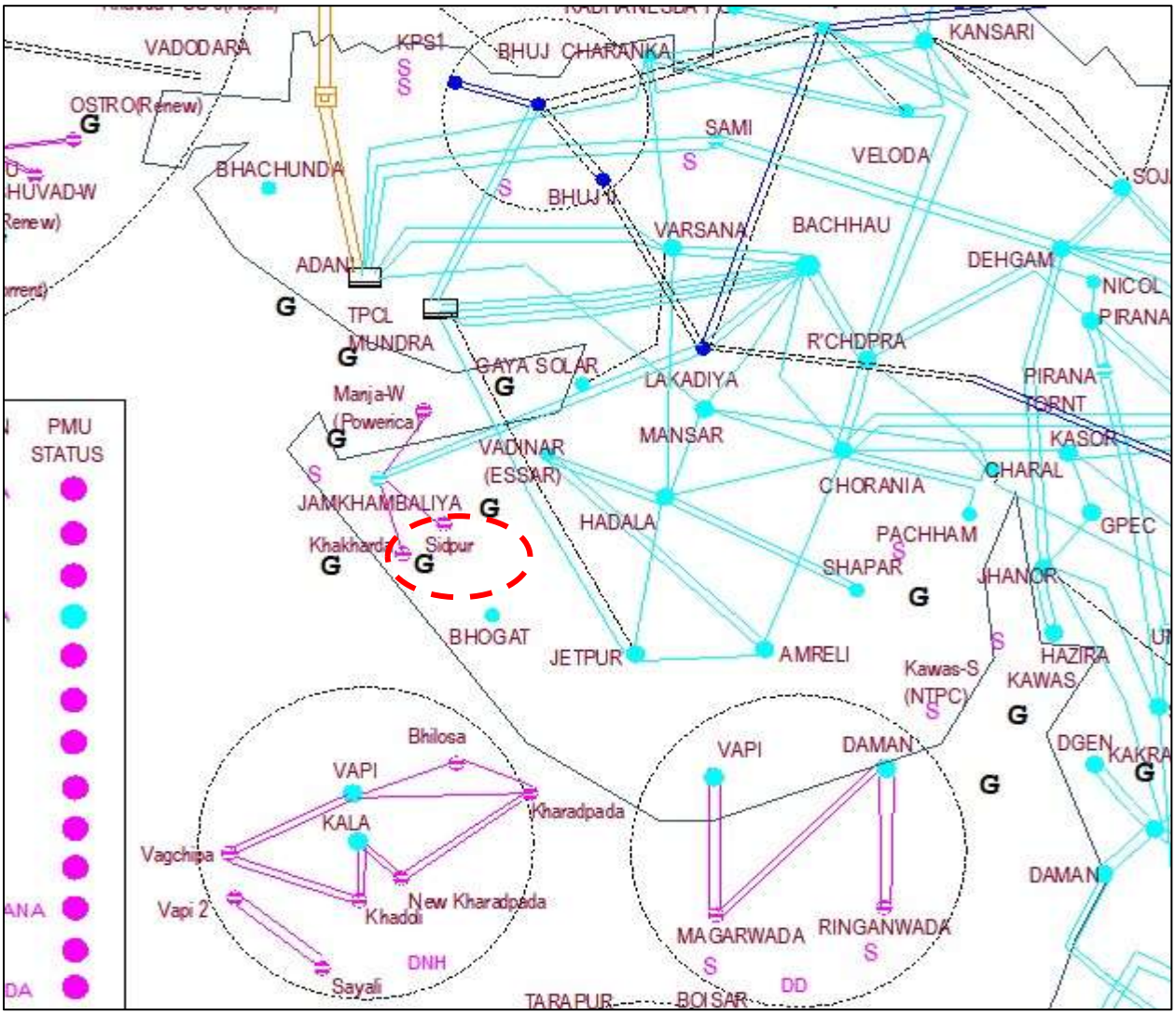


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (Sidhpur)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (remote end)	वापसी का समय Restoration time
1	220KV JKTL-Sidhpur line	12:24:05 19.08.24	Zone-1 OPTD, E/F Trip, 3 Ph Trip M1/M2, Y Phase trip R-121.47 A Y-455.773 A B-61.17 A N-608.078 A Fault Distance- 8.66 KM From Sidhpur PSS	JKTL End DISTANCE OPERATED Zone-01 Fault Distance-15.7 KM from JKTL PSS end	07:42:31/ 20.08.24

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

- 220 kV Jamkhambaliya-Sidhpur tripped on Y-E fault due to insulator failure at Tower location 59. All 3 phases tripped for fault in single phase which is undesirable.

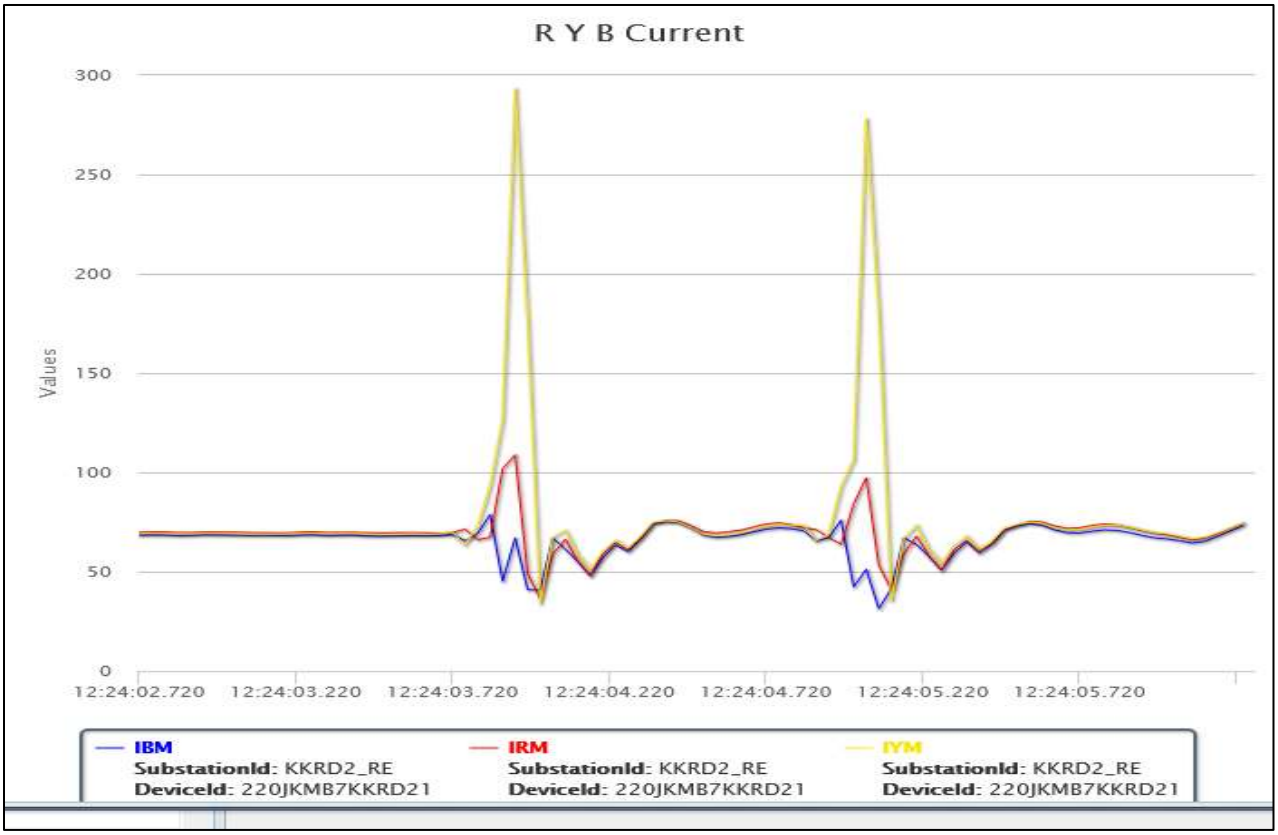


Figure 3. 220 kV Jamkhambaliya-Khakharda-1 Current Plot

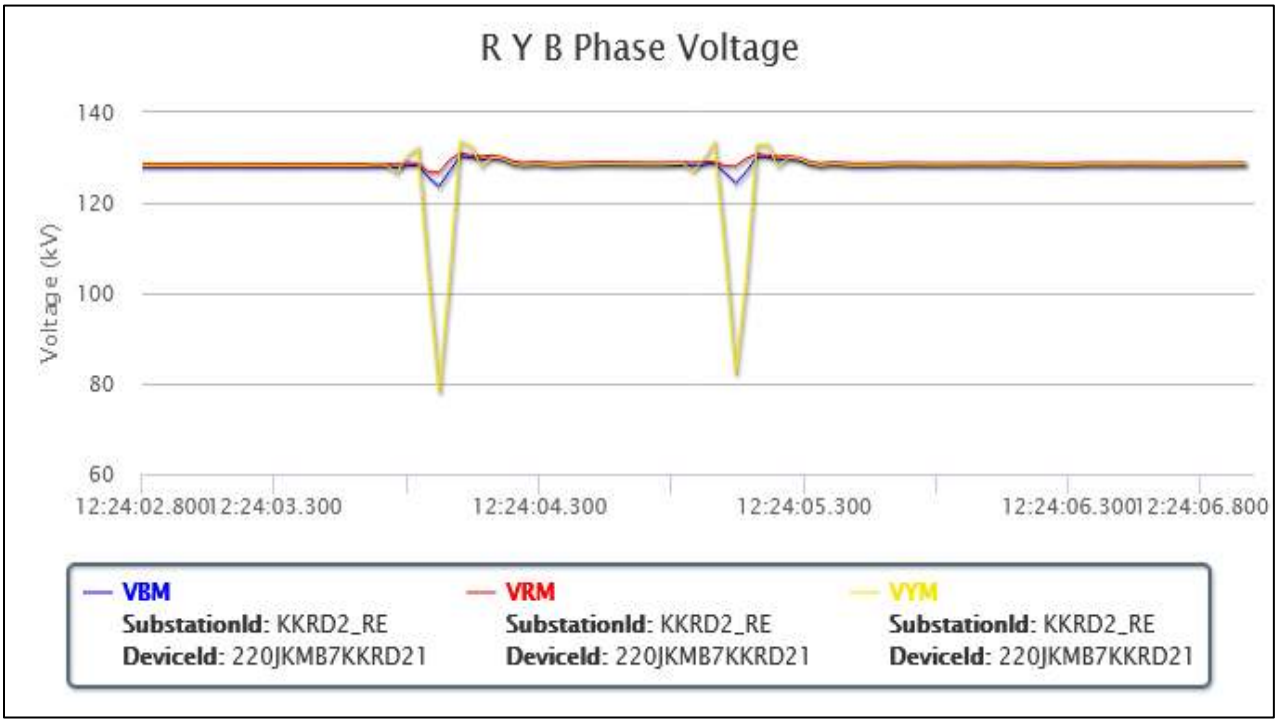


Figure 4. 220 kV Jamkhambaliya-Khakharda-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- As per DR of 220kV JKTL-Sidhpur of Sidhpur end, it is observed that Auto Recloser block signal was active hence A/R didn't attempt for single phase fault and line tripped on 3 phase fault.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Sidhpur (Torrent) has planned inspection of all 220 KV line towers with binoculars and thermography to avoid unnecessary tripping in future.
- Sidhpur (Torrent) may kindly investigate the reason for non-operation of A/R for single phase fault.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Sidhpur(Torrent) and not received from Adani-Jamkhambaliya
3.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Auto Recloser block signal was active hence A/R didn't attempt for single phase fault and line tripped on 3 phase fault.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE from WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	JKMB7_PG	JAM KHAMBALIYA CB 20652 (SDPR2-1) FAULTY	12:24:03	940
WRLDC	220KV-CB	JKMB7_PG	JAM KHAMBALIYA CB 20652 (SDPR2-1) FAULTY	12:24:03	940
WRLDC	220-SOE	JKMB7_PG	JAM KHAMBALIYA CB 20652 (SDPR2-1) ACTED	12:24:04	603
WRLDC	220KV-CB	JKMB7_PG	JAM KHAMBALIYA CB 20652 (SDPR2-1) OPEN	12:24:05	65
WRLDC	220KV-CB	SDPR2_RE	SIDHPUR TORRENT CB 20452 (JKMB7-1) OPEN	12:24:05	243
WRLDC	220KV-CB	JKMB7_PG	JAM KHAMBALIYA CB 20652 (SDPR2-1) OPEN	12:24:05	65
WRLDC	220-SOE	JKMB7_PG	JAM KHAMBALIYA CB 20552 (T2_S) ACTED	12:24:05	900

SOE from Sidhpur (Torrent)-



ABB

Pr

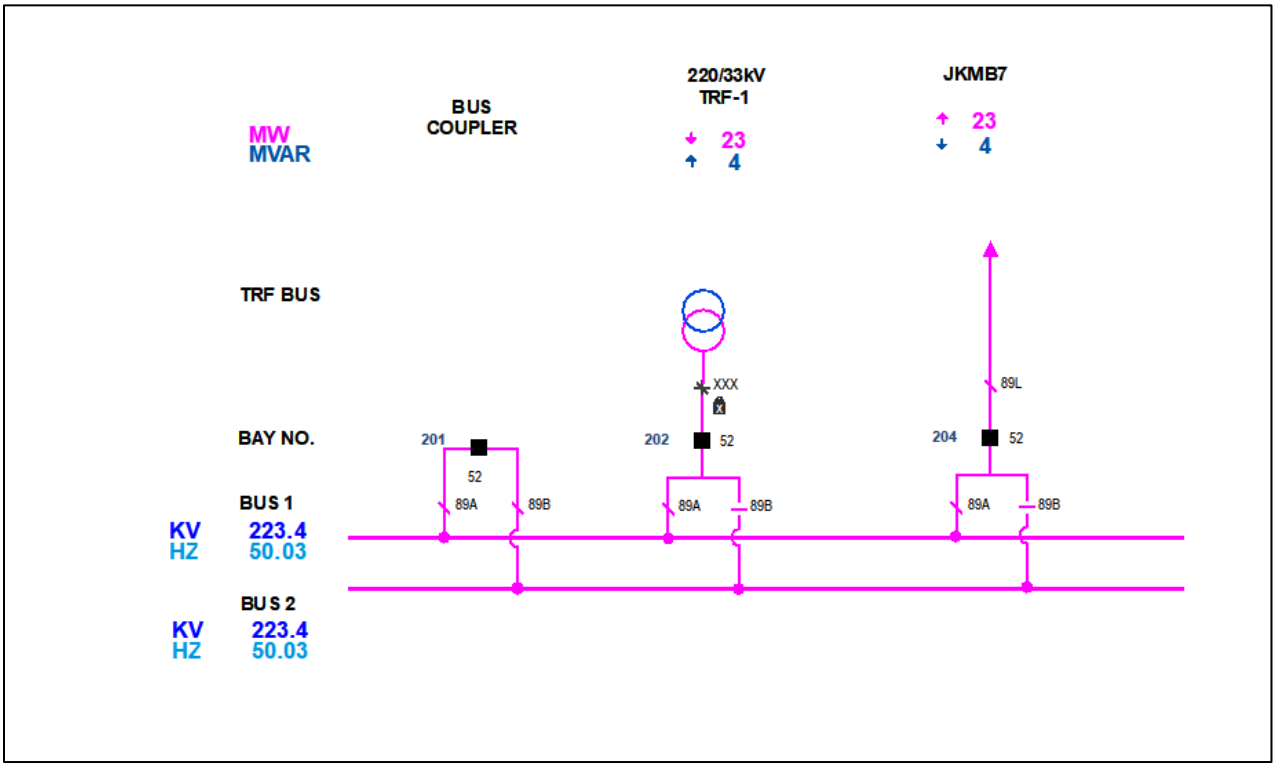
5 SEL_VT_BPH 136991.422 (V) 69.9°

Events List

Channel Number	Name	Status	Time
33	86A RELAY OPTD	On	8/19/2024 12:24:05.213 PM
34	86B RELAY OPTD	On	8/19/2024 12:24:05.213 PM
42	3PH_TRIP_M1/2	On	8/19/2024 12:24:05.217 PM
41	BLOCK_AR_M1/2	On	8/19/2024 12:24:05.218 PM
40	START_AR_M1/2	On	8/19/2024 12:24:05.226 PM
2	Q52-CLOSE-POS	Off	8/19/2024 12:24:05.234 PM
1	Q52-OPEN-POS	On	8/19/2024 12:24:05.246 PM
40	START_AR_M1/2	Off	8/19/2024 12:24:05.268 PM
42	3PH_TRIP_M1/2	Off	8/19/2024 12:24:05.358 PM
22	CB_AC_SUPP_FAIL	On	8/19/2024 12:24:06.145 PM

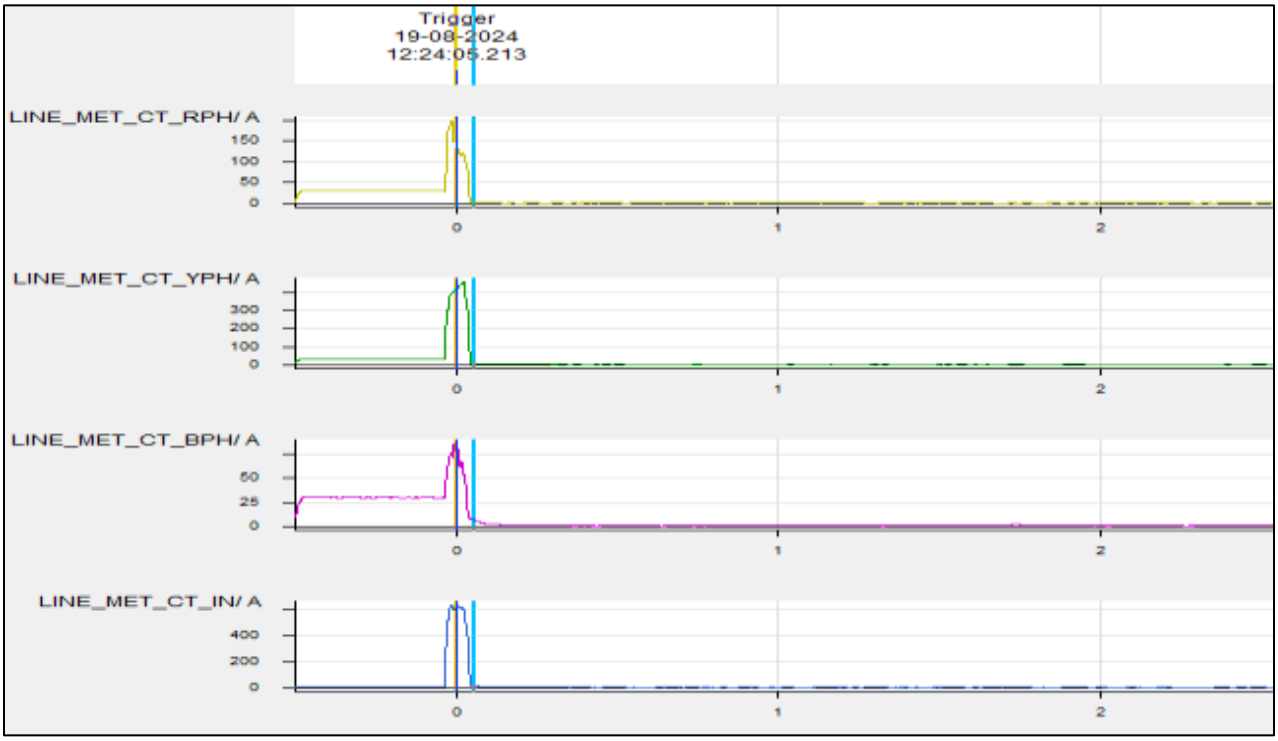
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

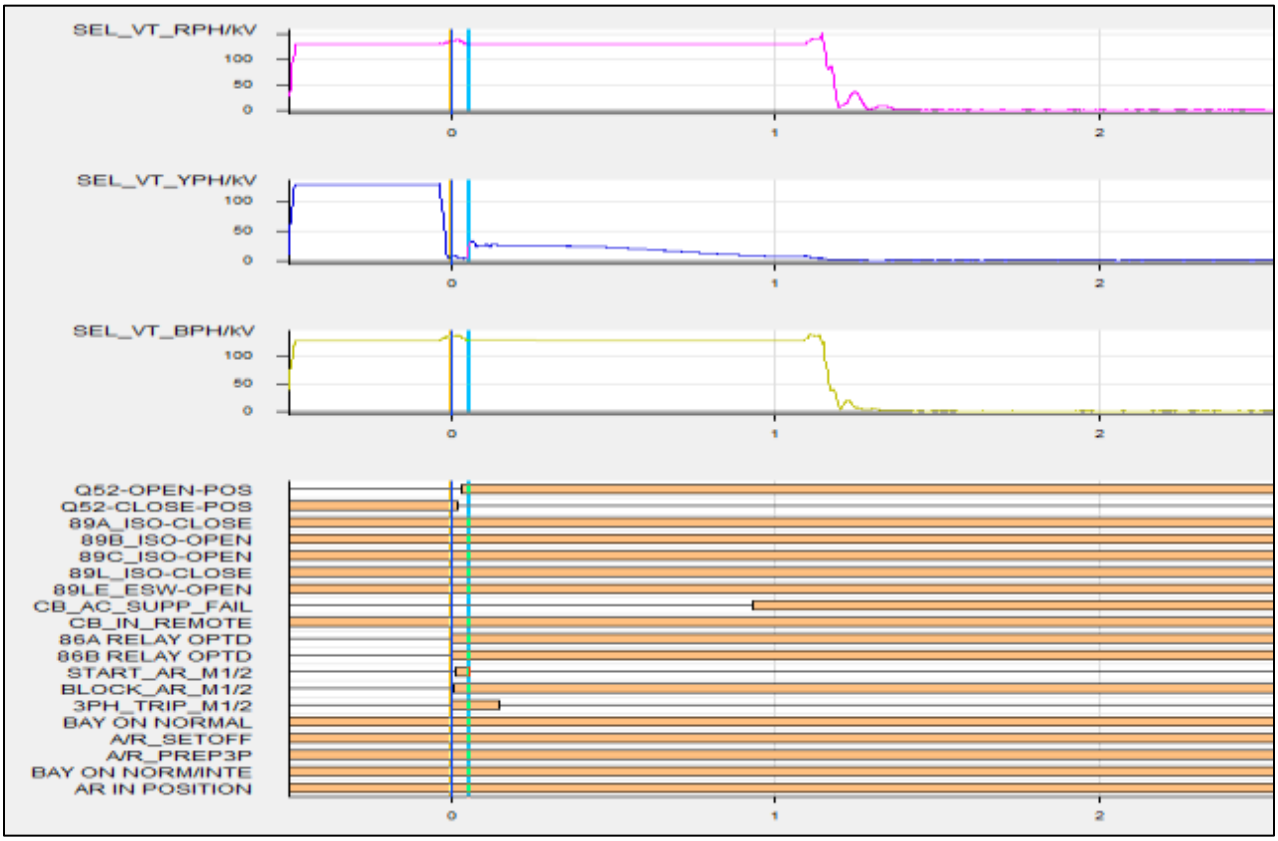
220 kV Sidhpur SLD-



अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below-

A. DR of 220kV Jamkhambaliya Sidhpur line from Sidhpur End.





अनुलग्नक-4 / Annexure-4: Site photographs-



Vijay Kumar Kodali

DGM, SO, WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. चुग्गर उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Chugger of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 01:51 Hrs / 27-08-2024, 220 kV Chugger-Bhuj-II-S/c tripped on R-E fault. During patrolling, R phase Jumper found open at Tower location 07 along with failure of insulator. Generation loss of 240 MW occurred at Chugger (Sitac) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 01:51 Hrs / 27-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Chugger, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.99	60364	43412	7628	10539
घटना के बाद Post Event	49.93	60347	43382	7618	10458

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Rainy, Lightning and Gusty Wind.

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 240 MW occurred at Chugger (Sitac) Wind Power plant.

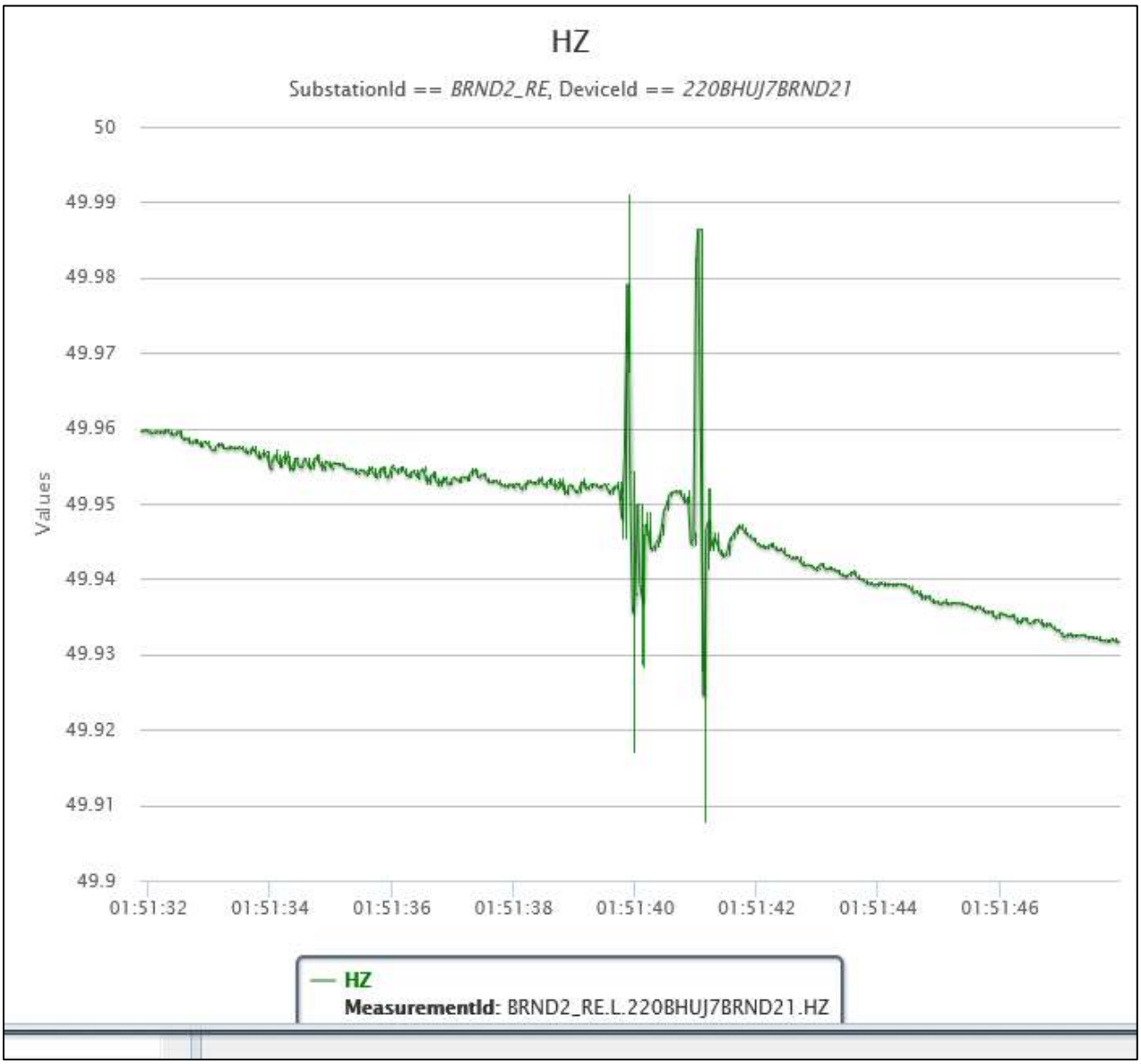


Figure 1. 220 kV Bhuj- Baranda-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 19 hours 41 minutes

8. **प्रभावित क्षेत्र का नक्शा / Network across the affected area:**

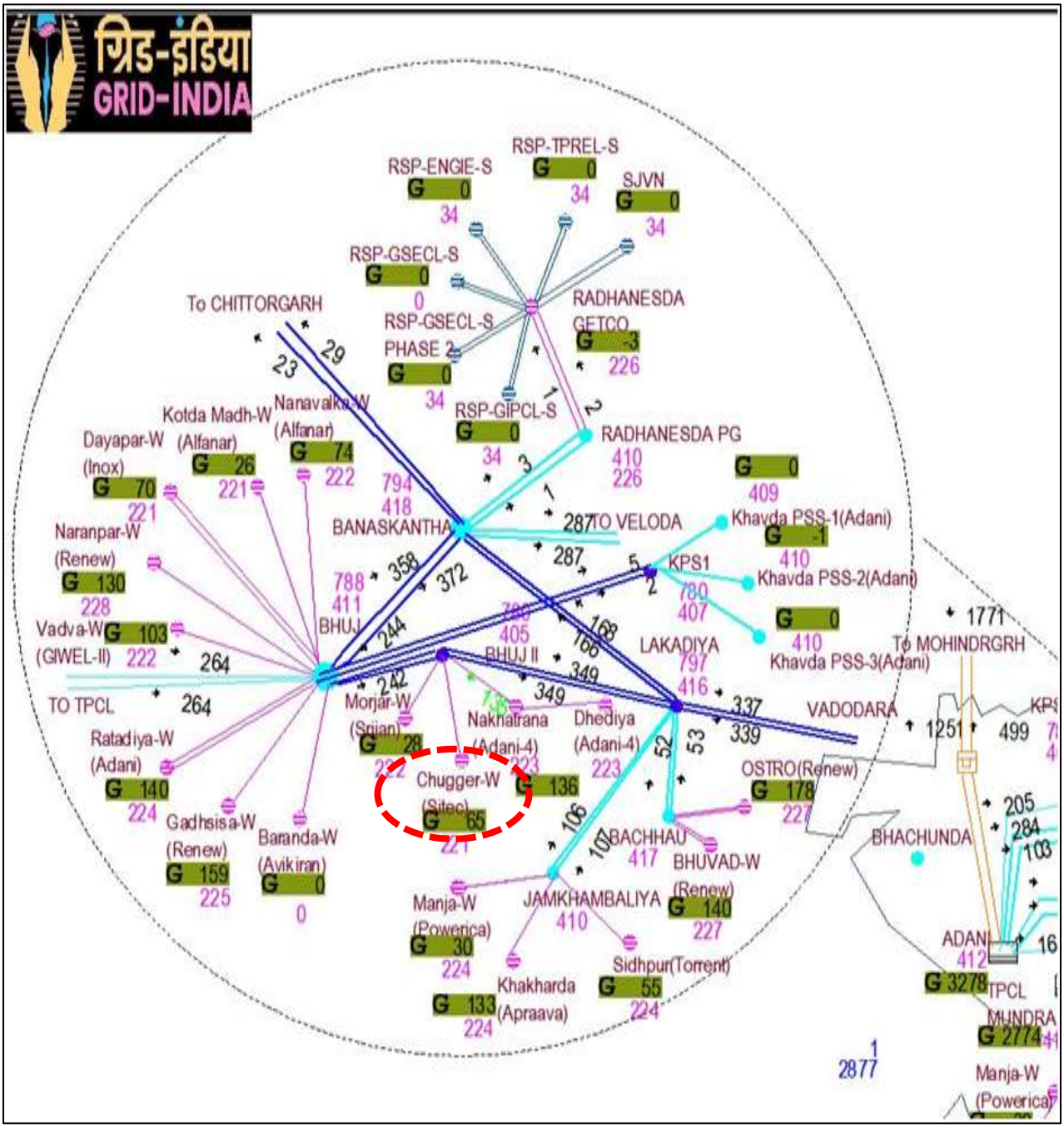


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Chugger	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220 kV Bhuj II-Sitac/Chugger	01:51	Tripped on Rph to e/f, with indications- Zone 1, 1.102 KA , 40.05km. Load Before Trip: 240 MW	-	21:32

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

- 220 kV Chugger-Bhuj-II-S/c tripped on R-E fault

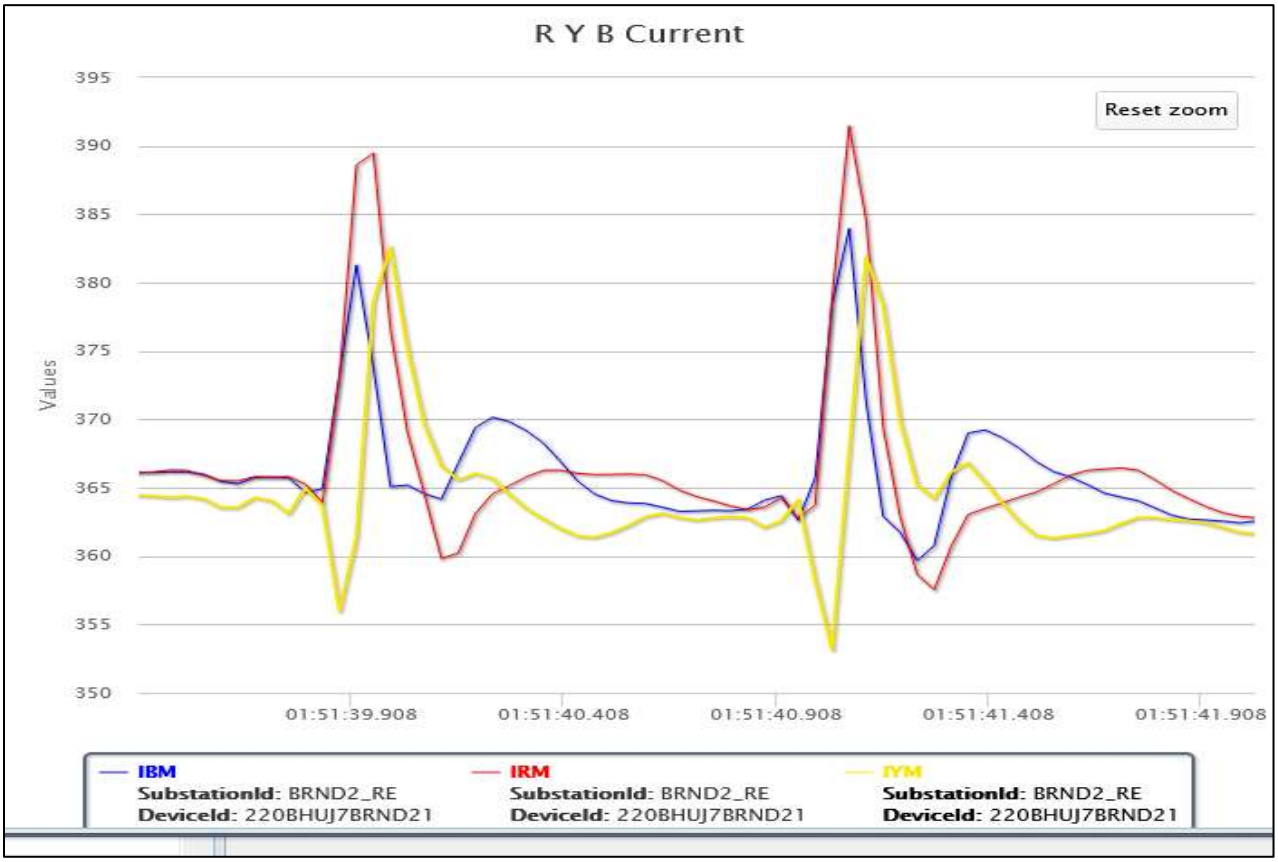


Figure 3. 220 kV Bhuj- Baranda -1 Current Plot

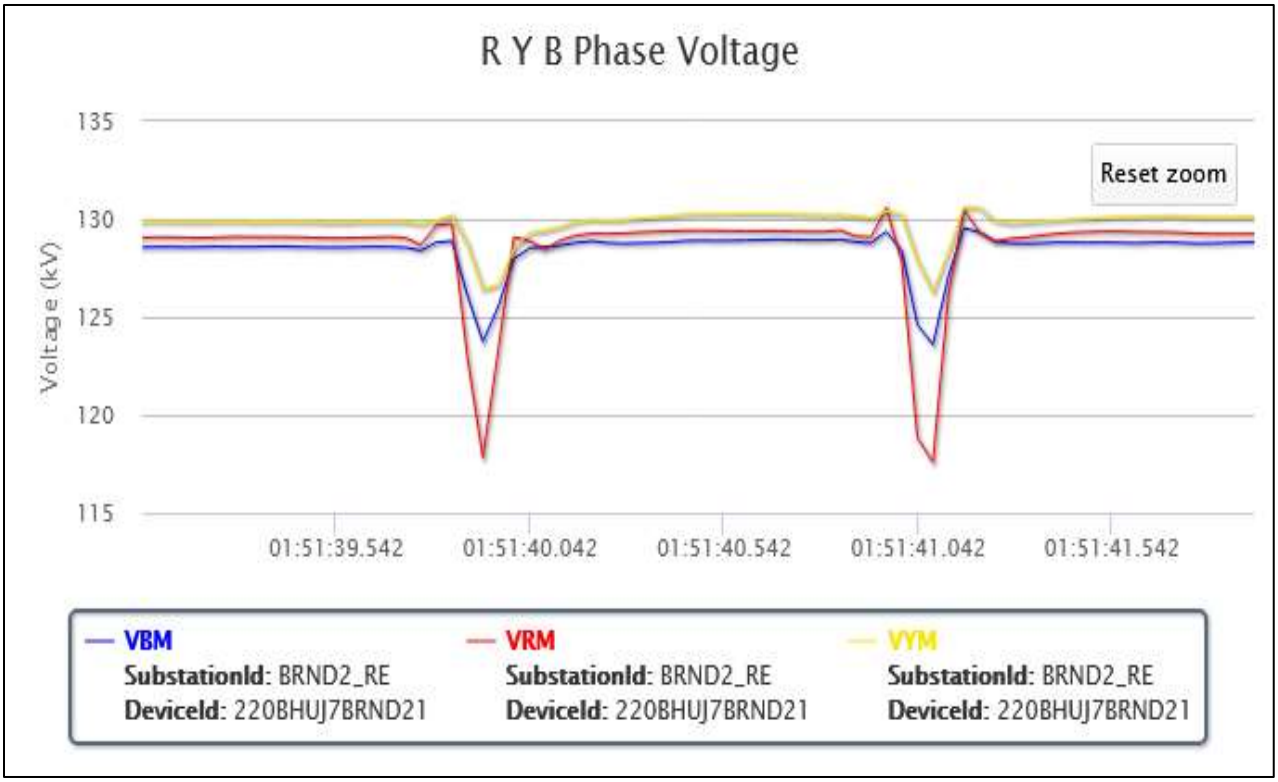


Figure 4. 220 kV Bhuj- Baranda -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed: Nil

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Line restored after rectification

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र°सं° S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from Chugger (Sitac)
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Powergrid.
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Chugger (Sitac)

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC- SOE not generated by WRLDC SCADA

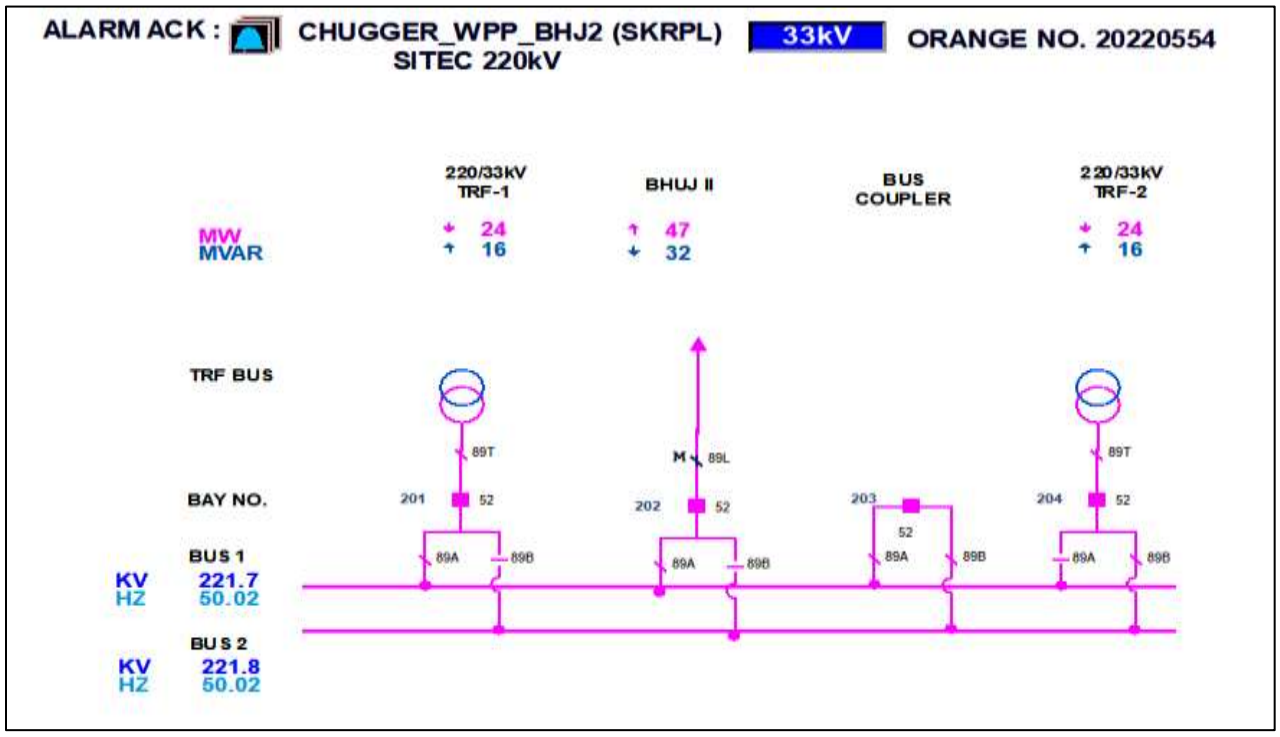
SOE from Chugger-

Type	Date & Time	Signal name	Status
P	27-Aug-24 9:03:16:972 AM	CARR RCV CH1	Off
P	27-Aug-24 9:03:16:967 AM	CARR RCV CH2	Off
P	27-Aug-24 9:03:16:937 AM	FSD1-BLKU	Off
P	27-Aug-24 9:03:16:847 AM	CARR RCV CH1	On
P	27-Aug-24 9:03:16:846 AM	CARR RCV CH2	On
P	27-Aug-24 9:03:16:829 AM	FSD1-BLKU	On
P	27-Aug-24 9:03:16:529 AM	FSD1-BLKU	Off
P	27-Aug-24 9:03:16:514 AM	FSD1-BLKU	On
P	27-Aug-24 3:36:17:486 AM	CARR RCV CH1	Off
P	27-Aug-24 3:36:17:479 AM	CARR RCV CH2	Off
P	27-Aug-24 3:36:17:455 AM	FSD1-BLKU	Off
P	27-Aug-24 3:36:17:369 AM	CARR RCV CH1	On
P	27-Aug-24 3:36:17:368 AM	CARR RCV CH2	On
P	27-Aug-24 3:36:17:347 AM	FSD1-BLKU	On
P	27-Aug-24 1:51:41:102 AM	FSD1-BLKU	Off
P	27-Aug-24 1:51:40:217 AM	BRC_START	Off
P	27-Aug-24 1:51:40:214 AM	FSD1-BLKU	On
P	27-Aug-24 1:51:40:118 AM	CB OPEN B	On
P	27-Aug-24 1:51:40:109 AM	CB OPEN Y	On
P	27-Aug-24 1:51:40:073 AM	TRIP1_TRIP	Off
P	27-Aug-24 1:51:40:073 AM	TRIP1 L3	Off
P	27-Aug-24 1:51:40:073 AM	TRIP1 L2	Off
P	27-Aug-24 1:51:40:073 AM	TRIP1 L1	Off
P	27-Aug-24 1:51:40:060 AM	CARR RCV CH1	Off
P	27-Aug-24 1:51:40:053 AM	CARR RCV CH2	Off
P	27-Aug-24 1:51:40:052 AM	TRIP1 L3	On
P	27-Aug-24 1:51:40:052 AM	TRIP1 L2	On
P	27-Aug-24 1:51:40:049 AM	TEF-START	Off
P	27-Aug-24 1:51:40:049 AM	PREP 3PH TR	On
P	27-Aug-24 1:51:40:044 AM	PERM1P TR_BCU	Off
P	27-Aug-24 1:51:40:041 AM	TOC1-START	Off
P	27-Aug-24 1:51:40:025 AM	ZCOM_CS	Off
P	27-Aug-24 1:51:40:009 AM	TEF-START	On
P	27-Aug-24 1:51:39:993 AM	TOC1-START	On
P	27-Aug-24 1:51:39:989 AM	ZCOM_TRIP	Off
P	27-Aug-24 1:51:39:989 AM	AR START	Off
P	27-Aug-24 1:51:39:965 AM	FAULT LOOP R	Off
P	27-Aug-24 1:51:39:962 AM	ZMF03-START	Off
P	27-Aug-24 1:51:39:962 AM	ZMF02-START	Off
P	27-Aug-24 1:51:39:962 AM	ZMF01-TRIP	Off
P	27-Aug-24 1:51:39:962 AM	ZMF01-START	Off
P	27-Aug-24 1:51:39:962 AM	R-PH FAULT	Off
P	27-Aug-24 1:51:39:962 AM	PHS-STFWPE	Off
P	27-Aug-24 1:51:39:962 AM	PHS-STFWL1	Off
P	27-Aug-24 1:51:39:961 AM	TEF-START	Off
P	27-Aug-24 1:51:39:961 AM	BRC_START	On
P	27-Aug-24 1:51:39:956 AM	CB OPEN R	On
P	27-Aug-24 1:51:39:953 AM	TOC1-START	Off
P	27-Aug-24 1:51:39:926 AM	FAULT LOOP R	On
P	27-Aug-24 1:51:39:923 AM	ZMF01-TRIP	On
P	27-Aug-24 1:51:39:923 AM	ZMF01-START	On
P	27-Aug-24 1:51:39:923 AM	ZCOM_TRIP	On
P	27-Aug-24 1:51:39:923 AM	ZCOM_CS	On
P	27-Aug-24 1:51:39:923 AM	TRIP1_TRIP	On
P	27-Aug-24 1:51:39:923 AM	TRIP1 L1	On
P	27-Aug-24 1:51:39:923 AM	R-PH FAULT	On
P	27-Aug-24 1:51:39:923 AM	AR START	On
P	27-Aug-24 1:51:39:919 AM	CARR RCV CH1	On
P	27-Aug-24 1:51:39:918 AM	CARR RCV CH2	On
P	27-Aug-24 1:51:39:911 AM	ZMF03-START	On
P	27-Aug-24 1:51:39:911 AM	ZMF02-START	On
P	27-Aug-24 1:51:39:905 AM	TOC1-START	On
P	27-Aug-24 1:51:39:897 AM	TEF-START	On
P	27-Aug-24 1:51:39:893 AM	PHS-STFWPE	On
P	27-Aug-24 1:51:39:893 AM	PHS-STFWL1	On

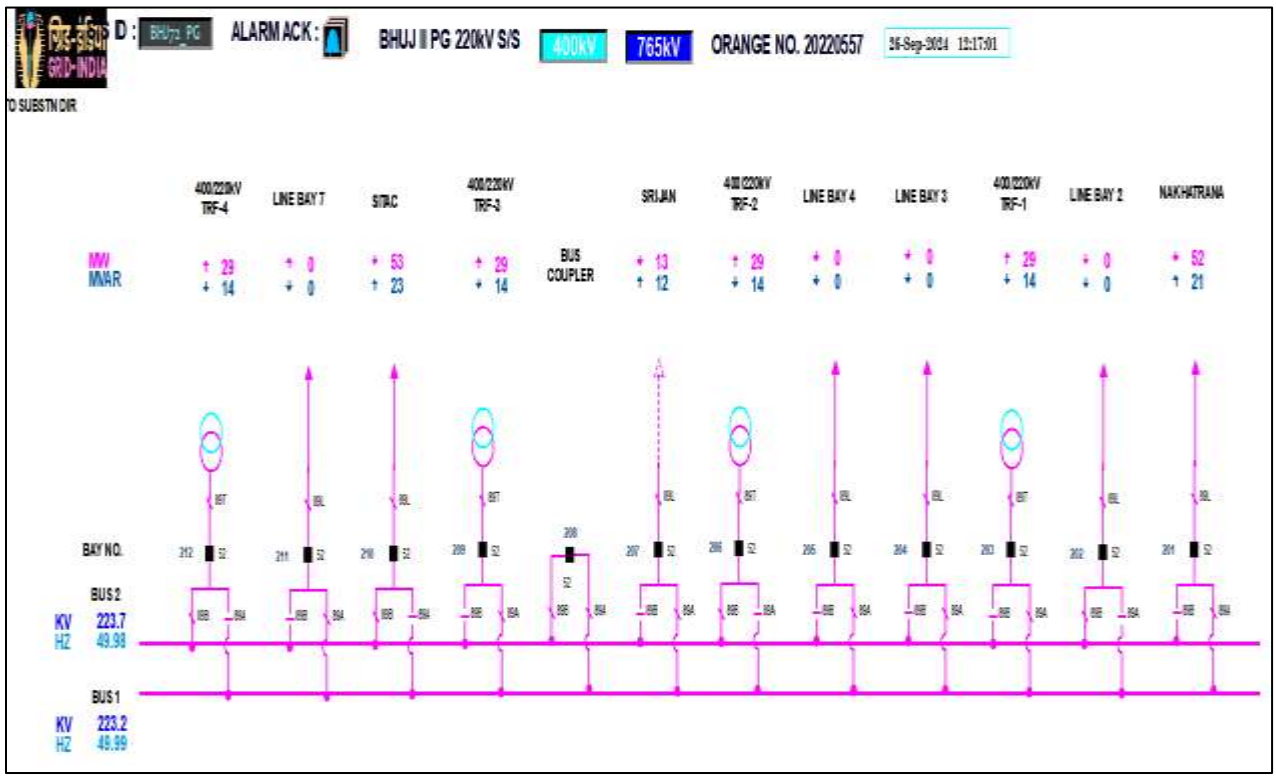
IED Information	
Name	AA1D1Q02FN1_REL
Serial Number	I2124011
Order Code	
Technical Key	AA1D1Q02FN1
Product Type	REL670
Product Version	2.2.4

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Chugger SLD:

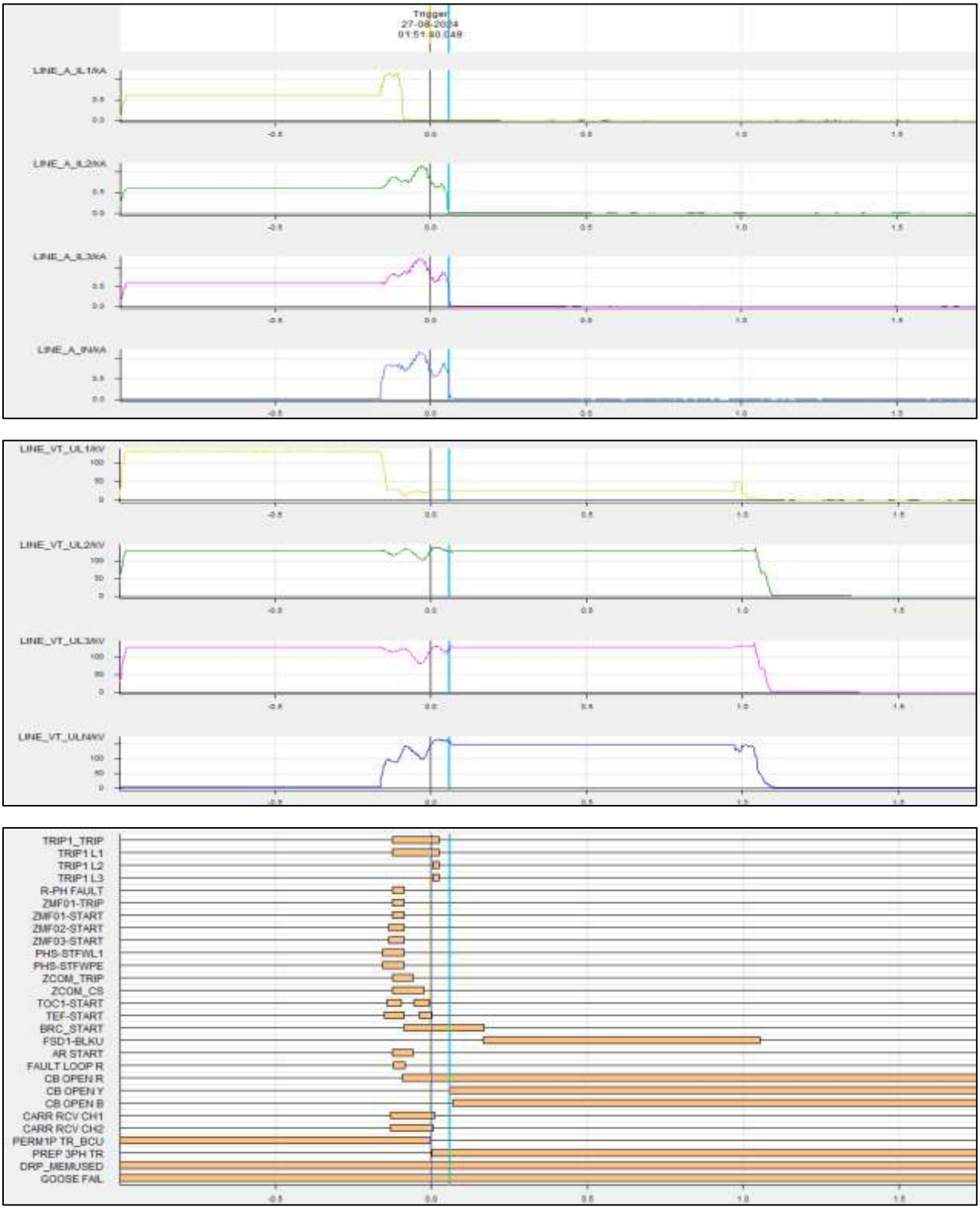


220kV Bhuj SLD:



अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Chugger- Bhuj II from Chugger end



अनुलग्नक-D / Annexure-D: Site photographs –







Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. बरांडा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Baranda of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 16:58 Hrs / 27-08-2024, 220 kV Bhuj-Baranda-S/c tripped on B-E fault. Generation loss of 148 MW occurred at Baranda (ASIPL) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 16:58 Hrs / 27-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Baranda, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.05	59674	47898	6903	11432
घटना के बाद Post Event	50.05	59440	47892	6897	11442

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Heavy rain & lightening

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 148 MW Gen loss.

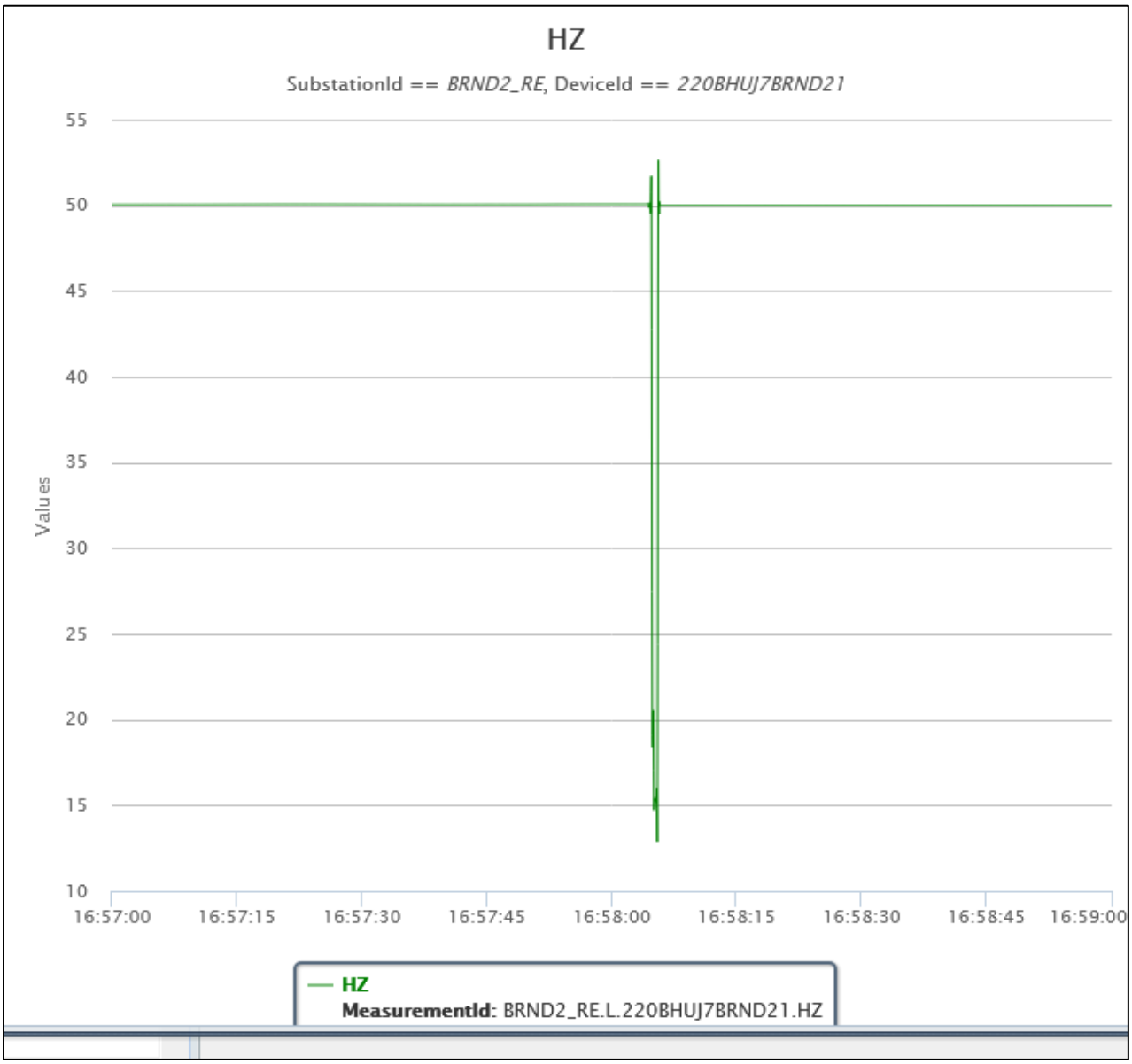


Figure 1. 220 kV Bhuj- Baranda_-1 Active Power Line Plot

7. **रुकावट की अवधि / Duration of interruption:** 3 hours 49 minutes

8. प्रभावित क्षेत्र का नक्शा / Network across the affected area

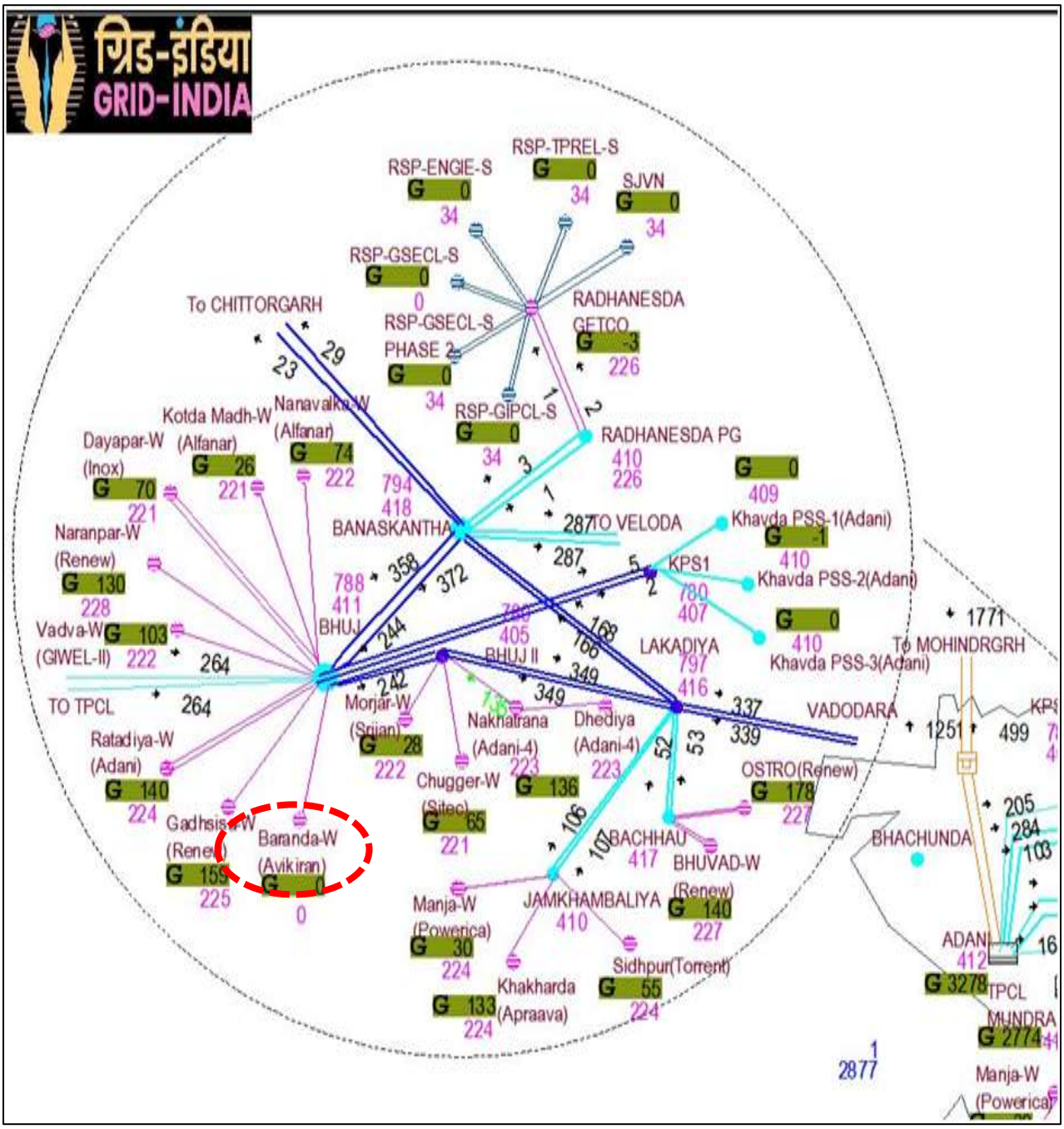


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Baranda	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1.	220 kV Baranda-Bhuj S/C	16:58	Fault Current:- 0.79kA Fault Phase:- B-Phase Fault Distance:- 51.0km Zone-1	Fault Current:- 7.028kA Fault Phase:- B-Phase Fault Distance:- 24.56kM Zone-1	20:47

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

- 220 kV Bhuj-Baranda-S/c tripped on B-E fault without A/R attempt.

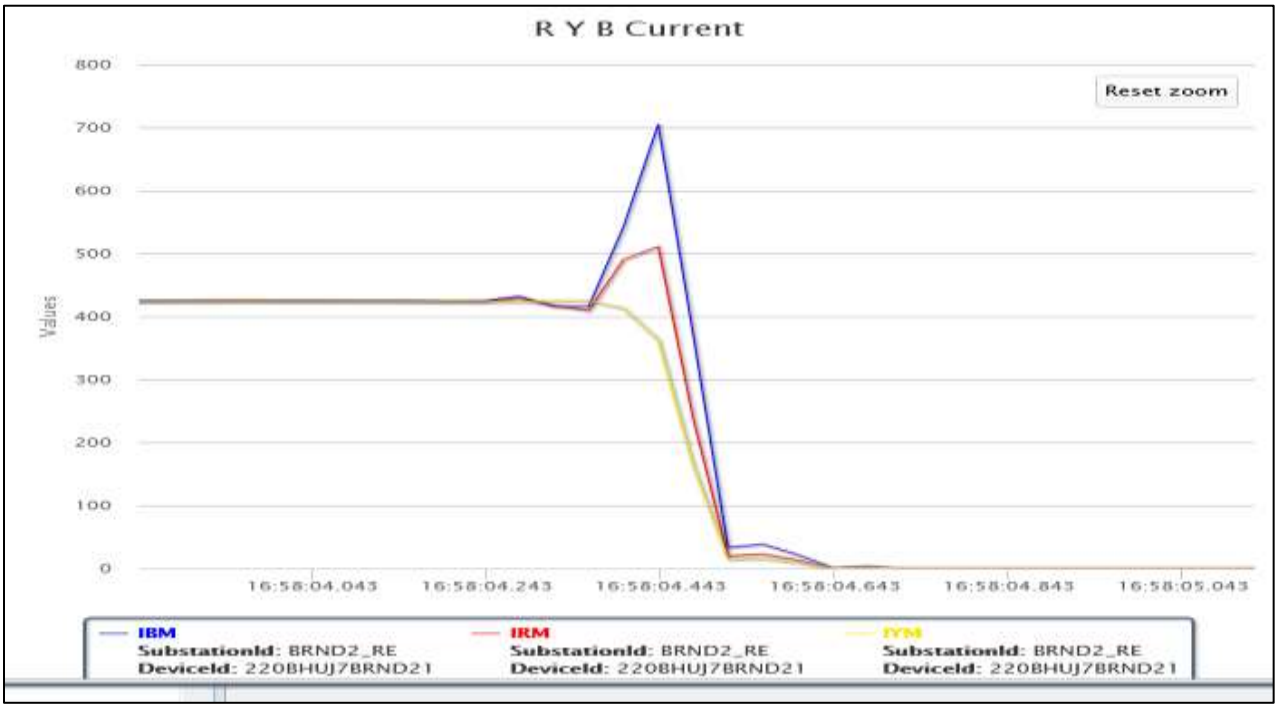


Figure 3. 220 kV Bhuj- Baranda_-1 Current Plot

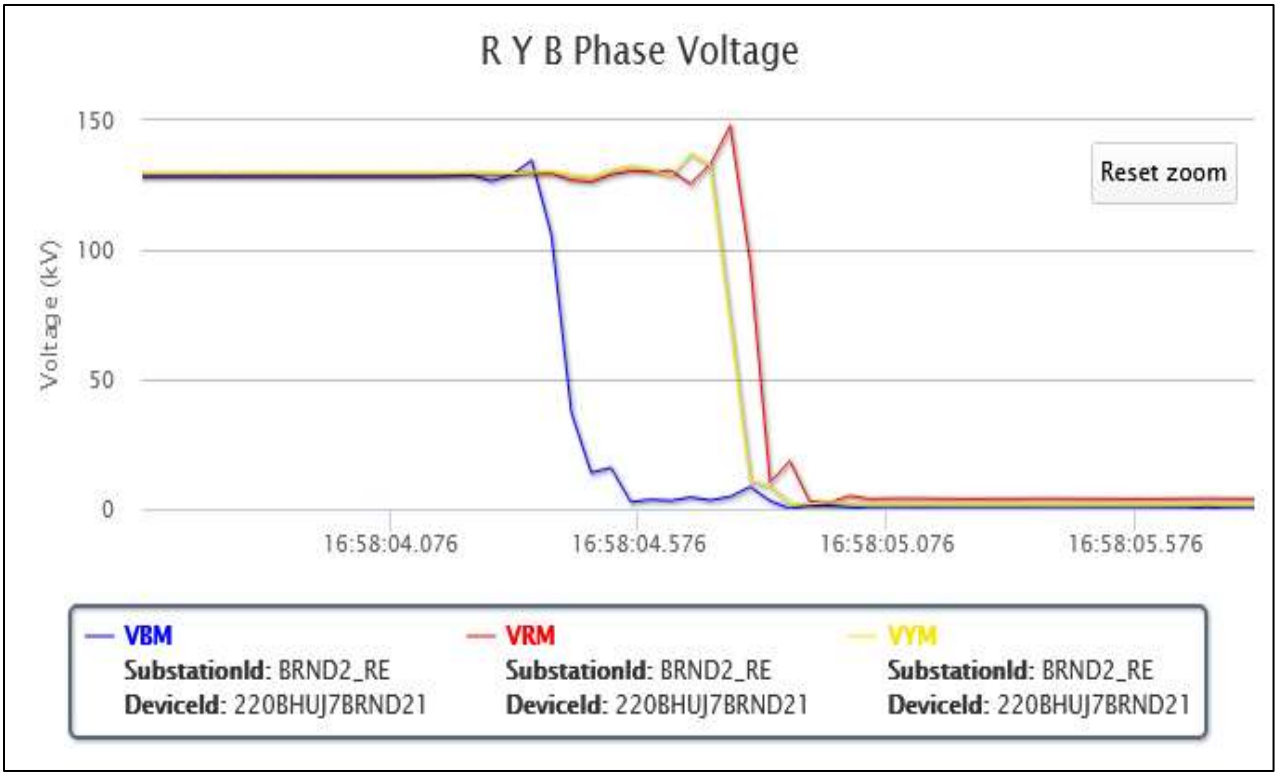


Figure 4. 220 kV Bhuj- Baranda_-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- A/R not attempted for single phase fault

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Patrolling work done by Avikiran Baranda but no fault was found. Fault might have occurred due to heavy rain & lightening in that area.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र°सं° S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Avikiran and not received from POWERGRID WR-2

3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late i.e. on 10.09.2024
4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted for single phase fault

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23252 (BRND2) FAULTY	16:58:04	466
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 23252 (BRND2) ACTED	16:58:04	810
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23252 (BRND2) OPEN	16:58:04	829
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) FAULTY	16:58:04	476
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) TRANSIT	16:58:04	479
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) OPEN	16:58:04	480

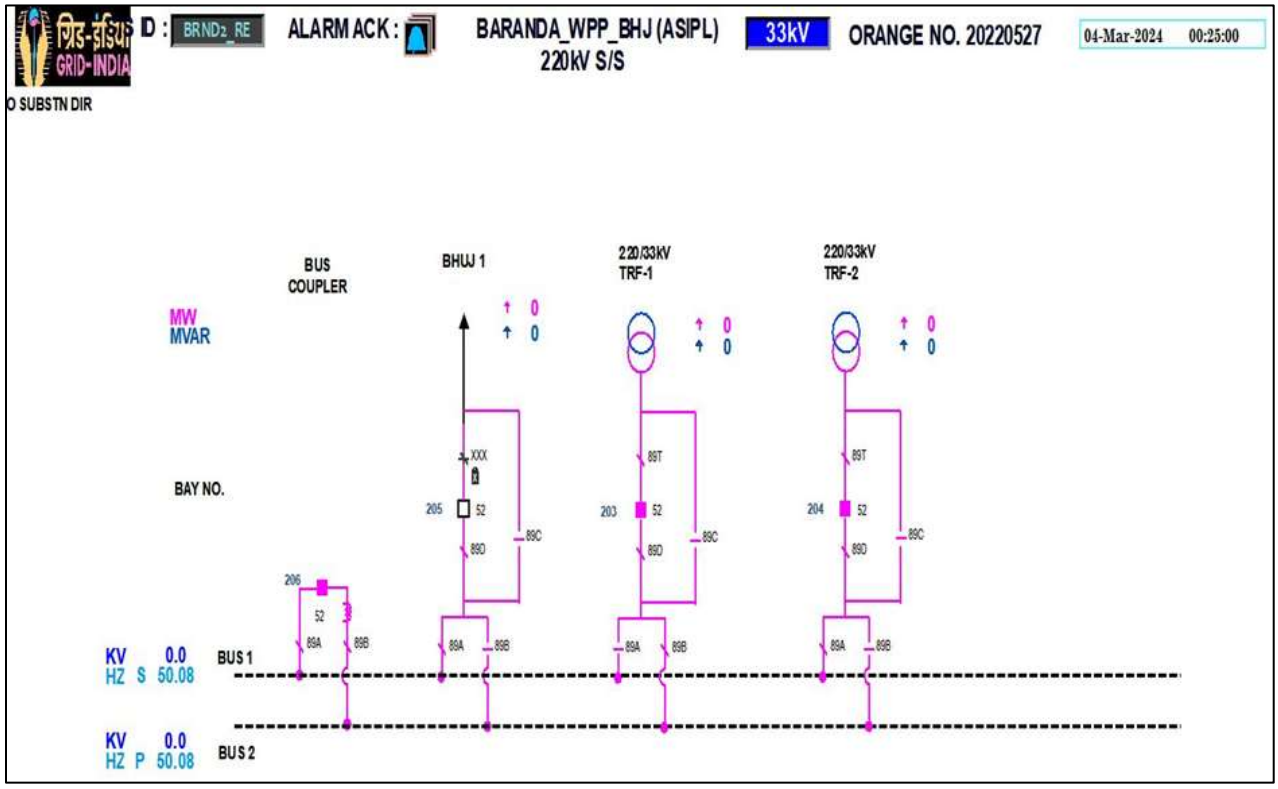
SOE from Baranda-

Trip Log - 000043 / 8/27/2024 4:58:04.441 PM - 5323_100_Suzlon / Line / B202_21_1__7SA522 V4.7/7SA522 V04.76.02

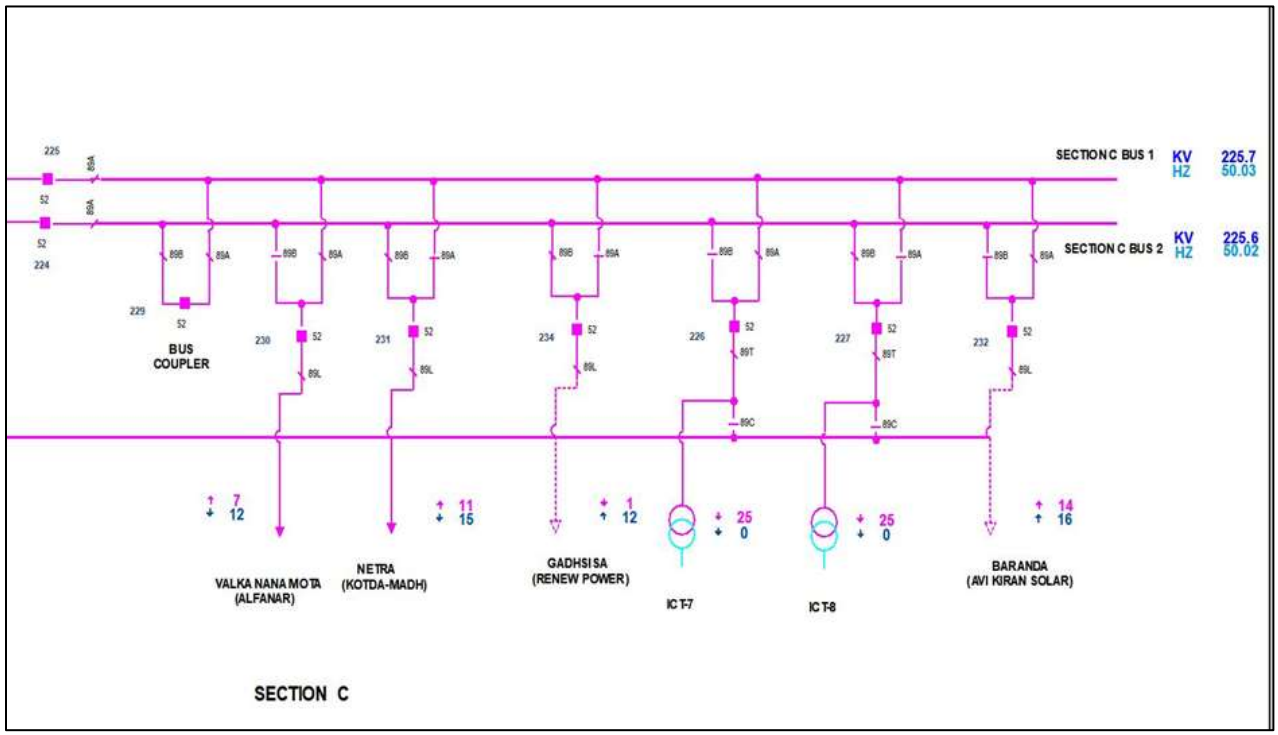
Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	43 - ON	27.08.2024 16:58:04.441		
00302	Fault Event	43 - ON	27.08.2024 16:58:04.441		
01358	67N picked up FORWARD	ON	0 ms		
01338	50N / 51N phase selector Ph.C selected	ON	0 ms		
01354	50N-1 PICKED UP	ON	0 ms		
01357	51N PICKED UP	ON	0 ms		
03688	21 Pickup CG	ON	4 ms		
03703	21 Selected Loop CG forward	ON	4 ms		
03804	21 TRIP command - Only Phase C	ON	4 ms		
04056	85-21 Carrier SEND signal	ON	5 ms		
02844	79 1st cycle running	ON	5 ms		
02801	79 - in progress	ON	5 ms		
02714	>79: External trip Ph. C for AR start	ON	6 ms		
00535	Primary fault current Ic	0.79 kA	8 ms		
04010	>85-21 Carrier RECEPTION, Channel 2	ON	20 ms		
04006	>85-21 Carrier RECEPTION, Channel 1	ON	23 ms		
07131	>50-STUB Enable STUB-Bus option	ON	41 ms		
00593	Single pole open detected in Phase C	ON	43 ms		
03671	21 PICKED UP	OFF	44 ms		
03703	21 Selected Loop CG forward	OFF	44 ms		
14080	50N-1 is blocked	ON	48 ms		
14083	51N is blocked	ON	48 ms		
01332	50N / 51N Ground O/C is BLOCKED	ON	48 ms		
01338	50N / 51N phase selector Ph.C selected	OFF	49 ms		
01345	50N / 51N PICKED UP	OFF	49 ms		
01125	Fault Locator Loop CG	ON	32 ms		
01117	Flt Locator: secondary RESISTANCE	3.37 Ohm	32 ms		
01118	Flt Locator: secondary REACTANCE	5.63 Ohm	32 ms		
01114	Flt Locator: primary RESISTANCE	7.50 Ohm	32 ms		
01115	Flt Locator: primary REACTANCE	12.50 Ohm	32 ms		
01119	Flt Locator: Distance to fault	51.0 km	32 ms		
01120	Flt Locator: Distance [%] to fault	60.7 %	32 ms		
00511	Relay GENERAL TRIP command	OFF	104 ms		
02839	79 dead time after 1pole trip running	ON	105 ms		
00593	Single pole open detected in Phase C	OFF	362 ms		
04010	>85-21 Carrier RECEPTION, Channel 2	ON	365 ms		
04006	>85-21 Carrier RECEPTION, Channel 1	ON	368 ms		
14080	50N-1 is blocked	OFF	402 ms		
14083	51N is blocked	OFF	402 ms		
01332	50N / 51N Ground O/C is BLOCKED	OFF	402 ms		
02851	79 - Close command	ON	1105 ms		
02784	79: Auto recloser is not ready	ON	1105 ms		

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

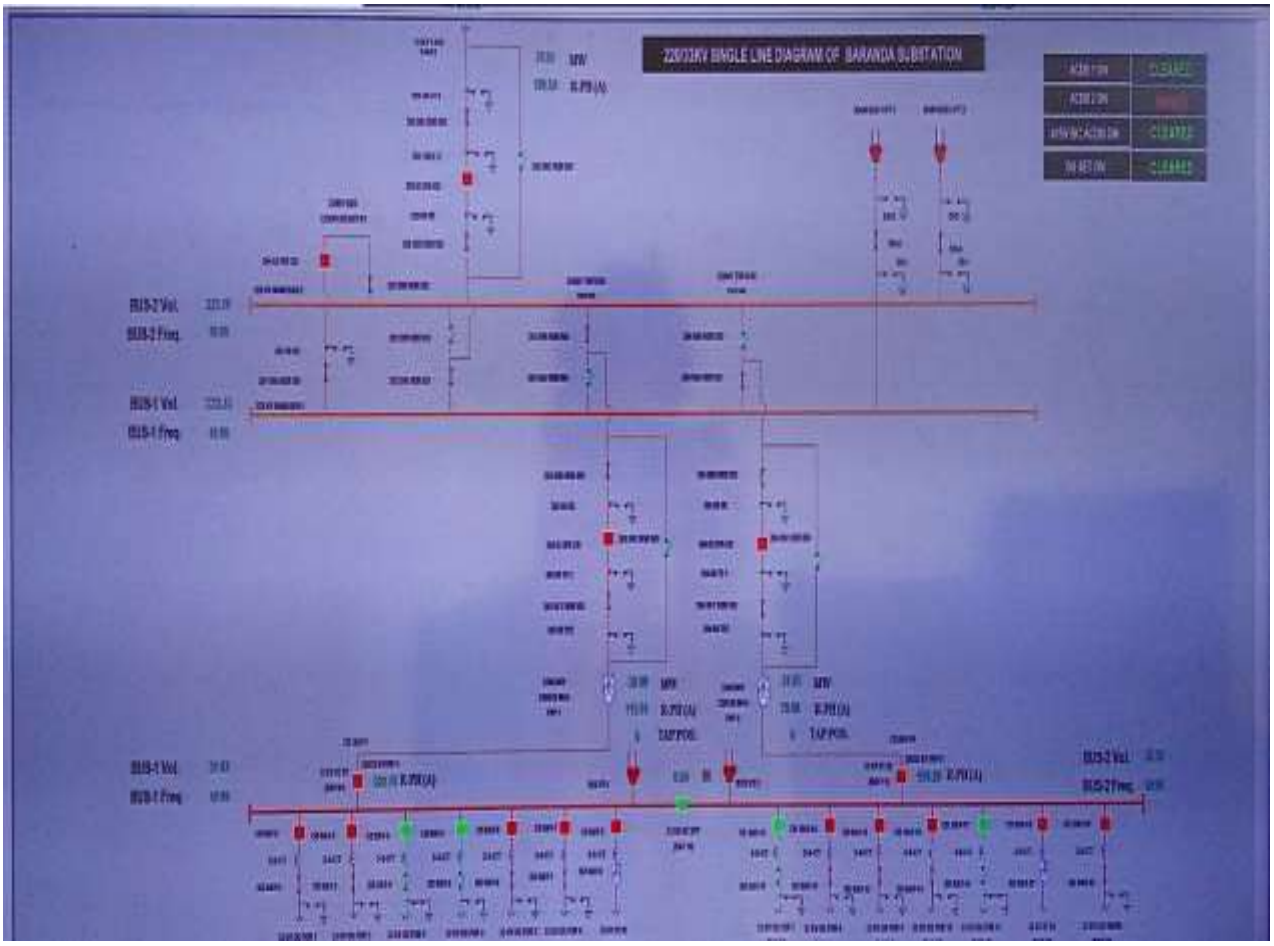
220kV Baranda SLD:



220kV Bhuj SLD:

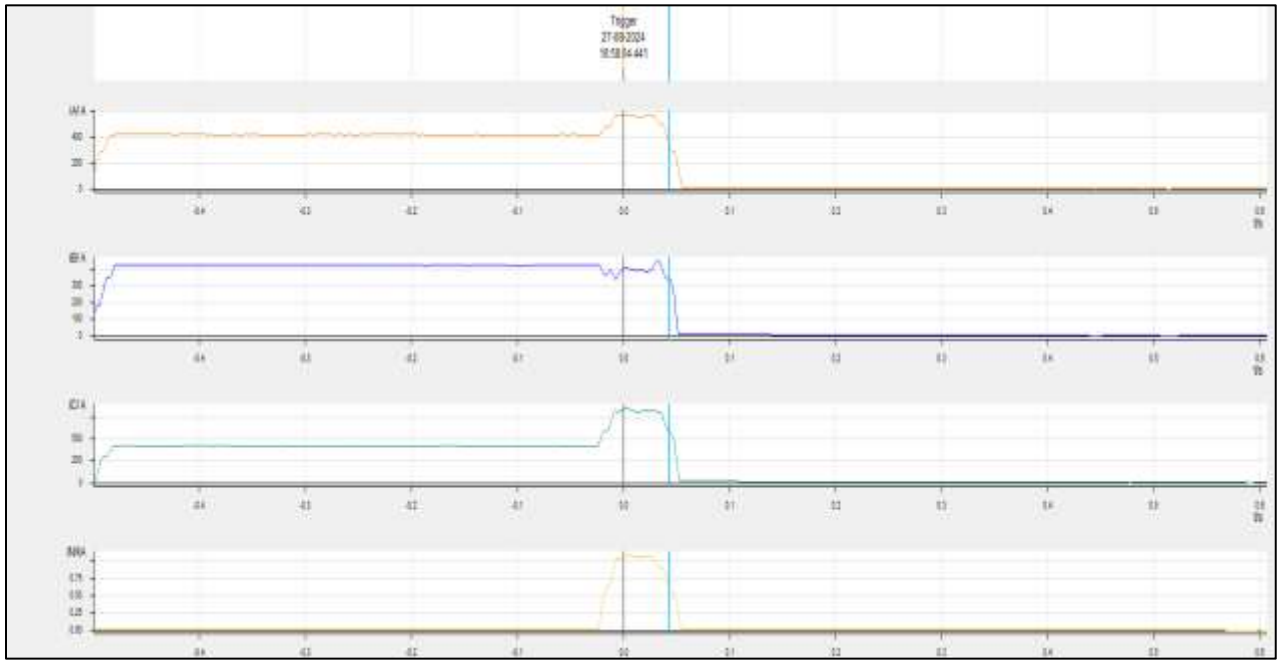


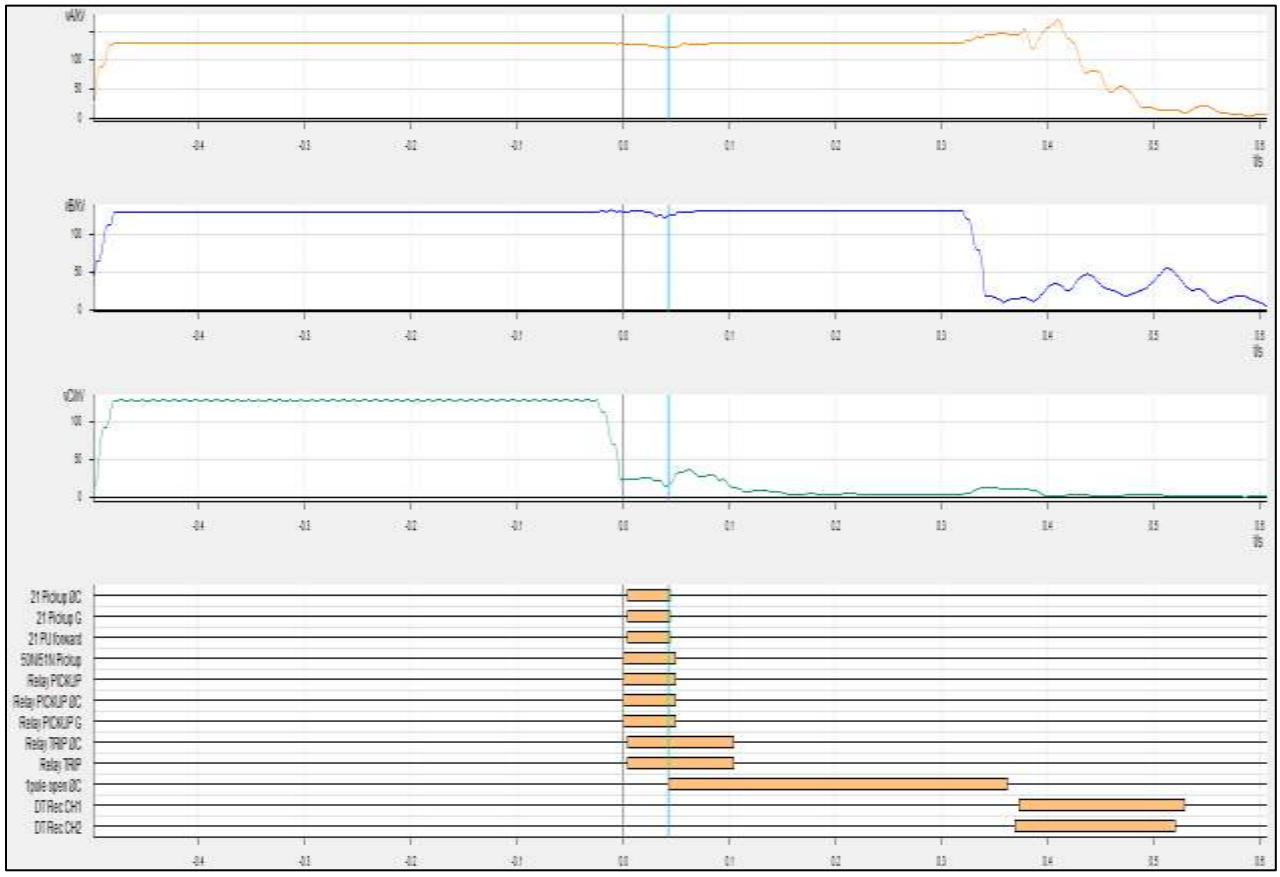
SLD from Avikiran (Baranda):



अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Bhuj- Baranda-1 from Baranda end





अनुलग्नक-D / Annexure-D: Site photographs- Nil

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. नारंपार उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Naranpar of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 24.09.2024

1. **घटना का सारांश / Event Summary**: At 18:52 Hrs / 29-08-2024, 220 kV Bhuj-Naranpar tripped on Y-E fault after auto recloser attempt. At the time of patrolling, Y Phase disc insulator failure observed at location 37/0. Generation loss of 69 MW occurred at Naranpar (GIWEL-3) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 18:52 Hrs / 29-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Naranpar, Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.97	64735	55689	6418	13512
घटना के बाद Post Event	49.97	64746	55825	6422	13505

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति Weather Condition	Rainy, Lightning and Gusty Wind

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 69 MW Gen loss.

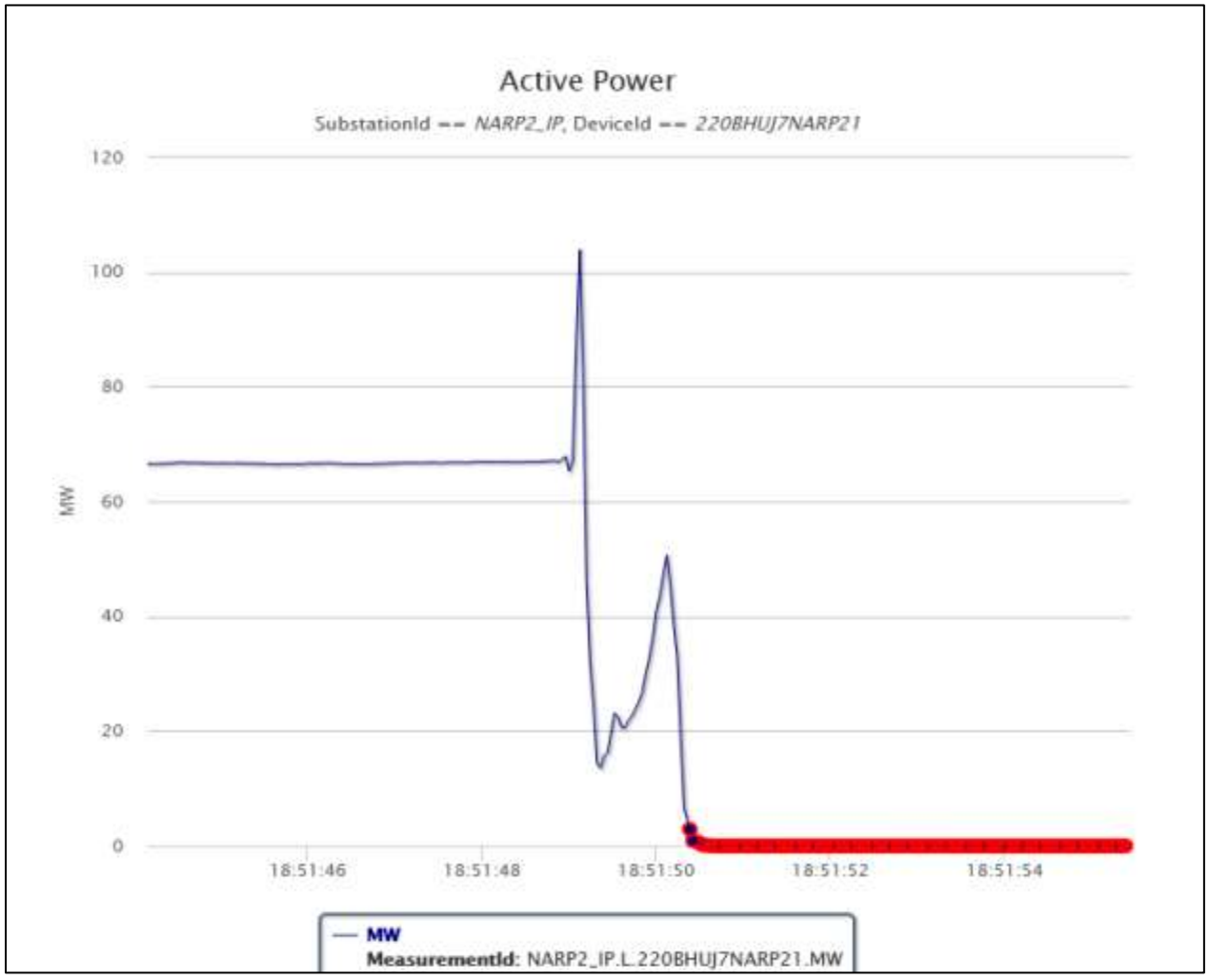


Figure 1. 220 kV Bhuj- Naranpar-1 Active Power Line Plot

7. **रुकावट की अवधि / Duration of interruption:** 42 hours 47 minutes

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

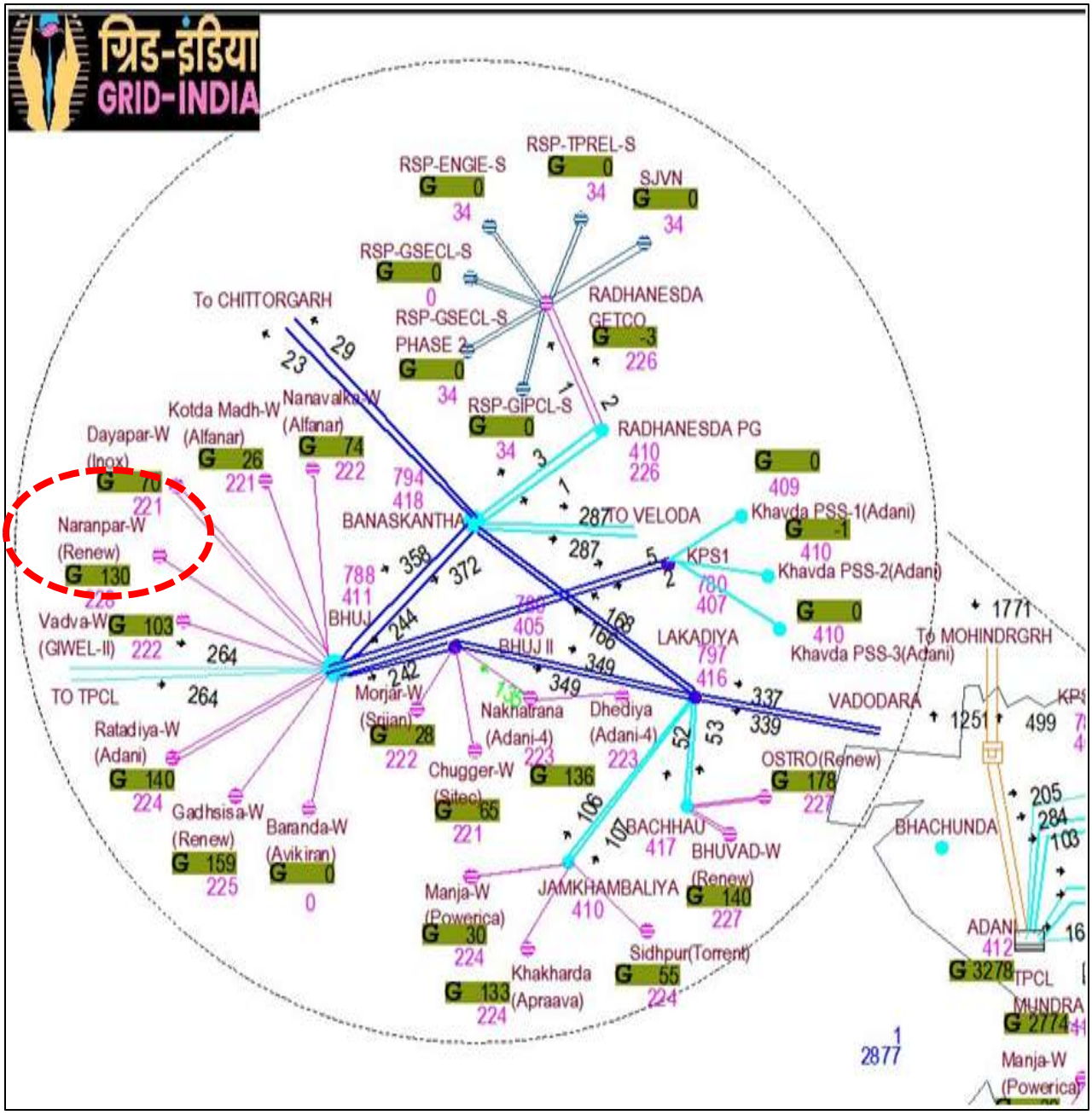


Figure 2. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Naranpar	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1.	220 kV Bhuj-Naranpar	18:52 / 29-08-2024	Y-E, Zone 1, 20.5 KM, 0.58 kA	Y-E, 37.79 KM, 3.8 KA	13:39 / 31-08-2024

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

- Line tripped after A/R attempt on R phase fault.

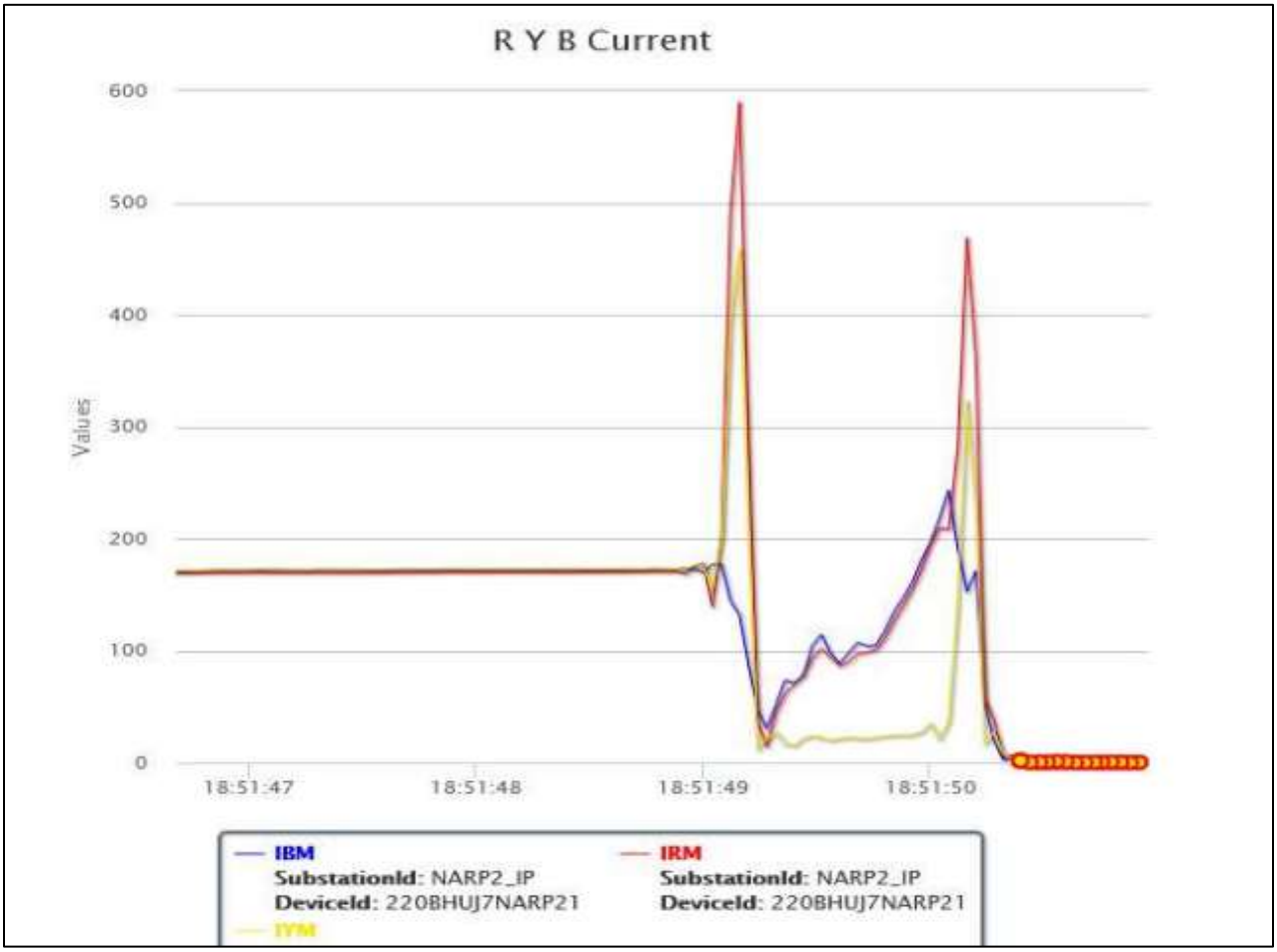


Figure 3. 220 kV Bhuj- Naranpar-1 Current Plot

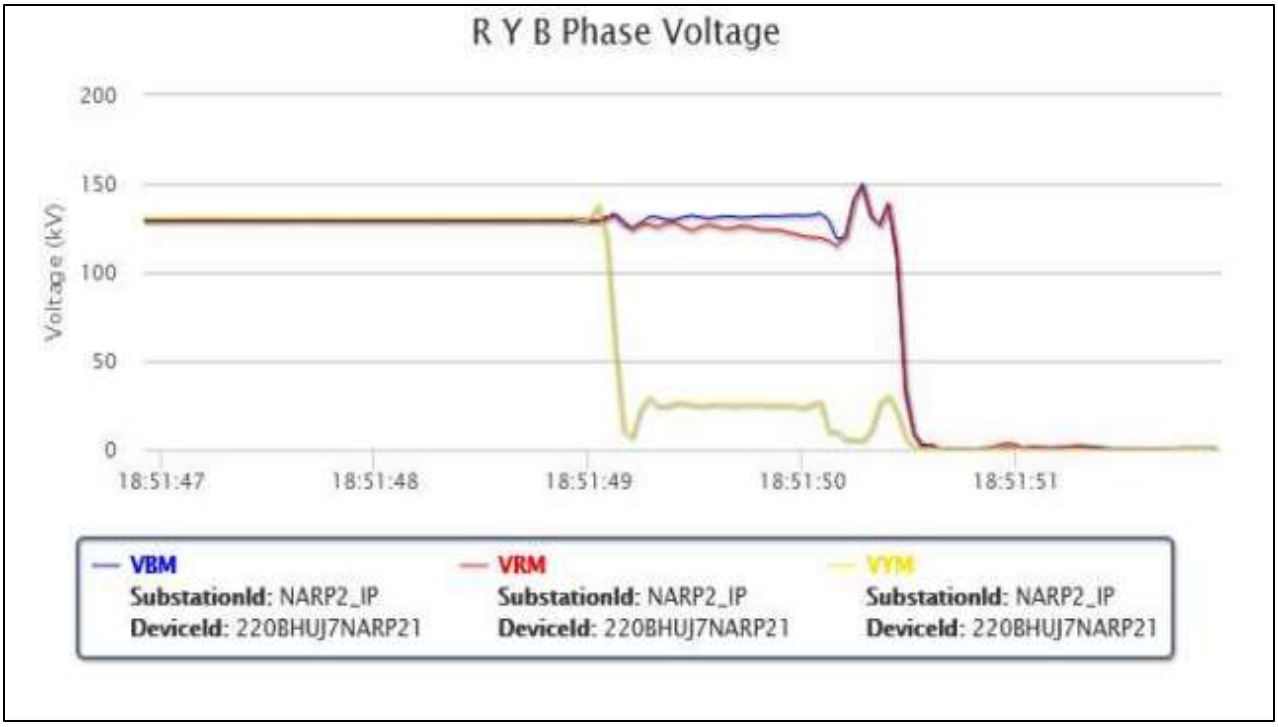


Figure 4. 220 kV Bhuj- Naranpar -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Restoration took 2 days, which is comparatively higher for insulator replacement work. Work to be expedited in future for such events.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Line restored after insulator replacement
- Work to be expedited in future for such events.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र°सं° S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late

2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Naranpar (GIWEL-3). (DR files shared are not opening)
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Naranpar (GIWEL-3)

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

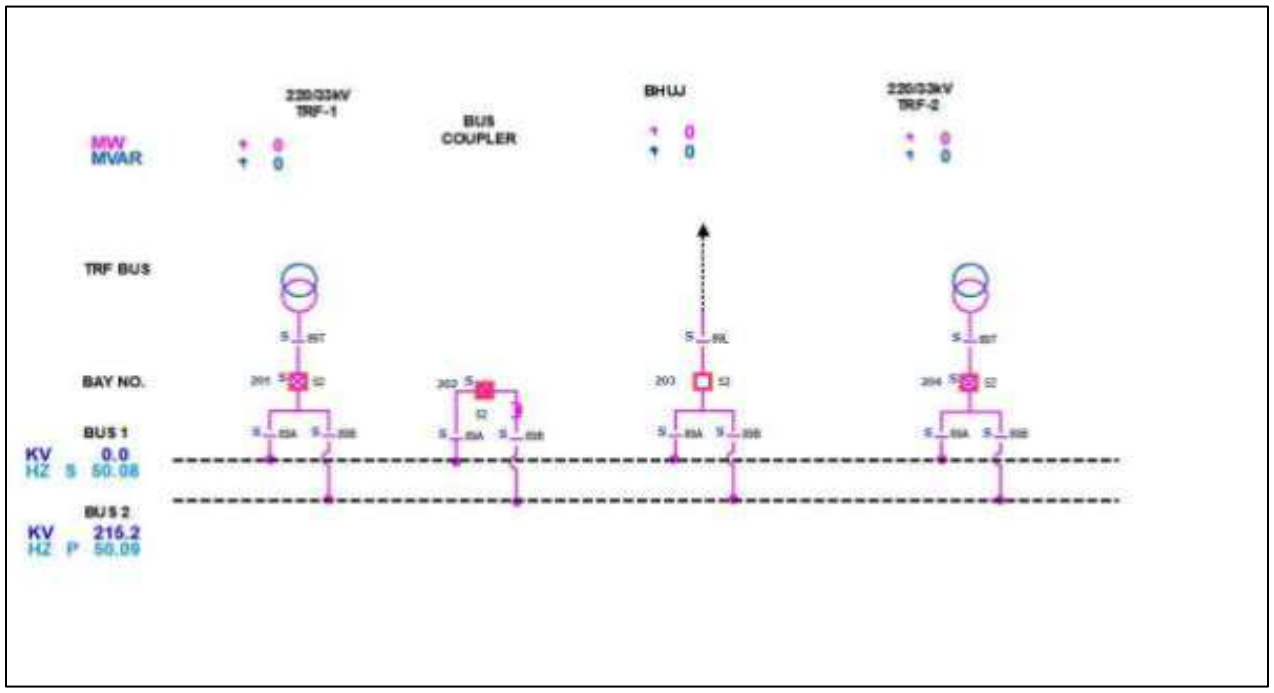
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

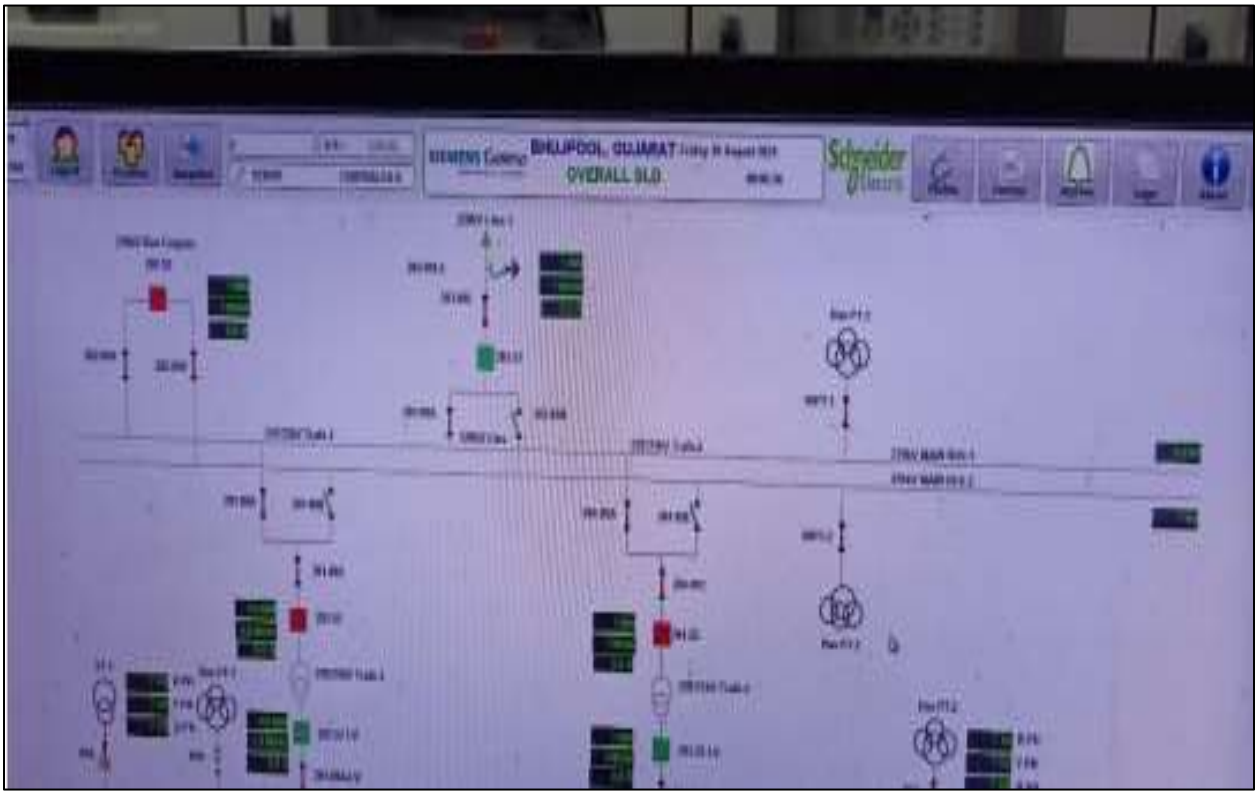
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) TRANSIT	18:51:49	254
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) TRANSIT	18:51:50	378
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) OPEN	18:51:50	505
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) CLOSED	18:51:50	247

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Naranpar SLD:

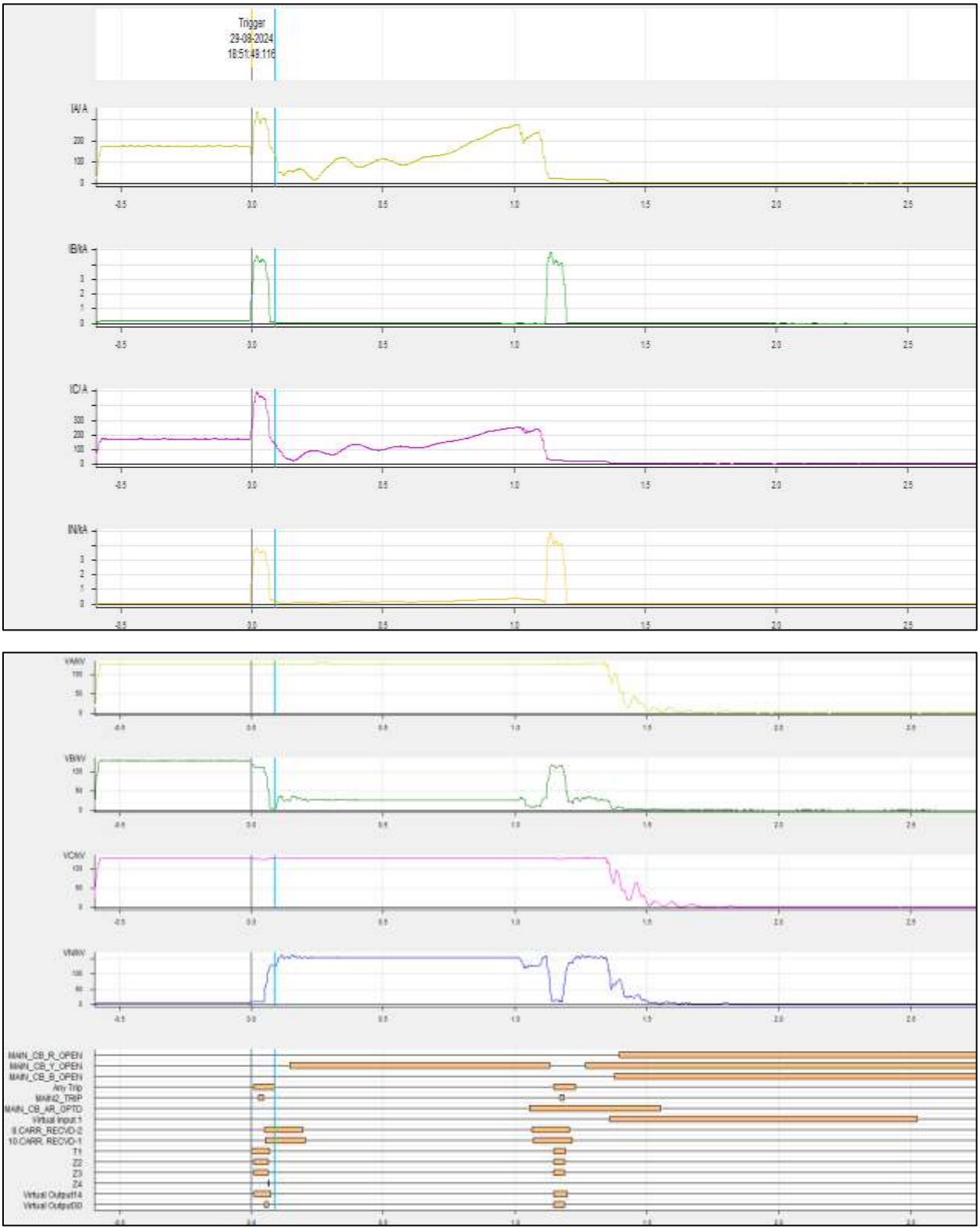


SLD from Naranpar (GIWEL-3)

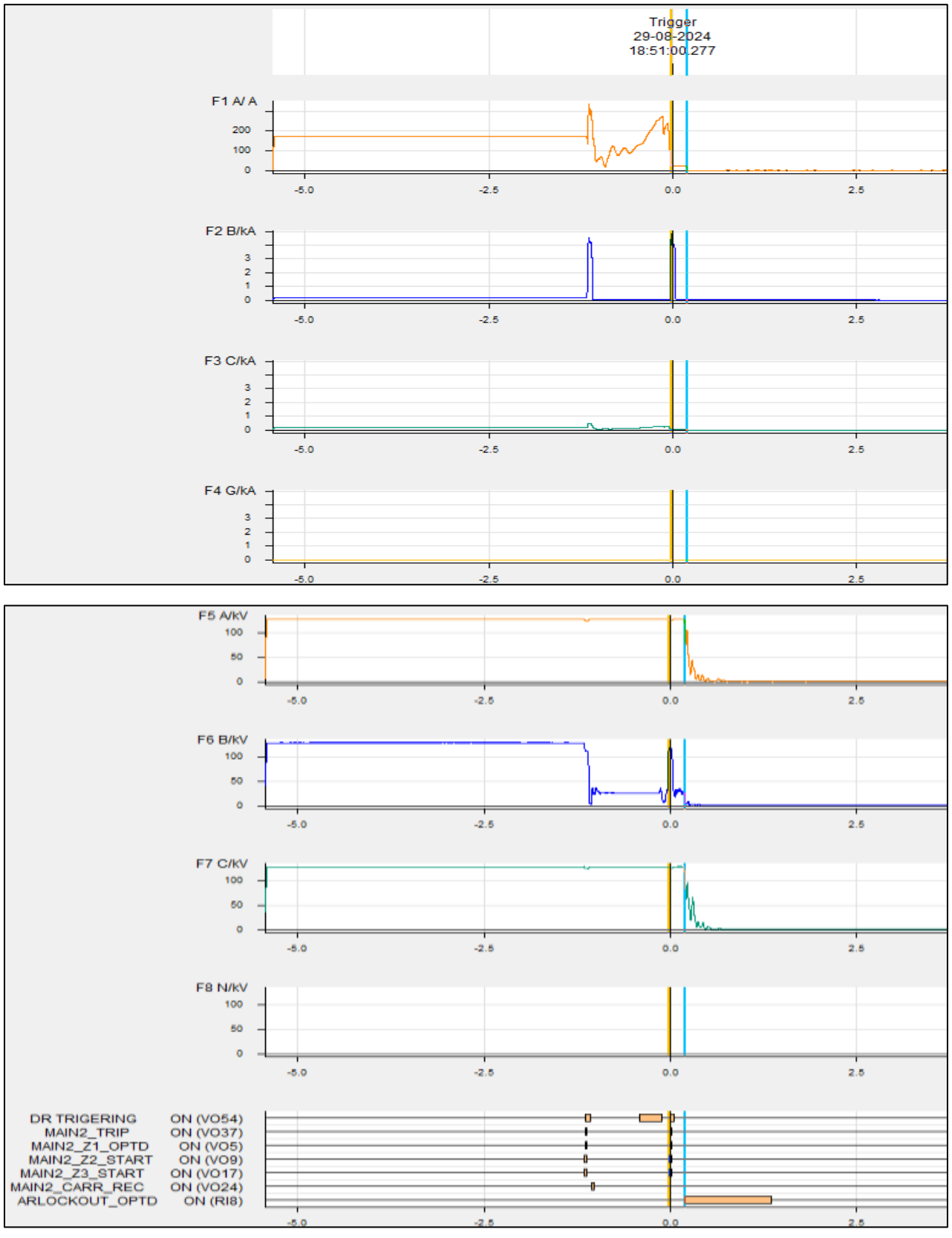


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 KV Bhuj – Naranpar line from Bhuj end, Main-1 relay



B. DR of 220 KV Bhuj – Naranpar line from Bhuj end, Main-2 relay



अनुलग्नक-D / Annexure-D: Site photographs –



Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. कोटड़ा मध उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Kotda Madh of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 03:26 Hrs / 30-08-2024, 220 kV Bhuj-Kotda Madh-S/c tripped on B-E fault due to fault occurred during auto recloser reclaim time. Generation loss of 17 MW occurred at Kotda Madh (Alfanar) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 03:26 Hrs / 30-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Kotda Madh (Alfanar), Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.01	59149	48632	5869	11856
घटना के बाद Post Event	49.98	59022	48528	5856	11798

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Heavy thunder storm and lightning

6. **लोड और जेनरेशन हानि / Load and Generation loss**: . Generation loss of 17 MW occurred at Kotda Madh (Alfanar) Wind Power plant.

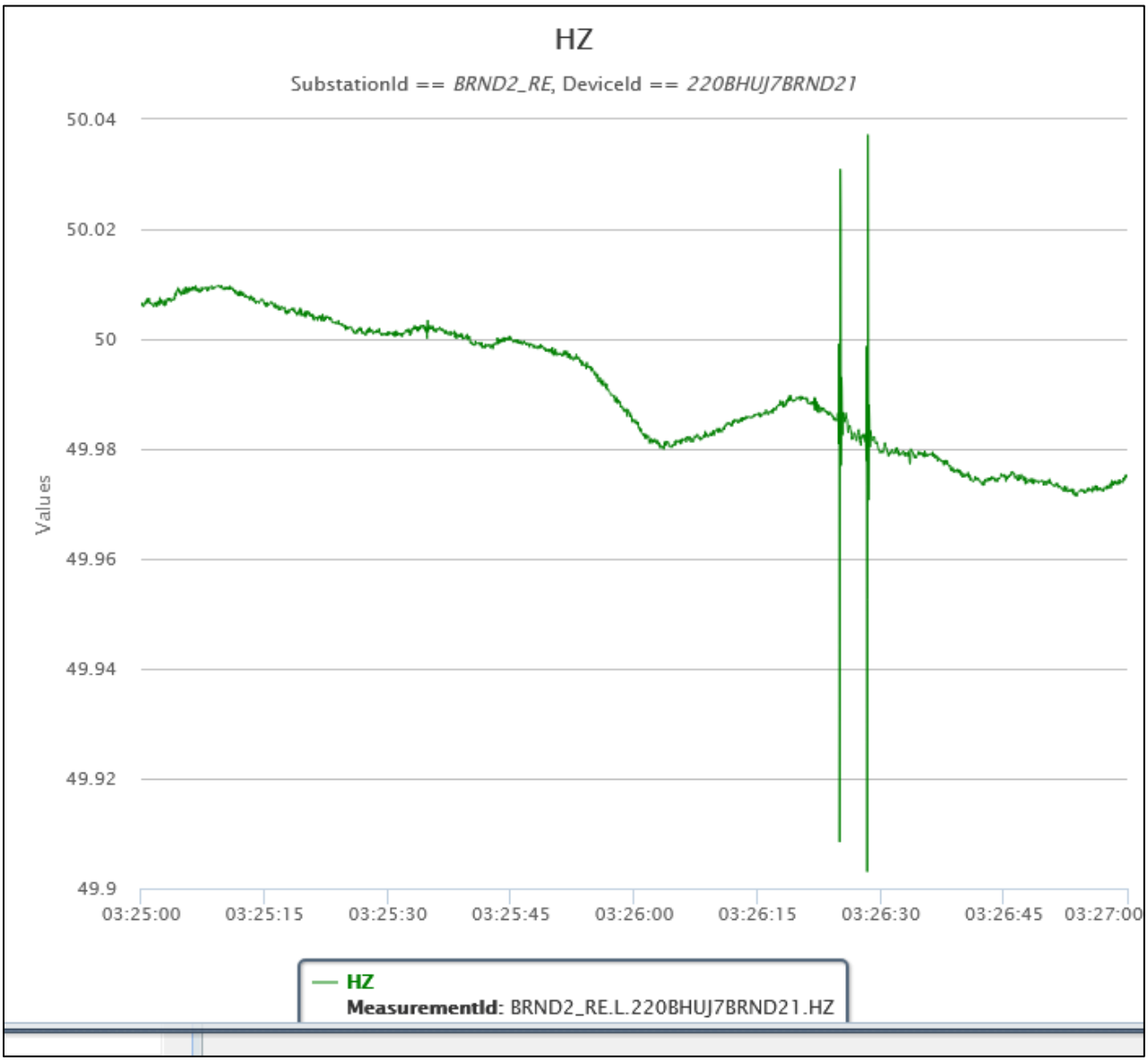


Figure 1. 220 kV Bhuj- Baranda-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 2 hours 4 minutes

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

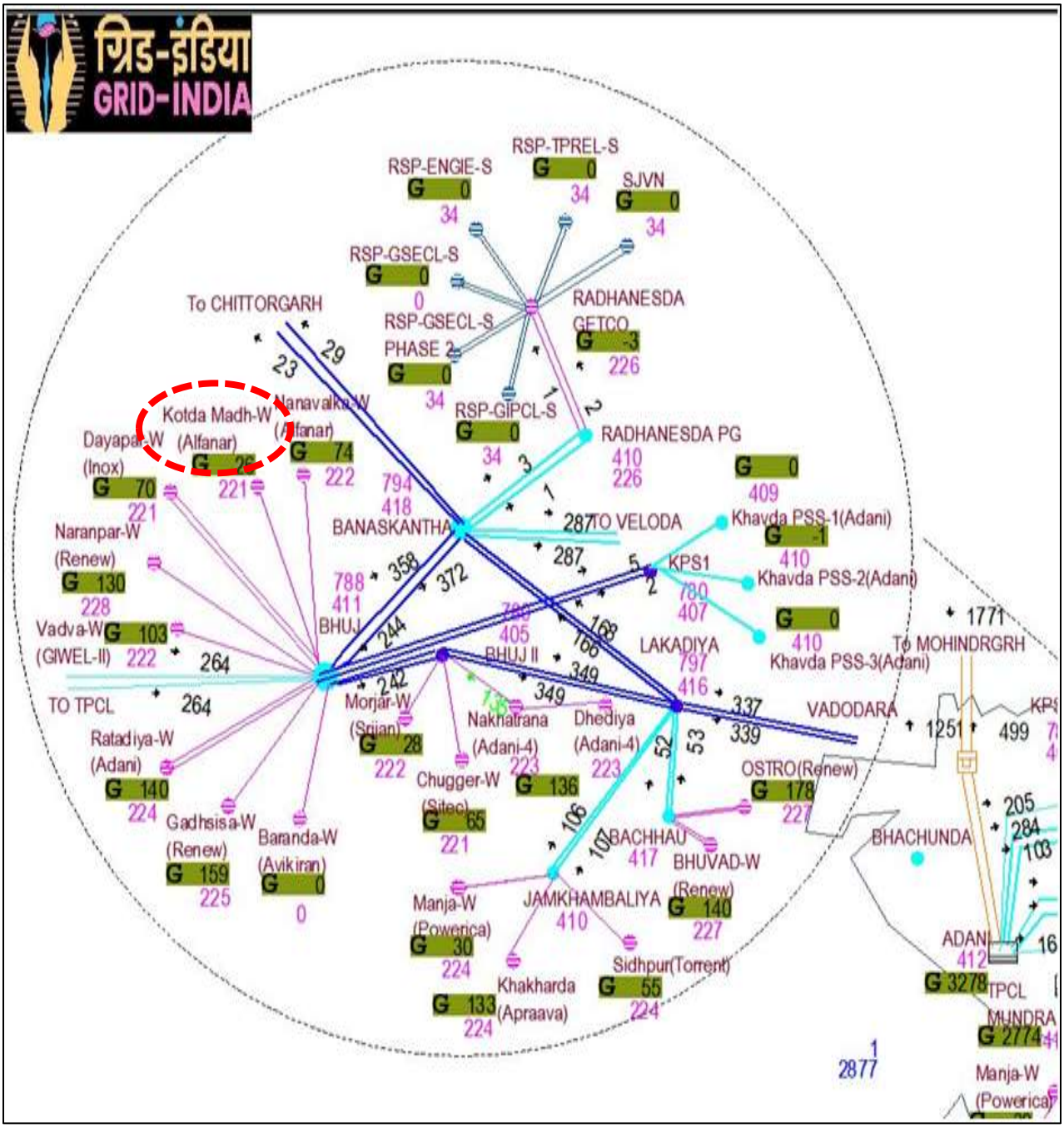


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Kotda Madh	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220kV Bhuj-Kotda Madh (Netra) s/c	03:26	B ph-E fault, fault current - 11.4 kA, 11km from Bhuj end Distance protection operated	Distance protection operated	05:30

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

Line tripped on B-N fault during A/R reclaim time.

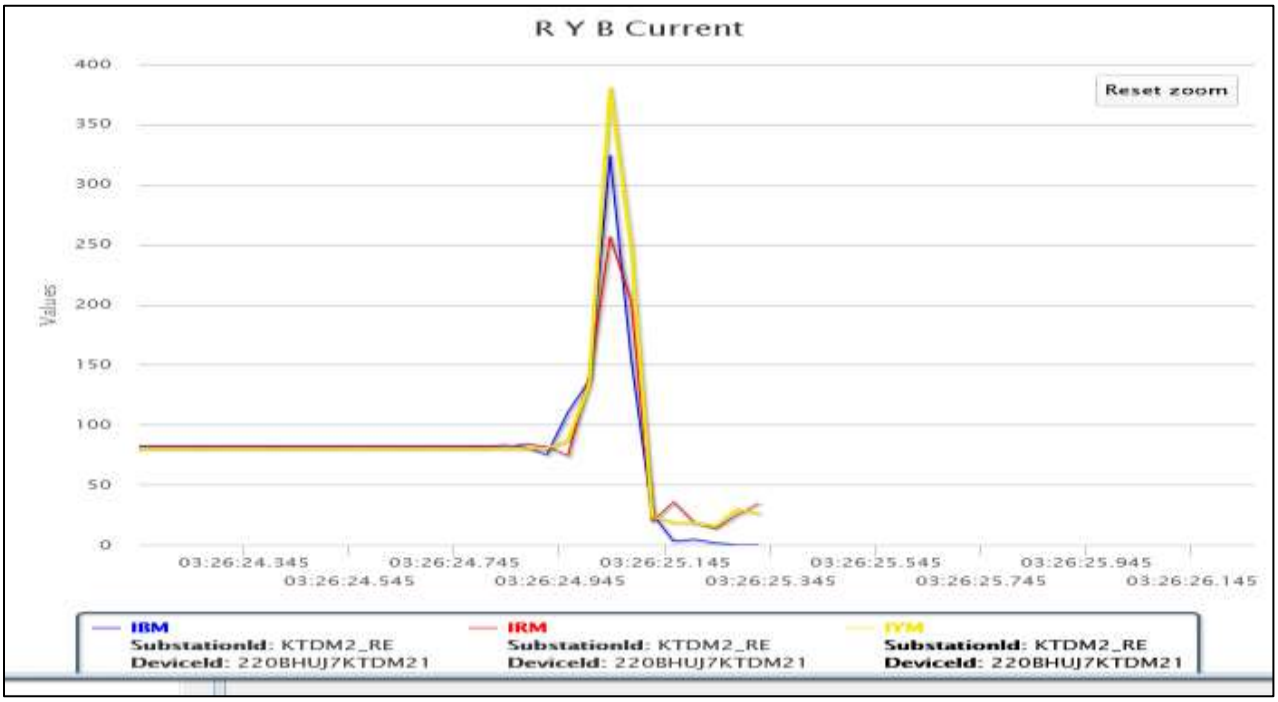


Figure 3. 220 kV Bhuj- Kotda Madh-1 Current Plot

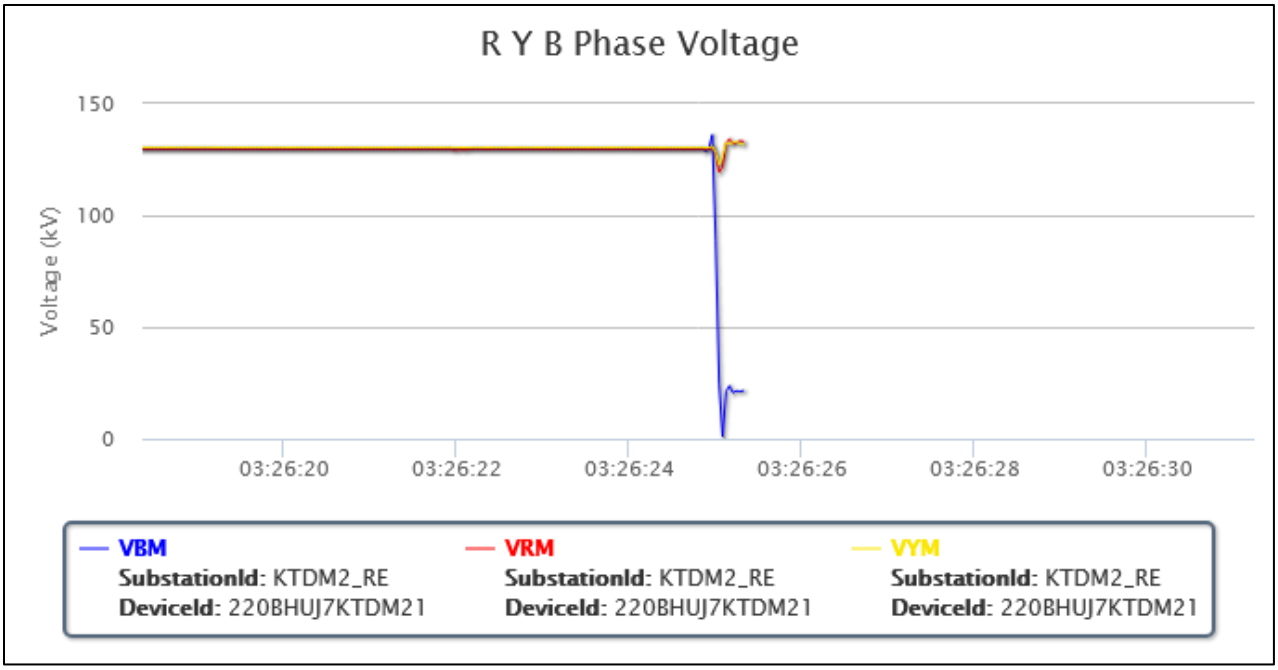


Figure 4. 220 kV Bhuj- Kotda Madh-1 Voltage Plot

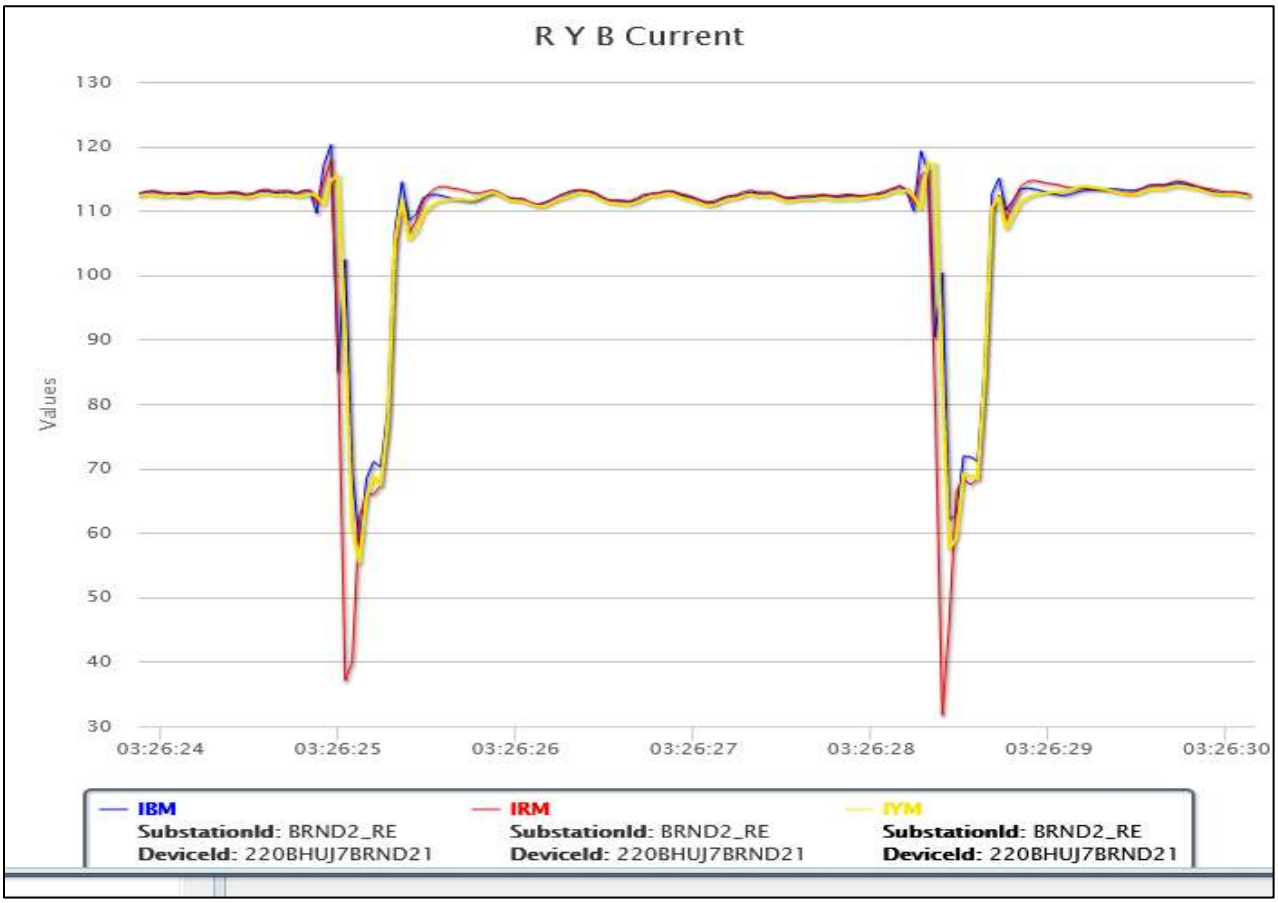


Figure 5. 220 kV Bhuj- Baranda-1 Currrent Plot

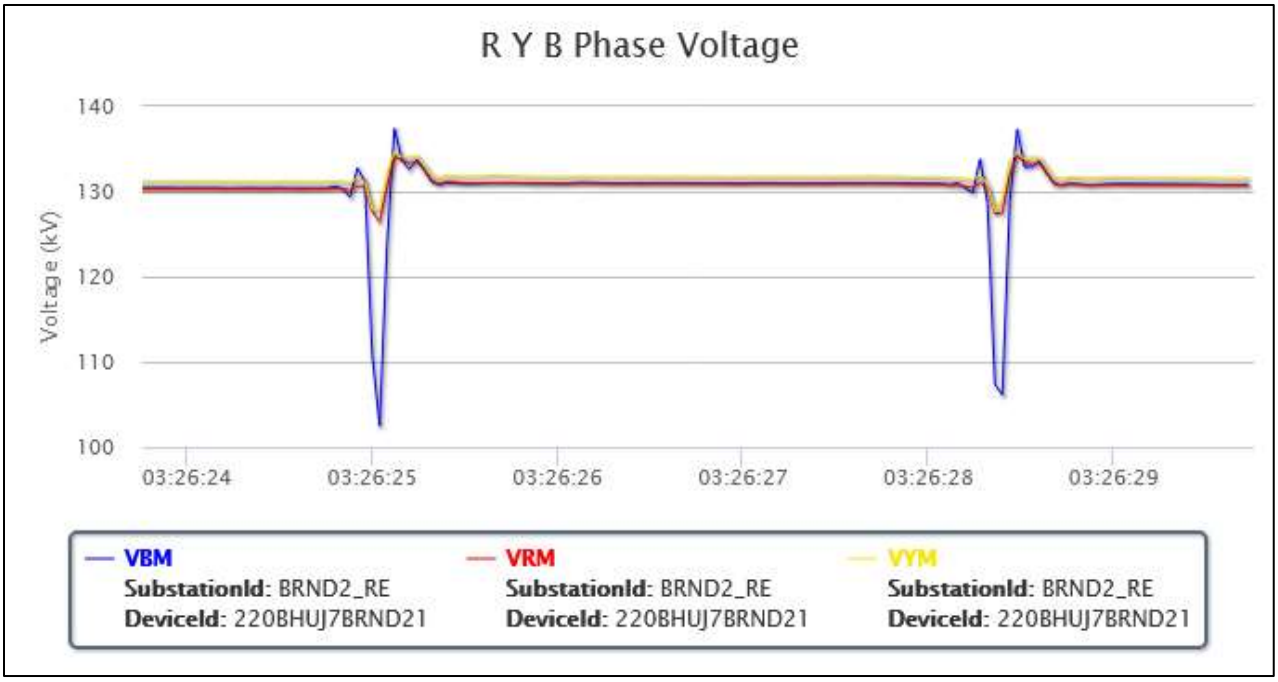


Figure 6. 220 kV Bhuj- Baranda-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- PMU data stopped at the time of tripping.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- PMU data stopped at the time of tripping. Kotda Madh (Alfanar) may kindly resolve this issue. This issue has been flagged multiple times by WRLDC.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Alfanar and Powergrid.
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Alfanar.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23152 (KTDM2) TRANSIT	03:26:25	74
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23152 (KTDM2) CLOSED	03:26:26	66
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23152 (KTDM2) OPEN	03:26:28	493

SOE from Alfanar-

Trip Log - 000040 / 30-08-2024 03:27:37.148 - 5336_Alfanar / 220kV / LINE / B202RA_21_1_7SA522/7SA522 V04.76.02

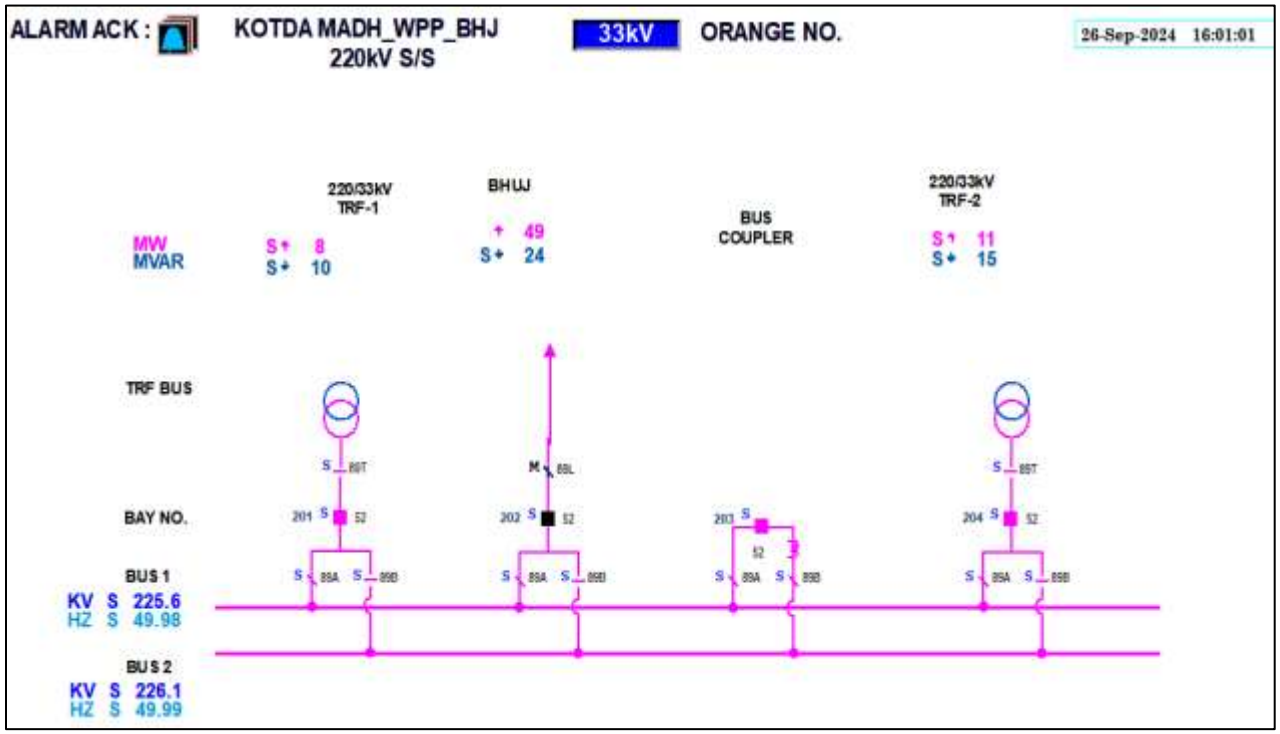
Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	40 - ON	30.08.2024 03:27:37.148		
00302	Fault Event	42 - ON	30.08.2024 03:27:37.148		
07165	50(N)/51(N) Backup O/C PICKUP GROUND	ON	0 ms		
07171	50(N)/51(N)-B Pickup - Only GROUND	ON	0 ms		
07193	51(N)-B Pickup	ON	0 ms		
01358	67N picked up FORWARD	ON	5 ms		
01338	50N / 51N phase selector Ph.C selected	ON	5 ms		
01355	50N-2 PICKED UP	ON	5 ms		
03688	21 Pickup CG	ON	20 ms		
03703	21 Selected Loop CG forward	ON	20 ms		
03804	21 TRIP command - Only Phase C	ON	20 ms		
02844	79 1st cycle running	ON	20 ms		
02801	79 - in progress	ON	20 ms		
00535	Primary fault current Ic	0.29 kA	24 ms		
01335	50N / 51N Ground O/C trip is BLOCKED	ON	24 ms		
02839	79 dead time after 1pole trip running	ON	52 ms		
00593	Single pole open detected in Phase C	ON	70 ms		
07161	50(N)/51(N) Backup O/C PICKED UP	OFF	79 ms		
14081	50N-2 is blocked	ON	83 ms		
01332	50N / 51N Ground O/C is BLOCKED	ON	83 ms		
01338	50N / 51N phase selector Ph.C selected	OFF	84 ms		
01345	50N / 51N PICKED UP	OFF	84 ms		
03671	21 PICKED UP	OFF	89 ms		
03703	21 Selected Loop CG forward	OFF	89 ms		
00590	Line closure detected	OFF	98 ms		
00511	Relay GENERAL TRIP command	OFF	118 ms		
01335	50N / 51N Ground O/C trip is BLOCKED	OFF	133 ms		
01125	Fault Locator Loop CG	ON	53 ms		
01117	Flt Locator: secondary RESISTANCE	6.25 Ohm	53 ms		
01118	Flt Locator: secondary REACTANCE	13.04 Ohm	53 ms		
01114	Flt Locator: primary RESISTANCE	10.42 Ohm	53 ms		
01115	Flt Locator: primary REACTANCE	21.73 Ohm	53 ms		
01119	Flt Locator: Distance to fault	55.0 km	53 ms		
01120	Flt Locator: Distance [%] to fault	68.8 %	53 ms		
02851	79 - Close command	ON	552 ms		
02784	79: Auto recloser is not ready	ON	552 ms		
00593	Single pole open detected in Phase C	OFF	638 ms		

Trip Log - 000040 / 30-08-2024 03:27:37.148 - 5336_Alfanar / 220kV / LINE / B202RA_21_1_7SA522/7SA522 V04.76.02(2)

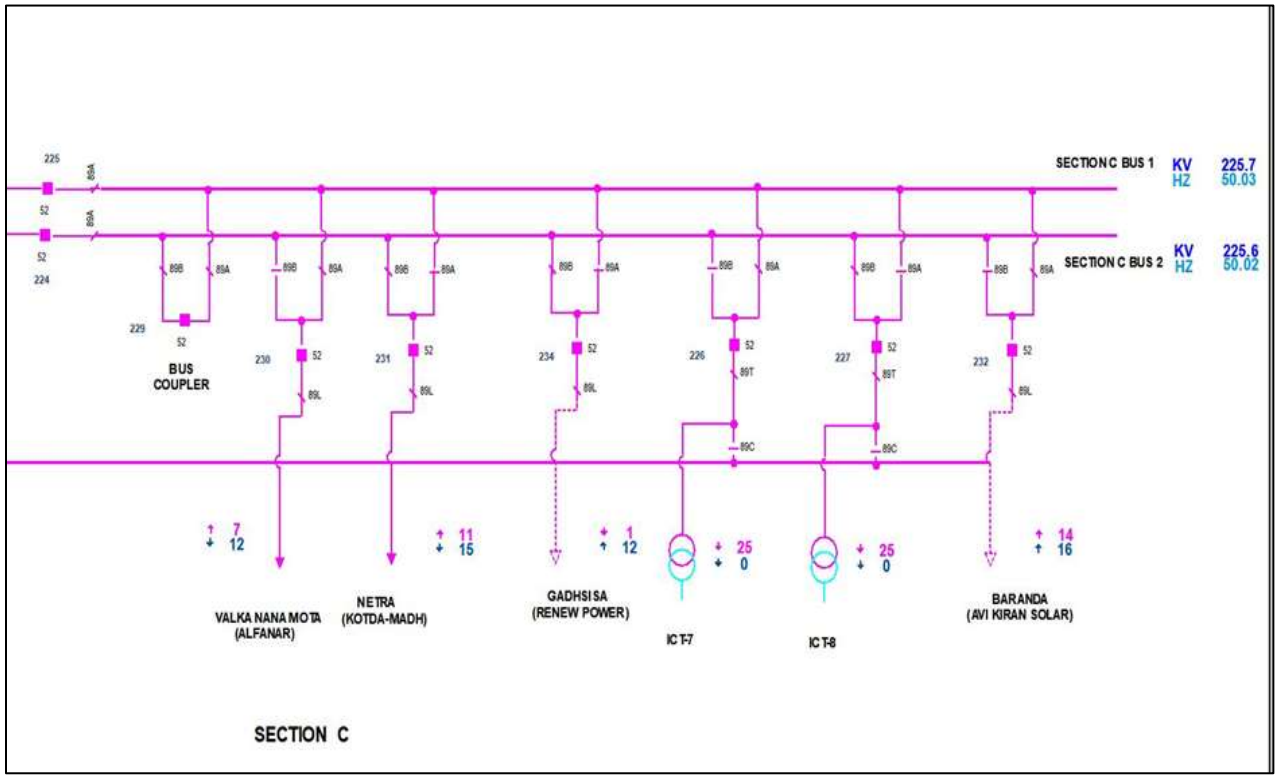
Number	Indication	Value	Date and time	Cause	State
14081	50N-2 is blocked	OFF	673 ms		
01332	50N / 51N Ground O/C is BLOCKED	OFF	673 ms		
00590	Line closure detected	ON	893 ms		
00590	Line closure detected	OFF	1038 ms		
00590	Line closure detected	ON	3350 ms		
00302	Fault Event	43 - ON	30.08.2024 03:27:40.499		
07165	50(N)/51(N) Backup O/C PICKUP GROUND	ON	3351 ms		
07171	50(N)/51(N)-B Pickup - Only GROUND	ON	3351 ms		
07193	51(N)-B Pickup	ON	3351 ms		
01358	67N picked up FORWARD	ON	3356 ms		
01338	50N / 51N phase selector Ph.C selected	ON	3356 ms		
01355	50N-2 PICKED UP	ON	3356 ms		
03688	21 Pickup CG	ON	3371 ms		
03703	21 Selected Loop CG forward	ON	3371 ms		
03804	21 TRIP command - Only Phase C	ON	3371 ms		
00536	Relay Definitive TRIP	ON	3371 ms		
00535	Primary fault current Ic	0.33 kA	3375 ms		
01335	50N / 51N Ground O/C trip is BLOCKED	ON	3375 ms		
00593	Single pole open detected in Phase C	ON	3415 ms		
14081	50N-2 is blocked	ON	3415 ms		
01332	50N / 51N Ground O/C is BLOCKED	ON	3415 ms		
03671	21 PICKED UP	OFF	3416 ms		
03703	21 Selected Loop CG forward	OFF	3416 ms		
01338	50N / 51N phase selector Ph.C selected	OFF	3416 ms		
01345	50N / 51N PICKED UP	OFF	3416 ms		
07161	50(N)/51(N) Backup O/C PICKED UP	OFF	3421 ms		
00590	Line closure detected	OFF	3430 ms		
01125	Fault Locator Loop CG	ON	3362 ms		
01117	Flt Locator: secondary RESISTANCE	9.33 Ohm	3362 ms		
01118	Flt Locator: secondary REACTANCE	11.09 Ohm	3362 ms		
01114	Flt Locator: primary RESISTANCE	15.54 Ohm	3362 ms		
01115	Flt Locator: primary REACTANCE	18.48 Ohm	3362 ms		
01119	Flt Locator: Distance to fault	46.8 km	3362 ms		
01120	Flt Locator: Distance [%] to fault	58.5 %	3362 ms		

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Kotda Madh SLD:

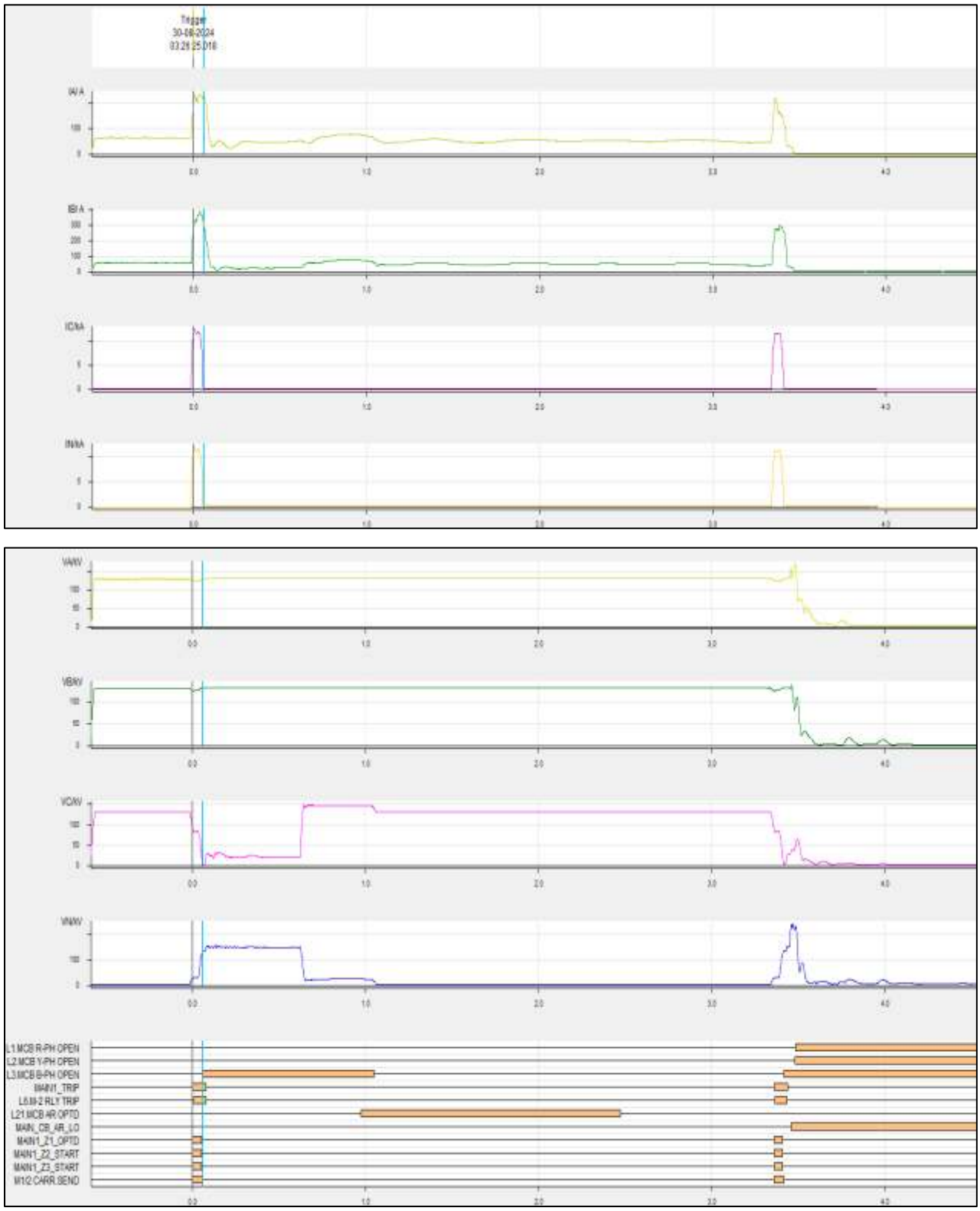


220kV Bhuj SLD:

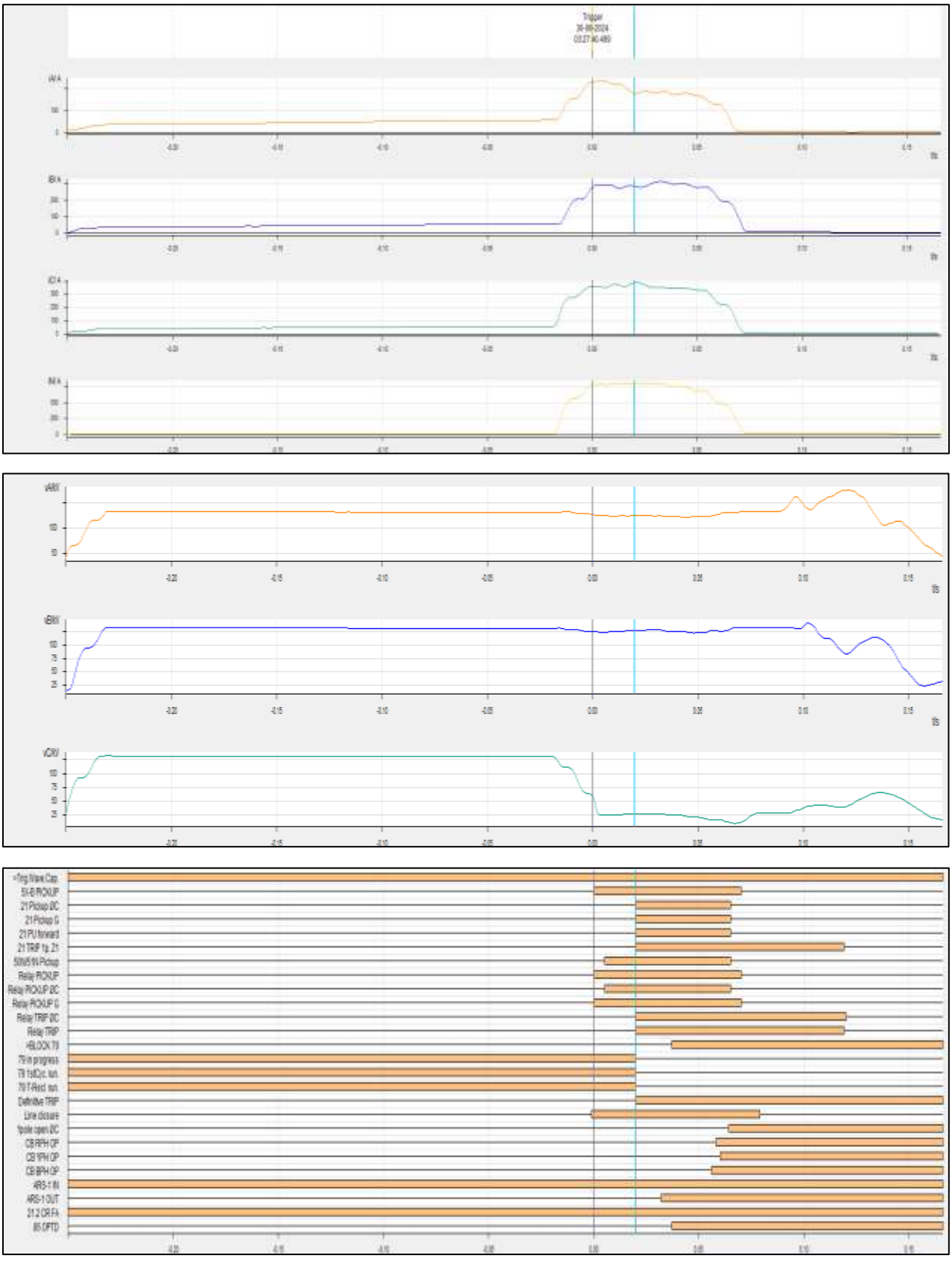


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Bhuj- Kotda Madh-1 from Bhuj end



B. DR of 220 kV Bhuj- Kotda Madh-1 from Kotda Madh end



अनुलग्नक-D / Annexure-D: Site photographs – Nil

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. दयापार उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Dayapar of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary**: : At 05:53 Hrs / 30-08-2024, 220 kV Bhuj-Dayapar-1&2 tripped at Bhuj end only on DEF relay operation due to non-clearance of fault in 33 kV Dayapar system i.e. blast in capacitor banks at Dayapar. Blast was due to grounding of PSS DC cable in Capacitor control panel, which resulted in burning of control panel of capacitor banks-1&2, meters, MCCBs. Simultaneously, feeder-8 conductor also fell down within the plant. Generation loss of 120 MW occurred at Dayapar (INOX) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 05:53 Hrs /30-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : 220 kV Dayapar(INOX), Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand

घटना के पूर्व **Pre Event**	49.99	60291	51589	5788	12032
घटना के बाद **Post Event**	50.00	60590	51688	5799	11953

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Inclement weather Cyclone effect (Asna). High wind, High rain

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 120 MW occurred at Dayapar (INOX) Wind Power plant.

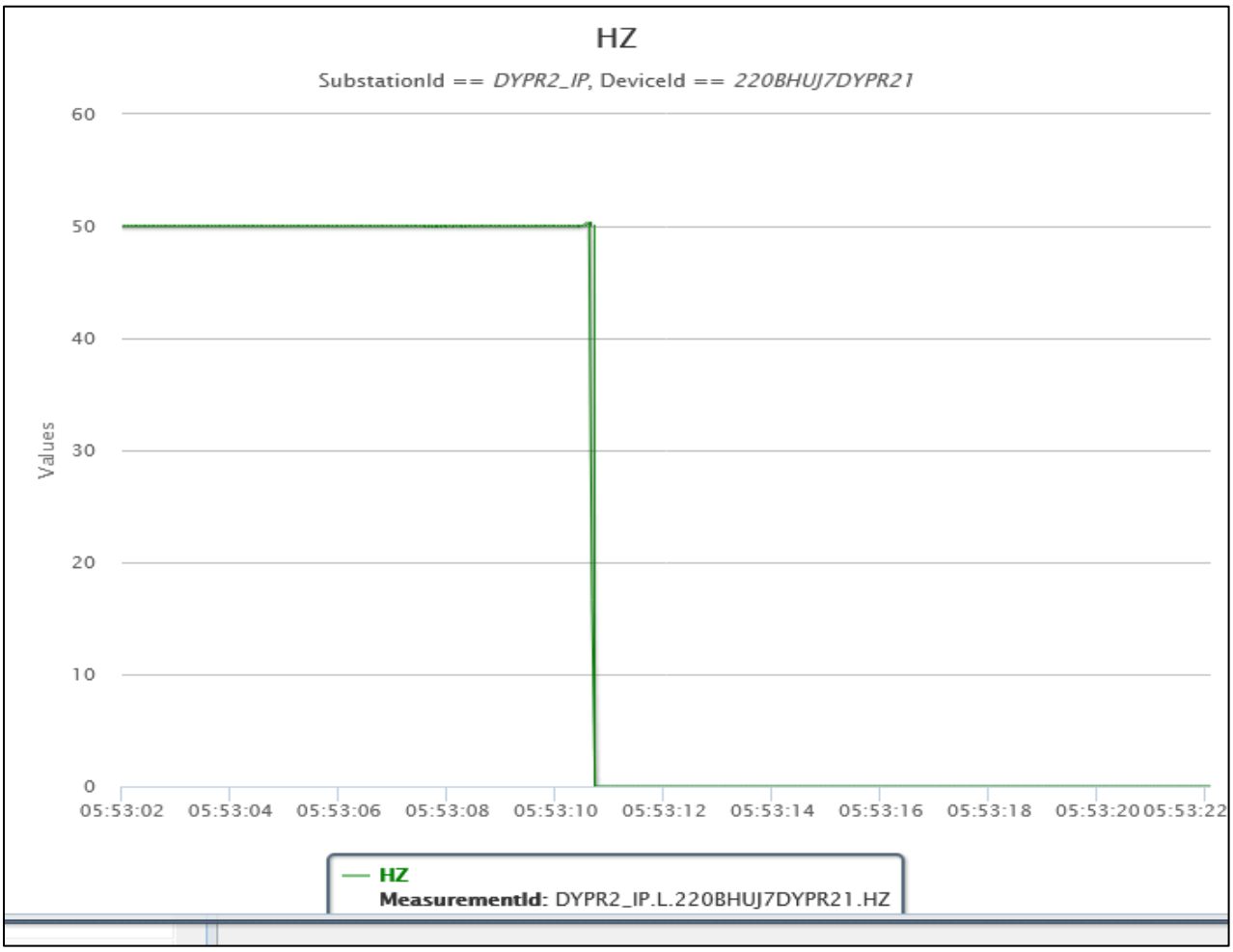


Figure 1. 220 kV Bhuj- Dayapar-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 08 hours 07 minutes

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

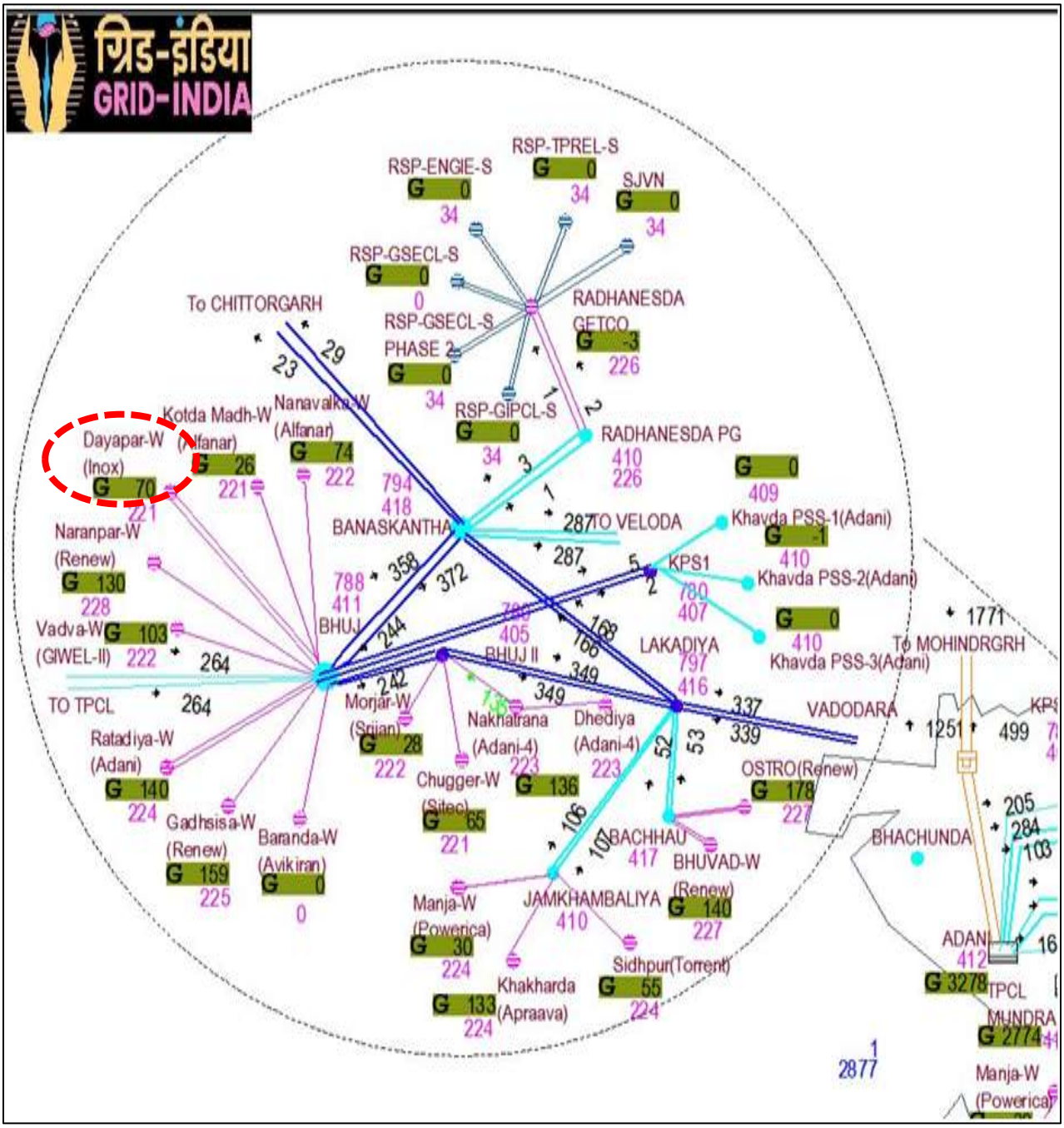


Figure 2. Network across the affected area

9. **उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event):** Blast in capacitor banks at Dayapar

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Dayapar	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220 kV Bhuj-Dayapar ckt-1	05:53	Not tripped	DEF operated, DT send	14:00
2	220 kV Bhuj-Dayapar ckt-2	05:53	Not tripped	DEF operated, DT send	14:08

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

- As seen from the DR of Bhuj end of 220 kV Bhuj Dayapar 1&2, Fault current of 700 A appeared in Y phase leading to system unbalance and hence DEF relay operated and sent DT command to Dayapar end. However it is reported that lines didn't trip at Dayapar end and H/T by site.
- 220 kV Bhuj-Dayapar-1&2 tripped at Bhuj end only due to non-clearance of fault in 33 kV system i.e. blast in capacitor banks at Dayapar. As informed, blast was due to grounding of PSS DC cable in Capacitor control panel, which resulted in burning of control panel of capacitor banks-1&2, meters, MCCBs. Simultaneously, feeder-8 conductor also fell down within the plant.

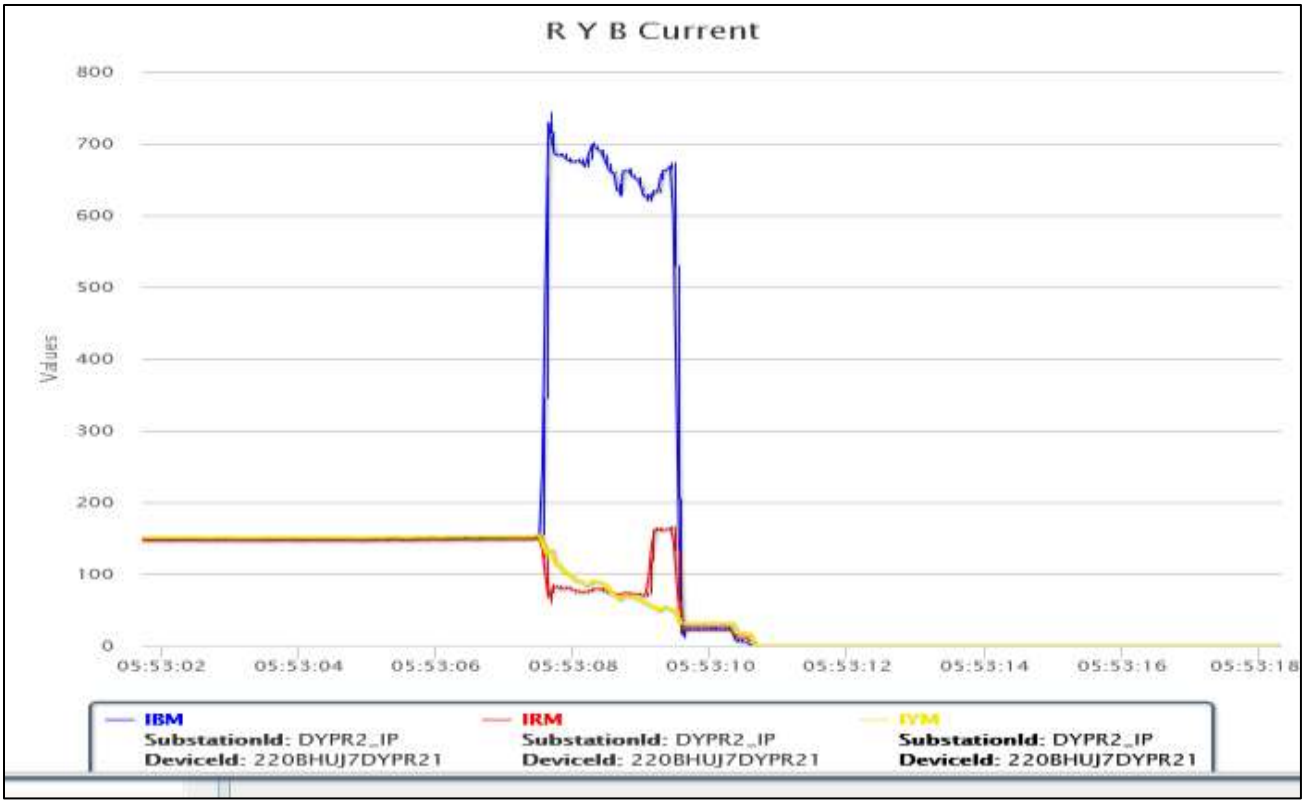


Figure 3. 220 kV Bhuj- Dayapar-1 Current Plot

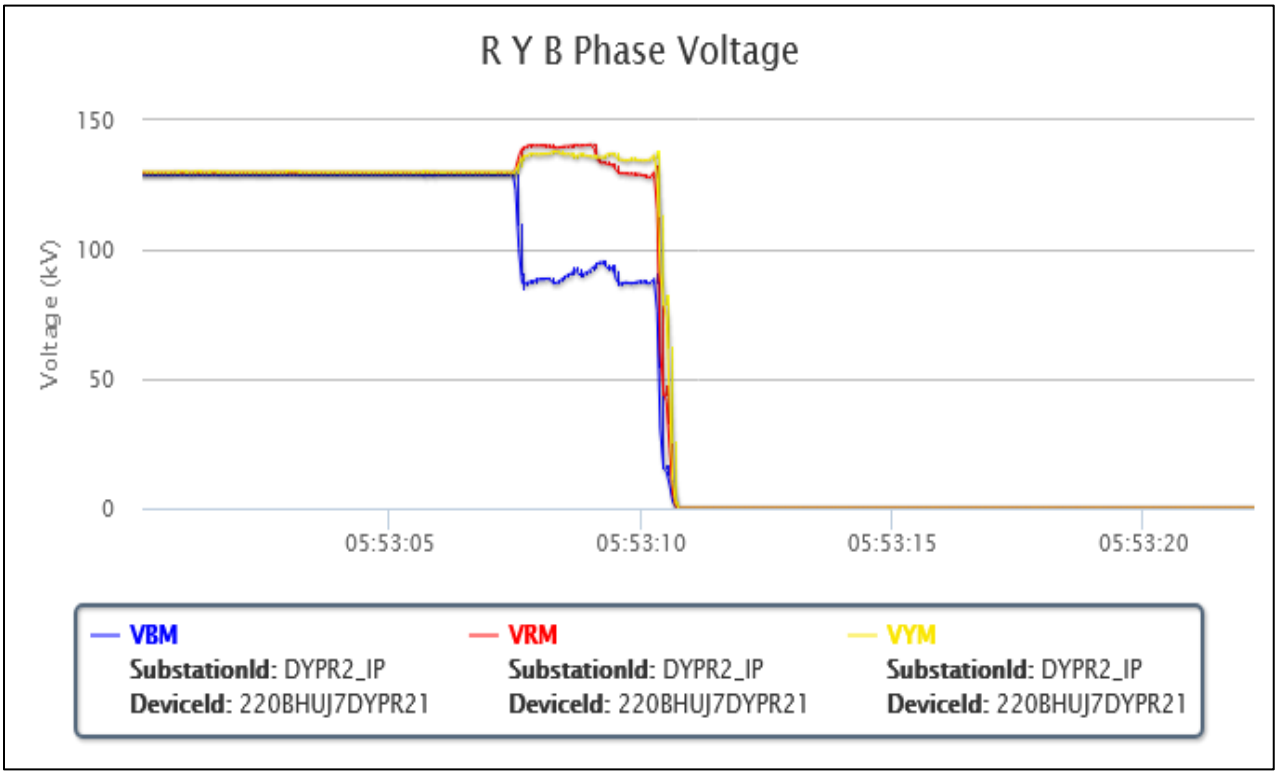


Figure 4. 220 kV Bhuj- Dayapar -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Fault in 33 kV system not cleared at Dyapar end, leading to tripping of 220 kV system.
- 220 kV Bhuj- Dayapar 1&2 didn't trip at Dayapar end inspite of receiving DT.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Ionox Dayapar isolated battery charger 2 from the circuit and took all DC load on charger 1. Upon checking one DC cable was found short which was replaced and system restored.
- Inox Dayapar may kindly investigate the reason for not clearing the fault in 33 kV system and non tripping of 220 kV Bhuj-Dayapar 1&2 at Dayapar end.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र°सं° S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from INOX and received late from POWERGRID WR-2
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from INOX
5.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Inox Dayapar may kindly investigate the reason for not clearing the fault in 33 kV system and non tripping of 220 kV Bhuj-Dayapar 1&2 at Dayapar end.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

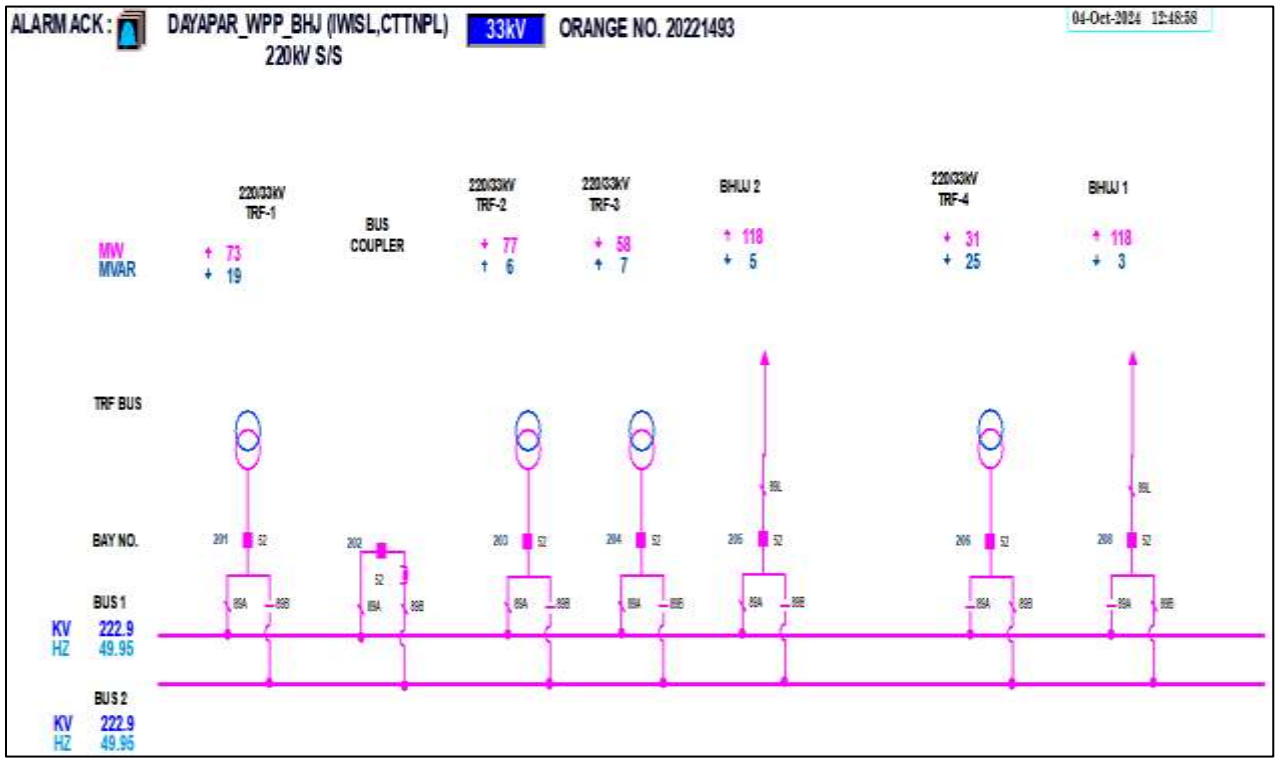
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

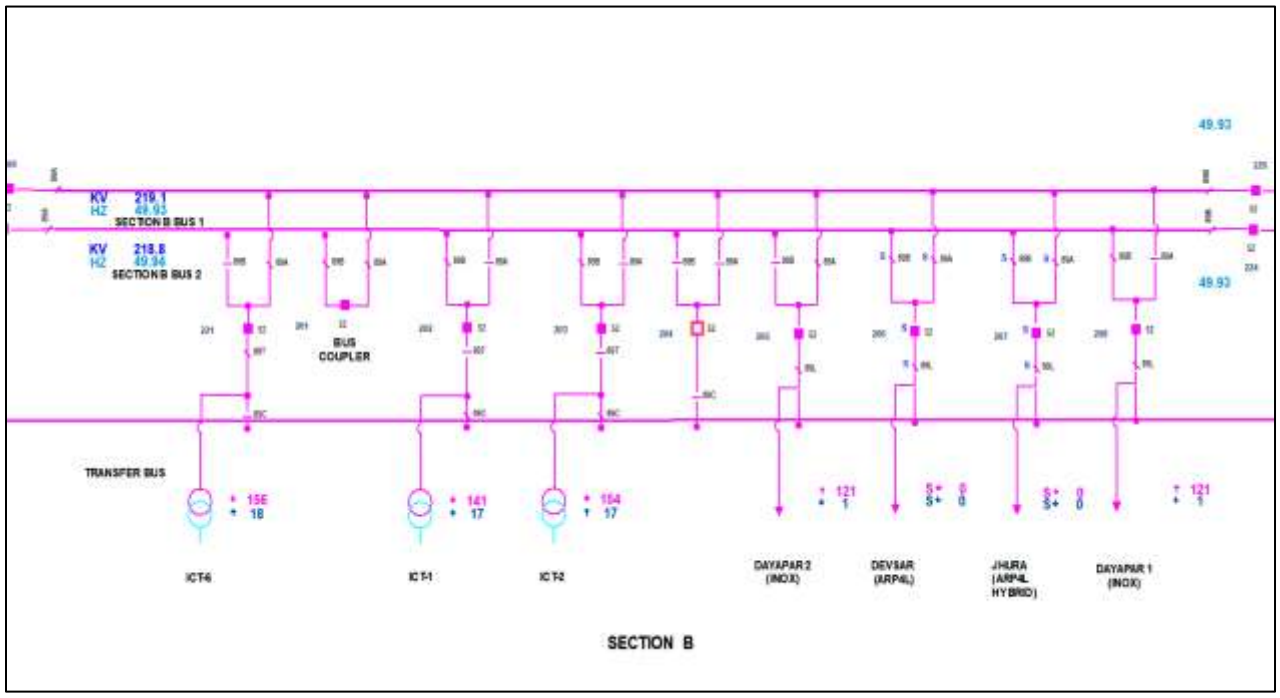
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 20852 (DYPR2-1) OPEN	05:53:09	518
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 20852 (DYPR2-1) ACTED	05:53:09	484
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 20552 (DYPR2-2) OPEN	05:53:10	376
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 20552 (DYPR2-2) ACTED	05:53:10	341

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Dayapar SLD:

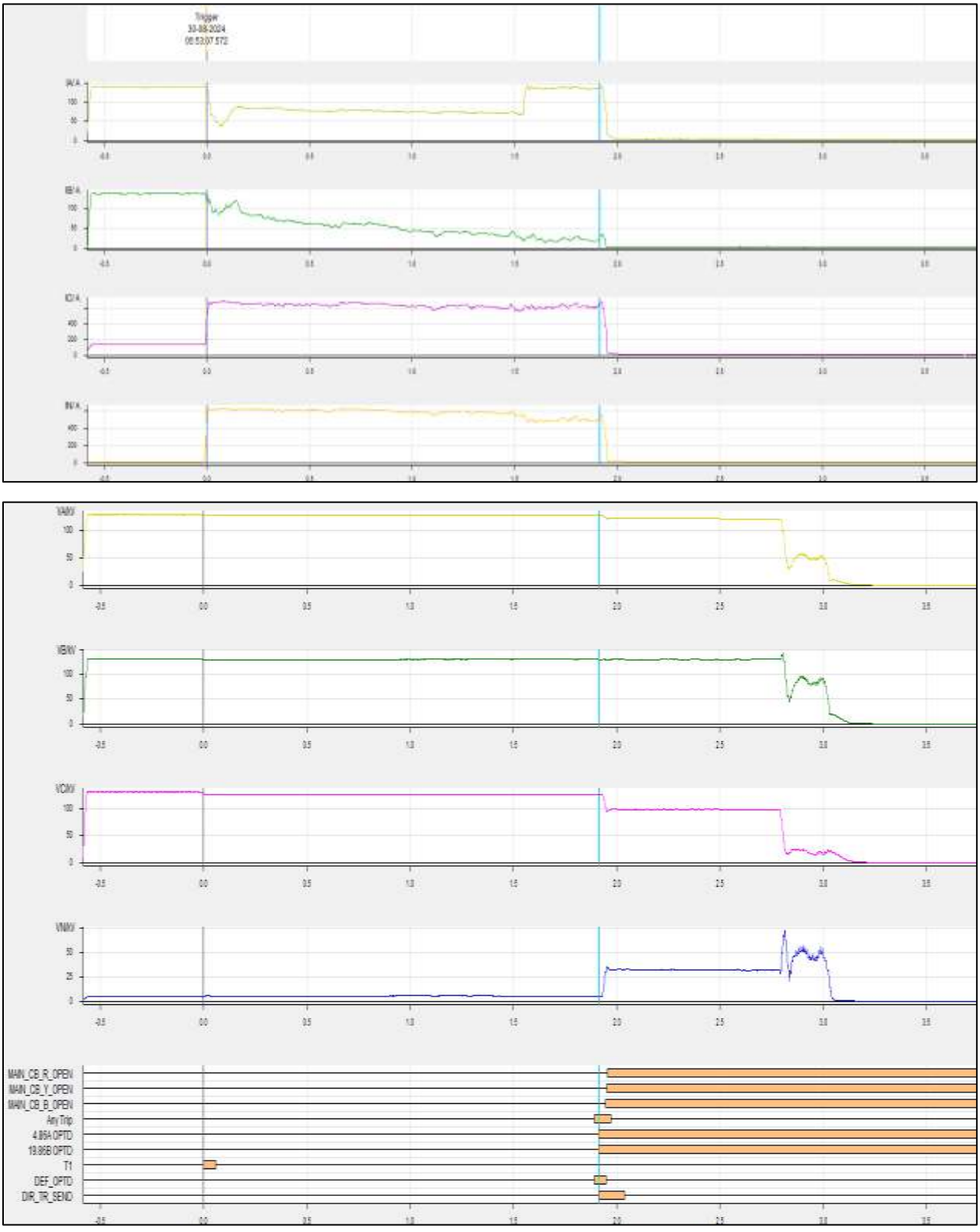


220kV Bhuj SLD:

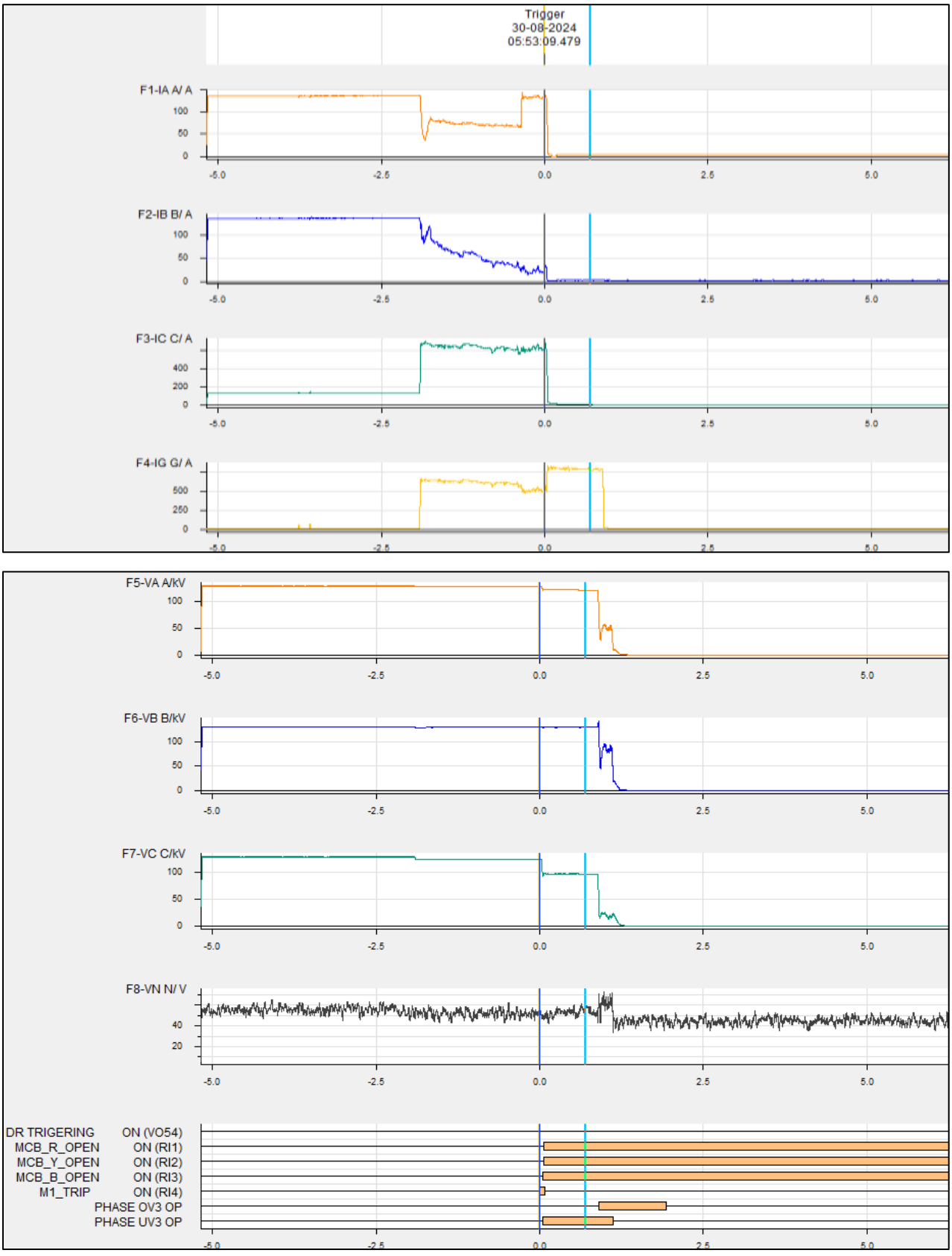


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

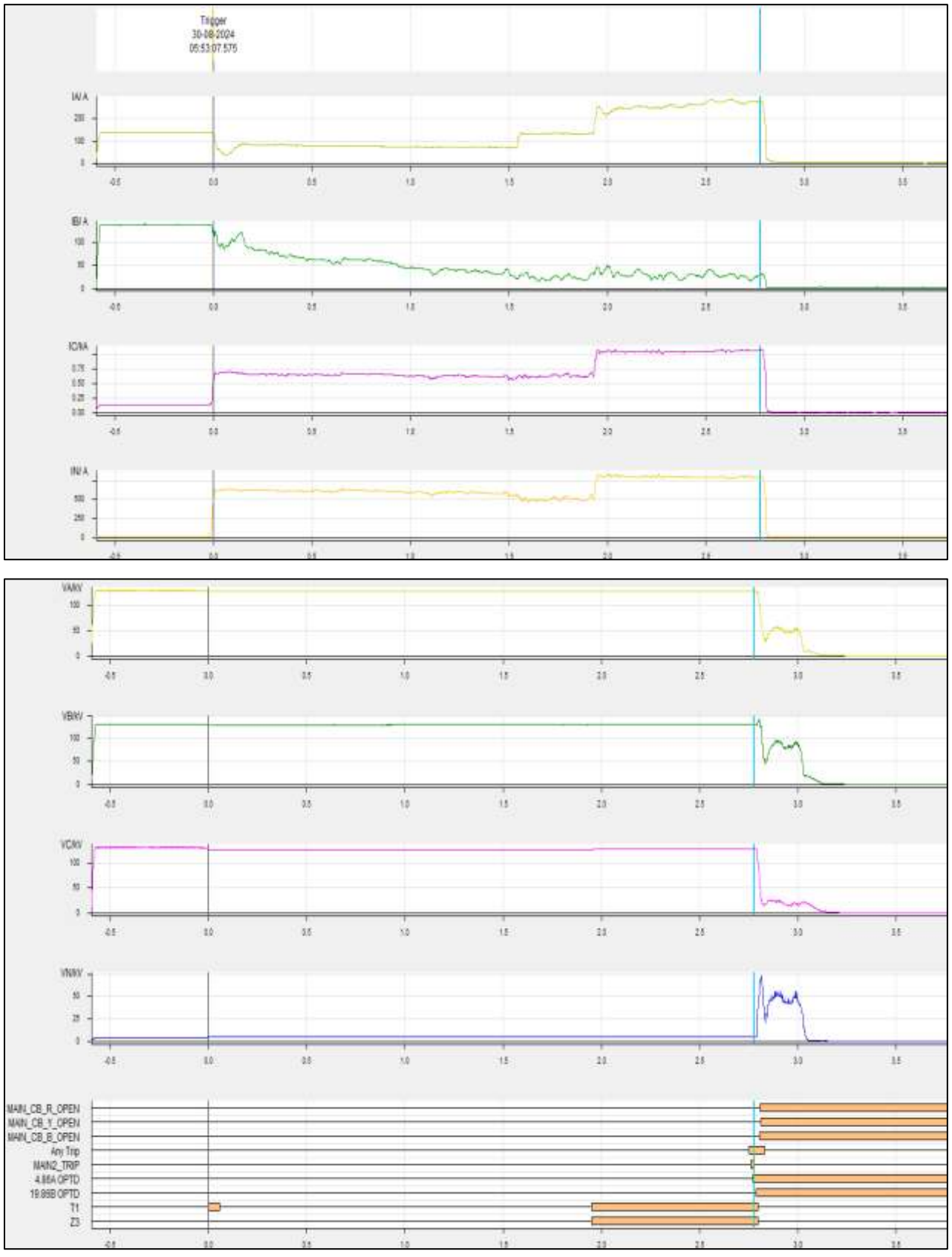
A. DR of 220 kV Bhuj- Dayapar -1 at Bhuj end, Main-1 relay



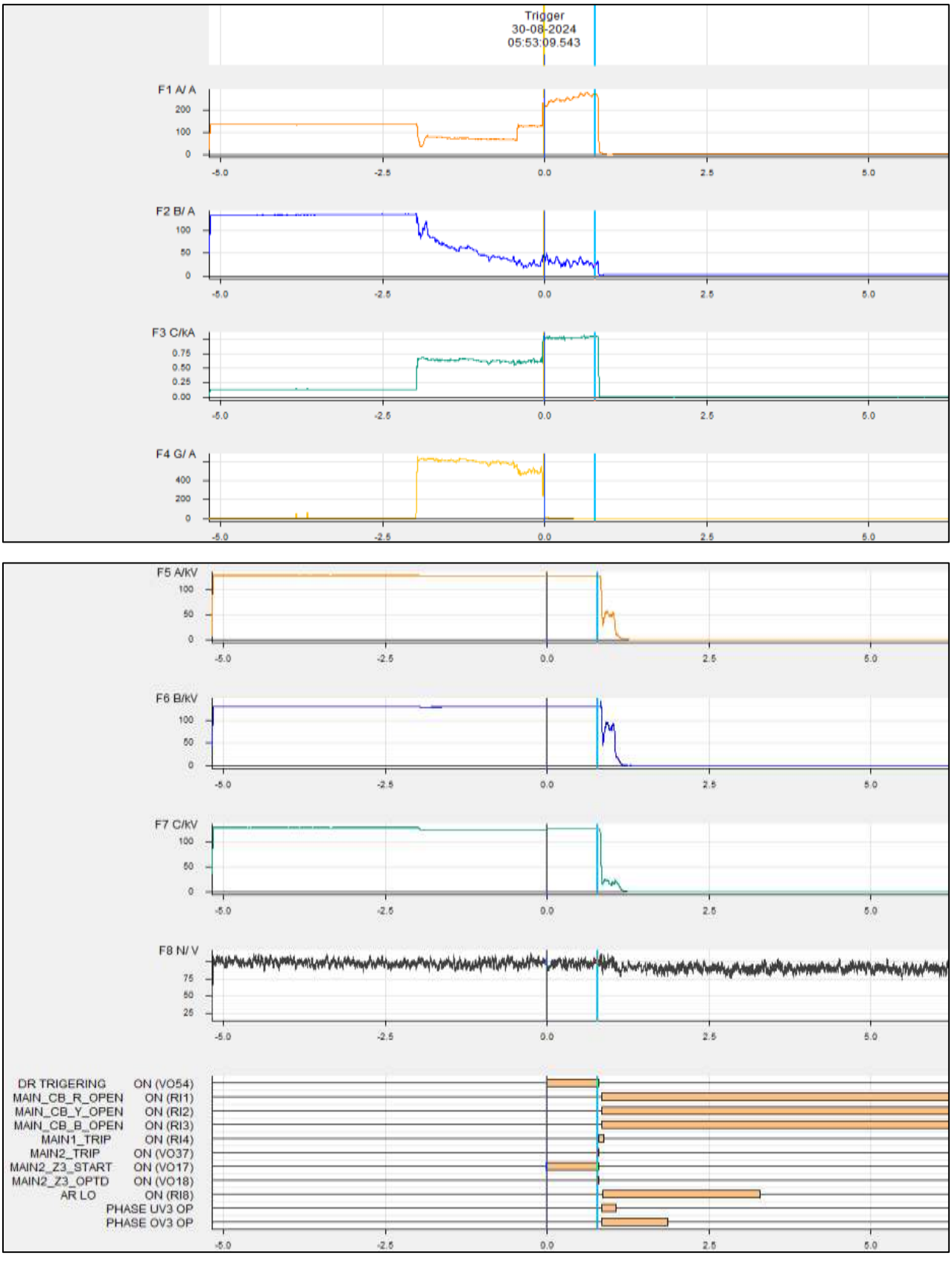
B. DR of 220 kV Bhuj- Dayapar -1 at Bhuj end, Main-2 relay



C. DR of 220 kV Bhuj- Dayapar -2 at Bhuj end, Main-1 relay



D. DR of 220 kV Bhuj- Dayapar -2 at Bhuj end, Main-2 relay



अनुलग्नक-D / Annexure-D: Site photographs –





Vijay Kumar Kodali

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ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. कोटड़ा मध उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Kotda Madh of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 06:32 Hrs / 30-08-2024, 220 kV Bhuj-Kotda Madh-S/C tripped on B-E fault. During patrolling rope was found hanging on B-phase conductor. Generation loss of 180 MW occurred at Kotda Madh (Netra) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 06:32 Hrs / 30-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Kotda Madh (Alfanar), Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.04	62071	53478	5818	12418
घटना के बाद Post Event	50.03	61961	53483	5773	12400

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Rains, Bad weather

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 180 MW occurred at Kotda Madh (Alfanar) Wind Power plant.

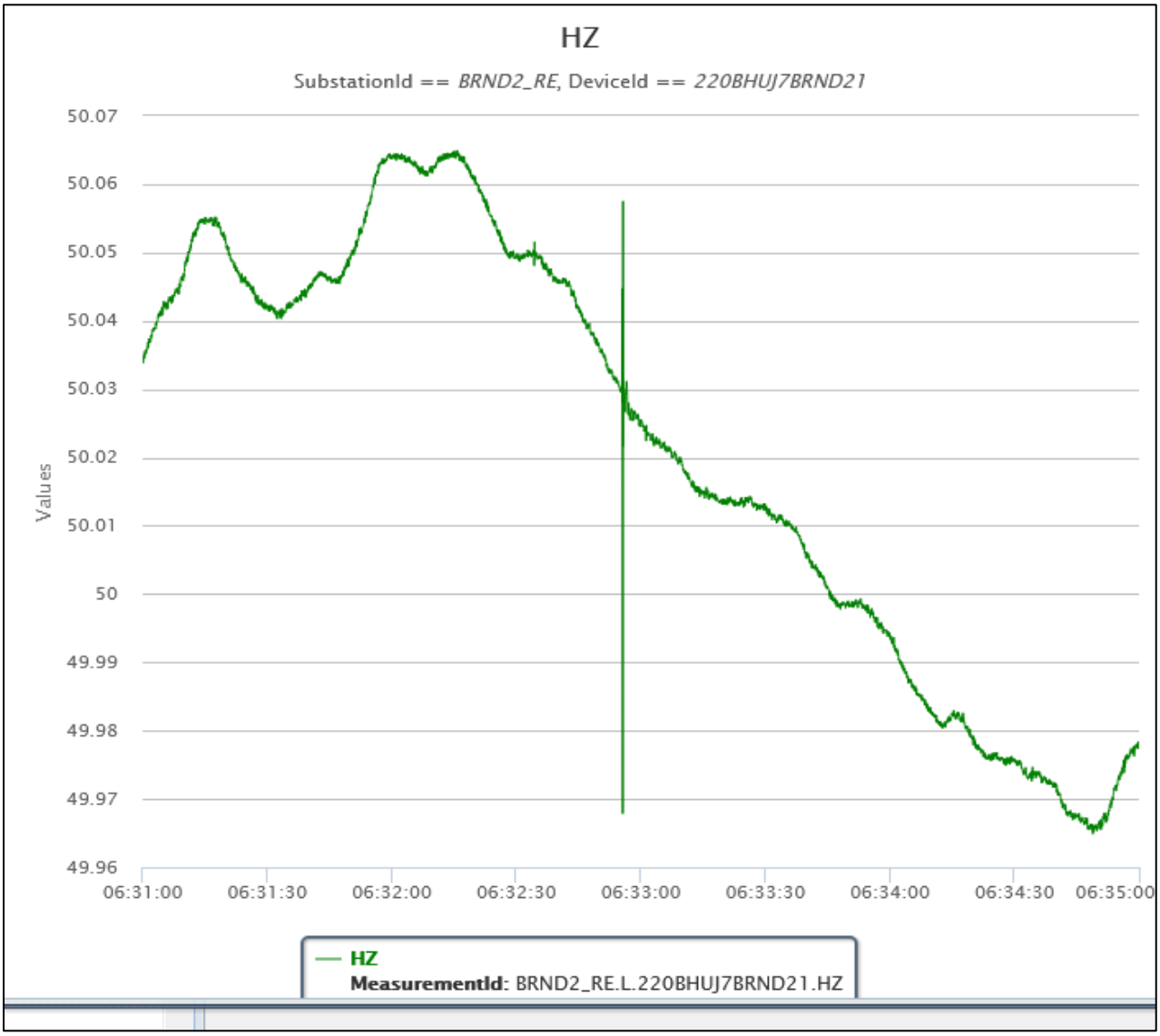


Figure 1. 220 kV Bhuj- Baranda-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 06 hours 39 minutes

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

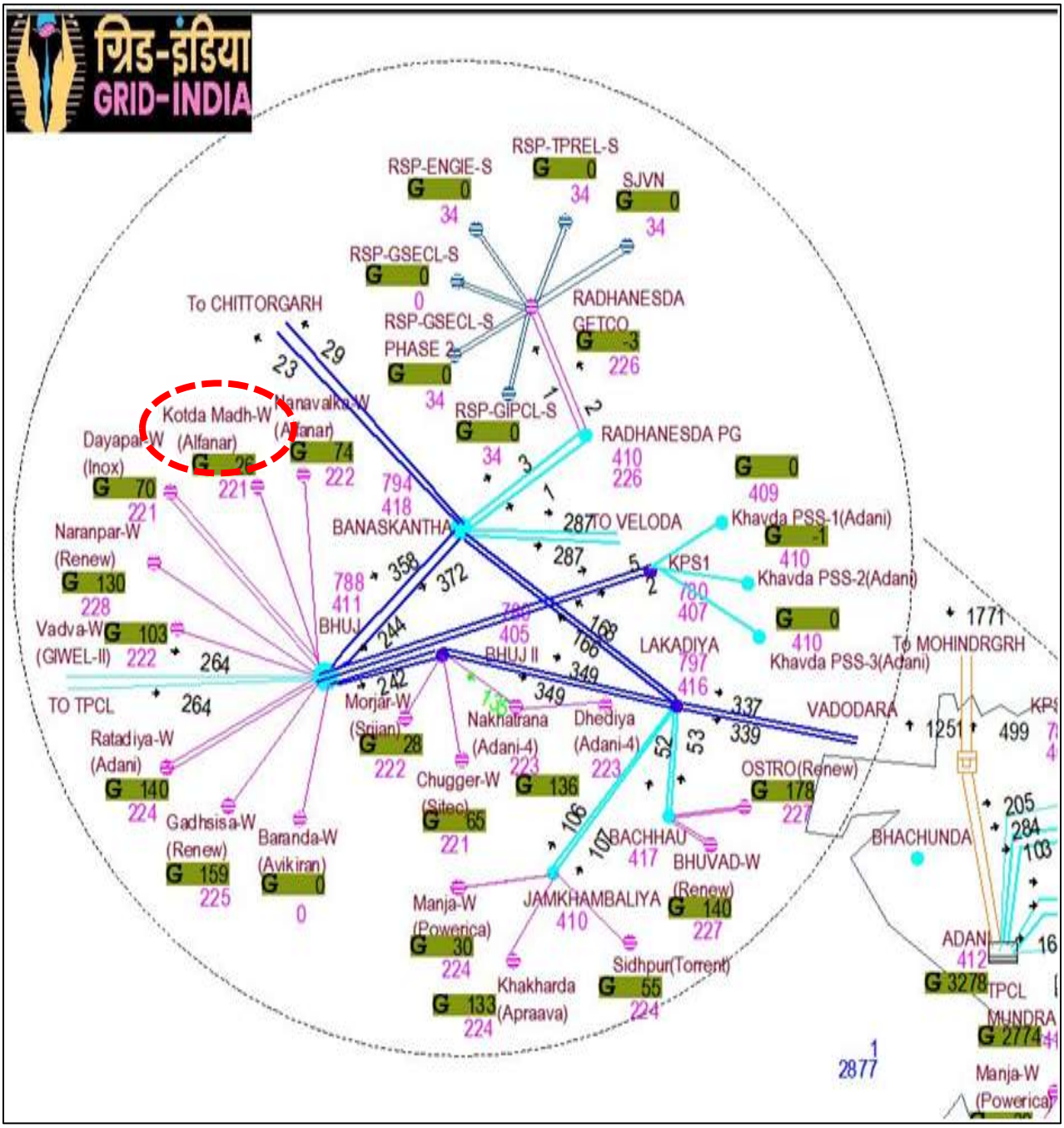


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Kotda Madh	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220kV Bhuj-Kotda Madh (Netra) s/c	06:32	B ph-E fault, Fault current – 0.31 kA,53.9 km from Kotdamadh end.	Fault current - 11.4 kA, 11km from Bhuj end.	13:11

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

- 220 kV Bhuj-Kotda Madh-S/C tripped on B-E fault without auto recloser attempt

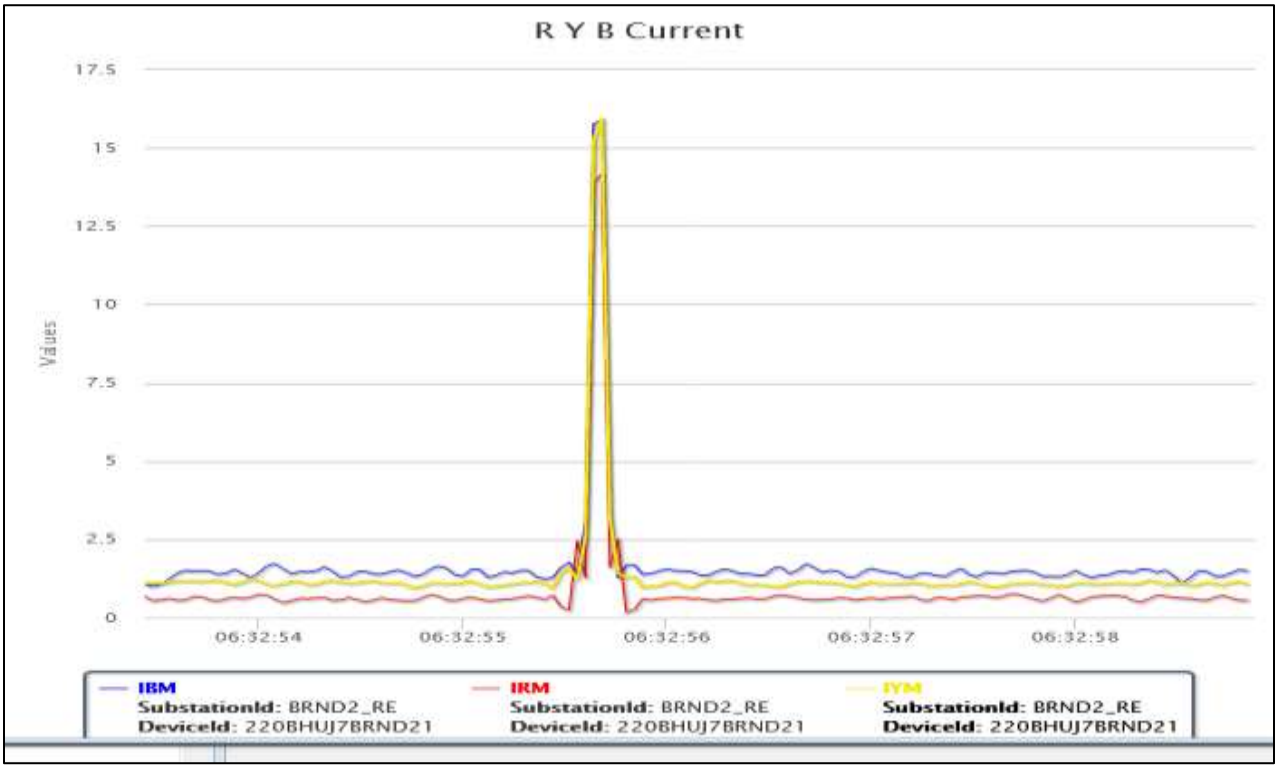


Figure 3. 220 kV Bhuj- Baranda -1 Current Plot

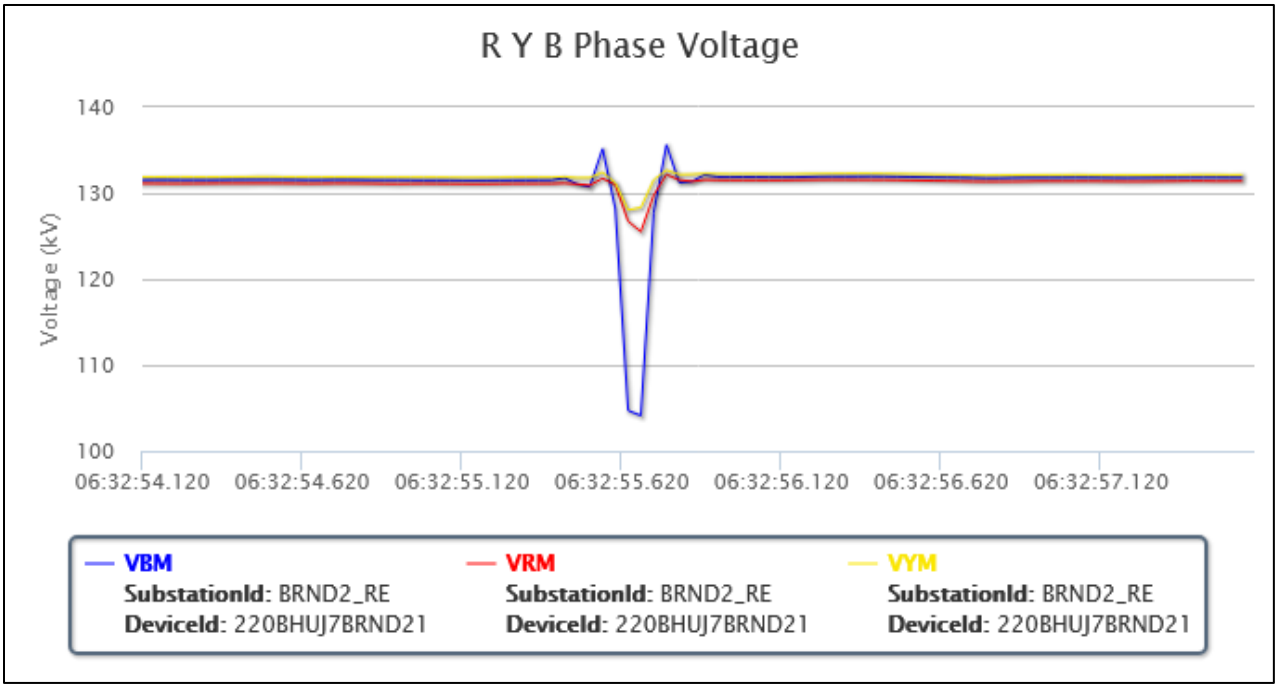


Figure 4. 220 kV Bhuj- Baranda -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- PMU data not generated at Kotda madh at the time of tripping.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- PMU data not generated at the time of tripping. Kotda Madh (Alfanar) may kindly resolve this issue. This issue has been flagged multiple times by WRLDC.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Alfanar.

2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Correct DR for the event time not received from Alfanar
3.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted at both ends. POWERGRID-WR2 and Alfanar may kindly investigate

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23152 (KTDM2) OPEN	06:32:55	713

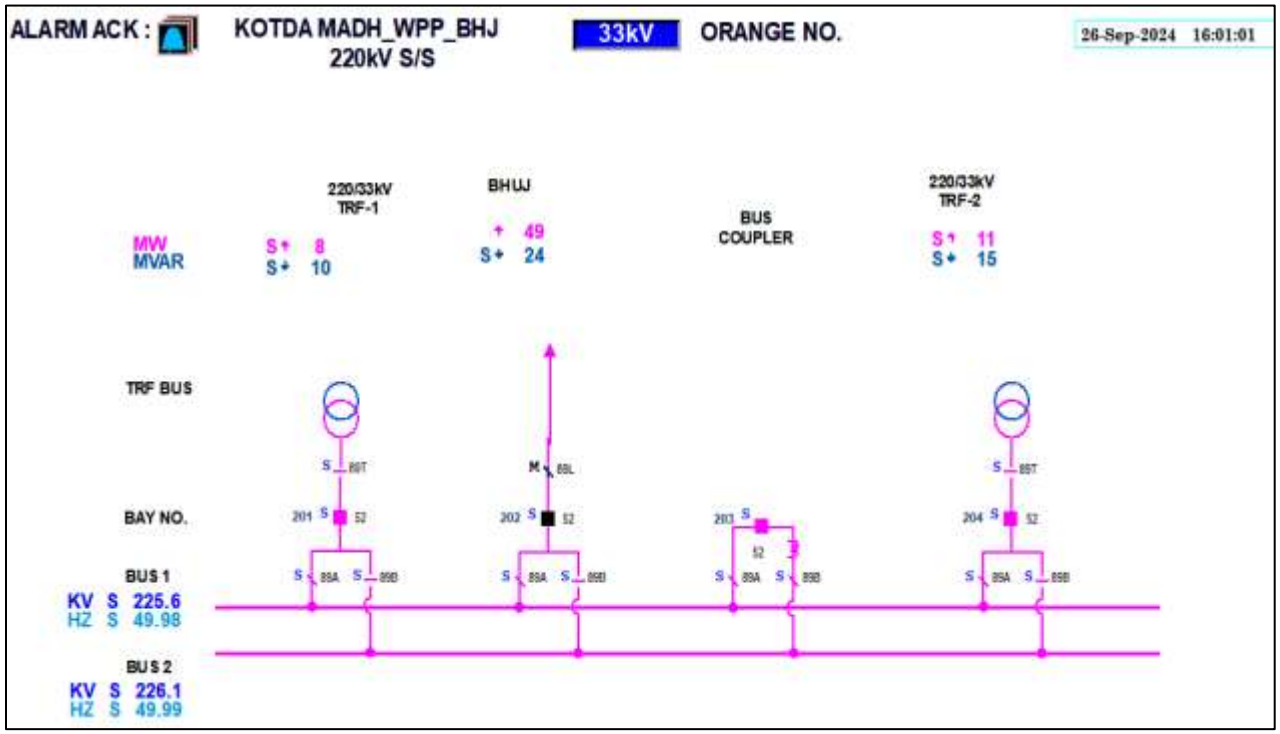
SOE from Alfanar -

Trip Log - 000042 / 30-08-2024 06:34:07.862 - 5336_Alfanar / 220kV / LINE / B202RA_21_1_7SA522/7SA522 V04.76.02

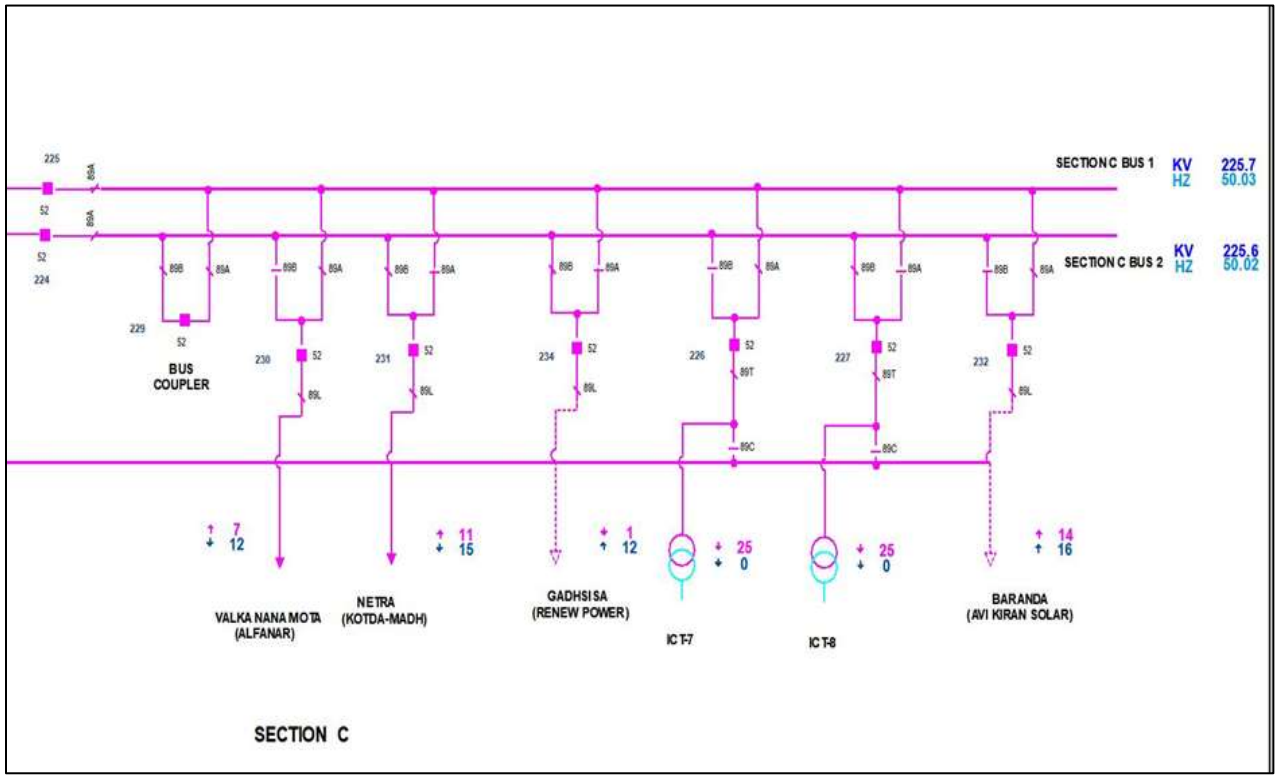
Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	42 - ON	30.08.2024 06:34:07.862		
00302	Fault Event	45 - ON	30.08.2024 06:34:07.862		
07165	50(N)/51(N) Backup O/C PICKUP GROUND	ON	0 ms		
07171	50(N)/51(N)-B Pickup - Only GROUND	ON	0 ms		
07193	51(N)-B Pickup	ON	0 ms		
01358	67N picked up FORWARD	ON	6 ms		
01338	50N / 51N phase selector Ph.C selected	ON	6 ms		
01355	50N-2 PICKED UP	ON	6 ms		
03688	21 Pickup CG	ON	20 ms		
03703	21 Selected Loop CG forward	ON	20 ms		
03804	21 TRIP command - Only Phase C	ON	20 ms		
02844	79 1st cycle running	ON	21 ms		
02801	79 - in progress	ON	21 ms		
00535	Primary fault current Ic	0.33 kA	24 ms		
01335	50N / 51N Ground O/C trip is BLOCKED	ON	24 ms		
02839	79 dead time after 1pole trip running	ON	56 ms		
03671	21 PICKED UP	OFF	60 ms		
03703	21 Selected Loop CG forward	OFF	60 ms		
07161	50(N)/51(N) Backup O/C PICKED UP	OFF	60 ms		
01338	50N / 51N phase selector Ph.C selected	OFF	65 ms		
01345	50N / 51N PICKED UP	OFF	65 ms		
00593	Single pole open detected in Phase C	ON	89 ms		
14081	50N-2 is blocked	ON	94 ms		
01332	50N / 51N Ground O/C is BLOCKED	ON	94 ms		
01125	Fault Locator Loop CG	ON	52 ms		
01117	Flt Locator: secondary RESISTANCE	5.14 Ohm	52 ms		
01118	Flt Locator: secondary REACTANCE	12.78 Ohm	52 ms		
01114	Flt Locator: primary RESISTANCE	8.56 Ohm	52 ms		
01115	Flt Locator: primary REACTANCE	21.29 Ohm	52 ms		
01119	Flt Locator: Distance to fault	53.9 km	52 ms		
01120	Flt Locator: Distance [%] to fault	67.4 %	52 ms		
01335	50N / 51N Ground O/C trip is BLOCKED	OFF	104 ms		
00511	Relay GENERAL TRIP command	OFF	120 ms		
00593	Single pole open detected in Phase C	OFF	473 ms		
14081	50N-2 is blocked	OFF	518 ms		
01332	50N / 51N Ground O/C is BLOCKED	OFF	518 ms		
02851	79 - Close command	ON	554 ms		
02784	79: Auto recloser is not ready	ON	554 ms		

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Kotda Madh SLD:

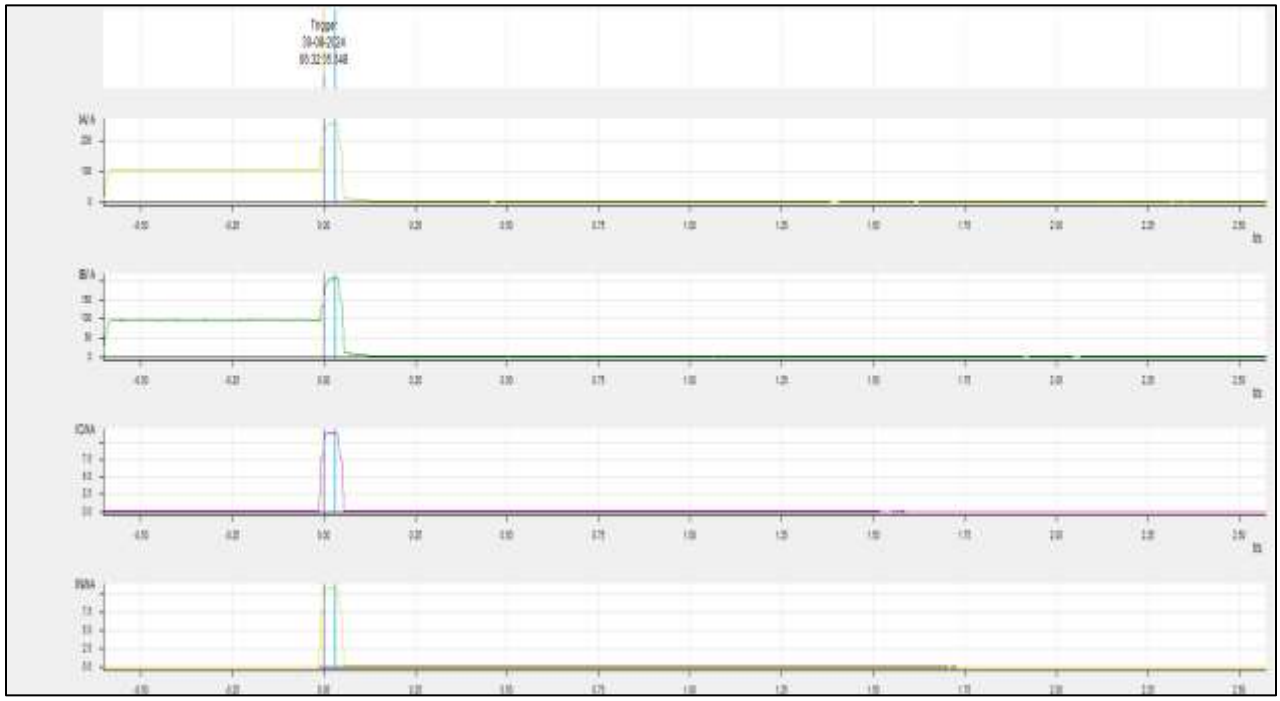


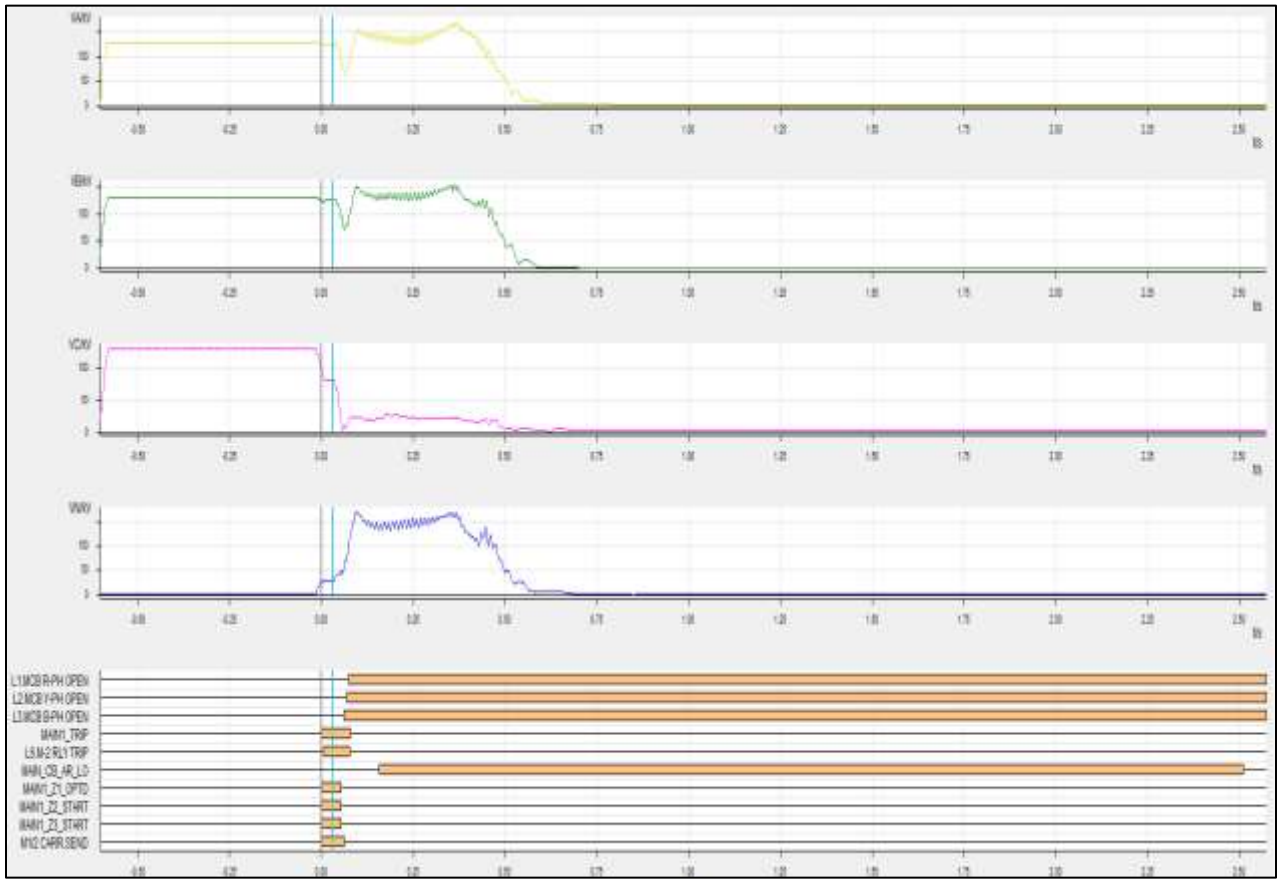
220kV Bhuj SLD:



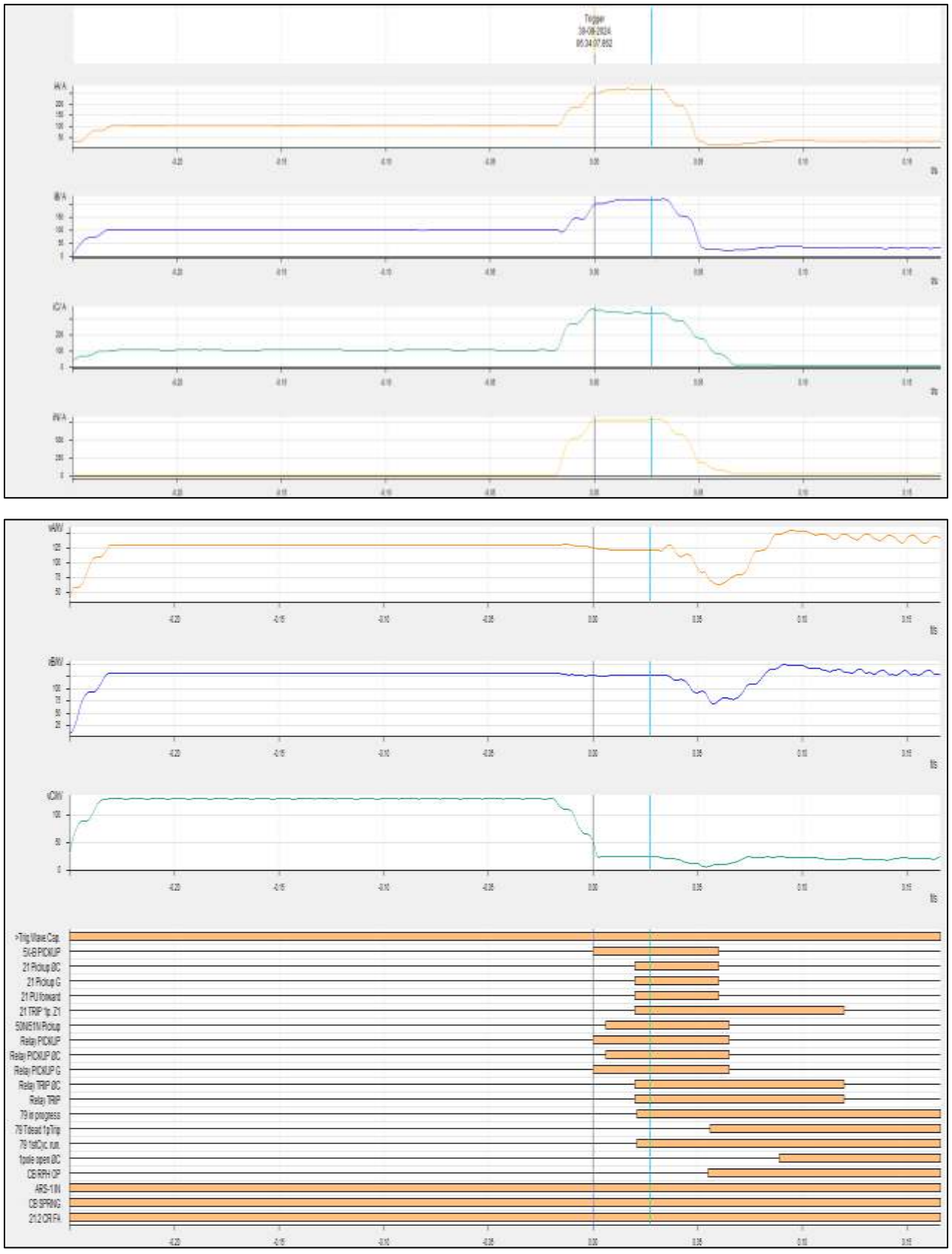
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Bhuj- Kotda Madh-1 from Bhuj end





B. DR of 220 kV Bhuj- Kotda Madh-1 from Kotda Madh end



अनुलग्नक-D / Annexure-D: Site photographs –Nil

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. चुग्गर उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Chugger of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 09.10.2024

1. **घटना का सारांश / Event Summary**: At 11:40 Hrs / 30-08-2024, 220 kV Bhuj-II - Chugger tripped on B-E fault. At the time of patrolling, insulator failure observed at tower location 147 and 206. Generation loss of 48 MW occurred at Chugger (Sitac) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 11:40 Hrs / 30-08-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Chugger, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.07	61497	53100	9443	12708
घटना के बाद Post Event	50.03	61469	52997	9430	12668

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Gusty Wind & Rain

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 48 MW occurred at Chugger (Sitac) Wind Power plant



Figure 1. 220 kV Bhuj- Baranda-1 Frequncy Plot

7. **रुकावट की अवधि / Duration of interruption:** 46 hours 52 minutes

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

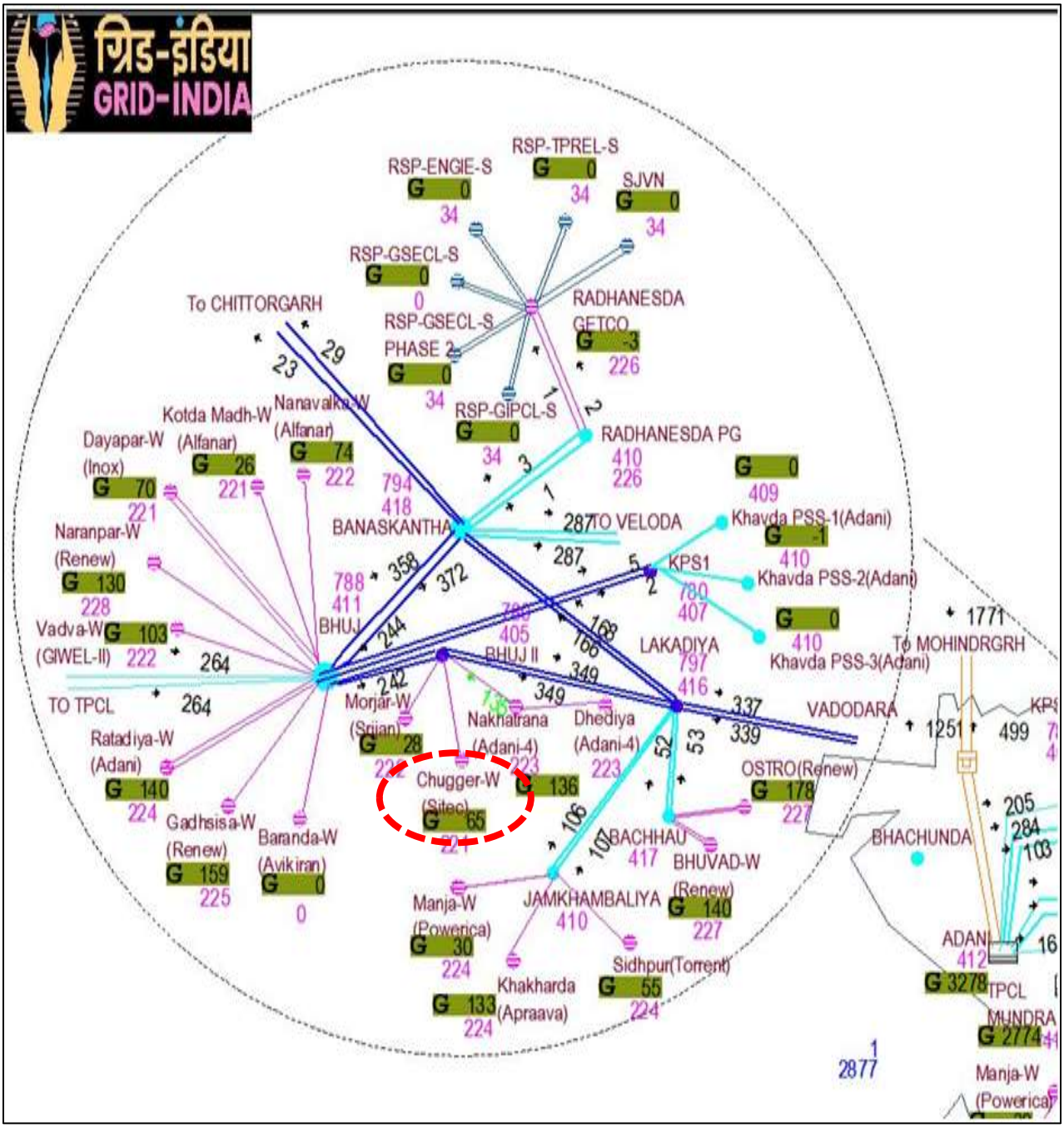


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Chugger	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220 kV Bhuj II-Sitac/Chugger	11:40 / 30-08-2024	Tripped due to Bph-E fault. At sitac end, z1, 8.43 km, 600.52 A.	At Bhuj2 end, 20.5 km, 4.38 kA	10:32 / 01-09-2024

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

- 220 kV Chugger-Bhuj-II tripped on B-E fault.

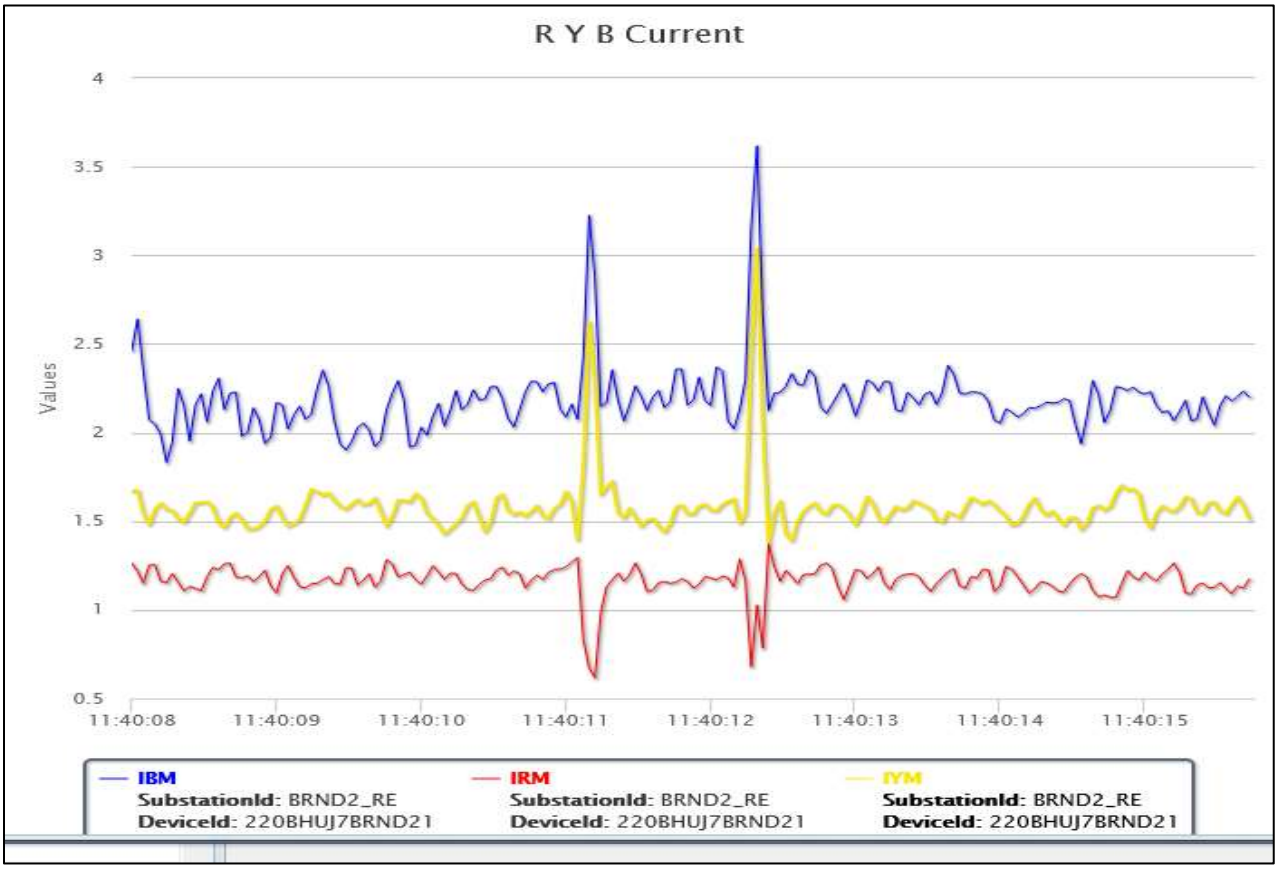


Figure 3. 220 kV Bhuj- Baranda -1 Current Plot

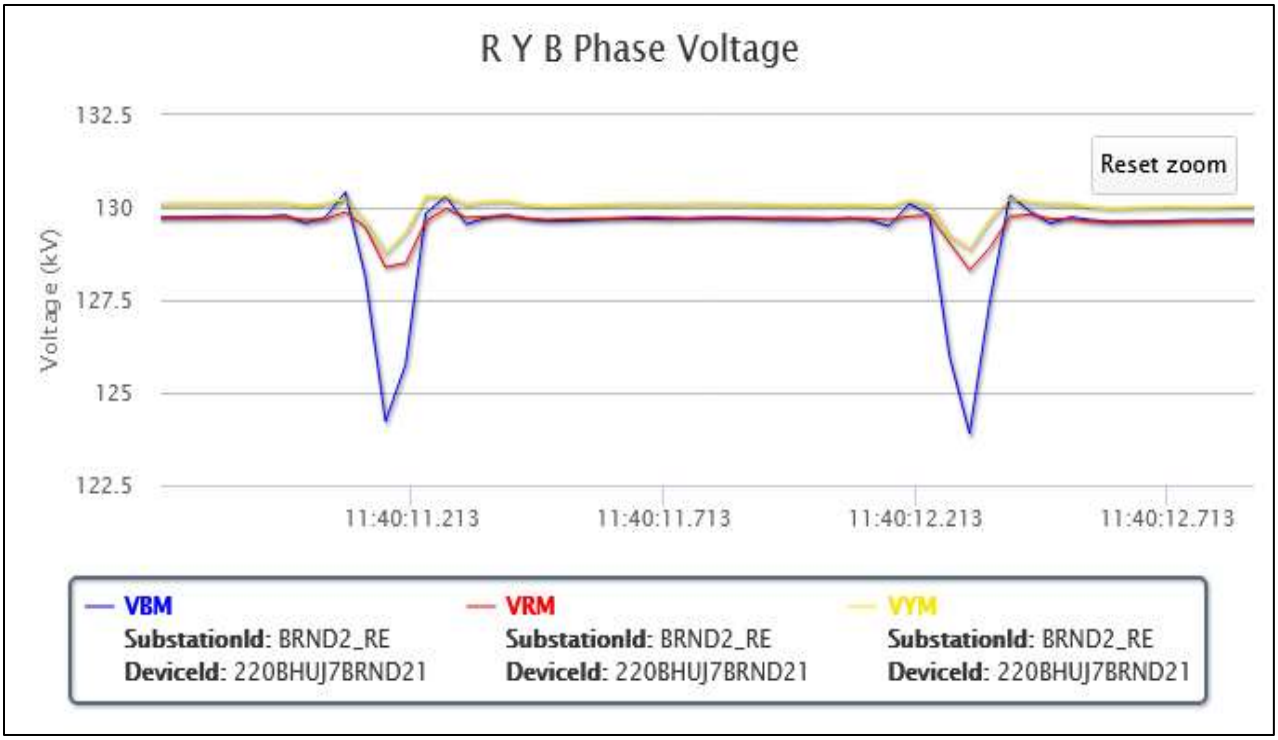


Figure 4. 220 kV Bhuj- Baranda -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed: Nil

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Line restored after insulator replacement

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र°सं° S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from Chugger (Sitac)
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Chugger (Sitac) and Powergrid.
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Chugger (Sitac)

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 20552 (DYPR2-2) NORMAL	11:38:44	798
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 21052 (SITC2) FAULTY	11:40:11	186
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 21052 (SITC2) CLOSED	11:40:12	292
WRLDC	220-SOE	BHJ72_PG	BHUJ 2 CB 21052 (SITC2) ACTED	11:40:12	307
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 21052 (SITC2) FAULTY	11:40:12	329
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 21052 (SITC2) OPEN	11:40:12	354

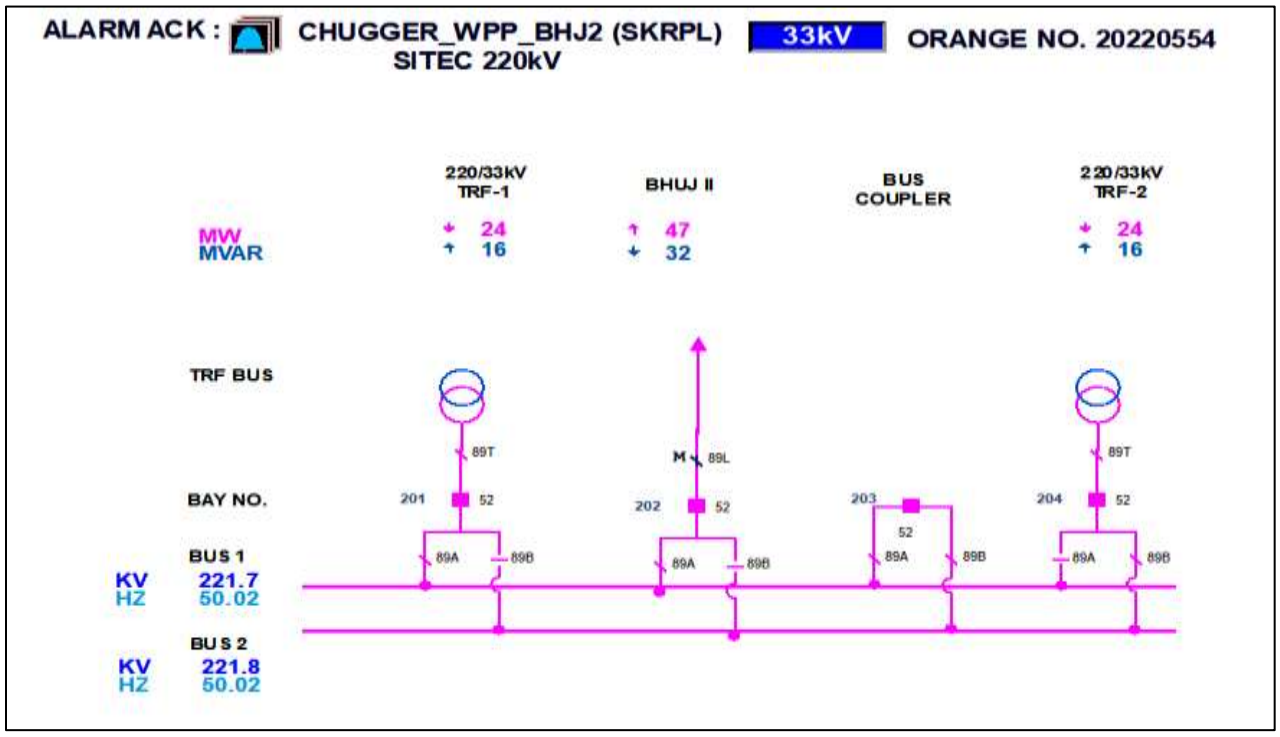
SOE from Chugger –

Type	Date & Time	Signal name	Status
P	30-Aug-24 11:40:11:157 AM	ZMF03-START	On
P	30-Aug-24 11:40:11:223 AM	ZMF03-START	Off
P	30-Aug-24 11:40:11:157 AM	ZMF02-START	On
P	30-Aug-24 11:40:11:223 AM	ZMF02-START	Off
P	30-Aug-24 11:40:11:166 AM	ZMF01-TRIP	On
P	30-Aug-24 11:40:11:223 AM	ZMF01-TRIP	Off
P	30-Aug-24 11:40:11:166 AM	ZMF01-START	On
P	30-Aug-24 11:40:11:223 AM	ZMF01-START	Off
P	30-Aug-24 11:40:11:187 AM	ZCOM_TRIP	On
P	30-Aug-24 11:40:11:250 AM	ZCOM_TRIP	Off
P	30-Aug-24 11:40:11:166 AM	ZCOM_CS	On
P	30-Aug-24 11:40:11:268 AM	ZCOM_CS	Off
P	30-Aug-24 11:40:11:166 AM	TRIP1_TRIP	On
P	30-Aug-24 11:40:11:316 AM	TRIP1_TRIP	Off
P	30-Aug-24 11:40:11:166 AM	TRIP1 L3	On
P	30-Aug-24 11:40:11:316 AM	TRIP1 L3	Off
P	30-Aug-24 11:40:11:304 AM	TRIP1 L2	On
P	30-Aug-24 11:40:11:316 AM	TRIP1 L2	Off
P	30-Aug-24 11:40:11:304 AM	TRIP1 L1	On
P	30-Aug-24 11:40:11:316 AM	TRIP1 L1	Off
P	30-Aug-24 11:40:11:154 AM	TEF-START	On
P	30-Aug-24 11:40:11:226 AM	TEF-START	Off
P	30-Aug-24 11:40:11:301 AM	PREP 3PH TR	On
P	30-Aug-24 11:40:11:151 AM	PHS-STFWPE	On
P	30-Aug-24 11:40:11:223 AM	PHS-STFWPE	Off
P	30-Aug-24 11:40:11:151 AM	PHS-STFWL3	On
P	30-Aug-24 11:40:11:223 AM	PHS-STFWL3	Off
P	30-Aug-24 11:40:11:298 AM	PERM1P TR_BCU	Off
P	30-Aug-24 11:40:11:457 AM	FSD1-BLKU	On
P	30-Aug-24 11:40:12:357 AM	FSD1-BLKU	Off
P	30-Aug-24 11:40:11:169 AM	FAULT LOOP B	On
P	30-Aug-24 11:40:11:226 AM	FAULT LOOP B	Off
P	30-Aug-24 11:40:11:361 AM	CB OPEN Y	On
P	30-Aug-24 11:40:11:360 AM	CB OPEN R	On
P	30-Aug-24 11:40:11:232 AM	CB OPEN B	On
P	30-Aug-24 11:40:11:182 AM	CARR RCV CH2	On
P	30-Aug-24 11:40:11:302 AM	CARR RCV CH2	Off
P	30-Aug-24 11:40:12:312 AM	CARR RCV CH2	On
P	30-Aug-24 11:40:12:442 AM	CARR RCV CH2	Off
P	30-Aug-24 11:40:11:183 AM	CARR RCV CH1	On
P	30-Aug-24 11:40:11:308 AM	CARR RCV CH1	Off
P	30-Aug-24 11:40:12:313 AM	CARR RCV CH1	On
P	30-Aug-24 11:40:12:446 AM	CARR RCV CH1	Off
P	30-Aug-24 11:40:11:154 AM	BRC_START	On
P	30-Aug-24 11:40:11:266 AM	BRC_START	Off
P	30-Aug-24 11:40:11:166 AM	B-PH FAULT	On
P	30-Aug-24 11:40:11:223 AM	B-PH FAULT	Off
P	30-Aug-24 11:40:11:166 AM	AR START	On
P	30-Aug-24 11:40:11:250 AM	AR START	Off

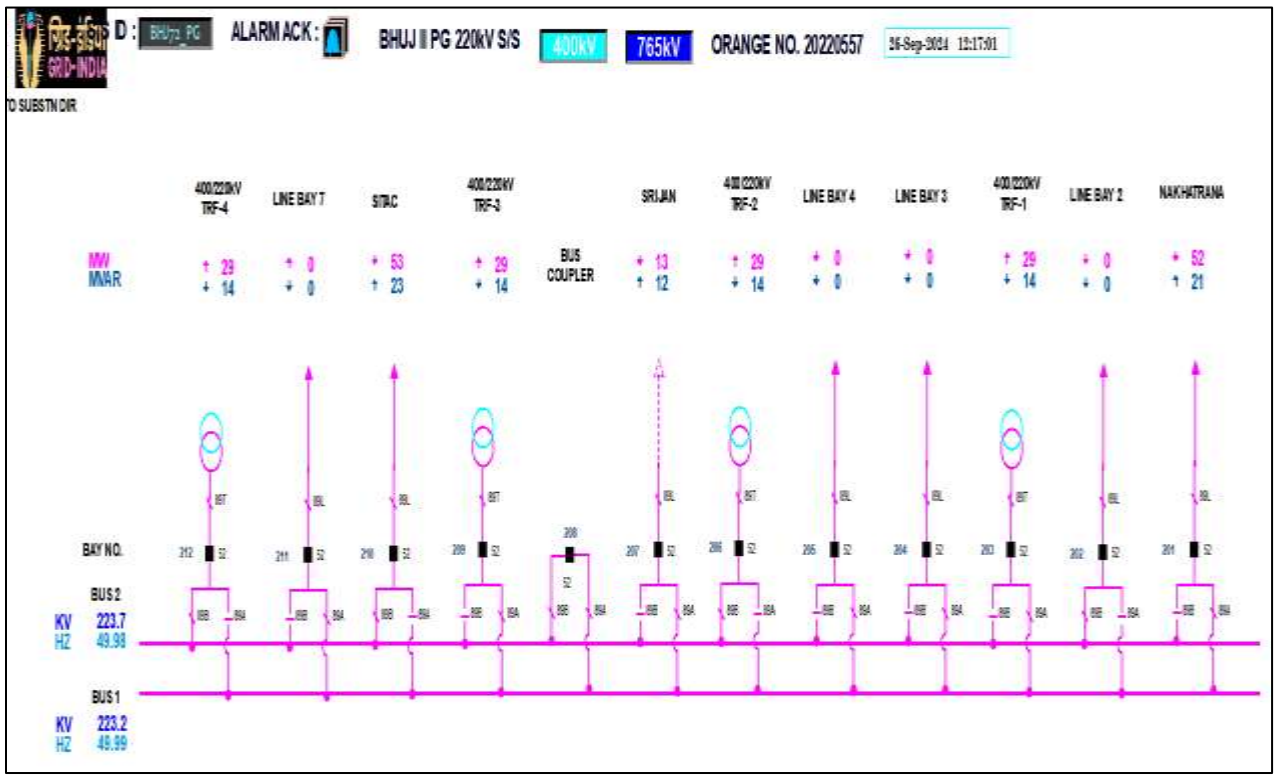
IED Information	
Name	AA1D1Q02FN1_REL
Serial Number	I2124011
Order Code	
Technical Key	AA1D1Q02FN1
Product Type	REL670
Product Version	2.2.4

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Chugger SLD:



220kV Bhuj SLD:



अनुलग्नक-3 / Annexure-3: Disturbance recorder- Not received from Chugger (Sitac)

अनुलग्नक-D / Annexure-D: Site photographs –

Tower No. 147



Tower No. 206



Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के. वी. नालासुपारा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nalasopara Sub Station of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary:** At 10:35 Hrs / 31-08-2024, 220 kV Nalasopara S/s became dead due to tripping of all elements on busbar protection operation. During the event, switchyard works were going on. 220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends which was undesirable. Load loss of 219 MW occurred at Nalasopara Substation due to the event.
2. **घटना का समय और दिनांक / Time and Date of the Event** : 10:35 Hrs / 31-08-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Nalasopara S/S, Maharashtra
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.08	62019	55303	14516	22259

घटना के बाद **Post Event**	50.04	61755	55089	14446	22101

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Cloudy weather.

6. लोड और जेनरेशन हानि / Load and Generation loss: 219 MW Load Loss

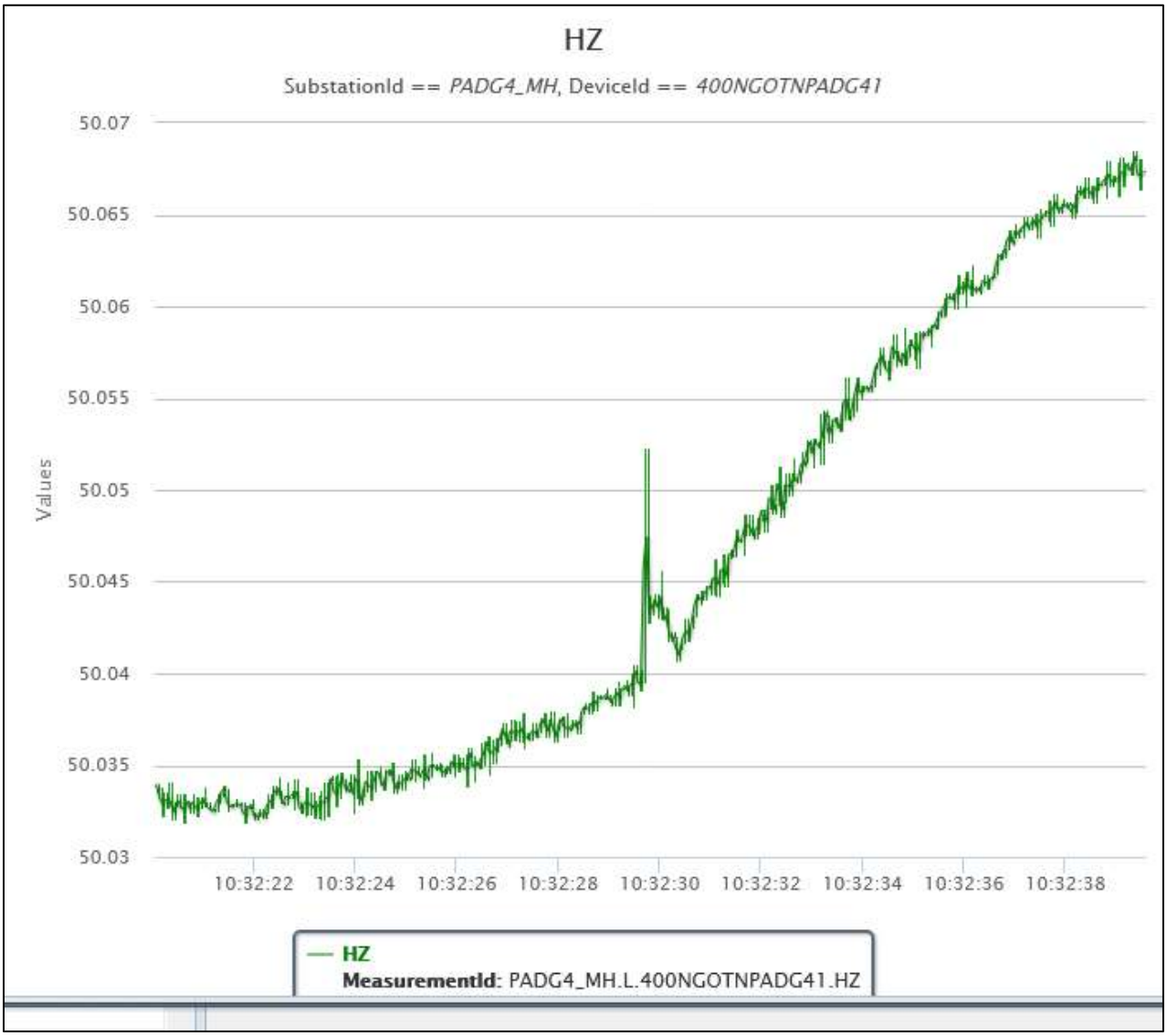


Figure 1. PMU Frequency plot of 400 kV Nagothane- Padghe-1 line

7. **रुकावट की अवधि / Duration of interruption:** 33 Minutes

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

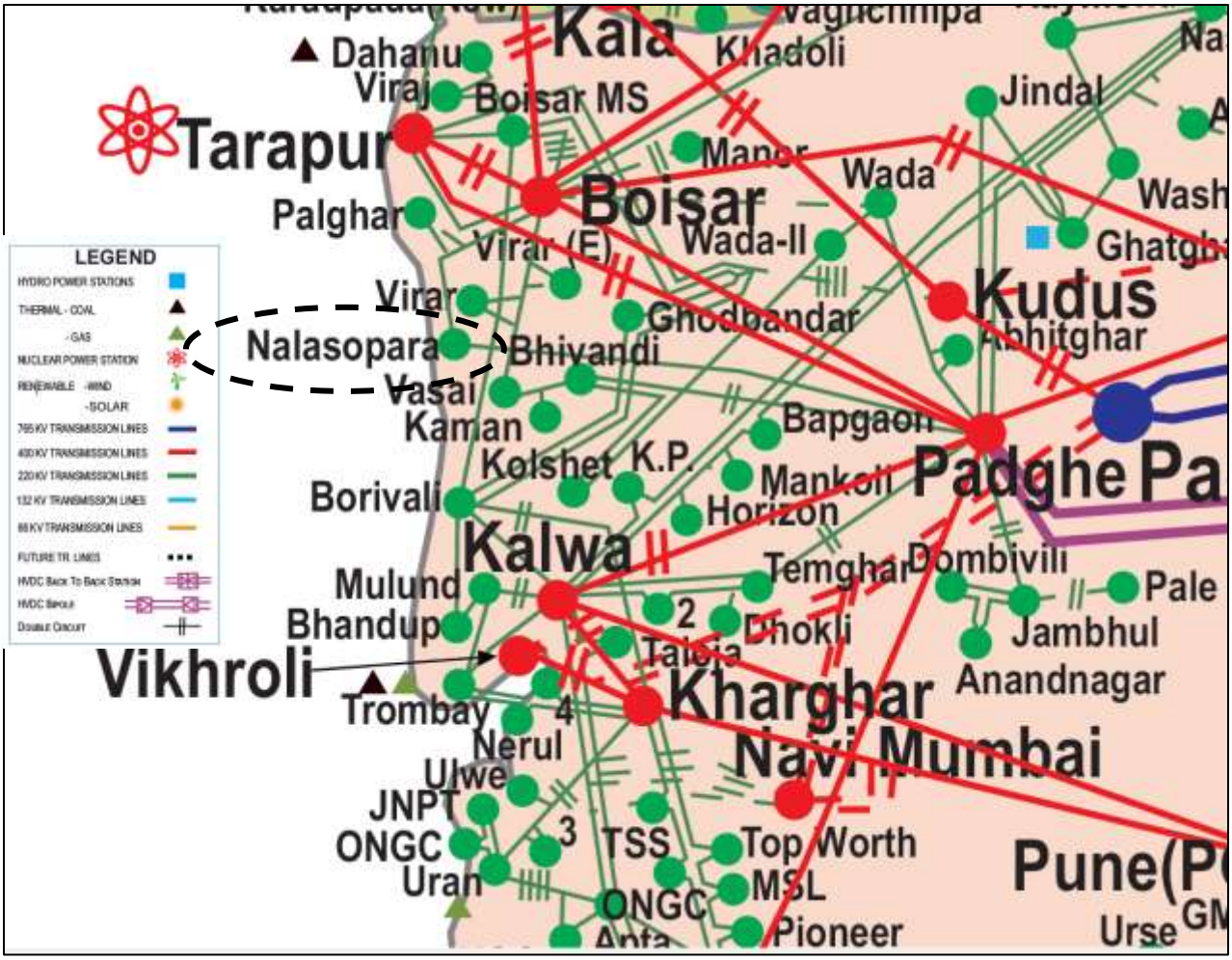


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (Nalasopara)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (remote end)	वापसी का समय Restoration time
1	220 kV Palghar Nalasopara	10:35	96 trip relay operated Bus bar protection operated	Information not furnished	11:08
2	220 kV Boisar Nalasopara	10:35			11:20
3	220kV Nalasopara ICT 1	10:35		NA	11:08
4	220kV Nalasopara ICT 2	10:35		NA	11:12
5	220kV Nalasopara ICT 3	10:35		NA	13:06

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

- At 220kV Nalasopara SS, 220kV Bus Bar Protection operated leading to tripping of all elements on main bus due to which substation went into dark. Smoke and black spots observed inside the directional unit of the RADSS busbar, which is suspected to extend the trip to the external LBB circuit. Resulting into the operation of all bays 96 relays.
- Upon observation, post event, Faulty Directional Unit auxiliary supply was disconnected and Busbar Protection was restored. Internal busbar was found to be stable.

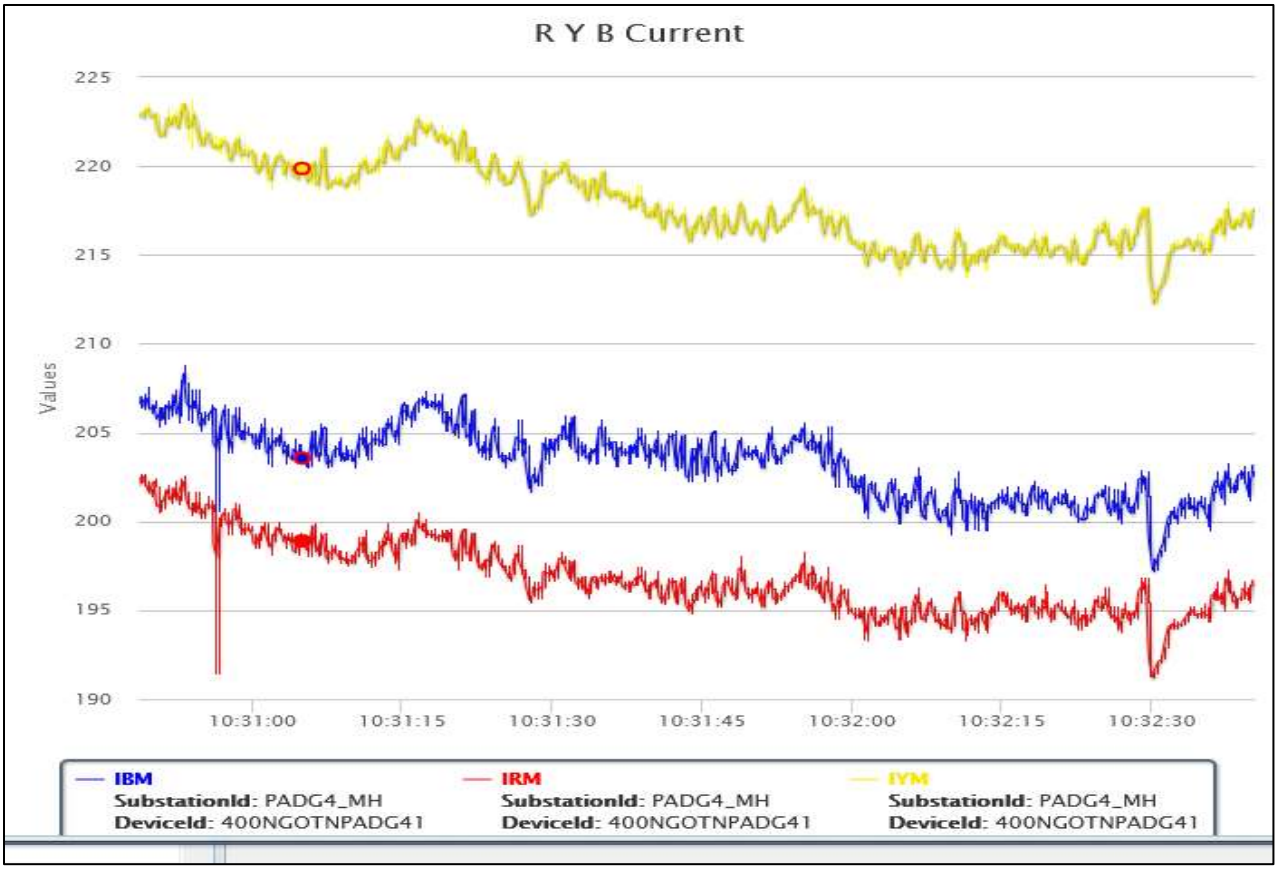


Figure 3. PMU Current plot of 400 kV Nagothane- Padghe-1 line

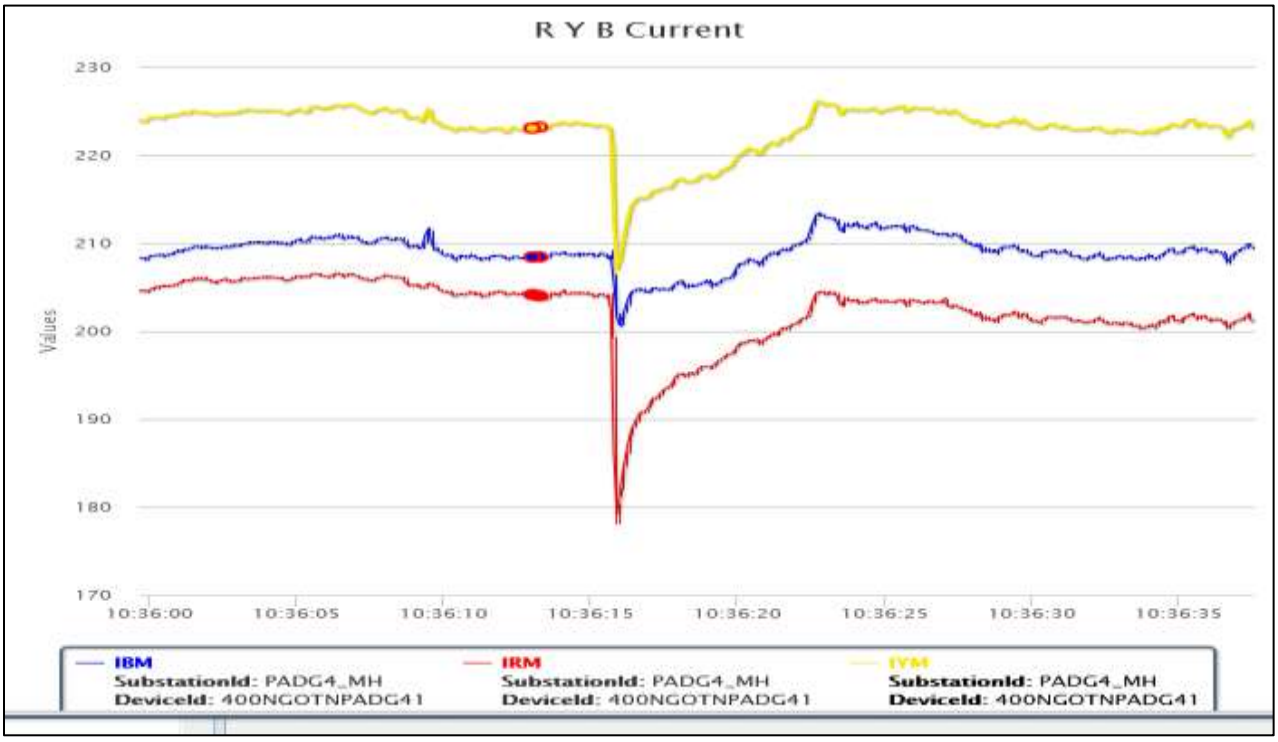


Figure 4. PMU Current plot of 400 kV Nagothane- Padghe-1 line

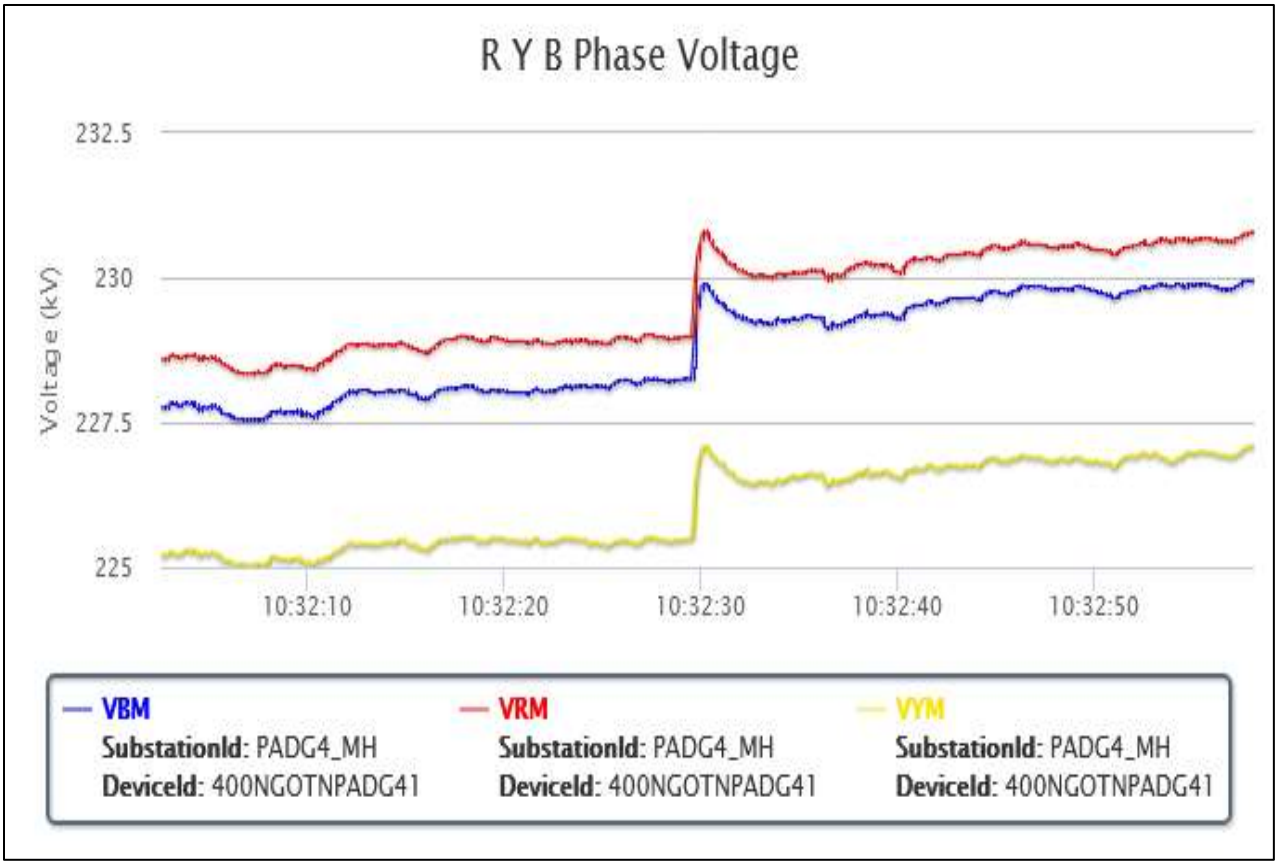


Figure 5. PMU Voltage plot of 400 kV Nagothane- Padghe-1 line

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- 220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable. 220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable. This happened due to incorrect configuration reported. This issue may be checked for other 220 kV lines also.
- Fault created by manual error during switchyard works. MSETCL may kindly take proper care during the operational activities to avoid such events in future.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- MSETCL disconnected the Faulty Directional Unit Aux Supply. Checked healthiness of interconnecting cables from Bushar Panel to Individual CRP, ensured that no abnormality was observed. Then, Bus Bar taken back in service.

- As informed by MSETCL, New Numerical type Busbar Protection relay requirement initiated and after due tenderization and agency has delivered new panels at Major stores, Panvel. Same will be commissioned shortly MSETCL.
- 220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable. 220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable. This happened due to incorrect configuration reported. This issue may be checked for other 220 kV lines also.
- Fault created by manual error during switchyard works. MSETCL may kindly take proper care during the operational activities to avoid such events in future.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received from MSETCL
2.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from MSETCL i.e. on 08.10.2024
3.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt :

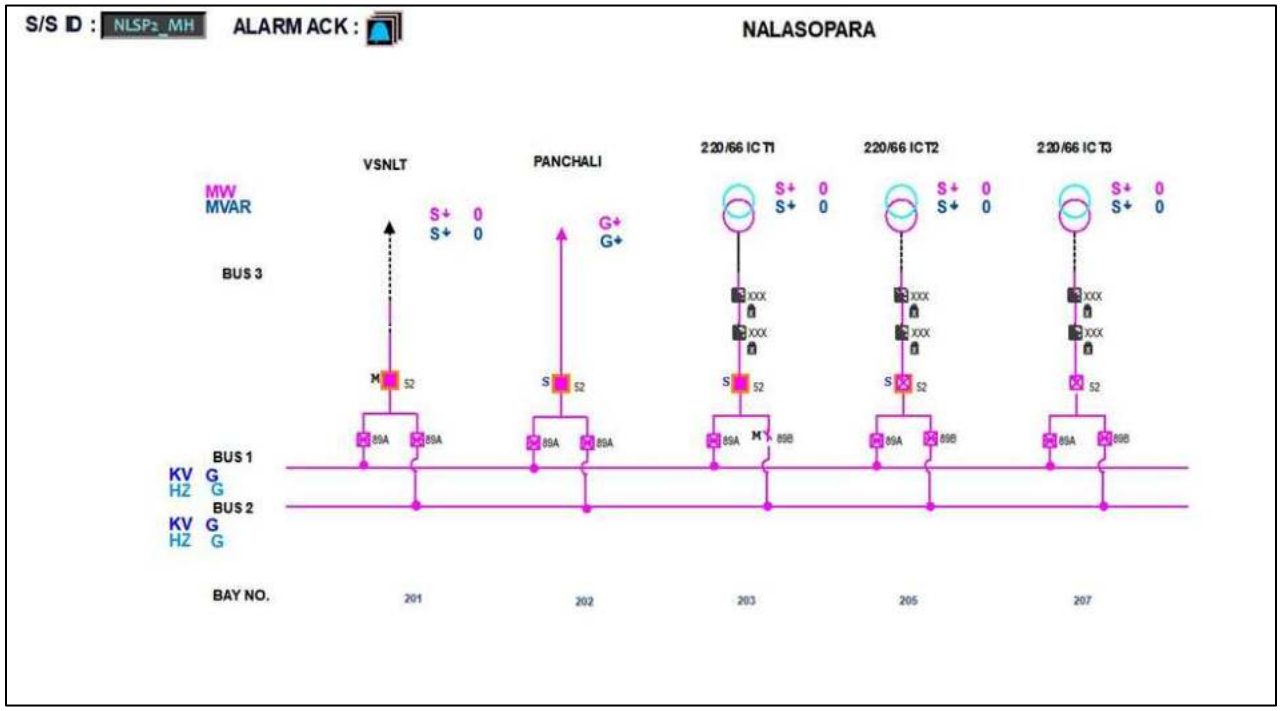
- Fault created by manual error during switchyard works. MSETCL may kindly take proper care during the operational activities to avoid such events in future.

- 220 kV Palghar-Nalasopara and 220 kV Boisar-Nalasopara tripped from Nalasopara end only, DT was not sent to remote ends, which is undesirable. This happened due to incorrect configuration reported. This issue may be checked for other 220 kV lines also.

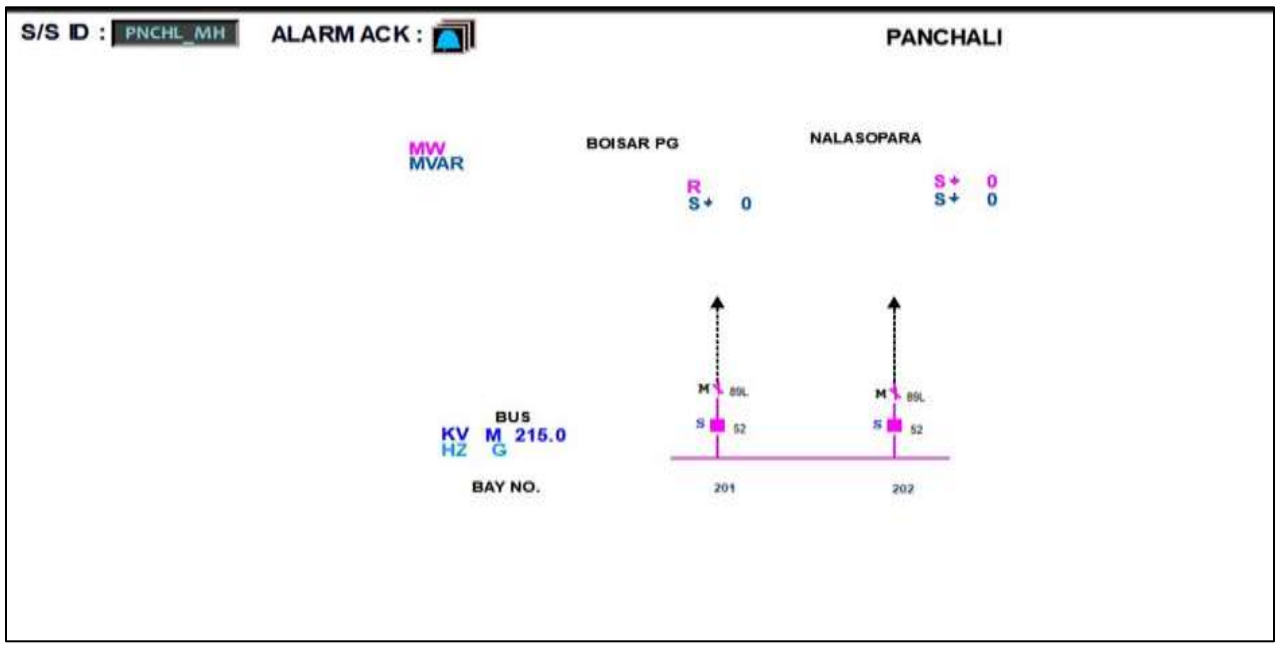
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE from WRLDC-No SOE generated.

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram



***VSNLT shall be read as Padghe**



अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below- MSETCL informed that this Busbar relay is of static type, hence Disturbance recorder data is not available.

अनुलग्नक-D / Annexure-D: Site photographs- Nil

विजय कुमार कोडाली Vijay Kumar Kodali
उप महाप्रबंधक Deputy General Manager
प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र में सितम्बर 2024 के दौरान ग्रिड घटनाओं का विवरण
Details of Grid Events during September 2024 in Western Region

Sl No.	Category of Grid Event (GI 1 or 2/ GD-1 to GD-5)	Time and Date of occurrence of Grid Event	Brief details of the event (pre fault and post fault system conditions)	Page no.
1	GD-1	00:40 / 02-09-2024	220 kV Gadhsisa S/S	1-13
2	GD-1	02:37 / 03-09-2024	220 kV Sayali S/S	14-26
3	GI-2	06:50 / 03-09-2024	400 kV Kakrapar S/S	27-58
4	GD-1	22:40 / 03-09-2024	220 kV Nanavalka S/S	59-69
5	GD-1	11:42 / 04-09-2024	220 kV Morjhar S/S	70-79
6	GD-1	13:10 / 06-09-2024	220 kV Bhawsingpura S/S	80-91
7	GD-1	00:31 / 10-09-2024	220 kV Gadhsisa S/S	92-105
8	GD-1	17:29 / 11-09-2024	220 kV Vapi S/S & 220 kV Sayali S/S	106-117
9	GD-1	17:03 / 15-09-2024	220 kV Shendra S/S	118-137
10	GI-2	15:31 / 17-09-2024	400 kV DGEN S/S	138-148
11	GD-1	15:03 / 19-09-2024	220 kV Dayapar S/S	149-158
12	GD-1	01:03 / 24-09-2024	220 kV Gadhsisa S/S	159-173
Total number of events= 12 (GD-1=10, GI-2=2)				

* Antecedent Generation/Load in the Regional Grid -- one minute prior to the event shall be preferred.

Disclaimer : The Above details are based on the preliminary/flash report of the event and may change after finalisation of the detailed report.The quantum of load/generation loss is based on details given by SLDC and other utilites and may vary later with updated details.

Categorization of Grid Disturbance: Refer Regulation 11(2) of Central Electricity Authority (Grid Standard) Regulations, 2010
GD-I: - When less than ten per cent of the antecedent generation or load in a regional grid is lost.
GD-II:- When ten per cent to less than twenty percent of the antecedent generation or load in a regional grid is lost.
GD-III:- When twenty per cent. to less than thirty per cent. of the antecedent generation or load in a regional grid is lost.
GD-IV:- When thirty per cent. to less than forty per cent. of the antecedent generation or load in a regional grid is lost.
GD-V:- When forty per cent. or more of the antecedent generation or load in a regional grid is lost.

विजय कुमार

विजय कुमार कोडाली /Vijay Kumar Kodali
उपमहाप्रबंधक (प्र.प्र) /DGM (SO)
प.क्षे.भा.प्रे.केंद्र, मुंबई/ WRLDC, Mumbai

ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
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पश्चिमी क्षेत्र के 220 के°वी. गध्सिसा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Gadhsisa of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary:** At 00:40 Hrs / 02-09-2024, 220 kV Bhuj-Gadhsisa tripped on B-E fault which got converted into 3 phase fault before A/R operation. During patrolling spare conductor of other utility (Niorana-junacay line) was lying on 220 kV Bhuj-Gadhsisa. Generation loss of 20 MW occured at Gashsisa (Renew Power) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 00:40 Hrs / 02-09-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Gadhsisa S/S, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.06	60874	49343	6598	14365
घटना के बाद Post Event	50.06	60761	49319	6574	14383

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Generation loss of 20 MW occurred at Gadhsisa (Renew Power)

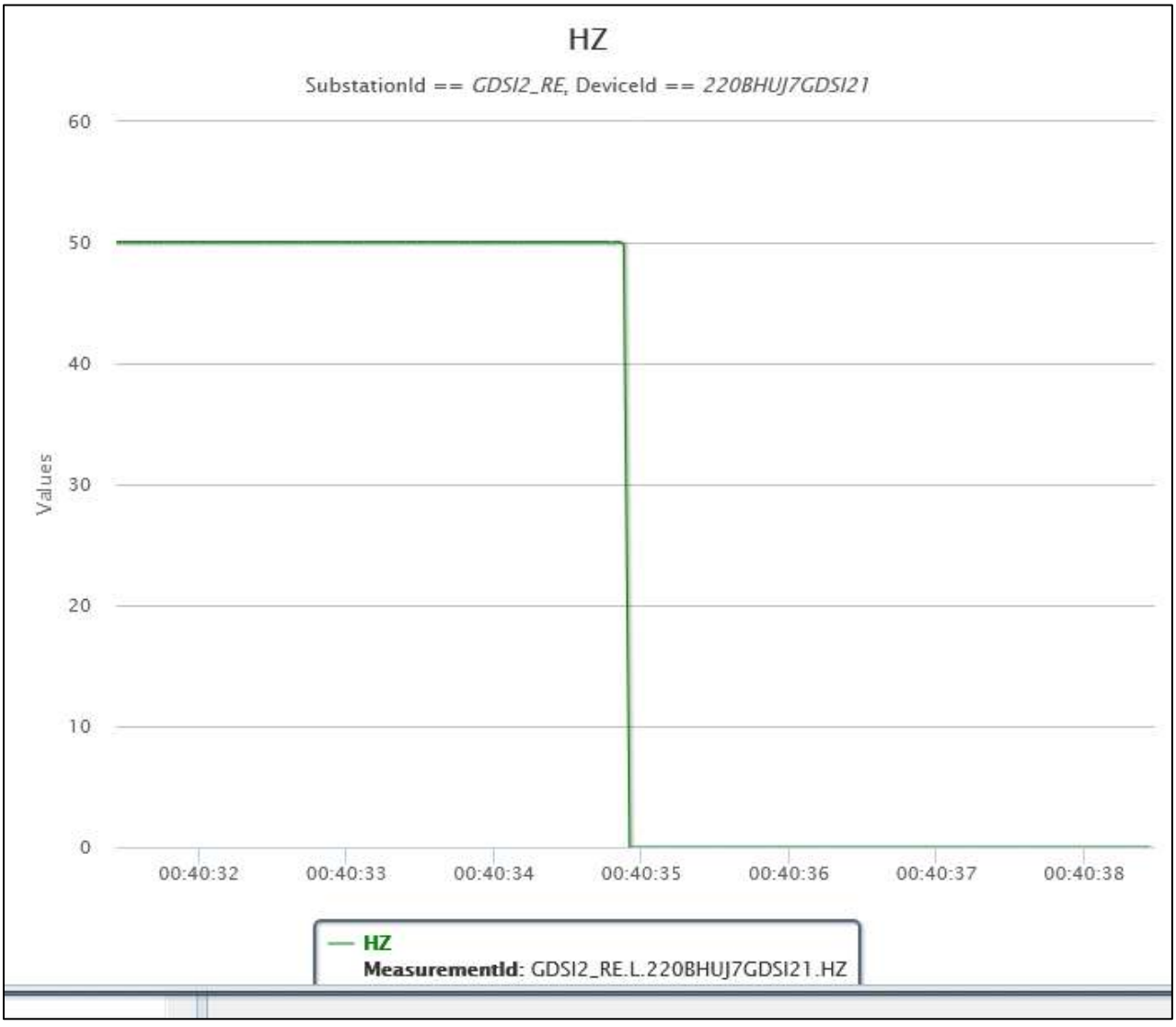


Figure 1. PMU Frequency plot of 220 kV Bhuj- Gadhsisa-1

7. रुकावट की अवधि / Duration of interruption: Gadhsisa- 05 Hrs 30 Minutes.

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

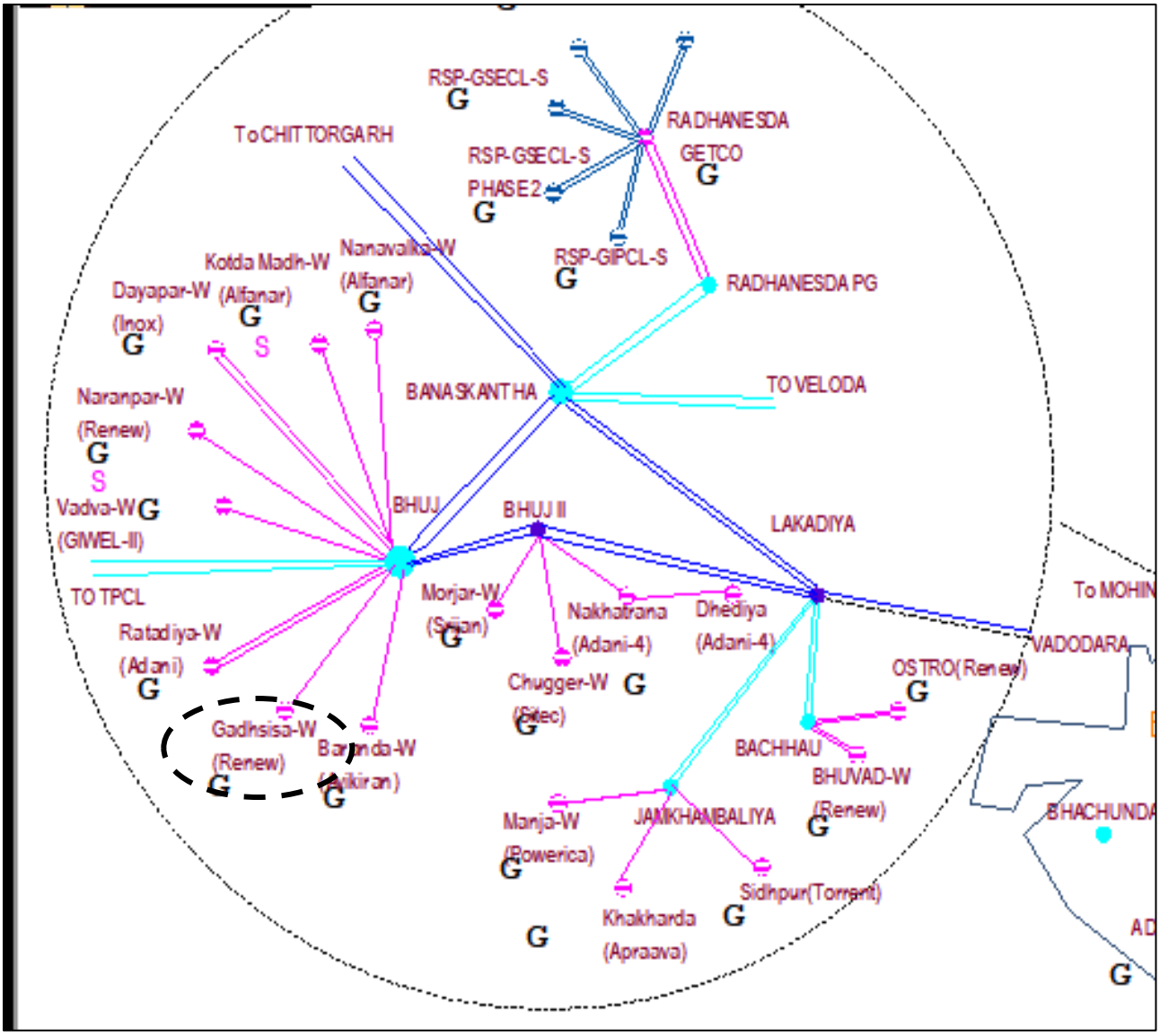


Figure 2. Network across the affected area

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

Nil

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय	रिले संकेत (उप केंद्र-1)	रिले संकेत (उप केंद्र-2)	वापसी का समय

		Tripping time (hh:mm:ss)	Relay Indication (End-1) Gadhsisa	Relay Indication (End-2) Bhuj	Restoration time
1	220kV Bhuj-Gadhsisa s/c	00:40	Main-1- R-Y Phase ,zone -1 – Main-2 - R-Y Phase ,Zone-1 - Other Relay indications- 86A, 86B	Z-1 M-1-41.8km M-2-Bph fault, 23.87KM	06:12

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

- First of all fault came in B-phase and A/R started. But before A/R operation fault appeared in R-Y phase also and all 3 phases got tripped.

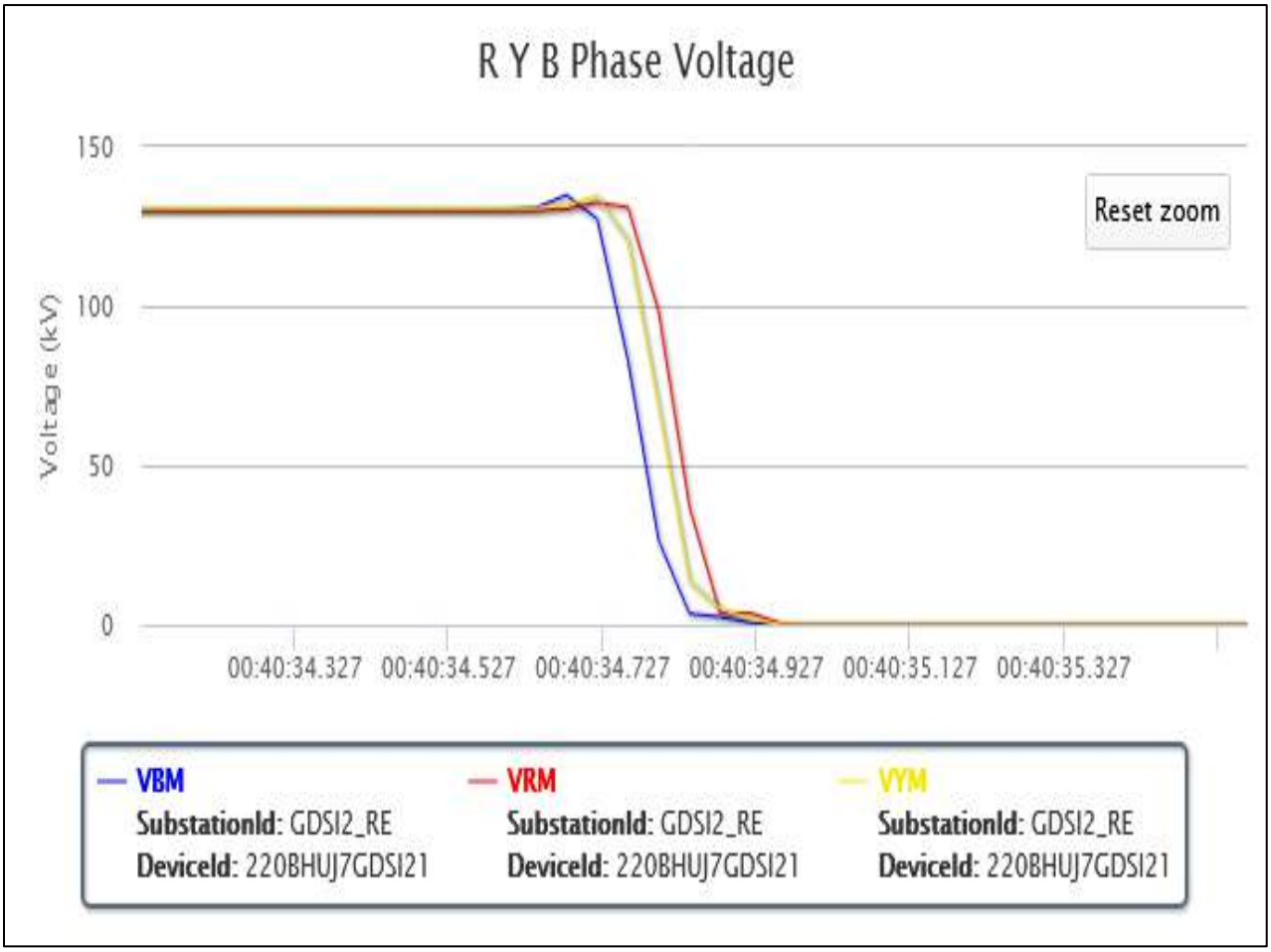


Figure 3. PMU Voltage plot of 220 kV Bhuj- Gadhsisa-1

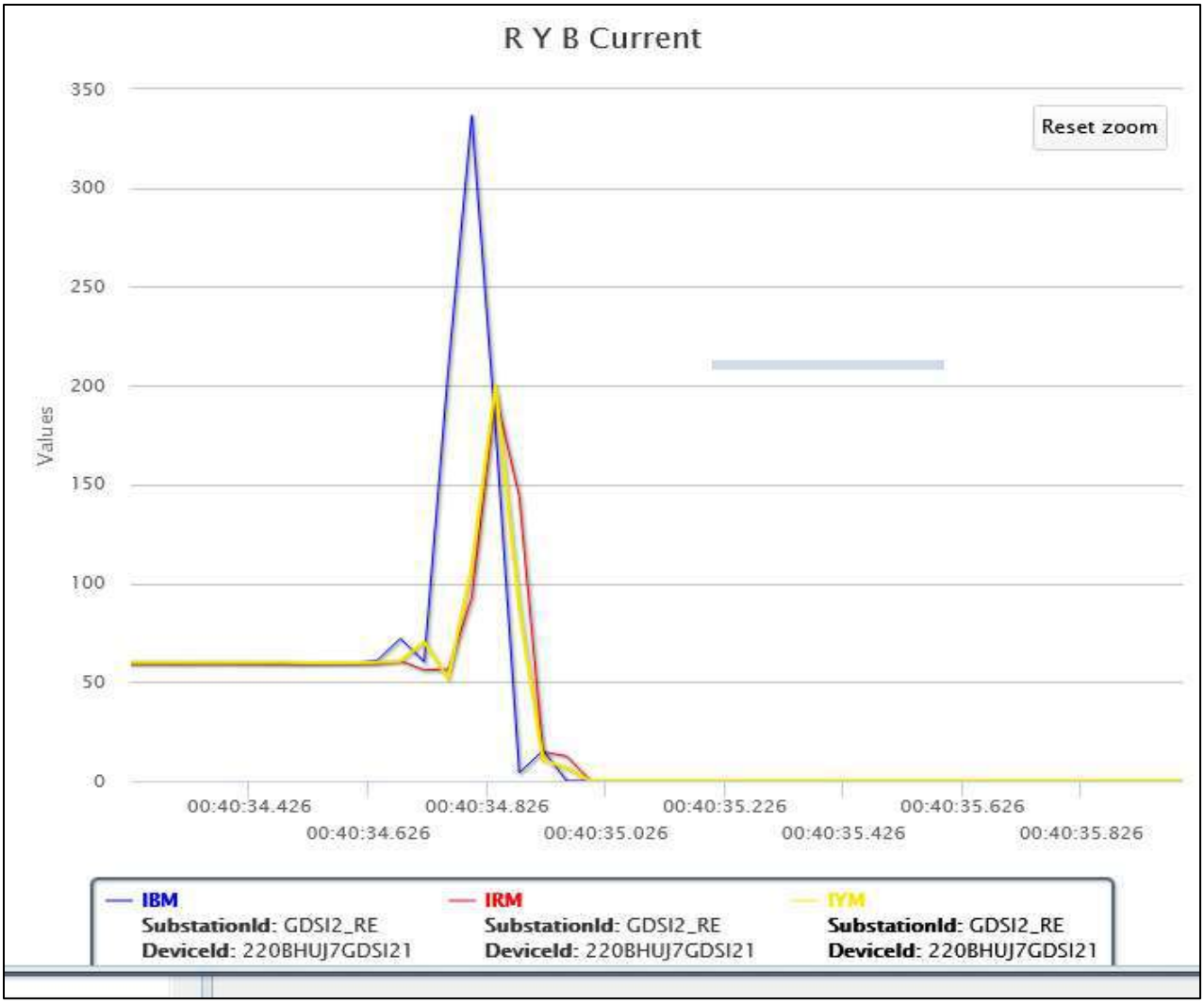


Figure 4. PMU Current plot of 220 kV Bhuj- Gadhsisa-1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- DR not time sync at Gadhsisa.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Gadhsisa, Renew power may kindly fix the issue of time sync of DR.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities

1	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not Submitted in .cfg/.dat format by Renew-Gadhsisa.
2	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received.
3	DR Time Synchronization Issues	IEGC section 17.3	DR not time sync at GADHSISA end. Renew Power may kindly look into this

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC –

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23452 (GDSI2) OPEN	00:40:34	865
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23452 (GDSI2) OPEN	00:40:34	865
WRLDC	220KV-CB	GDSI2_RE	GADHSISA CB 20252 (BHUJ7) OPEN	00:40:35	675

SOE from Gadhsisa-

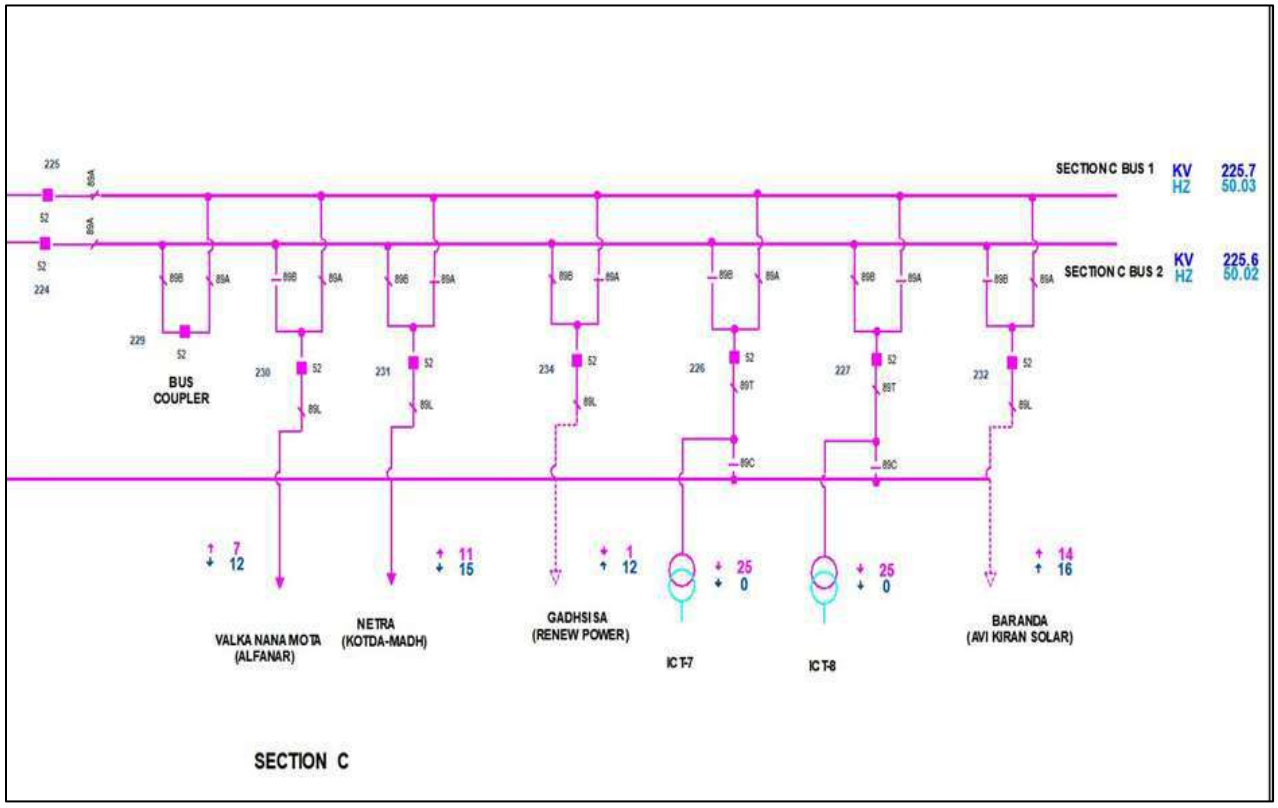
Events List

Channel Number	Name	Status	Time
44	PHS-STFWL3	On	9/2/2024 12:42:29.105 AM
93	PHS-STNDL3	On	9/2/2024 12:42:29.105 AM
94	PHS-STFWPE	On	9/2/2024 12:42:29.105 AM
25	ZM03-START	On	9/2/2024 12:42:29.111 AM
79	ZM03-STND	On	9/2/2024 12:42:29.111 AM
13	CAR RECV CH-2	On	9/2/2024 12:42:29.112 AM
70	TEF1-START	On	9/2/2024 12:42:29.116 AM
7	MAIN-1 TRIP	On	9/2/2024 12:42:29.120 AM
23	ZM02-START	On	9/2/2024 12:42:29.120 AM
32	ZCOM-TRIP	On	9/2/2024 12:42:29.120 AM
33	MAIN/TBC CB-T	On	9/2/2024 12:42:29.120 AM
36	MAIN/TBC CB-T	On	9/2/2024 12:42:29.120 AM
68	AR01-START	On	9/2/2024 12:42:29.120 AM
76	ZM02-STL3	On	9/2/2024 12:42:29.120 AM
78	ZM02-STND	On	9/2/2024 12:42:29.120 AM
12	CAR RECV CH-1	On	9/2/2024 12:42:29.128 AM
70	TEF1-START	Off	9/2/2024 12:42:29.140 AM
70	TEF1-START	On	9/2/2024 12:42:29.148 AM
23	ZM02-START	Off	9/2/2024 12:42:29.156 AM
76	ZM02-STL3	Off	9/2/2024 12:42:29.156 AM
78	ZM02-STND	Off	9/2/2024 12:42:29.156 AM
23	ZM02-START	On	9/2/2024 12:42:29.162 AM
34	MAIN/TBC CB-T	On	9/2/2024 12:42:29.162 AM
35	MAIN/TBC CB-T	On	9/2/2024 12:42:29.162 AM
37	MAIN/TBC CB-T	On	9/2/2024 12:42:29.162 AM
43	PHS-STFWL2	On	9/2/2024 12:42:29.162 AM
75	ZM02-STL2	On	9/2/2024 12:42:29.162 AM
76	ZM02-STL3	On	9/2/2024 12:42:29.162 AM
78	ZM02-STND	On	9/2/2024 12:42:29.162 AM
92	PHS-STNDL2	On	9/2/2024 12:42:29.162 AM

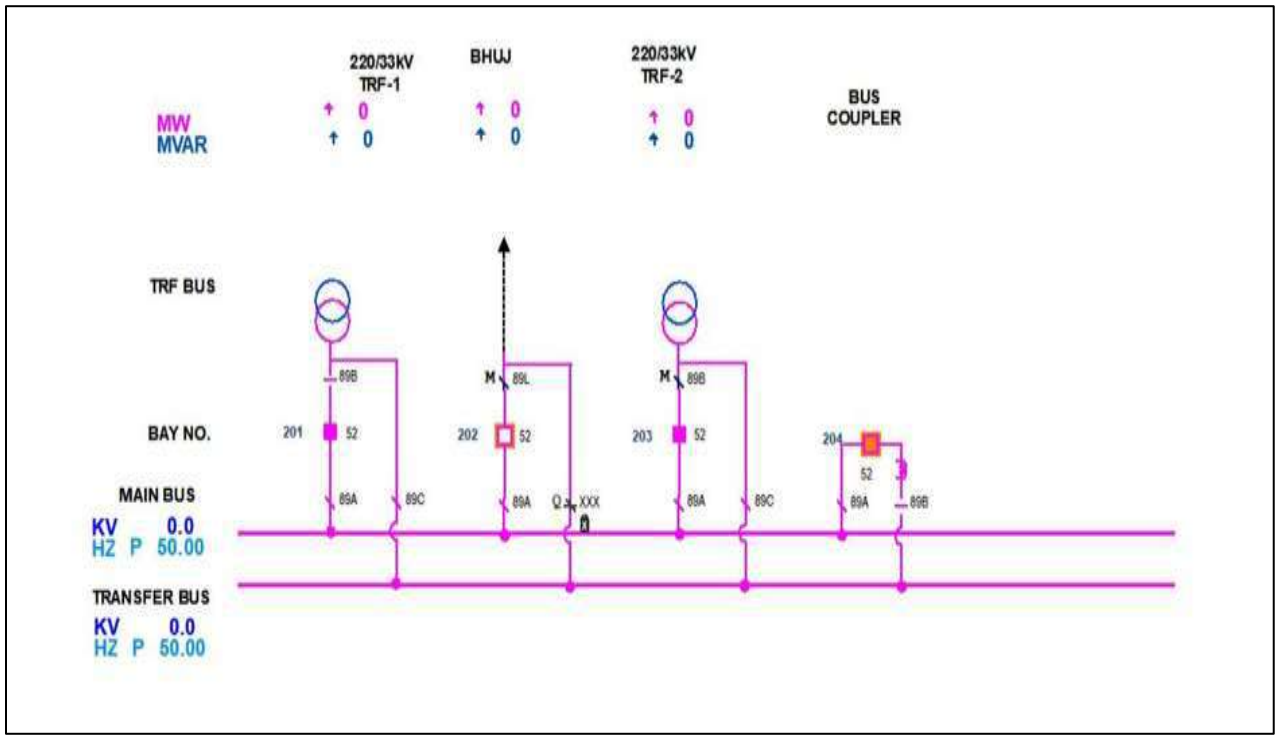
70	TEF1-START	Off	9/2/2024 12:42:29.164 AM
12	CAR RECV CH-1	Off	9/2/2024 12:42:29.167 AM
3	MAIN_BPH_OP	On	9/2/2024 12:42:29.173 AM
42	PHS-STFWL1	On	9/2/2024 12:42:29.177 AM
91	PHS-STNDL1	On	9/2/2024 12:42:29.177 AM
44	PHS-STFWL3	Off	9/2/2024 12:42:29.183 AM
74	ZM02-STL1	On	9/2/2024 12:42:29.183 AM
75	ZM02-STL2	Off	9/2/2024 12:42:29.183 AM
76	ZM02-STL3	Off	9/2/2024 12:42:29.183 AM
38	PREP_3PH_TRIP	On	9/2/2024 12:42:29.186 AM
73	PERMIT 1-PH T	On	9/2/2024 12:42:29.186 AM
75	ZM02-STL2	On	9/2/2024 12:42:29.186 AM
85	ZM05-STND	On	9/2/2024 12:42:29.186 AM
22	ZM01-TRIP	On	9/2/2024 12:42:29.189 AM
39	ZM01-START	On	9/2/2024 12:42:29.189 AM
59	ZM01-TRL1	On	9/2/2024 12:42:29.189 AM
77	ZM01-STND	On	9/2/2024 12:42:29.189 AM
86	ZCOM-CS	On	9/2/2024 12:42:29.189 AM
93	PHS-STNDL3	Off	9/2/2024 12:42:29.189 AM
30	M-1/2 CAR SEN	On	9/2/2024 12:42:29.192 AM
2	MAIN_YPH_OP	On	9/2/2024 12:42:29.210 AM
85	ZM05-STND	Off	9/2/2024 12:42:29.210 AM
1	MAIN_RPH_OP	On	9/2/2024 12:42:29.214 AM
2	MAIN_YPH_OP	Off	9/2/2024 12:42:29.214 AM
2	MAIN_YPH_OP	On	9/2/2024 12:42:29.216 AM
1	MAIN_RPH_OP	Off	9/2/2024 12:42:29.219 AM
22	ZM01-TRIP	Off	9/2/2024 12:42:29.219 AM
39	ZM01-START	Off	9/2/2024 12:42:29.219 AM
43	PHS-STFWL2	Off	9/2/2024 12:42:29.219 AM
59	ZM01-TRL1	Off	9/2/2024 12:42:29.219 AM
75	ZM02-STL2	Off	9/2/2024 12:42:29.219 AM
77	ZM01-STND	Off	9/2/2024 12:42:29.219 AM
1	MAIN_RPH_OP	On	9/2/2024 12:42:29.220 AM
23	ZM02-START	Off	9/2/2024 12:42:29.222 AM
25	ZM03-START	Off	9/2/2024 12:42:29.222 AM
42	PHS-STFWL1	Off	9/2/2024 12:42:29.222 AM
74	ZM02-STL1	Off	9/2/2024 12:42:29.222 AM
92	PHS-STNDL2	Off	9/2/2024 12:42:29.222 AM
94	PHS-STFWPE	Off	9/2/2024 12:42:29.222 AM
78	ZM02-STND	Off	9/2/2024 12:42:29.228 AM
79	ZM03-STND	Off	9/2/2024 12:42:29.228 AM
91	PHS-STNDL1	Off	9/2/2024 12:42:29.234 AM
32	ZCOM-TRIP	Off	9/2/2024 12:42:29.249 AM
68	AR01-START	Off	9/2/2024 12:42:29.249 AM
13	CAR RECV CH-2	Off	9/2/2024 12:42:29.252 AM
86	ZCOM-CS	Off	9/2/2024 12:42:29.291 AM
30	M-1/2 CAR SEN	Off	9/2/2024 12:42:29.294 AM
7	MAIN-1 TRIP	Off	9/2/2024 12:42:29.333 AM
33	MAIN/TBC CB-T	Off	9/2/2024 12:42:29.333 AM
34	MAIN/TBC CB-T	Off	9/2/2024 12:42:29.333 AM
35	MAIN/TBC CB-T	Off	9/2/2024 12:42:29.333 AM
36	MAIN/TBC CB-T	Off	9/2/2024 12:42:29.333 AM
37	MAIN/TBC CB-T	Off	9/2/2024 12:42:29.333 AM

अनुलग्नक-2 / Annexure-2:

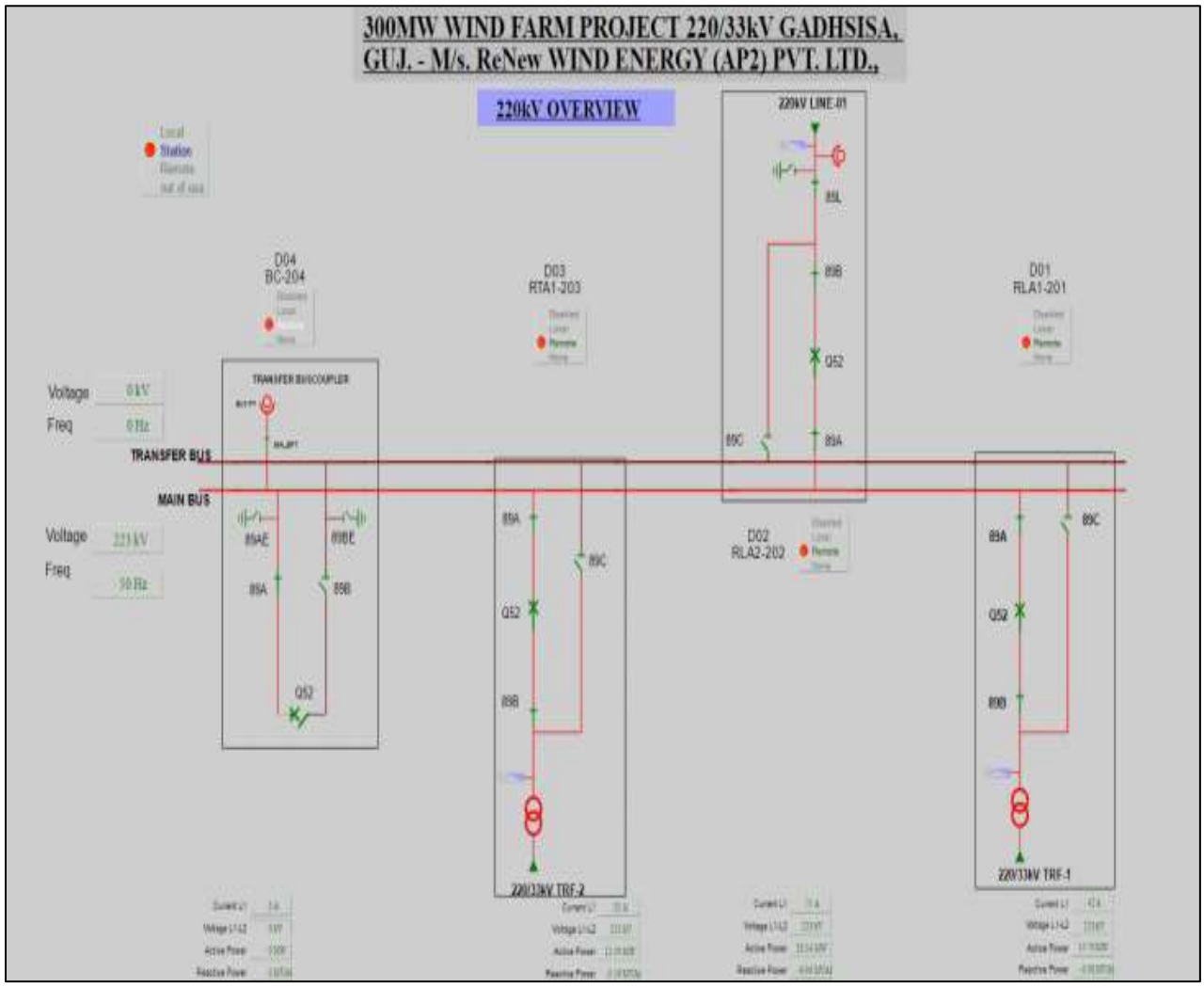
220kV Bhuj SLD:



220kV Gadhsisa SLD:

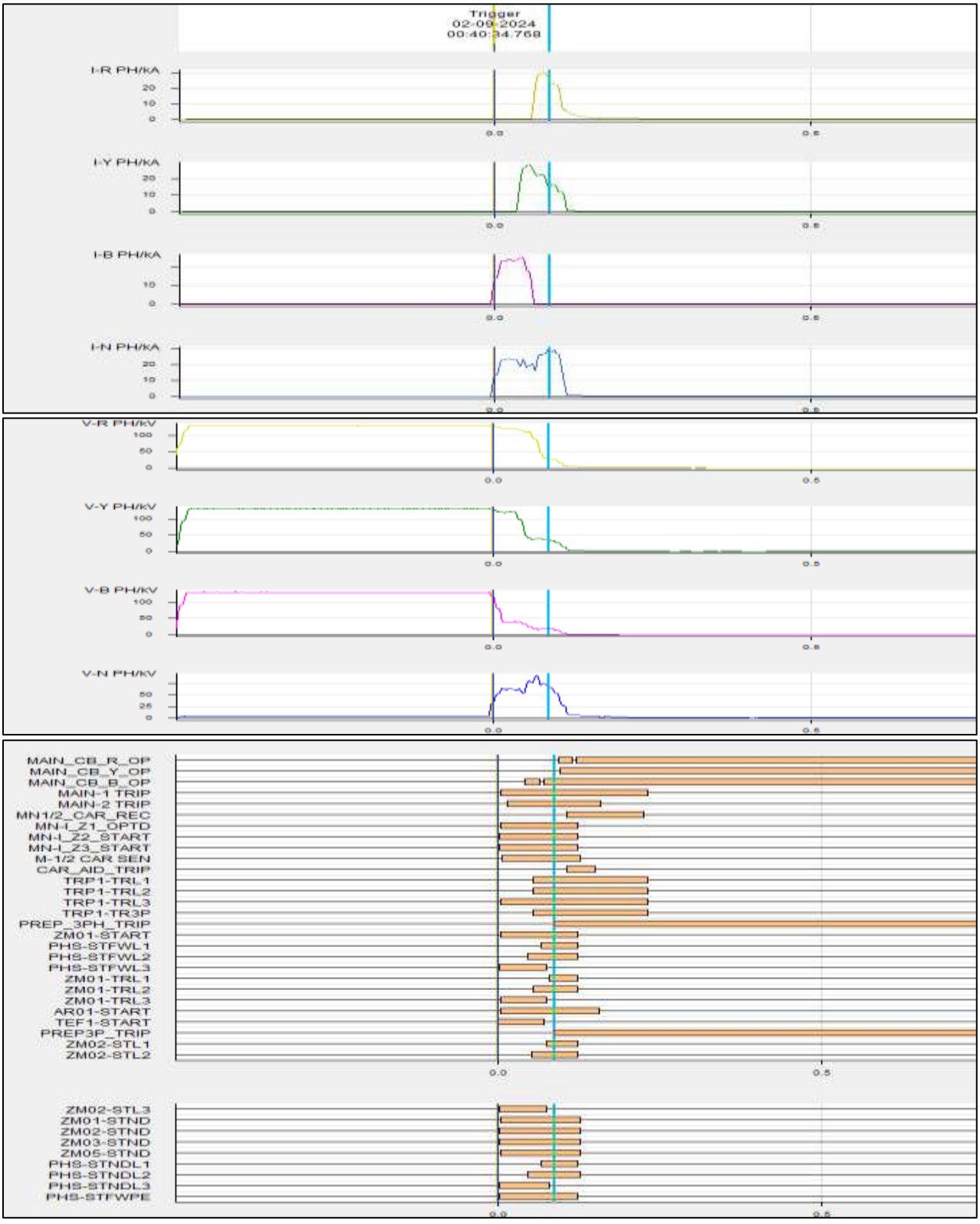


SLD from Gadhsisa RENEW-

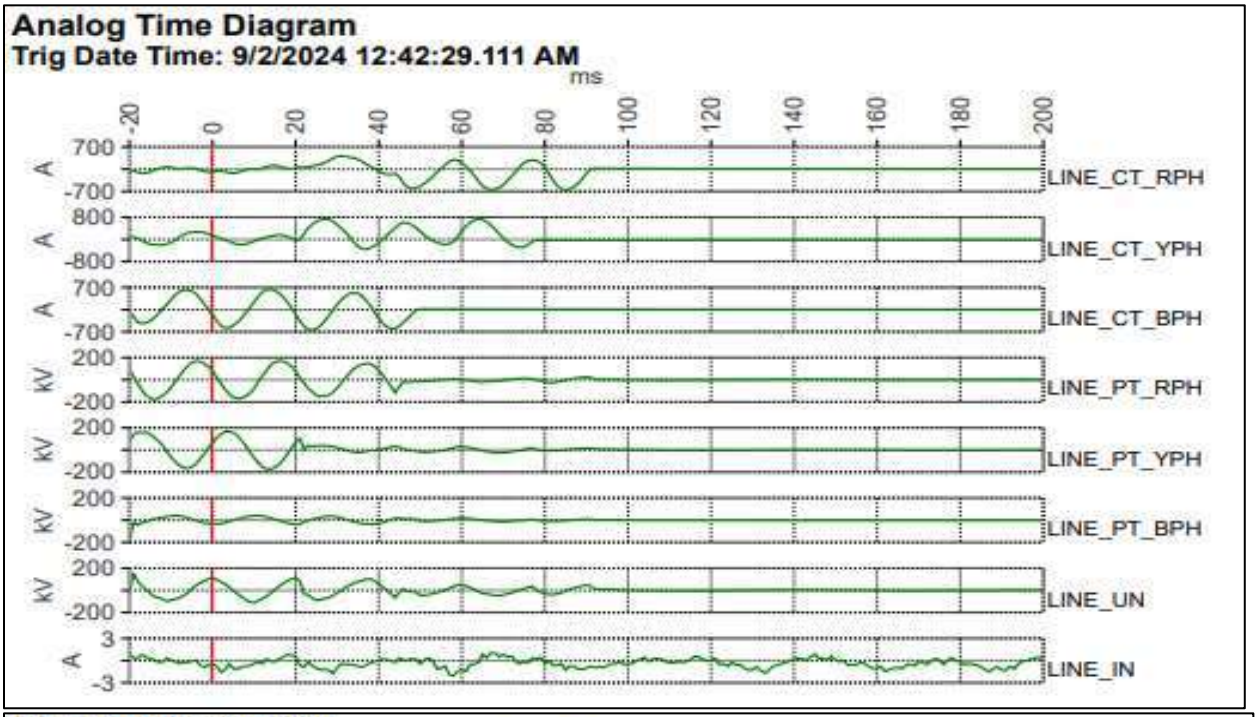


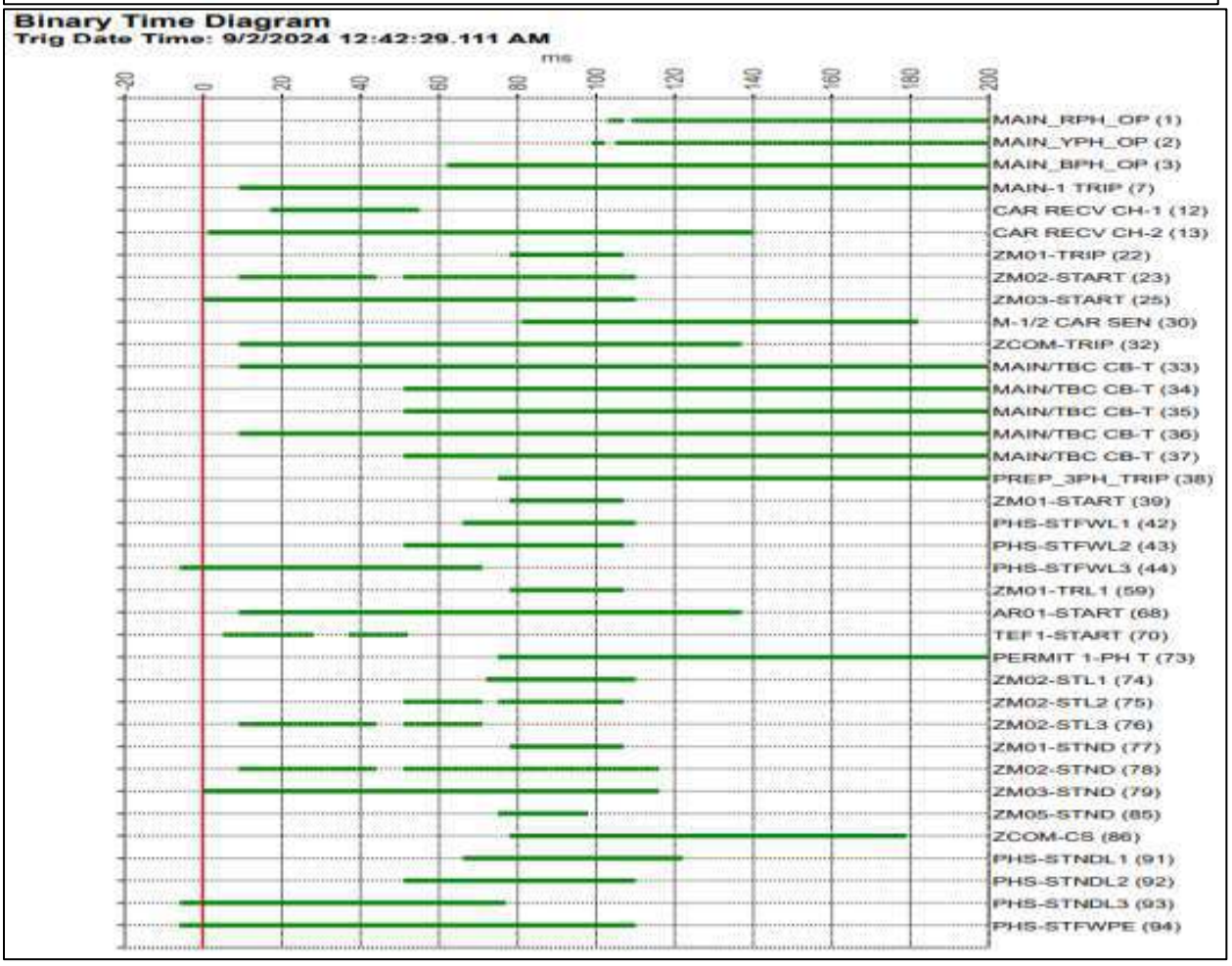
अनुलग्नक-3 / Annexure-3: Disturbance recorder –

A. DR of 220 kV Bhuj- Gadhsisa -1 Line from Bhuj end



B. DR of 220 kV Bhuj- Gadhsisa -1 Line from Gadhsisa end





अनुलग्नक – 4 / Annexure-4 Any other photographs from Gadhsisa-Nil

Vijay Kumar Kodali

DGM, SO WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. नानावल्का उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nanavalka of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary**: At 22:40 Hrs / 03-09-2024, As informed by Alfanar, 220 kV Bhuj-Nanavalka tripped on B-E fault, but is seen from DRs that fault current appeared in R & Y phase also. During patrolling it was found by Alfanar, that the suspension insulator on Tower No. 39/0 B phase and Tower- No 36/0 Y phase Tension insulator had failed.

   Multiple test charging were taken but line tripped on SOTF. It is inferred that thorough patrolling had not been carried out before attempting test charging. Generation loss of 6 MW occured at Nanavalka (Alfanar) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 22:40 Hrs / 03-09-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nanavalka, (Gujarat)
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.02	64249	54841	6856	15529

घटना के बाद Post Event	50.03	64190	54664	6843	15516

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 6 MW occurred at Nanavalka (Alfanar) Wind Power plant.

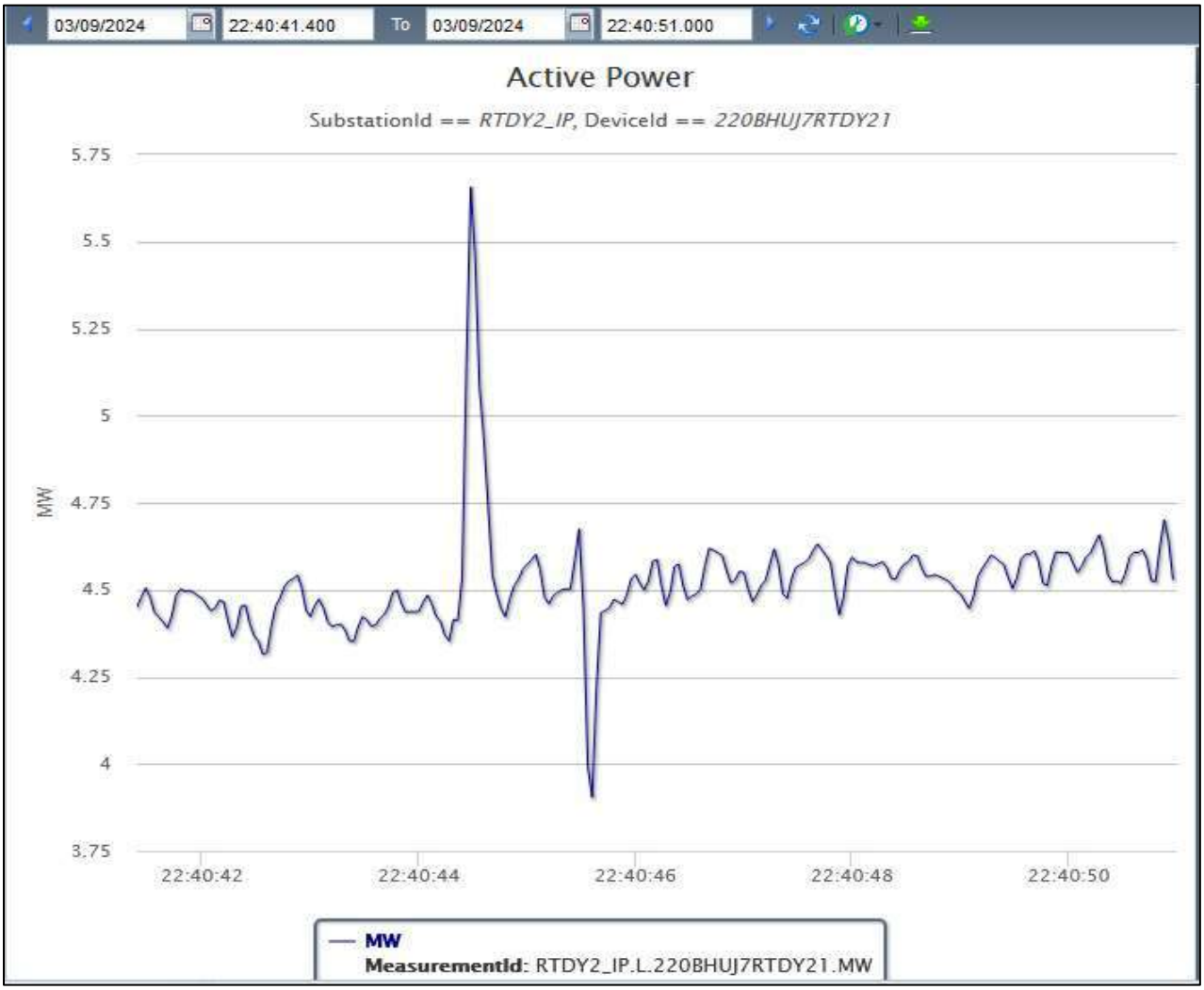


Figure 1. 220 kV Bhuj-Ratadiya-1 Active Power Line Plot

7. **रुकावट की अवधि / Duration of interruption:** 16 hours 56 minutes.

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

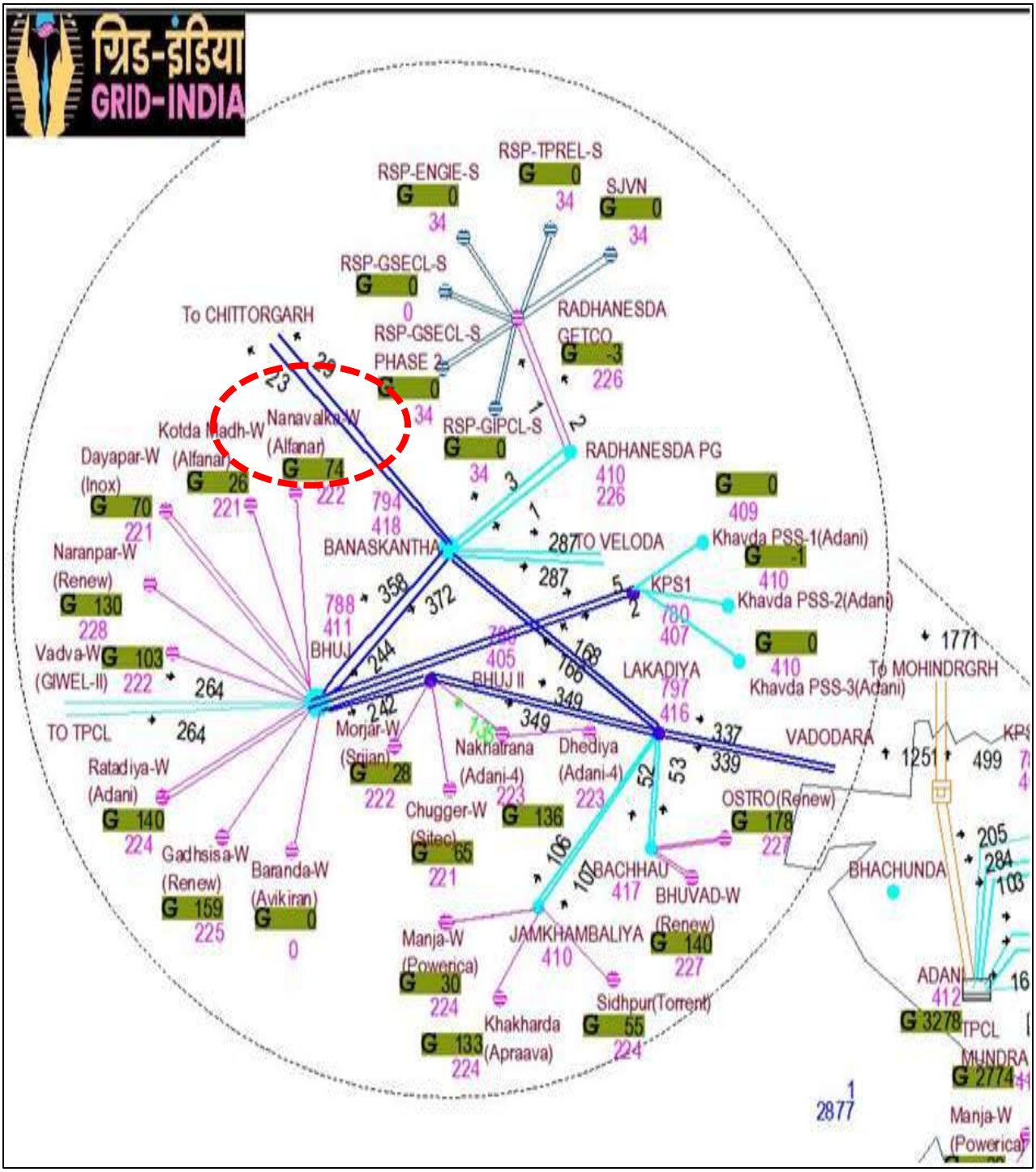


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nanavalka	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1	220 kV Bhuj-Nanavalka(Alfanar) S/C	22:40 / 03-09-2024	Tripped due to B-E fault. IB-0.639 A Zone-1 Fault Distance – 4.537 Km	IB-2525.760 A Zone-1 Fault Distance – 67.0 Km	15:36 / 04-09-2024

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

- As informed by Alfanar, 220 kV Bhuj-Nanavalka tripped on B-E fault (Fault current approx. 3.5 kA), but is seen from DRs that fault current appeared in R & Y phase also. During patrolling it was found by Alfanar, that the suspension insulator on Tower No. 39/0 B phase and Tower- No 36/0 Y phase Tension insulator had failed.

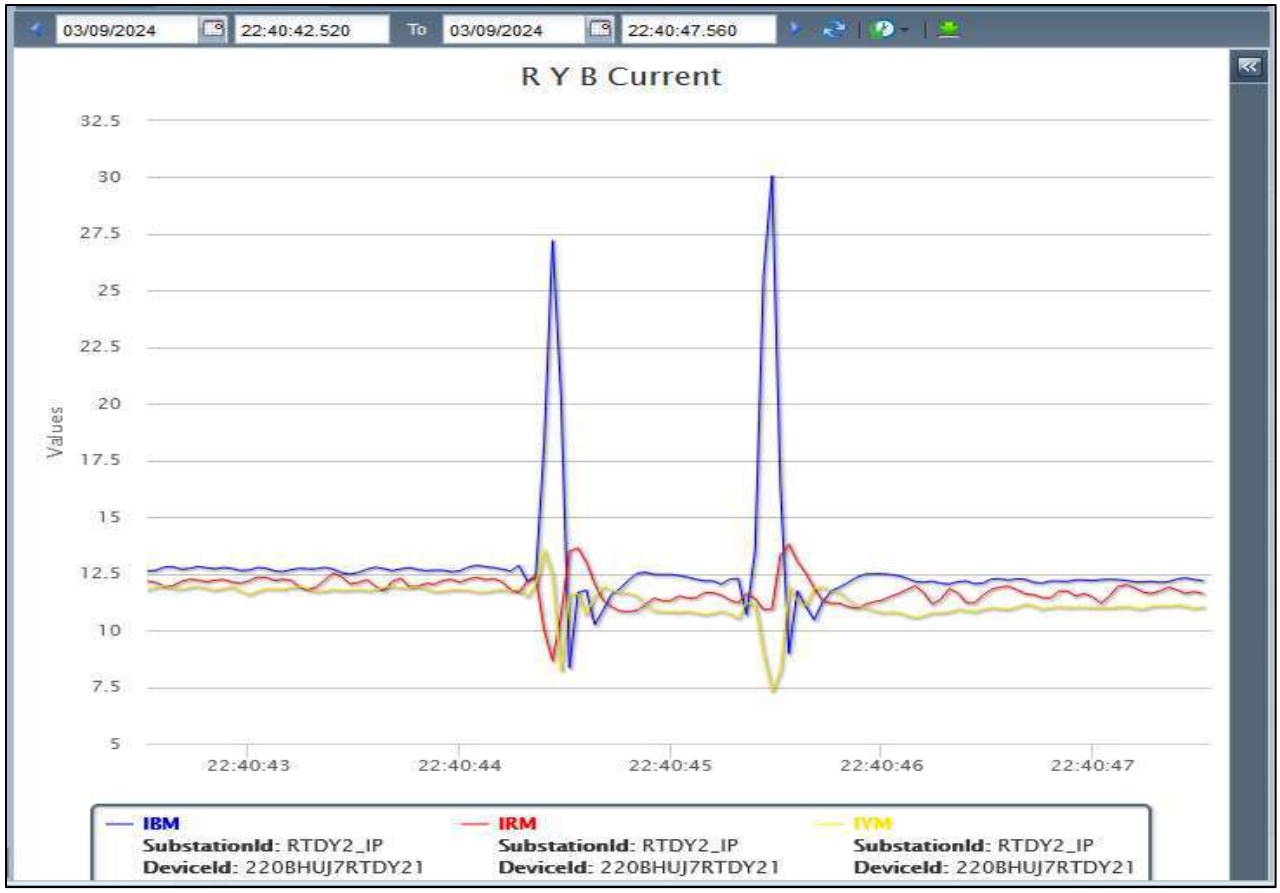


Figure 3. 220 kV Bhuj- Ratadiya -1 Current Plot

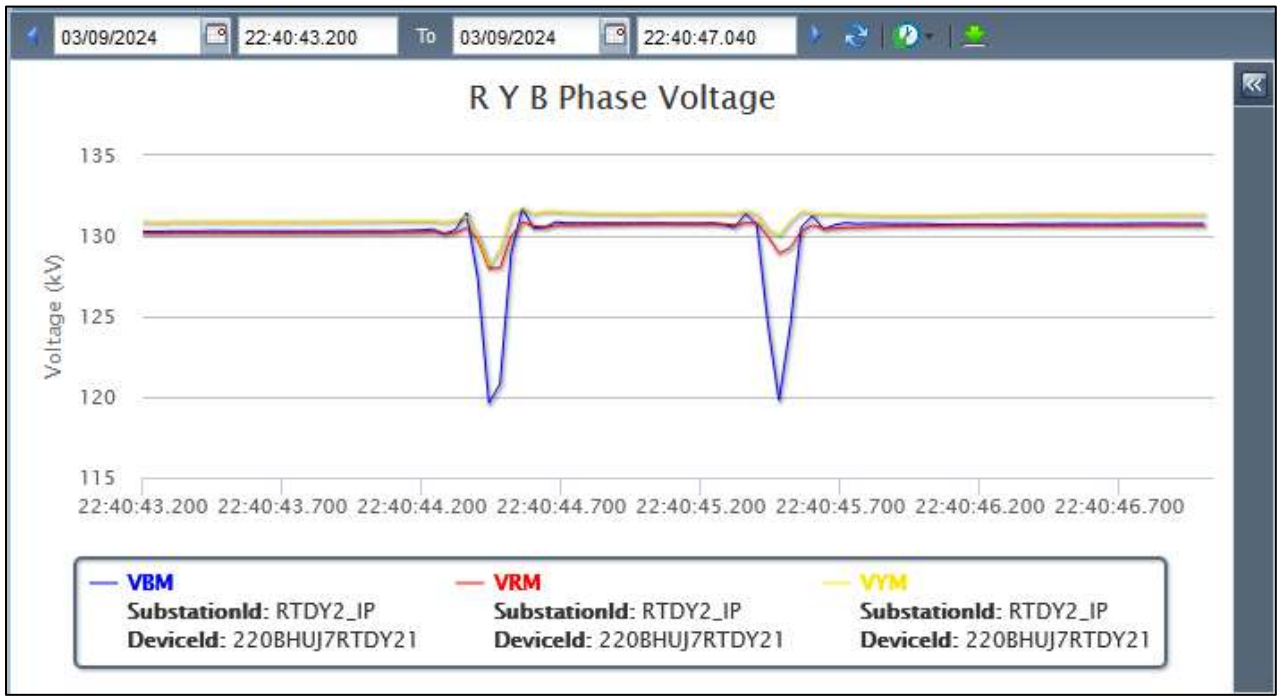


Figure 4. 220 kV Bhuj- Ratadiya -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Multiple test charging were taken but line tripped on SOTF. It is inferred that thorough patrolling had not been carried out before attempting test charging.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Line restored after insulator replacement.
- In case of SOTF, charging attempt should not be made without thorough patrolling. Healthiness to be ensured before attempting test charging in future.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from Nanavalka, Alfanar
2.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Nanavalka, Alfanar

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

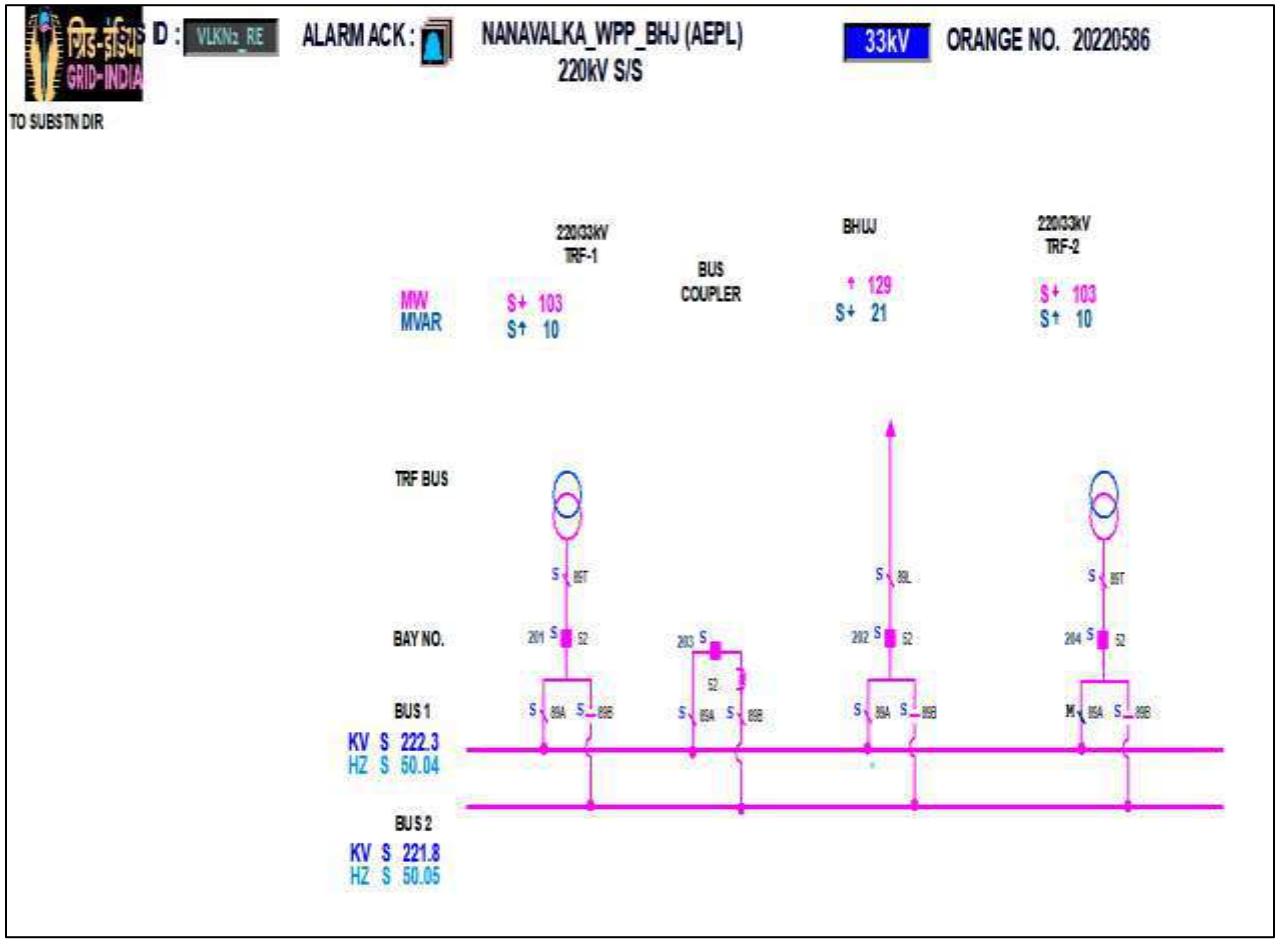
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) TRANSIT	22:40:44	500
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 23052 (VLKN2) ACTED	22:40:45	502
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) CLOSED	22:40:45	440
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) OPEN	22:40:45	520

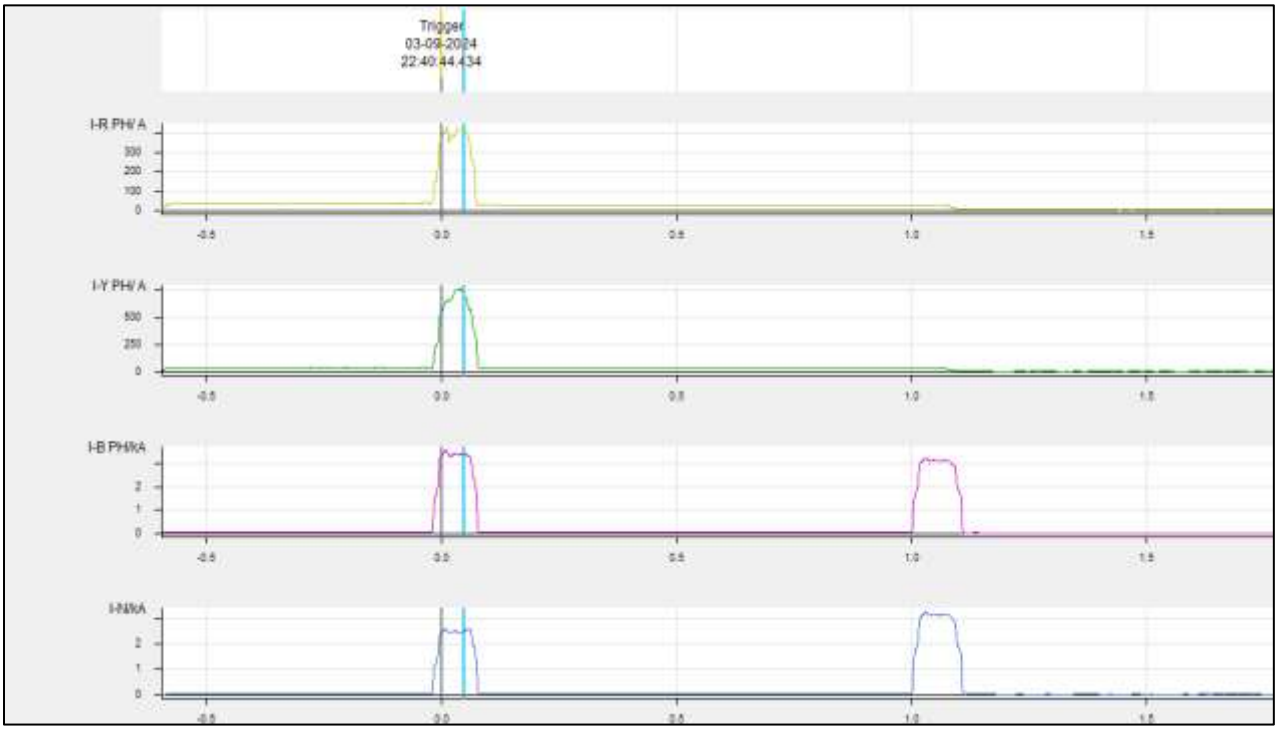
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

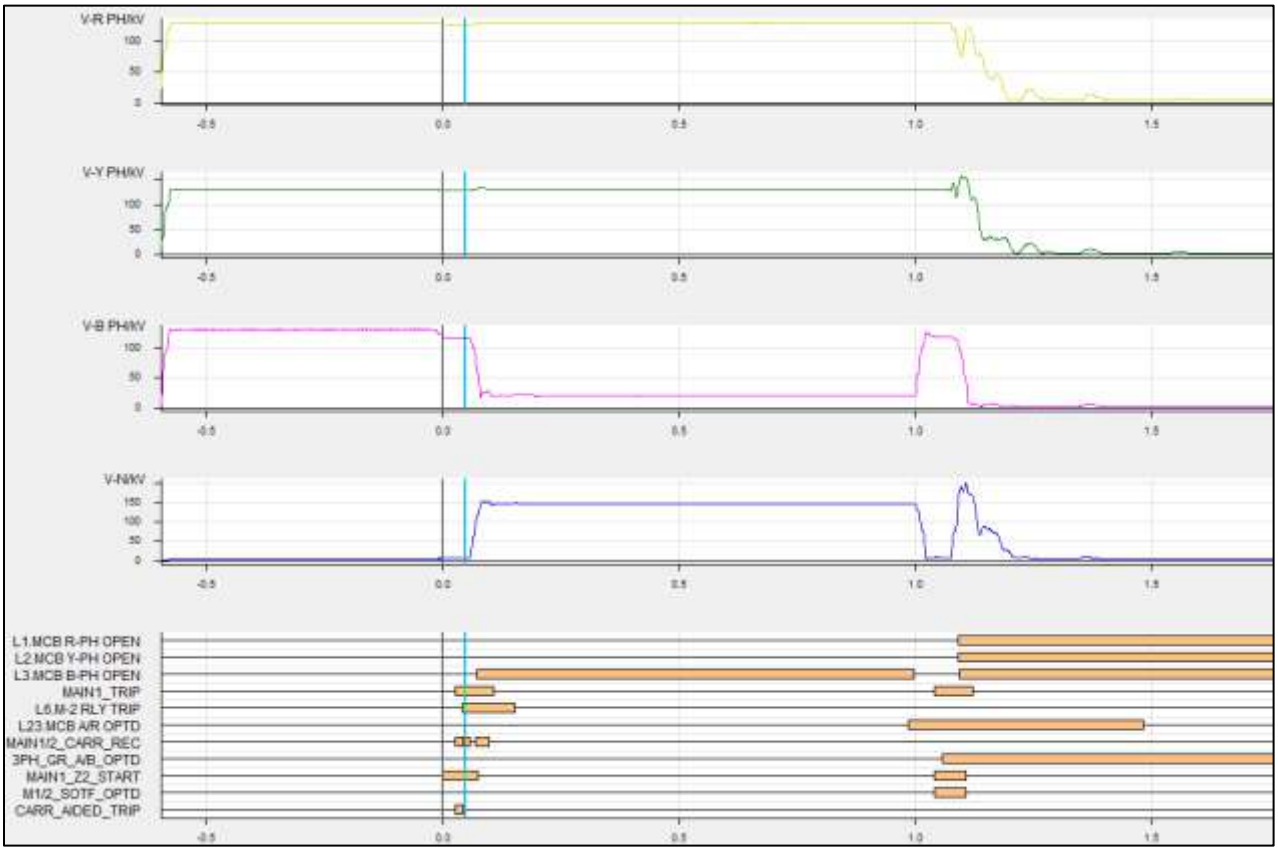
220 kV Nanavlka SLD-



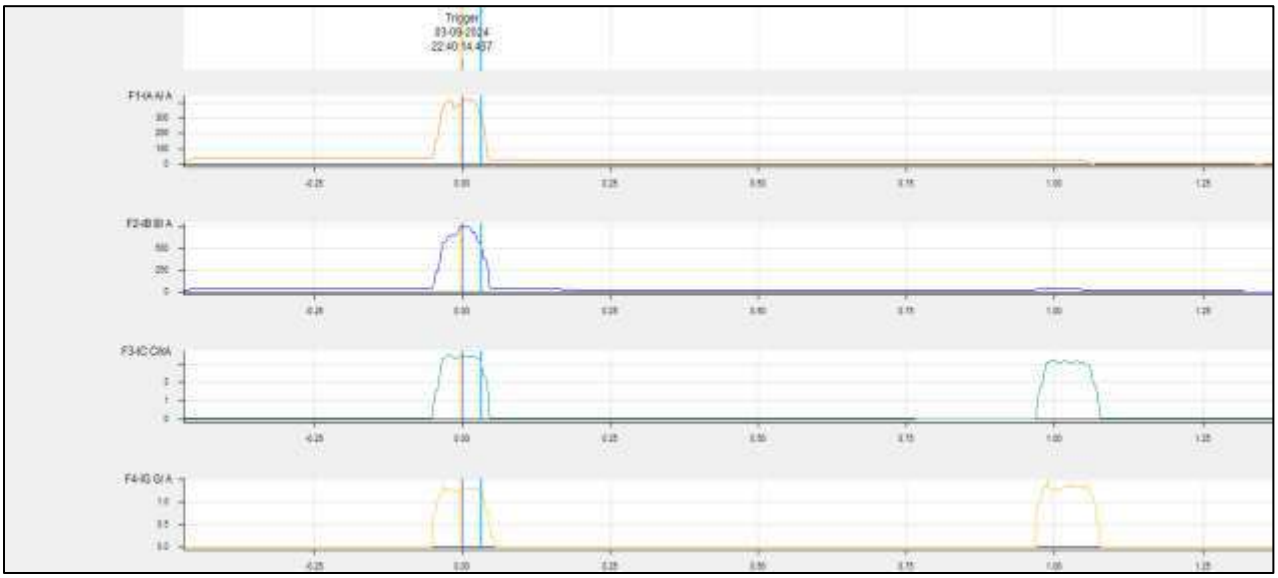
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

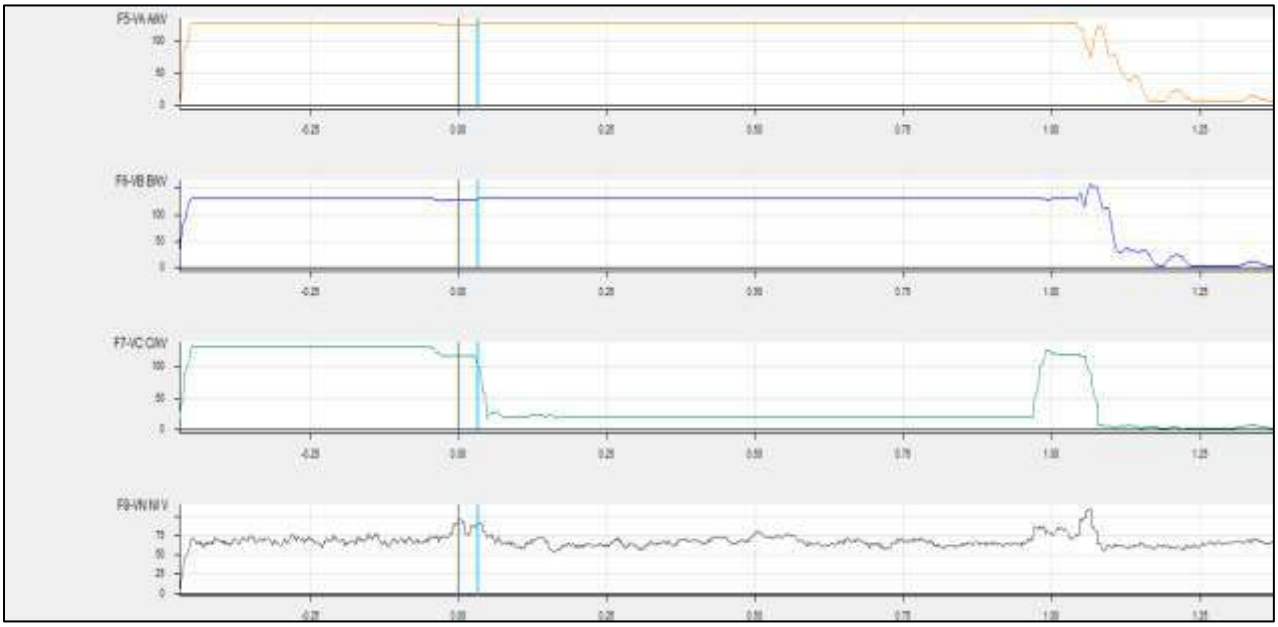
A. DR of 220 kV Bhuj-Nanavalka -1 at Bhuj end

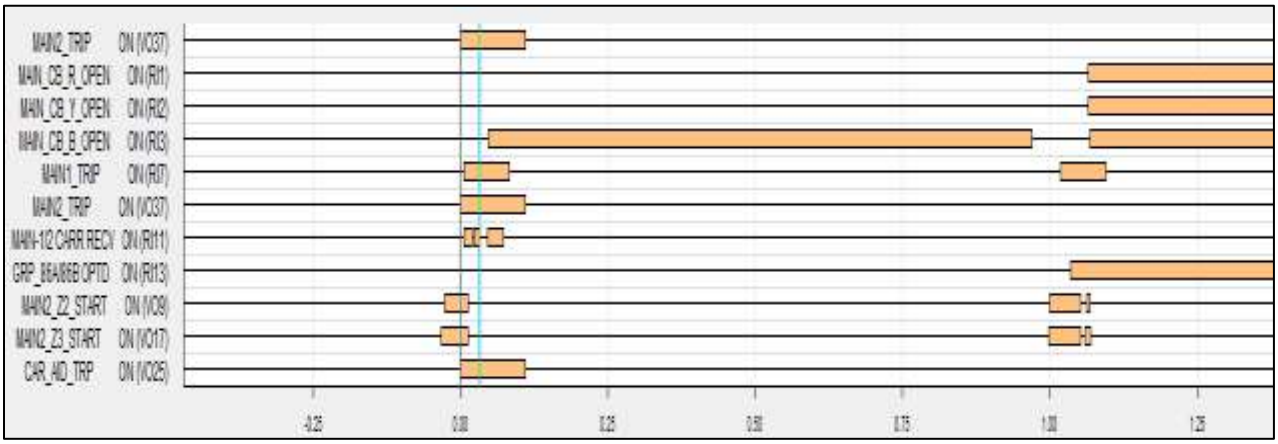


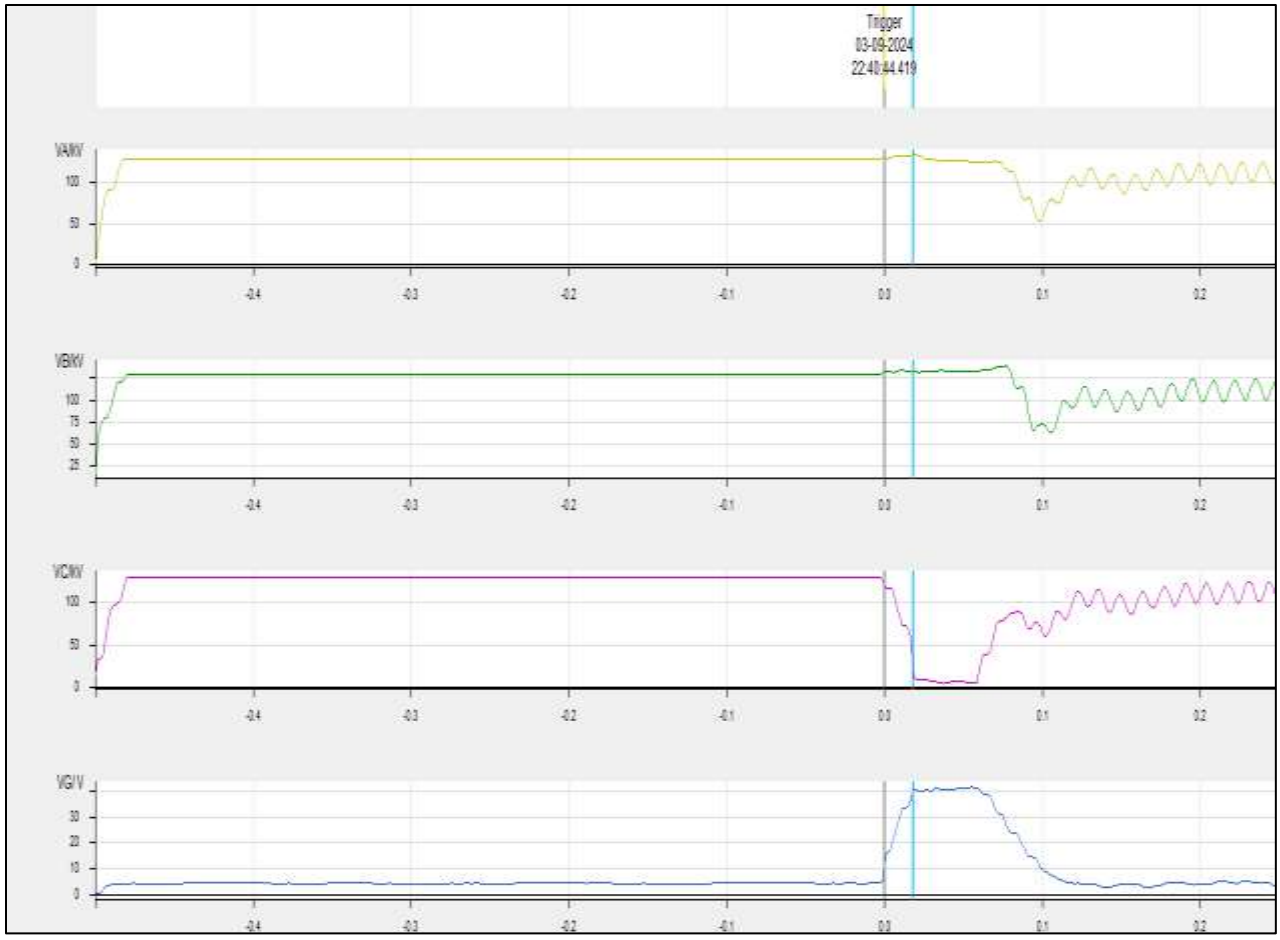


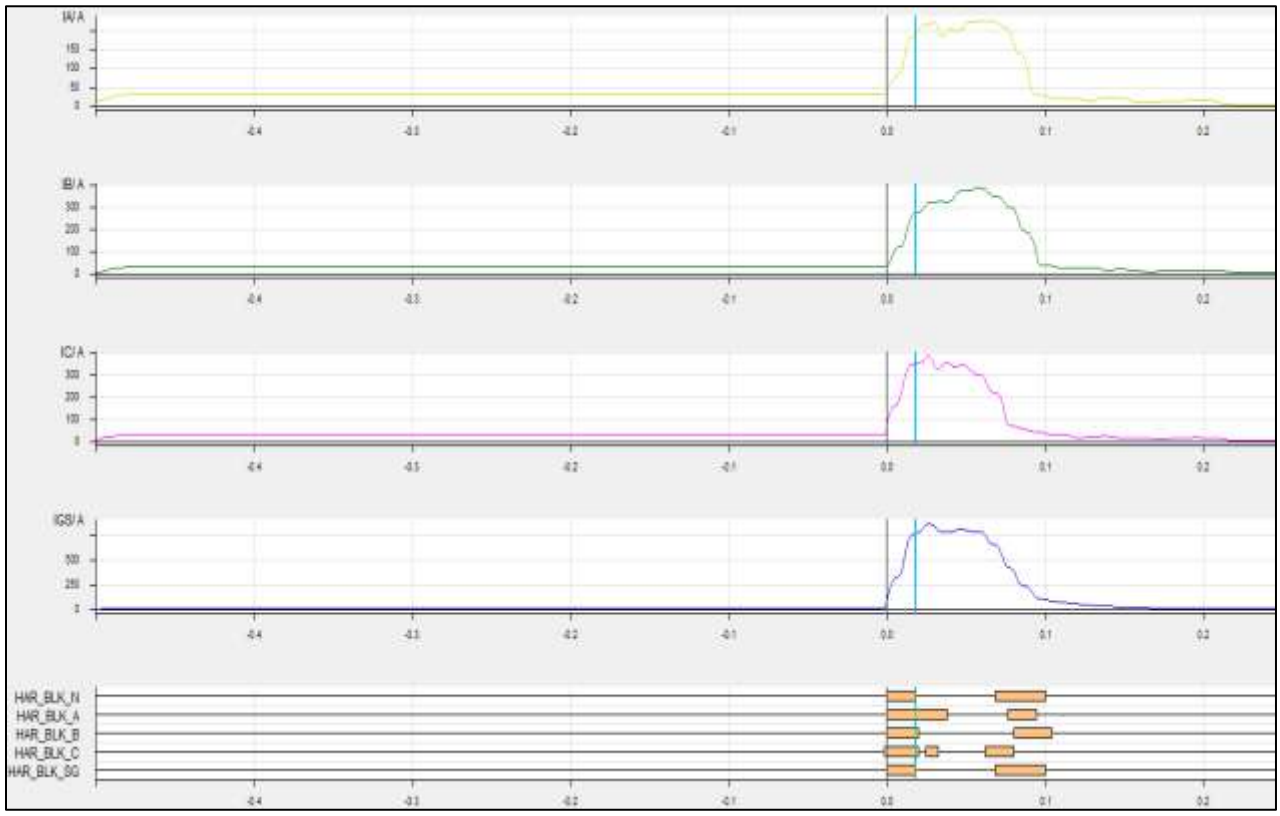
B. DR of 220 kV Bhuj-Nanavalka -1 at Nanavalka end








Trigger
03-09-2024
22:40:44.419
VA/kV
VB/kV
VC/kV
VG/V


IA/A
IB/A
IC/A
IGS/A
HAR_BLK_N
HAR_BLK_A
HAR_BLK_B
HAR_BLK_C
HAR_BLK_SG

अनुलग्नक-D / Annexure-D: Site photographs – (Insulator failure)



के विजय कुमार

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. सृजन मोरझर पवन आर ई उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Srijan Morjhar Wind RE of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary:** At 11:42 Hrs / 04-09-2024, 220 kV Bhuj II-Morjar (Srijan) tripped on R-E fault. During patrolling it was found that a tension insulator failed at tower number AP-05A .Generation loss of 31 MW occured at Morjar (Srijan) Wind Power plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 11:42 Hrs / 04-09-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Srijan Morjhar, Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.05	61815	55037	8345	14684
घटना के बाद Post Event	50.05	61632	54786	8335	14719

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Rainy and windy

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 31 MW at Srijan Morjhar RE.



Figure 1. 220 kV Bhuj- KBTL-2 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 28 hours 17 minutes

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

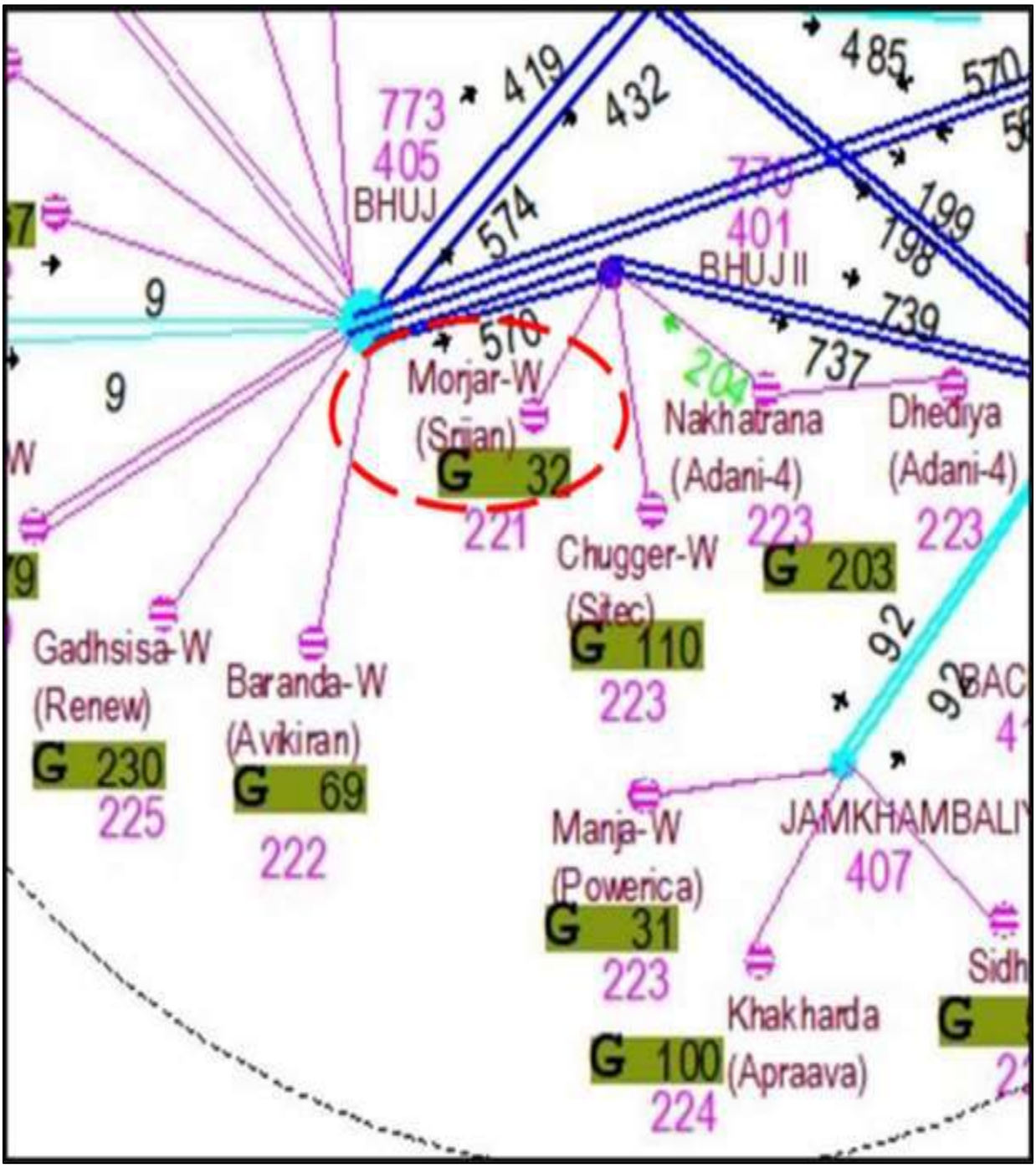


Figure 2. Network across the affected area

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

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Srijan Morjhar	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1.	220kV Srijan Morjhar – Bhuj-II Ckt#1	11:42 / 04-09-2024	RPH-Trip, Zcom-Trip, General trip. 86 Optd.	Fault dist=3.1 kM, Fault current= 14.6kA,	15:59 / 05-09-2024

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

- 220 kV Bhuj II-Morjar (Srijan) tripped on R-E fault.

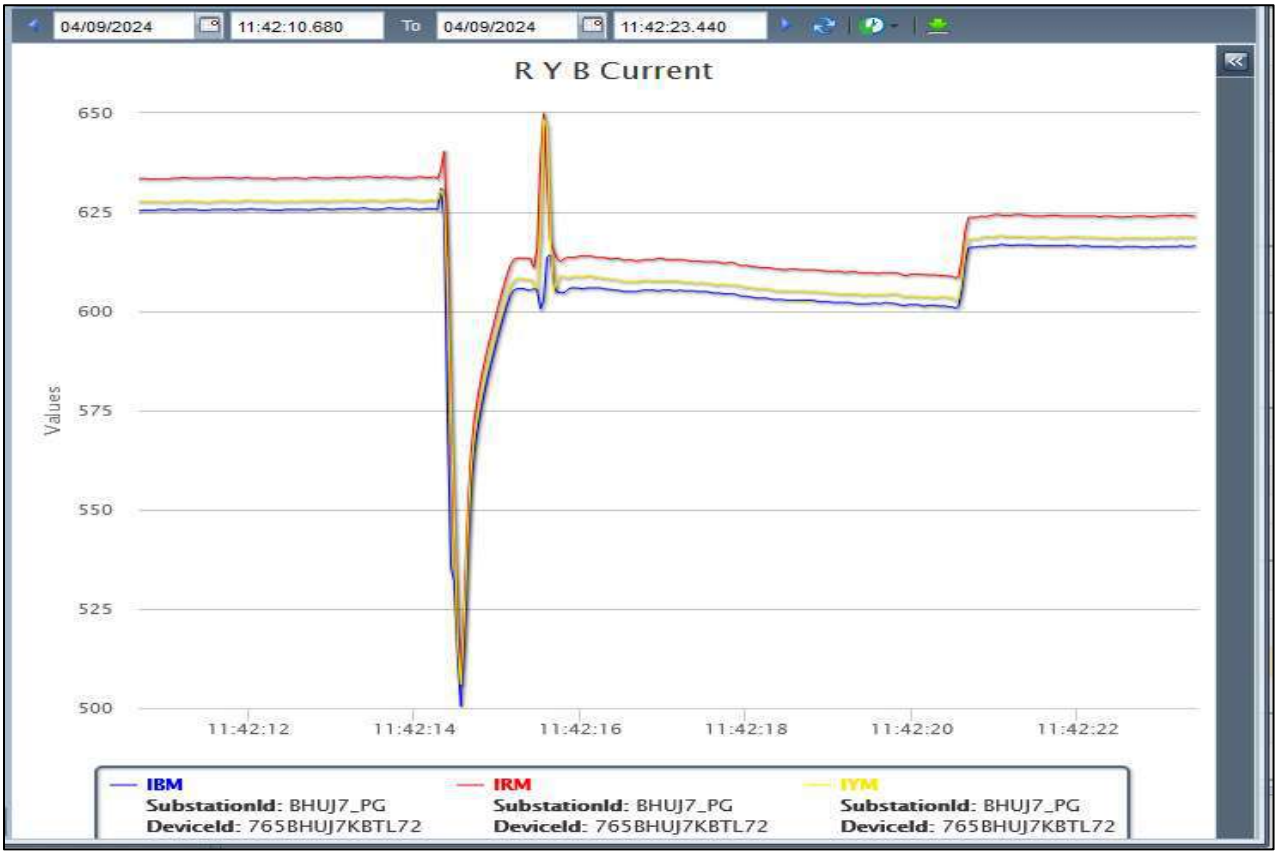


Figure 3. 220 kV Bhuj- KBTL-2 Current Plot

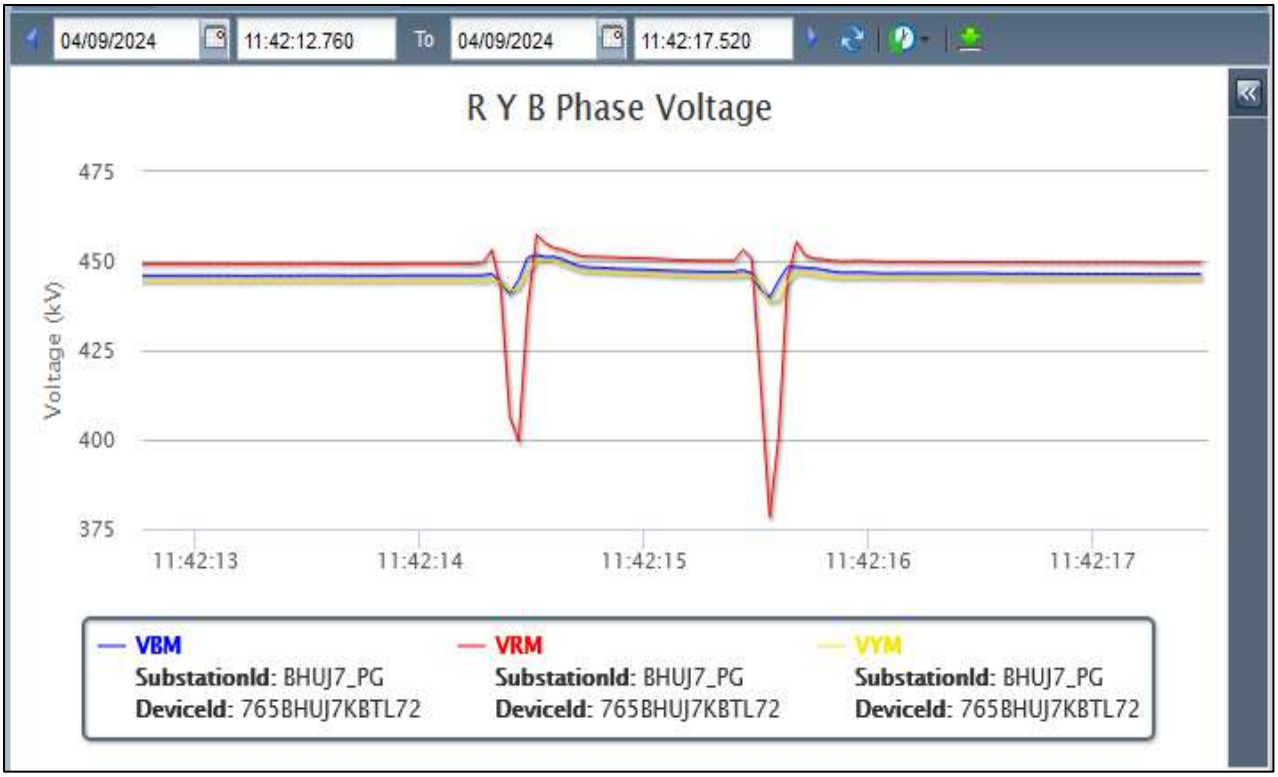


Figure 4. 220 kV Bhuj- KBTL-2 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed: Nil

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Line restored after insulator replacement

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र°सं° S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late
2.	Whether DR/EL provided within 24?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Srijan Morjhar and not received from Powergrid WR-2.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

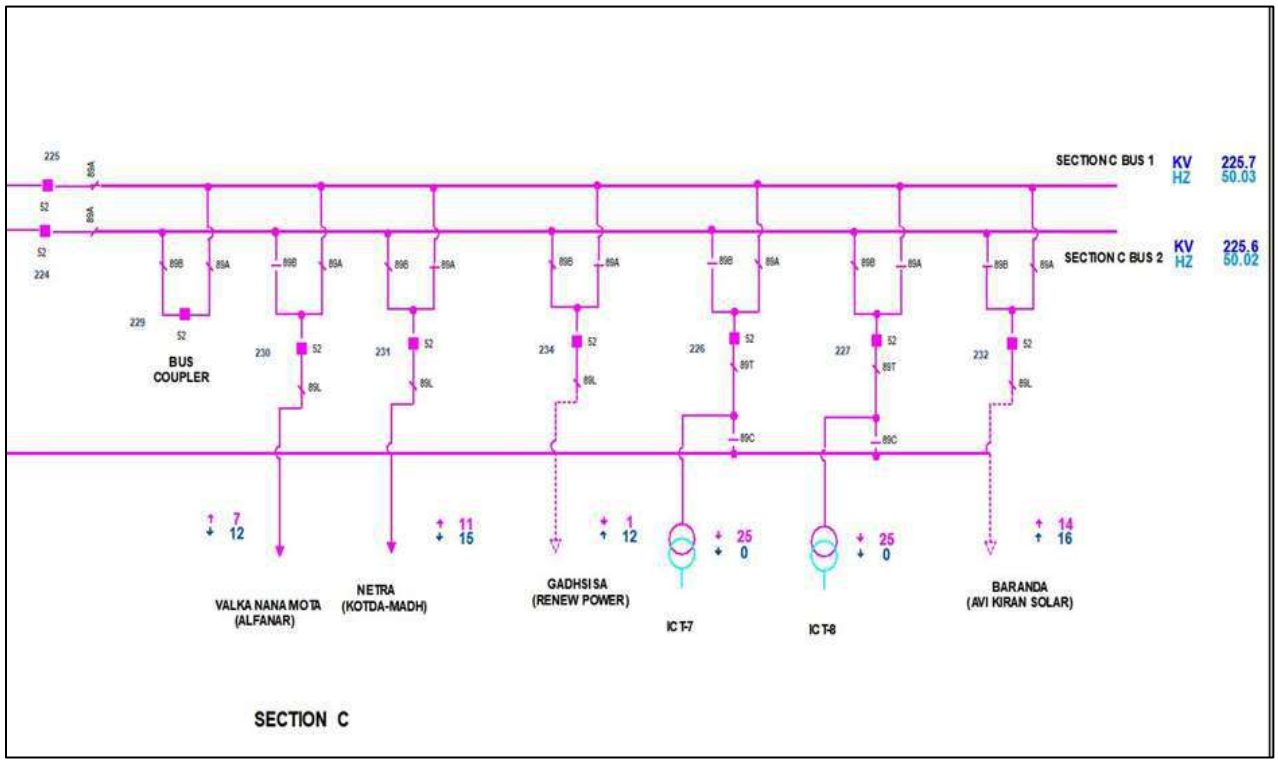
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20752 (SRJN2) FAULTY	11:42:14	437
WRLDC	220-SOE	BHJ72_PG	BHUJ 2 CB 20752 (SRJN2) ACTED	11:42:15	557
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20752 (SRJN2) CLOSED	11:42:15	544
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20752 (SRJN2) FAULTY	11:42:15	566
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20752 (SRJN2) CLOSED	11:42:15	567
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20752 (SRJN2) FAULTY	11:42:15	580
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20752 (SRJN2) OPEN	11:42:15	604

SOE from Srijan Morjhar –

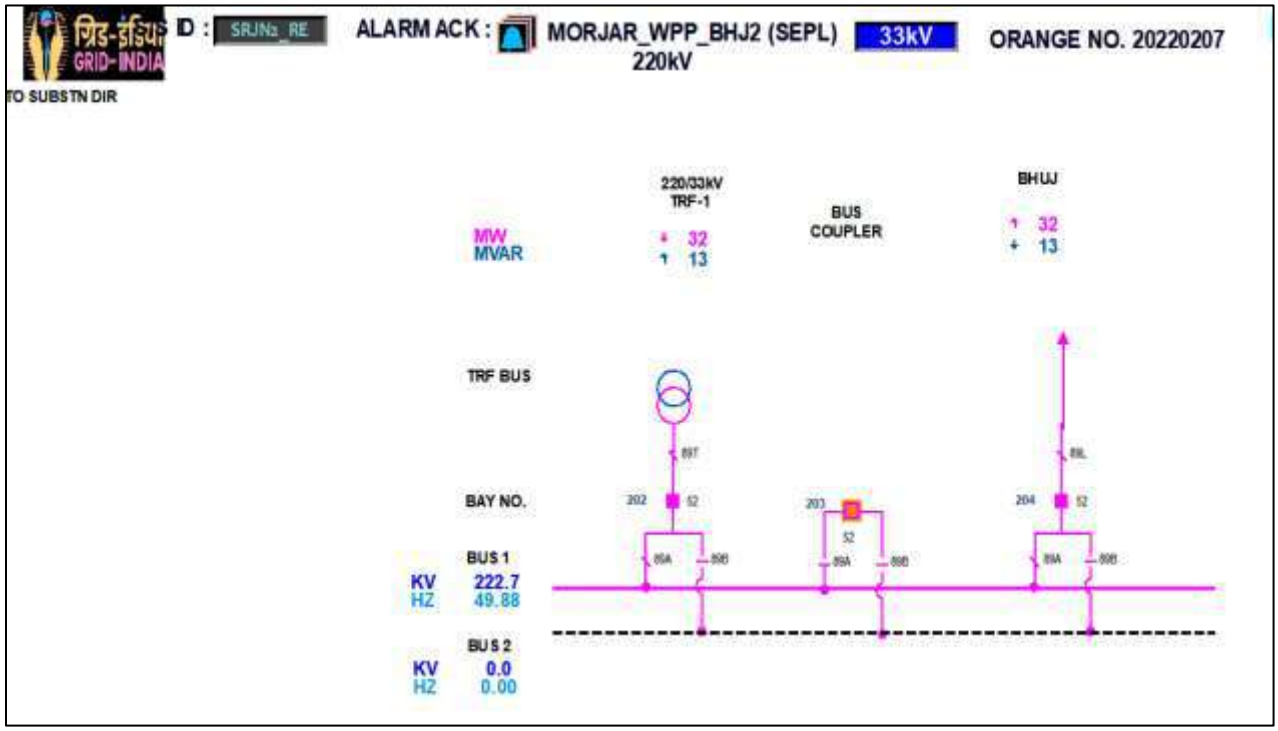
307	*	2024-09-04 11:41:47.646	SESPL	D1Q04_LINE	RELM2	SESPL, D1Q04_LINE, RELM2,	FUSE FAIL
308	*	2024-09-04 11:41:47.649	SESPL	H1Q21_CAP2	REF615	SESPL, H1Q21_CAP2, REF615, PROTN	FUSEFAIL OPERATED
309	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay General Distance Trip R-Ph
310	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay General Distance Trip Y-Ph
311	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay General Distance Trip B-Ph
312	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay Distance Picked up Forward
313	*	2024-09-04 11:41:47.704	SESPL	BB1	REB670	SESPL, BB1, REB670,	204 LBB INITIATON BPH
314	*	2024-09-04 11:41:47.706	SESPL	BB1	REB670	SESPL, BB1, REB670,	204 LBB INITIATON YPH
315	*	2024-09-04 11:41:47.703	SESPL	BB1	REB670	SESPL, BB1, REB670,	204 LBB INITIATON RPH
316	*	2024-09-04 11:41:47.701	SESPL	BB1	REB670	SESPL, BB1, REB670,	204 LBB INITIATON 3PH
317	*	2024-09-04 11:41:47.706	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	86A/B_RLY_OPTD
318	*	2024-09-04 11:41:47.683	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	R PH TRIP
319	*	2024-09-04 11:41:47.674	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	CARRIER RECEIVE CH-2
320	*	2024-09-04 11:41:47.675	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	CARRIER RECEIVE-CH-1
321	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay Zone-1B Trip Operated
322	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay Zone-1B Start
323	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay General-2 Start
324	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay General-2 Trip
325	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay General-1 Start
326	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay General-1 Trip
327	*	2024-09-04 11:41:47.682	SESPL	D1Q04_LINE	7SAM1	SESPL, D1Q04_LINE, 7SAM1,	Main-2 Relay Carrier Aided Trip

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

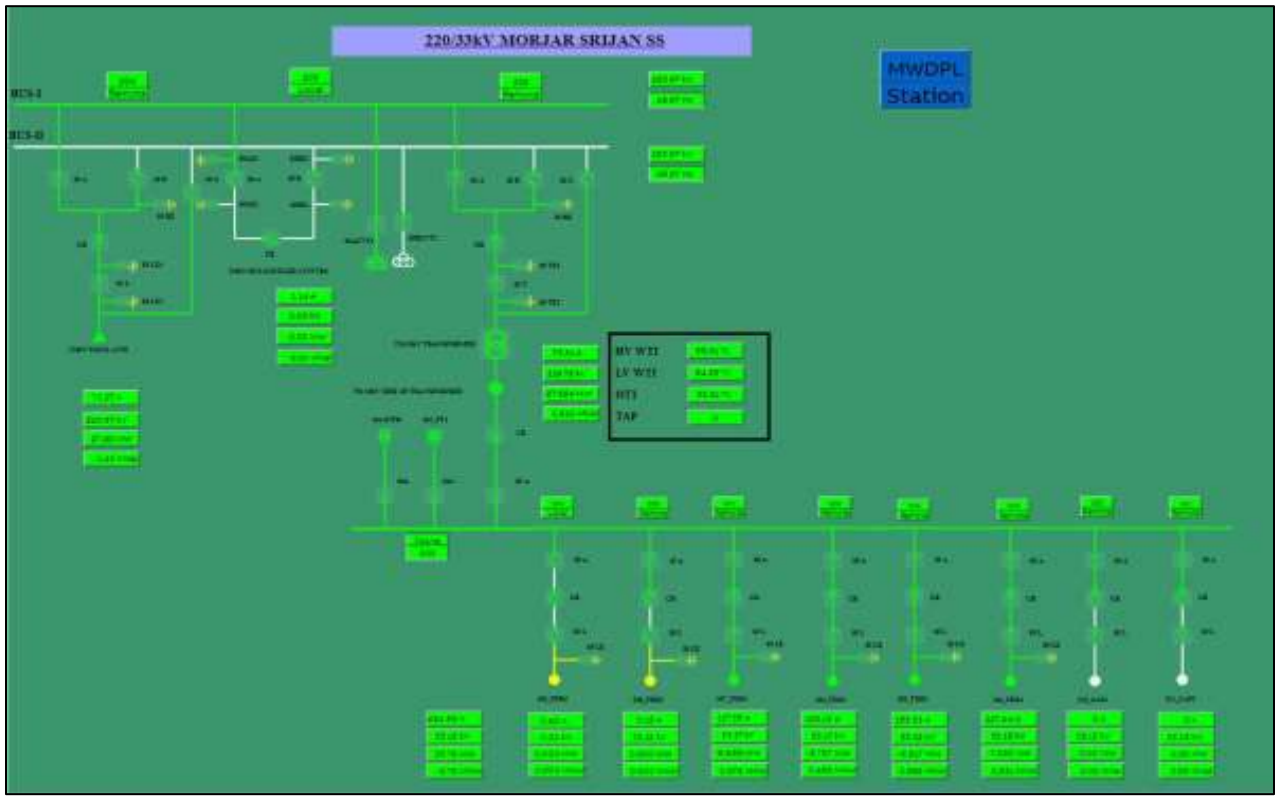
220kV Bhuj SLD:



220 kV Srijan Morjhar SLD:

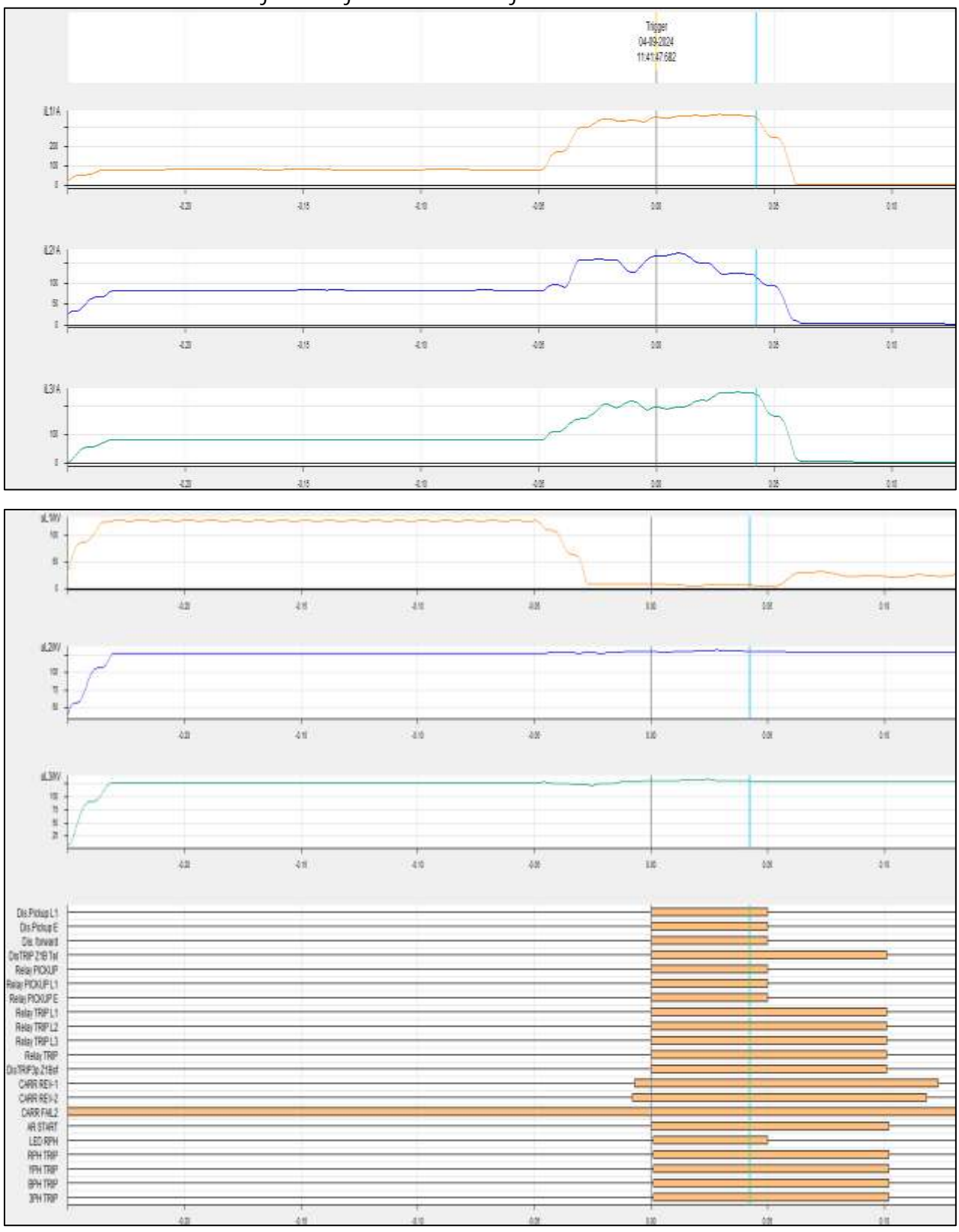


SLD from Srijan Morjhar-



अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Morjar- Bhuj II Line from Srijan end



अनुलग्नक-D / Annexure-D: Site photographs- 120 KN tension insulator at Tower no AP-05A observed fail.



Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. भवसिंगपुरा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Bhawsignpura of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 18.10.2024

1. **घटना का सारांश / Event Summary:** At 13:09 hrs / 06-09-2024, 220 kV Bhawsinghpura-Bus-1 and all connected elements tripped on Bus bar protection operation due to actuation of Overcurrent relay (50/51). 220 kV Bhawsingpura-Kanwani-1, 220 kV Bhawsingpura-Khandwa-1 tripped leading to generation loss of 118 MW.

   Prior to the incident, 220/33 kV Bhawsingpura-ICT-1 tripped on over current protection operation at 12:50 hrs leading to generation loss of 151 MW. Total Generation loss of 269 MW Bhawsinghpura and Kanwani (Masaya Solar) Solar Power Plant occurred due to the event.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 10:49 Hrs / 10-05-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area:** 220kV Bhawsingpura & 220 kV Kanwani Solar RE substation/Madhya Pradesh
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.22	60442	53318	4901	10362
घटना के बाद Post Event	50.18	60198	53268	4964	10335

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	220/33 kV ICT-1 was out since 12:50 Hrs/ 06.09.2024 as it got tripped due To Thermal Overload
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Generation loss of Bhawsingpura and Kanwani – 269 MW



Figure 1. PMU Frequency plot of 220 kV Bhawsinghpura-Khandwa-1

7. **रुकावट की अवधि / Duration of interruption:** 03 Hrs 39 Minute.

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

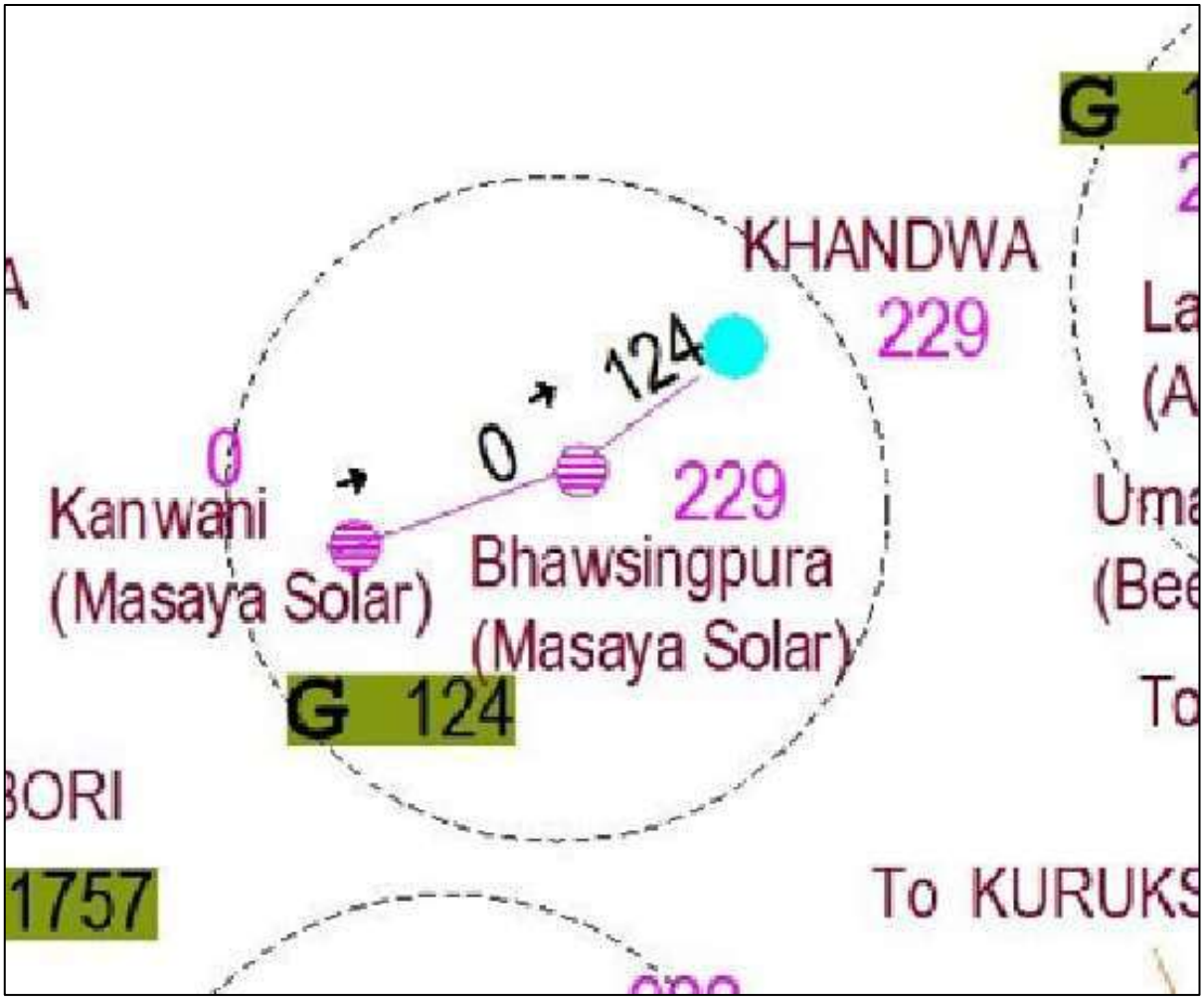


Figure 2. Network across the affected area

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

Some auxillary transformer CT failed as informed over telephonic conversation. But the complete details are not received

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Bhawsinghpura	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220 KV Bhawsingpura Khandwa s/c	13:10	DT Send CH-1	DT Received CH-1	16:49

2	220 KV Bhawsingpura Kanwani S/C	13:10	NO INDICATION	NO INDICATION	16:55
3	220/33kV ICT at Bhawsinghpura	12:50	Tripped due to thermal overloading	-	16:58
4	BUS-1	13:10	R-Phase Trip End	NO INDICATION	Isolated
5	BUS-2	13:10	NO INDICATION	NO INDICATION	16:49

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

- As informed by Masaya Solar, R phase trip indication appeared in Bus -1, Bus bar protection operated.
- As seen from the DR and PMU, 3 Ph fault in the tune of 3 kA appeared. Tripping occurred due to bus bar protection operation. However the reason for bus bar operation could not be explained by Masaya solar.
- 220 kV Bhawsinghpura-Khandwa line tripped due to DT received at PGCIL Khandwa end.
- 220/33kV ICT at Bhawsinghpura tripped on overloading proper to the event, DR are not submitted for the same. Masaya Solar may kindly review this tripping.

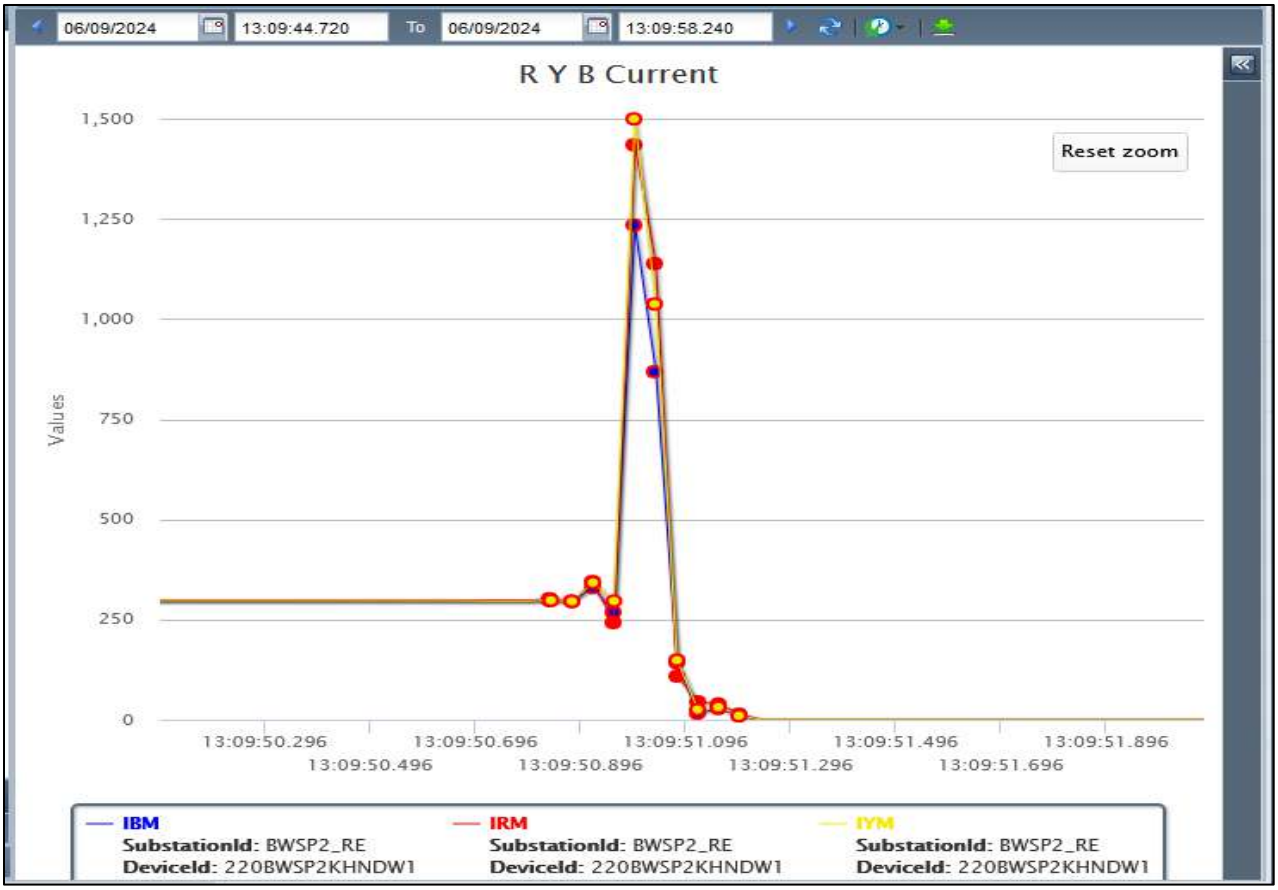


Figure 3. PMU Current plot of 220 kV Bhawsinghpura-Khandwa-1

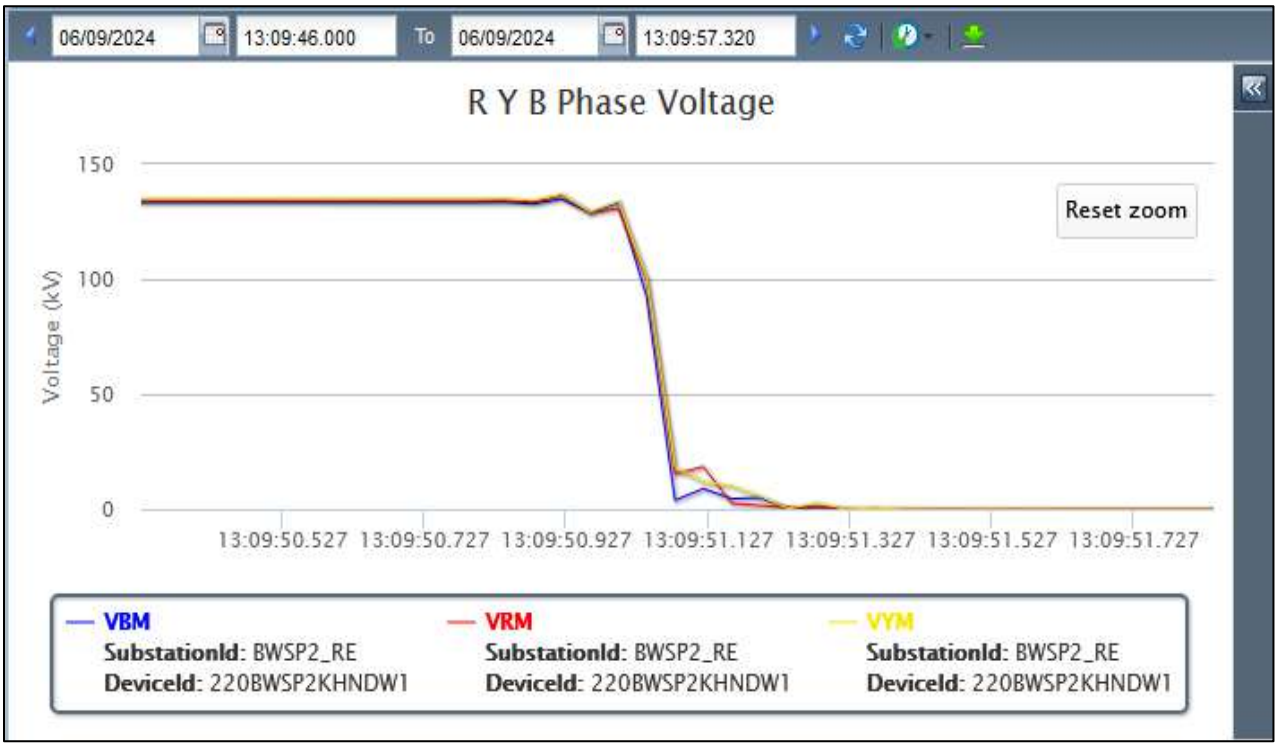


Figure 4. PMU Voltage plot of 220 kV Bhawsinghpura-Khandwa -1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Masaya Solar may kindly investigate the reason for Bus bar protection operation and ICT tripping on overloading.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- System restored.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from Masaya Solar
2	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Khandwa, POWERGRID DR files shared in .cfg, .dat format for 220kV Bhawsingpura-Kanwani line are not opening. Wrong DR files uploaded for Bhawsingpura Bus & ICT-1
3	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Masaya Solar i.e. on 16.09.2024. But the report is missing with the relavent material information

प्रमुख अधिगम बिंदु / Key Lessons Learnt :

- Masaya Solar may kindly investigate the reason for Bus bar protection operation and ICT tripping on overloading.

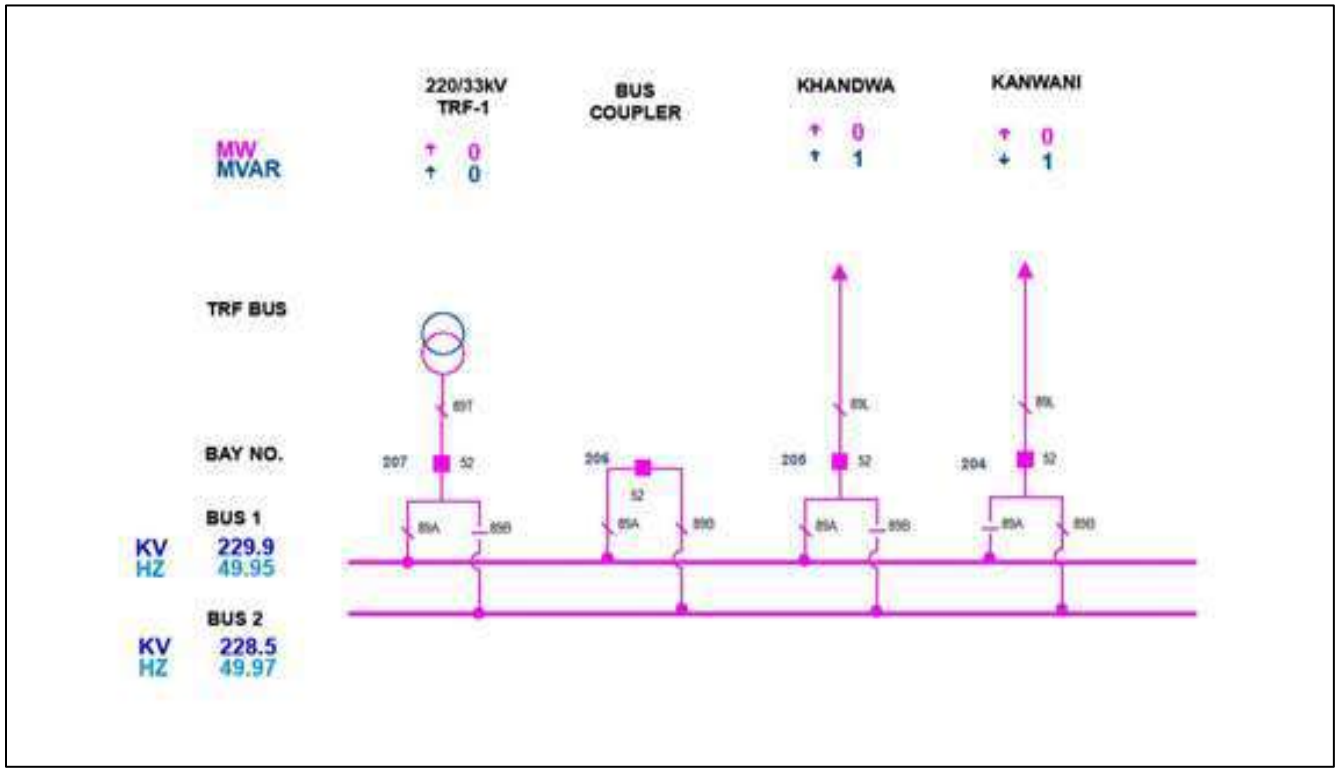
अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC –

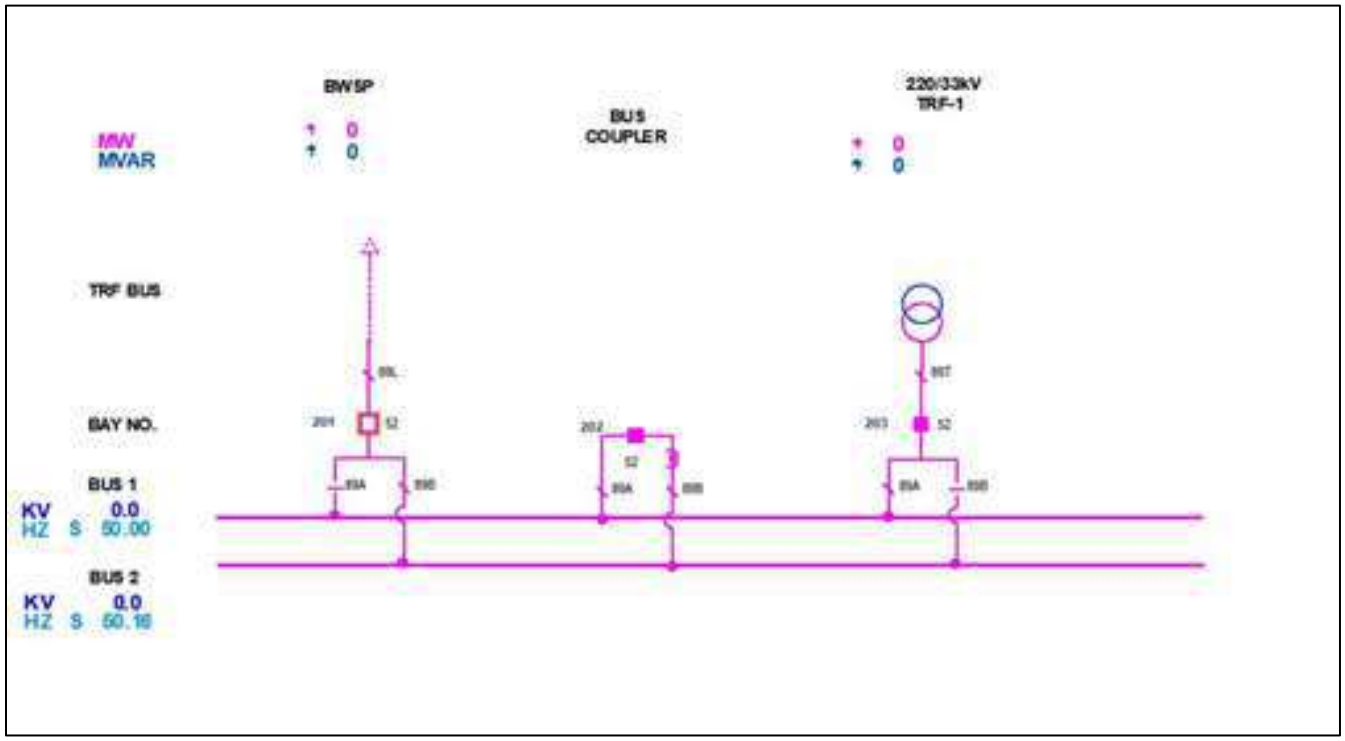
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	BWSP2_RE	BHAWSINGHPURA CB 20552 (KHNDW) ACTED	13:09:51	12
WRLDC	220-SOE	BWSP2_RE	BHAWSINGHPURA CB COUPLER CB 20652 ACTED	13:09:51	42
WRLDC	220-SOE	BWSP2_RE	BHAWSINGHPURA CB 20752 (T1_P) ACTED	13:09:51	13
WRLDC	220KV-CB	BWSP2_RE	BHAWSINGHPURA CB 20752 (T1_P) FAULTY	13:09:51	27
WRLDC	220KV-CB	BWSP2_RE	BHAWSINGHPURA CB COUPLER CB 20652 FAULTY	13:09:51	27
WRLDC	220KV-CB	BWSP2_RE	BHAWSINGHPURA CB 20552 (KHNDW) FAULTY	13:09:51	28
WRLDC	220KV-CB	BWSP2_RE	BHAWSINGHPURA CB 20752 (T1_P) OPEN	13:09:51	41
WRLDC	220KV-CB	BWSP2_RE	BHAWSINGHPURA CB COUPLER CB 20652 OPEN	13:09:51	42
WRLDC	220KV-CB	BWSP2_RE	BHAWSINGHPURA CB 20552 (KHNDW) OPEN	13:09:51	42
WRLDC	220KV-CB	KHNDW_PG	KHANDWA CB 21452 (BWSP2) OPEN	13:09:51	57
WRLDC	220KV-CB	KHNDW_PG	KHANDWA CB 21452 (BWSP2) OPEN	13:09:51	57

अनुलग्नक-2 / Annexure-2:

220kV Bhawsingpura SLD:

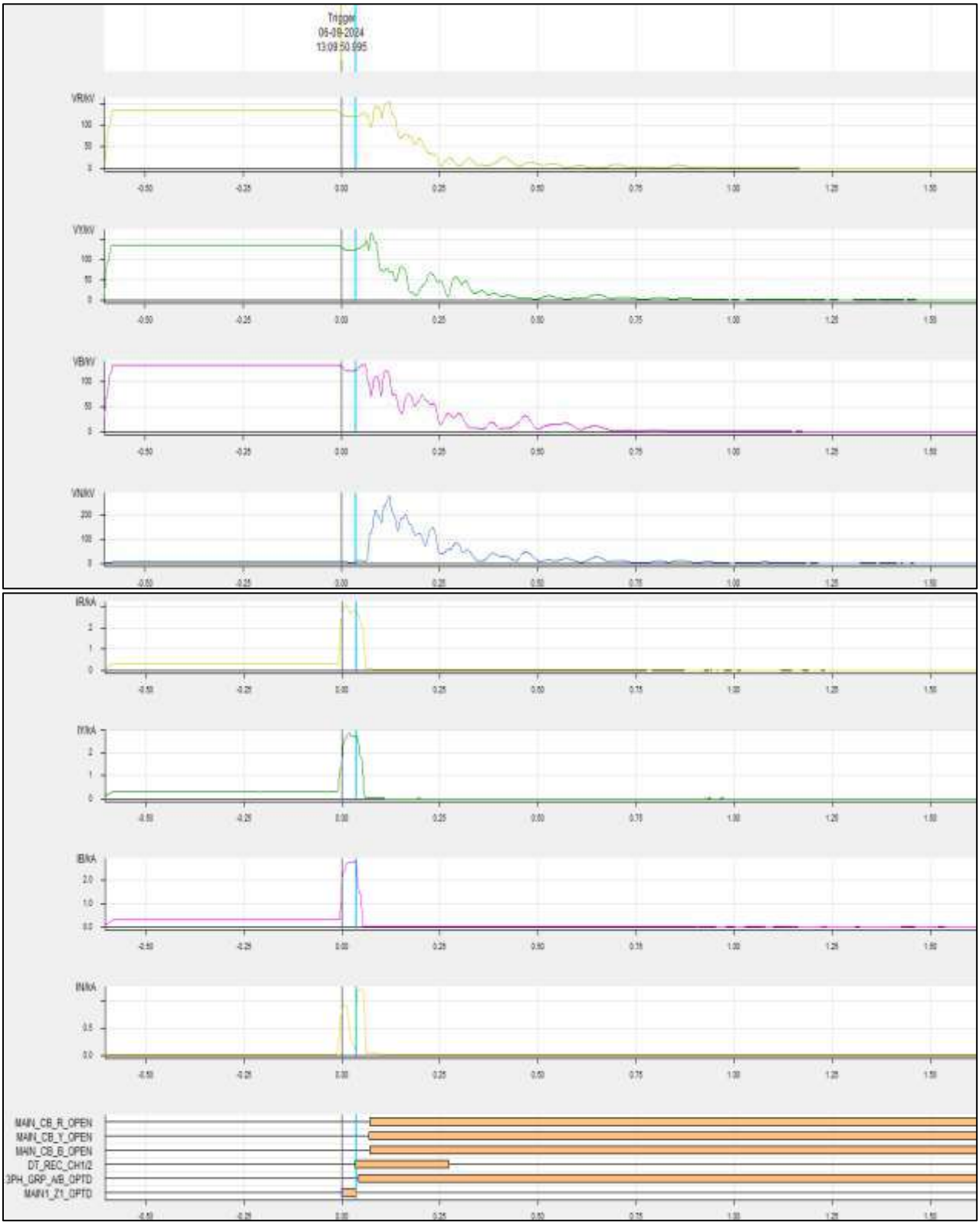


220kV Kanwani SLD:

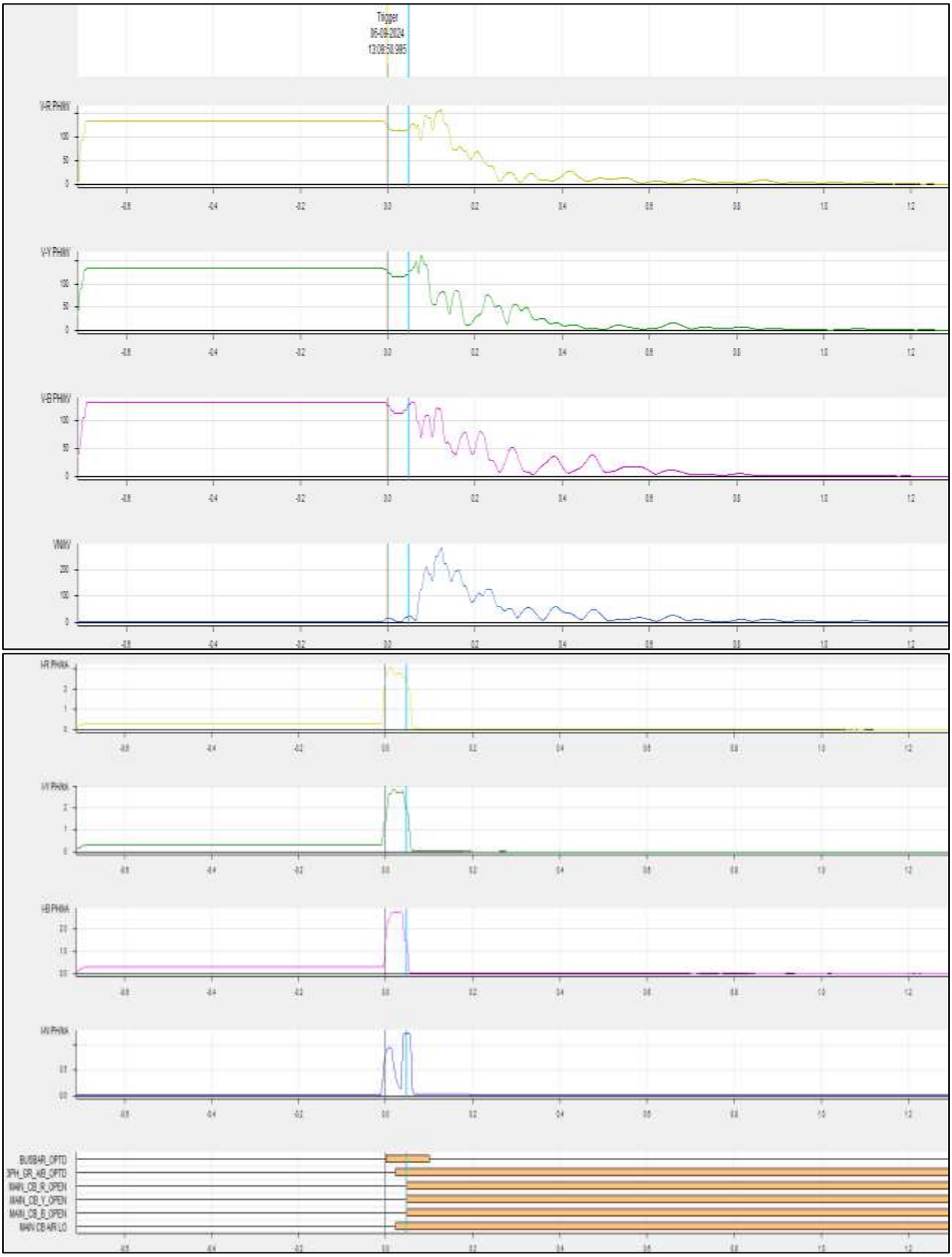


अनुलग्नक-3 / Annexure-3: Disturbance recorder –

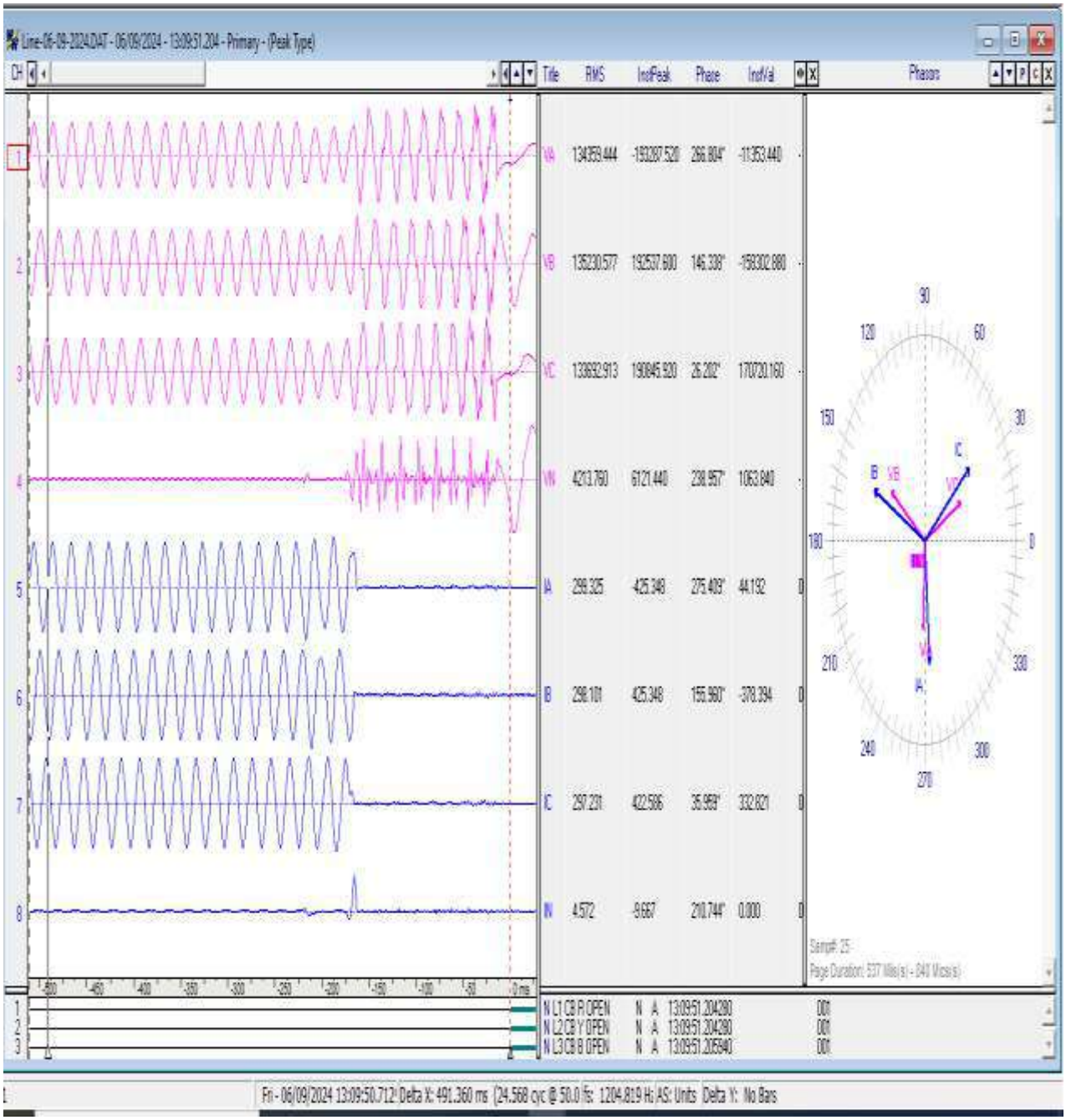
A. DR of 220 kV Bhawsingpura-Khandwa-1 from Khandwa, PGCIL end



B. DR of 220 kV Bhawsingpura-Khandwa-1 at Bhawsinghpura end



C. DR of 220 kV Bhawsingpura-Kanwani-1 at Bhawsinghpura end



अनुलग्नक–4 / Annexure-4 Any other photographs -Nil

DGM, SO WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. गध्सिसा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Gadhsisa of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary:** At 00:31 Hrs / 10-09-2024, 220 kV Bhuj-Gadhsisa tripped on Y-B fault due to tower collapse at loc 46/0 from Cage section. Generation loss of 59 MW occured at Gashsisa (Renew Power) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 00:31 Hrs / 10-09-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Gadhsisa S/S, Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.01	65837	54438	9465	16442
घटना के बाद Post Event	49.99	65608	54436	9436	16412

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Generation loss of 59 MW occurred at Gadhsisa (Renew Power)



Figure 1. PMU Frequency plot of 220 kV Bhuj- Gadhsisa-1

7. **रुकावट की अवधि / Duration of interruption:** Gadhsisa- 8 Days 22 Hrs 56 Minutes.

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

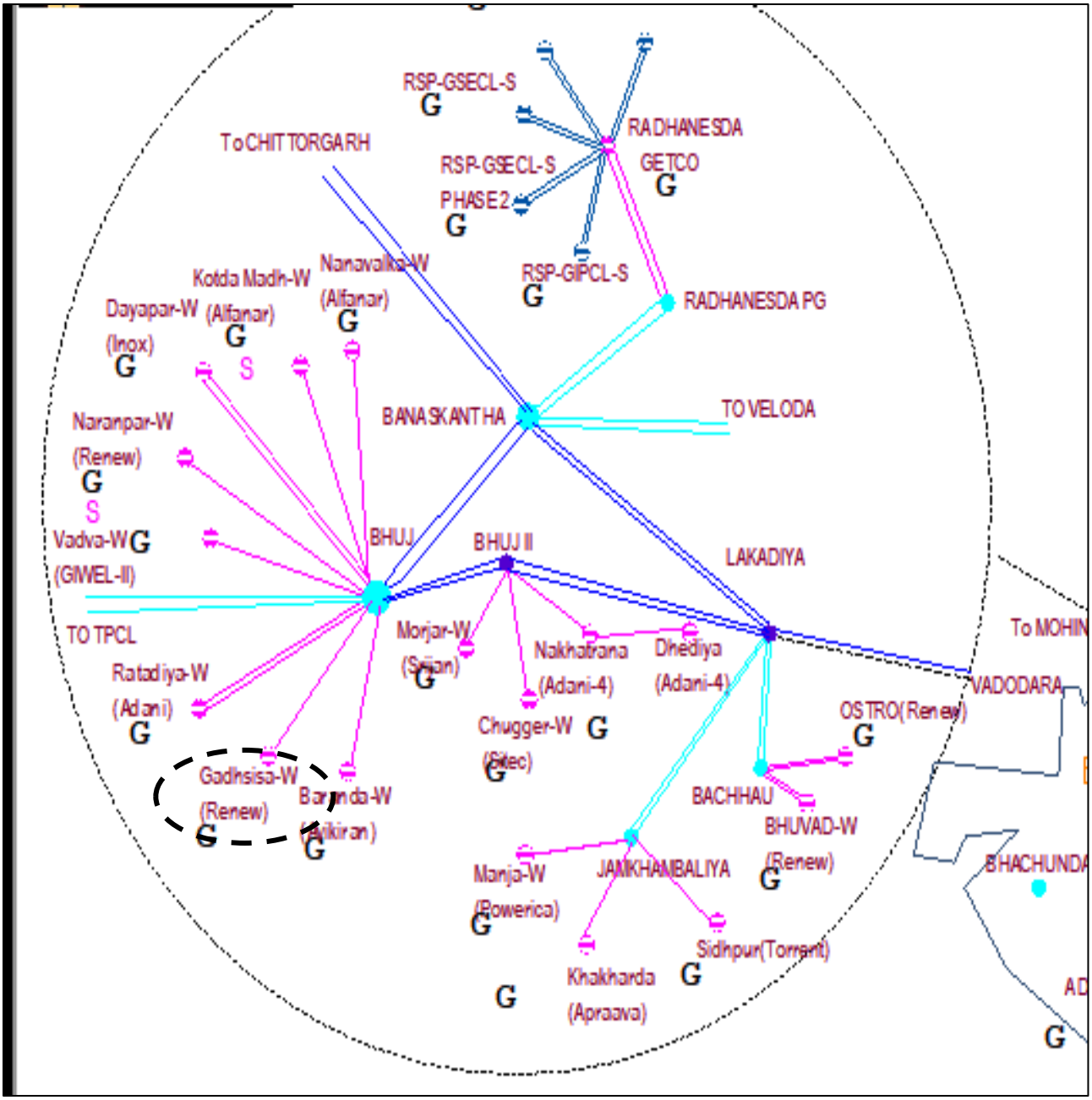


Figure 2. Network across the affected area

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

- Tower collapse at loc 46/0 from Cage section

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Gadhsisa	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1	220kV Bhuj-Gadhsisa s/c	00:31 / 10-09-2024	Main-1 Relay indications- Y-B Phase ,zone -1 Main-2 Relay indications- Y-B Phase ,Zone-1 – Other Relay indications- 86A, 86B – Fault Distance(km)- 11.91	Y-B fault, Z-2 trip Fault current-3.5 kA, Fault dist-73 KM	23:27 / 18-09-2024

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

- 220 kV Bhuj-Gadhsisa tripped on Y-B fault due to tower collapse at loc 46/0 from Cage section.

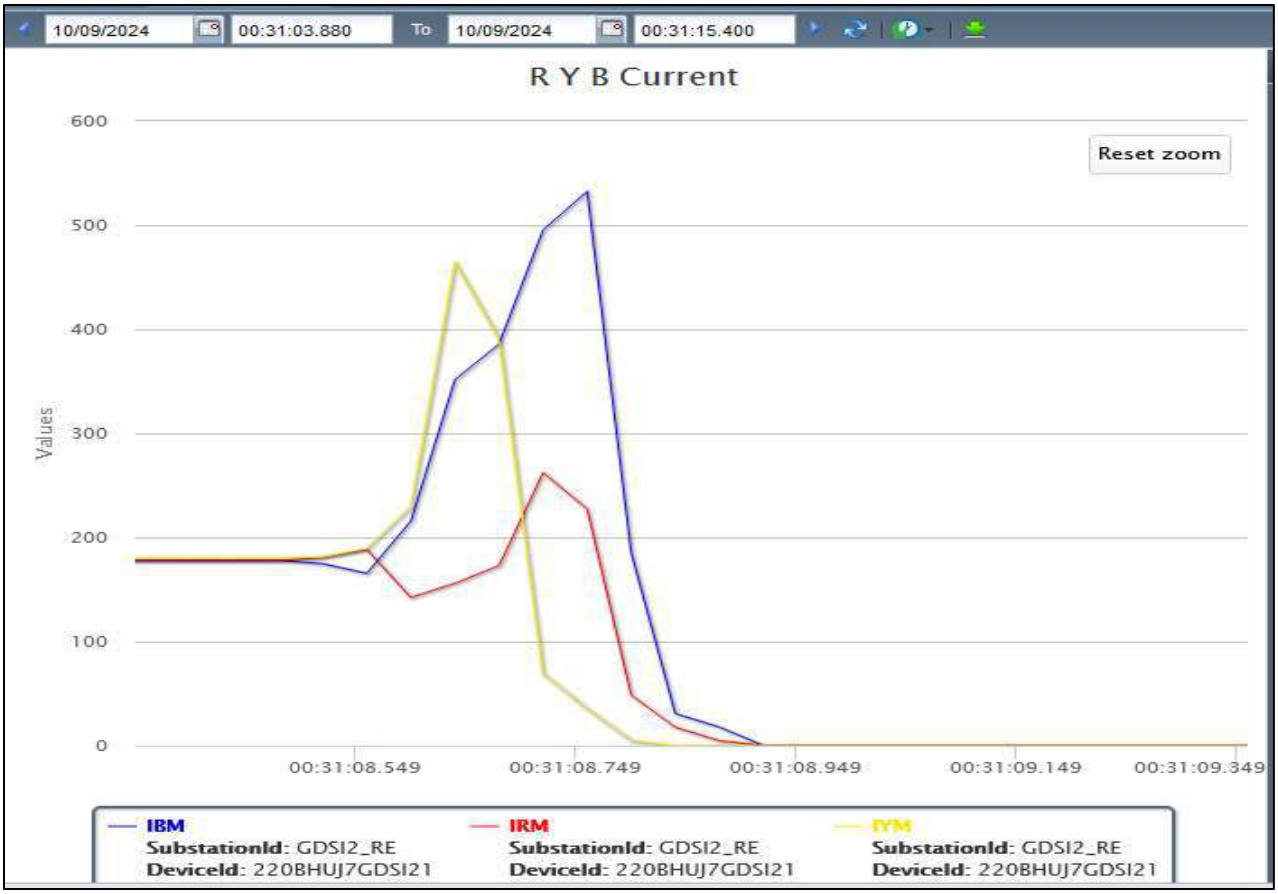


Figure 3. PMU Voltage plot of 220 kV Bhuj- Gadhsisa-1

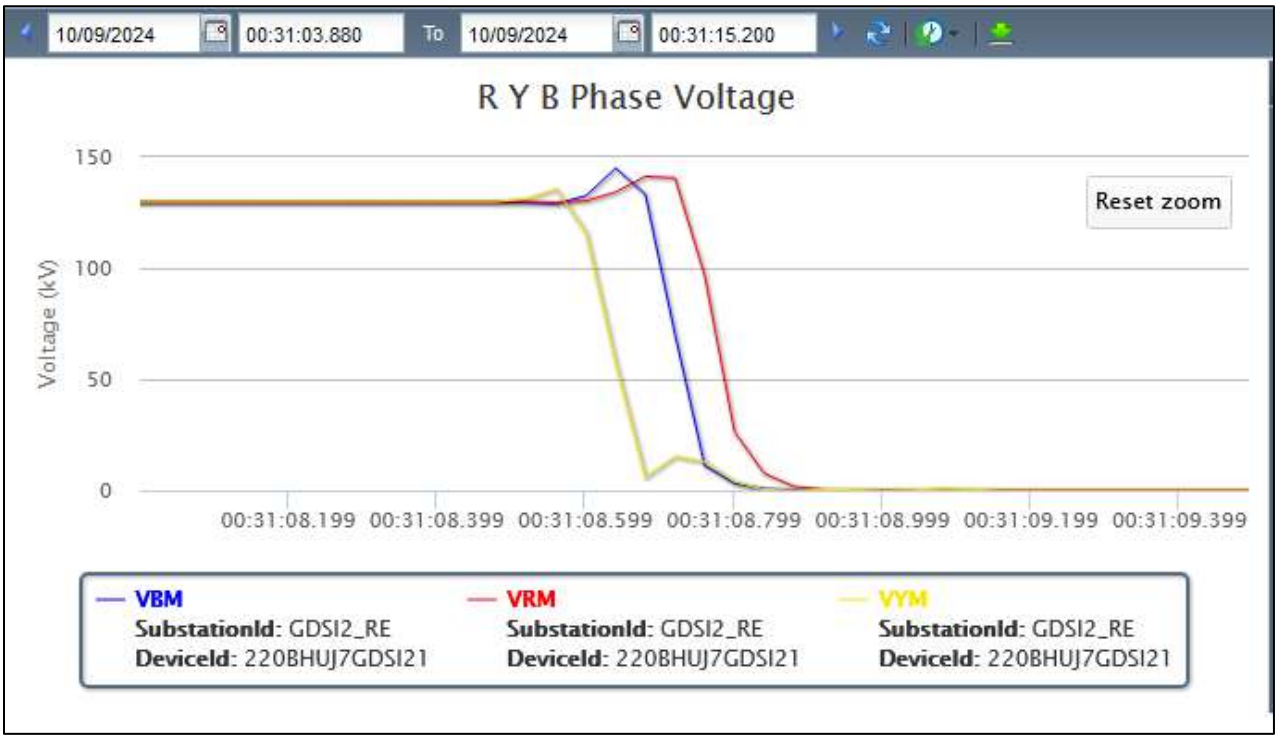


Figure 4. PMU Current plot of 220 kV Bhuj- Gadhsisa-1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- DR not time sync at Gadhsisa end. Renew power may kindly resolve.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- DR not time sync at Gadhsisa end. Renew power may kindly resolve.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from RENEW Gadhsisa
2	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not Submitted in .cfg/.dat format by Renew-Gadhsisa and received late from POWERGRID-WR-2
3	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from RENEW Gadhsisa
4	DR Time Synchronization Issues	IEGC section 17.3	DR not time sync at Gadhsisa end. Renew power may kindly resolve.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC –

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23452 (GDSI2) FAULTY	00:31:08	701
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23452 (GDSI2) OPEN	00:31:08	782
WRLDC	220KV-CB	GDSI2_RE	GADHSISA CB 20252 (BHUJ7) FAULTY	00:31:09	927
WRLDC	220KV-CB	GDSI2_RE	GADHSISA CB 20252 (BHUJ7) OPEN	00:31:10	897

SOE from Gadhsisa-

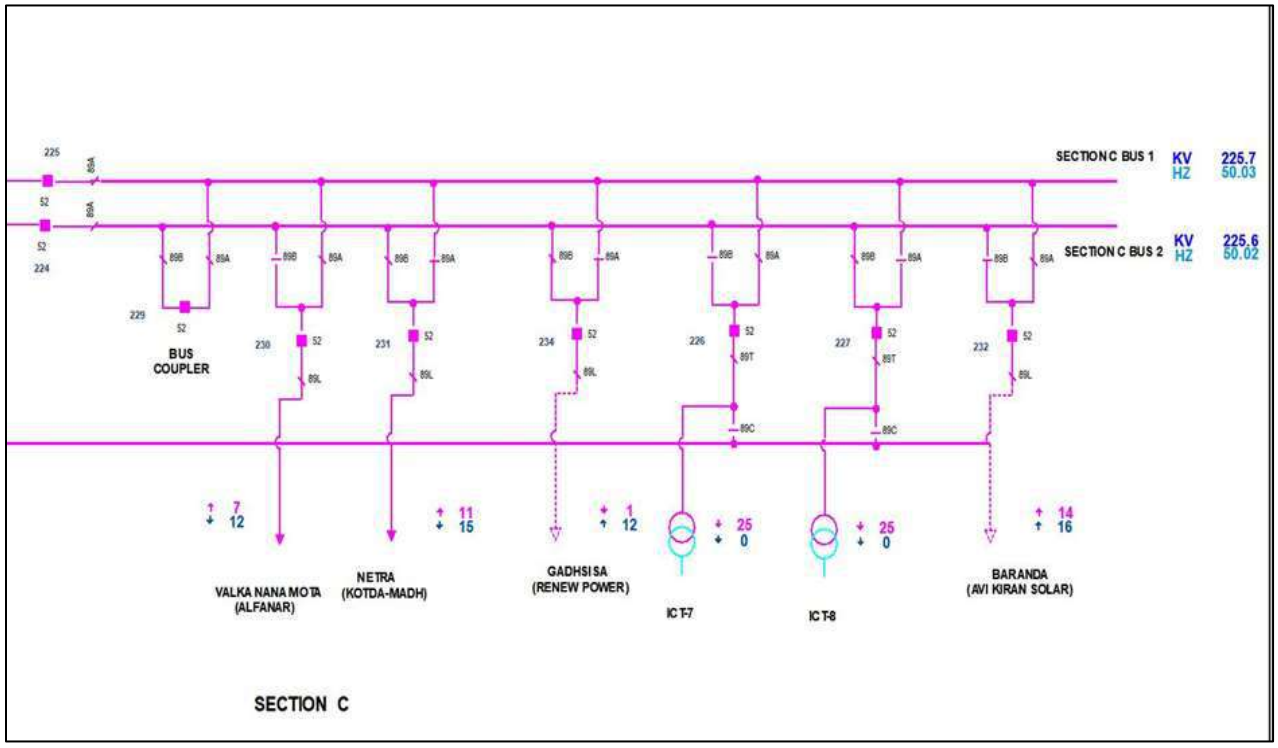
Events List

Channel Number	Name	Status	Time
7	MAIN-1 TRIP	On	9/10/2024 12:32:59.500 AM
22	ZM01-TRIP	On	9/10/2024 12:32:59.500 AM
23	ZM02-START	On	9/10/2024 12:32:59.500 AM
25	ZM03-START	On	9/10/2024 12:32:59.500 AM
33	MAIN/TBC CB-T	On	9/10/2024 12:32:59.500 AM
35	MAIN/TBC CB-T	On	9/10/2024 12:32:59.500 AM
39	ZM01-START	On	9/10/2024 12:32:59.500 AM
43	PHS-STFWL2	On	9/10/2024 12:32:59.500 AM
60	ZM01-TRL2	On	9/10/2024 12:32:59.500 AM
68	AR01-START	On	9/10/2024 12:32:59.500 AM
75	ZM02-STL2	On	9/10/2024 12:32:59.500 AM
77	ZM01-STND	On	9/10/2024 12:32:59.500 AM
78	ZM02-STND	On	9/10/2024 12:32:59.500 AM
79	ZM03-STND	On	9/10/2024 12:32:59.500 AM
85	ZM05-STND	On	9/10/2024 12:32:59.500 AM
86	ZCOM-CS	On	9/10/2024 12:32:59.500 AM
92	PHS-STNDL2	On	9/10/2024 12:32:59.500 AM
94	PHS-STFWPE	On	9/10/2024 12:32:59.500 AM
30	M-1/2 CAR SEN	On	9/10/2024 12:32:59.503 AM
70	TEF1-START	On	9/10/2024 12:32:59.508 AM
70	TEF1-START	Off	9/10/2024 12:32:59.540 AM
2	MAIN_YPH_OP	On	9/10/2024 12:32:59.553 AM
22	ZM01-TRIP	Off	9/10/2024 12:32:59.554 AM
23	ZM02-START	Off	9/10/2024 12:32:59.554 AM
25	ZM03-START	Off	9/10/2024 12:32:59.554 AM
39	ZM01-START	Off	9/10/2024 12:32:59.554 AM
43	PHS-STFWL2	Off	9/10/2024 12:32:59.554 AM
60	ZM01-TRL2	Off	9/10/2024 12:32:59.554 AM
68	AR01-START	Off	9/10/2024 12:32:59.554 AM

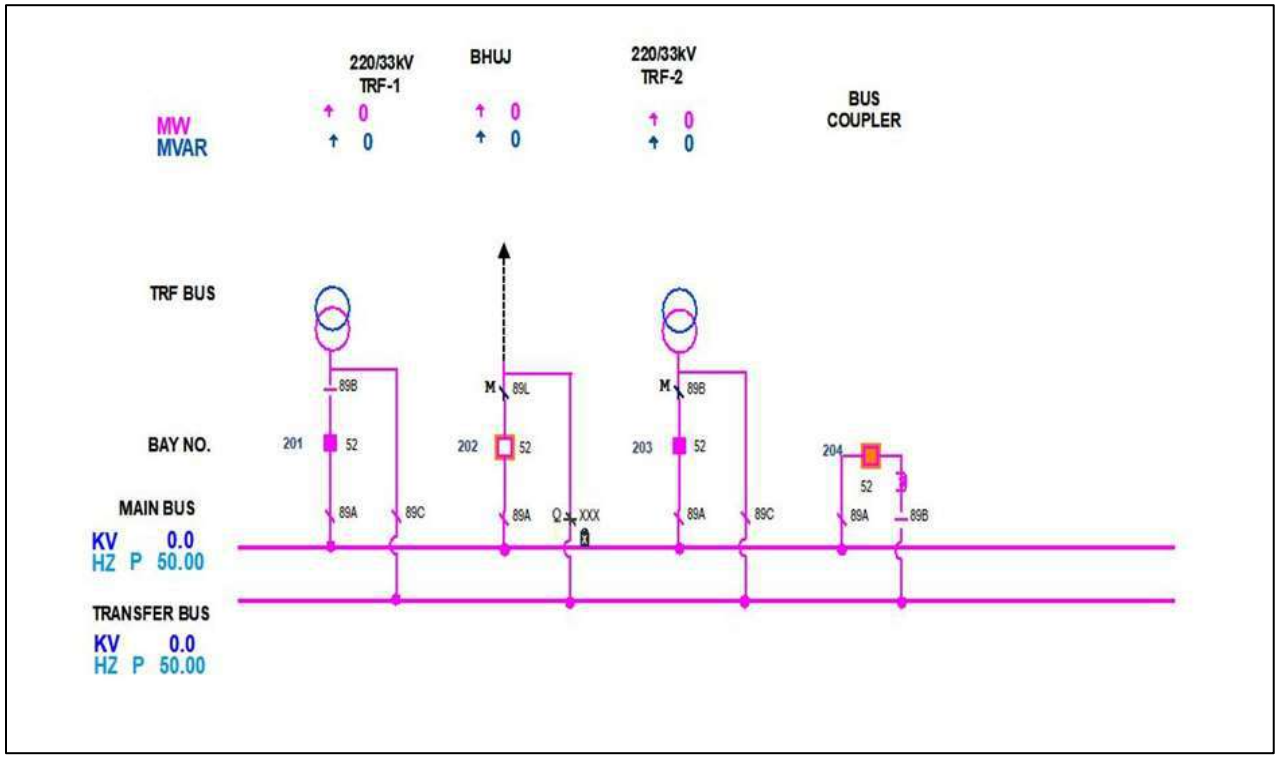
75	ZM02-STL2	Off	9/10/2024 12:32:59.554 AM
76	ZM02-STND	Off	9/10/2024 12:32:59.554 AM
79	ZM03-STND	Off	9/10/2024 12:32:59.554 AM
85	ZM05-STND	Off	9/10/2024 12:32:59.554 AM
92	PHS-STNDL2	Off	9/10/2024 12:32:59.554 AM
94	PHS-STFWPE	Off	9/10/2024 12:32:59.554 AM
77	ZM01-STND	Off	9/10/2024 12:32:59.554 AM
2	MAIN_YPH_OP	Off	9/10/2024 12:32:59.556 AM
70	TEF1-START	On	9/10/2024 12:32:59.556 AM
2	MAIN_YPH_OP	On	9/10/2024 12:32:59.558 AM
70	TEF1-START	Off	9/10/2024 12:32:59.564 AM
44	PHS-STFWL3	On	9/10/2024 12:32:59.590 AM
93	PHS-STNDL3	On	9/10/2024 12:32:59.590 AM
94	PHS-STFWPE	On	9/10/2024 12:32:59.590 AM
25	ZM03-START	On	9/10/2024 12:32:59.593 AM
79	ZM03-STND	On	9/10/2024 12:32:59.593 AM
22	ZM01-TRIP	On	9/10/2024 12:32:59.596 AM
23	ZM02-START	On	9/10/2024 12:32:59.596 AM
34	MAIN/TBC CB-T	On	9/10/2024 12:32:59.596 AM
36	MAIN/TBC CB-T	On	9/10/2024 12:32:59.596 AM
37	MAIN/TBC CB-T	On	9/10/2024 12:32:59.596 AM
39	ZM01-START	On	9/10/2024 12:32:59.596 AM
61	ZM01-TRL3	On	9/10/2024 12:32:59.596 AM
68	AR01-START	On	9/10/2024 12:32:59.596 AM
76	ZM02-STL3	On	9/10/2024 12:32:59.596 AM
77	ZM01-STND	On	9/10/2024 12:32:59.596 AM
78	ZM02-STND	On	9/10/2024 12:32:59.596 AM
85	ZM05-STND	On	9/10/2024 12:32:59.596 AM
70	TEF1-START	On	9/10/2024 12:32:59.597 AM
36	PREP_3PH_TRIP	On	9/10/2024 12:32:59.608 AM
73	PERMIT 1-PH T	On	9/10/2024 12:32:59.608 AM
70	TEF1-START	Off	9/10/2024 12:32:59.620 AM
1	MAIN_RPH_OP	On	9/10/2024 12:32:59.648 AM
3	MAIN_BPH_OP	On	9/10/2024 12:32:59.649 AM
22	ZM01-TRIP	Off	9/10/2024 12:32:59.653 AM
23	ZM02-START	Off	9/10/2024 12:32:59.653 AM
25	ZM03-START	Off	9/10/2024 12:32:59.653 AM
39	ZM01-START	Off	9/10/2024 12:32:59.653 AM
44	PHS-STFWL3	Off	9/10/2024 12:32:59.653 AM
61	ZM01-TRL3	Off	9/10/2024 12:32:59.653 AM
68	AR01-START	Off	9/10/2024 12:32:59.653 AM
76	ZM02-STL3	Off	9/10/2024 12:32:59.653 AM
77	ZM01-STND	Off	9/10/2024 12:32:59.653 AM
78	ZM02-STND	Off	9/10/2024 12:32:59.653 AM
79	ZM03-STND	Off	9/10/2024 12:32:59.653 AM
85	ZM05-STND	Off	9/10/2024 12:32:59.653 AM
86	ZCOM-CS	Off	9/10/2024 12:32:59.653 AM
93	PHS-STNDL3	Off	9/10/2024 12:32:59.653 AM
94	PHS-STFWPE	Off	9/10/2024 12:32:59.653 AM
30	M-1/2 CAR SEN	Off	9/10/2024 12:32:59.656 AM
7	MAIN-1 TRIP	Off	9/10/2024 12:32:59.749 AM
33	MAIN/TBC CB-T	Off	9/10/2024 12:32:59.749 AM
34	MAIN/TBC CB-T	Off	9/10/2024 12:32:59.749 AM
35	MAIN/TBC CB-T	Off	9/10/2024 12:32:59.749 AM
36	MAIN/TBC CB-T	Off	9/10/2024 12:32:59.749 AM
37	MAIN/TBC CB-T	Off	9/10/2024 12:32:59.749 AM

अनुलग्नक-2 / Annexure-2:

220kV Bhuj SLD:

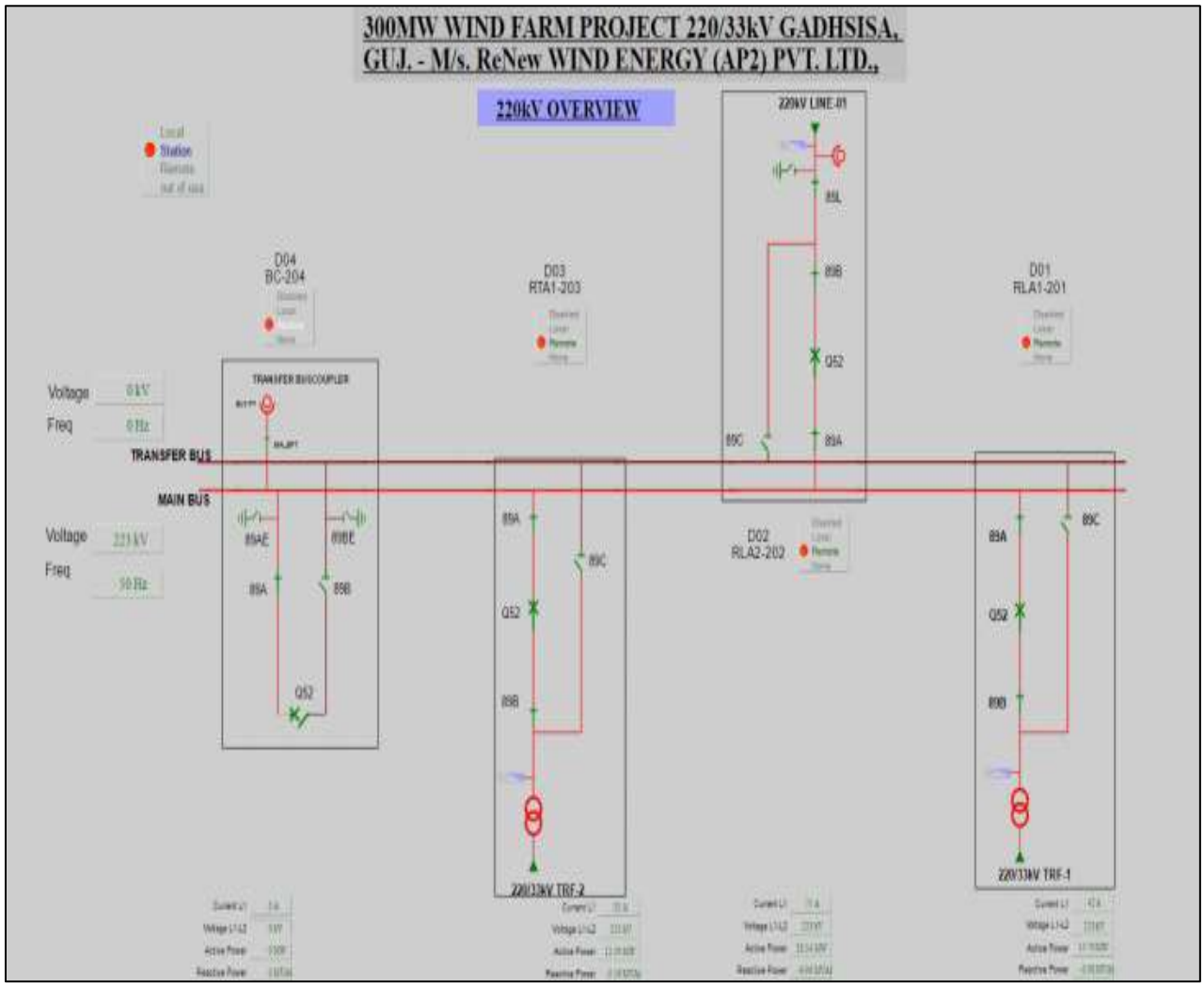


220kV Gadhsisa SLD:



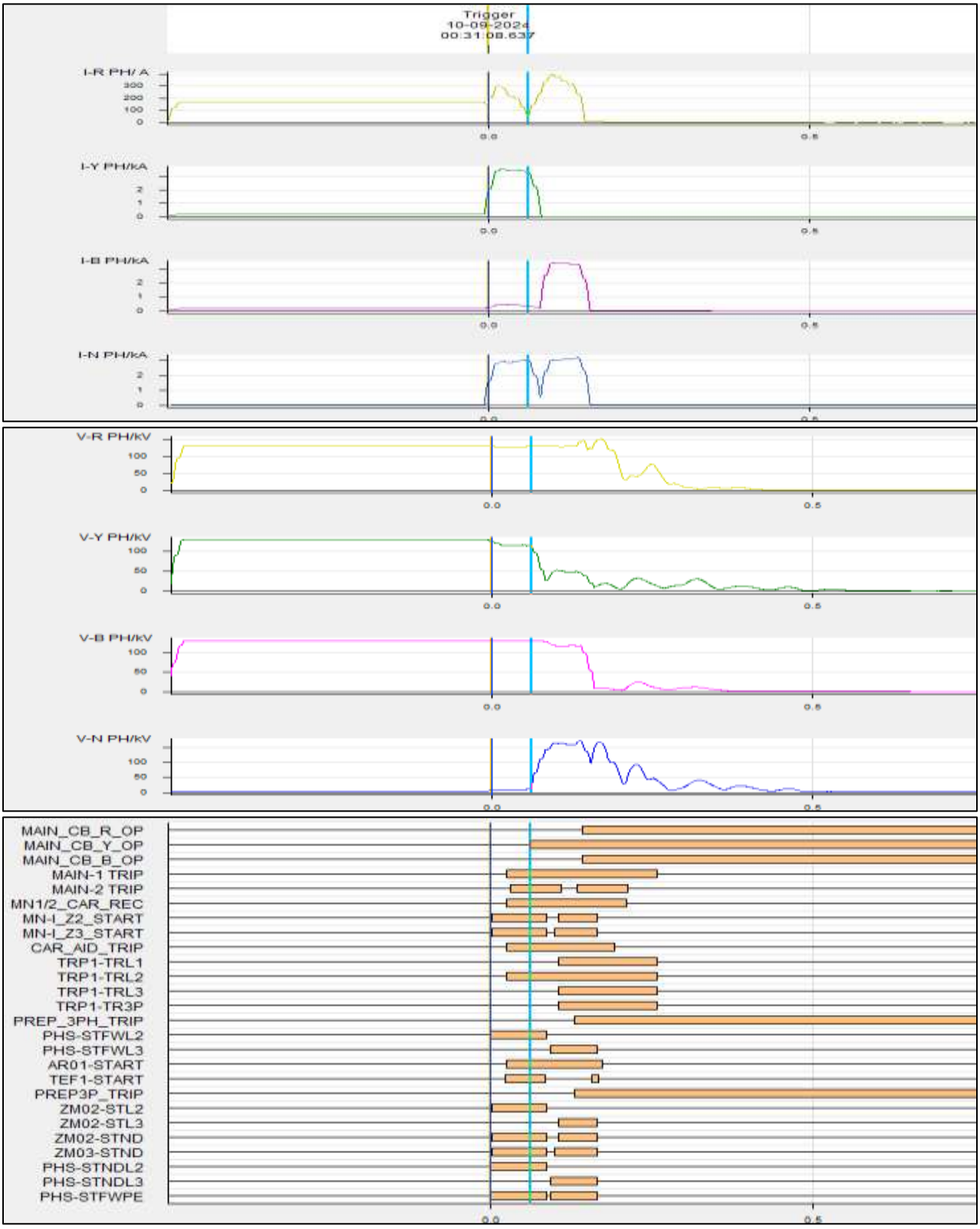
=

SLD from Gadhsisa RENEW-

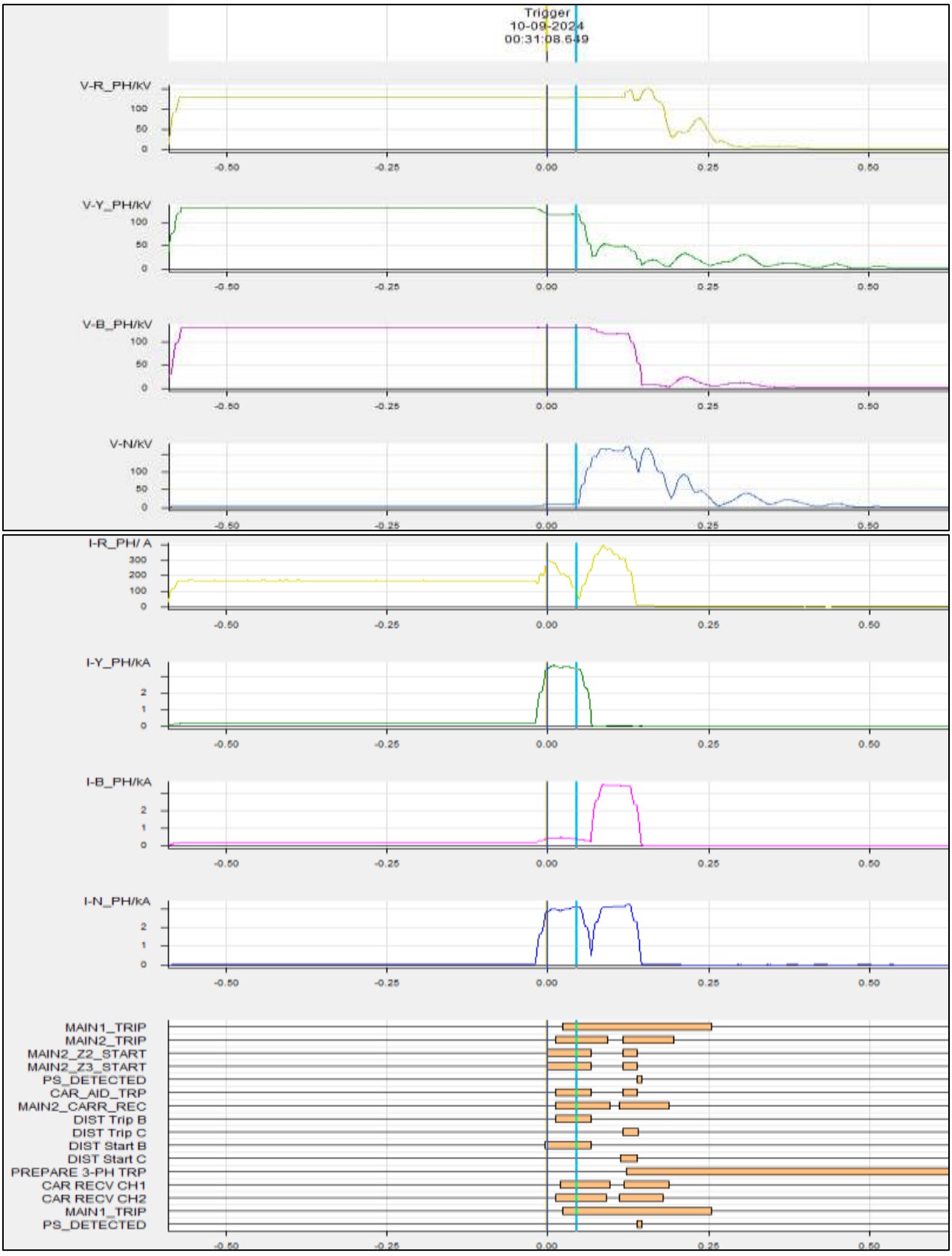


अनुलग्नक-3 / Annexure-3: Disturbance recorder –

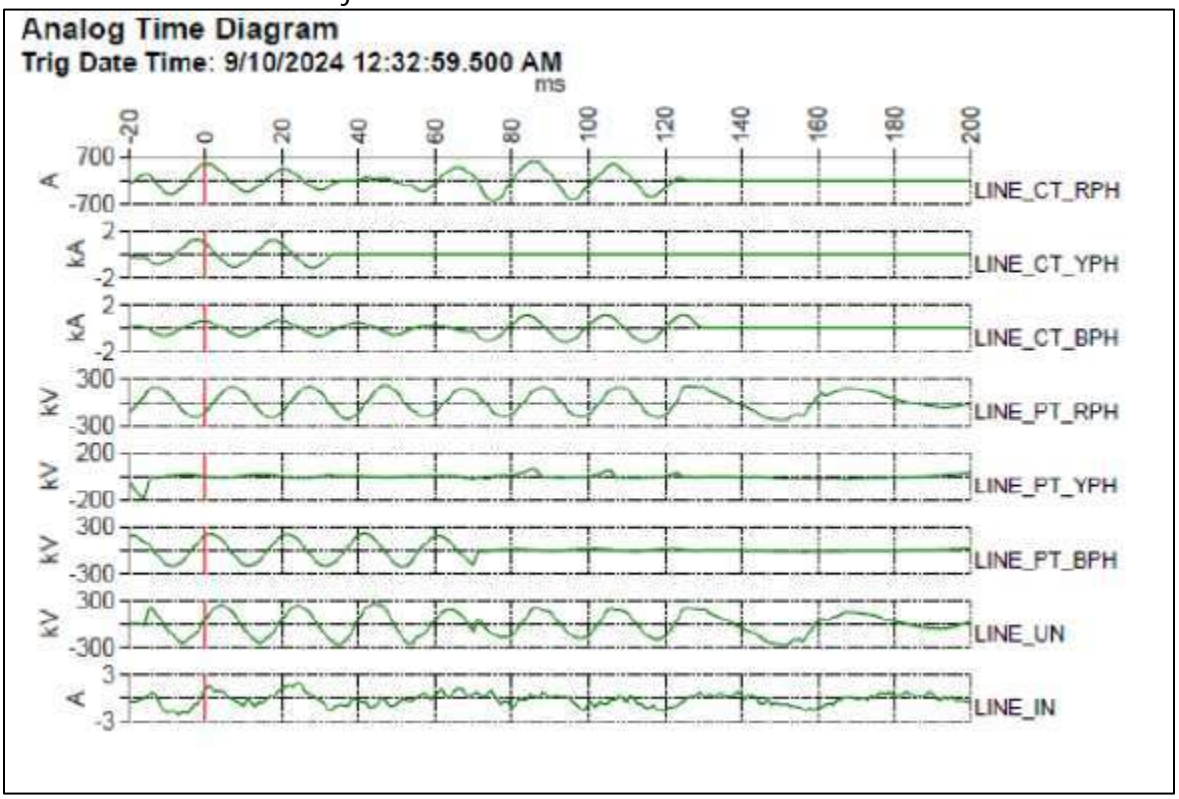
A. DR of 220 kV Bhuj- Gadhsisa -1 Line from Bhuj end, Main-1 relay

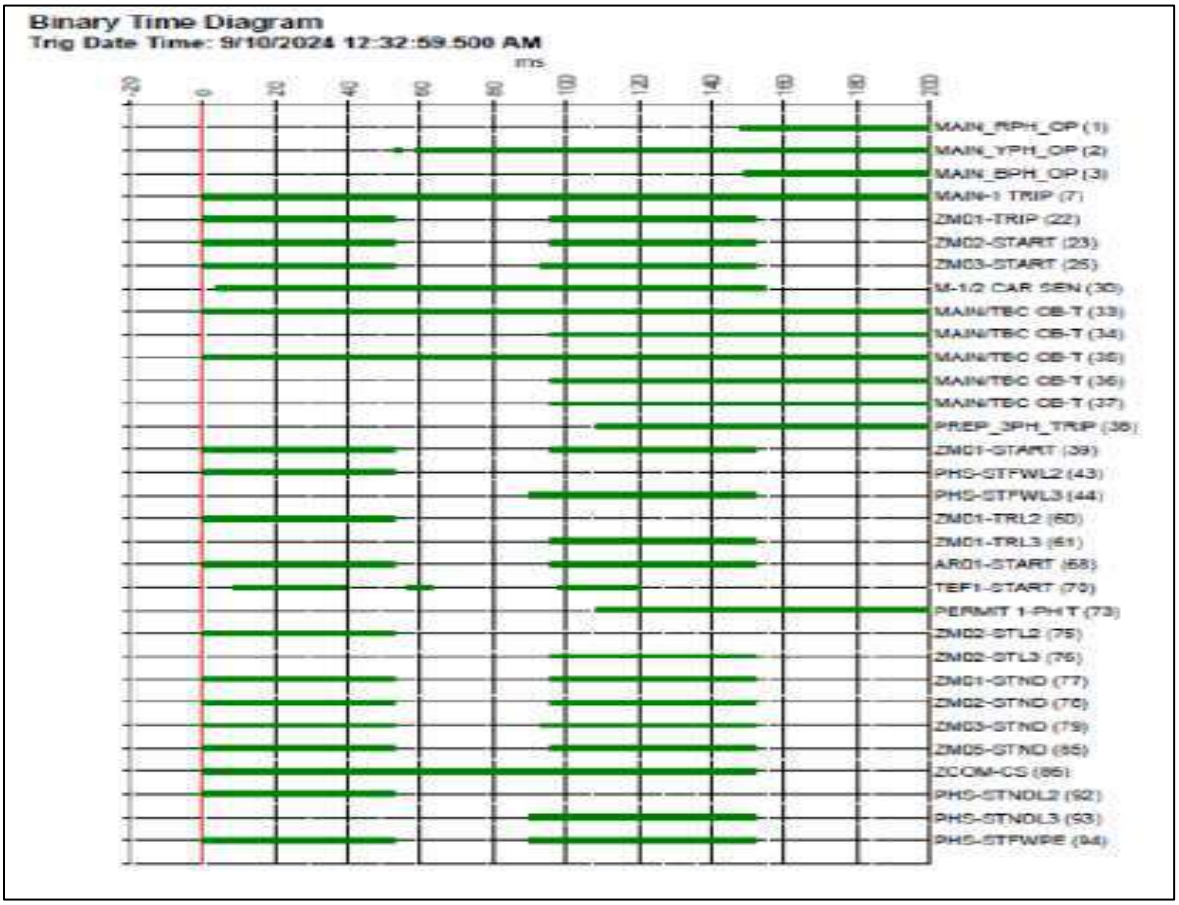


B. DR of 220 kV Bhuj- Gadhsisa -1 Line from Bhuj end, Main-2 relay



C. DR of 220 kV Bhuj- Gadhsisa -1 Line from Gadhsisa end





अनुलग्नक – 4 / Annexure-4 photographs from Gadhsisa-



Vijay Kumar Kodali

DGM, SO WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. दयापार उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Dayapar of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary**: At 15:03 hrs / 19-09-2024, 220 kV Dayapar sub-station AC supply cable and DC supply cable of 220/33 kV Dayapar-ICT-1 got punctured resulting in tripping of 220 kV Bhuj-Dayapar-1&2 and 220/33 kV Dayapar-ICT-1,2,3&4. Generation loss of 30 MW occurred at Dayapar (INOX) Wind Power Plant due to the event.

2. **घटना का समय और दिनांक / Time and Date of the Event :** 15:03 hrs / 19-09-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : 220 kV Dayapar(INOX), Gujarat

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.05	71864	64707	13947	22700

घटना के बाद **Post Event**	50.05	71838	64561	13890	22679

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Inclement weather Cyclone effect (Asna). High wind, High rain

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 30 MW occurred at Dayapar (INOX) Wind Power plant.

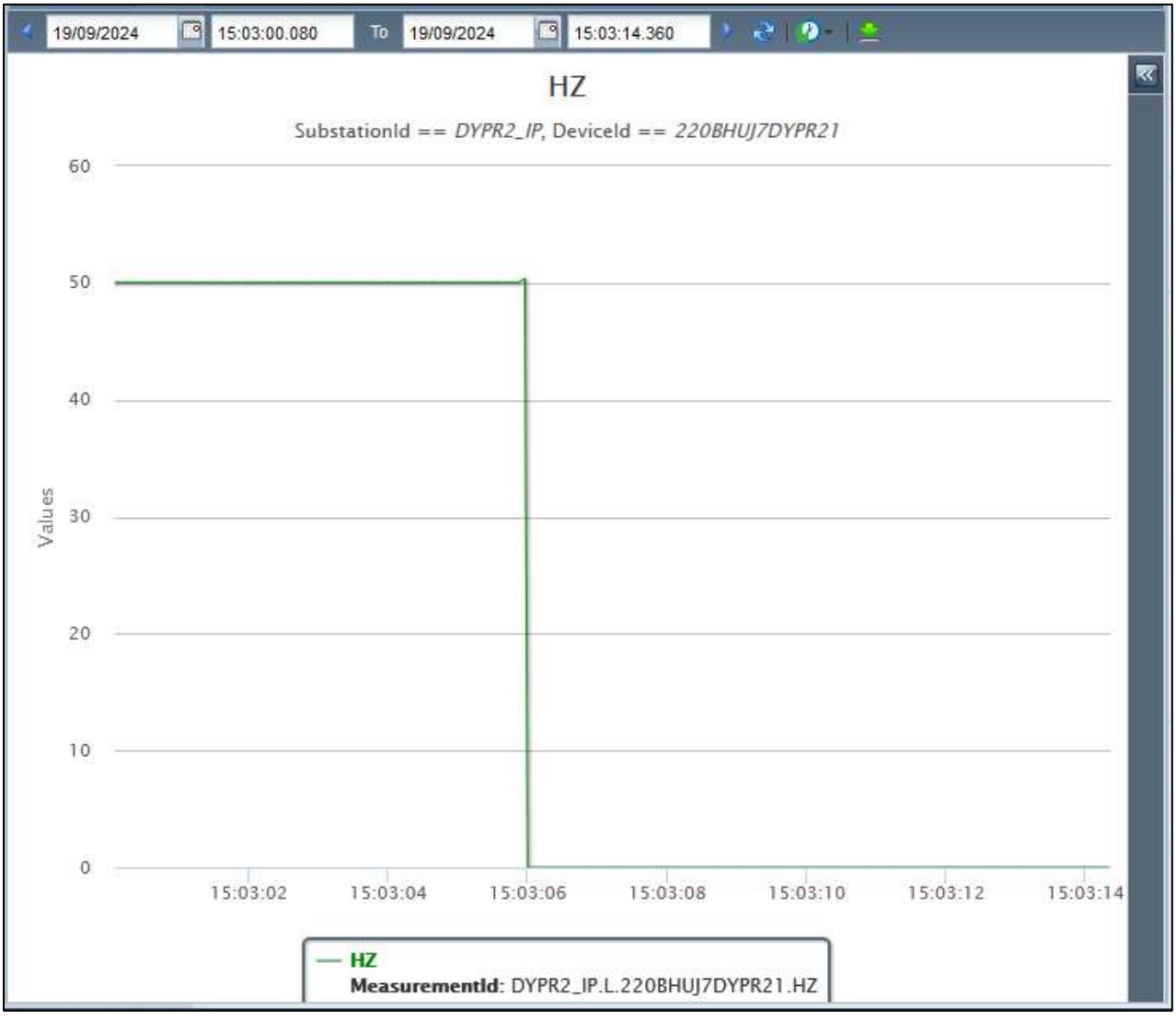


Figure 1. 220 kV Bhuj- Dayapar-1 Frequency Plot

7. **रुकावट की अवधि / Duration of interruption:** 49 minutes

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

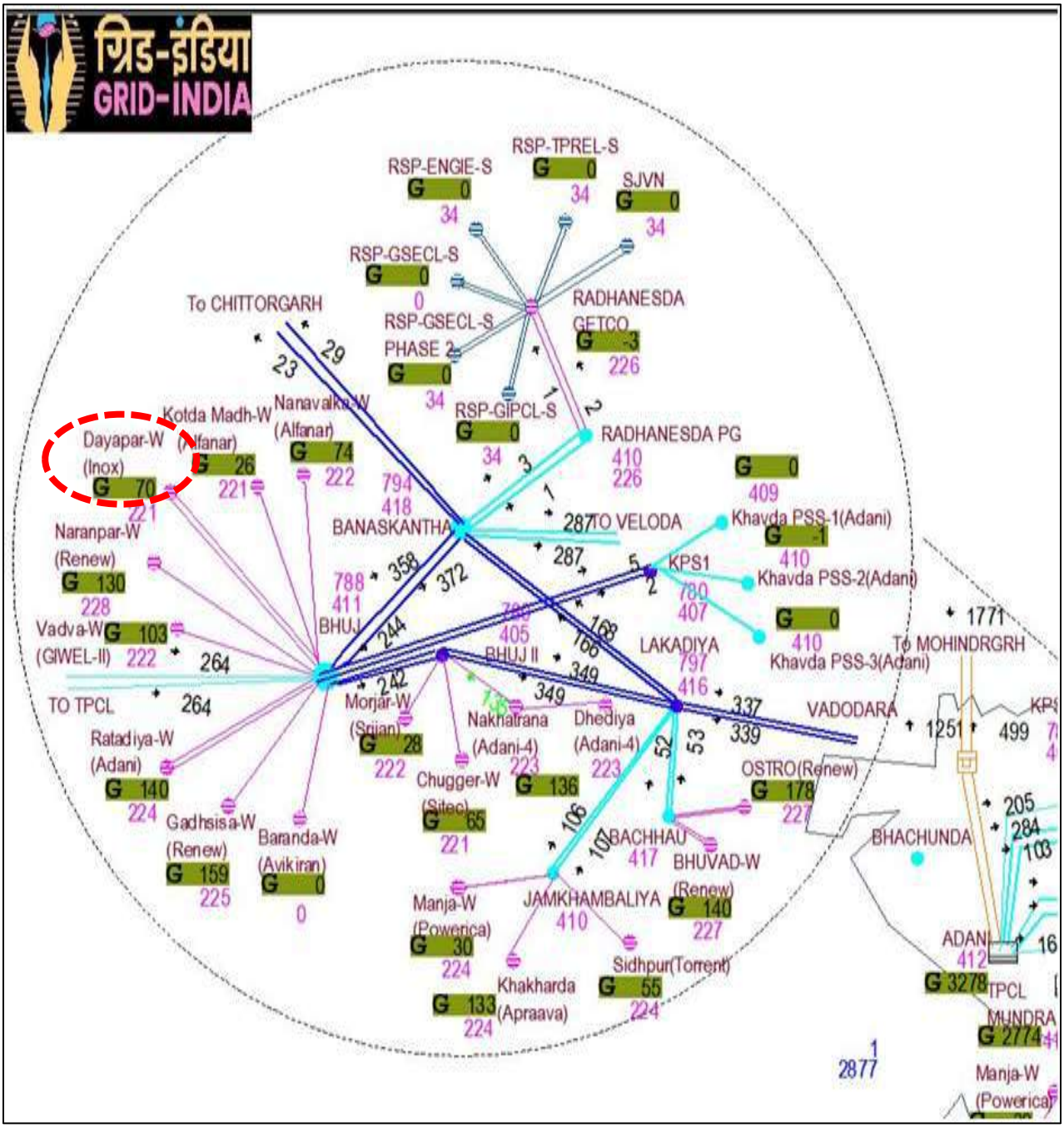


Figure 2. Network across the affected area

9. **उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event):** Blast in capacitor banks at Dayapar

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Dayapar	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220 kV Bhuj-Dayapar ckt-1	15:03 hrs	AC and DC supply cable failure of ICT 1 at Dayapar	DT received	15:52 hrs
2	220 kV Bhuj-Dayapar ckt-2	15:03 hrs	AC and DC supply cable failure of ICT 1 at Dayapar		16:02 hrs
3	220/33 kV ICT 1	15:03 hrs	AC and DC supply cable failure of ICT 1 at Dayapar	NA	17:53 hrs
4	220/33 kV ICT 2	15:03 hrs	AC and DC supply cable failure of ICT 1 at Dayapar		15:52 hrs
5	220/33 kV ICT 3	15:03 hrs	AC and DC supply cable failure of ICT 1 at Dayapar		15:52 hrs
6	220/33 kV ICT 4	15:03 hrs	AC and DC supply cable failure of ICT 1 at Dayapar		15:52 hrs

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

- 220 kV Dayapar sub-station AC supply cable and DC supply cable of 220/33 kV Dayapar-ICT-1 got punctured resulting in tripping of 220 kV Bhuj-Dayapar-1&2 and 220/33 kV Dayapar-ICT-1,2,3&4.
- DT received at Bhuj end.

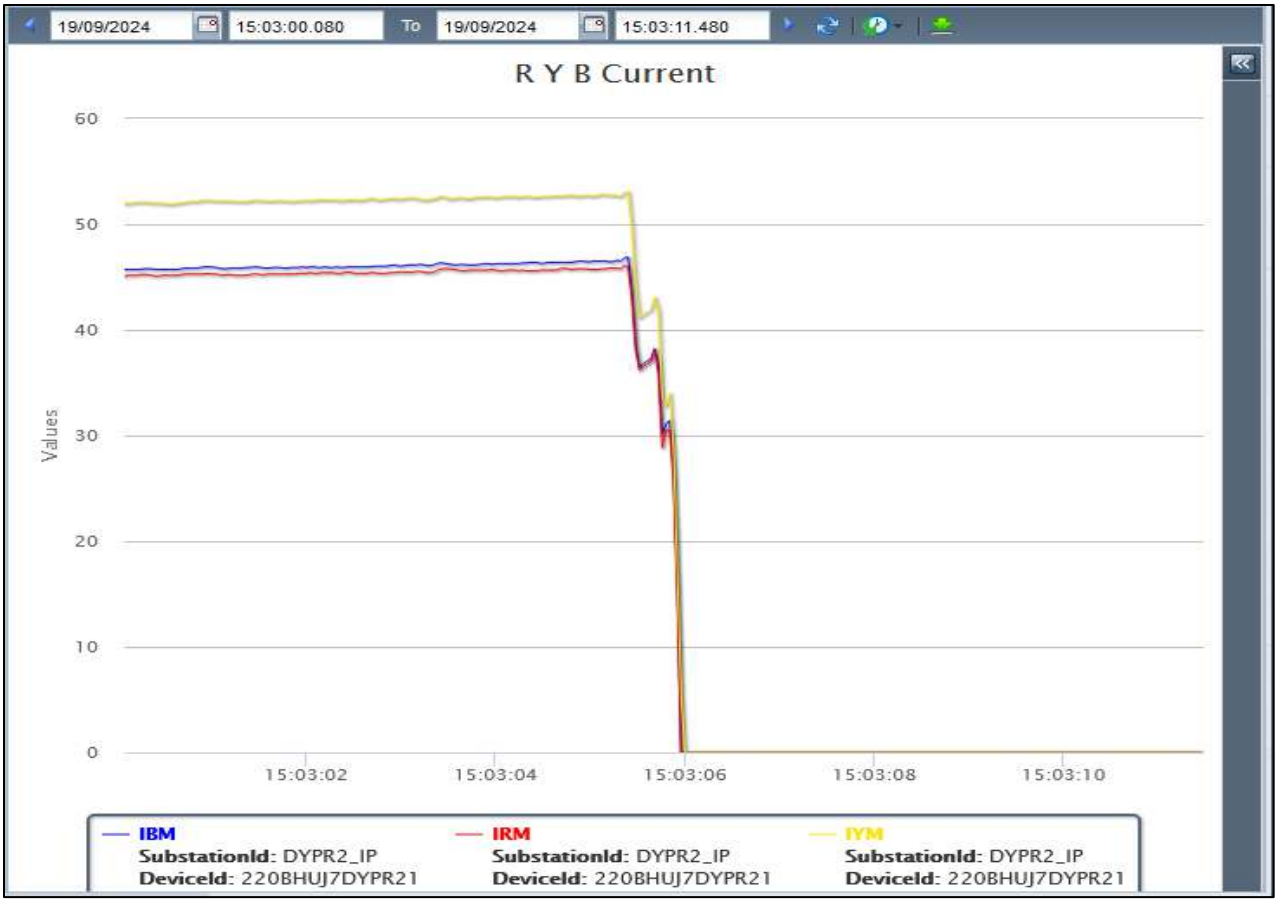


Figure 3. 220 kV Bhuj- Dayapar-1 Current Plot

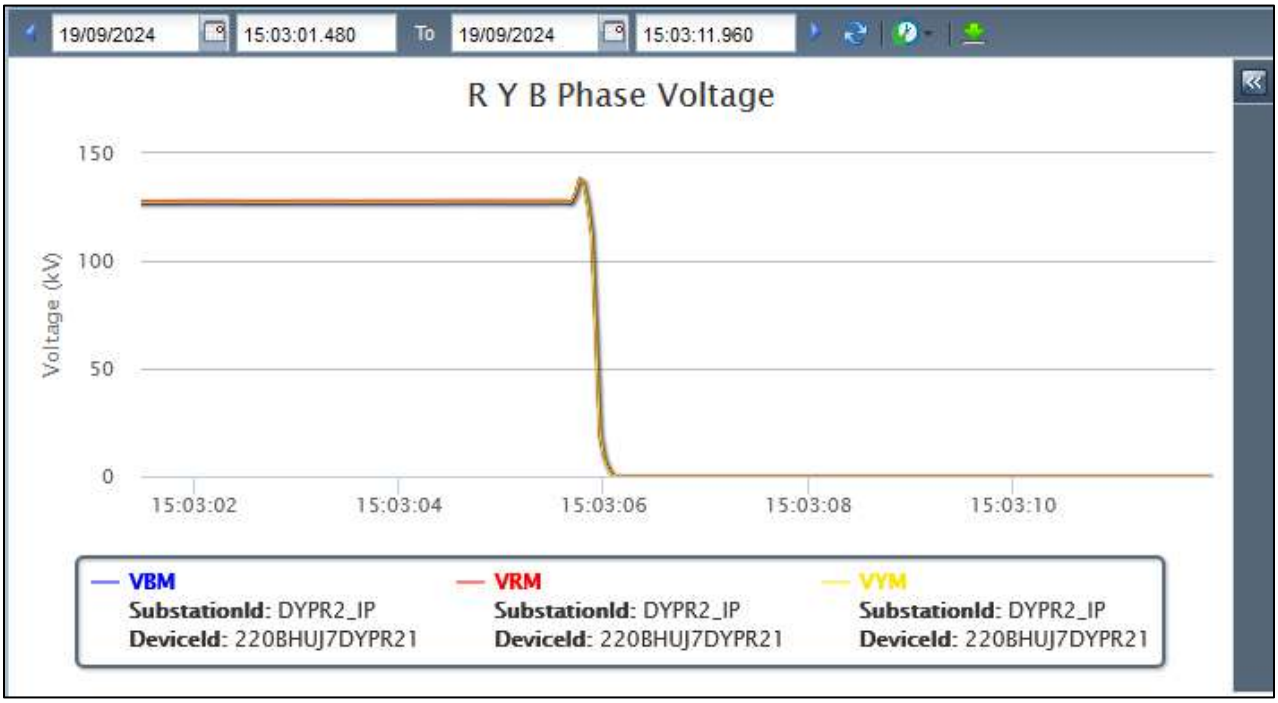


Figure 4. 220 kV Bhuj- Dayapar -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed: Nil

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Faulty cable was isolated and replaced with spare by Inox, Dayapar and system was restored.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late.
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from INOX and received late from POWERGRID WR-2
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from INOX Dayapar

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

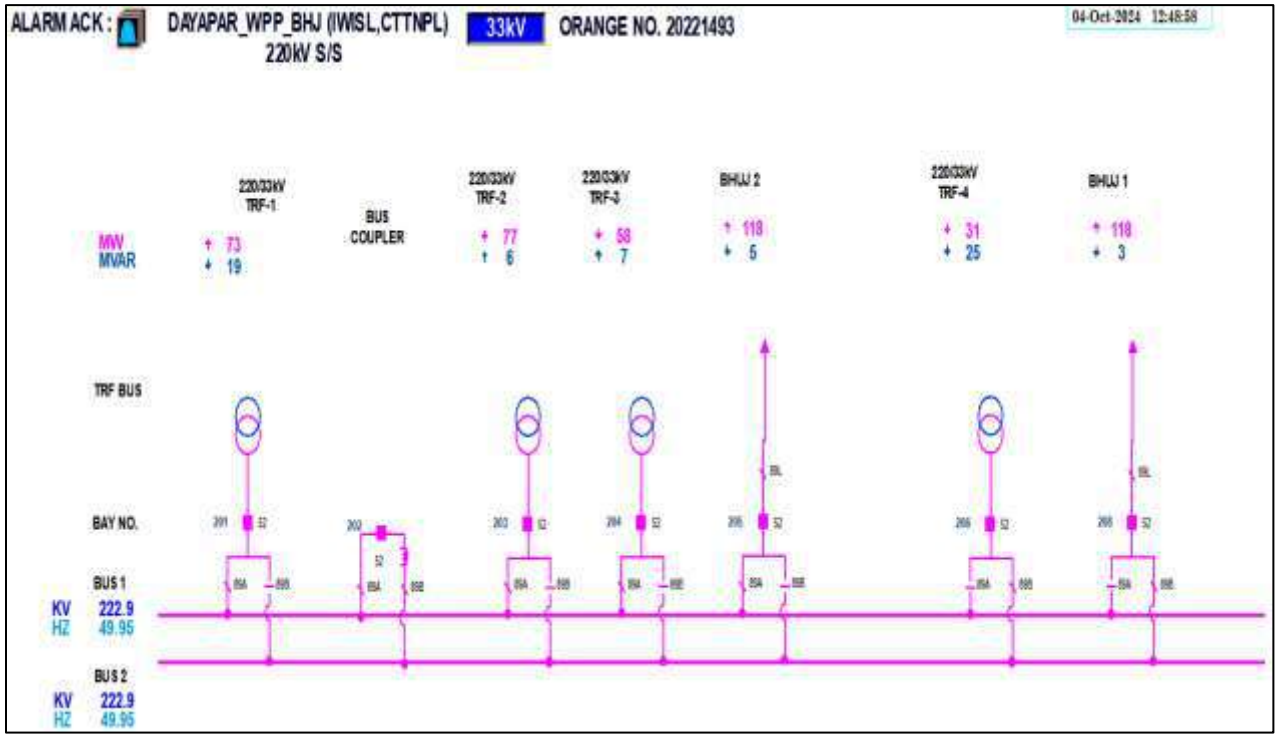
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

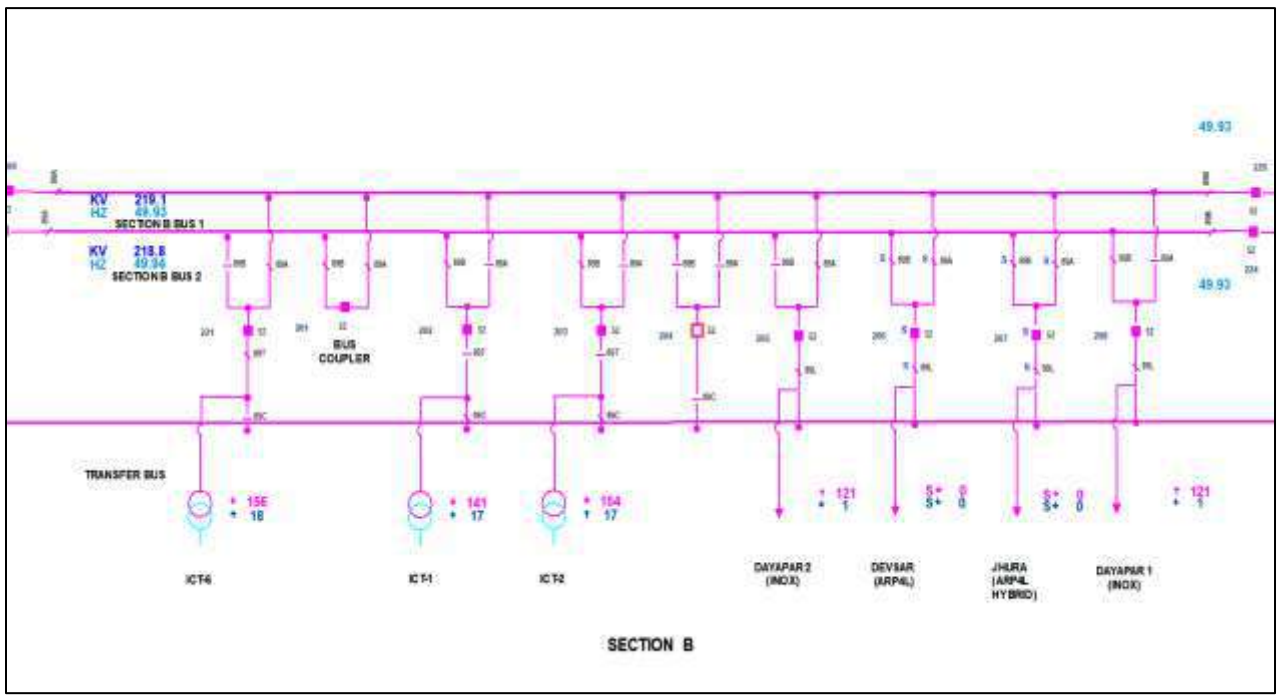
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 20852 (DYPR2-1) OPEN	15:03:05	776
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 20552 (DYPR2-2) OPEN	15:03:05	775
WRLDC	220KV-CB	DYPR2_IP	DAYAPAR CB 20152 (T1_P) FAULTY	16:00:49	400
WRLDC	220-SOE	DYPR2_IP	DAYAPAR CB 20152 (T1_P) ACTED	16:00:49	402
WRLDC	220KV-CB	DYPR2_IP	DAYAPAR CB 20152 (T1_P) OPEN	16:00:49	402
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 20552 (DYPR2-2) ACTED	15:03:05	728
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 20852 (DYPR2-1) ACTED	15:03:05	726
WRLDC	220KV-CB	BHJ72_PG	BHUJ 2 CB 20552 (LINE-4) OPEN	15:03:28	613

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Dayapar SLD:

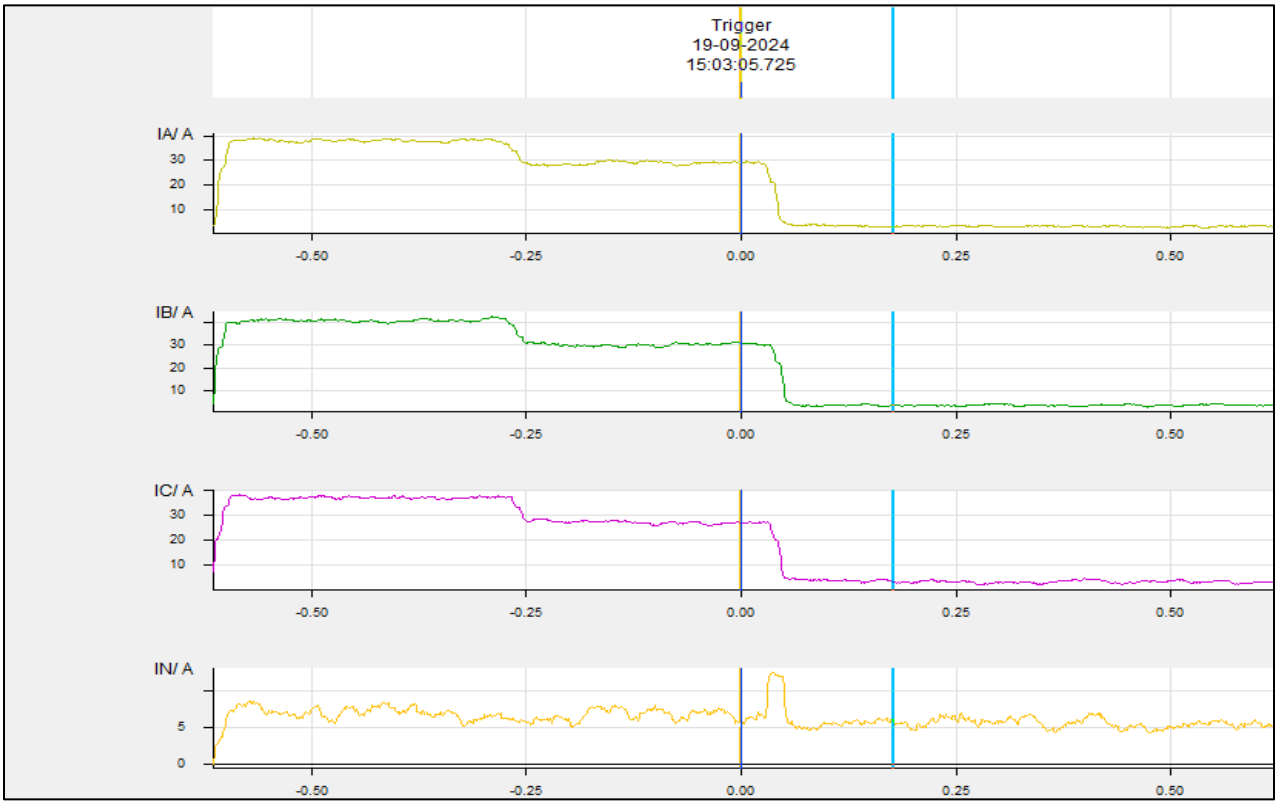


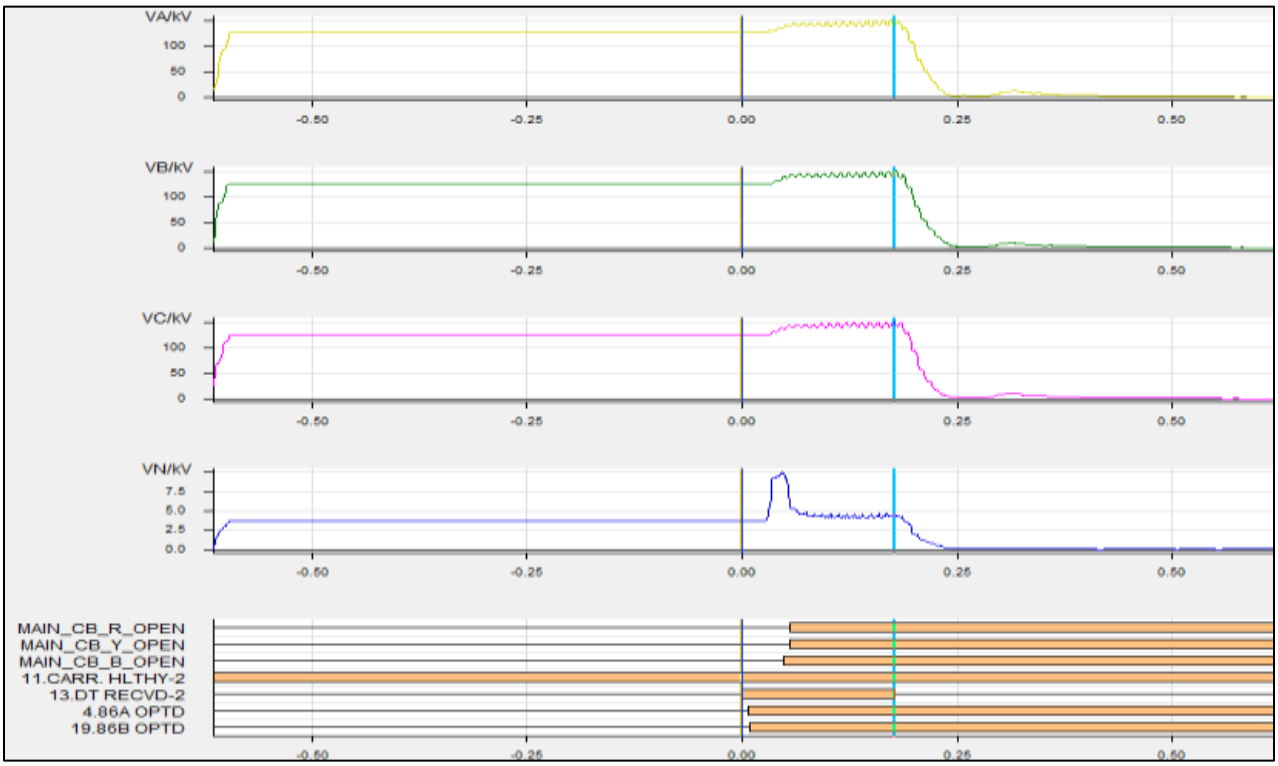
220kV Bhuj SLD:



अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Bhuj- Dayapar -1 at Bhuj end.





अनुलग्नक-D / Annexure-D: Site photographs –

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. गध्सिसा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Gadhsisa of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 14.10.2024

1. **घटना का सारांश / Event Summary:** At 01:03 Hrs / 24-09-2024, 220kV Bhuj- Gadhsisa line tripped on Y-N fault. During patrolling tower was found damaged on top section due to conductor theft of spare line on same tower i.e. tower no. 15/0. Charging attempt failed on 9/10/2024 at 19:11 due to insulator damage. Line was restored after insulator replacement Work. Generation loss of 72 MW occured at Gashsisa (Renew Power) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 01:03 Hrs / 24-09-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Gadhsisa S/S, Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.02	70744	57266	13202	18327
घटना के बाद Post Event	50.02	70704	57215	13201	18328

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Generation loss of 72 MW occurred at Gadhsisa (Renew Power)



Figure 1. PMU Frequency plot of 220 kV Bhuj- Dayapar-1

7. **रुकावट की अवधि / Duration of interruption:** Gadhsisa- 17 Days 21 Hrs 36 Minutes.

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

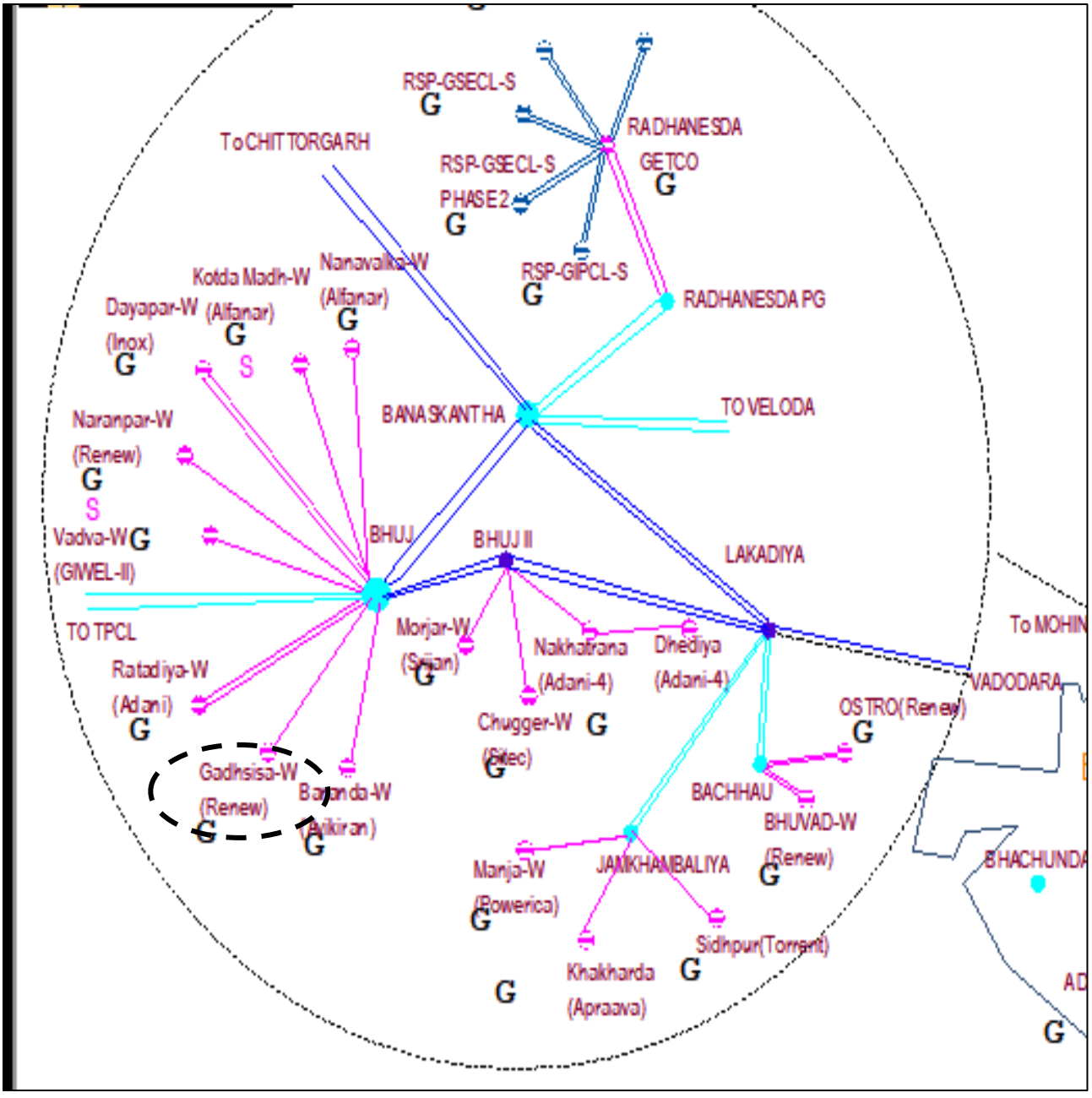


Figure 2. Network across the affected area

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

Nil

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Gadhsisa	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1	220kV Bhuj-Gadhsisa s/c	01:09 / 24-09-2024	Tripped due to Y-E fault. R-PH: 159.728 A Y-PH: 786.498 A B-PH: 355.555 A IN : 0.814 A Fault Location 40 km Zone-1		22:39/ 11.10.2024

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

- 220kV Bhuj- Gadhsisa line tripped on Y-N fault. During patrolling tower was found damaged on top section due to conductor theft of spare line on same tower i.e. tower no. 15/0.
- 3 Ph tripping observed at both ends on single phase fault without A/R operation.
- Charging attempt failed on 9/10/2024 at 19:11 due to insulator damage.
- Line was restored after insulator replacement Work at 22:39/11.10.2024 .



Figure 3. PMU Voltage plot of 220 kV Bhuj- Dayapar -1

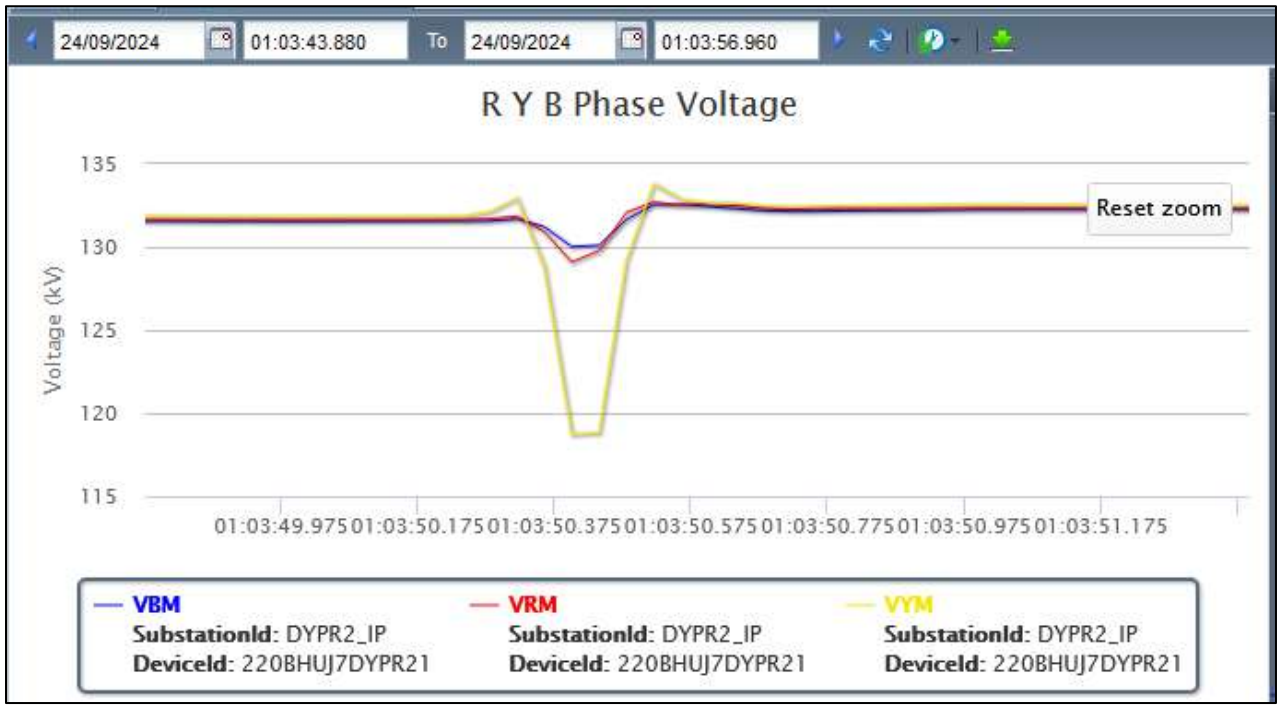


Figure 4. PMU Current plot of 220 kV Bhuj- Dayapar -1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- 3 Ph tripping observed at both ends on single phase fault without A/R operation.
- Renew Power may kindly take appropriate legal action to avoid such occurrences of theft in future leading generation loss.
- DR not time sync at Renew Gadhsisa end.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Damaged tower repaired and charging attempt taken on 9/10/2024 at 19:11 which failed as the insulator was found damaged.
- Line restored at 22:39/11.10.2024 after insulator replacement.
- Renew Power may kindly take appropriate legal action to avoid such occurrences of theft in future.
- DR not time sync at Renew Gadhsisa end. Renew power may kindly resolve.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received from RENEW Gadhsisa
2	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not Submitted in .cfg/.dat format by Renew-Gadhsisa
3	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from RENEW Gadhsisa

4	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	3 Ph tripping observed at both ends on single phase fault without A/R operation. POWERGRID WR-2 and RENEW POWER may kindly investigate for the same.
5	DR Time Synchronization Issues	IEGC section 17.3	DR not time sync at Renew Gadhsisa end

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC –

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23452 (GDSI2) OPEN	01:03:50	451
WRLDC	220KV-CB	GDSI2_RE	GADHSISA CB 20252 (BHUJ7) OPEN	01:03:51	226

SOE from Gadhsisa-

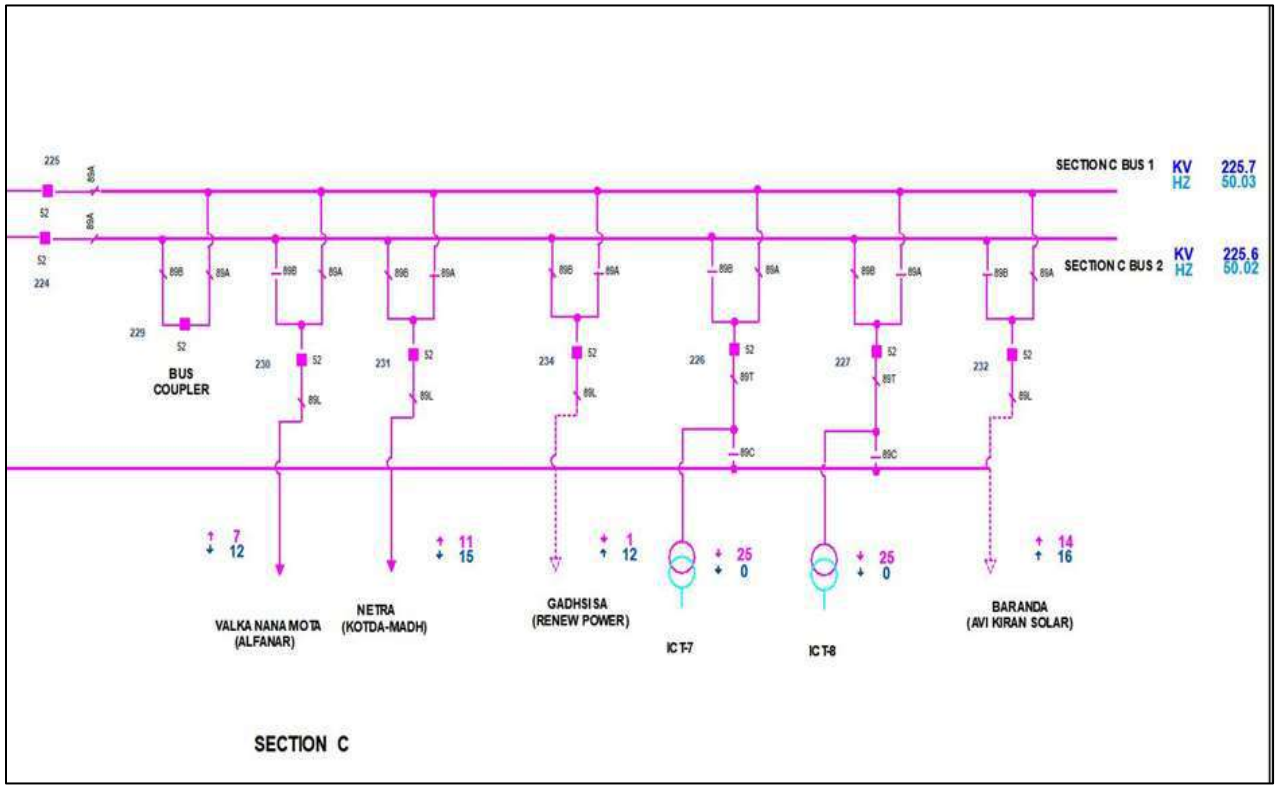
Events List

Channel Number	Name	Status	Time
23	ZM02-START	On	9/24/2024 1:09:24.516 AM
25	ZM03-START	On	9/24/2024 1:09:24.516 AM
43	PHS-STFWL2	On	9/24/2024 1:09:24.516 AM
75	ZM02-STL2	On	9/24/2024 1:09:24.516 AM
78	ZM02-STND	On	9/24/2024 1:09:24.516 AM
79	ZM03-STND	On	9/24/2024 1:09:24.516 AM
92	PHS-STNDL2	On	9/24/2024 1:09:24.516 AM
94	PHS-STFWPE	On	9/24/2024 1:09:24.516 AM
13	CAR RECV CH-2	On	9/24/2024 1:09:24.525 AM
22	ZM01-TRIP	On	9/24/2024 1:09:24.525 AM
33	MAIN/TBC CB-T	On	9/24/2024 1:09:24.525 AM
7	MAIN-1 TRIP	On	9/24/2024 1:09:24.525 AM
39	ZM01-START	On	9/24/2024 1:09:24.525 AM
60	ZM01-TRL2	On	9/24/2024 1:09:24.525 AM
68	AR01-START	On	9/24/2024 1:09:24.525 AM
77	ZM01-STND	On	9/24/2024 1:09:24.525 AM
86	ZCOM-CS	On	9/24/2024 1:09:24.525 AM
35	MAIN/TBC CB-T	On	9/24/2024 1:09:24.525 AM
70	TEF1-START	On	9/24/2024 1:09:24.527 AM
30	M-1/2 CAR SEN	On	9/24/2024 1:09:24.528 AM
32	ZCOM-TRIP	On	9/24/2024 1:09:24.528 AM
12	CAR RECV CH-1	On	9/24/2024 1:09:24.537 AM
38	PREP_3PH_TRIP	On	9/24/2024 1:09:24.558 AM
73	PERMIT 1-PH T	On	9/24/2024 1:09:24.558 AM
70	TEF1-START	Off	9/24/2024 1:09:24.568 AM
2	MAIN_YPH_OP	On	9/24/2024 1:09:24.578 AM
2	MAIN_YPH_OP	Off	9/24/2024 1:09:24.581 AM
2	MAIN_YPH_OP	On	9/24/2024 1:09:24.584 AM
1	MAIN_RPH_OP	On	9/24/2024 1:09:24.585 AM

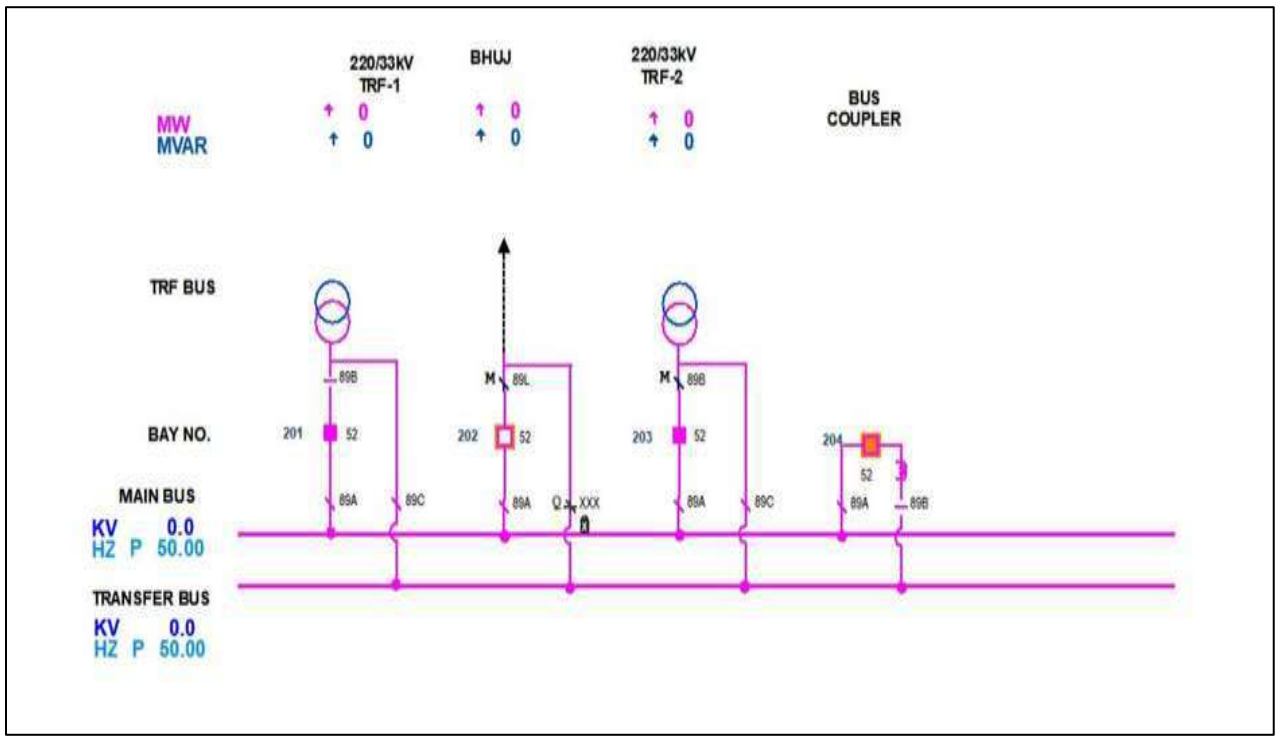
23	ZM02-START	Off	9/24/2024 1:09:24.585 AM
25	ZM03-START	Off	9/24/2024 1:09:24.585 AM
39	ZM01-START	Off	9/24/2024 1:09:24.585 AM
22	ZM01-TRIP	Off	9/24/2024 1:09:24.585 AM
75	ZM02-STL2	Off	9/24/2024 1:09:24.585 AM
60	ZM01-TRL2	Off	9/24/2024 1:09:24.585 AM
78	ZM02-STND	Off	9/24/2024 1:09:24.585 AM
77	ZM01-STND	Off	9/24/2024 1:09:24.585 AM
92	PHS-STNDL2	Off	9/24/2024 1:09:24.585 AM
94	PHS-STFWPE	Off	9/24/2024 1:09:24.585 AM
43	PHS-STFWL2	Off	9/24/2024 1:09:24.585 AM
79	ZM03-STND	Off	9/24/2024 1:09:24.585 AM
3	MAIN_BPH_OP	On	9/24/2024 1:09:24.586 AM
32	ZCOM-TRIP	Off	9/24/2024 1:09:24.612 AM
68	AR01-START	Off	9/24/2024 1:09:24.612 AM
86	ZCOM-CS	Off	9/24/2024 1:09:24.627 AM
30	M-1/2 CAR SEN	Off	9/24/2024 1:09:24.630 AM
13	CAR RECV CH-2	Off	9/24/2024 1:09:24.646 AM
12	CAR RECV CH-1	Off	9/24/2024 1:09:24.655 AM
7	MAIN-1 TRIP	Off	9/24/2024 1:09:24.675 AM
33	MAIN/TBC CB-T	Off	9/24/2024 1:09:24.675 AM
35	MAIN/TBC CB-T	Off	9/24/2024 1:09:24.675 AM

अनुलग्नक-2 / Annexure-2:

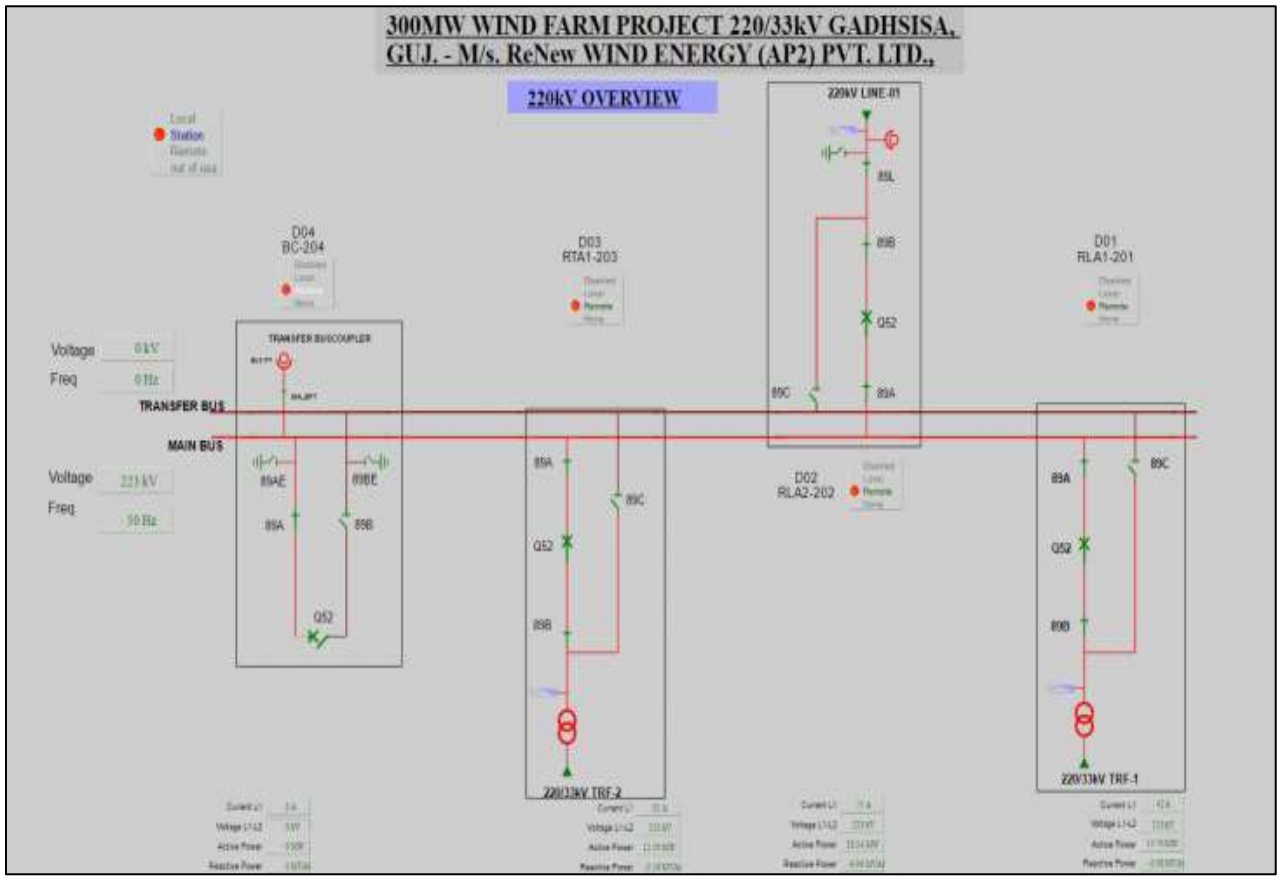
220kV Bhuj SLD:



220kV Gadhsisa SLD:

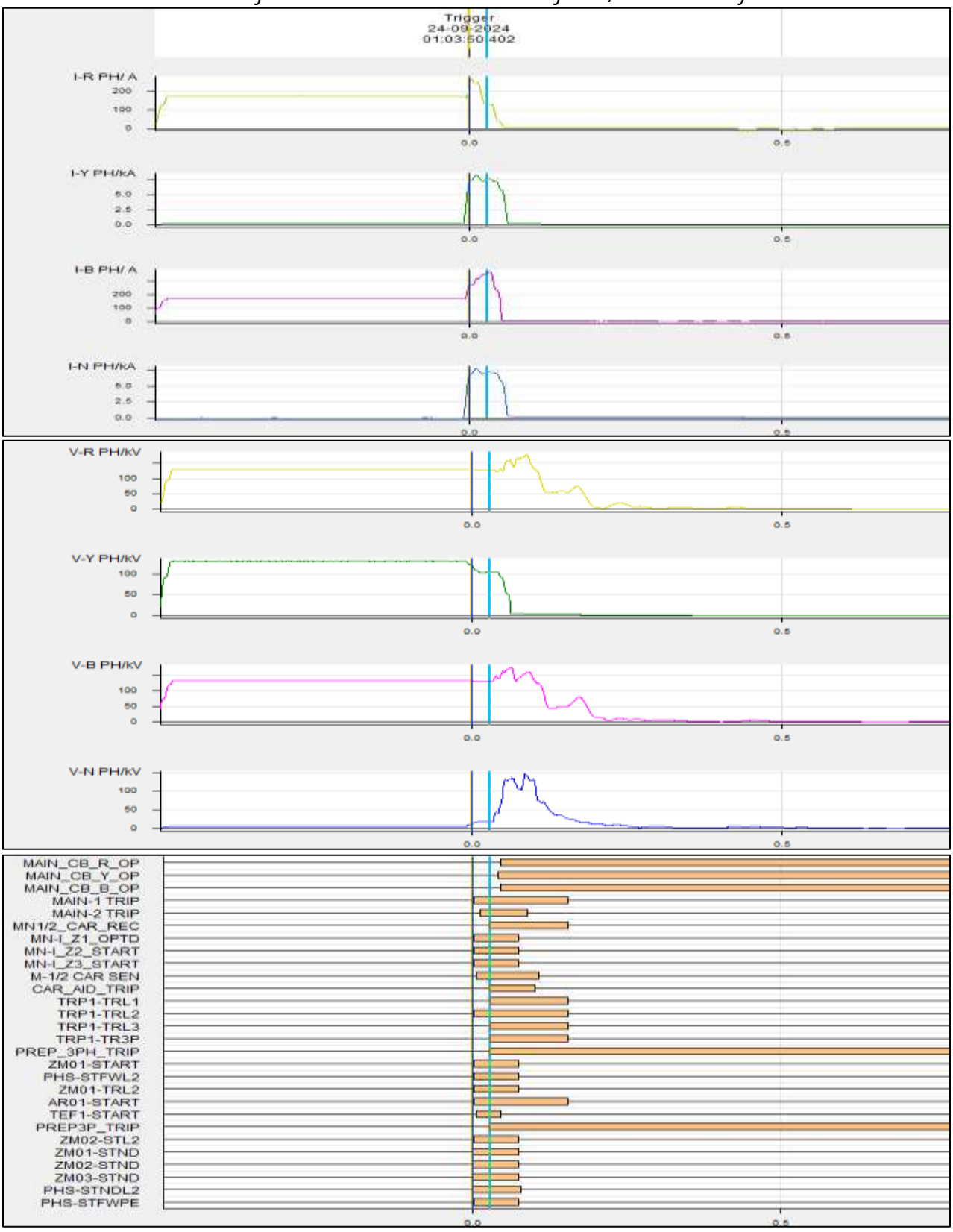


SLD from Gadhsisa RENEW-

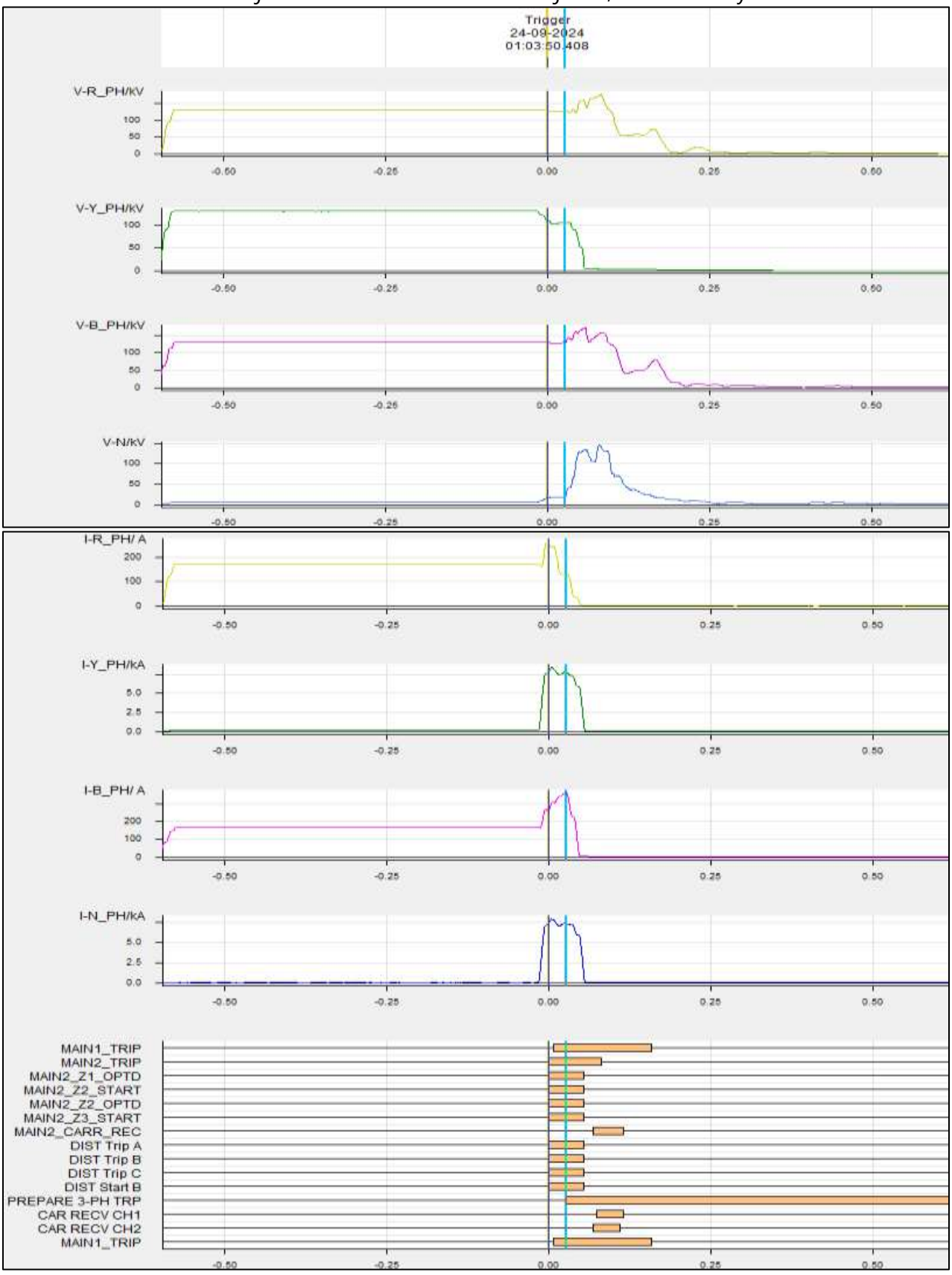


अनुलग्नक-3 / Annexure-3: Disturbance recorder –

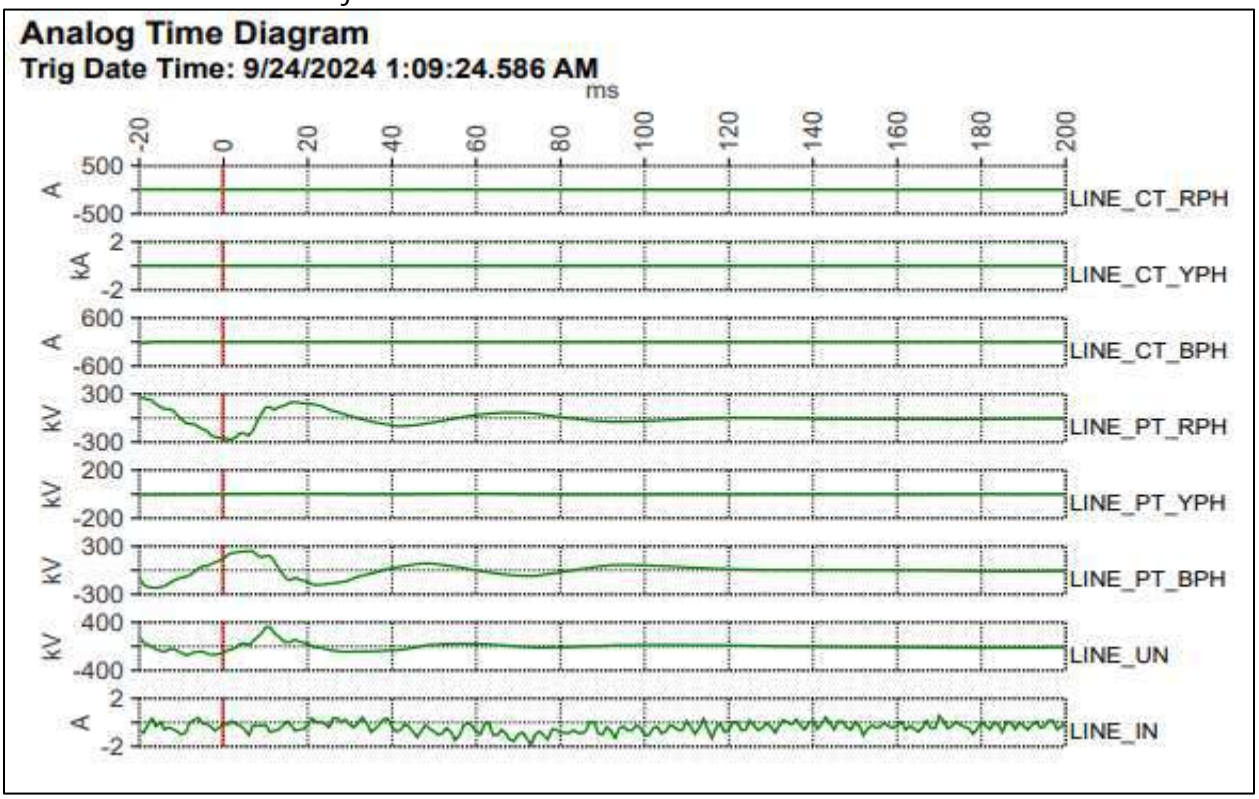
A. DR of 220 kV Bhuj- Gadhsisa -1 Line from Bhuj end, Main 1 relay

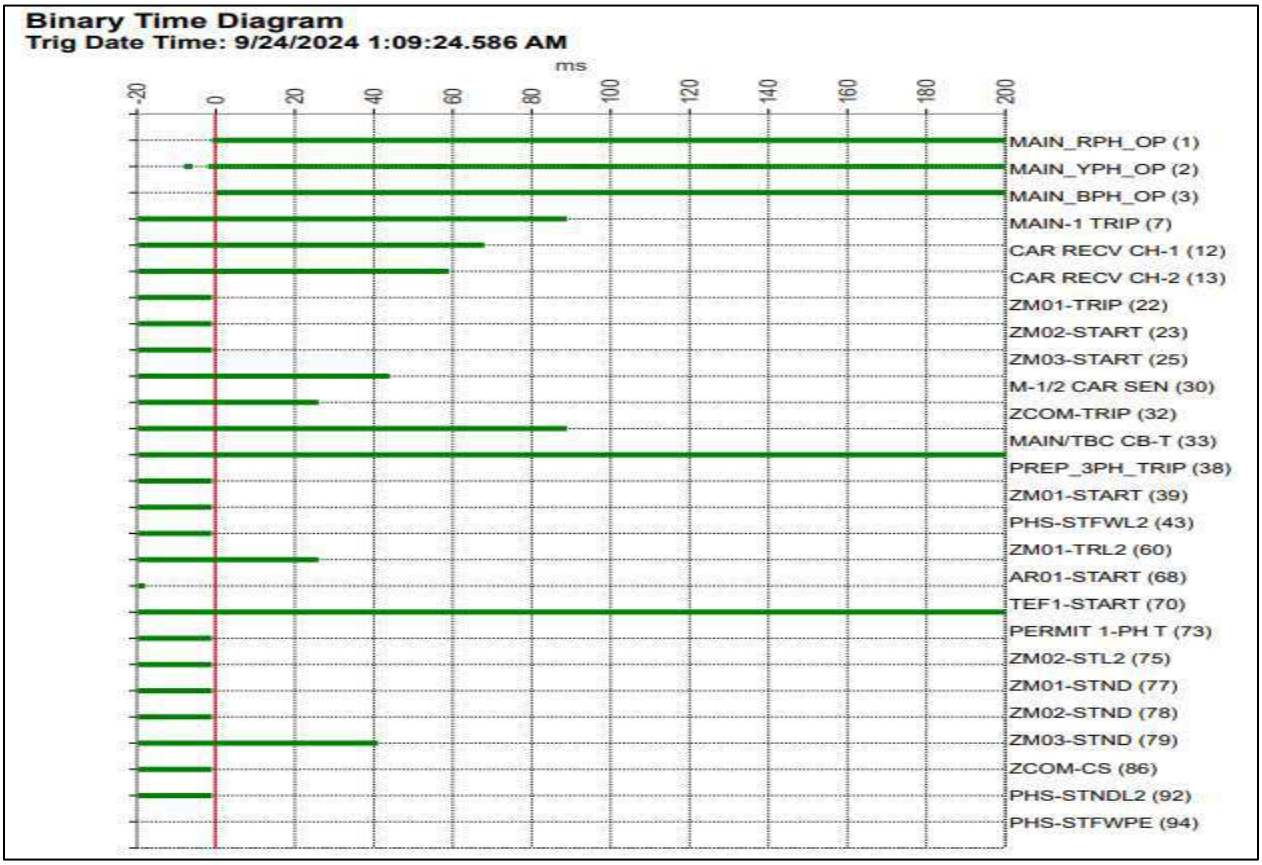


B. DR of 220 kV Bhuj- Gadhsisa -1 Line from Bhuj end, Main 2 relay



C. DR of 220 kV Bhuj- Gadhsisa -1 Line from Gadhsisa end





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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. बरांडा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Baranda of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 23.10.2024

1. **घटना का सारांश / Event Summary:** At 02:45 Hrs / 01-10-2024, 220 kV Baranda-Bhuj S/C tripped on B-phase to G fault. Generation loss of around 63 MW occurred due to the event.

1. **घटना का समय और दिनांक / Time and Date of the Event :** 02:45 Hrs / 01-10-2024

2. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1

3. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Baranda, Gujarat

4. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.02	67742	53124	9233	15728
घटना के बाद Post Event	50.01	67667	53362	9194	15748

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति Weather Condition	Normal

5. **लोड और जेनरेशन हानि / Load and Generation loss**: 63 MW Gen loss.

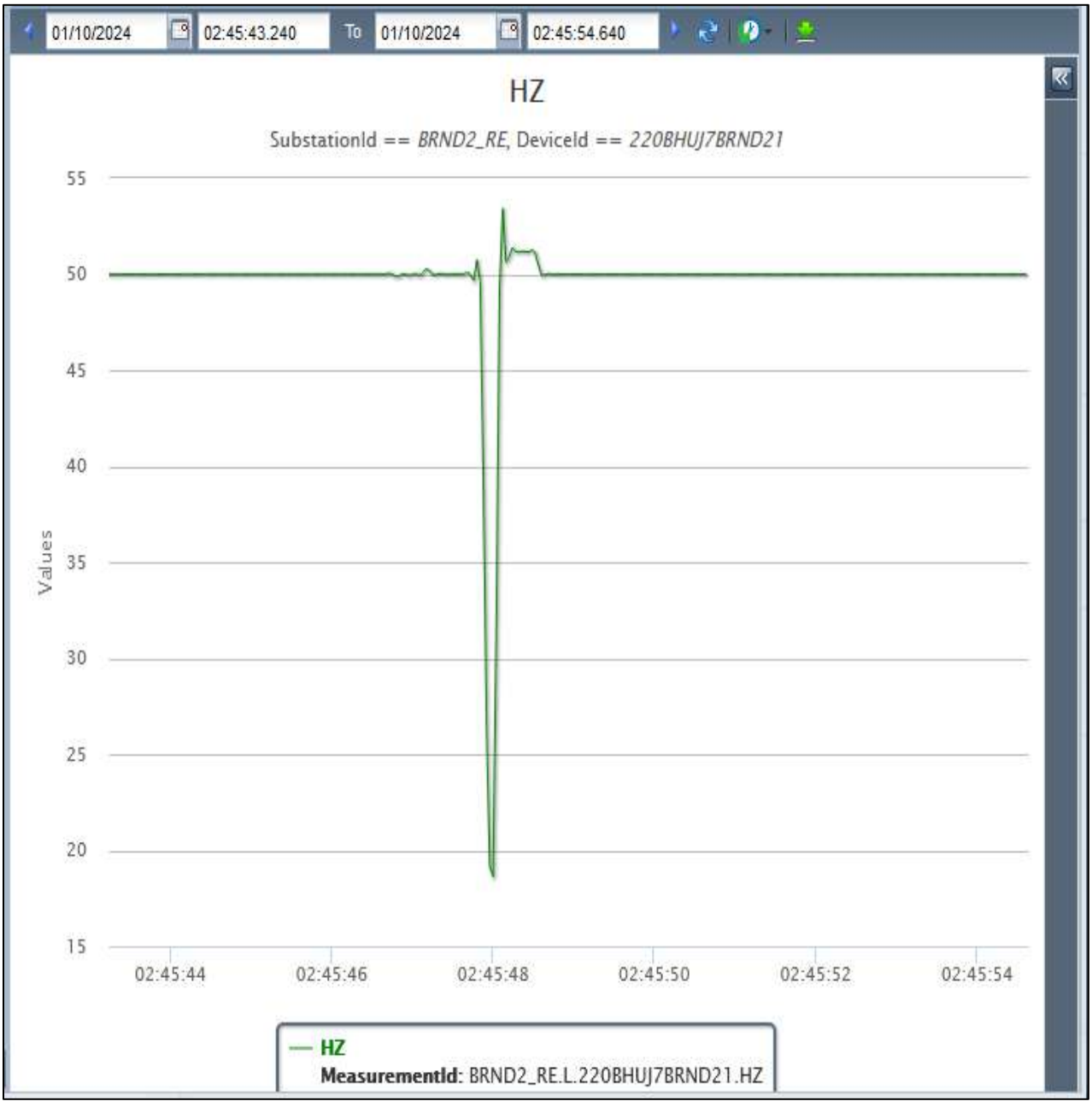


Figure 1. 220 kV Bhuj- Baranda_-1 Frequency Plot

6. **रुकावट की अवधि / Duration of interruption:** 3 hours 56 minutes

7. **प्रभावित क्षेत्र का नक्शा / Network across the affected area**

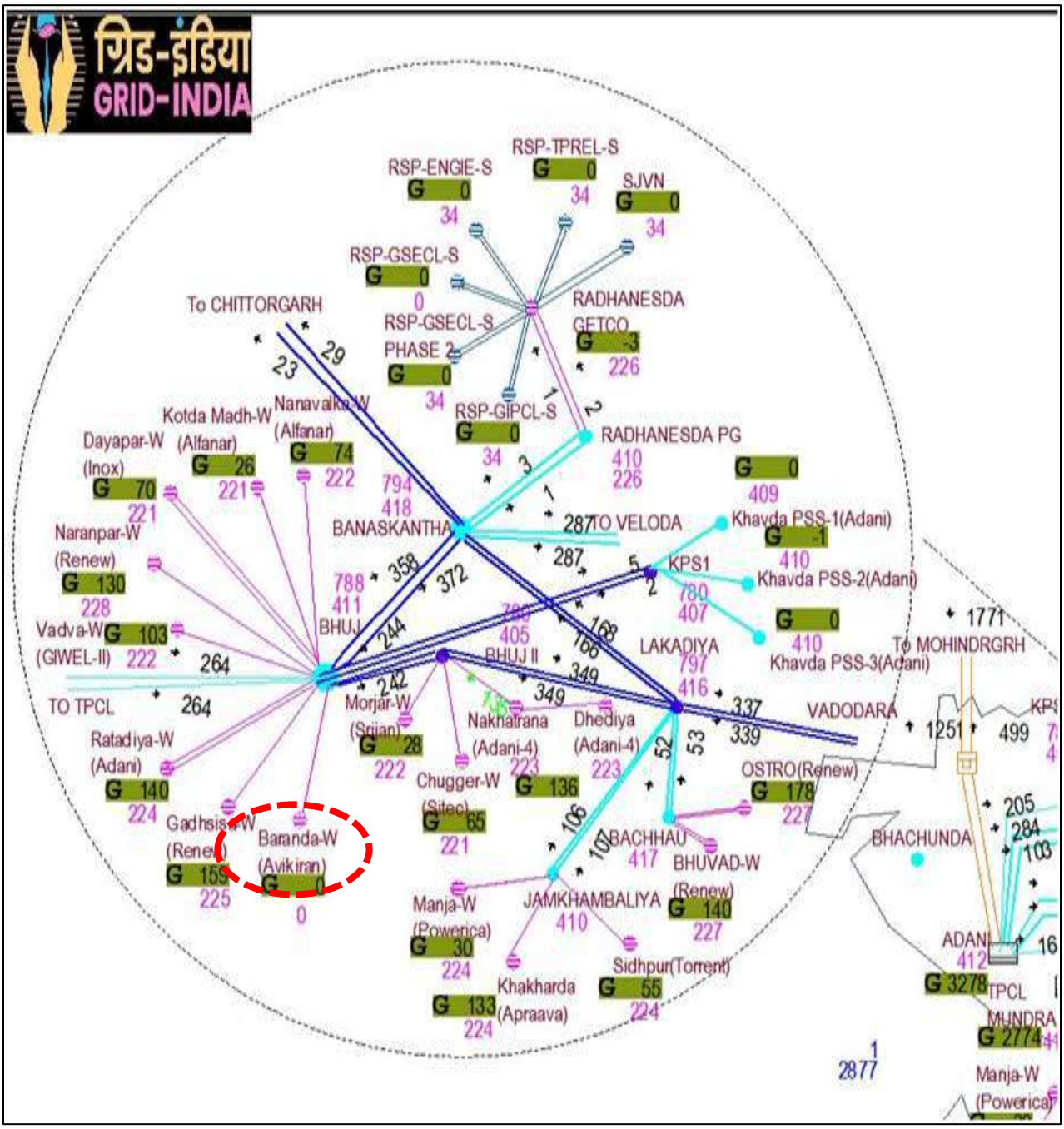


Figure 2. Network across the affected area

8. **उपकरण विफलता का विवरण / Details of Equipment Failure (if any during the event):** Nil

9. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Baranda	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1.	220 kV Baranda-Bhuj S/C	02:45	Fault Current:- 0.79kA Fault Phase:- B-Phase Fault Distance:- 15.0km Zone-1 Distance relay operated, 86 Relay Operated. Zone-1 Operated, Overcurrent & Overvoltage Operated, DT Send/Rec, carrier Send, Carrier Receive General trip, B-Phase Trip, Zone-1 Trip, Overvoltage, carrier receive Master Relay Operated	Fault Current:- 3.93 kA Fault Phase:- B-Phase Fault Distance:- 54.42 kM Zone-1	06:41

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

- 220KV Baranda – Bhuj line tripped, after patrolling team has identified some foreign object on the B phase to ground @Tower no. 233 thrown by some local villagers (ROW Issue). A/R not attempted in single phase fault.

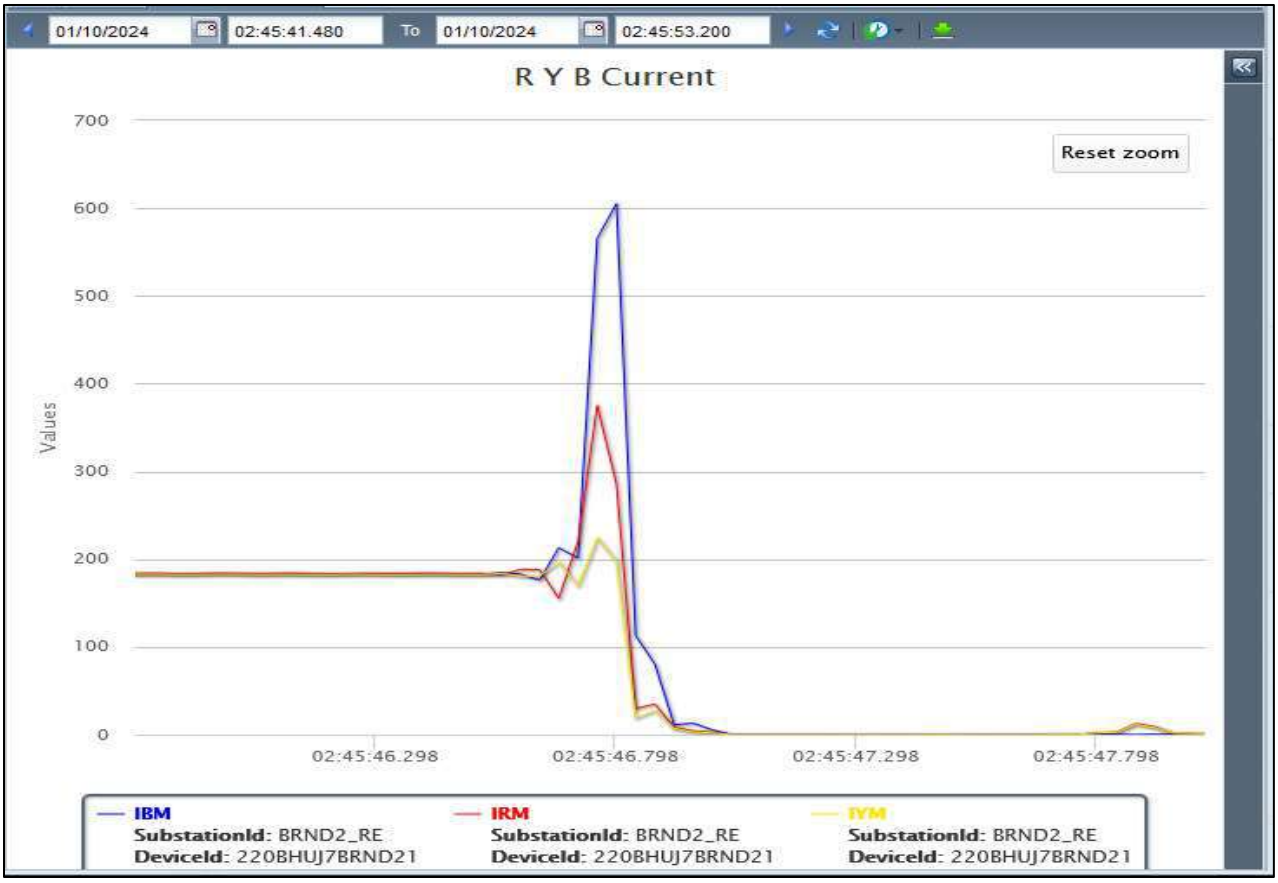


Figure 3. 220 kV Bhuj- Baranda_-1 Current Plot

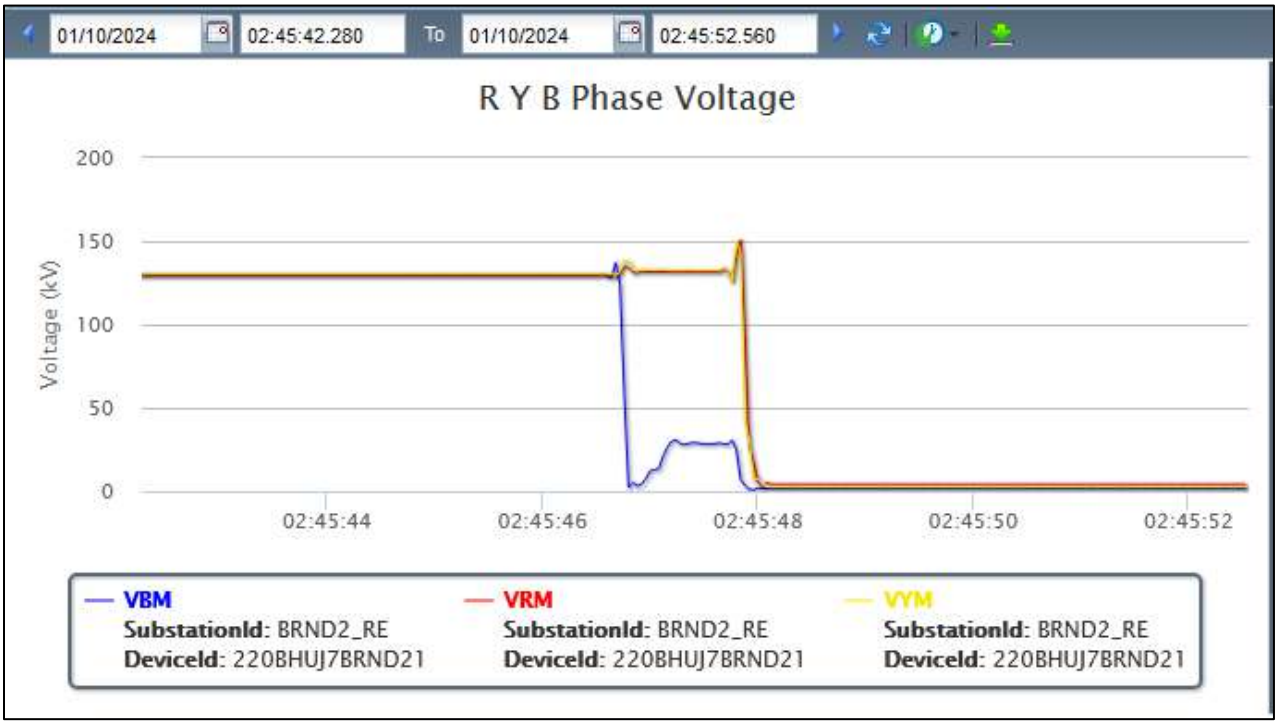


Figure 4. 220 kV Bhuj- Baranda_-1 Voltage Plot

11. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- During Patrolling, Avikiran found foreign object on the B phase to ground at Tower no. 233 on 220KV Baranda – Bhuj line. Avikiran resolved this issue in discussion with locals and and foreign object has also been removed from the line.
- 3 phase tripping on Single phase fault without A/R attempt

12. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- After removal of foreign object from 220KV Baranda- Bhuj Line, Line charged successfully.

13. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted for single phase fault. Avikiran may kindly resolve.

14. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) FAULTY	02:45:46	807
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) TRANSIT	02:45:46	809
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23252 (BRND2) FAULTY	02:45:46	798
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23252 (BRND2) CLOSED	02:45:47	836
WRLDC	220-SOE	BHUJ7_PG	BHUJ CB 23252 (BRND2) ACTED	02:45:47	867
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23252 (BRND2) FAULTY	02:45:47	871
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23252 (BRND2) CLOSED	02:45:47	881
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) OPEN	02:45:46	812
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23252 (BRND2) OPEN	02:45:47	885
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) FAULTY	02:45:47	877
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) CLOSED	02:45:47	890
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) TRANSIT	02:45:47	961
WRLDC	220KV-CB	BRND2_RE	BARANDA CB 20252 (BHUJ7) OPEN	02:45:47	962

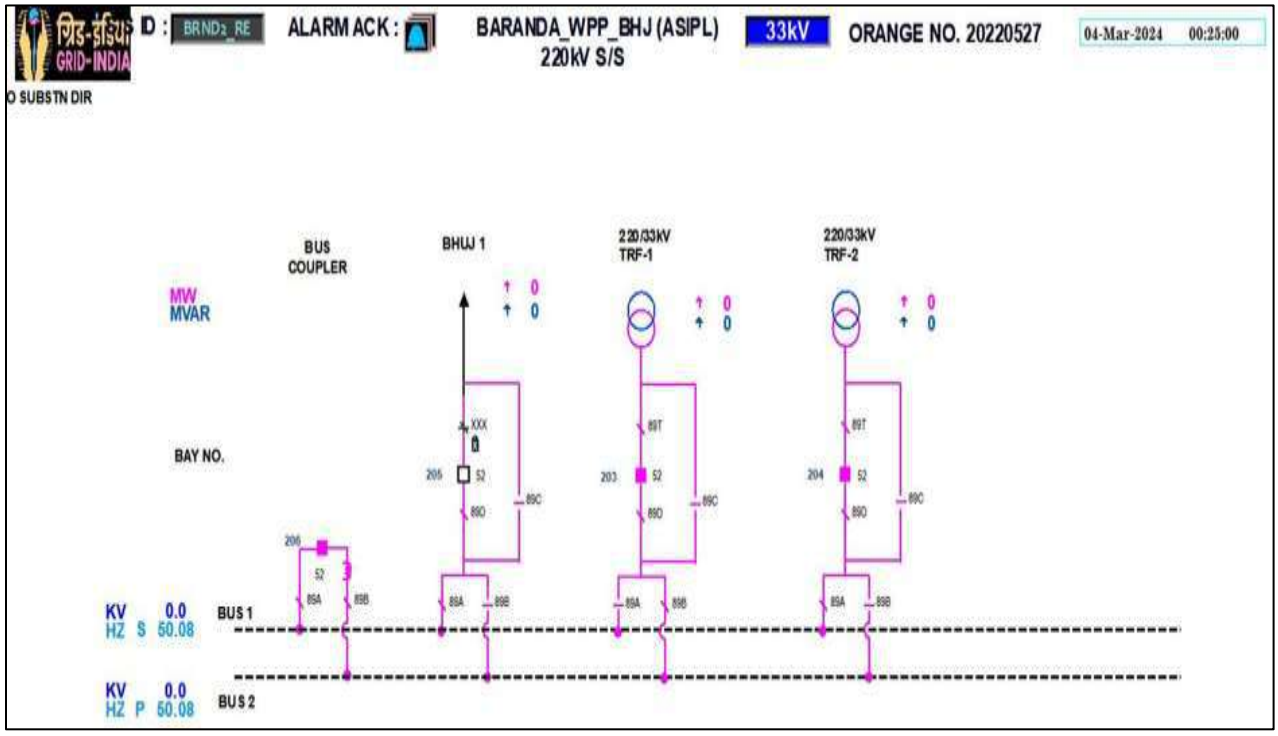
SOE from Baranda-

Trip Log - 000045 / 10/ 1/2024 2:45:46.767 AM - 5323_100_Suzlon / Line / B202_21_1__7SA522 V4.7/7SA522 V04.76.02

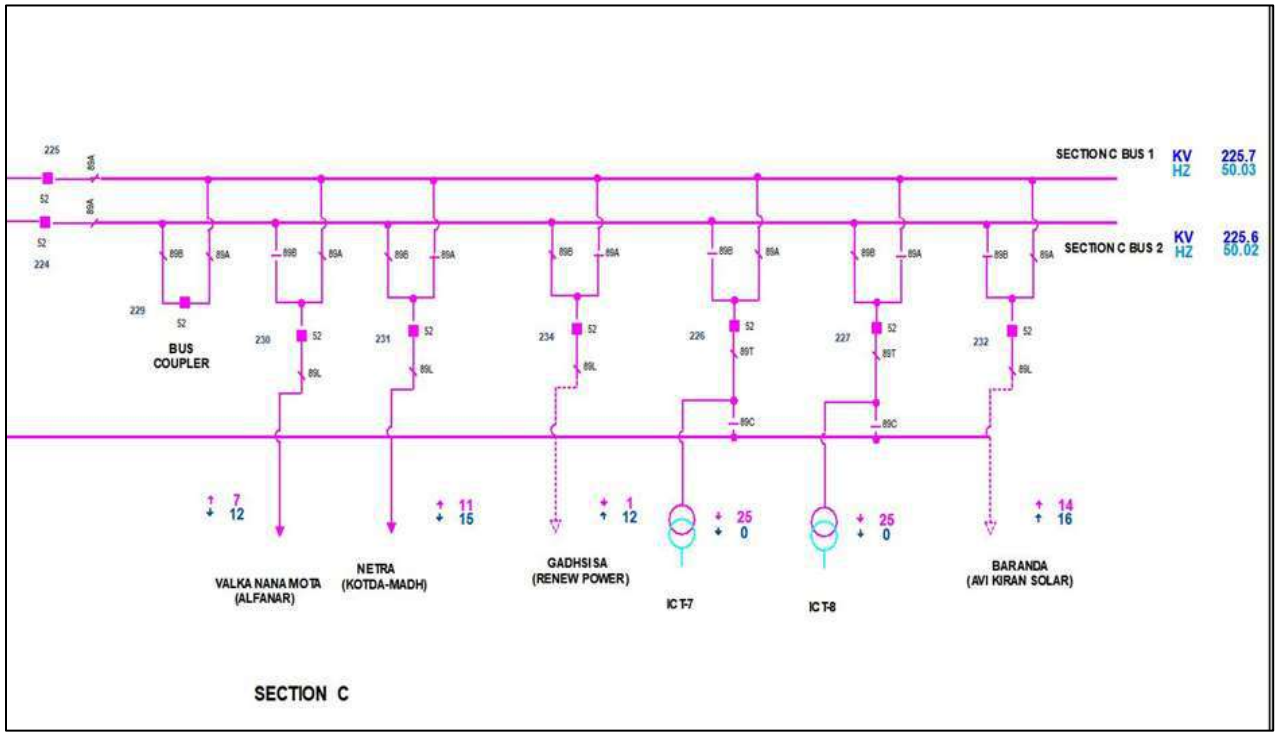
Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	45 - ON	01.10.2024 02:45:46.767		
00302	Fault Event	45 - ON	01.10.2024 02:45:46.767		
03688	21 Pickup CG	ON	0 ms		
03703	21 Selected Loop CG forward	ON	0 ms		
03804	21 TRIP command - Only Phase C	ON	0 ms		
04056	85-21 Carrier SEND signal	ON	0 ms		
02844	79 1st cycle running	ON	1 ms		
02801	79 - in progress	ON	1 ms		
00535	Primary fault current Ic	0.79 kA	2 ms		
02714	>79: External trip Ph. C for AR start	ON	1 ms		
01358	67N picked up FORWARD	ON	9 ms		
01338	50N / 51N phase selector Ph.C selected	ON	9 ms		
01354	50N-1 PICKED UP	ON	9 ms		
01357	51N PICKED UP	ON	9 ms		
04010	>85-21 Carrier RECEPTION, Channel 2	ON	26 ms		
04006	>85-21 Carrier RECEPTION, Channel 1	ON	29 ms		
07131	>50-STUB Enable STUB-Bus option	ON	44 ms		
00593	Single pole open detected in Phase C	ON	52 ms		
03671	21 PICKED UP	OFF	53 ms		
03703	21 Selected Loop CG forward	OFF	53 ms		
14080	50N-1 is blocked	ON	57 ms		
14083	51N is blocked	ON	57 ms		
01332	50N / 51N Ground O/C is BLOCKED	ON	57 ms		
01338	50N / 51N phase selector Ph.C selected	OFF	58 ms		
01345	50N / 51N PICKED UP	OFF	58 ms		
01125	Fault Locator Loop CG	ON	20 ms		
01117	Flt Locator: secondary RESISTANCE	1.19 Ohm	20 ms		
01118	Flt Locator: secondary REACTANCE	1.71 Ohm	20 ms		
01114	Flt Locator: primary RESISTANCE	2.65 Ohm	20 ms		
01115	Flt Locator: primary REACTANCE	3.80 Ohm	20 ms		
01119	Flt Locator: Distance to fault	15.5 km	20 ms		
01120	Flt Locator: Distance [%] to fault	18.4 %	20 ms		
00511	Relay GENERAL TRIP command	OFF	103 ms		
02839	79 dead time after 1pole trip running	ON	104 ms		
02784	79: Auto recloser is not ready	ON	1051 ms		
00536	Relay Definitive TRIP	ON	1051 ms		

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

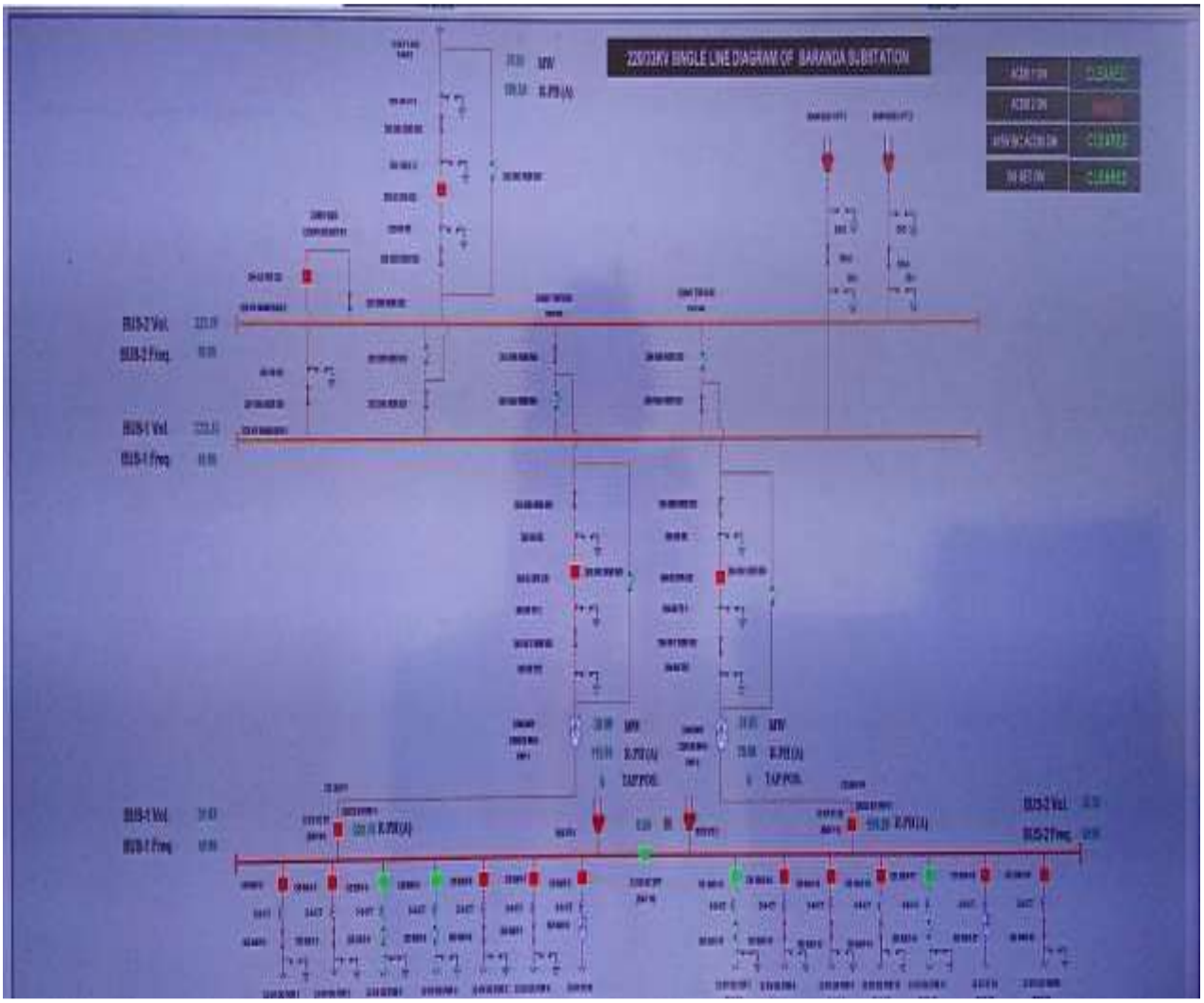
220kV Baranda SLD:



220kV Bhuj SLD:

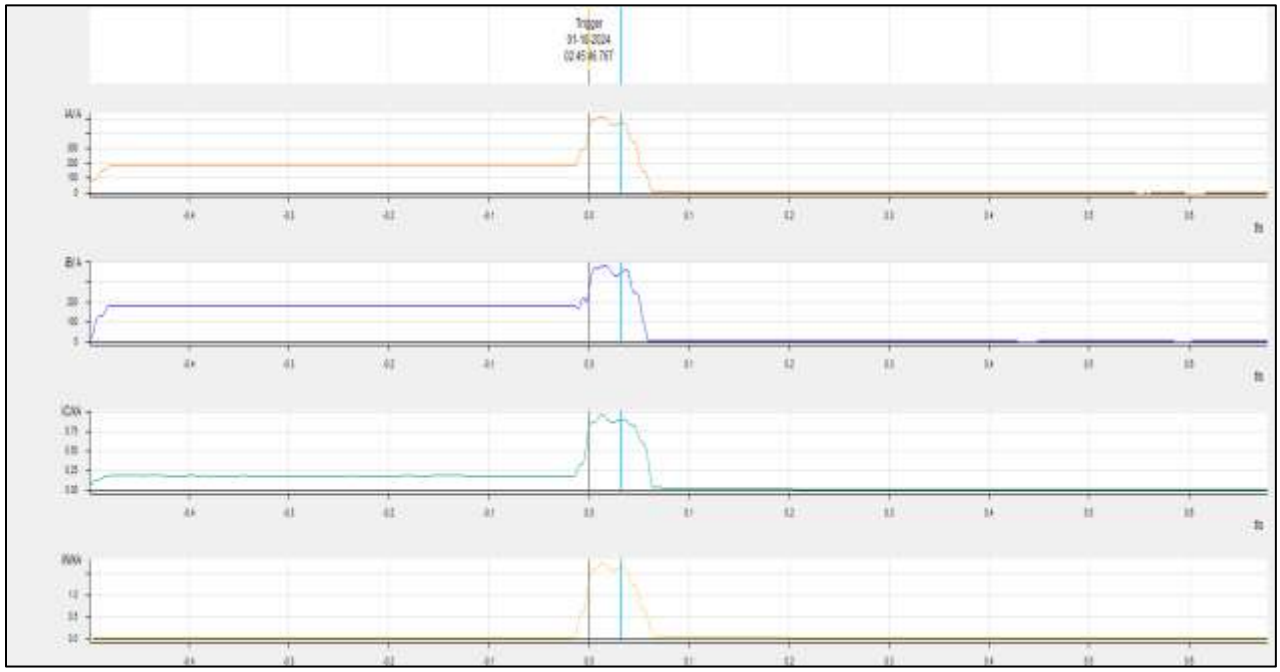


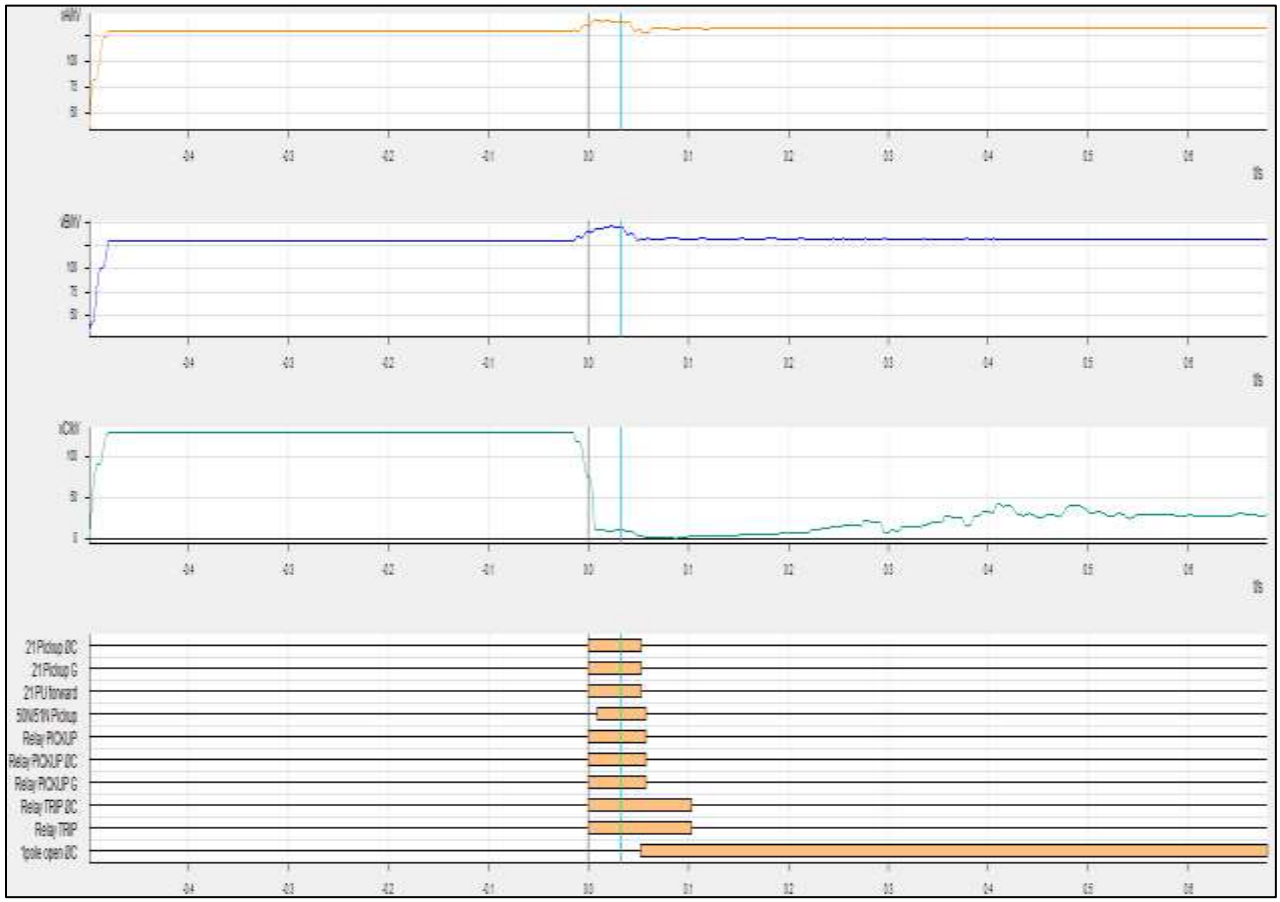
SLD from Avikiran (Baranda):



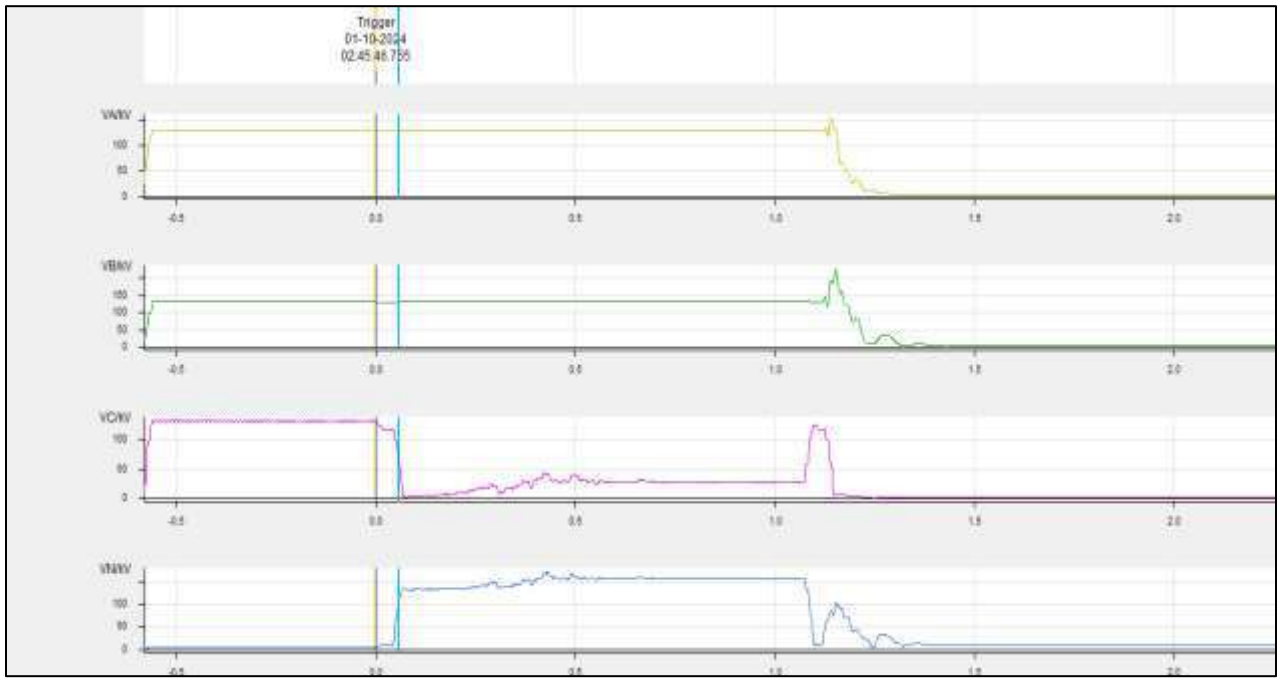
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

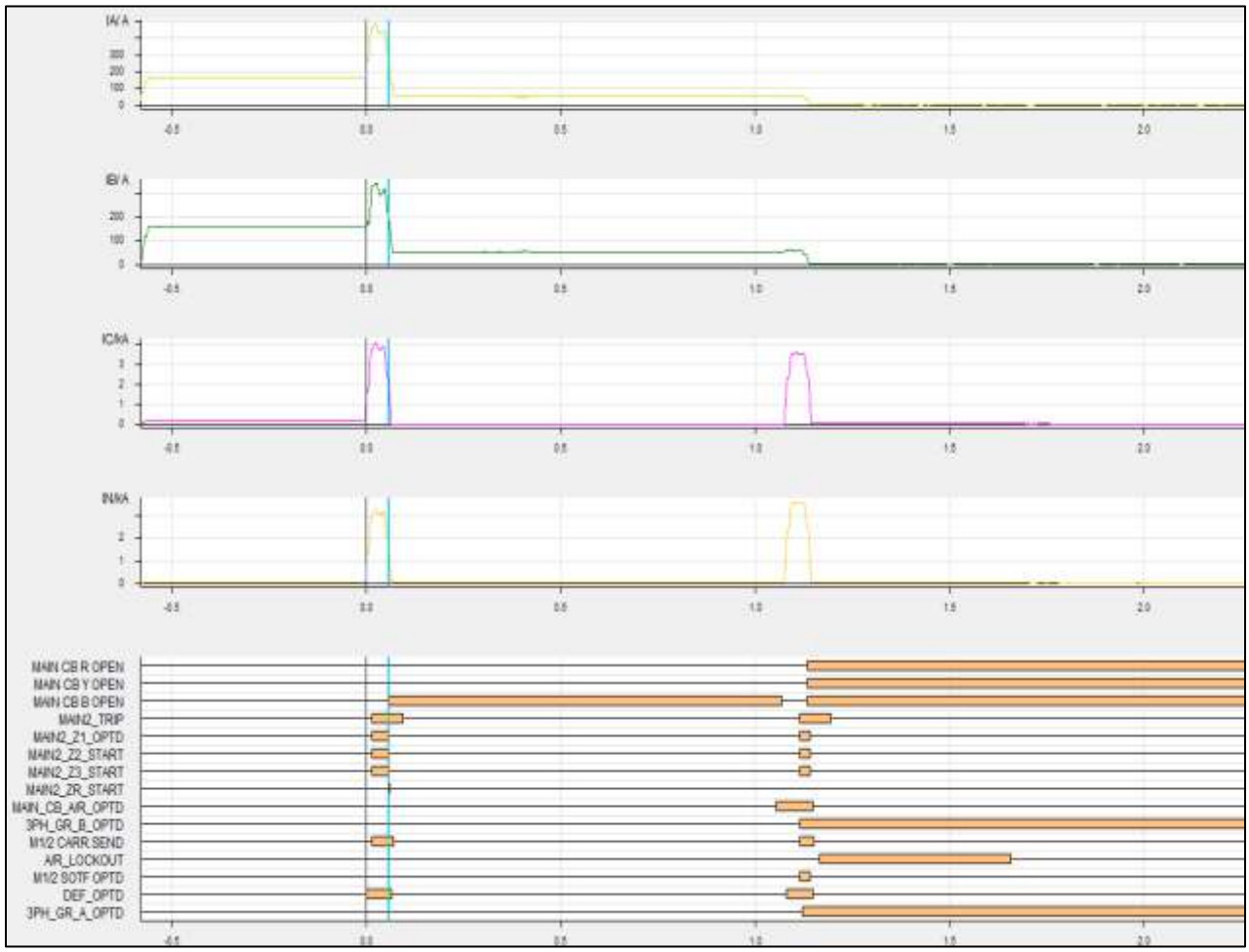
A. DR of 220 kV Bhuj- Baranda-1 from Baranda end





B. DR of 220 kV Bhuj- Baranda-1 from Bhuj end





अनुलग्नक-D / Annexure-D: Site photographs-



Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. नखत्राना और ढेडिया उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nakhatrana & Dhediya of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 23.10.2024

1. **घटना का सारांश / Event Summary:** At 15:24 Hrs / 10-10-2024, 220kV Nakhtrana-Dhediya single circuit tripped on R-N fault at Nakhatrana end only due to falling of R-Phase Conductor from Suspension insulator clamp at Tower No.55 without A/R attempt. Being a radial line, Generation loss of 97.49 MW occurred at Nakhatrana and Dedhiya (Adani) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 15:24 Hrs / 10-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nakatrana, Dhediya , Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.06	71008	64757	11777	21413
घटना के बाद Post Event	50.07	71212	64594	11771	21418

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Cloudy & Windy

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 97.49 MW Gen loss.



Figure 1. 220 kV Bhuj- Nakhatrana-1 Active Power Plot

7. **रुकावट की अवधि / Duration of interruption:** 26 hours 06 minutes

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

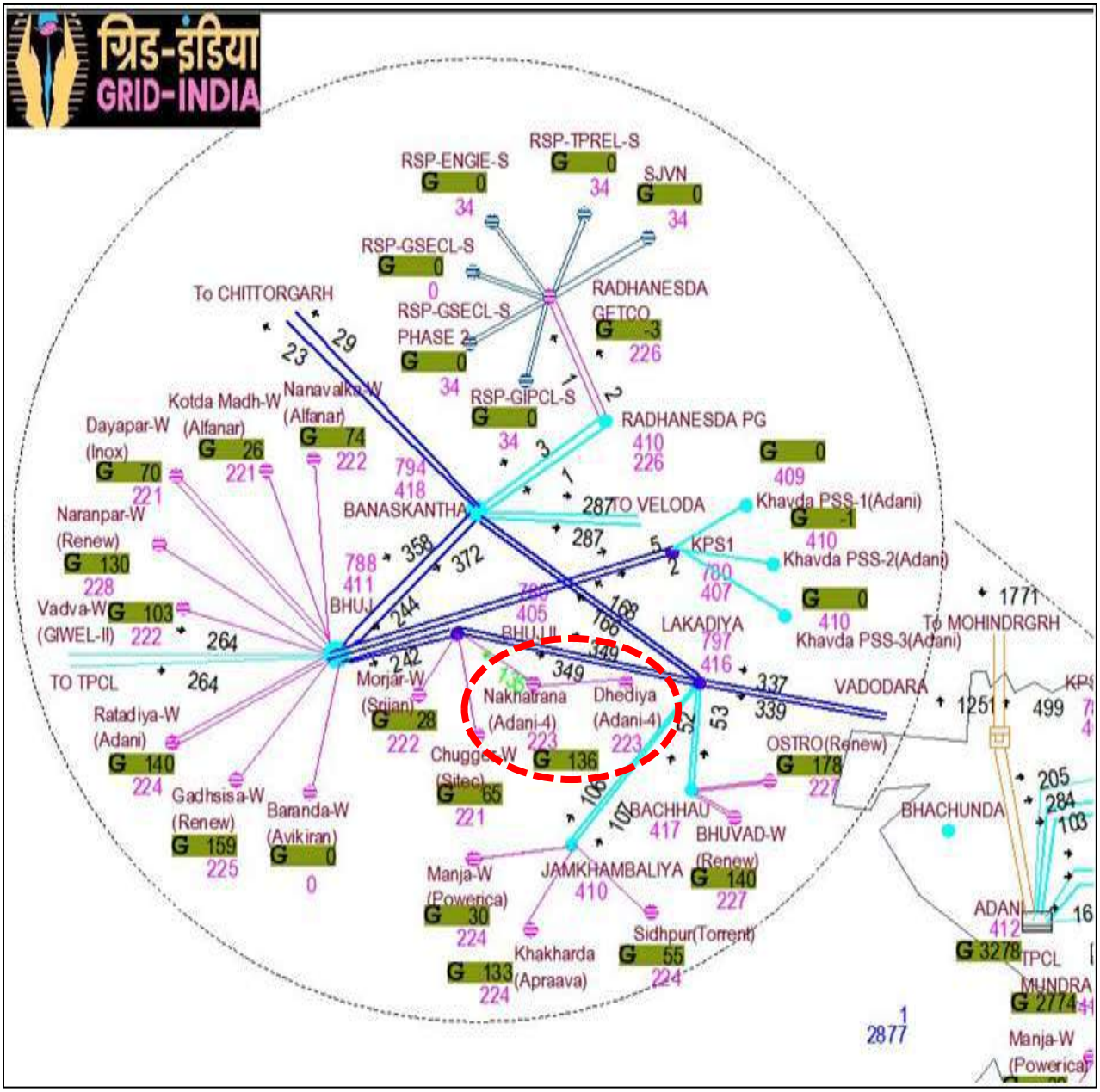


Figure 2. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped:**

क्र॰सं॰ Sr.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nakhatrana	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Dhediya	वापसी का समय Restoration time
1	220kV Nakhatrana-Dhediya single circuit	15:24 / 10.10.2024	R-E fault, 3.0 kA , Zone-1 , 39.99 km ZONE-1 OPTD, ZCOM TRIP, DIR E/F Trip, R-PH Trip R-3001.601 A Y-344.119 A B-220.66 A N-2511.831 A Fault Distance = 40.5 KM	-	17:30 / 11.10.2024
2	220kV Nakhatrana Bus Coupler	15:24 / 10.10.2024	Became out due to tripping of 220kV Nakhatrana-Dhediya single circuit		17:33/11.10.2024
3	220/33 kV Nakhatrana ICT	15:24 / 10.10.2024			17:54/10.10.2024
4.	220/33 kV Dhediya ICT-1	15:24 / 10.10.2024			17:39/11.10.2024
5.	220/33 kV Dhediya ICT-2	15:24 / 10.10.2024			17:38/11.10.2024

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

- 220kV Nakhatrana -Dhediya single circuit tripped on R-N fault at Nakhatrana end only without A/R attempt due to falling of R-Phase Conductor from Suspension insulator clamp at Tower No.55.
- Line didn't tripped at Dhediya PSS.

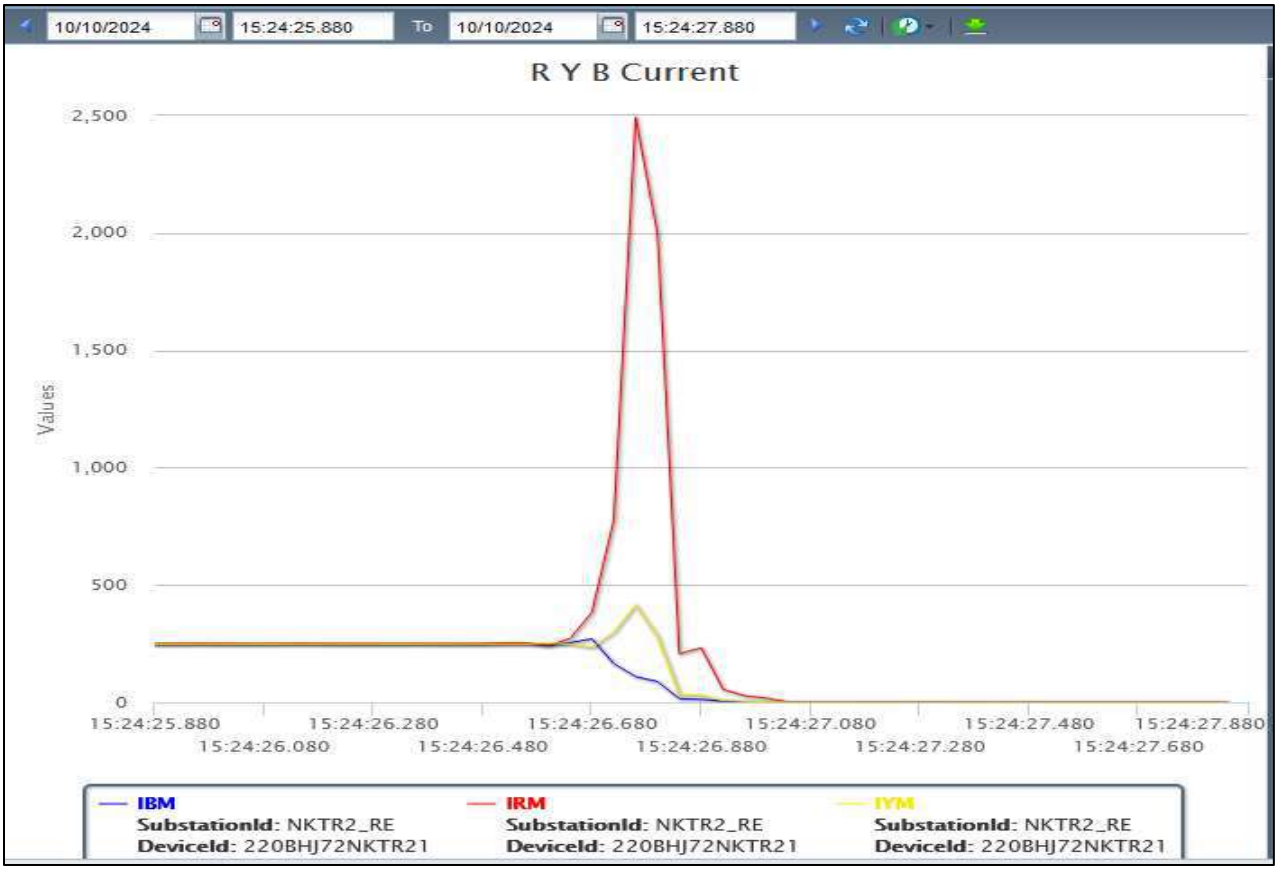


Figure 3. 220 kV Bhuj- Nakhatrana-1 Current Plot

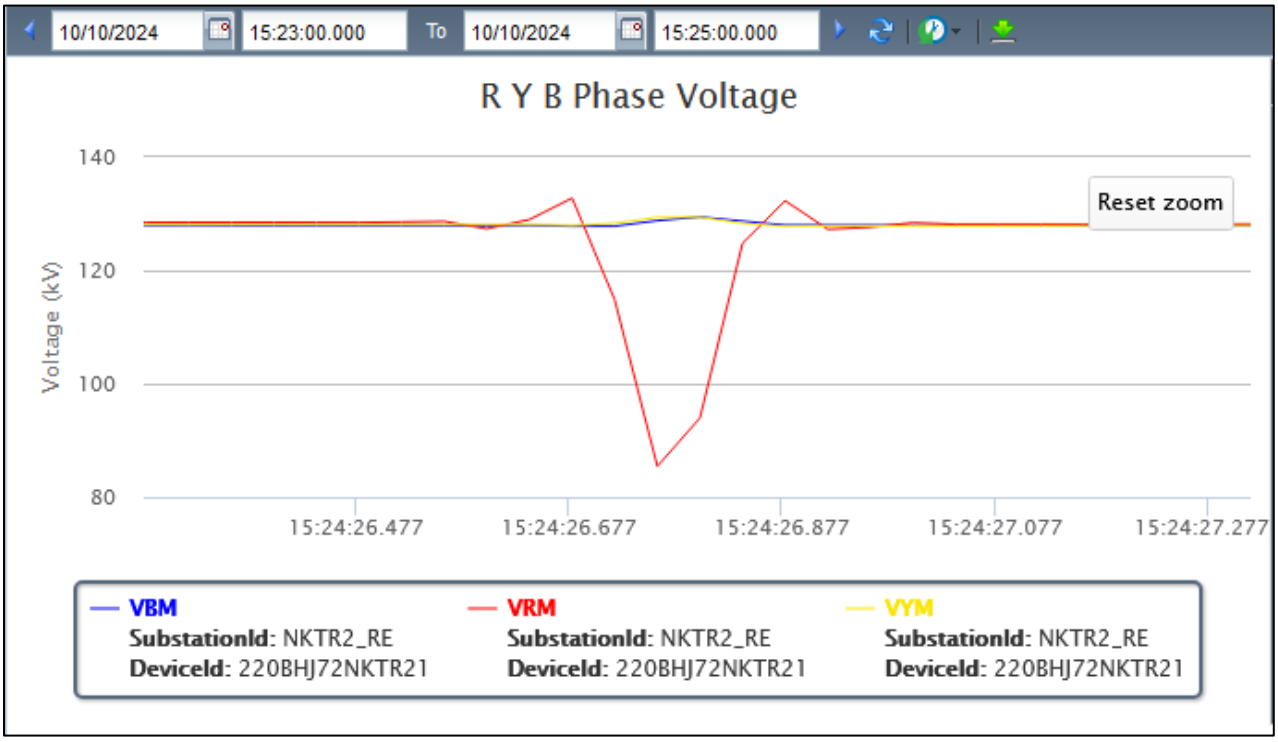


Figure 4. 220 kV Bhuj- Nakhatrana -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Three phase tripping occurred for single phase fault at Nakhatrana without A/R attempt.
- Line didn't trip at Dhediya end.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- During Patrolling, M/s Adani found that at Tower No.55 from Dhediya PSS, R-Phase Conductor fell down from Suspension insulator clamp. Suspension clamp R-pin was missing, so conductor fell down from suspension clamp and was touching with tower structure. Line charged after inserting Rpin in Clamp and placing conductor in Suspension clamp.
- M/s Adani may kindly investigate the reason behind not attempting A/R at Nakhatrana and non-tripping at Dedhiya end.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	DR not submitted by Adani for Dhediya end
2	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Three phase tripping occurred for single phase fault at Nakhatrana without A/R attempt. Line didn't trip at Dhediya end.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	DHDY2_RE	DHEDIYA CB COUPLER CB 20252 OPEN	15:24:27	0
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB 20152 (T1_P) FAULTY	15:24:27	400
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB COUPLER CB 20252 FAULTY	15:24:27	400
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB 20352 (DHDY2) FAULTY	15:24:27	400

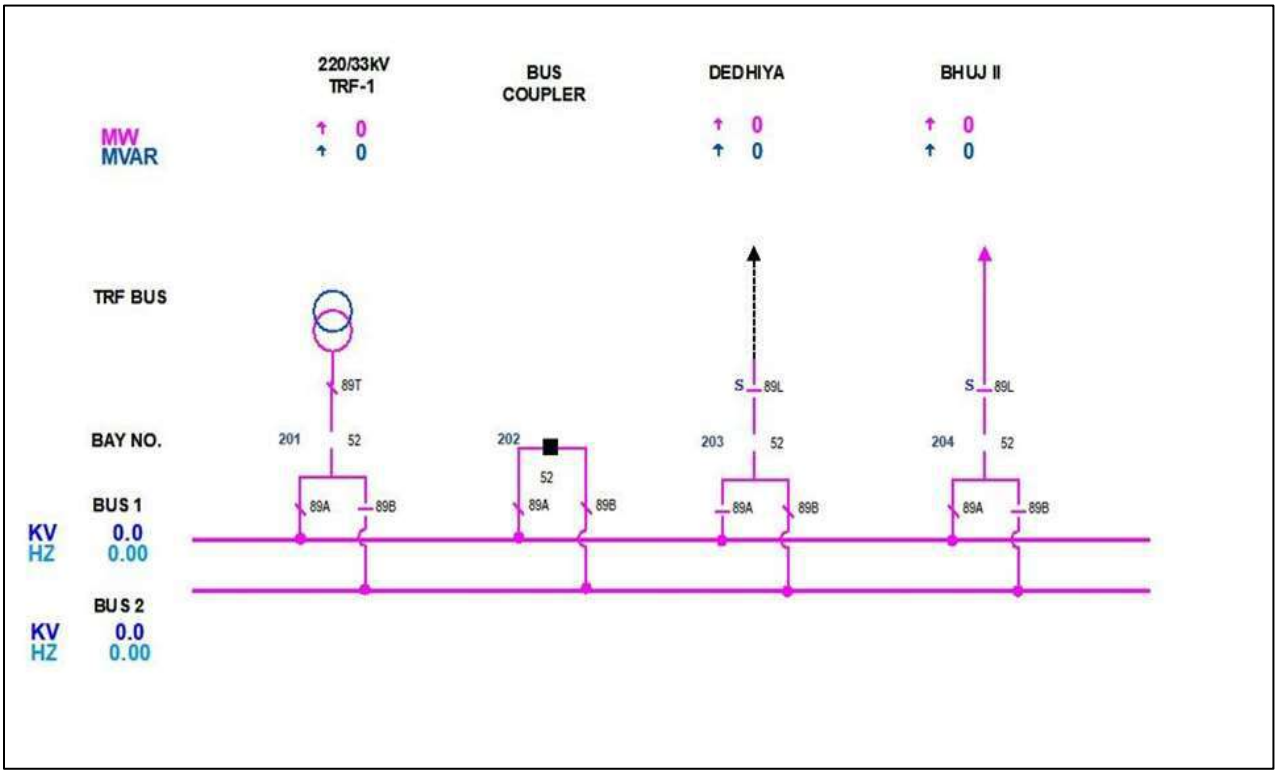
SOE from Nakhatrana-

P	10-Oct-24 3:24:28:116 PM	DRP_RECSTART	Off
P	10-Oct-24 3:24:27:614 PM	DRP_RECSTART	On
P	10-Oct-24 3:24:27:311 PM	LINE_CVT_FF	Off
P	10-Oct-24 3:24:27:308 PM	LINE_CVT_FF	On
P	10-Oct-24 3:24:27:305 PM	LINE_CVT_FF	Off
P	10-Oct-24 3:24:27:299 PM	LINE_CVT_FF	On
P	10-Oct-24 3:24:27:296 PM	LINE_CVT_FF	Off
P	10-Oct-24 3:24:27:293 PM	LINE_CVT_FF	On
P	10-Oct-24 3:24:27:290 PM	LINE_CVT_FF	Off
P	10-Oct-24 3:24:27:011 PM	LINE_CVT_FF	On
P	10-Oct-24 3:24:26:931 PM	BRC_START	Off
P	10-Oct-24 3:24:26:906 PM	TRIP_TRIP	Off
P	10-Oct-24 3:24:26:906 PM	TRIP L1	Off
P	10-Oct-24 3:24:26:875 PM	3PH_TRIP_M-2	Off
P	10-Oct-24 3:24:26:861 PM	AR-START	Off
P	10-Oct-24 3:24:26:861 PM	ZCOM_TRIP	Off
P	10-Oct-24 3:24:26:858 PM	ZCOM_CS	Off
P	10-Oct-24 3:24:26:837 PM	CAR_RCV_CH-2	Off
P	10-Oct-24 3:24:26:834 PM	ZM02-START	Off
P	10-Oct-24 3:24:26:834 PM	PHS-STFWPE	Off

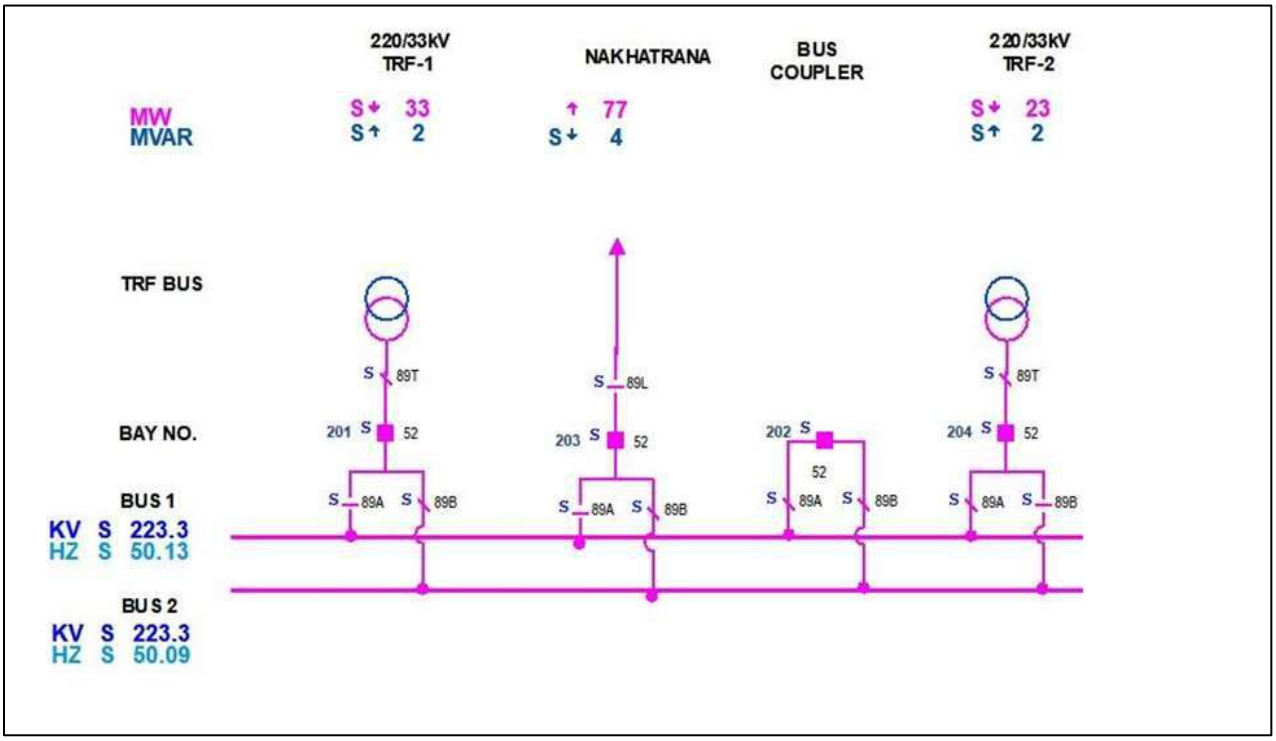
P	10-Oct-24 3:24:26:834 PM	ZM03-START	Off
P	10-Oct-24 3:24:26:834 PM	PHS-STFWL1	Off
P	10-Oct-24 3:24:26:828 PM	ZM01-TRIP	Off
P	10-Oct-24 3:24:26:828 PM	ZM01-START	Off
P	10-Oct-24 3:24:26:827 PM	TEF1_START	Off
P	10-Oct-24 3:24:26:827 PM	AR_START_M-2	Off
P	10-Oct-24 3:24:26:814 PM	CB_OPEN_Y-PH	On
P	10-Oct-24 3:24:26:811 PM	CB_OPEN_B-PH	On
P	10-Oct-24 3:24:26:800 PM	CB_CLOSE_Y-PH	Off
P	10-Oct-24 3:24:26:799 PM	CB_OPEN_R-PH	On
P	10-Oct-24 3:24:26:796 PM	3PH_TRIP_M-2	On
P	10-Oct-24 3:24:26:795 PM	CB_CLOSE_B-PH	Off
P	10-Oct-24 3:24:26:785 PM	CB_CLOSE_R-PH	Off
P	10-Oct-24 3:24:26:783 PM	ZCOM_TRIP	On
P	10-Oct-24 3:24:26:780 PM	CAR_RCV_CH-2	On
P	10-Oct-24 3:24:26:779 PM	AR_IN_PROGRES	Off
P	10-Oct-24 3:24:26:779 PM	AR-PREP3P	On
P	10-Oct-24 3:24:26:779 PM	AR_1PT1	Off
P	10-Oct-24 3:24:26:777 PM	AR-BLOCK	On
P	10-Oct-24 3:24:26:772 PM	BB_PROT_OPTD	On
P	10-Oct-24 3:24:26:763 PM	AR_IN_PROGRES	On
P	10-Oct-24 3:24:26:763 PM	AR_1PT1	On
P	10-Oct-24 3:24:26:756 PM	TRIP L1	On
P	10-Oct-24 3:24:26:756 PM	ZM01-TRIP	On
P	10-Oct-24 3:24:26:756 PM	AR-START	On
P	10-Oct-24 3:24:26:756 PM	TRIP_TRIP	On
P	10-Oct-24 3:24:26:756 PM	ZCOM_CS	On
P	10-Oct-24 3:24:26:756 PM	ZM01-START	On
P	10-Oct-24 3:24:26:755 PM	AR_START_M-2	On
P	10-Oct-24 3:24:26:747 PM	BRC_START	On
P	10-Oct-24 3:24:26:747 PM	TEF1_START	On
P	10-Oct-24 3:24:26:747 PM	ZM02-START	On
P	10-Oct-24 3:24:26:744 PM	PHS-STFWPE	On
P	10-Oct-24 3:24:26:744 PM	ZM03-START	On
P	10-Oct-24 3:24:26:744 PM	PHS-STFWL1	On

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Nakhatrana SLD:

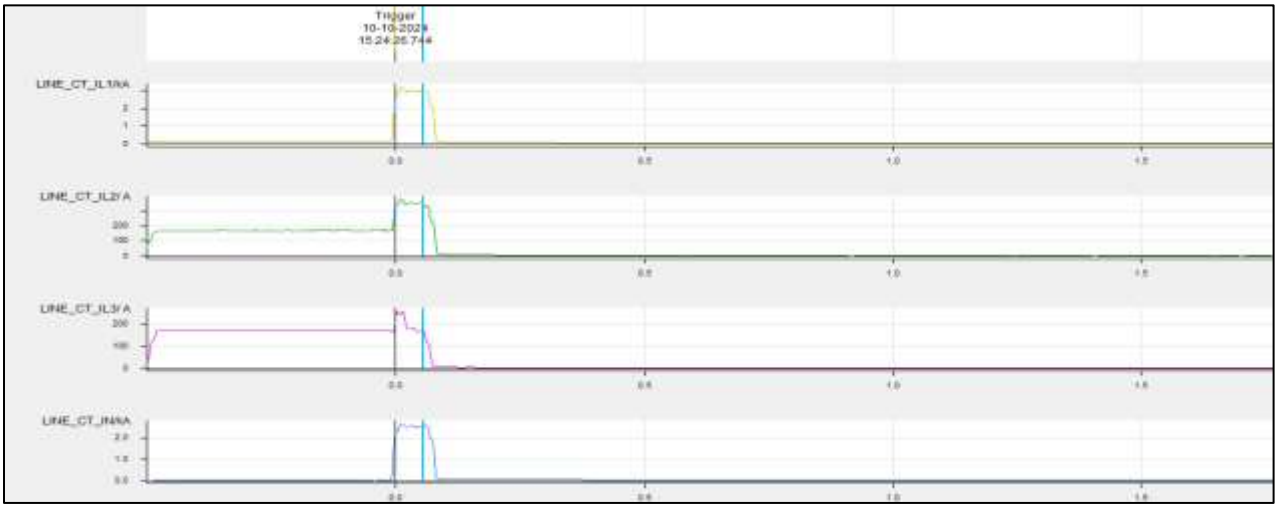


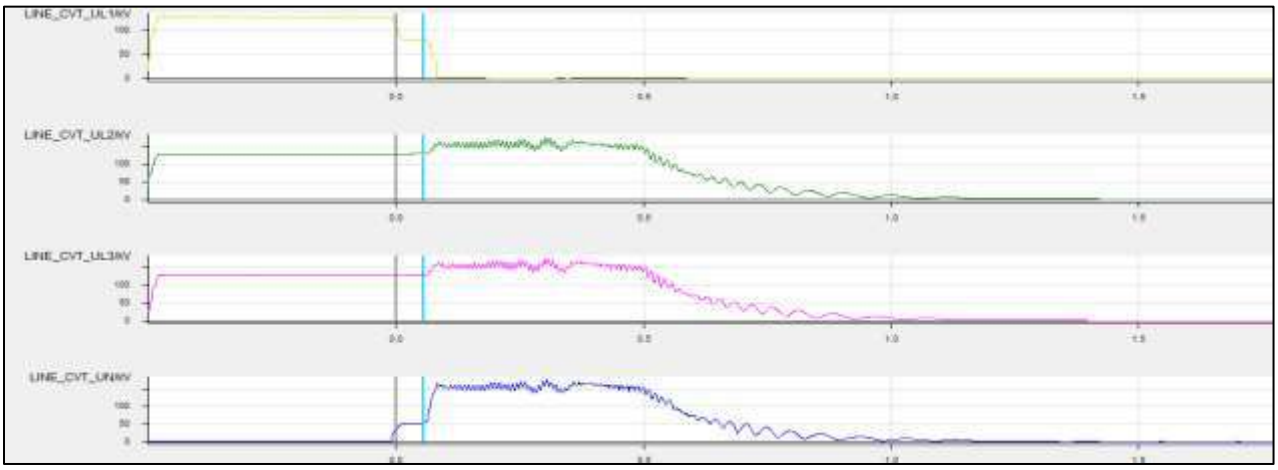
220kV Dhediya SLD:

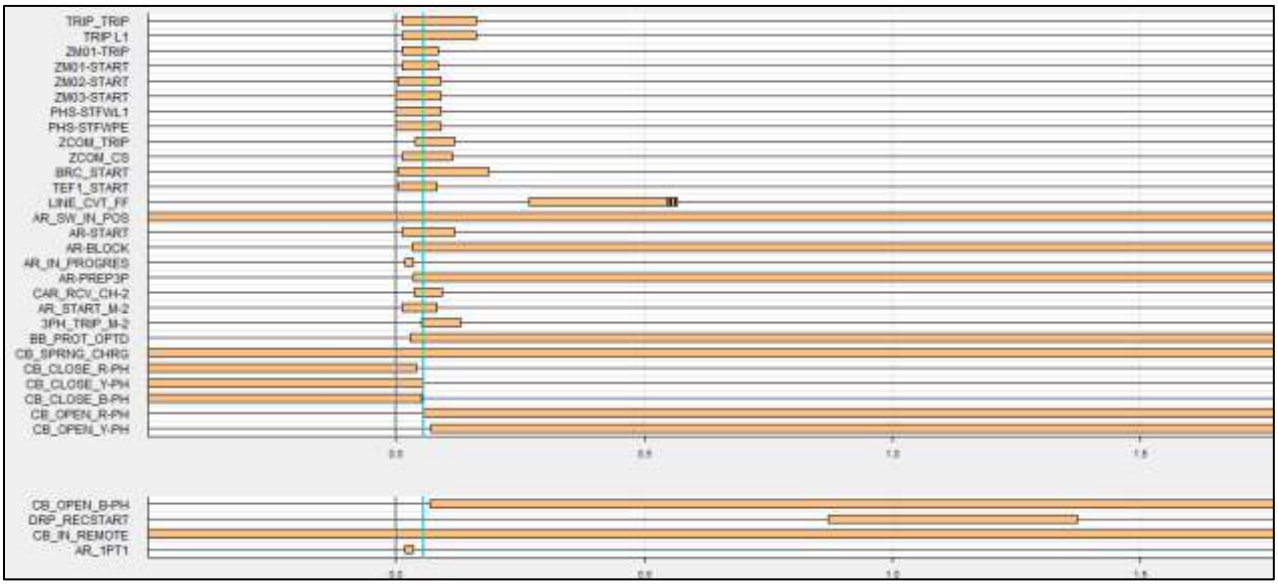


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 kV Nakhatrana-Dhediya-1 for Nakhatrana end







अनुलग्नक-D / Annexure-D: Site photographs –



Before Incident



After Incident

Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. भवसिंगपुरा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Bhawsignpura of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 04.11.2024

1. **घटना का सारांश / Event Summary:** At 13:05 Hrs / 11-10-2024, 220 kV Bhawsingpura- Khandwa tripped on Z-3 protection mal-operation at Bhawsingpura end only due to relay overreach as 400 kV Khandwa-Dhule-1 tripped on Y-N fault at the same time. 220 kV Bhawsingpura- Kanwani line also tripped. This resulted in generation loss of 98 MW occurred at Bhawsingpura and Kanwani solar power plant (Masaya Solar) due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 13:05 Hrs / 11-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area:** 220kV Bhawsingpura & 220 kV Kanwani Solar RE substation/Madhya Pradesh
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.16	65305	60907	3916	11124

घटना के बाद Post Event	50.13	64973	60964	3893	11058

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: Generation loss of Bhawsingpura and Kanwani – 98 MW



Figure 1. PMU Frequency plot of 220 kV Bhawsingpura-Khandwa-1



Figure 2. PMU Active Power plot of 220 kV Bhawsingpura-Khandwa-1

7. **रुकावट की अवधि / Duration of interruption:** 02 Hrs 27 Minute.

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

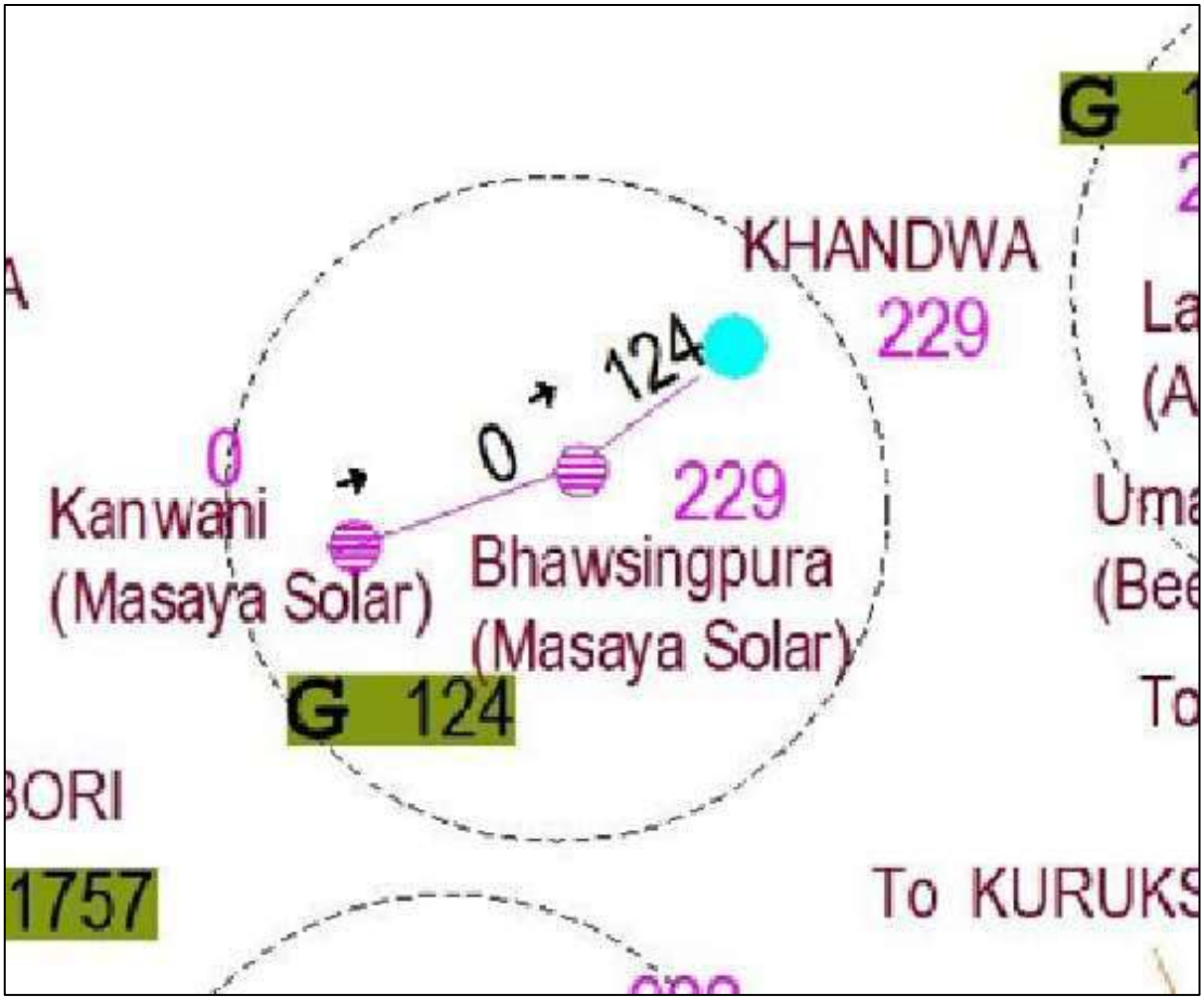


Figure 3. Network across the affected area

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

Nil

10. प्रमुख ट्रिपिंग / Major Elements Tripped

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Bhawsinghpura	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220 KV Bhawsingpura Khandwa s/c	13:05	220kV Khandwa-Bhawsingura (Masaya Solar) line		15:32

2	220 KV Bhawsingpura Kanwani S/C	13:05	tripped (from Bhawsingpura end only) due to earth fault.		16:10

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

- As seen from the DR, there is no fault. 220 kV Bhawsingpura- Khandwa tripped on Z-3 protection mal-operation at Bhawsingpura end only due to relay overreach as 400 kV Khandwa-Dhule-1 tripped on Y-N fault at the same time.
- 220 kV Bhawsingpura- Kanwani line also tripped.

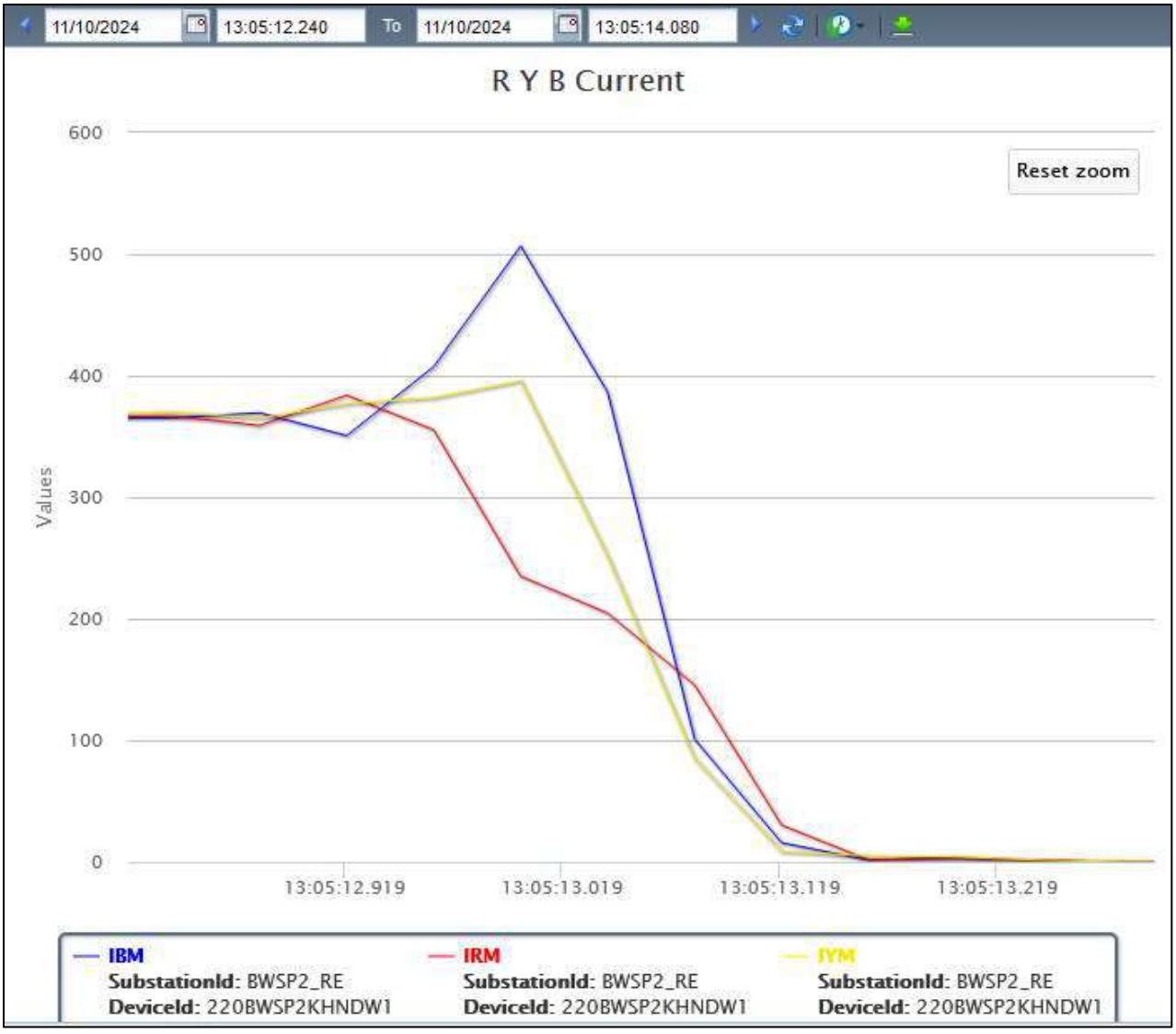


Figure 4. PMU Current plot of 220 kV Bhawsingpura-Khandwa-1

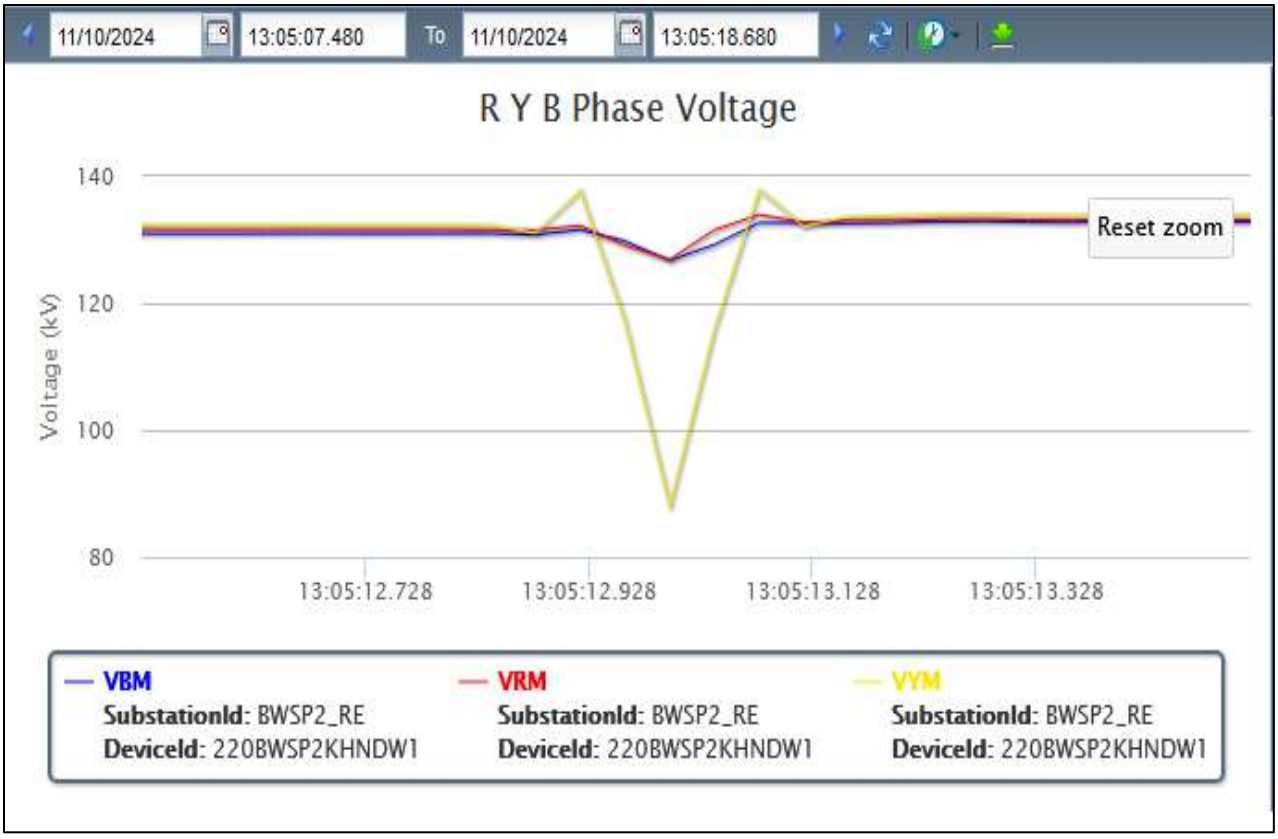


Figure 5. PMU Voltage plot of 220 kV Bhawsingpura-Khandwa-1

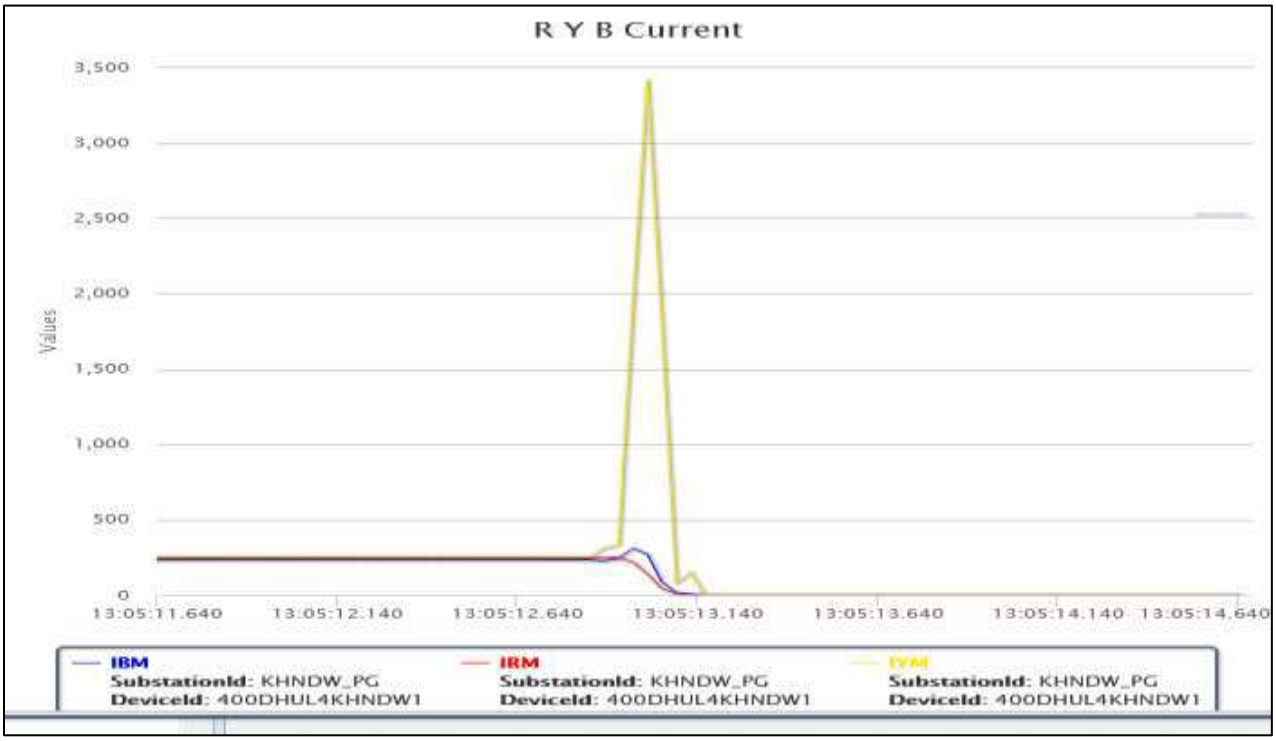


Figure 6. PMU Current plot of 400 kV Dhule-Khandwa-1

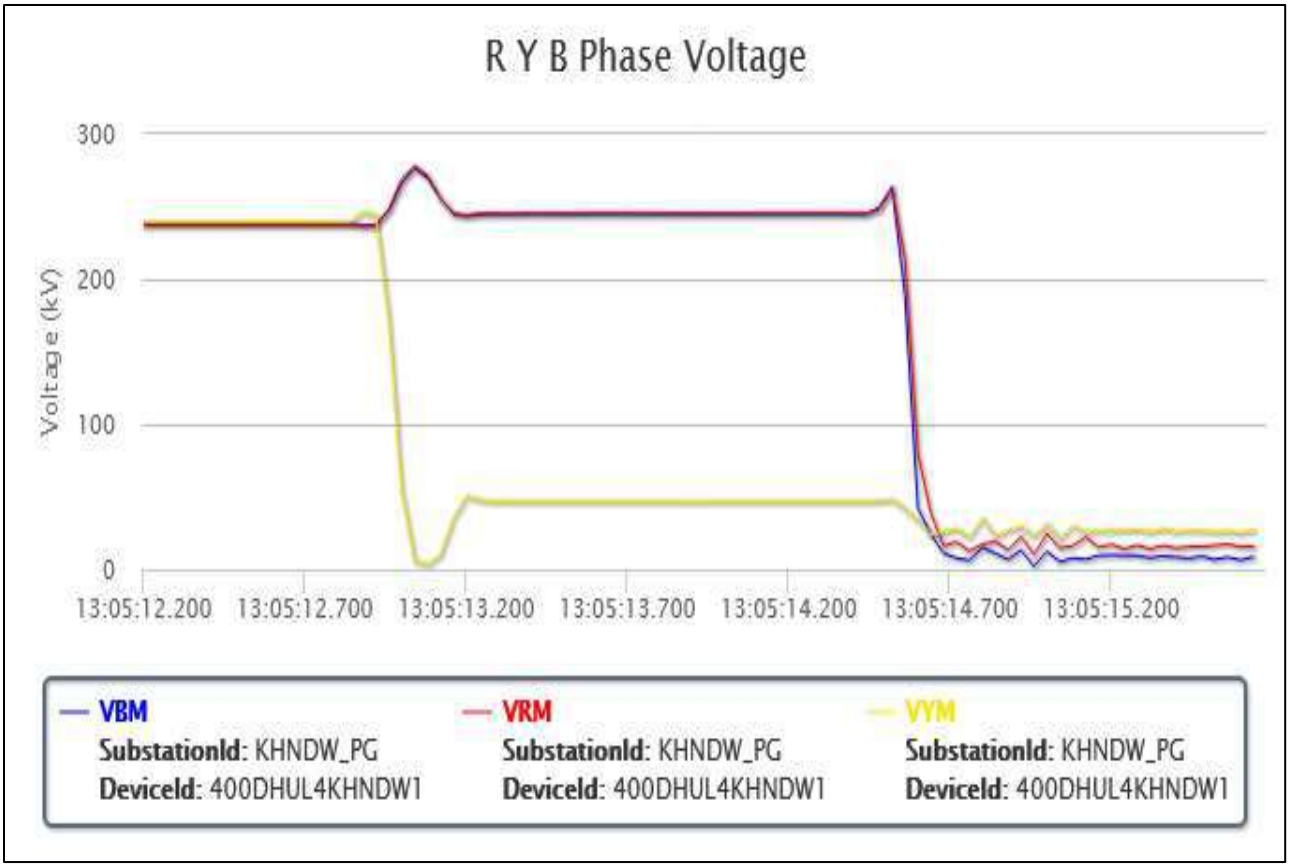


Figure 7. PMU Voltage plot of 400 kV Dhule-Khandwa-1

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- 220 kV Bhawsingpura- Khandwa tripped on Z-3 protection mal-operation at Bhawsingpura end only.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Masaya Solar may kindly investigate and review the protection settings to find out the root cause of mal-operation.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received from Masaya Solar
2	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Masaya Solar for Kanwani end.
3	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Masaya Solar
4	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	220 kV Bhawsingpura-Khandwa tripped on Z-3 protection mal-operation at Bhawsingpura end, Masaya Solar may kindly investigate

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

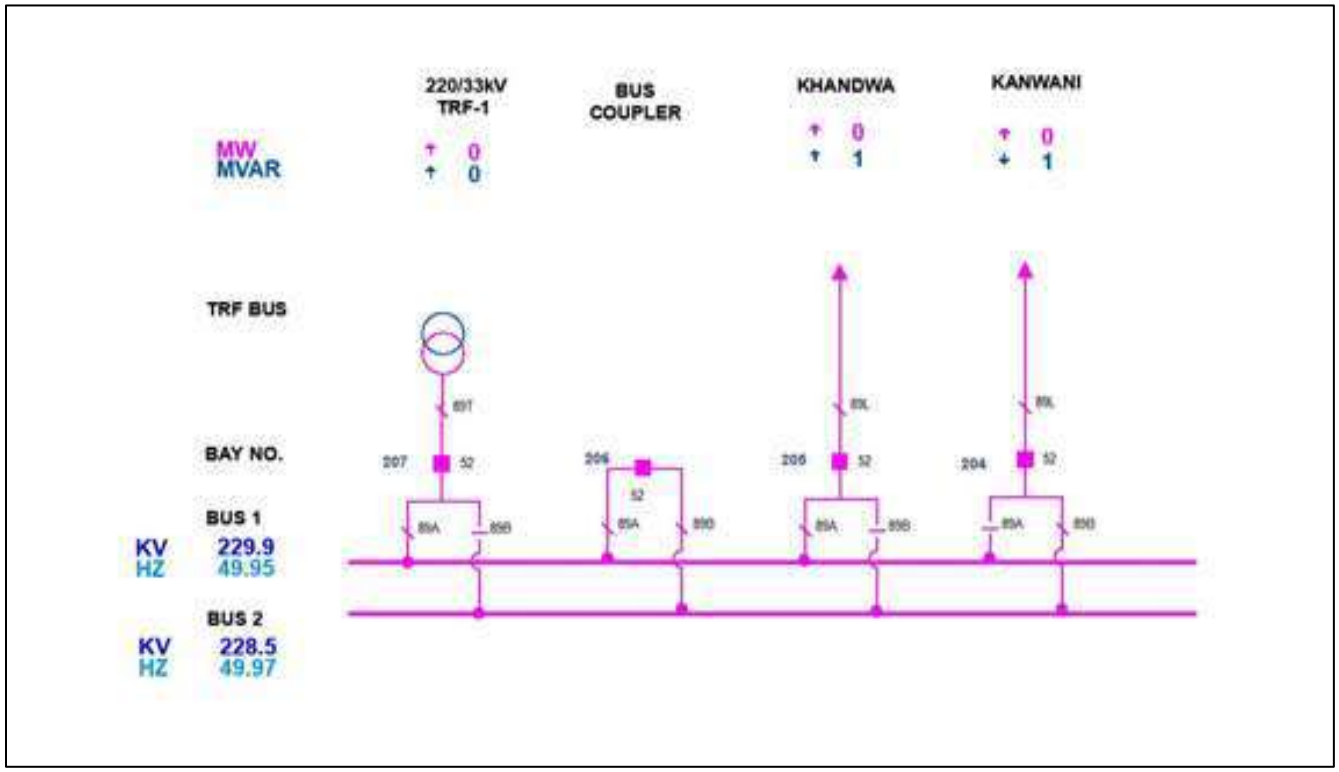
अनुलग्नक-1 / Annexure-1: Sequence of Events as per SCADA-

SOE by WRLDC –

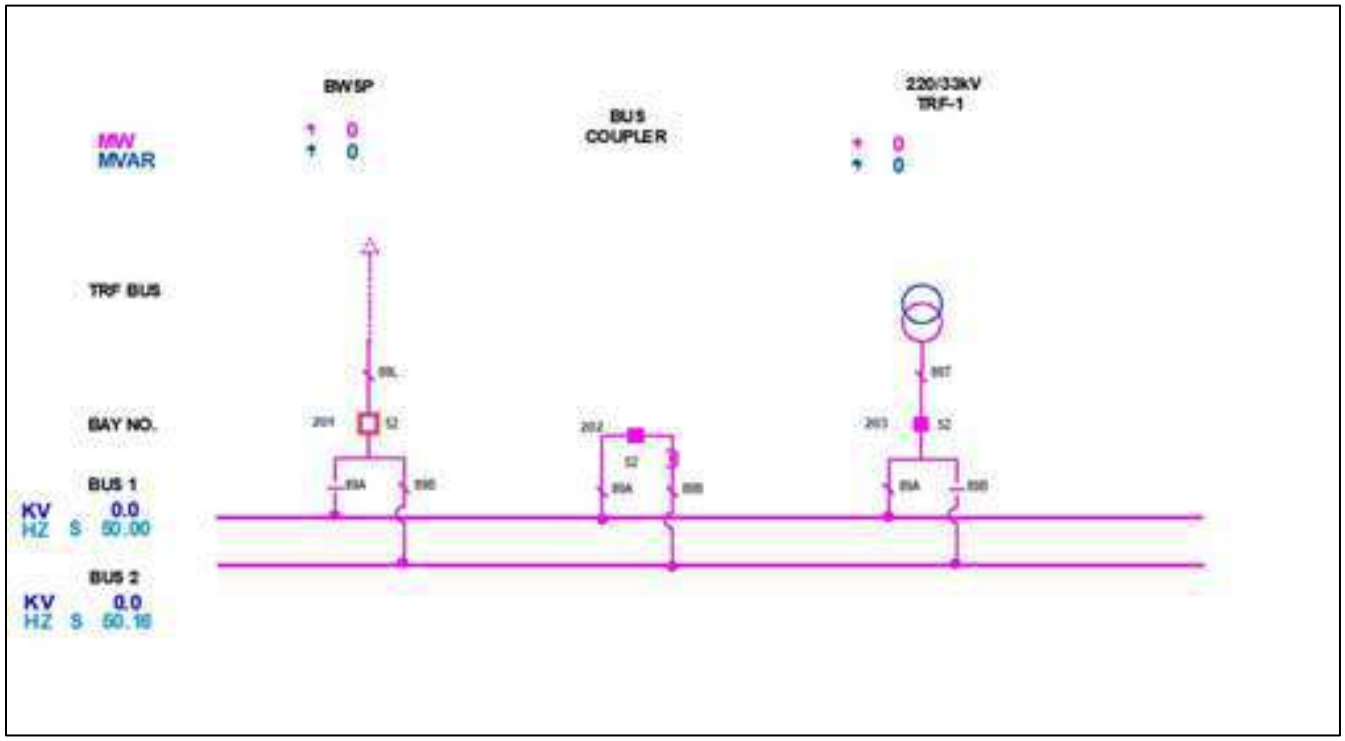
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	BWSP2_RE	BHAWSINGHPURA CB 20552 (KHNDW) ACTED	13:05:13	38
WRLDC	220KV-CB	BWSP2_RE	BHAWSINGHPURA CB 20552 (KHNDW) OPEN	13:05:13	81
WRLDC	220-SOE	KNWN2_RE	KANWANI CB 20152 (BWSP2) ACTED	13:05:13	0
WRLDC	220KV-CB	KNWN2_RE	KANWANI CB 20152 (BWSP2) OPEN	13:05:13	0

अनुलग्नक-2 / Annexure-2:

220kV Bhawsingpura SLD:

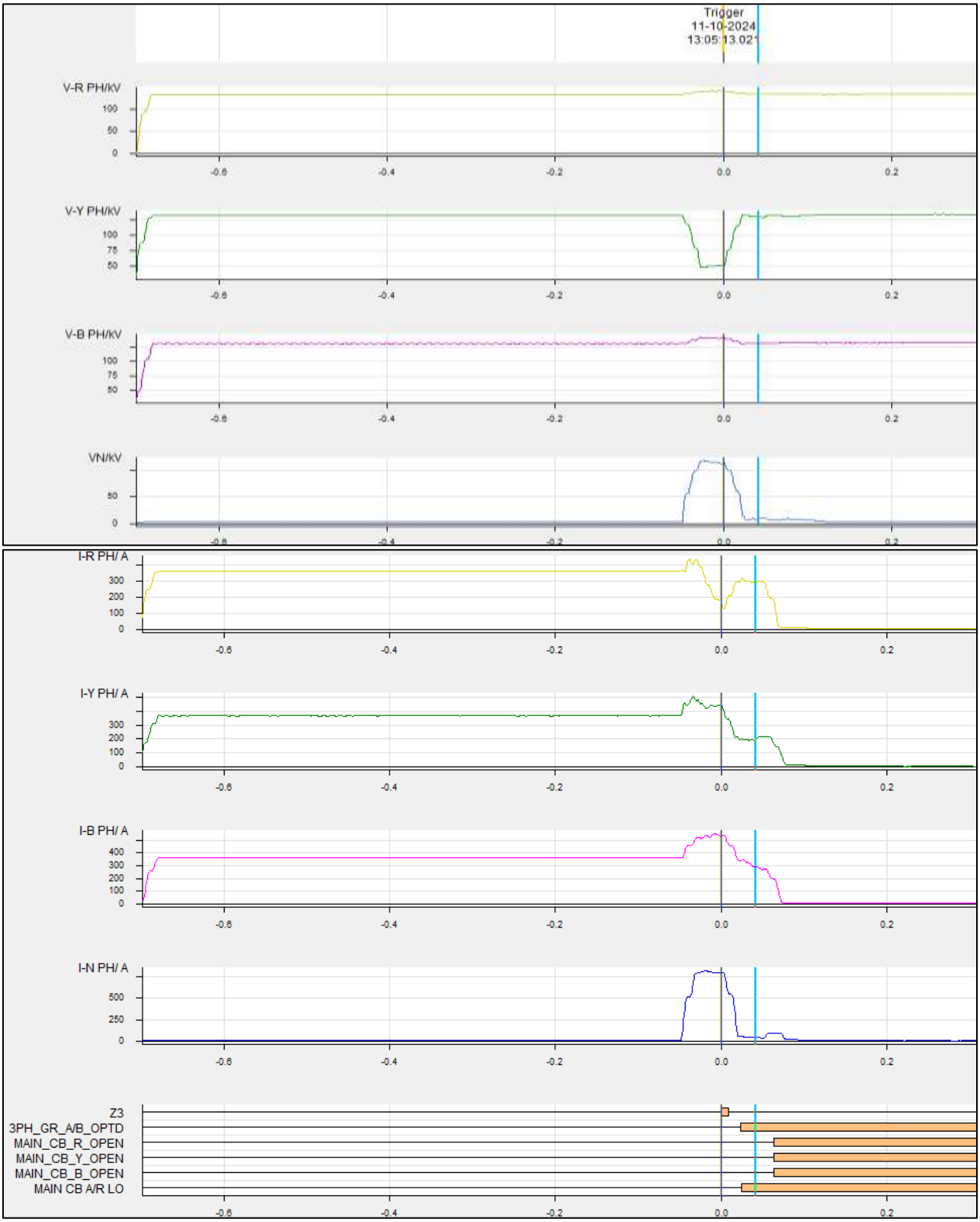


220kV Kanwani SLD:

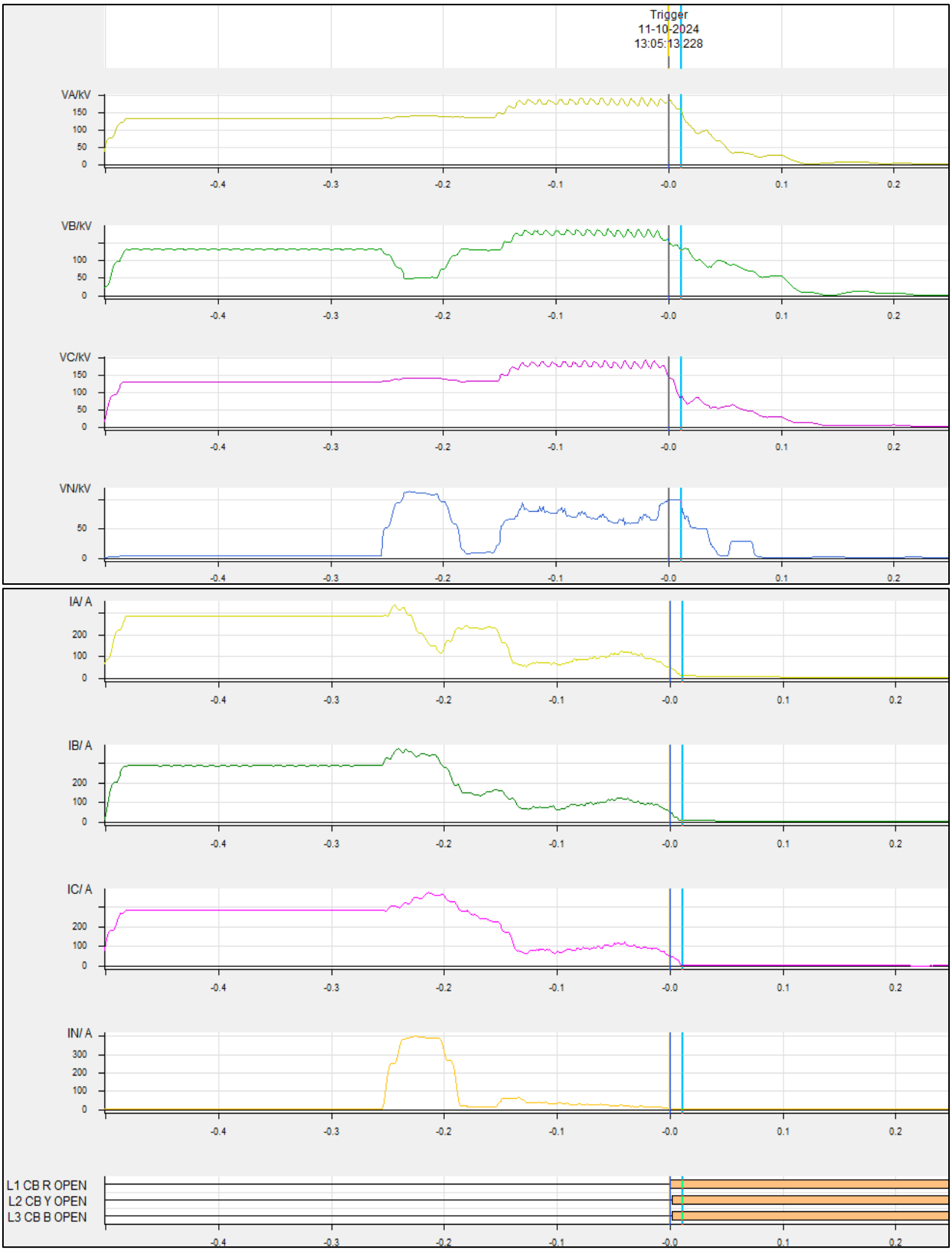


अनुलग्नक-3 / Annexure-3: Disturbance recorder –

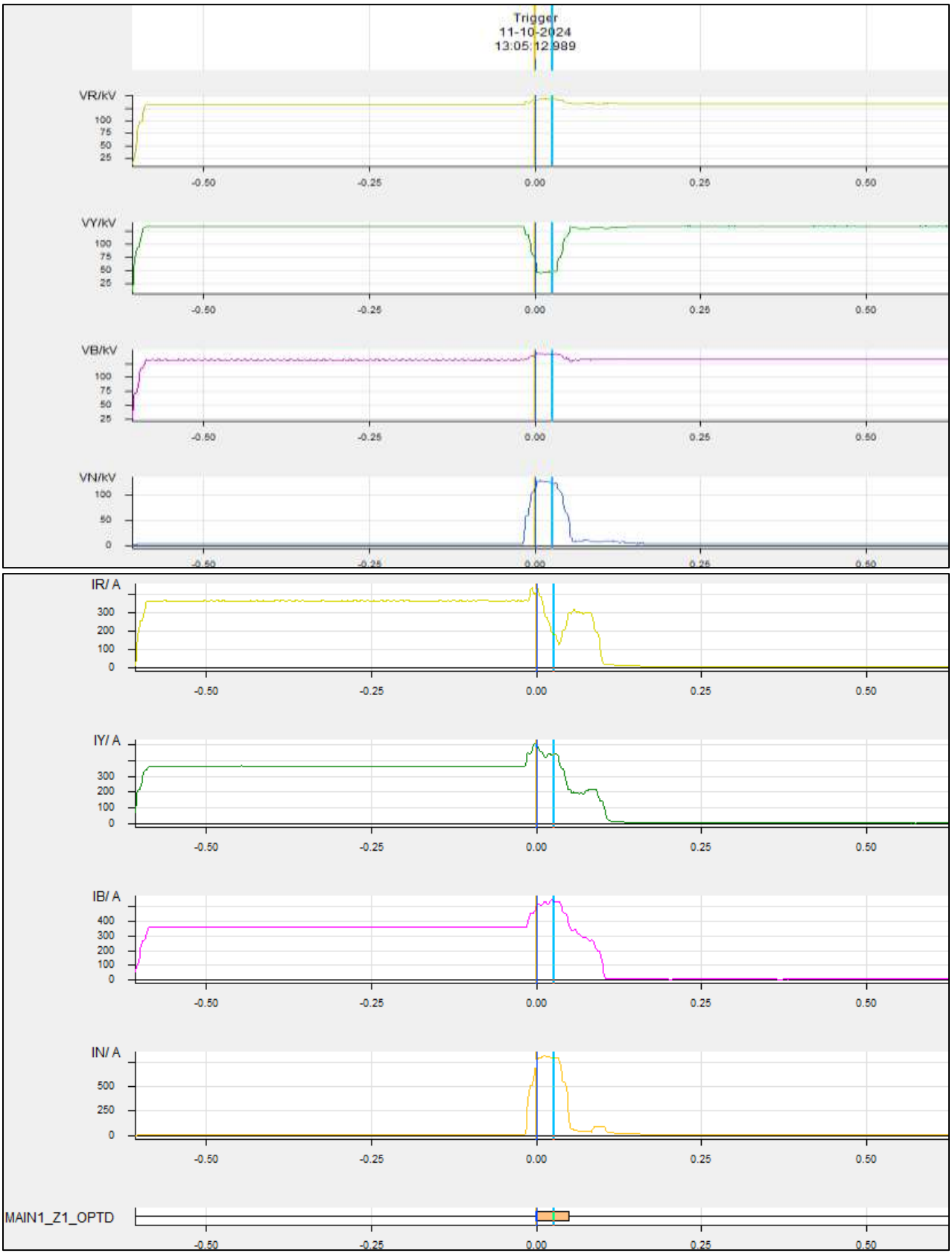
A. DR of 220 kV Bhawsingpura-Khandwa-1 from Bhawsingpura end



B. DR of 220 kV Bhawsingpura-Kanwani-1 from Bhawsingpura end



C. DR of 220 kV Bhawsingpura-Khandwa-1 from Khandwa end



अनुलग्नक-4 / Annexure-4 Any other photographs -Nil

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के°वी. नखत्राना और ढेडिया उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nakhatrana and Dhediya of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 23.10.2024

1. **घटना का सारांश / Event Summary:** At 16:43 Hrs / 14-10-2024, 220kV Nakhtrana-Dhediya single circuit tripped on B-N fault at both ends without A/R attempt. Generation loss of 38.36 MW occurred at Nakhatrana and Dedhiya (Adani) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 16:43 Hrs / 14-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nakatrana, Dhediya , Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.01	68911	61505	11001	19305
घटना के बाद Post Event	50.00	68900	61625	10984	19328

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है Important Transmission Line/Unit if under outage	Nil
मौसम की स्थिति Weather Condition	Rainy, Heavy Lighting & Windy

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 38.36 MW Gen loss.



Figure 1. 220 kV Dhediya - Nakhatrana-1 Active Power Plot

7. **रुकावट की अवधि / Duration of interruption:** 02 hours 56 minutes

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

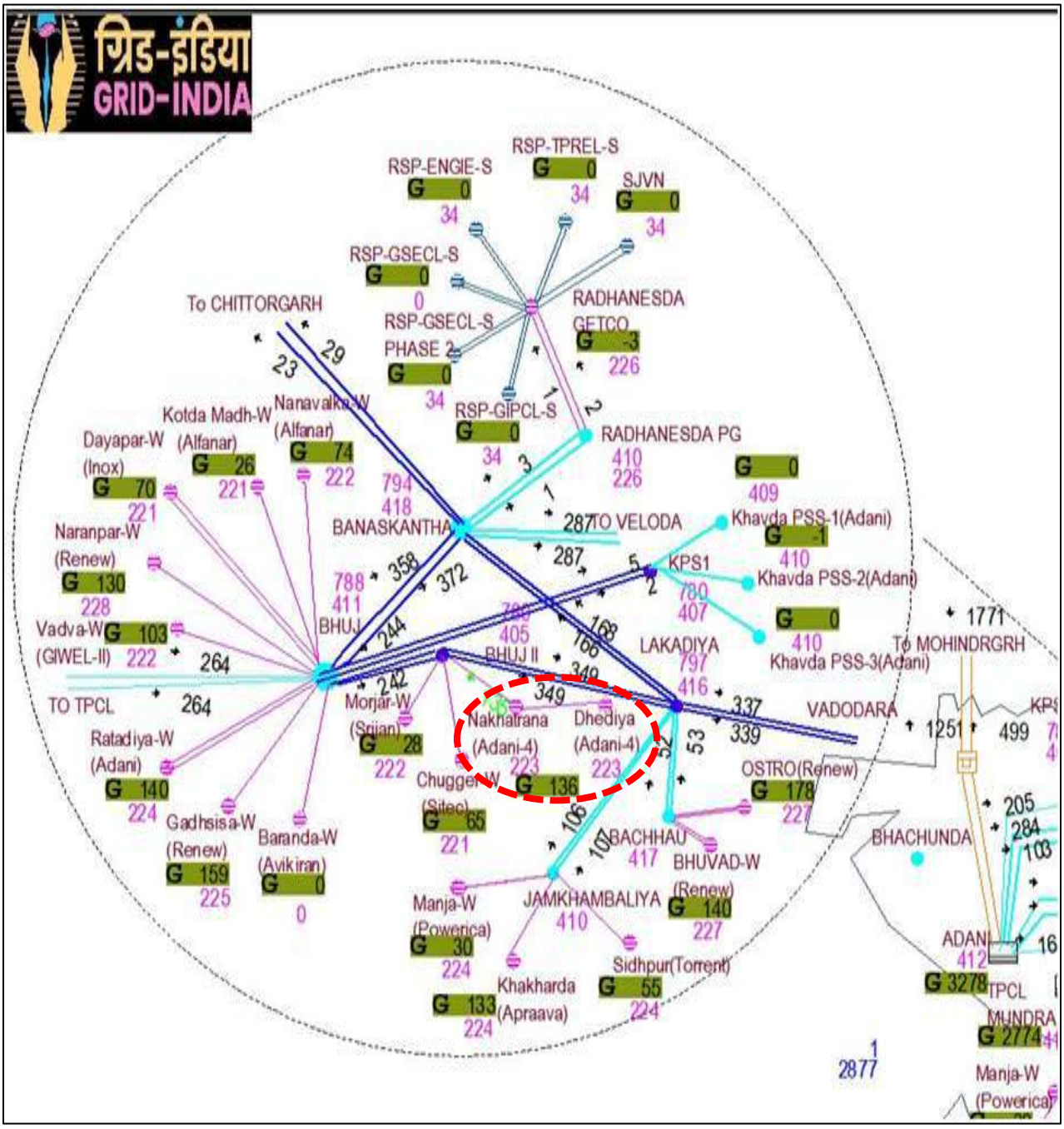


Figure 2. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nakhatrana	रिले संकेत (उप केंद्र-2) Relay Indication (End-2)	वापसी का समय Restoration time
1	220kV Nakhtrana-Dhediya	16:43	ZONE-1 OPTD, ZCOM TRIP, DIR E/F Trip, B-PH Trip R- 391.73A Y- 401.299A B- 2937.185A N- 2170.92A Fault Distance = 55.4KM	ZONE-1 TRIP, BPH TRIP, Fault Location = 1.371 KM	19:39
2	220kV Dedhiya SS Bus-1	16:43	Discharged due to tripping of evacuation feeder (220 kV Nakhatrana-Dedhiya line)	-	19:47
3	220kV Dedhiya SS Bus-2	16:43			19:39
4	220/33kV ICT-1 at Dhediya	16:43			19:48
5	220/33kV ICT-2 at Dhediya	16:43			19:49

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

- 220kV Nakhtrana-Dhediya single circuit tripped on B-N fault at both ends without A/R attempt.

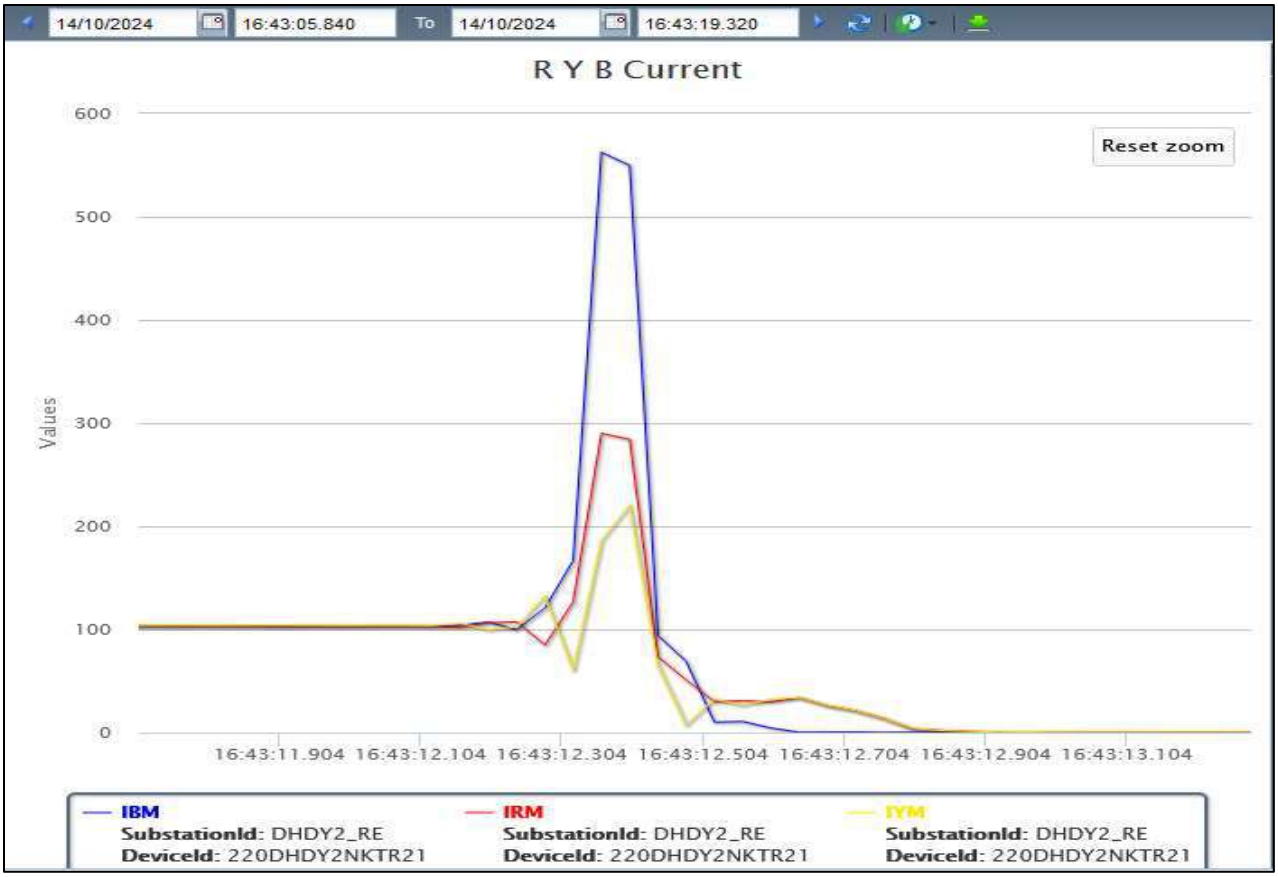


Figure 3. 220 kV Dhediya - Nakhatrana-1 Current Plot

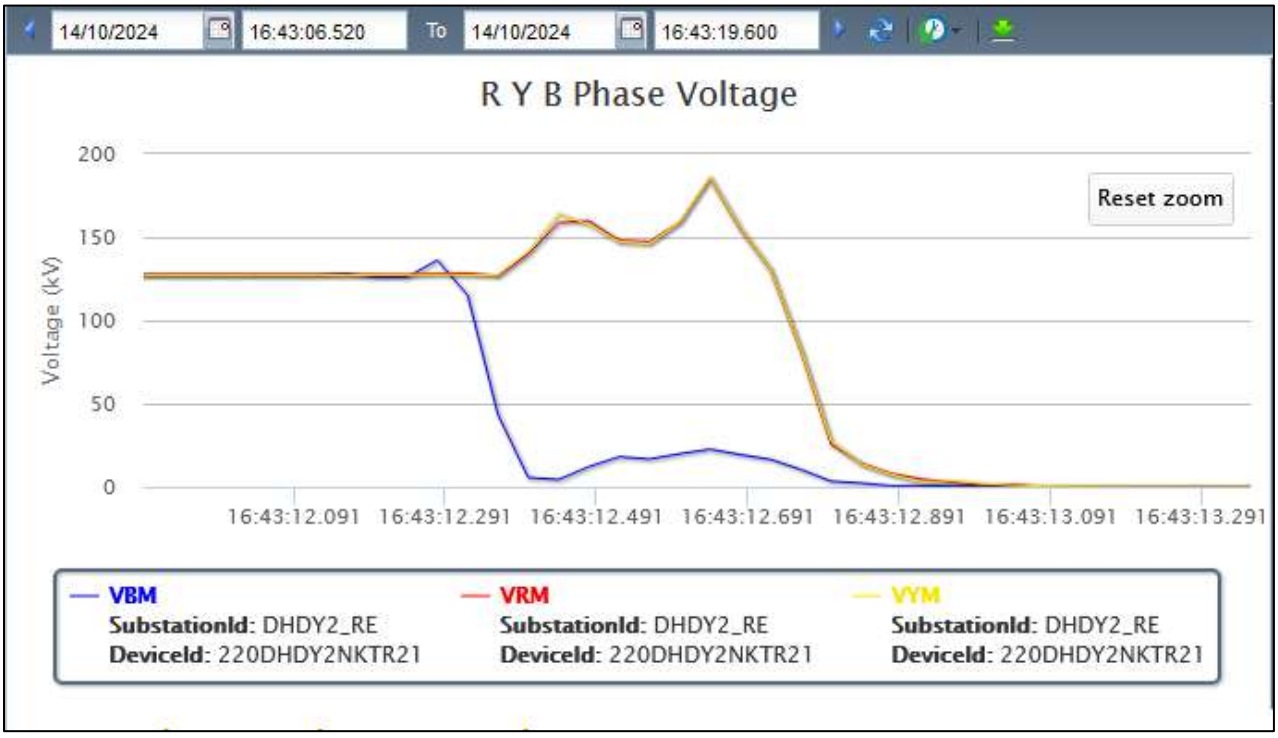


Figure 4. 220 kV Dhediya- Nakhatrana -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Three phase tripping occurred for single phase fault without A/R attempt at both ends.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- No any abnormalities found by M/s Adani during patrolling. Tripping is suspected by lightening.
- M/s Adani may kindly investigate the reason behind not attempting A/R at both ends.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from ADANI
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Received late from Nakhatrana end. Not received for Dedhiya end from Adani
3.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	Three phase tripping occurred for single phase fault without A/R attempt at both ends.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	DHDY2_RE	DHEDIYA CB COUPLER CB 20252 OPEN	16:43:12	0
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB COUPLER CB 20252 FAULTY	16:43:17	0
WRLDC	220KV-CB	NKTR2_RE	NAKHATRANA CB 20352 (DHDY2) FAULTY	16:43:17	0
WRLDC	220KV-CB	DHDY2_RE	DHEDIYA CB CB 304_10_1 OPEN	16:44:53	0

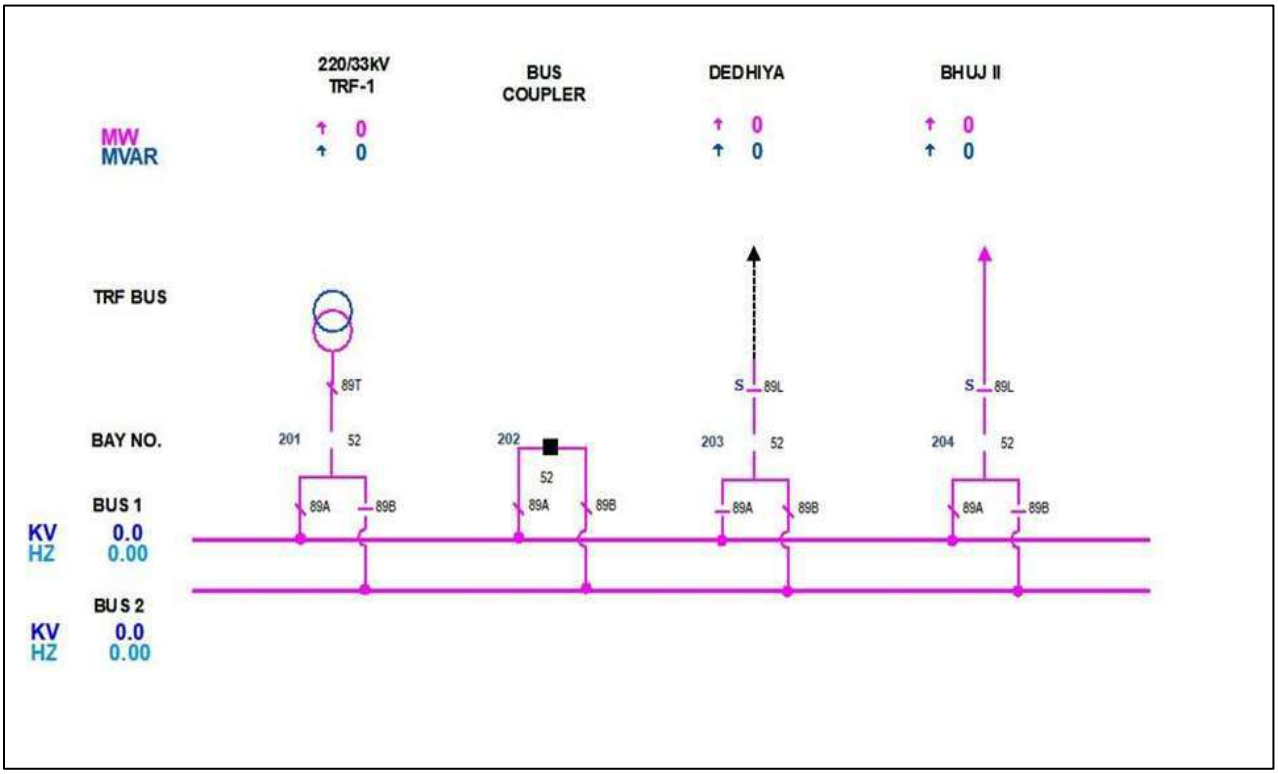
SOE from Nakhatrana-

P	14-Oct-24 4:43:13:096 PM	DRP_RECSTART	Off
P	14-Oct-24 4:43:12:858 PM	LINE_CVT_FF	Off
P	14-Oct-24 4:43:12:855 PM	LINE_CVT_FF	On
P	14-Oct-24 4:43:12:840 PM	LINE_CVT_FF	Off
P	14-Oct-24 4:43:12:837 PM	LINE_CVT_FF	On
P	14-Oct-24 4:43:12:831 PM	LINE_CVT_FF	Off
P	14-Oct-24 4:43:12:828 PM	LINE_CVT_FF	On
P	14-Oct-24 4:43:12:822 PM	LINE_CVT_FF	Off
P	14-Oct-24 4:43:12:819 PM	LINE_CVT_FF	On
P	14-Oct-24 4:43:12:816 PM	LINE_CVT_FF	Off
P	14-Oct-24 4:43:12:691 PM	DRP_RECSTART	On
P	14-Oct-24 4:43:12:645 PM	LINE_CVT_FF	On
P	14-Oct-24 4:43:12:552 PM	TRIP L3	Off
P	14-Oct-24 4:43:12:552 PM	TRIP_TRIP	Off
P	14-Oct-24 4:43:12:552 PM	TRIP L2	Off
P	14-Oct-24 4:43:12:552 PM	TRIP L1	Off
P	14-Oct-24 4:43:12:549 PM	BRC_START	Off
P	14-Oct-24 4:43:12:488 PM	3PH_TRIP_M-2	Off
P	14-Oct-24 4:43:12:477 PM	AR-START	Off
P	14-Oct-24 4:43:12:477 PM	ZCOM_TRIP	Off
P	14-Oct-24 4:43:12:453 PM	CAR_RCV_CH-2	Off
P	14-Oct-24 4:43:12:450 PM	ZM03-START	Off
P	14-Oct-24 4:43:12:450 PM	PHS-STFWPE	Off
P	14-Oct-24 4:43:12:450 PM	ZM02-START	Off
P	14-Oct-24 4:43:12:450 PM	PHS-STFWL3	Off
P	14-Oct-24 4:43:12:445 PM	TEF1_START	Off

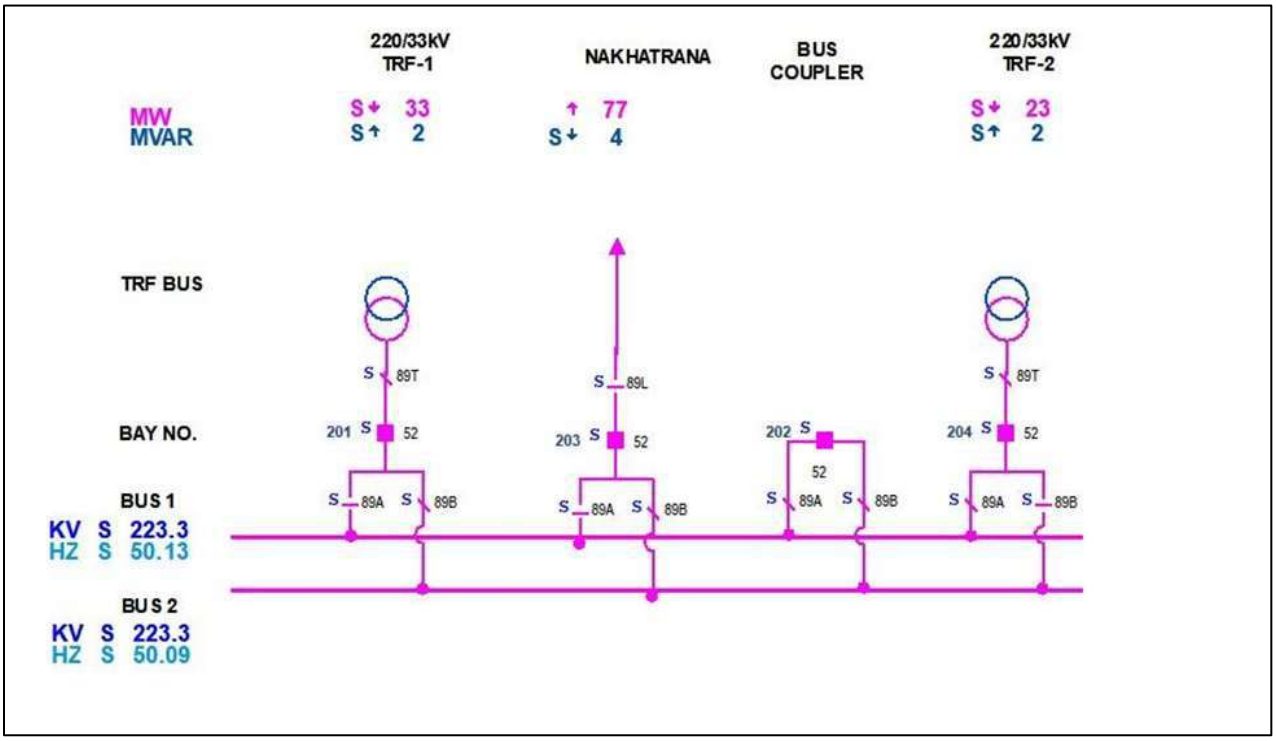
P	14-Oct-24 4:43:12:443 PM	AR_START_M-2	Off
P	14-Oct-24 4:43:12:425 PM	CB_OPEN_Y-PH	On
P	14-Oct-24 4:43:12:423 PM	CB_OPEN_R-PH	On
P	14-Oct-24 4:43:12:423 PM	CB_OPEN_B-PH	On
P	14-Oct-24 4:43:12:411 PM	CB_CLOSE_Y-PH	Off
P	14-Oct-24 4:43:12:409 PM	CB_CLOSE_R-PH	Off
P	14-Oct-24 4:43:12:409 PM	3PH_TRIP_M-2	On
P	14-Oct-24 4:43:12:409 PM	CB_CLOSE_B-PH	Off
P	14-Oct-24 4:43:12:409 PM	AR_START_M-2	On
P	14-Oct-24 4:43:12:402 PM	TRIP L1	On
P	14-Oct-24 4:43:12:402 PM	TRIP_TRIP	On
P	14-Oct-24 4:43:12:402 PM	TRIP L3	On
P	14-Oct-24 4:43:12:402 PM	AR-START	On
P	14-Oct-24 4:43:12:402 PM	ZCOM_TRIP	On
P	14-Oct-24 4:43:12:402 PM	TRIP L2	On
P	14-Oct-24 4:43:12:398 PM	CAR_RCV_CH-2	On
P	14-Oct-24 4:43:12:389 PM	AR-PREP3P	On
P	14-Oct-24 4:43:12:387 PM	AR-BLOCK	On
P	14-Oct-24 4:43:12:384 PM	BB_PROT_OPTD	On
P	14-Oct-24 4:43:12:369 PM	ZM02-START	On
P	14-Oct-24 4:43:12:357 PM	ZM03-START	On
P	14-Oct-24 4:43:12:357 PM	PHS-STFWPE	On
P	14-Oct-24 4:43:12:357 PM	BRC_START	On
P	14-Oct-24 4:43:12:357 PM	TEF1_START	On
P	14-Oct-24 4:43:12:357 PM	PHS-STFWL3	On

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Nakhatrana SLD:

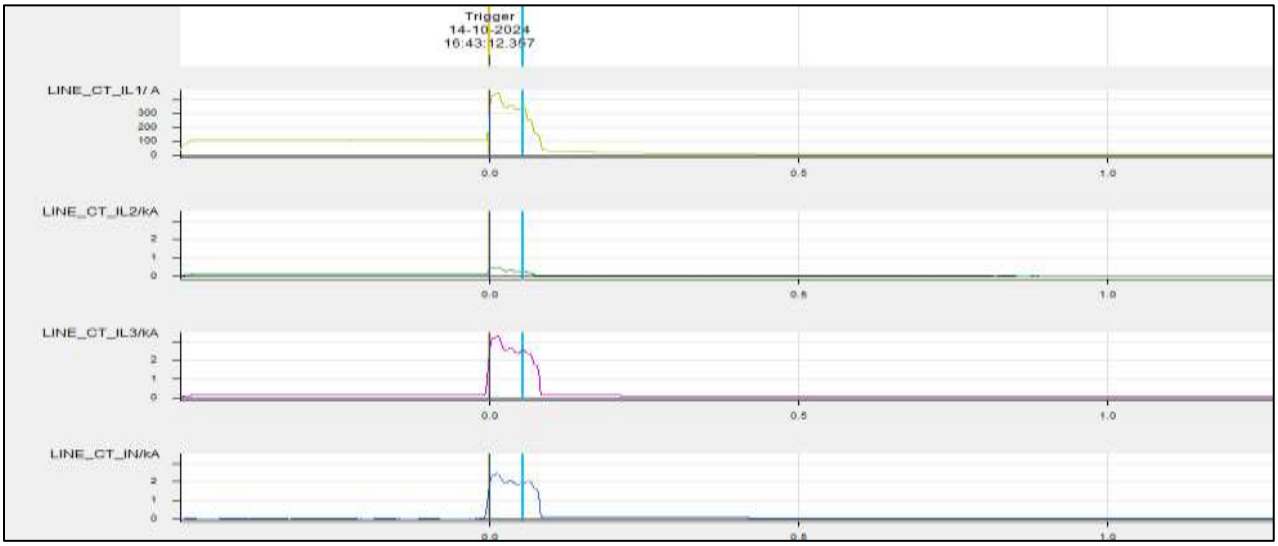


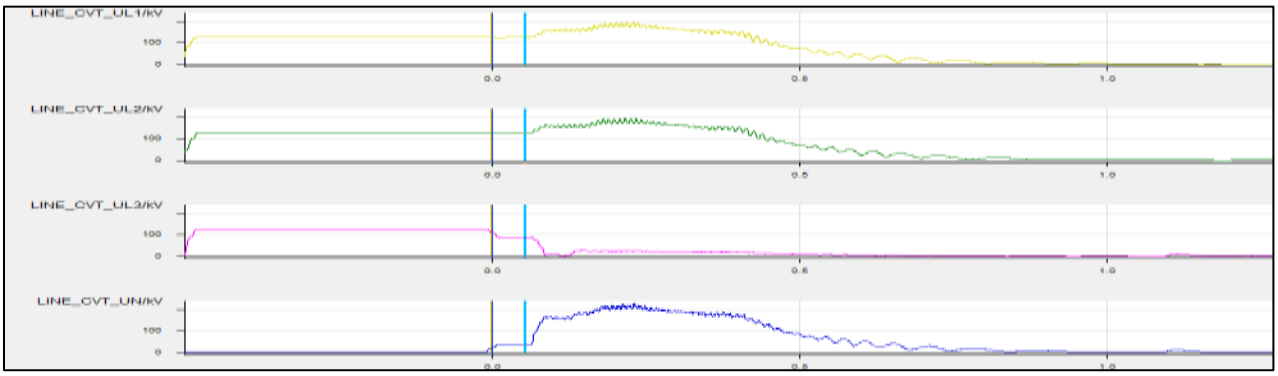
220kV Dhediya SLD:

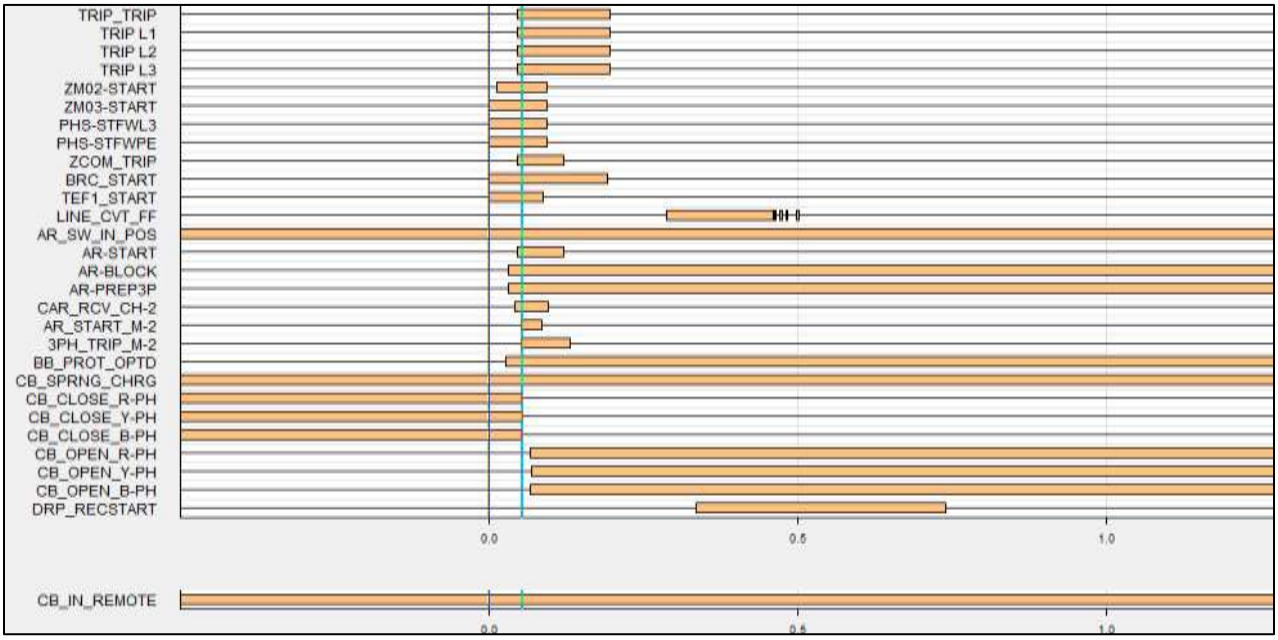


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

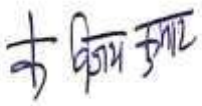
A. DR of 220 kV Nakhatrana-Dhediya-1 for Nakhatrana end







अनुलग्नक-D / Annexure-D: Site photographs- Nil



Vijay Kumar Kodali

DGM (SO), WRLDC

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. ऑस्ट्रो उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Ostro of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 29.10.2024

1. **घटना का सारांश / Event Summary:** At 22:20 Hrs /13-10-2024, 220 kV Bachau-Ostro Line-1 & Line-2 tripped due to R-N fault without A/R attempt and DT received at Bachau end. Generation loss of 142 MW occurred at Ostro Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 22:20 Hrs /13-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Ostro (Kutchh), Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.01	65882	54832	9192	16479
घटना के बाद Post Event	49.99	65990	54844	9237	16436

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति Weather Condition	Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**:- Generation loss of 142 MW occurred at Ostro (Renew) Wind Power plant.

7. **रुकावट की अवधि / Duration of interruption:** 1 hours 38 minutes

8. **प्रभावित क्षेत्र का नक्शा / Network across the affected area:**

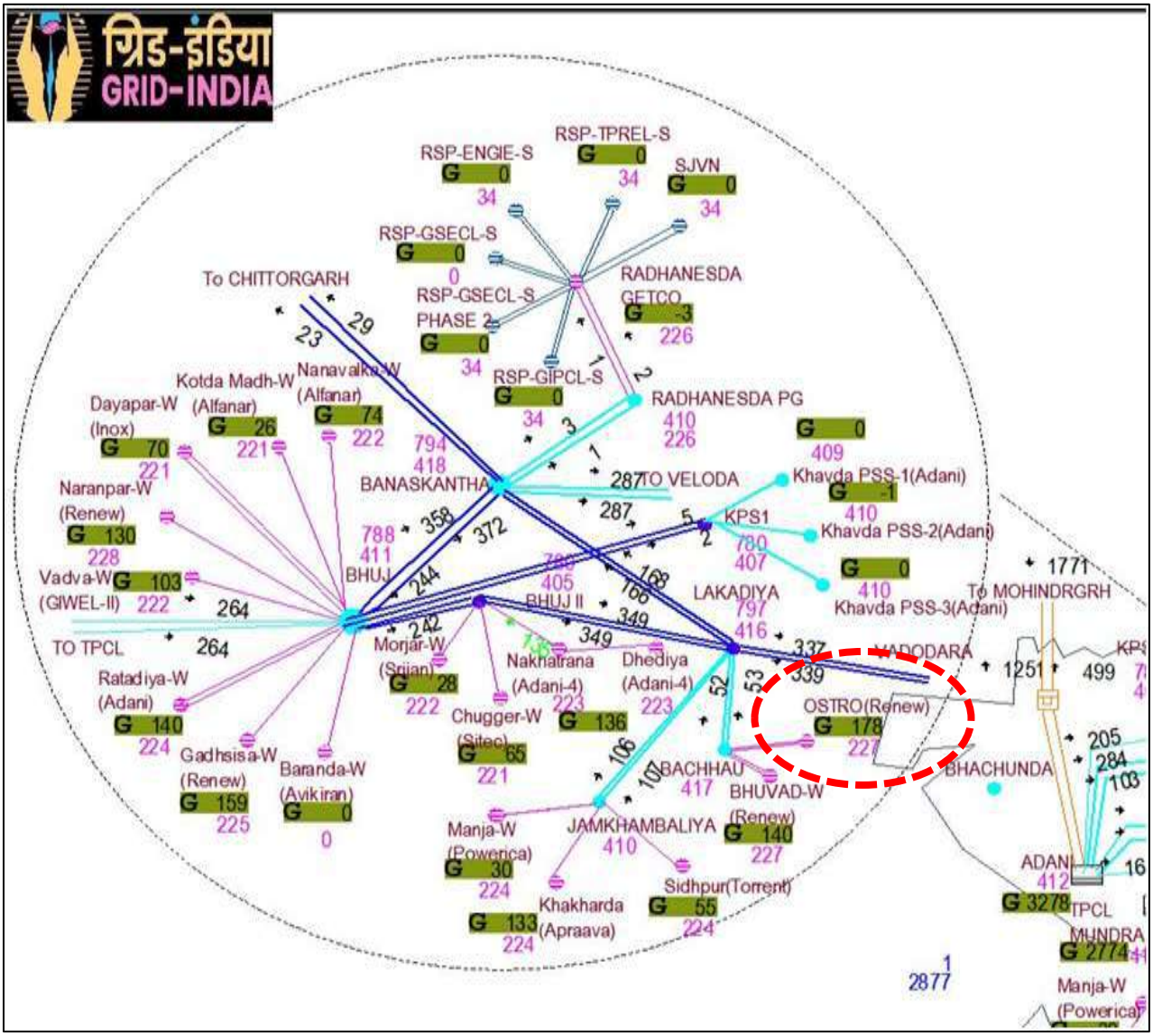


Figure 1. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Ostro	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bachau	वापसी का समय Restoration time
1	220 kV Bachau-Ostro-1	22:20	Tripped due to R-E fault, 1.02kA	DT received	23:58
2	220 kV Bachau-Ostro-2	22:20	Tripped due to R-E fault, 1.02kA	DT received	23:58

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

- 220 kV Bachau-Ostro Line-1 & Line-2 tripped due to R-N fault without A/R attempt.
- DT received at Bachau end.

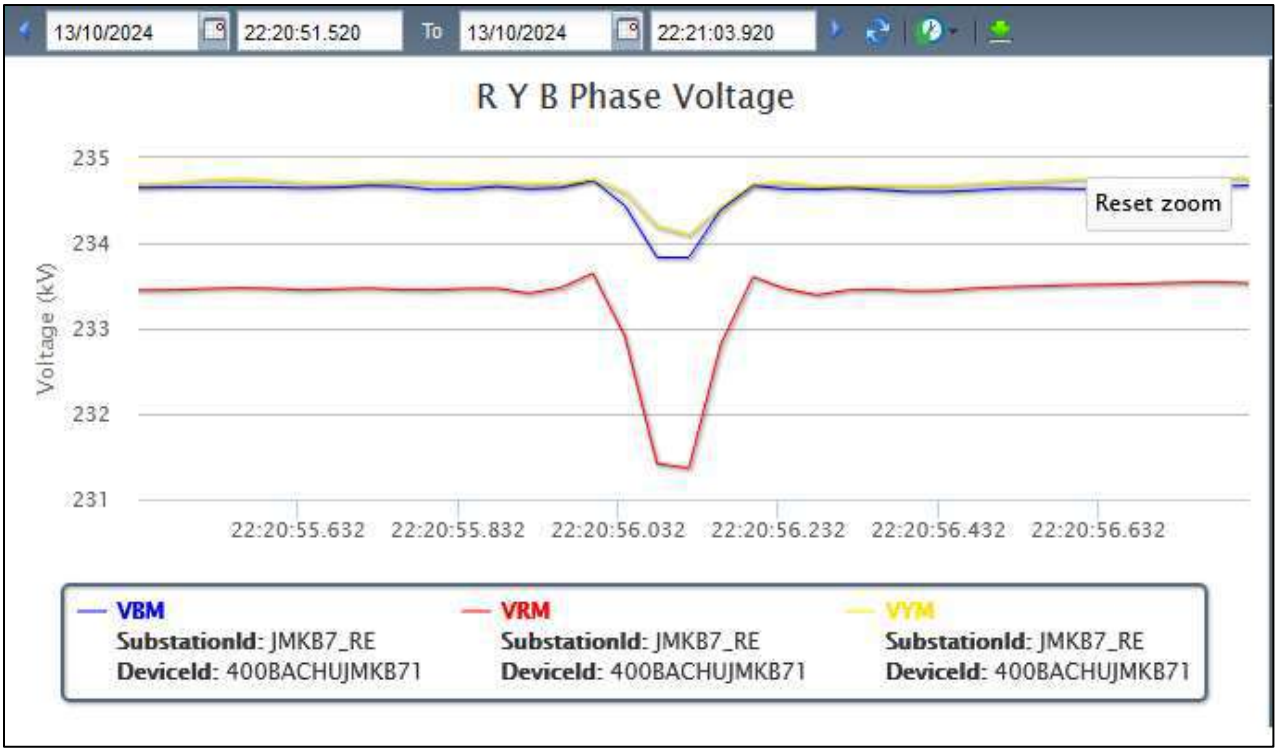


Figure 2. 220 kV Bachau- Jamkhambaliya -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- A/R not attempted in both the circuits. As seen from EL "**A/R is not ready**" signal generated.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- Renew power may kindly investigate the reason for not attempting A/R in both the ckts.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Received late from Ostro (Renew)
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Power grid and received late from Ostro (Renew)
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Ostro (Renew) on 21.10.2024
4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted in both the circuits. As seen from EL "A/R is not ready" signal generated. Renew power may kindly investigate.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 1 to BACHU ACTED	22:20:46	352
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU ACTED	22:20:46	351
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY CB 20352 (BACHU-2) ACTED	22:20:46	373
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY CB 20552 (BACHU-1) ACTED	22:20:46	380
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU ACTED	22:20:46	472
WRLDC	220KV-CB	OSTR2_IP	OSTRO ENERGY CB 20352 (BACHU-2) FAULTY	22:20:46	391
WRLDC	220KV-CB	OSTR2_IP	OSTRO ENERGY CB 20552 (BACHU-1) FAULTY	22:20:46	408
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 1 to BACHU NORMAL	22:20:46	552
WRLDC	220KV-CB	OSTR2_IP	OSTRO ENERGY CB 20352 (BACHU-2) OPEN	22:20:46	408
WRLDC	220KV-CB	OSTR2_IP	OSTRO ENERGY CB 20552 (BACHU-1) OPEN	22:20:46	425
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 1 to BACHU ACTED	22:20:46	632
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU NORMAL	22:20:46	706
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU NORMAL	22:20:46	700
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 1 to BACHU NORMAL	22:20:46	729
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU ACTED	22:20:46	831
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU NORMAL	22:20:47	112
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU ACTED	22:20:47	236
WRLDC	220-SOE	OSTR2_IP	OSTRO ENERGY LINE 220Kv LINE 2 to BACHU NORMAL	22:20:47	564

SOE from Ostro(Renew)-

Trip Log - 001046 / 13-10-2024 22:20:46.331 - backup220kv FINAL / 220KV / B205 / B205-21.1 (7SA522)/7SA522 V04.74.02

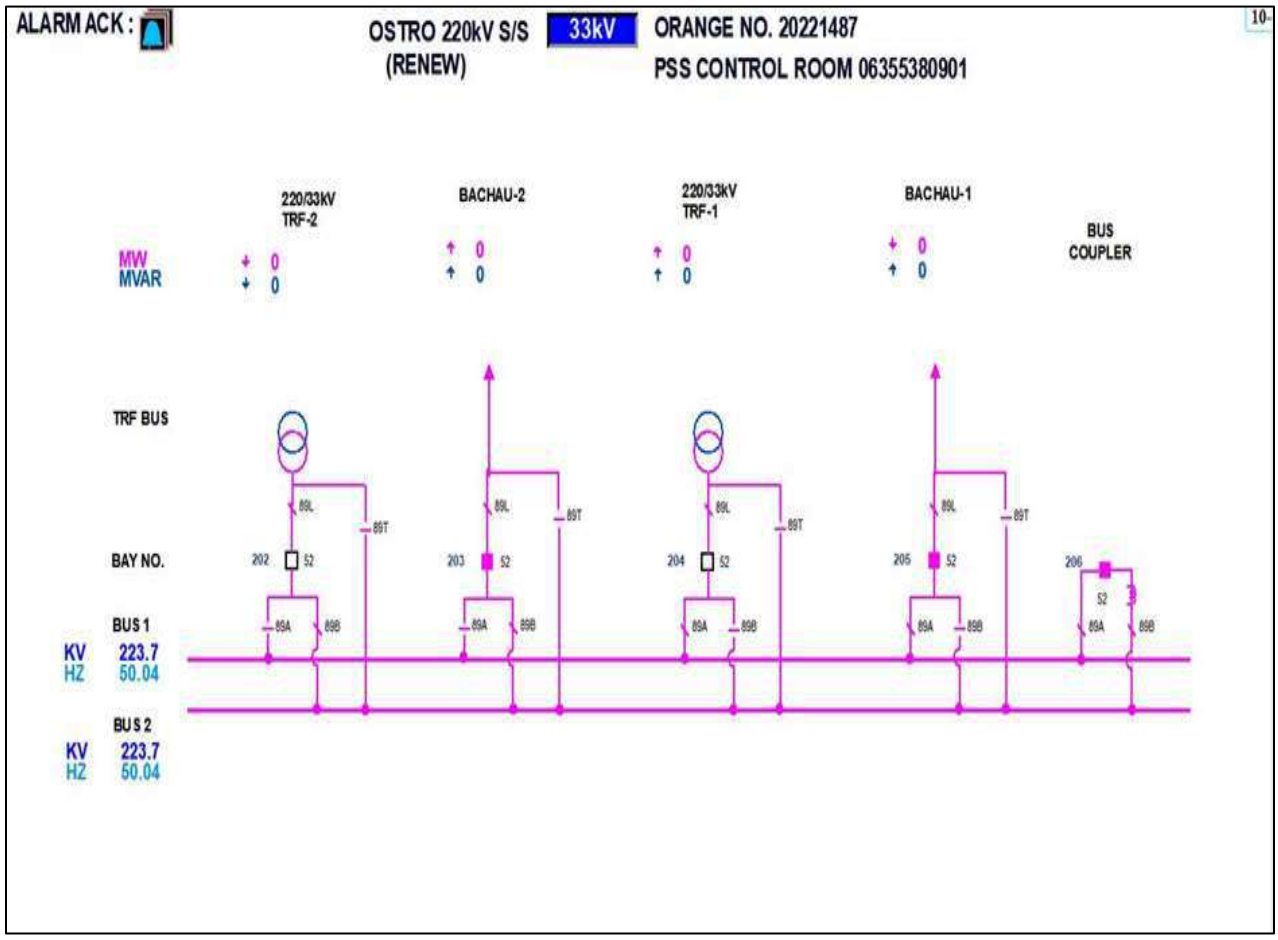
Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	1046 - ON	13.10.2024 22:20:46.331		
00302	Fault Event	1166 - ON	13.10.2024 22:20:46.331		
10240	59-1-Vphg Pickup	ON	0 ms		
10243	59-Vphg Pickup B	ON	0 ms		
10241	59-2-Vphg Pickup	ON	21 ms		
10244	59-Vphg Pickup C	ON	21 ms		
10247	59-Vphg TRIP command	ON	21 ms		
00536	Relay Definitive TRIP	ON	21 ms		
00533	Primary fault current Ia	1.02 kA	25 ms		
00534	Primary fault current Ib	0.09 kA	25 ms		
00535	Primary fault current Ic	0.27 kA	25 ms		
02784	79: Auto recloser is not ready	ON	62 ms		
10240	59-1-Vphg Pickup	OFF	80 ms		
10241	59-2-Vphg Pickup	OFF	80 ms		
10243	59-Vphg Pickup B	OFF	80 ms		
10244	59-Vphg Pickup C	OFF	80 ms		

Trip Log - 000861 / 13-10-2024 22:20:46.330 - backup220kv FINAL / 220KV / B203 / B203-21.1 (7SA522)/7SA522 V04.74.02

Number	Indication	Value	Date and time	Cause	State
00301	Power System fault	861 - ON	13.10.2024 22:20:46.330		
00302	Fault Event	945 - ON	13.10.2024 22:20:46.330		
10240	59-1-Vphg Pickup	ON	0 ms		
10243	59-Vphg Pickup B	ON	0 ms		
00592	Single pole open detected in Phase B	ON	14 ms		
10241	59-2-Vphg Pickup	ON	20 ms		
10244	59-Vphg Pickup C	ON	20 ms		
10247	59-Vphg TRIP command	ON	20 ms		
00536	Relay Definitive TRIP	ON	21 ms		
00592	Single pole open detected in Phase B	OFF	24 ms		
00533	Primary fault current Ia	1.02 kA	24 ms		
00534	Primary fault current Ib	0.09 kA	24 ms		
00535	Primary fault current Ic	0.28 kA	24 ms		
02784	79: Auto recloser is not ready	ON	51 ms		
10240	59-1-Vphg Pickup	OFF	89 ms		
10241	59-2-Vphg Pickup	OFF	89 ms		
10243	59-Vphg Pickup B	OFF	89 ms		
10244	59-Vphg Pickup C	OFF	89 ms		

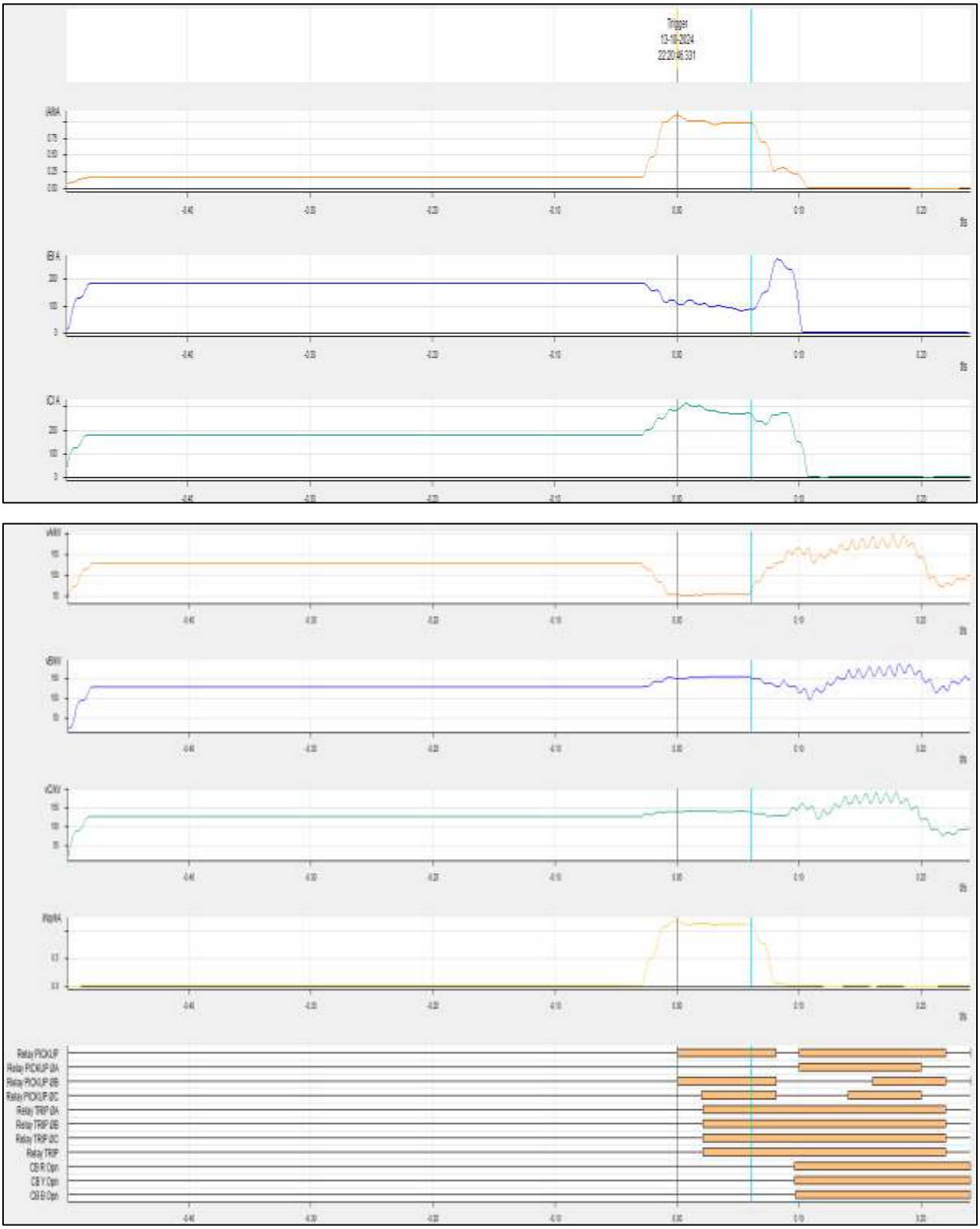
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Ostro SLD:

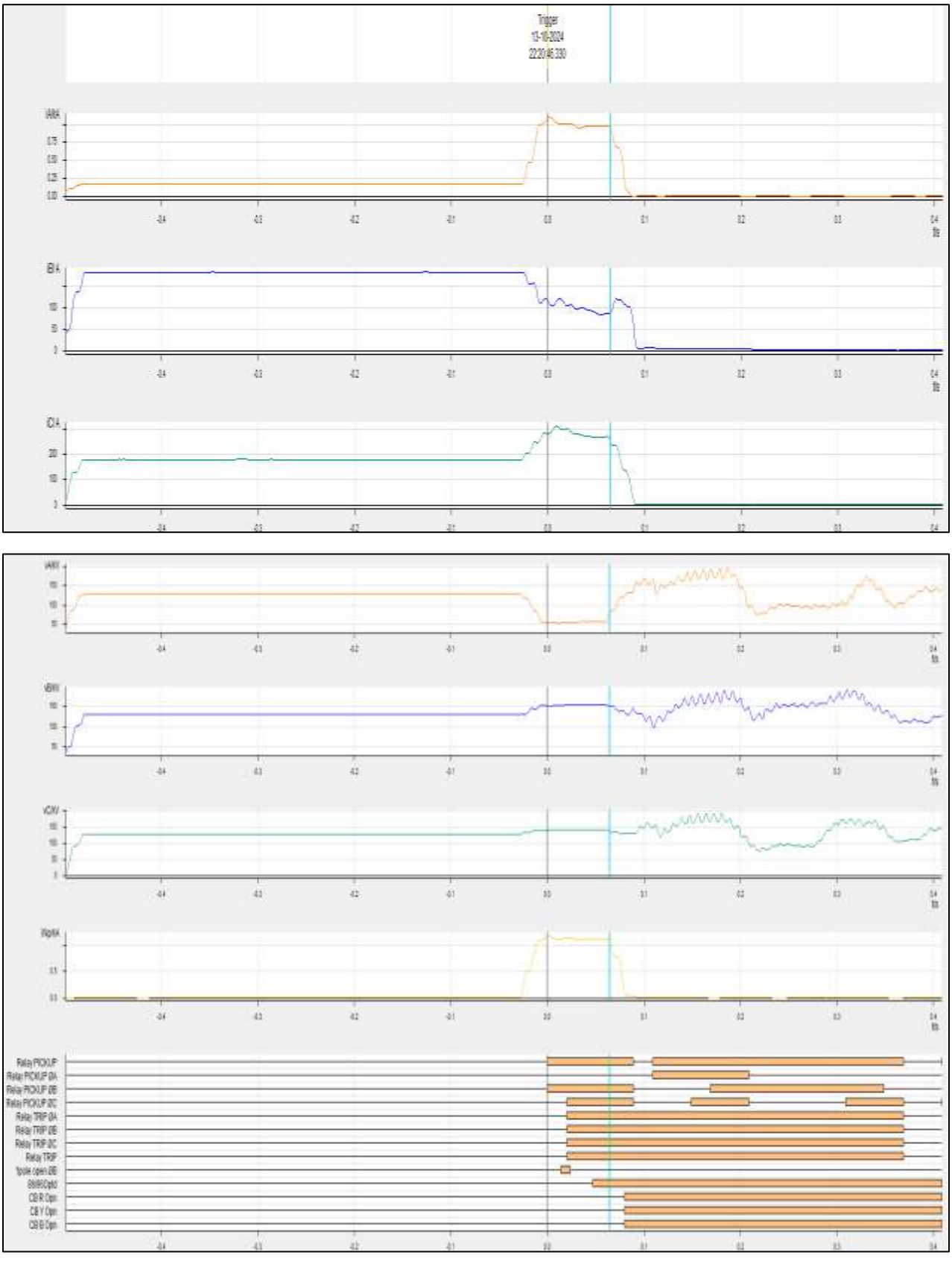


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

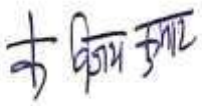
A. DR of 220 kV BACHHAU - Ostro – I from Ostro end



B. DR of 220 kV BACHHAU - Ostro – II from Ostro end



अनुलग्नक-D / Annexure-D: Site photographs- Nil



Vijay Kumar Kodali

DGM (SO), WRLDC

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पश्चिमी क्षेत्र के 220 के॰वी. नारंपार उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Naranpar of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 29.10.2024

1. **घटना का सारांश / Event Summary:** At 00:29 Hrs /15-10-2024, 220 kV Naranpar(Roha)-Bhuj S/C tripped on B-E fault from Bhuj end. A/R successful from Naranpar end and line tripped at Bhuj end. 220 kV Naranpar(Roha) s/s went dark due to the event. During patrolling, it was observed that Tower no-67, 68 collapsed and there was also conductor theft. There was no Wind generation at the time of the event at 220 kV Naranpar(Roha).
2. **घटना का समय और दिनांक / Time and Date of the Event :** 00:29 Hrs /15-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Naranpar, Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.98	66849	56381	9053	17089
घटना के बाद Post Event	49.97	66950	56357	9047	17029

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति **Weather Condition**	Slightly rain & Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Nil



Figure 1. 220 kV Bhuj- Naranpar-1 Active Power Plot

7. **रुकावट की अवधि / Duration of interruption:** 3 days 21 hours 22 minutes.

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

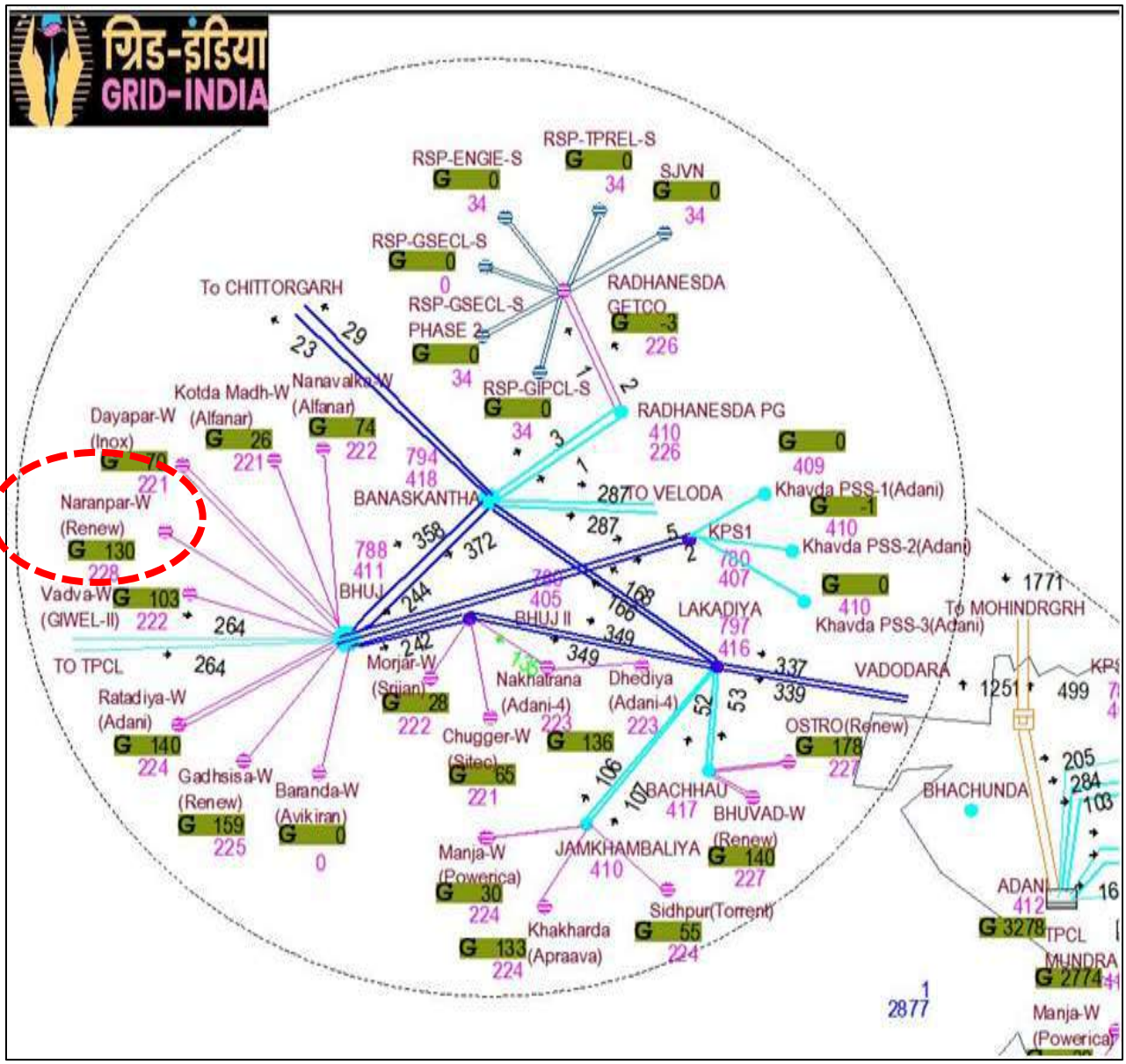


Figure 2. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped:**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Naranpar	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time

1	220 kV Naranpar(Roha)-Bhuj	00:29/ 15.10.2024	M-1 relay operated, B-E fault, Z COM operated, A/R successful Fault distance- 17.87 KM & fault current 8.39 kA	B-E fault Fault Current:- 7.2 kA Fault Distance:- 18.3 km	21:51/ 18.10.2024

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

- 220 kV Naranpar(Roha)-Bhuj S/C tripped on B-E fault from Bhuj end due to collapsing of Tower no-67, 68 and conductor theft.
- A/R successful from Naranpar end as informed by GIWEL-3. However, DR not submitted.

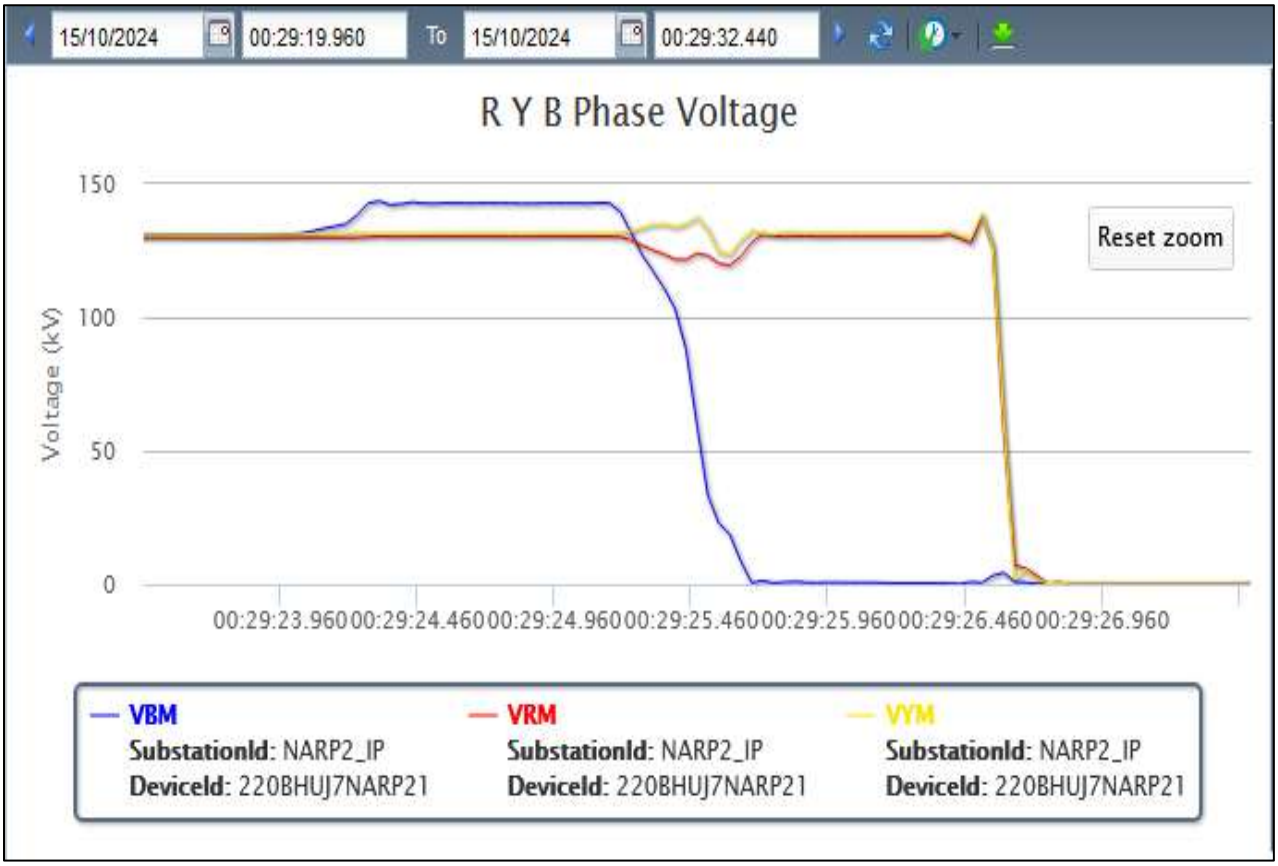


Figure 3. 220 kV Bhuj- Naranpar -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- As informed by GIWEL-3, A/R successful from Naranpar end but DR not generated at Naranpar end, GIWEL-3 may kindly look into this and solve this issue.
- As seen from the DR, A/R attempted at Bhuj end, there was no visible fault current during A/R dead time. Therefore, A/R should have been successful. However, all 3 phases tripped which was a wrong operation, POWERGRID-WR-2 may kindly look into this.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- During patrolling, Naranpar (GIWEL-3) found that tripping occurred due to collapsing of Tower no-67, 68 and there was conductor theft also observed.
- As informed by GIWEL-3, A/R successful from Naranpar end but DR not generated at Naranpar end, GIWEL-3 may kindly look into this and solve this issue.
- A/R attempted at Bhuj end, there was no fault visible during A/R so, A/R should have been successful, but all 3 phases tripped, this is a wrong operation, POWERGRID-WR-2 may kindly look into this.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Naranpur (GIWEL-3) and received late from POWERGRID WR-2
2.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Naranpar (GIWEL-3)

3.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	As seen from the DR, A/R attempted at Bhuj end, there was no visible fault current during A/R dead time. Therefore, A/R should have been successful. However, all 3 phases tripped which was a wrong operation, POWERGRID-WR-2 may kindly look into this.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

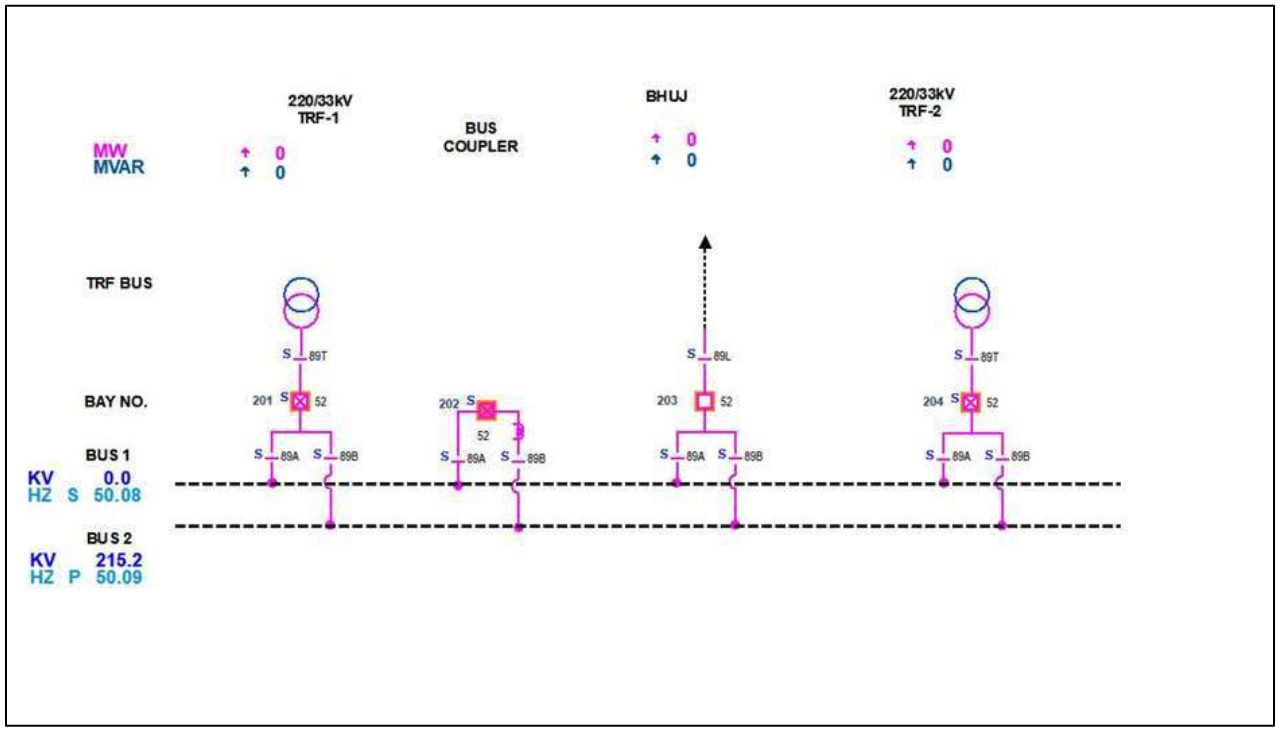
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) TRANSIT	00:29:25	546
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) CLOSED	00:29:26	543
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) TRANSIT	00:29:26	633
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21552 (NARP2) OPEN	00:29:27	250

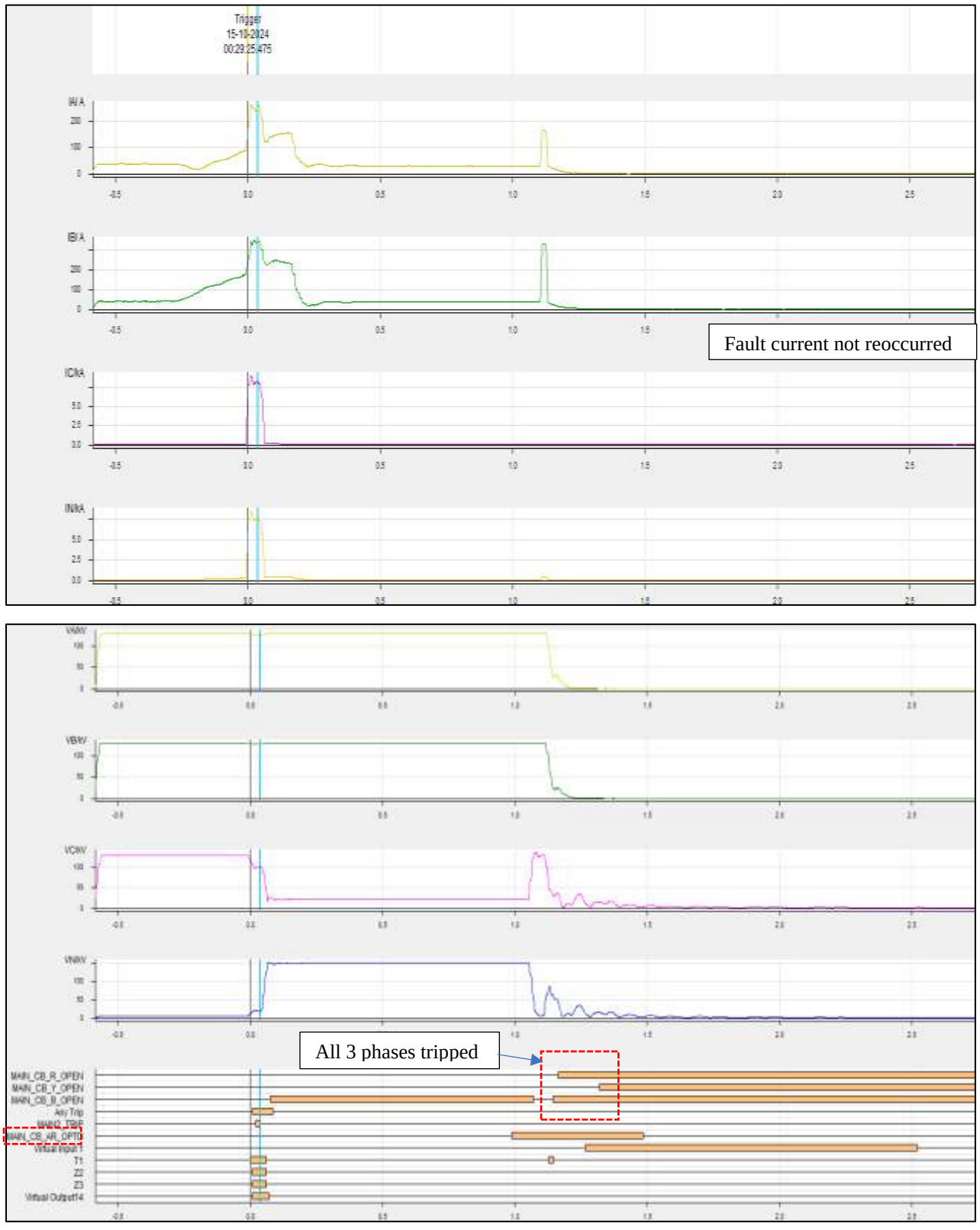
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

220kV Naranpar SLD:

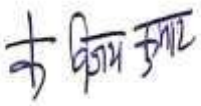


अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 KV Bhuj – Naranpar line from Bhuj end



अनुलग्नक-D / Annexure-D: Site photographs- Nil



Vijay Kumar Kodali

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ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
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(A Government of India Enterprise)
[formerly Power System Operation Corporation Limited (POSOCO)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. वाडवा उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Vadva of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 29.10.2024

1. **घटना का सारांश / Event Summary:** At 16:24 Hrs /15-10-2024, 220 kV Vadva-Bhuj S/C tripped on R-E fault at Vadva end only without A/R attempt. A/R successful at Bhuj end. 220 kV Vadva s/s went into dark due to the event. Generation loss of 84MW occurred at Vadva Wind Power plant due to loss of evacuation path
2. **घटना का समय और दिनांक / Time and Date of the Event :** 16:24 Hrs /15-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Vadva, Gujarat
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.98	68367	61117	10786	19338
घटना के बाद Post Event	49.98	68428	61095	10787	19339

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति Weather Condition	Rain & Lightning

6. **लोड और जेनरेशन हानि / Load and Generation loss**: 84 MW Gen loss.



Figure 1. 220 kV Bhuj- Vadva-1 Frequency Plot

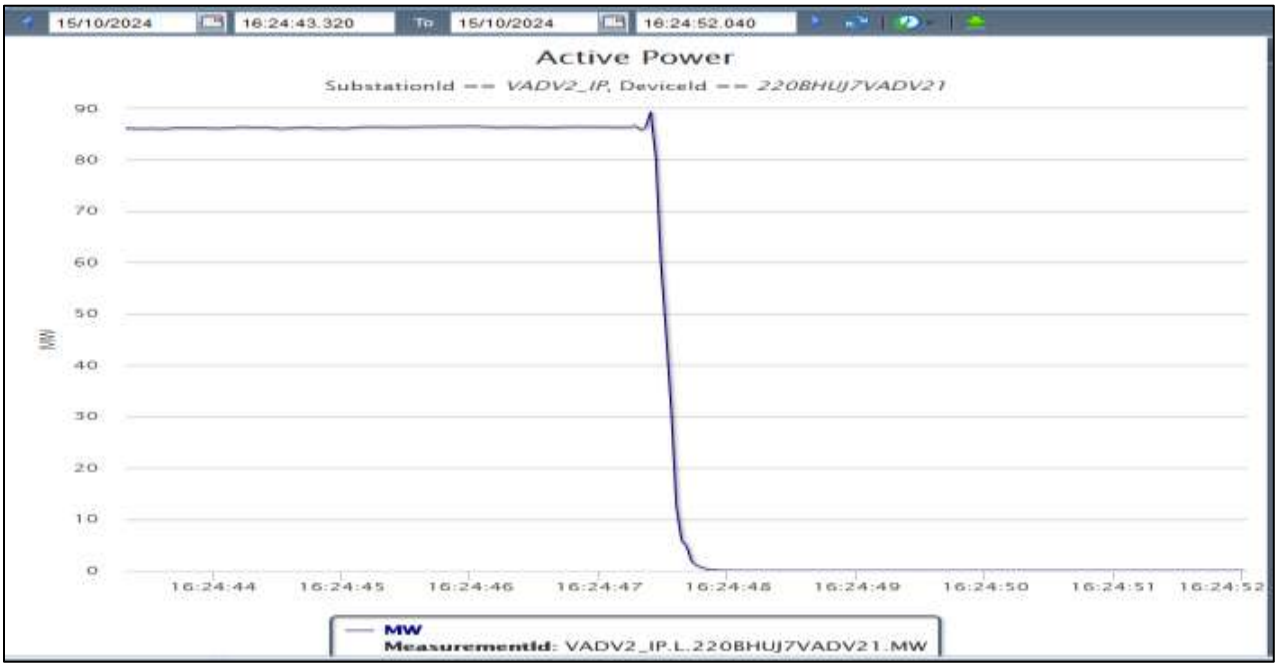


Figure 2. 220 kV Bhuj- Vadva-1 Active Power Plot

7. **रुकावट की अवधि / Duration of interruption:** 1 hour 25 minutes

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

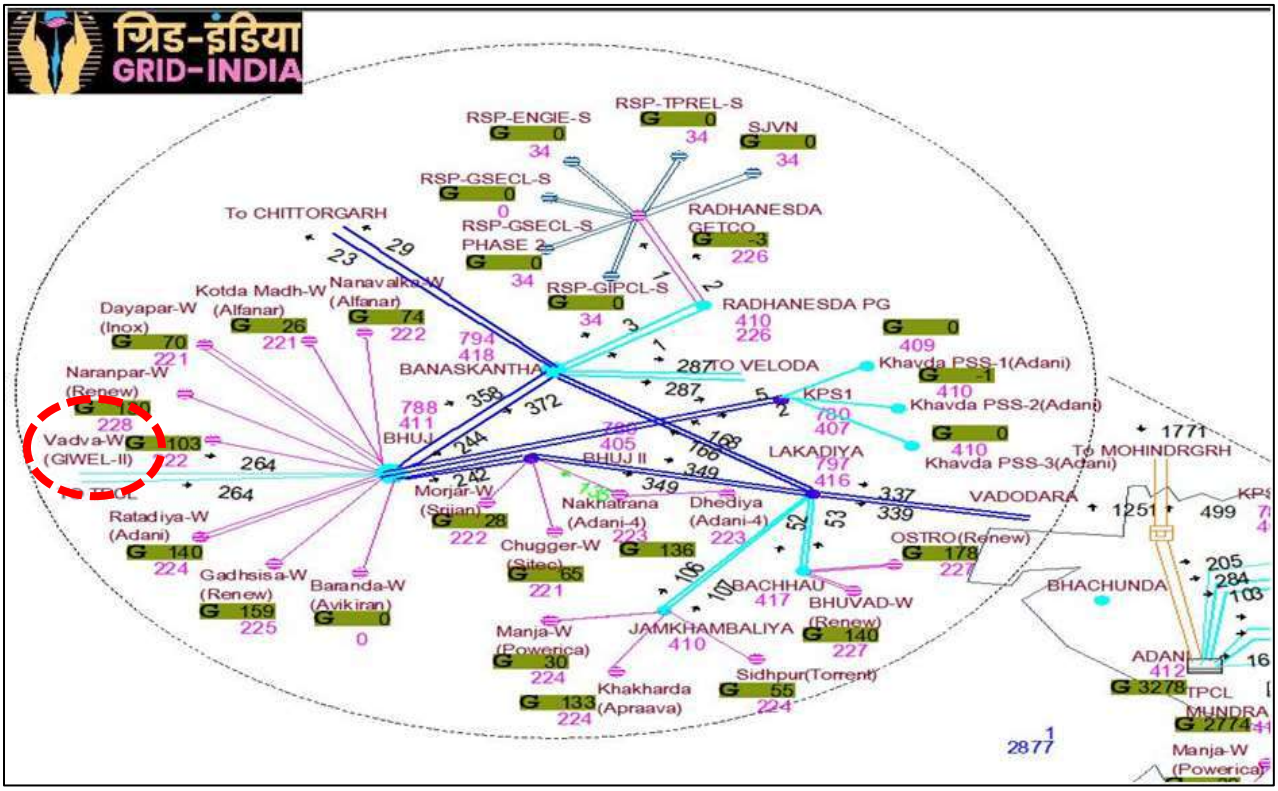


Figure 3. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Vadva	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1	220 kV Vadva-Bhuj-1	16:24	R Ph:- 795.84, Y Ph:- 358.73, B Ph:- 302.67, N:- 1381.42 A	A/R successful	17:49

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

- 220 kV Vadva-Bhuj S/C tripped on R-E fault at Vadva end only without A/R attempt. A/R successful at Bhuj end.

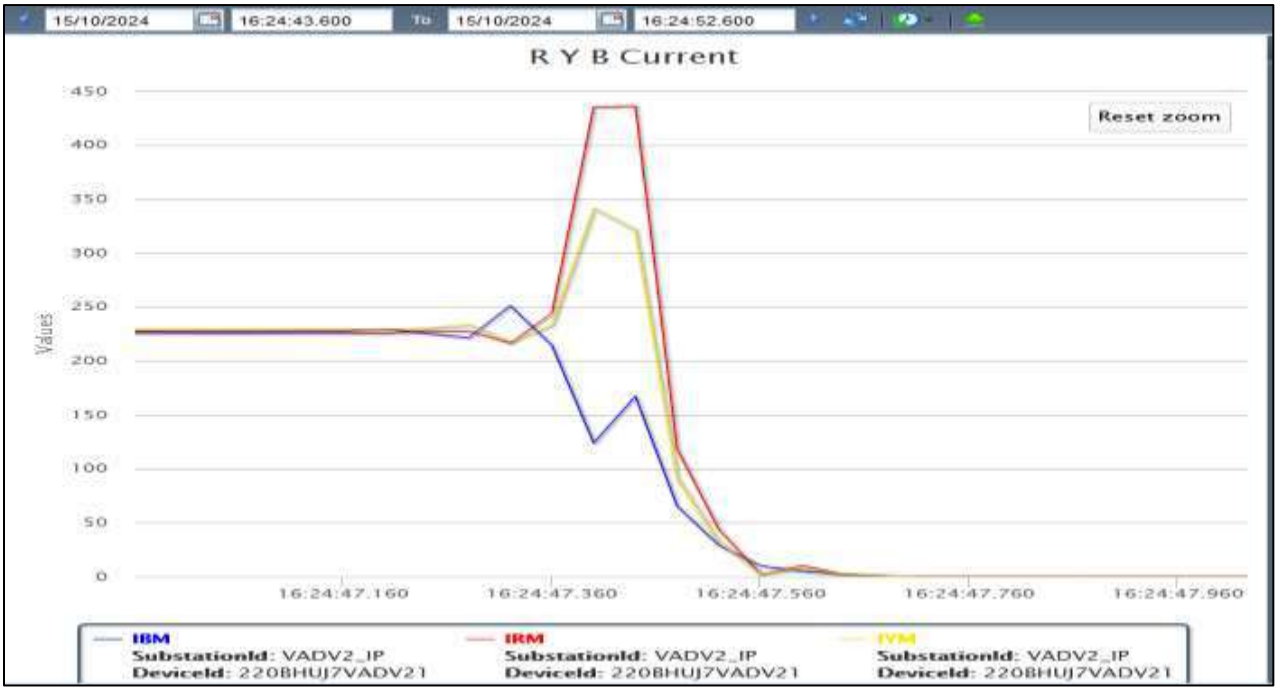


Figure 4. 220 kV Bhuj- Vadva-1 Current Plot

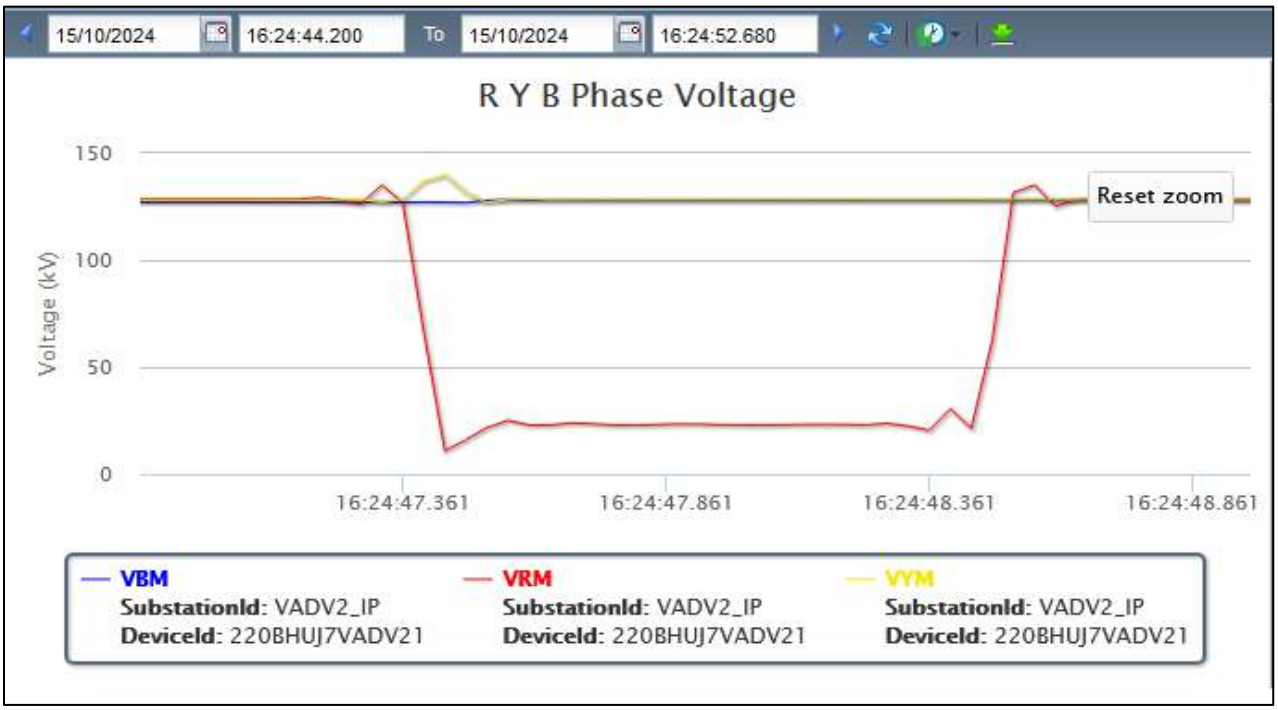


Figure 5. 220 kV Bhuj- Vadva -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- A/R not attempted at Vadva end for single phase fault.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- GIWEL-3 may kindly investigate as the A/R not attempted at Vadva end for single phase fault.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

क्र॰सं॰ S.No.	विवरण Description	विनियमन का गैर-अनुपालन Regulation Non-Compliance	टिप्पणी Remarks
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received from Vadva(Giwel-3)
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Vadva(Giwel-3) and received late from POWERGRID
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Not received from Vadva(Giwel-3)
4.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted at Vadva end for single phase fault. GIWEL-3 may kindly investigate

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

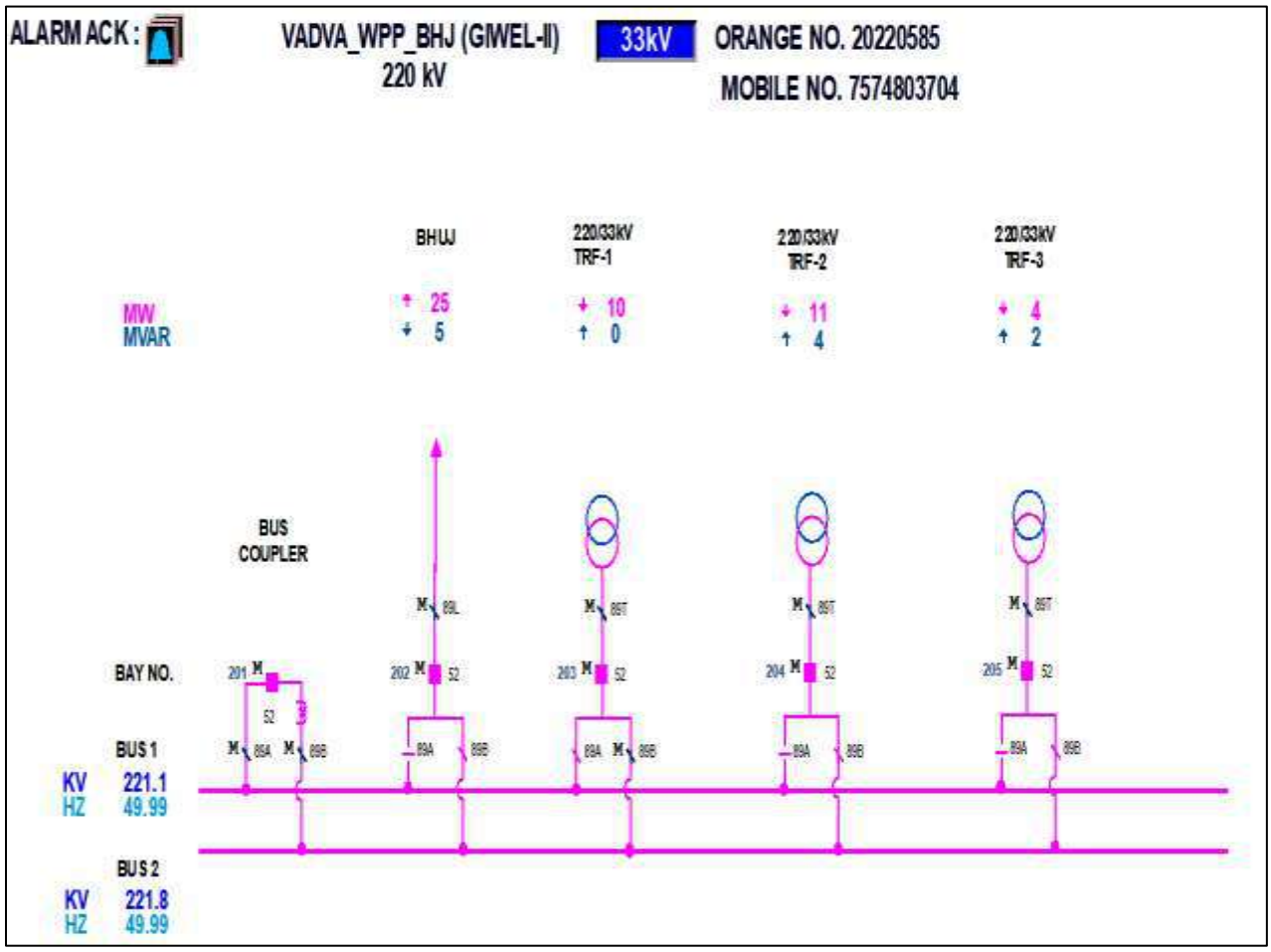
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220-SOE	VADV2_IP	VADVA GIWEL CB 20252 (BHUJ7) ACTED	16:24:47	420
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21652 (VADV2) TRANSIT	16:24:47	491
WRLDC	220-SOE	VADV2_IP	VADVA GIWEL CB 20252 (BHUJ7) NORMAL	16:24:47	573
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 21652 (VADV2) CLOSED	16:24:48	488

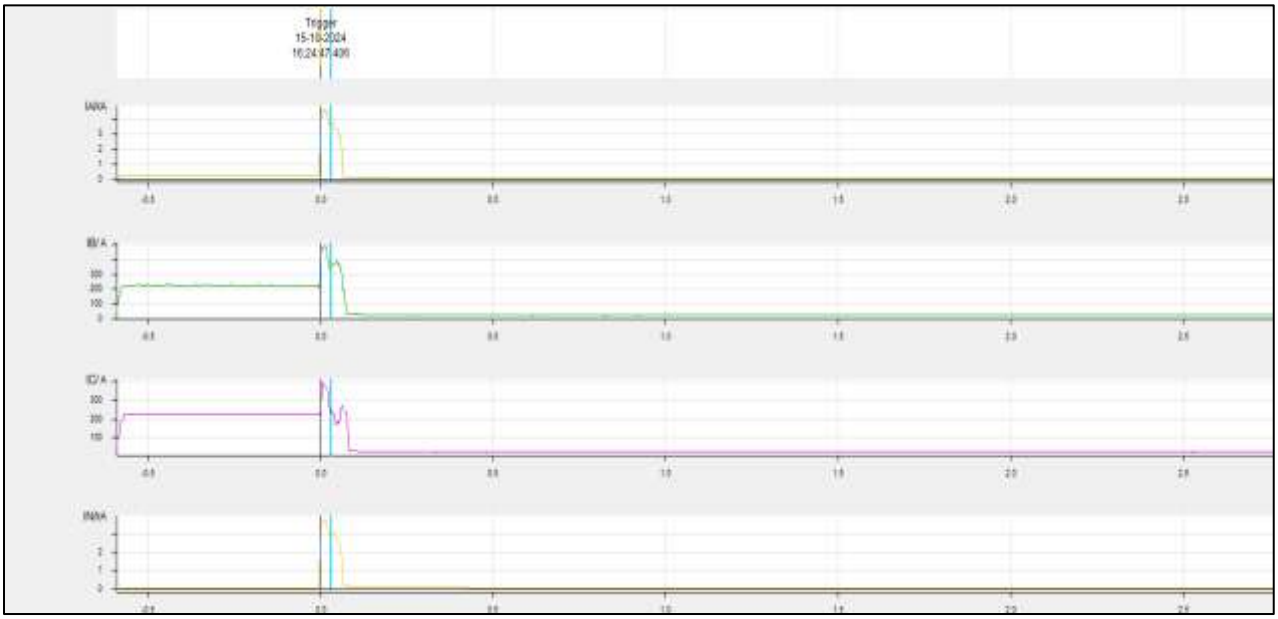
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

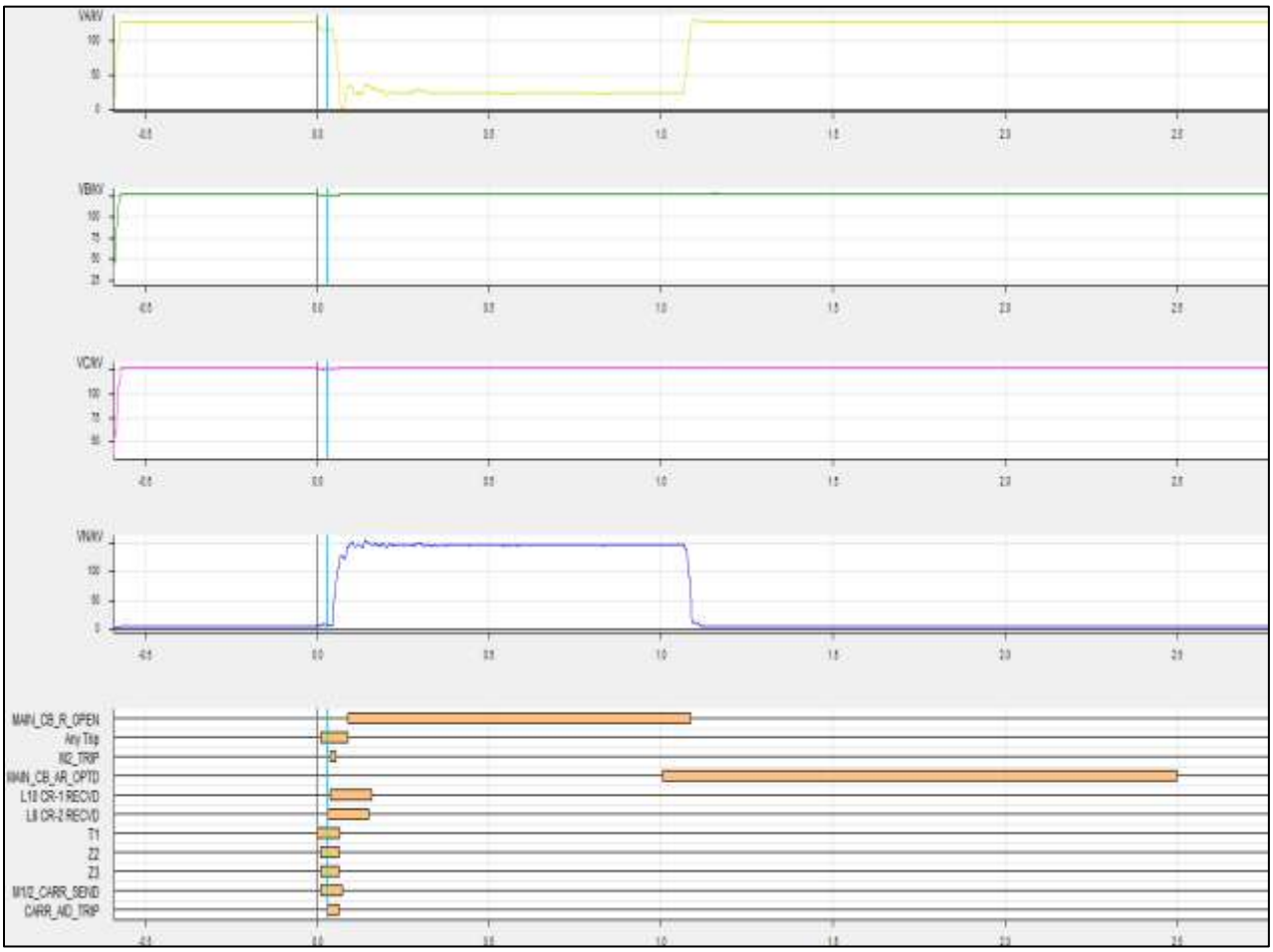
220kV Vadva SLD:



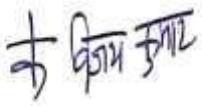
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

A. DR of 220 KV Bhuj – Vadva line from Bhuj end





अनुलग्नक-D / Annexure-D: Site photographs- Nil



Vijay Kumar Kodali

DGM (SO), WRLDC

ग्रिड-इंडिया GRID-INDIA
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
GRID CONTROLLER OF INDIA LIMITED
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पश्चिमी क्षेत्र के 220 के. वी. उमरिया आगार सोलर आर ई उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Umariya Agar Solar RE S/S of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 05.11.2024

1. **घटना का सारांश / Event Summary:** At 13:01 Hrs /18-10-2024 220kV Umariya (Agar Unit-5) Pachora ckt tripped on Differential protection operation on Y-phase to Earth fault. A/R not operated for single phase fault. During patrolling no abnormalities found. Generation loss of 247 MW occurred at Umariya (Agar) Wind Power Plant due to loss of evacuation path.

2. **घटना का समय और दिनांक / Time and Date of the Event** : 13:01 Hrs / 18-10-2024

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

4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area :** Unit-5 S/S, Umariya, Madhya Pradesh

5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	50.09	66499	59755	4677	10437
घटना के बाद Post Event	50.13	66550	59430	4725	10349

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है **Important Transmission Line/Unit if under outage**	Nil
मौसम की स्थिति **Weather Condition**	Clear

6. लोड और जेनरेशन हानि / Load and Generation loss: 247 MW gen loss

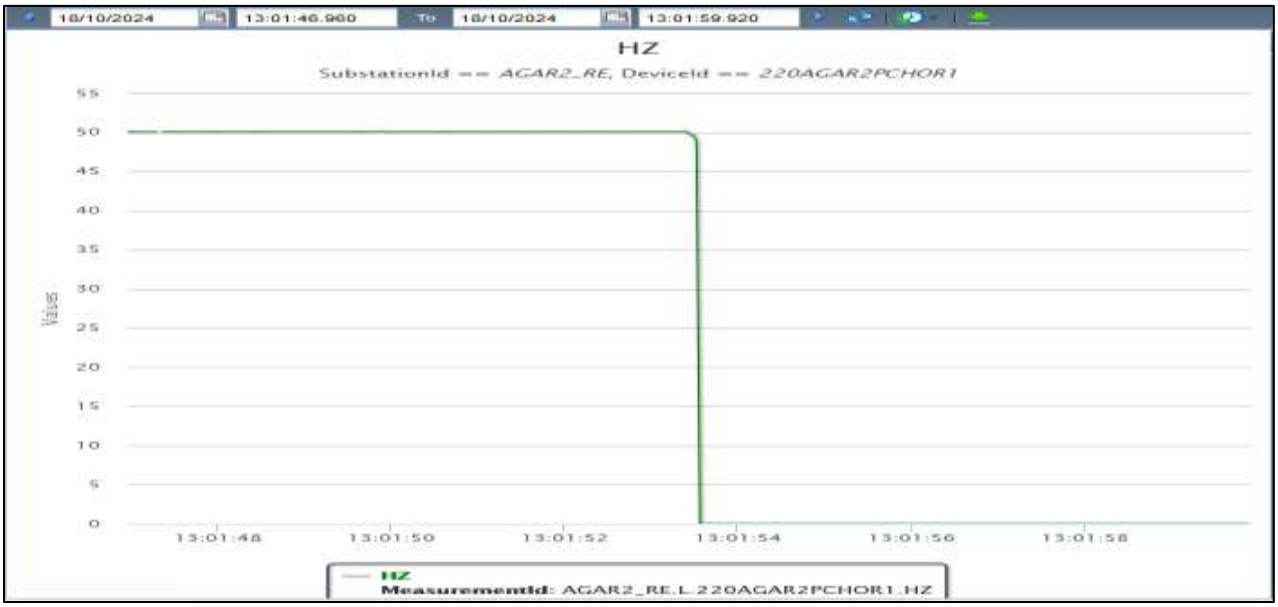


Figure 1. Frequency PMU plot of 220 kV Agar5(Umariya)-Pachora

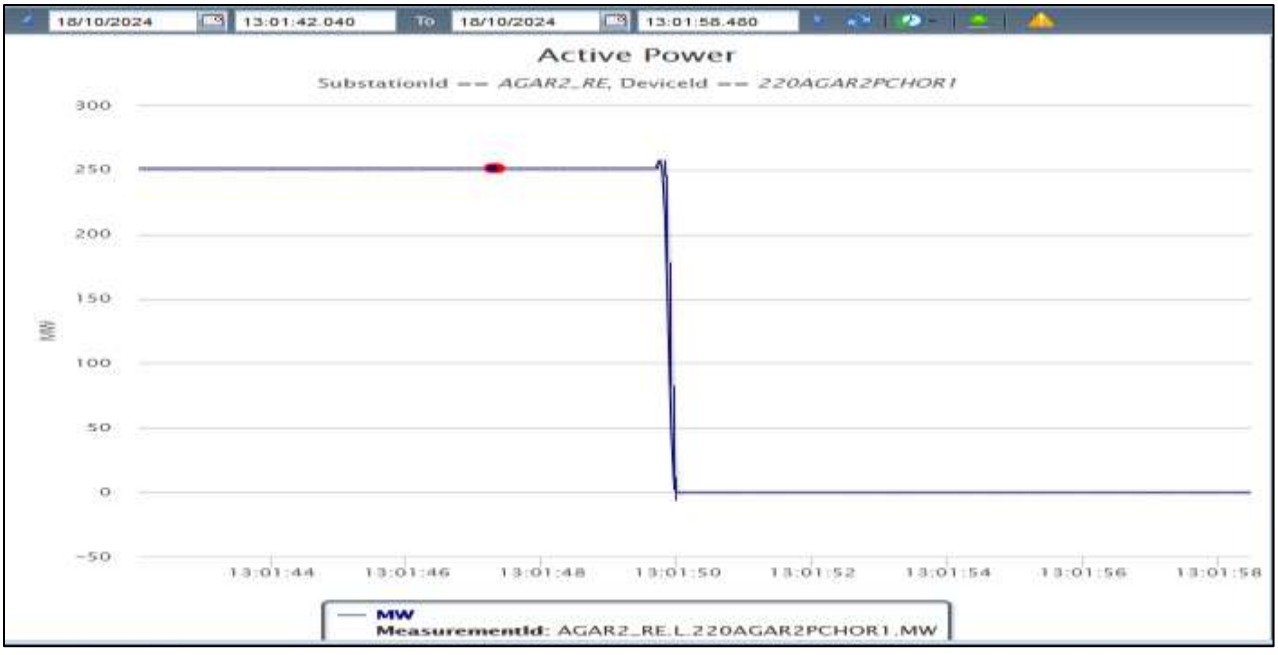


Figure 2. Active power line PMU plot of 220 kV Agar5(Umariya)-Pachora

7. **रुकावट की अवधि / Duration of interruption:** 1 Hr 44 Minutes

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

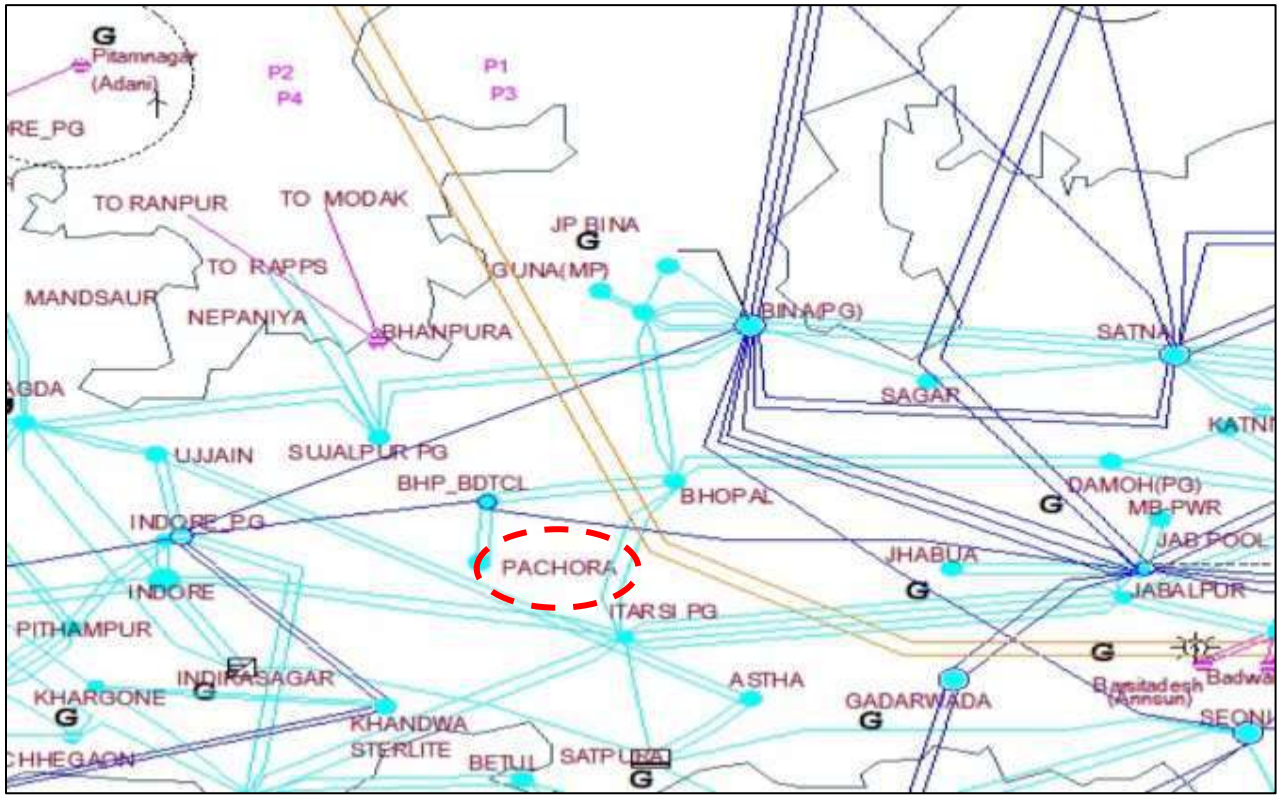


Figure 3. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) (Umariya)	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) (Pachora)	वापसी का समय Restoration time
1	220kV Umariya (Agar) Pachora ckt	13:01	Tripped on Y-phase to Earth fault. 17.5 Km, 5.023 kA	15.87 Km, 4.989 kA	14:45

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

- Line tripped on Y-N fault on differential protection operation as seen from the DR of Umariya end without A/R attempt.

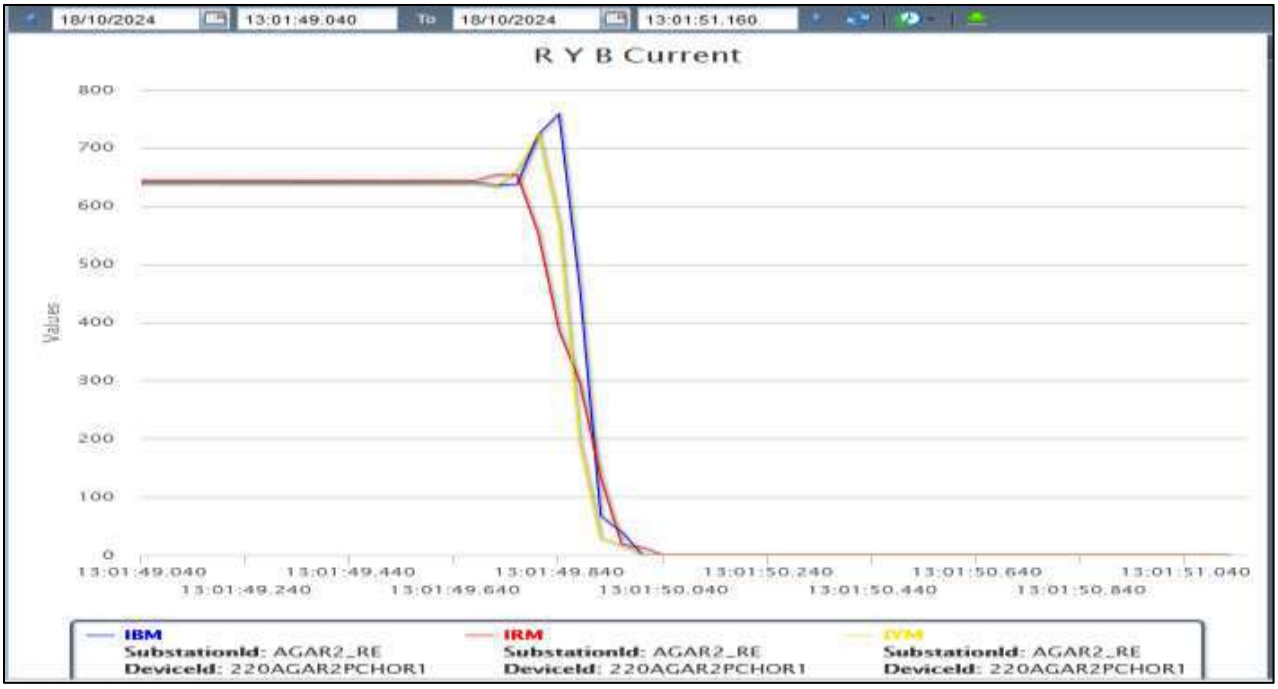


Figure 4. 220 kV Agar-Pachora-1 Current Plot

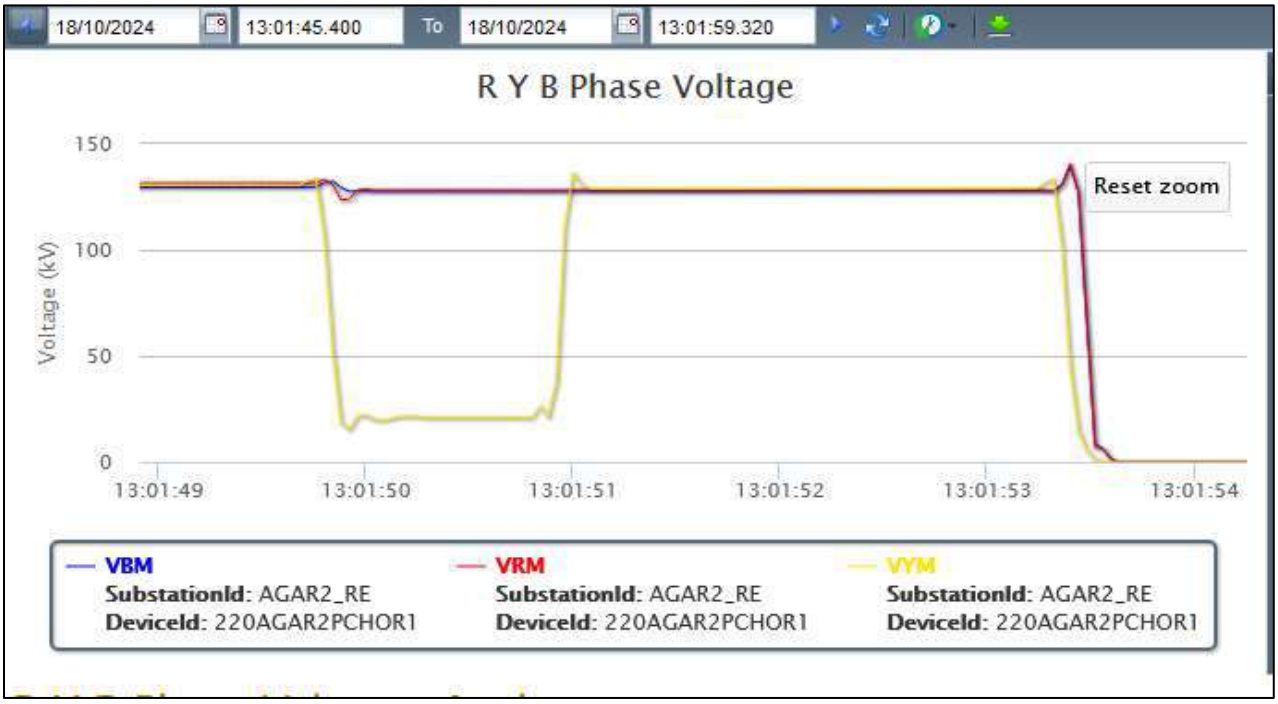


Figure 5. 220 kV Agar-Pachora-1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- Line tripped without A/R attempt

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- M/S Beempow may kindly investigate the reason for 3 phase tripping on single phase fault

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

S.No.	Issues	Regulation Non-Compliance	Utilities
1.	Flash Report received within 8hrs?	IEGC section 37.2 (b)	Not received from Umariya end.
2.	Whether DR/EL provided within 24 Hours?	1. IEGC section 37.2 (c) 2. CEA grid Standard 15.3	Not received from Pachora end. Received late from Umariya end.
3.	Detailed Report received within 7 days?	IEGC section 37.2 (e)	Received late from Umariya end.
4.	Protection system operated correctly?	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted for single phase fault. M/S Beempow may kindly investigate

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE from WRLDC-

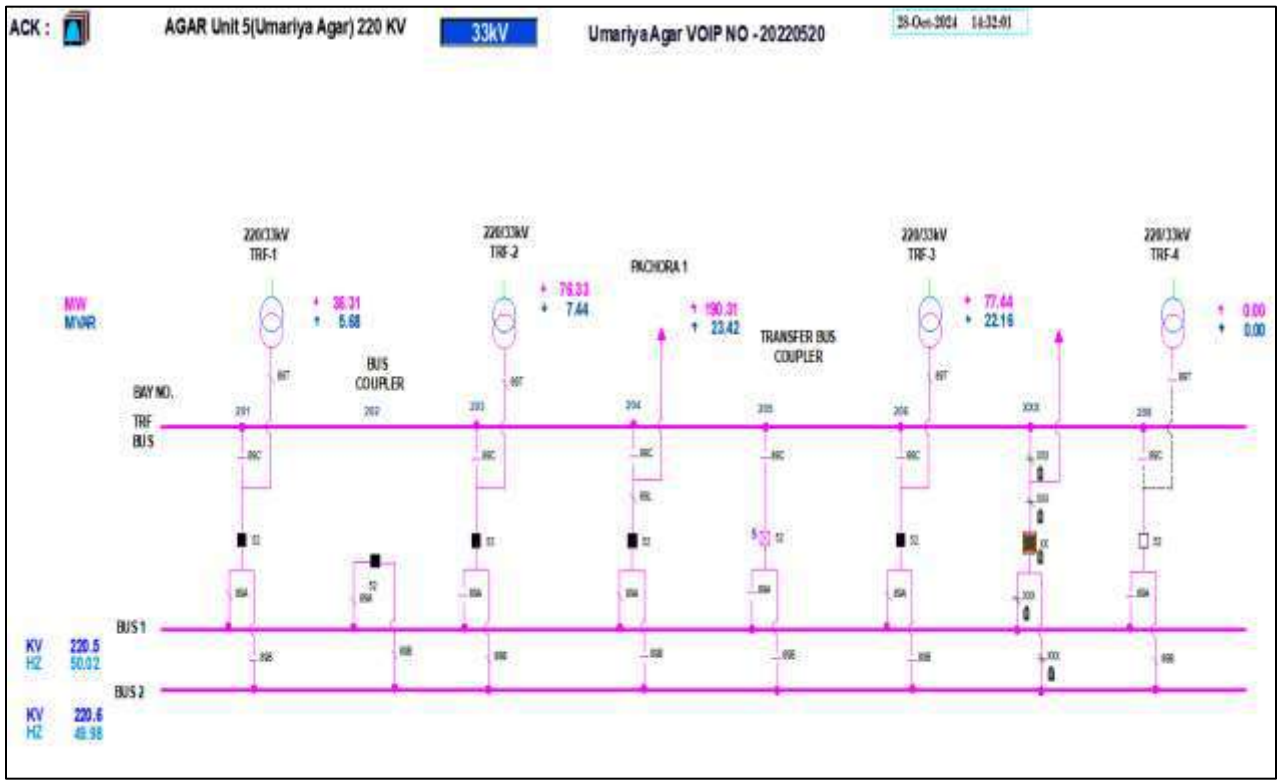
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	AGAR2_RE	AGAR 2 CB 20452 (PCHOR-1) OPEN	12:59:50	234
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) FAULTY	13:01:49	869
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) TRANSIT	13:01:50	936
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) CLOSED	13:01:50	937
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) FAULTY	13:01:53	434
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) TRANSIT	13:01:53	435
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) FAULTY	13:01:53	436
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) TRANSIT	13:01:53	484
WRLDC	220KV-CB	PCHOR_PG	PACHORA CB 20352 (AGAR2-1) OPEN	13:01:53	485

SOE from Agar5 (Umariya)-

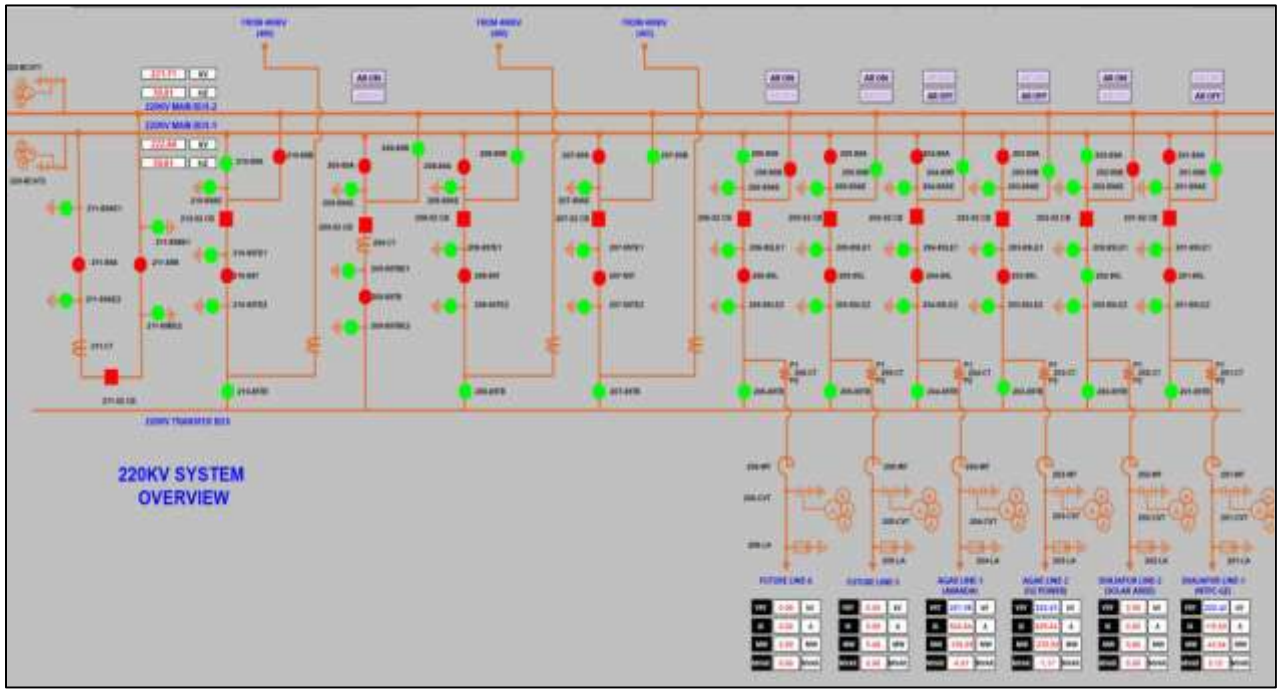
AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS
WRLDC	220KV-CB	Pachora ss	CB 203-52 (Agar Line-2) Trip	13:01:00
WRLDC	220KV-CB	Pachora ss	CB 203-52 (Agar Line-2) Close	14:45:00

अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

SLD by WRLDC-

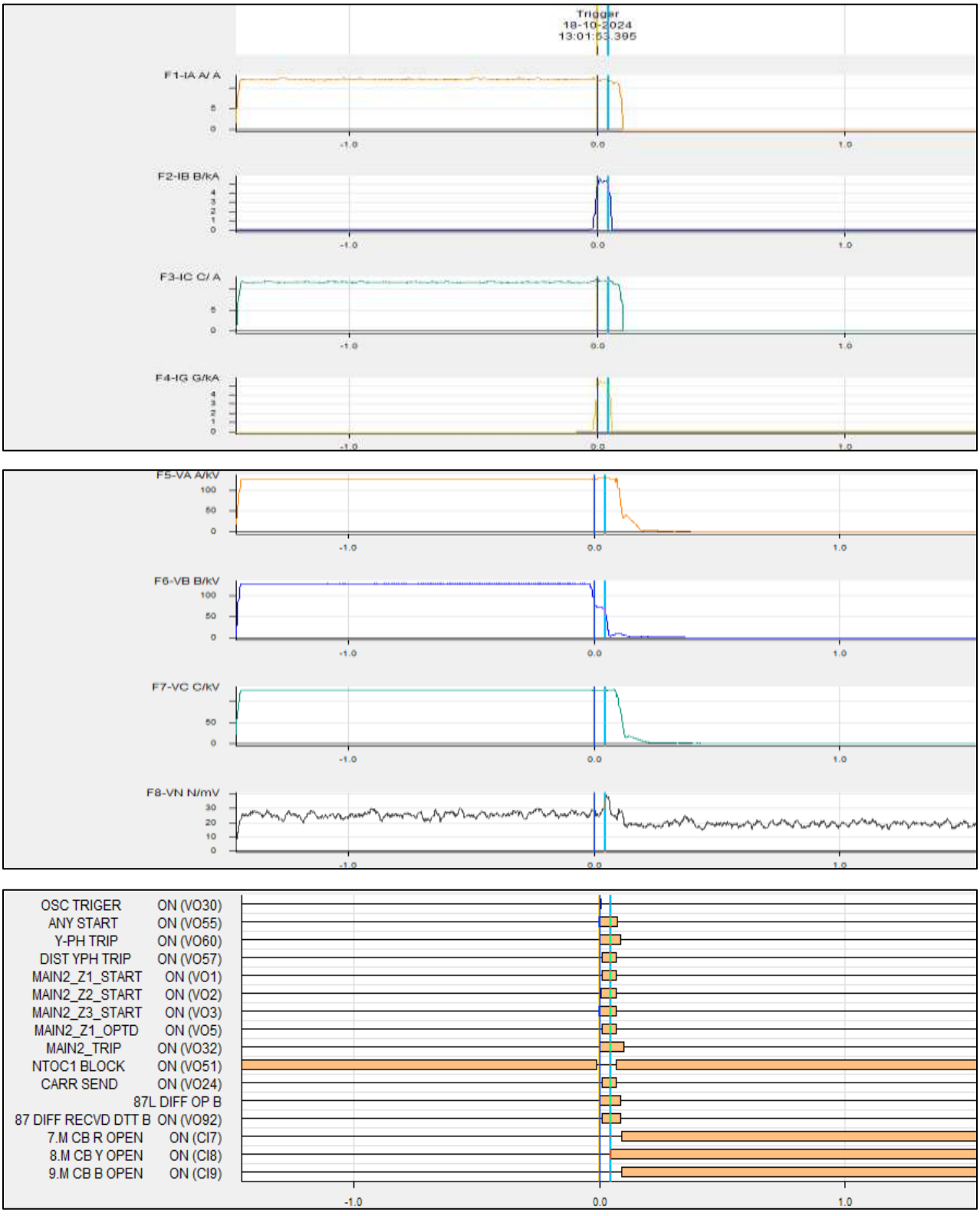


SLD by Agar5 (Umariya)-



अनुलग्नक-3 / Annexure-3: Disturbance recorder as per below-

A. DR of 220 kV Agar5(Umariya)-Pachora from Umariya end



B. DR of 400/220 kV Pachora ss Agar



अनुलग्नक-4 / Annexure-4: Photographs from site- Nil

विजय कुमार कोडाली Vijay Kumar Kodali
उप महाप्रबंधक Deputy General Manager
प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
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CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. नानावल्का उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nanavalka of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 04.11.2024

1. **घटना का सारांश / Event Summary**: At 06:25 Hrs / 27-10-2024, 220kV Bhuj-Nanavalka line tripped on B-E fault at Nanavalka end only without A/R attempt. A/R successfully operated at Bhuj end. Generation loss of 28 MW occurred at Nanavalka (Alfanar) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 06:25 Hrs / 27-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nanavalka, (Gujarat)
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.95	61435	56892	7534	15920
घटना के बाद Post Event	49.96	61604	57037	7555	15982

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति **Weather Condition**	Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 28 MW occurred at Nanavalka (Alfanar) Wind Power plant.

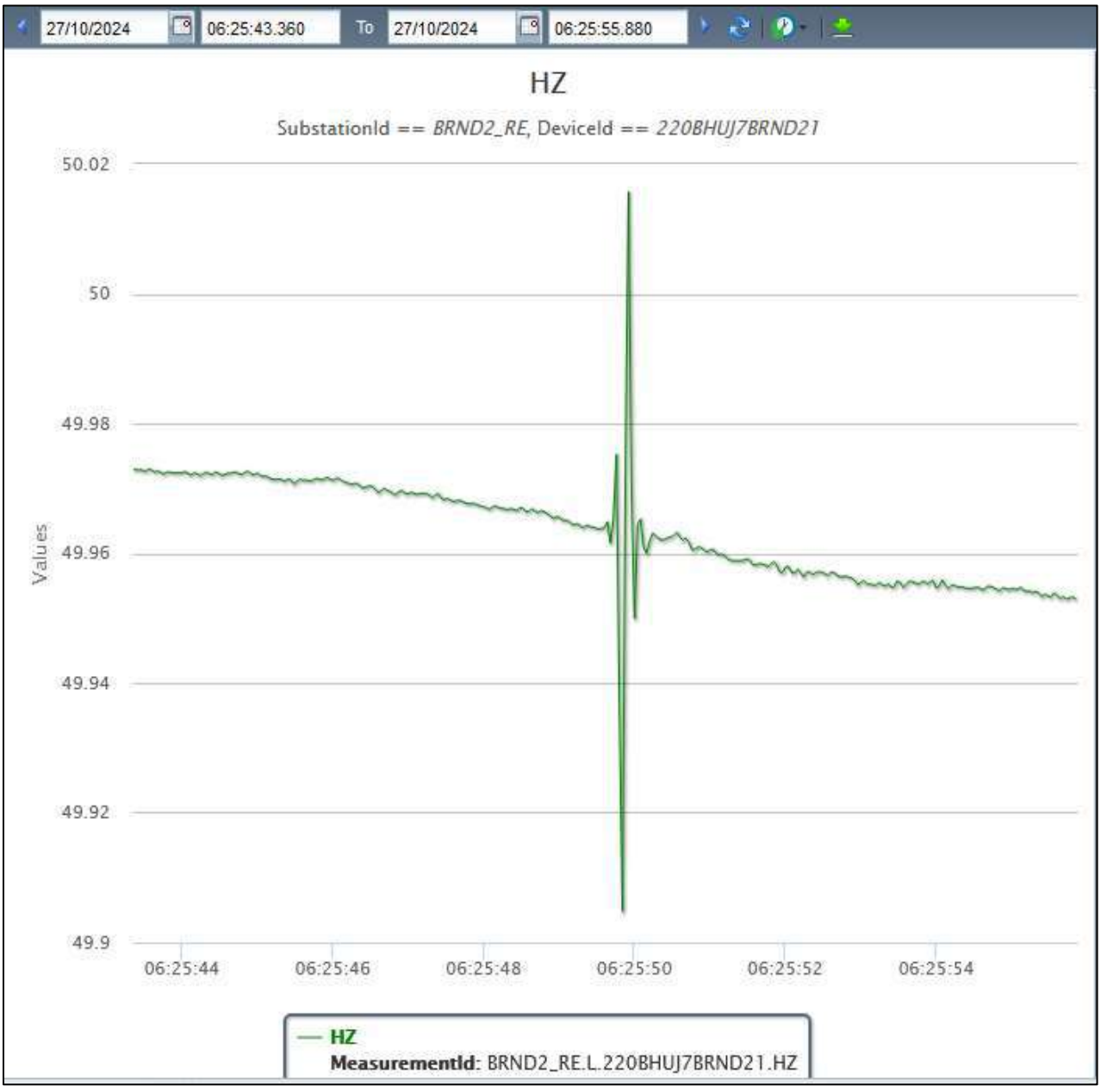


Figure 1. 220 kV Bhuj-Baranda-1 Frequency Plot

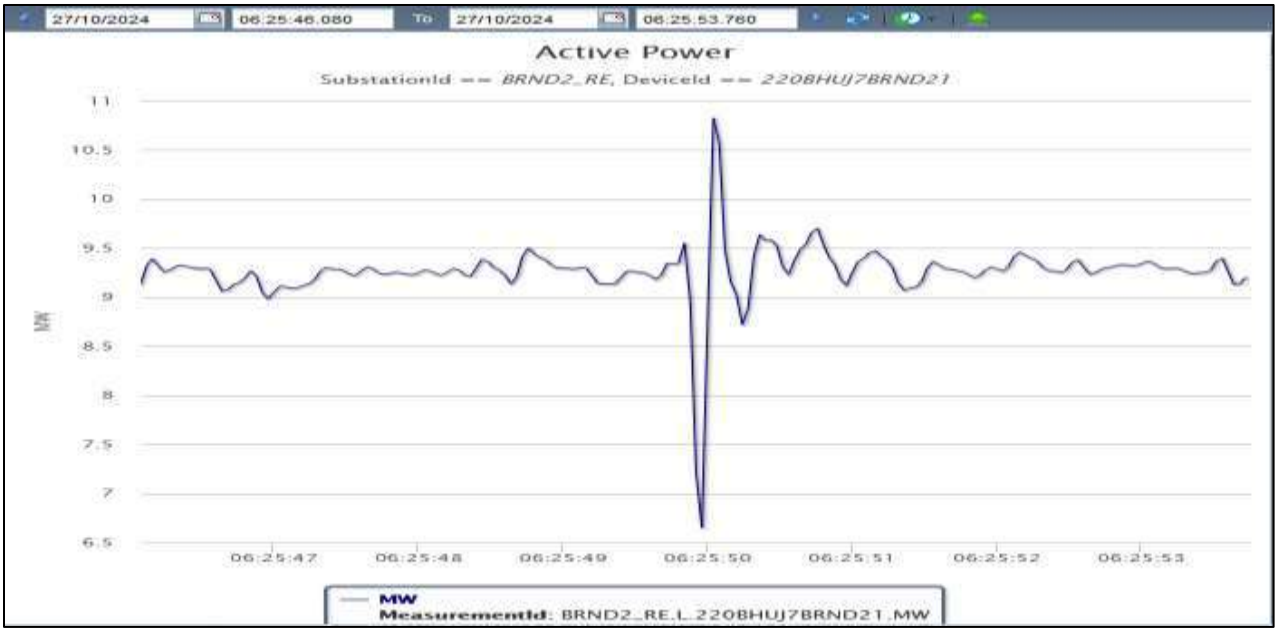


Figure 2. 220 kV Bhuj-Baranda-1 Active Power Plot

7. **रुकावट की अवधि / Duration of interruption:** 01 hours 28 minutes.

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

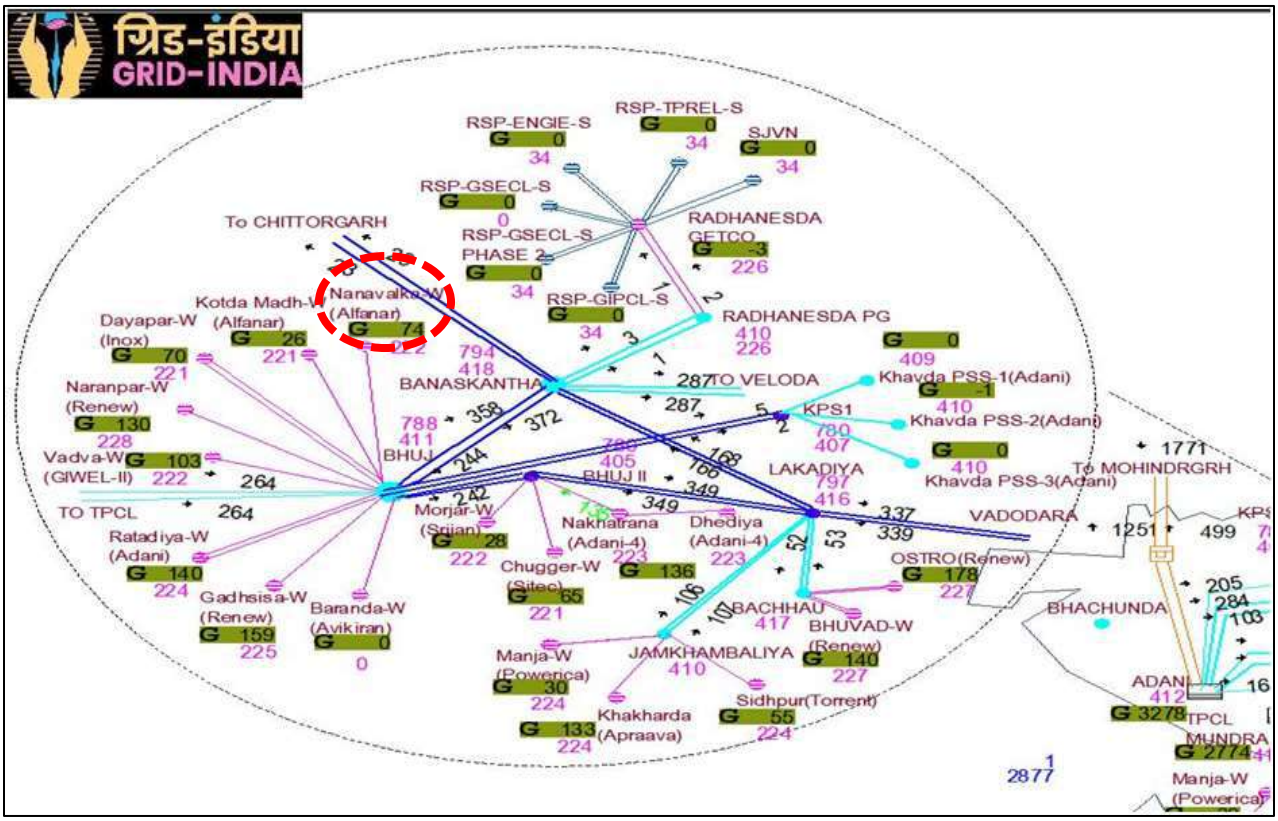


Figure 3. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nanavalka	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1	220 kV Bhuj-Nanavalka(Alfanar) S/C	06:25	IB- 499.2 A Zone-1 B-E fault Fault Distance – 36.71 Km	IB-6.006 kA Zone-1 Fault Distance 28.7 Km A/R successful	07:53

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

- Alfanar Valkanana 220KV line tripped on a B-E fault at Alfanar Valkanana end only without A/R attempt.
- Bhuj Power Grid end A/R was successful, and their end breaker was in the charged condition.

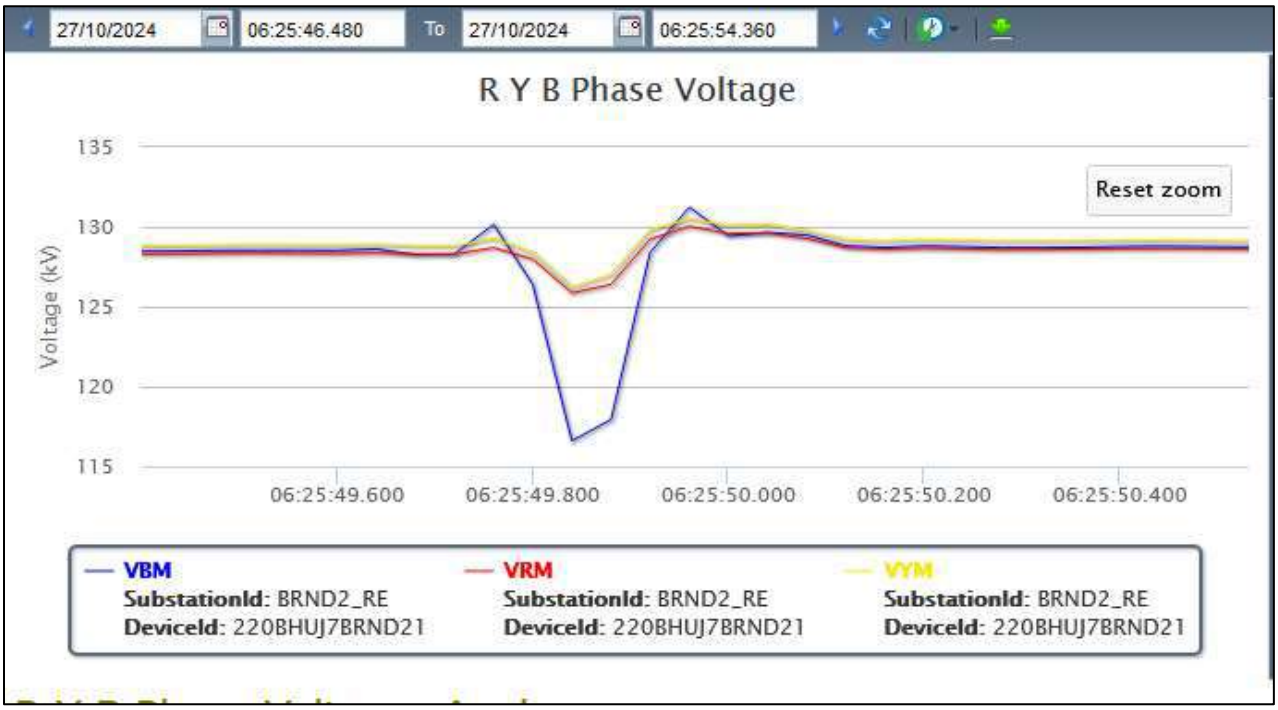


Figure 4. 220 kV Bhuj- Baranda -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- A/R not attempted and all 3 phases tripped at Nanavalka end.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- A/R not attempted and all 3 phases tripped at Nanavalka end. Alfanar may kindly investigate the reason for the same.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted and all 3 phases tripped at Nanavalka end. Alfanar may kindly investigate the reason for the same.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

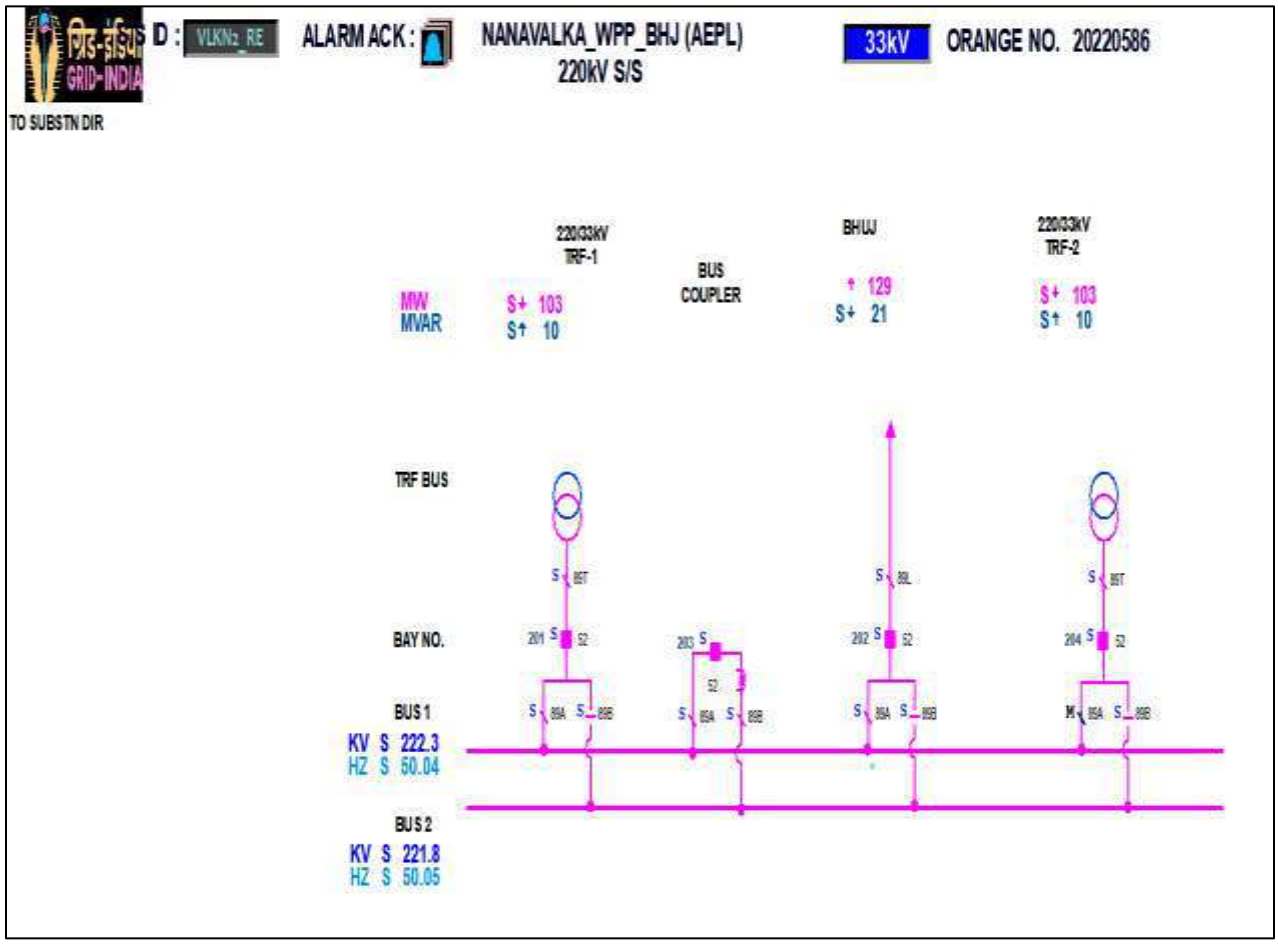
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) TRANSIT	06:25:49	882
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) CLOSED	06:25:50	821

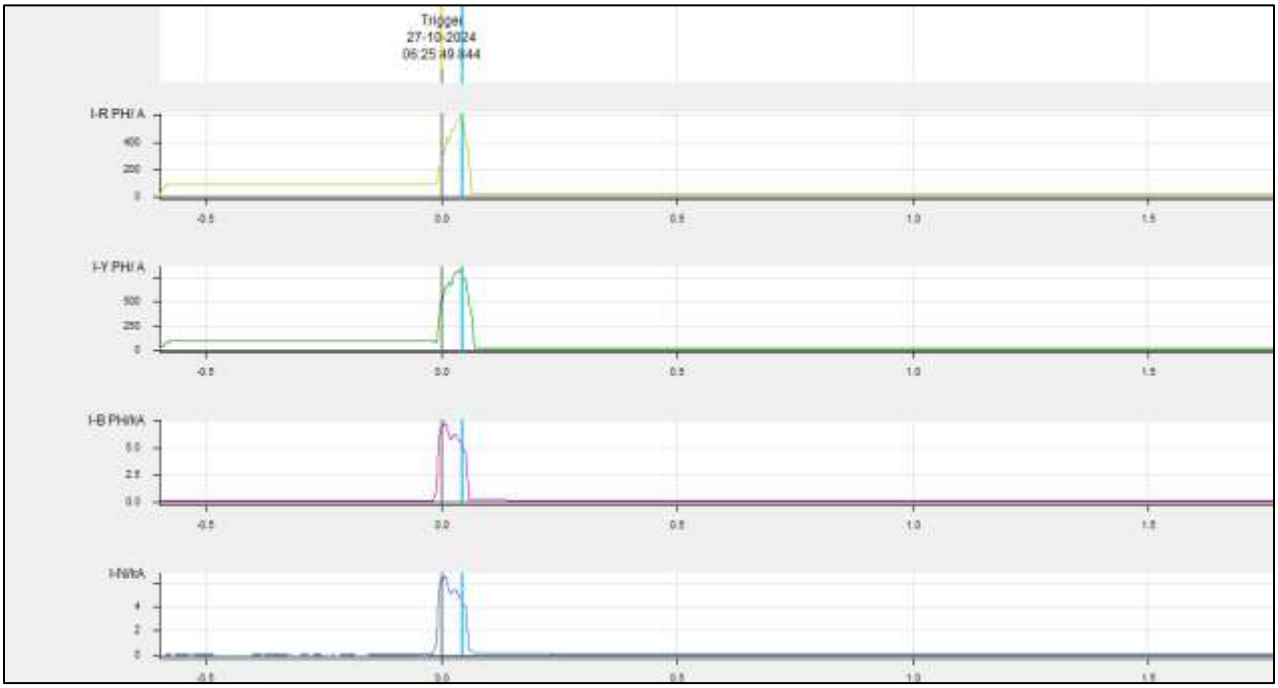
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

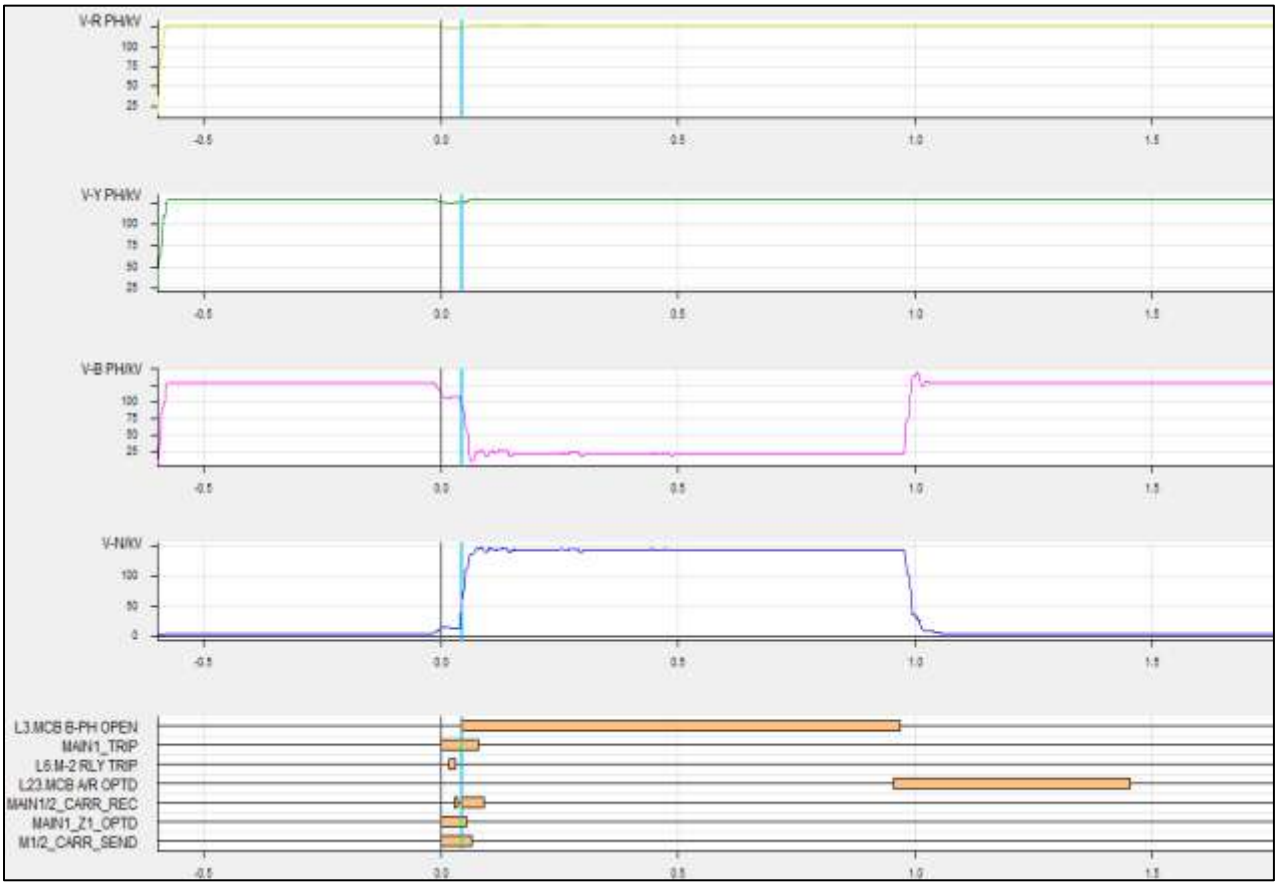
220 kV Nanavlka SLD-



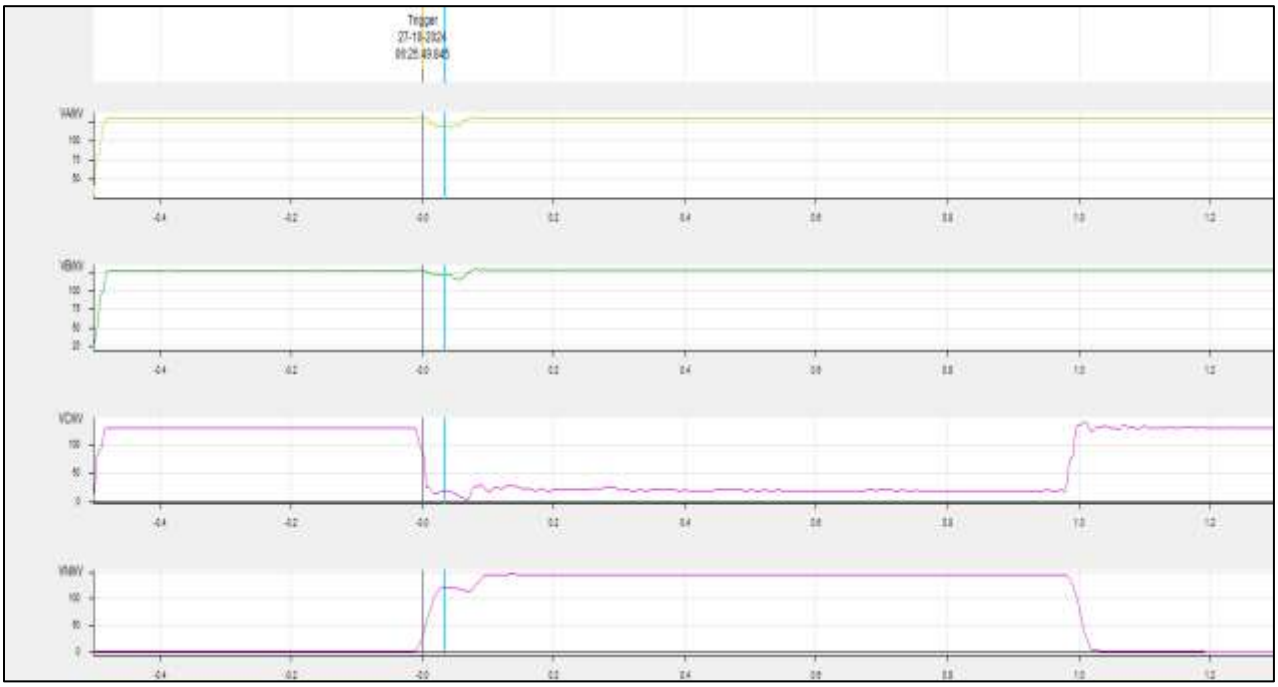
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

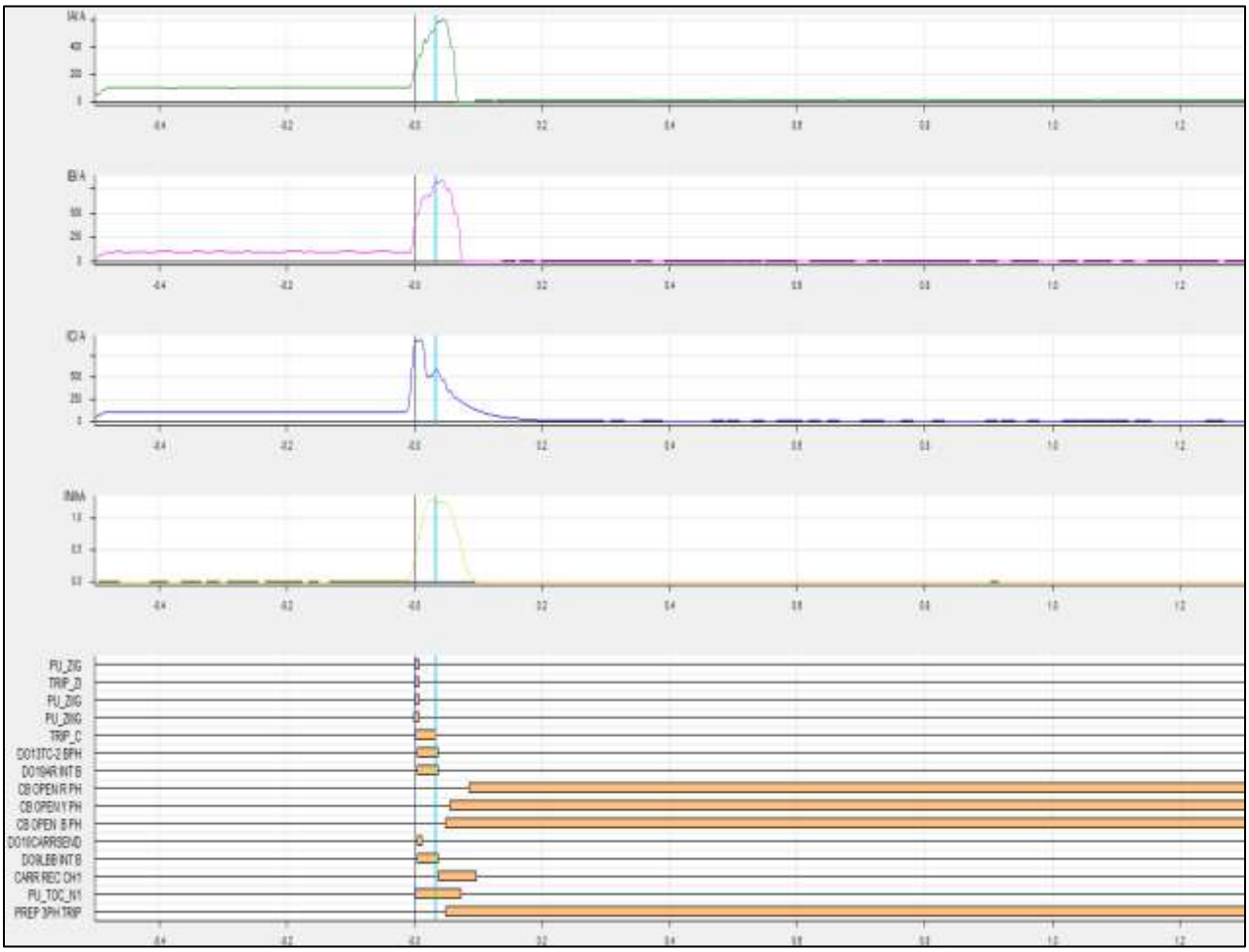
A. DR of 220 kV Bhuj-Nanavalka -1 at Bhuj end





B. DR of 220 kV Bhuj-Nanavalka -1 at Nanavalka end





अनुलग्नक-D / Annexure-D: Site photographs – Nil

के विजय कुमार

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

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)]
पश्चिम क्षेत्रीय भार प्रेषण केन्द्र / Western Regional Load Despatch Centre
कार्यालय : एफ-3, एम. आई. डी. सी. क्षेत्र, मरोल, अंधेरी (पूर्व), मुंबई-400093
Office : F-3, M.I.D.C. Area, Marol, Andheri (East), Mumbai- 400093
CIN : U40105DL2009GOI188682, Website : www.wrldc.in, Tel.: 022 28202690, Fax: 022 28235434, 28202630

पश्चिमी क्षेत्र के 220 के॰वी. नानावल्का उप-केन्द्र में ग्रिड घटना पर विस्तृत रिपोर्ट

Detailed Report of grid event at 220 kV Nanavalka of Western Region

(आई.ई.जी.सी 37.2 (एफ) के अनुपालन में)

(To be submitted by RLDC/NLDC during Grid Disturbances/Grid Incidents/Near Miss Event as per IEGC section 37.2 (f))

दिनांक / Date: 04.11.2024

1. **घटना का सारांश / Event Summary**: At 06:25 Hrs / 27-10-2024, 220kV Bhuj-Nanavalka line tripped on B-E fault at Nanavalka end only without A/R attempt. A/R successfully operated at Bhuj end. Generation loss of 28 MW occurred at Nanavalka (Alfanar) Wind Power plant due to loss of evacuation path.
2. **घटना का समय और दिनांक / Time and Date of the Event :** 06:25 Hrs / 27-10-2024
3. **ग्रिड घटना का प्रकार / Event Category :** Grid Disturbance (GD)-1
4. **स्थान/नियंत्रण क्षेत्र / Location/Control Area** : Nanavalka, (Gujarat)
5. **पूर्ववर्ती स्थिति / Antecedent Conditions:**

	आवृत्ति Frequency (Hz)	क्षेत्रीय उत्पादन Regional Generation	क्षेत्रीय मांग Regional Demand	राजकीय उत्पादन State Generation	राजकीय मांग State Demand
घटना के पूर्व Pre Event	49.95	61435	56892	7534	15920
घटना के बाद Post Event	49.96	61604	57037	7555	15982

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

महत्वपूर्ण संचरण लाइने/ विधुत उत्पादन इकाइयां जो बंद है	Nil

Important Transmission Line/Unit if under outage	
मौसम की स्थिति **Weather Condition**	Normal

6. **लोड और जेनरेशन हानि / Load and Generation loss**: Generation loss of 28 MW occurred at Nanavalka (Alfanar) Wind Power plant.

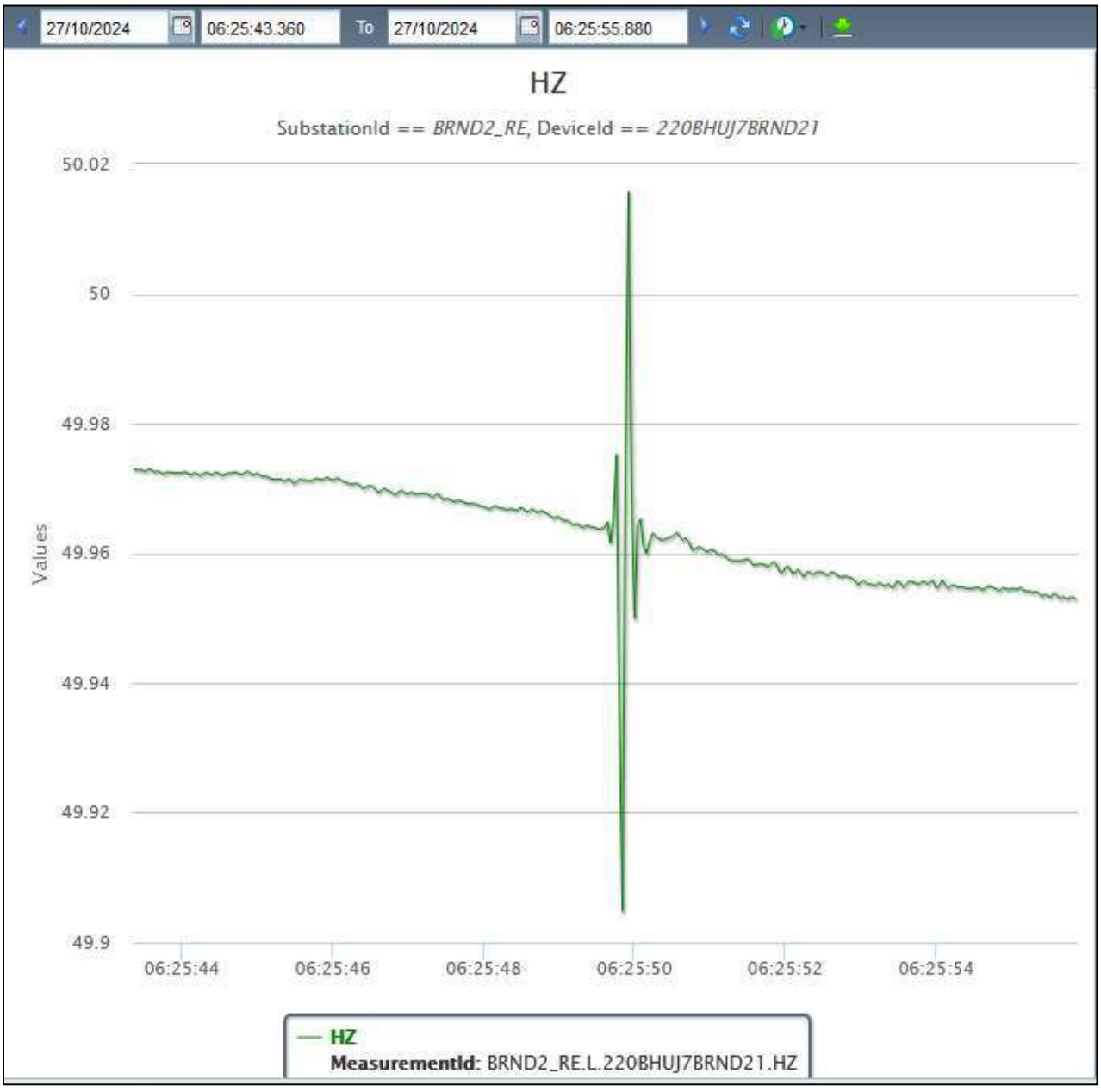


Figure 1. 220 kV Bhuj-Baranda-1 Frequency Plot

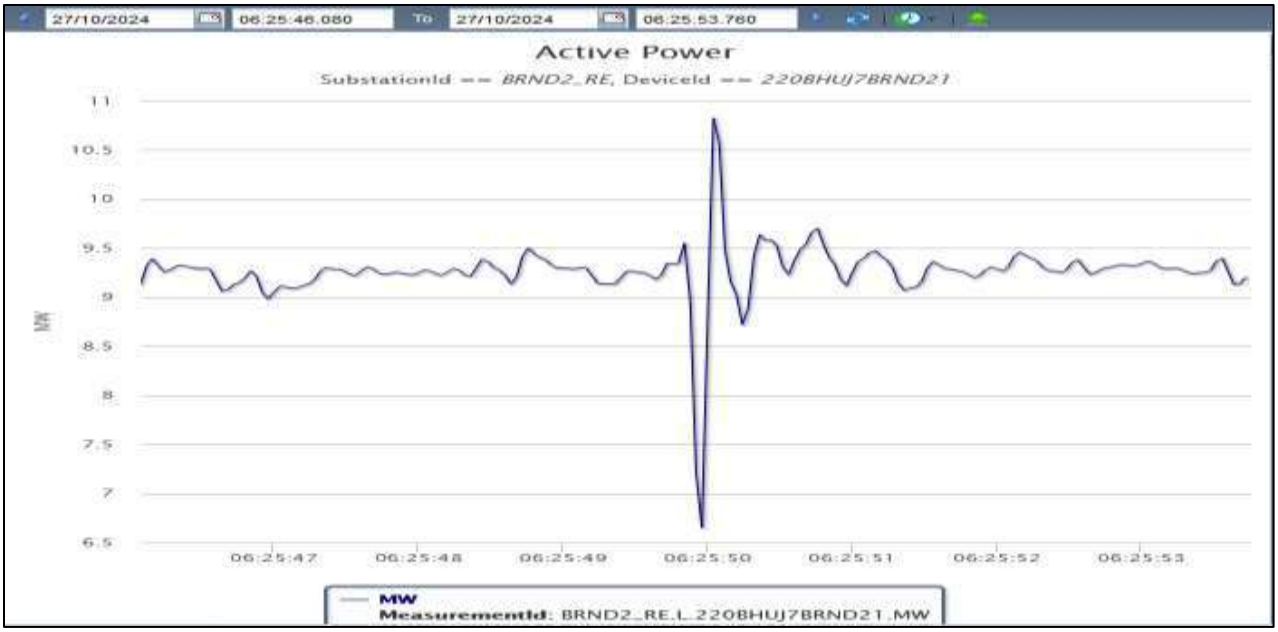


Figure 2. 220 kV Bhuj-Baranda-1 Active Power Plot

7. **रुकावट की अवधि / Duration of interruption:** 01 hours 28 minutes.

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

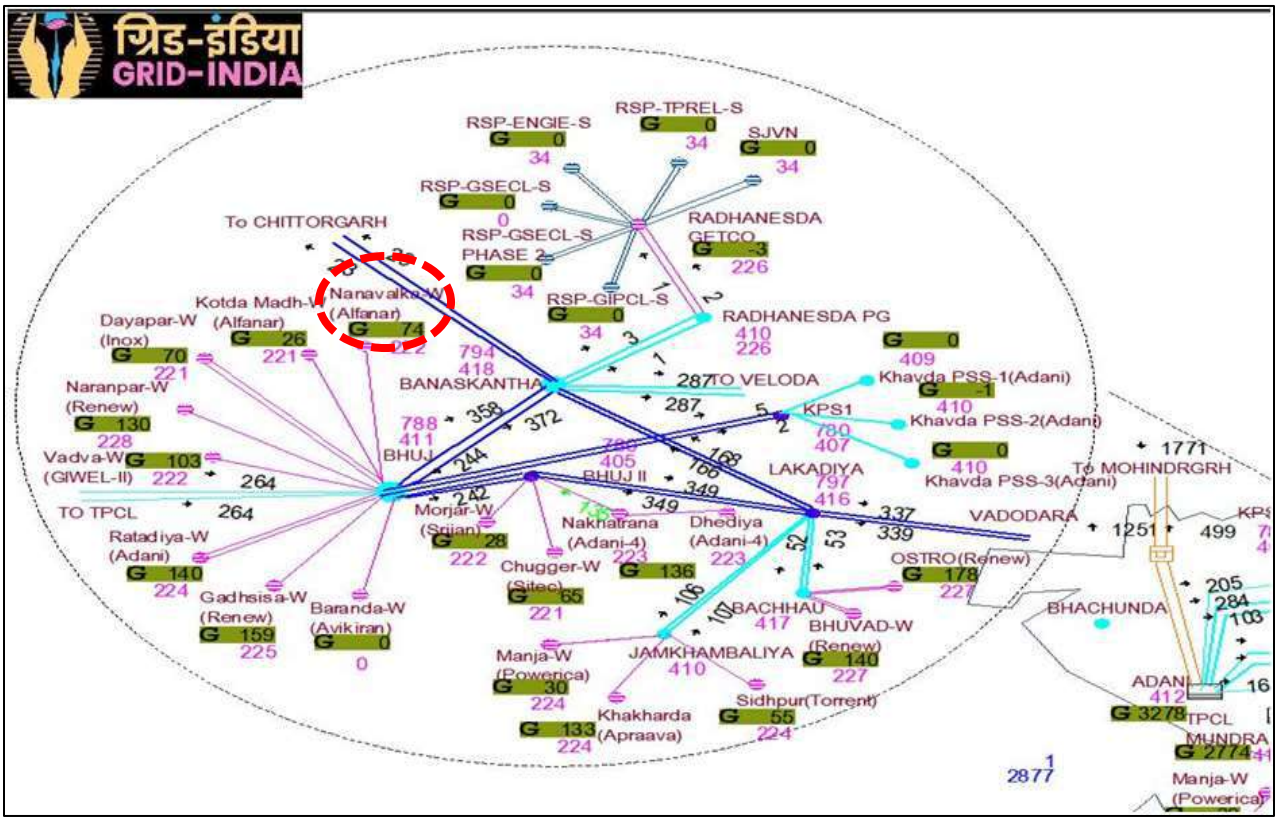


Figure 3. Network across the affected area

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

10. **प्रमुख ट्रिपिंग / Major Elements Tripped**

क्र॰सं॰ S.No	नाम Name	ट्रिपिंग का समय Tripping time (hh:mm:ss)	रिले संकेत (उप केंद्र-1) Relay Indication (End-1) Nanavalka	रिले संकेत (उप केंद्र-2) Relay Indication (End-2) Bhuj	वापसी का समय Restoration time
1	220 kV Bhuj-Nanavalka(Alfanar) S/C	06:25	IB- 499.2 A Zone-1 B-E fault Fault Distance – 36.71 Km	IB-6.006 kA Zone-1 Fault Distance 28.7 Km A/R successful	07:53

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

- Alfanar Valkanana 220KV line tripped on a B-E fault at Alfanar Valkanana end only without A/R attempt.
- Bhuj Power Grid end A/R was successful, and their end breaker was in the charged condition.

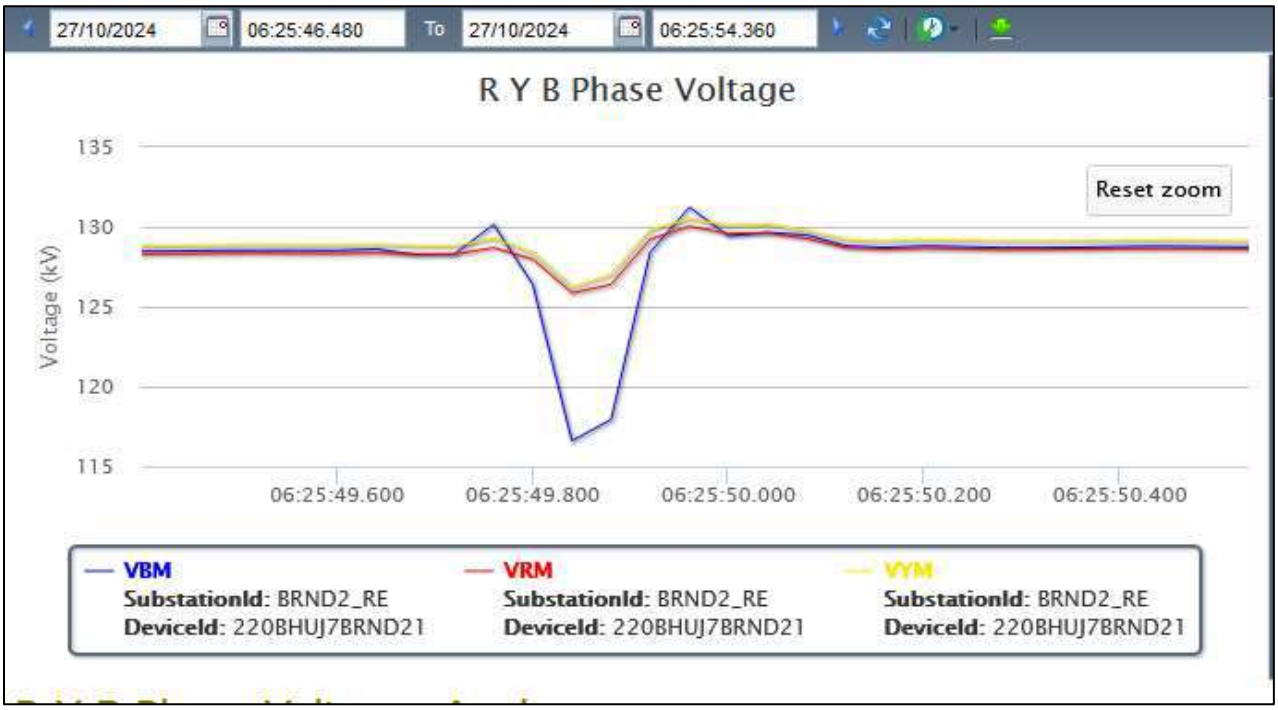


Figure 4. 220 kV Bhuj- Baranda -1 Voltage Plot

12. प्रमुख अधिगम बिंदु / Protection/Operational issues observed:

- A/R not attempted and all 3 phases tripped at Nanavalka end.

13. सुधारात्मक उपाय / Action Taken/Remedial Measures :

- A/R not attempted and all 3 phases tripped at Nanavalka end. Alfanar may kindly investigate the reason for the same.

14. विनियमन का गैर-अनुपालन / Non-compliance observed:

Sr.No.	Issues	Regulation Non-Compliance	Utilities
1.	Protection system not operated correctly	CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 48 (1) a. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	A/R not attempted and all 3 phases tripped at Nanavalka end. Alfanar may kindly investigate the reason for the same.

15. प्रमुख अधिगम बिंदु / Key Lessons Learnt : Nil

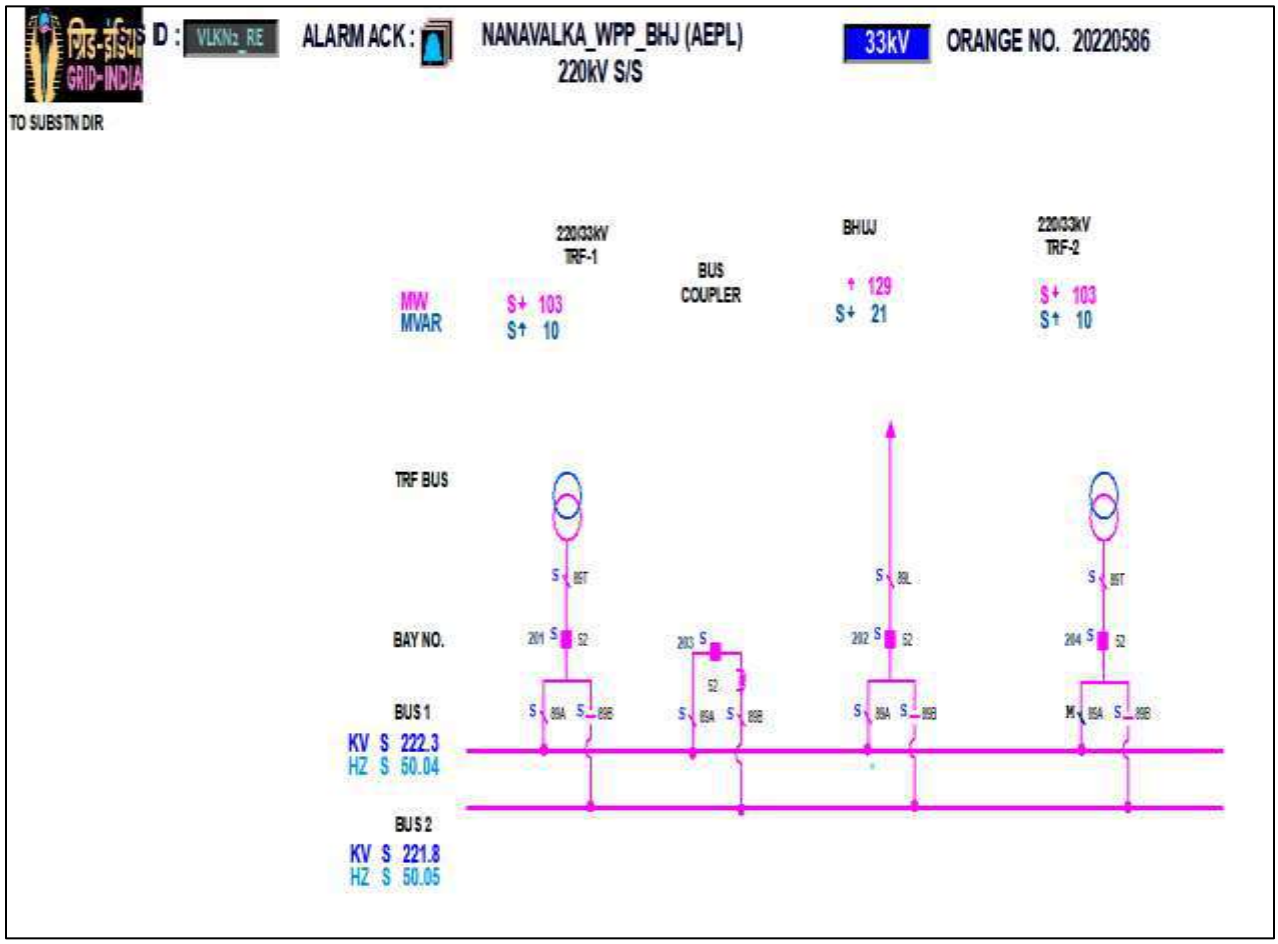
अनुलग्नक-1 / Annexure-1: Sequence of Events-

SOE by WRLDC-

AREA	CATEGORY	LOCATION	TEXT	HH:MM:SS	MS
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) TRANSIT	06:25:49	882
WRLDC	220KV-CB	BHUJ7_PG	BHUJ CB 23052 (VLKN2) CLOSED	06:25:50	821

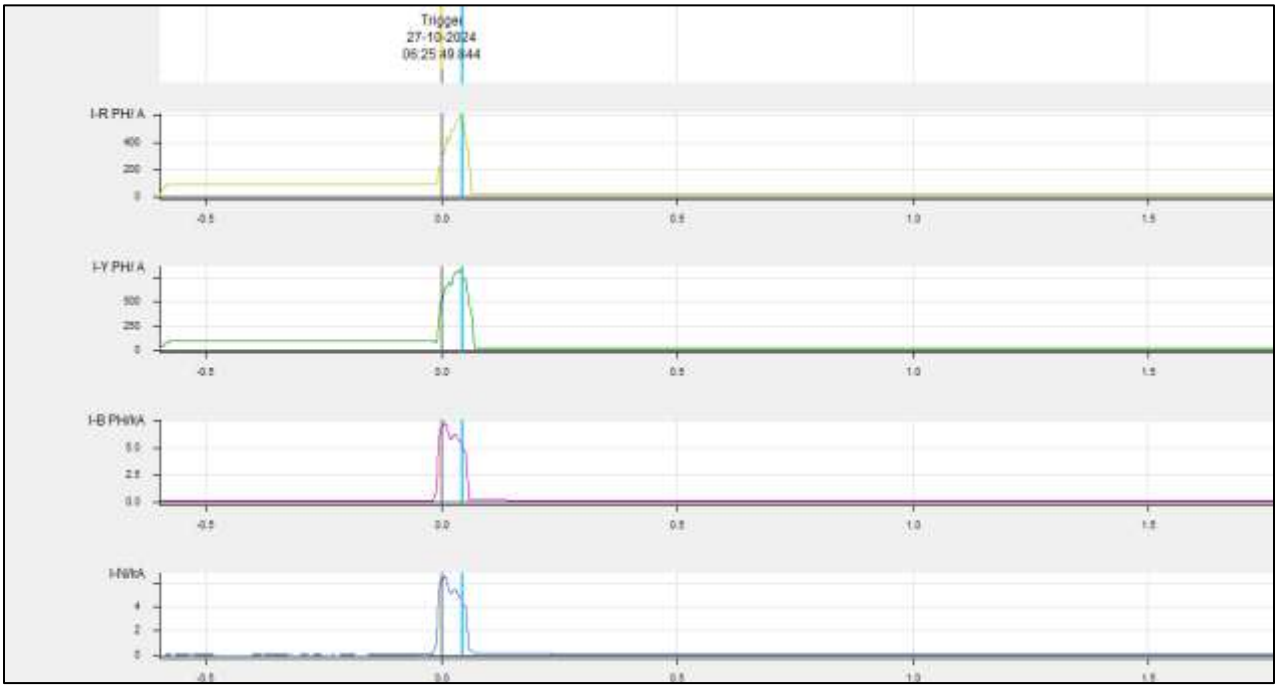
अनुलग्नक-2 / Annexure-2: SLD of the affected Sub-station/Connectivity Diagram

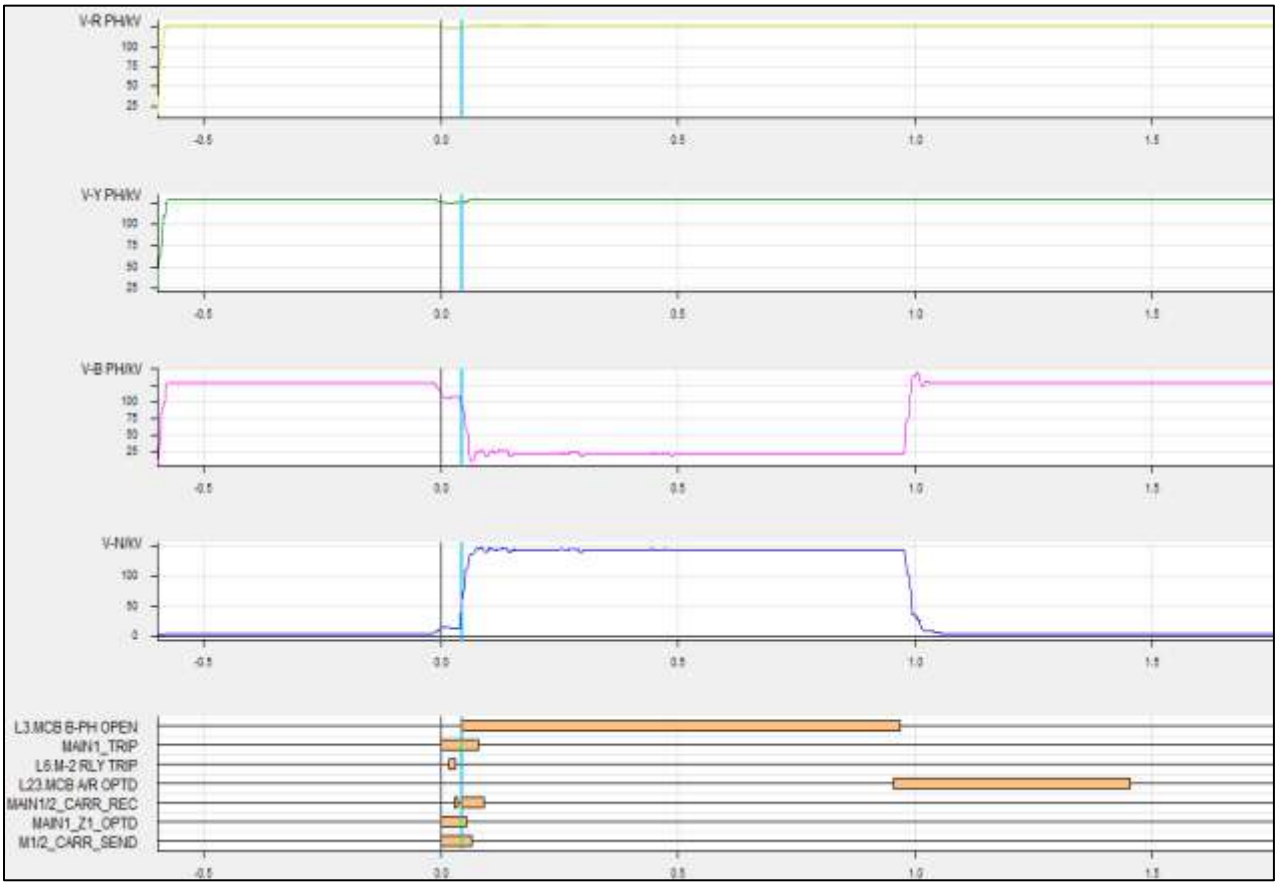
220 kV Nanavlka SLD-



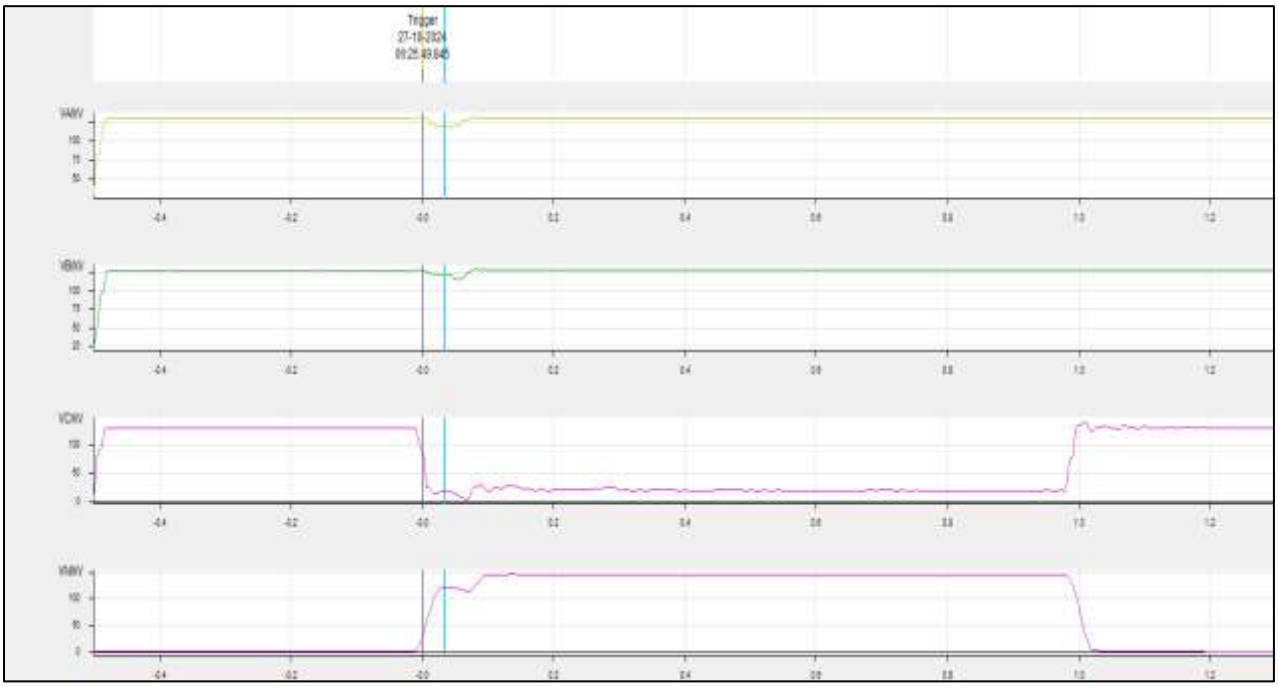
अनुलग्नक-3 / Annexure-3: Disturbance recorder-

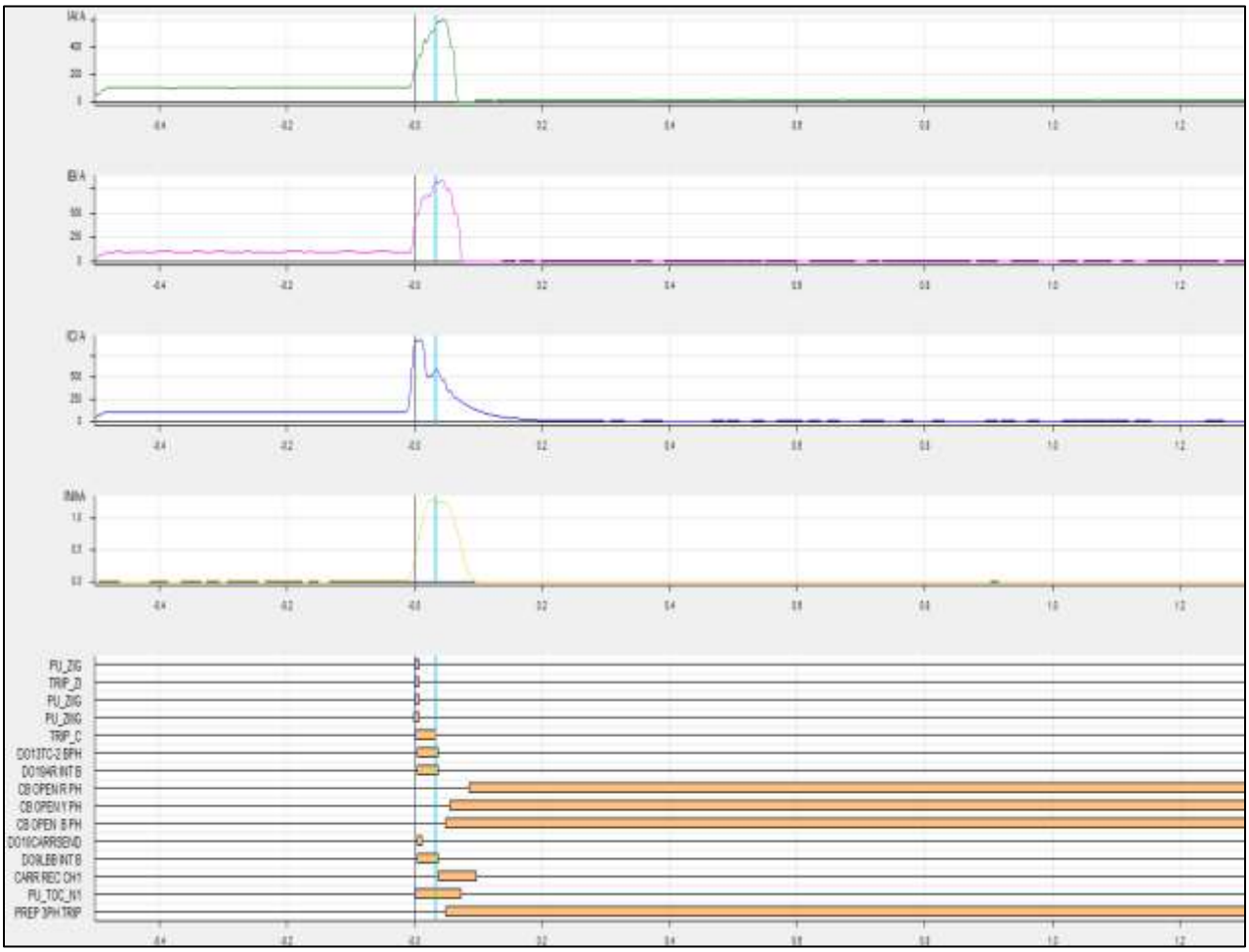
A. DR of 220 kV Bhuj-Nanavalka -1 at Bhuj end





B. DR of 220 kV Bhuj-Nanavalka -1 at Nanavalka end





अनुलग्नक-D / Annexure-D: Site photographs – Nil

के विजय कुमार

विजय कुमार कोडाली Vijay Kumar Kodali

उप महाप्रबंधक Deputy General Manager

प्रणाली प्रचालन System Operation

Annexure 3

The Details of Incorrect Operations in MSETCLfor Month of AUG-24							
Sr.No	**Name of Substation**	**Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Aciton taken against to avoid Mal-operation/Non Operation**
1	220 KV SICOM S/S	05-08-2024	22:31:17	220kV Busbar protection	Protection Mal-operation	This is suspected that the PU installed for 220kv CFAP-2 line has maloperated/failed due to which the CU has maloperated as per ZIV. M/S. ZIV suggested to reconfigured the busbar relay. Matter is pending with ZIV.	
2	220 KV NALASOPARA	31-08-2024	10:35:00	220kV Busbar protection	Protection Mal-operation	Maloperation due to problem in directional unit of busbar protection panel	i)Faulty Directional Unit Aux Supply is Disconnected. ii)Checked healthiness of interconnecting cables from Busbar Panel to Individual CRP, no abnormality observed. iii)New Numerical type Busbar Protection relay requirement initiated and after due tenderization and agency has delivered new panels at Major stores, Panvel. Same will be commissioned shortly.
3	220 KV PURTI S/S	28-08-2024	23:01:00	220 KV PURTI-BHUGA(	Protection Non-operation	DC supply failed	Post occurrence, The DC cells are checked and found weak, same has been replaced
4	400 KV BABHLESHWA	19-08-2024	12:49:00	400/220 KV 501 MVA IC	Protection Mal-operation	While analyzing the Event List of ZIV BB Central Unit, ZIV BB ICT-5 and Spare ICT-3 Bay Unit, it is observed that, Operate coil of ABB make 96 relay chattering (Operate & Reset) takes place which results into tripping of 400/220/33KV 501MVA ICT-5 & 400/220/33KV 167MVA Spare ICT-3. Whereas all other bays 96 relay(Alstom make) were in healthy condition. Also, No any Fault DR observed in BB central unit as well as Bay unit, which indicates no any operation of Busbar. In Event list of ICT-5 Bay Unit, Input 12 (3-ph LBB Initiation Input) Pickup/Drop Off observed several times along with 96 relay , indicates that operation/chattering of 96 relay was due to DC Leakage.	Outage on bus bar is proposed for DC leakge rectification work. During outage period , 96 relay of ICT-5 will be replaced if required.
5	400 KV DHULE S/S	12-08-2024	05:12:00	400/220 KV 501 MVA IC	Protection Non-operation	From Distubance record of Differential relay, it is cleared that Differential protection was operated correctly but relay output contacts were not operated , hence could not extend the trip command to master trip relays 186 &286	Diffrential relay Sifang CSC326 is replaced with new Siemes make differentail relay.

The Details of Incorrect Operations in CSPTCL for Month of AUG-24							
Sr.No	**Name of Substation**	**Tripping Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Action taken against to avoid Mal-operation/ non-operation**
1	220 KV S/S Bhatapara	30.08.24	05:29	160 MVA Xmer-I	Mal- operation	HV CT Cable fault at CT Junction Box	CTJB & CT Cable replaced.

Details of incorrect operations in MPPTCL for the month of Aug-2024							
Sr.No	**Name of Substation**	**Tripping Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Action taken against to avoid Mal-operation/ non-operation**
1	Hoshangabad 220	17.08.2024	13:01	X-mer 160 MVA BHEL	Mal operation	Transformer tripped on PRV operated fault under investigation found that tiny water droplets seen on the contacts of R phase PRV which might be the cause of tripping. The contact assembly cover was not properly tightened as the red & black wires were crossing eachother and touching the cover plate , after proper dressing them cover plate tightened properly	Properly cleane and properly tightened contact assembly with proper dressing
2	Ujjain 220	27.08.2024	11:25	160 MVA BHEL	Mal operation	Reason - Ingress of moisture in Bph OSR. Transformer charged at 18:51 hrs. Xmer OSR relay box top cover gas ket replace and provide new rain protection cover on all boxes	Properly sealed in entrance with gasket replaced and provide new rain protection cover on all boxes
3	INDORE HATUNIYA [PG]-INDORE-II [JAITPURA]-II	23.08.2024	04:08	LINE	Mal operation	Due to delay tripping of 220kV Hatuniya [PGCIL] - Jaitpura Ckt-II at Jaitpura substation, these feeders tripped from remote substation end. Reason - during tripping voltage proper not dip therefore line tripped on Z -3	Properly tightened terminal point and persently Bus PT is usend, arrangment are done for providing Line CVT

Details of incorrect operations in GETCO for the month of Aug-2024							
Sr. No	Circle	Voltage Class	Substation-A	Protection Scheme	Operation Assesment	Primary Analysis	Action taken
1	Himmatnagar	220KV	Faredi	Distance Protection M2	Mal-Operation	Due to PT selection relay issue	Issue rectified
2	Navsari	220kV	ICHHAPORE	Distance Protection M2	Non-Operation	7SA522 Relay not detected the fault due VT Secondary circuit issue	Secondary circuit issue will be rectified within week
3	Navsari	220kV	POPDA	Distance Protection M1	Non-Operation	P444 relay detected Z3	High resistive fault - Resistive reach increased in P444 M1 Relay
4	Navsari	220kV	ICHHAPORE	Distance Protection M1	Mal-Operation	CB tripped by Pole Discripancy Relay as B-phase pole tripped due to mal-operation.	PDR contactor replaced
5	Navsari	220kV	Mota	Trafo Protection	Mal-Operation	Transformer tripped due to squirrel formed nest arround PRV and test switch operated	Squiral nest was removed
6	Surendranagar	220kV	Charadava	Trafo Protection	Mal-Operation	SPRR trip occurred due to control cable damage	Cable replaced - OEM is reffered for frequent occurences
7	Surendranagar	400kV	Pachcham	Trafo Protection	Mal-Operation	OLTC OSR Tripped due to control cable damage	Cable replaced
8	Surendranagar	220kV	Sadala	Trafo Protection	Mal-Operation	86 Maloperation	86 Tripping relay replaced
9	Surendranagar	220kV	Charadava	Trafo Protection	Mal-Operation	SPRR trip occurred due to control cable damage	Cable replaced - OEM is reffered for frequent occurences
10	Palanpur	220kV	Aagthala	REF Protection	Mal-Operation	REF CT Circuit Cable Damaged	Cable replaced
11	JAMBUVA	220kV	Asoj	REF Protection	Mal-Operation	REF CT Circuit Cable Damaged	Cable replaced
12	JAMBUVA	220kV	Chandrapura	Trafo Protection	Mal-Operation	PRV Contact oxidation found	PRV Contact cleaned and sealing done to avoid this in future
13	JAMBUVA	220kV	Jambuva	Trafo Protection	Mal-Operation	SPRR cable found damage on SPRR terminal Gland	SPRR Bipassed and OEM is reffered for frequent occurences
14	Himmatnagar	220kV	Jamla	Trafo Protection	Mal-Operation	86 Maloperation	86 Tripping relay replaced

Details of incorrect operations in AESL for the month of Aug-2024

Sr.No	Name of Substation	Tripping Date	Time	Name of Element	Type (whether non-operation or mal operation)	Reason	Action taken against to avoid Mal-operation/ non-operation
1	765KV BanasKantha SS	02-Aug-24	15:25:00	765kV Line Reactor-2 at Banaskantha (PS)	Mal operation	765kV Line Reactor-2 at Banaskantha (PS) tripped due to PD mal operated in B phase owing to faulty control cable core	Faulty control cable replaced with spare core, detailed testing of PD circuit planned in Annual/opportunity maintenance
2	765KV Ektuni SS	20-Aug-24	21:57:00	765kV Akola-2 to AurangaBad (Ektuni) Line-1 Rph Reactor	Mal operation	765kV Akola- Ektuni Ckt-1 was tripped due to PRD operated in R-phase Reactor at Ektuni SS due to faulty control cable during heavily rainy weather	Faulty control cable replaced with spare core, detailed testing of PD circuit planned in Annual/opportunity shutdown
3	765KV Akola-II SS	25-Aug-24	3:22:00	Akola-2 765/400kV ICT	Mal operation	Akola-2 765/400kV ICT tripped due to PRD operated owing to faulty control cable core during heavily rainy weather	Marshalling box to CRP control cable found faulty, same is replaced & ICT Charged,detailed testing of PRD circuit planned in Annual/opportunity shutdown
4	765 KV Lakadia SS	31-Aug-24	3:38:00	765/400kV ICT-2 at Lakadia SS	Mal operation	765/400kV ICT-2 tripped on Impedance Protection Operated due to tripping of CVT MCB owing to false VT selection logic	VT selection logic modified & corrected.

The Details of Incorrect Operations in MSETCL for Month of SEP-24							
Sr.No	**Name of Substation**	**Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Aciton taken against to avoid Mal-operation/Non Operation**
1	400 KV KUDUS	08-09-2024	00:12:00	400/220/33 KV ICT 1 HV (407)	Protection Mal-operation	PRV operated due to moisture ingress	
2	220 KV ALEPHATA	23-09-2024	03:31:00	220/132 KV 100MVA BBL ICT NO 2 HV BAY	Protection Mal-operation	LBB relay maloperated & issued trip command in just 40 msec instead of 200msec.	Faulty Elecromechanical LBB relay ERL 20 taken out of service & LBB feature incoporated in Back up OC & EF relay.

The Details of Incorrect Operations in CSPTCL for Month of SEP-24							
Sr.No	**Name of Substation**	**Tripping Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Action taken against to avoid Mal-operation/ non-operation**
1	220 KV S/S Siltara	09.09.2024	18:10	160 MVA Xmer-II	Mal- operation	Differential relay defective	Differential relay replaced.
2	220 KV S/S Gurur	05.09.2024	08:59	132 KV Gurur- Kurud -I	Non- operation	The DPR settings of 220 KV Gurur- Barsoor line were incorrect	The DPR settiongs were corrected and checked.
3	220 KV S/S Gurur	05.09.2024	08:59	132 KV Gurur- Kurud -II	Non- operation	The DPR settings of 220 KV Gurur- Barsoor line were incorrect	The DPR settiongs were corrected and checked.

The Details of Incorrect Operations in AESL for Month of SEP-24							
Sr.No	**Name of Substation**	**Tripping Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Action taken against to avoid Mal-operation/ non-operation**
1	765kV Ektuni SS	02-Aug-24	3:16:00	765kV Akola-2 to Aurangabad (Ektuni) Line-2	Mal operation	765kV Akola-2 to A'Bad (Ektuni) Line-2 tripped due to PRD protection operated in Bph of Line Reactor at Ektuni substation.	PRD operated due to faulty control cable from MB to kiosk, same is replaced & line charged
2	765kV Ektuni SS	23-Sep-24	21:59:00	765kV Akola-2 to Aurangabad (Ektuni) Line-1	Mal operation	765kV Akola-2 to A'Bad (Ektuni) Line-1 tripped due to PRD protection operated in Rph of Line Reactor at Ektuni substation. Readiness time: 07:19hrs	PRD operated due to faulty control cable from MB to kiosk, same is replaced & line charged
3	400/220KV	24-Sep-24	3:55:00	400kV Kharghar-Vikhroli Ckt-I	Mal operation	400kV Kharghar-Vikhroli Ckt-I Tripped due to Relay settings of SOTF	Ckt-1 tripped on SOTF protection operated due to enabling of incorrect highset SOTF protection function

The Details of Incorrect Operations in MSETCL for the Month of Oct-24							
Sr.No	**Name of Substation**	**Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Aciton taken against to avoid Mal-operation/Non Operation**
1	220 KV PANCHANAND GIS S/S	2024/10/22	12:30:00	220 KV TALOJA - PANCHANAND LINE	Protection Mal-operation	Supurious Command from PLCC panel	Tripping for DT received temporarily kept out.

The Details of Incorrect Operations in CSPTCL for the Month of Oct-24							
Sr.No	**Name of Substation**	**Tripping Date**	**Time**	**Name of Element**	**Type (whether non-operation or mal operation)**	**Reason**	**Action taken against to avoid Mal-operation/ non-operation**
1	220 KV S/S Raigarh	18.10.2024	07:23	220 KV PGCIL-I	Mal- operation	Thsese simultaneous trippings occurred because of 220 KV Main Bus-I A& C Phases PT fuse failed. Fuse failure occurred during extension of PT supply to other panel. During the process, MB-I & MB-II PT supply was reverse charged from secondary side (while MB-II Primary was already in dead condition) causing PT fuse failue. This resulted in DPR operation.	To avoid simialr kind of incidences in future, separate PT supply will be connected from line CVT of 220 KV feeders instead of Main Bus PT
2	220 KV S/S Raigarh	18.10.2024	07:23	220 KV PGCIL-II	Mal- operation		
3	220 KV S/S Raigarh	18.10.2024	07:23	220 KV PGCIL-III	Mal- operation		
4	220 KV S/S Raigarh	18.10.2024	07:23	220 KV JSPL-II	Mal- operation		
5	220 KV S/S Raigarh	18.10.2024	07:23	220 KV Saraipali-I	Mal- operation		

The Details of Incorrect Operations in AESL for the Month of Oct-24

Sr.No	Name of Substation	Tripping Date	Time	Name of Element	Type (whether non-operation or mal operation)	Reason	Action taken against to avoid Mal-operation/ non-operation
1	400/220KV Vikhroli SS	17-Oct-24	4:09:00	400kV S/C Vikhroli- Kalwa Line	Mal operation	400kV S/c Vikhroli- Kalwa Line tripped on differential protection opearted at Vikhroli end due to differential relay malfunction	Relay malfunction issue is escaleted to OEM M/s HEIL and same is under RCA. CAPA shall be taken once RCA finalized
2	765KV Koradi III SS	07-Oct-24	10:02:00	765KV-KORADI-III-2-AKOLA (2)	Mal operation	765KV-AKOLA (2)-KORADI-III-2 line tripped due to Direction E/F due to R-Ph CT cable insulation failure of TIE bay(711-Koradi-III) at Koradi SS. At akola end line was tripped due to DT receiving.	Faulty cable replaced & system normalized
3	765KV Koradi III SS	14-Oct-24	17:38:00	765KV-KORADI-III-2-AKOLA (2)	Mal operation	765KV-AKOLA (2)-KORADI-III-2 line tripped on DT received from koradi end substation during bay maintenance work at Koradi SS.	System is normalized after ensuring healthiness of DT circuit

Annexure 4

Sr. No	Utility	TPPA Agency	No. of s/s Audit carried out	No. of deficiencies		No. of deficiencies attended		No. of deficiencies not yet attended	
				Category-A	Category-B	Category-A	Category-B	Category-A	Category-B
1	**GETCO**	**ERDA**	105	2060	3	2060	3	0	0
2	**PowerGrid WR1**	**CPRI**	22	83	1	83	1	0	0
3	**PowerGrid WR2**	**CPRI**	26	40	4	40	2	0	2
4	**GSECL**	**ERDA**	14	46	5	46	3	0	2
5	**NTPC**	**CPRI**	17	64	3	52	0	12	3
6	**DDDNH**	**CBIP**	2	50	20	47	12	3	8
7	**Goa**	**CPRI**	5	55	29	55	27	0	2
8	**AEML**	**CPRI**	10	7	0	7	0	0	0
9	**MSETCL**	**Internal**	463	1802	1713	1802	1711	0	2
10	**MPPTCL**	**Internal**	33	160	93	158	70	2	23
11	**CSPTCL**	**Internal**	12	0	35	0	4	0	31
12	**CSPGCL**	**Internal**	5	3	8	2	1	1	7

Name of Utility : MSETCL									
Sr. No.	**Name of Zone**	**Name of Sub-station**	**Substation Voltage level**	**Type (Internal or Third party *)**	**Financial Year (FY)**	**Date of audit conducted/ completed**	**Particulars of Deficiencies observed during protection Audit**	**Whether attended (Yes/No)**	**Present Status & Target**
WR-MH-1	Aurangabad	220KV Patoda	220 kV	Internal	2021-22	05-02-2022	220 KV Busbar protection relay is out of service	No	Internal card of busbar relay,Patch card & OFC cable are faulty.The relay needs to be send to Siemens factory for repairs.The issue can be resolved in 6 months.
WR-MH-2	Vashi	220 kV Sonkhar	220 kV	Internal	2017-18	28.11.2017	220 kV Bus bar Protection is out of service (REB500 main unit card Faulty)	No	CE, Vashi has accorded the approval for procurement of faulty Busbar relay card at 220kV Sonkhar. However, no response received from maufacturer. Subsequently,budgetary offer was obtained from three vendors for replacement of complete busbar relay.However, no response is received. The meeting will be arranged with vendors for non response of tender. The procurement of busbar relay will be completed within six month.

Name of Utility - MADHYA PRADESH POWER TRANSMISSION CO. LTD .JABALPUR						updated list yet to be received
S. No.	**Name of Circle**	**Name of Sub-Station identified**	**Date of which Audit**	**Observation of Protection Audit**	**Category**	**Remarks**
WR-MP-1	Gwalior	Gwalior (Sitholi) 220	05.07.23	Distance Protection Relay Main-I is available and in service in 220Kv PGCIL-I and II,Main -II is not available.	B	As there is limited space in the panel of 220 kv feeders arrangement are being made to fit the main-II relay. Main-II to be taken in service during shutdown.spare relay to be arranged.
WR-MP-2	Bhopal 400	Mandideep 220KV	15.12.21	4. The Restricted earth fault (REF) is not in service in any transformer. It has to be used in all the transformer if NCT is provided.	B	Total 4 No. EHV X-MER are at 220 KV S/S Mandideep in which 3 No. Xmer REF is in service while 1 No. Xmer is not having NCT so need to be procure.
WR-MP-3	Guna	Pichhore 220KV S/s	06.07.23	5. 110V Battery bank - and 48V Battery Bank-I are very old and survey reported, needs immediate replacement.	B	110 V Battery Bank replaced 48 V Battery requarement send on FLM
WR-MP-4	Gwalior	Morena 220KV	24.11.21	2. Battery charger is working only in boost mode.	B	01 nos Battery charger has been repaired. The second battery charger is not repairable. Therefore requirement for the same is submitted
WR-MP-5	Gwalior	Morena 220KV	24.11.21	4.Main I DPR is available, Main II DPR protection is required in all 220KV feeders.	B	As there is limited space in the panel of 220 kv feeders arrangement are being made to fit the main-II relay. Main-II to be taken in service during shutdown.spare relay to be arranged.
WR-MP-6	Gwalior	Morena 220KV	24.11.21	11. Surge counters are not available on 132KV Side LAs of 160MVA Xmer 1 (BBL)	B	Requirment of the 03 Nos. Surge counters is submitted.
WR-MP-7	Bhopal	Narmadapuram 220 (Hoshangabad)	14.12.21	1. 220 KV Bus Bar protection (GE B-90) is out of service since 01.10 2017. It has to be taken in service.	B	will be done after release of new bus batr protection scheme

WR-MP-8	Bhopal	Narmadapuram 220 (Hoshangabad)	14.12.21	2. Since 220 KV Bus bar is out of service, LBB protection has to be taken in both the 160 MVA Transformers ar KV feeders, which is not in service at present, LBB should also be in service in all 132KV feeders and X-mers.	A	Process for commissioning of LBB scheme is already started but 4 core cable is not available
WR-MP-9	Bhopal	Narmadapuram 220 (Hoshangabad)	14.12.21	3. Main II Protection DPR relay is not connected in any 220 KV feeder. It has to be taken in all the 220 KV feeder.	B	
WR-MP-10	Bhopal	Narmadapuram 220 (Hoshangabad)	14.12.21	13. 48 V Battery charger (Vijeta) and battery bank is in poor condition. They have to be replaced.	B	
WR-MP-11	Gwalior	Gwalior (Sitholi) 220	05.07.23	REF Protection shall be taken into service in 50 MVA transformer.	A	To be taken into service during shutdown after testing.
WR-MP-12	Jabalpur	Jabalpur 220	12.07.23	Main-2 protection relay is not available in 220 kV Narsinghpur feeder C&R panel	B	Work under process
WR-MP-13	Jabalpur	Jabalpur 220	12.07.23	Main-2 protection relay is not available in 220 kV class X-mer C&R panel.	B	Work under process
WR-MP-14	Jabalpur	Jabalpur 220	12.07.23	Only single DC source -1 is available at 220 kV Class C&R panel.	B	Requirement already sent but not received . Replaced as soon as received
WR-MP-15	Jabalpur	Sukha 220	14.07.23	Main-2 protection relay is not available in 220 kV Jabalpur ckt-1 feeder C&R panel.	B	Work in progress
WR-MP-16	Jabalpur	Sukha 220	14.07.23	Main-2 protection relay is not available in 220/33 kV class 2x50 MVA X-mer C&R panel.	B	Work in progress
WR-MP-17	Jabalpur	Sukha 220	14.07.23	Only single DC source -1 is available, being a 220 kV substation 2nd source DC is required	B	Requirement already sent but not received . Replaced as soon as received
WR-MP-18	Bhopal 400	Mandideep 220KV	15.12.21	7. Main Il protection relay is not commissioned in any 220 KV feeders. Main if protection has to be taken in service.	B	Relay terminal wiring is under progress.

WR-MP-19	Jabalpur	Jabalpur (Gorabazar) 220KV	13.07.23	1. 132 KV Buscoupler CT should be augmented from 400/1 CT ratio to 800/1 CT Ratio.	B	
WR-MP-20	Jabalpur	Jabalpur (Gorabazar) 220KV	13.07.23	5. Main-2 protection relay is not available in 220 kV feeder C&R panel.	B	Requirement submitted
WR-MP-21	Jabalpur	Jabalpur (Gorabazar) 220KV	13.07.23	6. Main-2 protection relay is not available in 220 kV class X-mer C&R panel.	B	Requirement submitted
WR-MP-22	Jabalpur	Jabalpur (Gorabazar) 220KV	13.07.23	7. Only single DC source -1 is available.	B	Requirement submitted for 2nd DC battery set & Battery charger
WR-MP-23	Gwalior	Datia 220KV S/s	07.07.23	5. REF Protection in 40MVA-I (BHEL) and 40 MVA (TELK) transformers is not available.	A	
WR-MP-24	Indore	Indore (North) 220	29.11.21	Main-II protection required in all 220kV feeder bays as per prevailing norms.	B	02 No. DPR required
WR-MP-25	Indore	Indore (Mangaliya) 220	01.12.21	Main-II protection required in all 220kV feeder bays as per prevailing norms.	B	
WR-MP-26	Bina 400	Ganjbasoda 220	19.12.21	There is no tripping connected in Main II feeder protection relays (DPR).	A	Work in progress
WR-MP-27	Gwalior	Gwalior (Mahalgaon) 220	23.11.21	132/33kV 63MVA BHEL Oil leakage observed and need replacement of MOG	B	Emailed to M/S BHEL on dtd. 21.01.2022 , 24.01.2022 ,13.06.2022 ,07.06.2023 &19.10.2023
WR-MP-28	Bhopal 400	Bairagarh 220	07.12.21	Backup EM relays to be ugraded by Numerical relays.	B	
WR-MP-29	Bhopal 400	Bairagarh 220	07.12.21	REF Prot. Is available in 160MVA CGL Transformers, however not available in 160MVA Areva transformer.	B	

WR-MP-30	Bina 400	Vidisha 220	08.12.21	Load dropping scheme is not connected in 160MVA BHEL, 220/132 transformer no.-II, 160MVA BHEL 220/132kV BHEL transformer no. III and in both 63MVA 132/33kV BBL transformers. Load dropping scheme has to be connected in all the transformer.	A	Work in progress
WR-MP-31	Bina 400	Vidisha 220	08.12.21	NIFPS is not commissioned in 160MVA EMCO Transformer and out of service in 160MVA BHEL transformer No. 3.	B	Commissioned in 160MVA -III but in 160MVA - I Procurement to be done.
WR-MP-32	Bina 400	Vidisha 220	08.12.21	Main II Distance protection relay in all the 220kV feeders is not in service. CT/VT/Tripping has to be connected.	A	Work in progress
WR-MP-33	Bhopal	Itarsi 220	13.12.21	LBB protection is not commissioned in 132kV Side transformers and feeders.	A	Will be done shortly
WR-MP-34	Bhopal	Itarsi 220	13.12.21	Auto-reclosure are not in service in 220kV PGCIL 1 and PGCIL 2 feeder.	A	Will be done shortly
WR-MP-35	Khandwa 400	Nimrani 220	19.07.23	Main-1 & Il protection should be fed from available separate PS Core of CT.	A	
WR-MP-36	Khandwa 400	Nimrani 220	19.07.23	Direct trip from LBB to be assigned, to individual feeder in 220 KV LBB protection.	A	
WR-MP-37	Satna	Satna 220	26.09.19	7. 160 MVA Transformer Back up relay shall be replaced by Numerical relay.	B	
WR-MP-38	Satna	Maihar 220	25.09.19	2. Single battery set is available for 110V and 48 V DC system. The condition of battery has been examined and needs replacement.	B	Need Procurement

WR-MP-39	Indore	Dhar 220	20.09.19	One set of 110 Volt battery is healthy and in service. Another battery set is very old and out of service, hence it is recommended to replace it and second tripping of 220kV feeders shall be provided from the second set of battery.	B	Requirement for replacement is submitted through FLM No. 1002443 Dt.05.08.2021
WR-MP-40	Satna	Kotar	27.09.19	Single battery set is available for 110V and 48V DC syetem. The condition of battery has been examined and needs replacement.	B	110V - 2nd battery set installed 48V - 1 set (need procurement)
WR-MP-41	Satna	Kotar	27.09.19	Only Main-I DPR protection is provided for 220kV Kotar-TONS circuit -I &II.	B	DPR relay is to be purchased
WR-MP-42	Bina 400	Bina 220	22.10.19	Only one PLCC channel in 220kV Ganjbasoda and 220kv Vidisha is available since there is Main I and Main-Il protection in both the feeders, there should be two PLCC channels in both feeders.	A	(1) FOTE commissioned on dt 13.03.2023 at 400KV SS Bina for second communication channel and same will enable after completion of OPGW work between 400KV S/s Bina to 220KV Ganjbasoda. (2)FOTE commissioned on dt 15.03.2023 at 220KV SS Bina for second communication channel and same will enable after completion of OPGW work between 220KV S/s BINA to Vidisha.
WR-MP-43	Guna	Ashoknagar 220	24.10.19	Main 2 protection is not available, is required.	B	
WR-MP-44	Guna	Guna 220	23.10.19	Main-2 protection is not available, is required.	B	Main-2 protection Commissioned in all feeder except 220kv Ashoknagar
WR-MP-45	Guna	Guna 220	23.10.19	Electro-mechanical back up relay need to be replaced by numerical relay.	B	
WR-MP-46	Guna	Guna 220	23.10.19	NIFPS not available in both 160MVA X-mer.	B	
WR-MP-47	Guna	Guna 220	23.10.19	REF protection provided but not in service.	B	In Service in 01 No. 160 MVA X-mer

WR-MP-48	Satna	Sirmour 220	04.10.19	Carrier scheme has not been implemented in C&R panel with communication panel though feature is available in panels.	A	Arranging for diagnosing the faulty section.
WR-MP-49	Satna	Sirmour 220	04.10.19	Speech & Protection scheme in communication panel has not implemented.	B	
WR-MP-50	Satna	Sirmour 220	04.10.19	NIFPS type fire protection system for 160MVA transformer is available & commissioning under process.	A	As the work left by M/s Isolux, therefore notesheet comprises of balance material required & its civil work involved, forwarded to competent authority for sanctioning.
WR-MP-51	Satna	Sirmour 220	04.10.19	Main-II protection required in all 220kV feeder bays as per prevailing norms.	B	02 Nos. DPRs is required. After receiving these DPR, Main -2 Protection will be installed on 220KV feeders.
WR-MP-52	Satna	Rewa 220	05.10.19	NIFPS scheme is not found in both transformers.	B	The order placed for installing NIFPS on 160 BHEL Xmer got installed on 160 CGL & this Xmer shifted to Tikamgarh Division.. For BHEL Xmer separate order is required from competent authority.
WR-MP-53	Satna	Rewa 220	05.10.19	48-volt battery charger found very old. No indication observed same required to replace.	B	
WR-MP-54	Satna	Rewa 220	05.10.19	Auto recloser scheme enable in 220 kV Rewa-Birsinghpur feeder but carrier signal not found in working condition.	A	A/R of 220KV Satna (old Birsingpur) has been taken in service of Zone 1 reach & after Fote installation carrier will be in service.
WR-MP-55	Satna	Rewa 220	05.10.19	There is no separate DC supply for TC-1 & TC-II Circuits.	B	As per competent authority the DC source has its bifurcation on its voltage level wise.
WR-MP-56	Indore	Pithampur Sector-I 220	19.09.19	GPS system is not available. Hence time synchronising of relays are not there.	B	SANDS GPS system is available but not working properly. Correspondence with M/s SANDS is in process.

Name of Utility : DD					
Sr.No.	**Substation name**	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
1	220/66KV Magarwada Sub-Station	Leakage in the DC system needs to be eliminated.	A		
2	220/66KV Magarwada Sub-Station	Mix up of two DC sources be eliminated.	A		
3	220/66KV Magarwada Sub-Station	It is understood that none of the IEDs are time synchronized with Global Positioning System (GPS)	B		
4	220/66KV Magarwada Sub-Station	All non-functional cooling fans of Transformers be made operational to meet enhanced load demand during summer months.	B		
5	220/66KV Magarwada Sub-Station	During analysis of simultaneous tripping of all the three (03) operating 220/66 KV Transformers on 09/05/2022 due to infringement by Mongoose in 66 KV Varkund circuit 2, it is reported that Bus Bar protection for 66 KV system is not in service for non-availability of CT secondary core in 66/11 KV transformer 3 bay. This may be addressed at the earliest possible opportunity.	B		
6	220/66KV Magarwada Sub-Station	It is observed 216 KV Lightning Arresters are installed in 220 KV system. Electricity Department, Daman may undertake Insulation Coordination study to review the rating of Lightning Arresters so that the equipment for which the Lightning Arresters are provided are duly protected against surge.	B		
7	220/66KV Magarwada Sub-Station	Joints wherever provided in the primary and discharge path of Lightning Arrester must not be allowed. Corrective action need to be taken forthwith. Redundant holes in the discharge path of Lightning Arresters be avoided as these holes effectively reduces the cross- sectional area of discharge path.	B		
8	220/66KV Magarwada Sub-Station	Grounding of overhead shield wires at earth pits need to be re-engineered to avoid exposure of shield wire over the gravels.	B		
9	220/66KV Magarwada Sub-Station	It is observed that Fire Hydrant System is functional from an overhead tank to maintain hydraulic pressure in the hydrant system. Easy and shortest access to the makeup pump house need to be ensured so that operating personnel, as and when exigency arises, can swiftly move to the pump house. The pump house does not have any door and broken glasses in windows may be replaced. There is no illumination within the pump house. Ingress of water from opening in the ceiling need to be arrested.	B		

10		At present the fire protection system for Transformer 3 has been kept out of service. Electricity Department, Daman may consider provision of underground tanks for Transformer 1 & 3 so that oil drained from the transformer tank can be retrieved for gainful utilization. Expansion joints to take care of thermal and vibration of transformer unit be provided in the pipeline where ever not envisaged	B		
11	220/66KV Ringanwada Sub-Station	Mix up of two DC sources be eliminated.	A		

Utility-GSECL						
S.NO	**Substation name**	**Date of Audit**	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
WR-GSECL-1	**220KV UKAI TPS**	**23.06.2021**	**1) Station Transformer-2 REF Protection Relay not available**	**B**		**CT Erection work completed and will be commissioned in next available shutdown.**
WR-GSECL-2	**220KV UKAI HEP**	**24.06.2021**	**1) ICT-2 REF protection relay not available.**	**B**		**Work under progress.**

Name of Utility : Powergrid WR2			
Sr. No.	**Name of Substation**	**Date of Audit**	**Observation**
WR-PG2-1	Boiser	Nov-19	It is observed that the Bus bar protection relay is of Static type. This needs to be replaced by Numerical relay. It is observed that the local breaker backup and auto reclose relays are Static/Digital relays. This needs to be replaced by Numerical relay

Name of Utility : Goa			
S.NO	**Substation name**	**Date of Audit**	**Observation details**
WR-Goa-1	Amona	22-10-2018	1. Distance relay settings are on higher side. 2. For few lines backup settings are not well coordinated. 3. Differential & REF settings are complied. 4. For few transformers backup settings are not well coordinated
WR-Goa-2	Cuncolim	07-05-2019	1. Resistive reach settings are on higher side. 2. Backup schemes, settings are not well coordinated. 3. Differential & REF settings are complied. 4. For few transformers backup settings are not well coordinated
WR-Goa-3	Ponda	23-10-2018	for all 220kV Lines. 2. Distance relay settings are on higher side for some of the 220kV lines. 3. 110kV Line distance relays are not functional. 4. For few lines backup settings are not well coordinated 5. For all 220kV transformers, electro mechanical relays are to be replaced with numerical relays. 6. Differential & REF settings are complied. 7. For few transformers backup settings are not well coordinated
WR-Goa-4	Thivim	23-10-2018	1. 220kV and 110kV Line distance relays are not functional. 2. Back up protection for 220kV lines are not present. 3. For all 220kV transformers, electro-mechanical relays are to be replaced with numerical relays. 4. Differential & REF settings are complied. 5. For few transformers backup settings are not well coordinated.
WR-Goa-5	Xeldem	06-05-2019	1. Independent Main 1 and Main 2 protection is necessary for all 220kV Lines. 2. Resistive reach settings of Cuncolim line 1& 2 are on higher side. 3. Some of the 220kV & 110kV Line distance relays are not functional. 4. For few lines backup settings are not well coordinated 5. For all 220kV transformers, electro-mechanical relays are to be replaced with numerical relays. 6. Differential & REF settings are complied. 7. For few transformers backup settings are not well coordinated.

PROTECTION AUDIT DEFFICIENCIES/OBSERVATIONS COMPLIANCE													
	NAME OF UTILITY		CHHATTISGARH STATE POWER TRANSMISSION COMPANY LIMITED										
S.No	Name of S/s Identified for Protection Audit	S/s Voltage	Name of internal protection audit agency	Date on which Audit conducted	Observations of Protection Audit	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks	Plan of Schedule to attend/ rectify the pending category-B deficiences
						YES /NO	Whether attended YES /NO	If not attended, reason	YES /NO	Whether attended YES /NO	If no, expected date to attend		
1	Chhuri	220 kV	Audit By Mr.K.K.Yadav E.E.MRT Dn. CSPTCL Raipur	22-03-2022	SAS System is out of service.No any operation can be performed through SAS One of the work station PC (out of 2) is lying defective. DR PC is non-functional SER/SOE as appearing on in-service work station PC is incomplete.Many of the parameters e.g.Voltages,Currents,MW,MVAr,CB status etc. of many bays are not appearing on screen. Bus-Bar protection of both 220 KV & 132 KV buses are out of service. LBB protection for both 220 KV & 132 KV System is out of service.	-	-	-	Yes	No	-	SCADA Programming (version) Updation required & also FO cable are damage at various points.Correspondance has been done with OEM regarding readiness of SAS & protection at S/s & detailed requirement will be submitted soon as per the directive of Hon'ble MD(CSPTCL) received via U.O.Note no.1584 dtd.18-03-2024 of S.E.(S/s) Korba. As the BB/LBB system is distributed and FO cable is used for it. Correspondances has been done for its services.	1. Correspondences has been done with O&M regarding readiness of SAS & protection at S/s. 2.Detailed requirement will be submitted soon as per the directives of Hon'ble MD (CSPTCL) recieved via UO Note 1584 dtd.18.03.2024 of SE(S/s) Korba. 3.As the BB/ LBB system is distributed & FO cable is used for it, correspondences has been done for its services.
2	Kotmikala	220 kV	EE MRT Dn. Bilaspur	07-05-2022	1. Carrier protection Scheme is not incorporated in 220 KV lines in CSPTCL network	-	-	-	Yes	No	-	02 nos. feeders are still not having carrier protection both are inter-state lines, it will be done soon.	Work will be executed within 1 month after procurement of material
					2. Bus Coupler & TBC is not available at 220 KV side	-	-	-	Yes	No	-	TBC Bay is ready but Bus Coupler is not ready and will be ready soon.	After receiving material from M/s Siemens work will be executed on 15 July 2024.
					3. Auxiliary bus is not available at 132 KV Side	-	-	-	Yes	No	-	Estimate sanctioned, some materials drawn but some materials are under procurement phase.	Work will be executed within 20 days after procurement of material
3	Banari	220 kV	EE MRT Dn. Bilaspur	09-03-2022	1. Bus Bar Protection Scheme (ABB RADSS) is defective & survey reported need to be replaced by new bus bar protection panel equipped with numerical relay in 220 KV side	-	-	-	Yes	No	-	Estimate sanctioned but material not procured. After procurement the replacement work will be executed.	Work will be executed within 1 month after procurement of material
					2. Display & Push buttons of distance protection relay of 132 KV PIL feeder is in very poor condition & need to be replaced.	-	-	-	Yes	No	-	Estimate sanctioned but material not procured. After procurement the replacement work will be executed.	Work will be executed within 25 days after procurement of material
					3. Main-I DPR relay of 220 KV Madwa-II feeder is defective which need to be replaced by new numerical relay.	-	-	-	Yes	No	-		
4	220 KV KTPS, Korba (E)	220 KV	M.K.Banchhor CSPTCL, N.P.Dewangan NTPC, N.K.Bizora CSPGCL, G.P.Rai CSPGCL, S.C.Chakraborty CSPGCL	25.04.2013	1. Separate two sets DC system is recommended for switchyard protection	-	-	-	Yes	No	-	Estimate will be prepared for new battery set-II	It is taken under scope of complete S/s renovation work.
					2. Auto re-closer is not available.	-	-	-	Yes	Auto Reclose available in E-W I/C-I&II, DSPM and Budhipadar-3	-	For rest of the feeders, Auto reclose will be put in service ASAP after confirmation of available scheme from other ends.	Work will be executed within 1 month after procurement of material
					3. Bus Bar Differential scheme is not available.	-	-	-	Yes	No	-	Swicthyard taken over by CSPTCL on dtd. 25/11/2021 & in proposal for S/s renovation Bus-bar protection included.	It is taken under scope of complete S/s renovation work.
5	220/132/33 KV Sub-Station Bishrampur	220/132/ 33 KV	EE MRT Dn CSPTCL Raigarh	11.03.2022	1. Addional 220 V 600 AH Battery Set & Charger needs to be commissioned	-	-	-	Yes	No	-	01 No. Charger received on Dtd. 31.05.2022 against estimate no. 41-438-3491-17-0076 Dtd. 23.12.2017. Estimate for battery set is to be prepared.	Work will be executed within 20 days after procurement of material
					2. Separate O/C & E/F relay is to be provided in 220 KV Chhuri Circuit II	-	-	-	Yes	No	-		Work will be executed within 15 days after procurement of material
					3. REF Relay on 220/132 KV 160 MVA Transformer No. II is found faulty, needs to be replaced	-	-	-	Yes	No	-		Work will be executed within 15 days after procurement of material
					4. 220KV bus bar protection out of service			-	Yes	No	-	Interlocking & FO cable problem and It will be rectified by Service Engineer	Work will be executed within 20 days after procurement of material
6	220 KV S/s Mopka	220KV/ 132KV	CSPTCL Engineers	29.03.2023	1. 2nd DC battery set is not available.	-	-	-	Yes	No	-	Both battery set and charger drawn but battery set (110, 600AH) issued to 132KV S/s Korba (100MW)	As per Korba Dn, it will be returned after receipt of new battery bank against survey report of existing
					2. synchronization trolly not available.	-	-	-	Yes	No	-	Provision is available in PSDF Estimate but not procured yet.	Work will be completed within 20 days after availibility of Synchronization trolly.
7	220/132/33 KV S/s Gerwani	220/132/ 33 KV	CSPTCL Engineers	31.03.2022	1. Additional 220 V 600 AH Battery Set & Charger needs to be commissioned	-	-	-	Yes	No	-	Estimate of both addl. Battery set & Charger is sanctioned. Charger has been drawn. Battery is not available in Area Store. Civil work is also pending.	Work will be completed within 20 days after availibility of battery sets and completion of civil work.
7	220/132/33 KV S/s Gerwani	220/132/ 33 KV	CSPTCL Engineers	31.03.2022	2. One no. additional 200 kVA station Xmer is required to install for other section of 33 KV Main Bus.	-	-	-	Yes	No	-	Estimate is sent for sanctioning.	Work will be completed within 20 days after availibility of Station Xmer.
					3. Distance Protection relay (MAIN-I) of 220 KV Raigarh feeder is defective, needs to be replaced.	-	-	-	Yes	No	-	Estimate for MAIN-II DPR relay is sanctioned. DPR relay is not available at Area store Bsp. Requirement sent.	Work will be completed within 20 days after availibility of DPR relay.
					4. Carrier Protection scheme is not available in 220KV Raigarh	-	-	-	Yes	No	-	Some components are required on existing carrier Panel of 220 KV Raigarh line as informed by C&TM Dn. Bilaspur.	Work will be completed within 20 days after availibility of some components on carrier panel.
					5. There is no capacitor bank installed, so atleast 12 MVAr 33 KV Capacitor bank is required.	-	-	-	Yes	No	-	Estimate is sanctioned. Capacitor cells are not available at area store Bilaspur.	Work will be completed within 20 days after availibility of Capacitor bank cells.
8	220/132/33 KV S/s Raigarh	220/132/ 33 KV	CSPTCL Engineers	24.03.2021	1. Main-2 DPR relays need to be installed.	-	-	-	Yes	No	-	Estimate for MAIN-II DPR relay is sanctioned. DPR relay is not available at Area store Bsp. Requirement sent.	Work will be completed within 20 days after availibility of DPR relay.
9	Suhela	220 KV	Internal PA	22.11.2022	1. Main-2 DPR relays need to be installed.	-	-	-	Yes	No	-		Procurement of material under progress
10	Thelkadih	220 KV	Internal PA	07.03.2022	1. Main-2 DPR relays need to be installed.	-	-	-	Yes	Yes	-		Completed
11	Paraswani	220 KV	Internal PA	30.12.2019	1. Main-2 DPR relays need to be installed.	-	-	-	Yes	Yes	-		Completed
12	Bemetara	220 KV	Internal PA	15.02.2018	1. Main-2 DPR relays need to be installed.	-	-	-	Yes	No	-		Relays received, work under progress will be completed by 15 July 2024

Name of Utility: NTPC Ltd.										
Sr.No	Station Name	Category A	Completed	Pending	Category B	Completed	Pending	Total	Total Pending	Target
1	**Kawas**	3	3	0	0	0	0	3	0	
2	**Jhanor**	6	6	0	1	0	1	7	1	July'25
3	**Mouda**	3	3	0	0	0	0	3	0	
4	**Solapur**	2	0	2	0	0	0	2	2	Dec'25
5	**Korba**	11	11	0	1	0	1	12	1	March'25
6	**VSTPS**	7	0	7	0	0	0	7	7	Dec'25
7	**Lara**	3	3	0	0	0	0	3	0	
8	**Khargone**	3	0	3	0	0	0	3	3	Dec'25
9	**Gadarwara**	1	1	0	0	0	0	1	0	
10	**Sipat**	24	24	0	0	0	0	24	0	
11	**RGPPL**	1	1	0	1	0	1	2	1	June'25
	Total	**64**	**52**	**12**	**3**	**0**	**3**	**67**	**15**	

Format for Protection Audit

Name of Utility: NTPC Ltd.

Sr. No.	Name of Station	Name of the Switchyard identified for audit	S/S Voltage (KV)	Date on which audit conducted/completed	Deficiency that can be corrected without procurment (Category A)			Deficiency that involves procurment (Category B)			Remark (Defect)	Action Plan to mitigate Category A	Target Date for Cat A	Action Plan to mitigate Category B	Target Date for Cat B	Remarks
					No. of Defects in Category A	Attended Yes/No	Reason for not attended	No. of Defects in Category B	Attended Yes/No	Reason for not attended						
1	Kawas	NTPC Kawas	220	07.07.2022	3	yes	Revised Zone-2,3 and 4 settings	NIL		-	No. of Defects - 3 Attended(nos.) - 3 Pending (nos.) -0	nil	nil	nil	nil	
2	Gandhar	NTPC Jhanor-Gandhar	220	05.07.2022	6	yes	Relay test kits servicing and calibration from OEM.	1	No	Numerical relays in ICT to be installed.	No. of Defects - 7 Attended(nos.) - 6 Pending (nos.) - 1	nil	nil	Procurement in progress.PO awarded Dec'24,delivery by May'25.Installation by June/July'25.	June/July'25	
			400									nil	nil			
3	Mouda	NTPC Mouda	132	27.04.2022	1	yes	132kV MUWL-1&2 zone settings need to be changed as per audit report. To be confirmed by PE-Electrical regarding Review of Zone settings	Nil			No. of Defects - 3 Attended(nos.) -3 Pending (nos.) -0	nil	nil			
			400	27.04.2022	2	yes	400kV Mouda-Wardha line-1&2, Mouda-Betul Lines-1&2 zone settings need to be changed as per audit report. To be confirmed by PE-Electrical regarding Review of Zone settings	Nil				nil	nil			
4	Solapur	NTPC Solapur	132	23.11.2022	0											
			400	22.11.2022	2	No	1.Zone-3 setting in all lines needs to be changed as the remote end longest line changed. Setting change needs Engg approval. 2.Line REL670 relay fuse failure (seal in) setting to be changed to On from Off. (Setting is OFF as per approved drawing) this change also needs Engg approval	nil			No. of Defects - 2 Attended(nos.) - 0 Pending (nos.) -2	a.one bay outage is proposed in Oct'24 and Dec'24 b. 2bays are proposed in Nov'24.	Dec'24	nil	nil	
5	Korba	NTPC Korba	400	19.09.2022	11			1	no	Existing EM type Busbar protection relays shall be replaced with Numerical protection IEDs with IEC61850 features with cyber security features.PO for SCADA R&M placed. As per SOW new busbar protection relays are to be installed with IEC 61850 capability.	No. of Defects -12 Attended(nos.) - 11 Pending (nos.) -1	nil	nil	PO placed,Part material received at site.Work shall start from second week of Oct 2024 as relay is to be configured in 27bays therefore duration is 6months.	March'25	
						YES	Zone-1 settings of few IEDs is kept as 0.1 sec and 0.08 sec which needs to be changed and must set as instantaneous trip as per the WRPC/ CBIP guidelines.			Settings revised as per Engg recommendation.						
						YES	Relay test System Omicron CMC 356 calibration report is not available. Recommended for calibration from NABL accredited laboratory. Calibration must include voltage, current, frequency, phase angle, power and time.			Servicing and Calibration done.						
						YES	Protection relays which are not in use and shall be removed from control and relay panels.			Protection relays not in used are taken out of CRP.						
						YES	Bhilai 1 & 2: 1 Zone 2 & 3 may be reviewed in Main I 2 Zone timings may be reviewed in Main I 3 Auto reclose settings may be reviewed in Main I			Bhilai#1 and 2 Main#1 and Main#2 relay settings modified as per Engg recommendations. As per Engg, no change in auto reclose settings.						
						YES	Bhatapara: Zone timings may be reviewed in Main I			Reviewed by Engg. No change to be done.						
						YES	Birsinghpur 1 & 2: 1 Zone 2 & 3 settings may be reviewed in Main I 2 The existing reach settings for Zones 3 & 4 phase to earth reactance of zones may be reviewed in Main II			Settings revised as per Engg recommendation.						
						YES	Korba West : 1 Zone 3 may be reviewed in Main I 2 Zone timings may be reviewed in Main I and Main II			Settings revised as per Engg recommendation.						
						YES	Raipur 3 & 4: 1 Zone 3 may be reviewed in Main I 2 Zone timings may be reviewed in Main I and Main II 3 The existing reach settings for Zones 2, 3 & 4, phase to phase and phase to earth reactance of zones may be reviewed in Main II			Main#1 settings of Raipur#3 and 4 changed as per Engg recommendation. Main#2 settings shall be done in opportunity.						
						YES	Sipat: 1 Zone 3 may be reviewed in Main I 2 Zone timings may be reviewed in Main I and Main II 3 The existing reach settings for Zones 3 & 4 phase to earth reactance of zones may be reviewed in Main II			Settings revised as per Engg recommendation.						
						YES	Vindhyachal 1 (Mahan): 1 Zone 2 & 3 may be reviewed in Main I 2 Zone timings may be reviewed in Main I 3 The existing reach settings for Zones 1B, 2 & 3, phase to phase and phase to earth reactance of zones may be reviewed in Main II			Settings revised as per Engg recommendation.						
						YES	Vindhyachal 2: 1 Zone 1 & 3 may be reviewed in Main I 2 Zone timings may be reviewed in Main I and Main II 3 The existing reach settings for Zones 1B, 2 & 3, phase to phase and phase to earth reactance of zones may be reviewed in Main II			Settings revised as per Engg recommendation.						
6	VSTPS	VSTPS	132	04.09.2023 to	0		**1.The distance protection Main-I & II Zone 1, Zone 2 impedance reach setting for Jabalpur-1 & 2 lines are properly set and some minor revisions are required in Zone-3 & Zone-4 impedance reach settings. 2. The distance protection Main-I & II of Jabalpur-3 & 4 lines some minor revisions are required in all Zones impedance reach settings. 3. The distance protection Main-I & II Zone 1 impedance reach setting for Korba-1 line are properly set and some minor revisions are required in Zone 2, Zone-3 & Zone-4 impedance reach settings.**	nil			No. of Defects - 7 Attended(nos.) - 0 Pending (nos.) -7			nil	nil	CPRI reports received in Nov'24,review from NTPC engineering pending.
			400	07.09.2023	7		**4. The distance protection Main-I of Korba-2 line some minor revisions are required in all Zones impedance reach settings. 5. The distance protection Main-II of Satna-1 & 2 line some minor revisions are required in all Zones impedance reach settings. 6. The distance protection Main-I & Main-II of Pooling lines some minor revisions are required in all Zones impedance reach settings. 7. The earth fault protection is also protected to all line protection. Power swing, CB fail, and broken conductor is also provided on all lines. Minor changes in Power swing, Auto-reclose time setting.**	nil				Observation of 3rd party audit on settings is under review by NTPC Engineering and shall be implemented after engineering recommendation.	Nov/Dec'24	nil	nil	

7	Lara	NTPC Lara									No. of Defects - 3 Attended(nos.) - 3 Pending (nos.) - 0					
			400	25.07.2022	3	Yes	Review of Zone settings(Zone 2,3 & 4) **(All audit points complied as per our PE electrical recommandation)**	Nil		Settings revised as per Engg recommendation.						
8	Khargone										No. of Defects - 3 Attended(nos.) - 0 Pending (nos.) - 3	Relay settings to be replaced. a.Two bays tageted in Nov'24 and remaining 2 bays in Dec '24				
		NTPC Khargone	400	22.09.2022	3	No	PE-Electrical reviewed settings of Zone-2,3,5 settings	nil					Dec'24			2 days outage required in each bays.
9	Gadarwara	Gadarwara NTPC 132 KV	132	07.07.2022	0	0			YES		No. of Defects - 1 Attended(nos.) - 1 Pending (nos.) -o					
		Gadarwara NTPC 765 KV	765	07.07.2022	1	Yes	Revised Zone 3 setting for Jabalpur Line 1 & 2	NIL	YES							
10	Sipat	NTPC Sipat	400		16	yes	Revised zone 2,3,4 settings	nil			No. of Defects - 24 Attended(nos.) - 24 Pending (nos.) - 00					
			765		8	yes	Revised zone 2,3,4 settings	nil								
11	RGPPL	RGPPL 400KV SWITCHYARD	400	23.11.2022	1	YES	Equipment Testing Kits sent to OEM for repair and calibration.	1	NO	PR for numerical relays of Bus Bar protection to be initiated	No. of Defects - 2 Attended(nos.) - 1 Pending (nos.) -1			PR for numerical relays of Bus Bar protection to be initiated,PO by Jan'25.Completion by June'25.	June'25	

Annexure 5.1

MSETCL

Sr. No.	Name of Sub-station	Audited By	Date of audit conducted/ completed	Observation details	Category-A (Non-Procurment) / Category-B (Procurment)	Attended (Yes/No)	Attended Date (dd-mmm-yy)	Reason if not attended
1	400kV Akola	MPPTCL	09-01-2024 to 12-01-2024	Current level detector setting for LBB protection are found 0.4 and 0.1Amp, needs to be checked and revised as per guidelines.	A	No		It was tried to change the setting of LBB relay. But due to OLD laptop version(Window XP) the relay setting couldnot be changed. Also the Engineering PC is not working to change the setting. Hence siemens engineer services are needed for this. The SCADA upgradation work is in process during which this point will be attended.
2	400kV Akola	MPPTCL	09-01-2024 to 12-01-2024	Overvoltage settings of Bhusaval and Nandgaon Peth lines found as follows • Stage-1, 110%, 6 sec, Trip • Stage II, 150%, 100 msec, Alarm only The same needs to be checked and revised as per guidelines. Grading in the overvoltage settings of all the line may be applied.	A	Yes	12.04.2024	setting conformed
3	400kV Akola	MPPTCL	09-01-2024 to 12-01-2024	Time synchronization device is provided but the following relays/ devices are found out of time synchronization: • Main- II relay (ABB REL 670) of line Aurangabad -I & II. • BCU & Relays for protection of ICT-3 (167*3 MVA, Make TBEA).	A	No		Need the siemens engineer (for configuration of IP station)/ for Aurangabad 1& 2 line informed to PGCIL
4	400kV Akola	MPPTCL	09-01-2024 to 12-01-2024	Redundant PLCC panel Make BPL of lines Wardha- I & Wardha -II are found in non-healthy condition.	B	No		Under PGCIL (PLCC PANEL RECEIVED AT SITE)
5	400kV Akola	MPPTCL	09-01-2024 to 12-01-2024	Centralised DR workstation along with Automatic DR download software may be installed for automatic DR download.	B	No		This observation comes under CATEGORY-B. The SCADA upgradation work is in process during which this point will be attended.
6	400kV Akola	MPPTCL	09-01-2024 to 12-01-2024	**400/220/33KV 3 X 105 MVA EMCO ICT-1, II & 400/220/33KV 3 X 167 MVA EMCO ICT-3, 400/220KV 1 X 105 MVA Spare EMCO -** No Provision of duplicated PRD & Buchhloz initiating contact for ICT.	A	Yes		1) PRV 1, PRV-2 are used in tripping scheme. Therefore duplicated contacts are used for PRV. 2) The Buch Alarm contact is used for tripping in addition to Buchola Trip contact Hence the Duplication is achieved.
7	400kV Akola	MPPTCL	09-01-2024 to 12-01-2024	Duplicated bus bar protection is not provided for 400kV bus. MSETCL has to confirm the provision of Reverse zone in case of single bus bar protection at s/s.	A	Yes		As pr MSETCL Standard only one bus bar relay is installed. Provision of revese zone is confirmed.

8	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	Current level detector setting for LBB protection is found 0.8 Amp in all feeders and TF relays except PGCIL lines. This need to be checked and revise as per guidelines i.e. 0.2 Amp.	A	Yes	10-Jul-24	
9	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	In 220 kV Padegaon-3, Thapti Thanda & Georai feeders, Auto Recloser function is not in service.	A	Yes	3rd, 5th , 7th June Relay Retrofitted	
10	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	Tele protection scheme is not available in 220 KV Padegaon-3 & 220KV Georai feeders.	B	Yes	3-Jul-24	
11	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	Zone 2 and Zone 3 timings need to be reviewed as per guidelines.	A	Yes	16-Apr-24	
12	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	Load encroachment settings for all lines should be reviewed.	A	No		Feature is disabled
13	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	Directional earth fault protection feature for high resistive fault in 400 KV Deepnagar, Thaptitanda, Babhaleshwar lines is not in service.	A	Yes		feature will be enabled and relay testing done during routine relay testing.
14	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	Following Main protection relays are not GPS synchronized:- Main-2 DPR of 400 KV Thaptitanda line Main-2 DPR of 400KV Deepnagar line Main-1 & Main-2 DPR of 400KV Line ACPG- 1 & 2.	A	No		will check the feasibility of IRIG prot for synchorinasition
15	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV APG-1 & 2 line** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		Line pertains to PGCIL
16	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Pune-1 & 2 line** - Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same.	A	No		Line pertains to PGCIL
17	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Pune-1 & 2 line** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		Line pertains to PGCIL
18	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Babhaleshwar line** - Main-I & II protection relay is not of different make.	B	Yes		Retrofitted under MTAMC project
19	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Babhaleshwar line** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	12-Mar-24	

20	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Babhaleshwar line -** No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	No		will be enabled in next schedule outage.
21	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Bhusawal line -** Main-I & II protection relay is not of different make.	B	Yes		Retrofitted under MTAMC project
22	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Bhusawal line -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	12-Apr-24	
23	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Bhusawal line** - No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	Yes		Already in service
24	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Thaptitanda line** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	12-Apr-24	
25	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Thaptitanda line** - No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	No		will be enabled in next schedule outage.
26	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Deepnagar Line -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	12-Apr-24	
27	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Deepnagar Line** - No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	No		will be enabled in next schedule outage.
28	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Padegaon 1 & 2 Line -** Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same	A	Yes	18-Apr-24	
29	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Padegaon 1, 2 & 3 Line** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	18-Apr-24	
30	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj - Padegaon-3 Line -** 1-ph Auto recloser is not taken into service.	A	Yes	7-Jun-24	
31	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Chitegaon** - Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same	A	Yes	18-Apr-24	
32	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Chitegaon** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	18-Apr-24	

33	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Bhenda -** Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same	A	Yes	18-Apr-24	
34	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Bhenda -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	18-Apr-24	
35	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Deogaon Rangari -** Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same	A	Yes	18-Apr-24	
36	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Deogaon Rangari -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	18-Apr-24	
37	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-ThaptiTanda -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	5-Jun-24	
38	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-ThaptiTanda -** 1-ph Auto recloser is not taken into service.	A	Yes	5-Jun-24	
39	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Georai -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	3-Jun-24	
40	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Georai -** 1-ph Auto recloser is not taken into service.	A	Yes	3-Jun-24	
41	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 315MVA ICT-1** - No Provision of duplicated PRD & Buchhloz initiating contact for ICT	A	Yes		Alarm & Trip of Buchholz are clubbed
42	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 315MVA ICT-1** - Harmonic restrain feature is not available in back up earth fault relay.	B	No		will be retrofitted in scheme
43	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 315MVA ICT-2** - No Provision of duplicated PRD & Buchhloz initiating contact for ICT	A	Yes		Alarm & Trip of Buchholz are clubbed
44	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 315MVA ICT-2** - Harmonic restrain feature is not available in back up earth fault relay.	B	No		will be retrofitted in scheme
45	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 501MVA ICT-3** - No Provision of duplicated PRD & Buchhloz initiating contact for ICT	A	Yes		Alarm & Trip of Buchholz are clubbed

46	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 501MVA ICT-3** - Harmonic restrain feature is not available in back up earth fault relay.	B	Yes		Provision in relay and in service
47	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 501MVA ICT-3** - Differential & Backup protection relays are not time synchronised with GPS based time synchronizing equipment.	A	No		will be retrofitted in scheme
48	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220/33kV 80MVA TF-1 & 2** - Harmonic restrain feature is not available in back up earth fault relay.	B	Yes		Provision in relay and in service
49	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220/33kV 80MVA TF-3** - Harmonic restrain feature is not available in back up earth fault relay.	B	Yes		Provision in relay and in service
50	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220/33kV 80MVA TF-3** - Differential & Backup protection relays are not time synchronised with GPS based time synchronizing equipment.	B	No		Integration in SCADA pending
51	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Pune-1& 2** - Main protection provided for reactor is not of numerical.	B	No		Pertains to PGCIL
52	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Pune-1 & 2** - Fire protection system (HVW/CTR type) provided for Reactor is out of service.	B	No		Pertains to PGCIL
53	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	400kV Bus-bar - Duplicated bus bar protection is not provided for 400kV bus.	A	Yes		As pr MSETCL Standard only one bus bar relay is installed. Provision of revese zone is confirmed.
54	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Pune-1 & 2** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		Pertains to PGCIL
55	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400kV Babhaleshwar, Bhusawal, Thaptitanda & Deepnagar line** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		feature will be enabled and relay testing done during routine relay testing.
56	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV 501MVA ICT-3 -** MSETCL has to confirm DR automatic fault record download facility to a central SCADA PC	B	No		will be retrofitted in scheme
57	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**400/220/33kV ICT-4 167MVA SPARE** - MSETCL has to confirm DR automatic fault record download facility to a central SCADA PC	A	Yes		Auto DR not required for spare unit REF relay

58	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220/33kV 50MVA TF-3** - MSETCL has to confirm DR automatic fault record download facility to a central SCADA PC	B	No		Integration in SCADA pending
59	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj - Padegaon-3 Line** - PLCC for tele-protection of distance relays is not in service.	B	Yes	3-Jul-24	
60	400kV Waluj	MPPTCL	17-01-2024 to 20-01-2024	**220kV Waluj-Georai -** PLCC for tele-protection of distance relays is not in service.	B	No		Panel needs to be shifted from Thapti to georai
61	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	Phase Selection setting for REL670 relays found kept lower than Zone-3 reach. Same required to be corrected.	A	No		Will be carried out
62	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud-Solapur line -** Zone-2 reach is not set 120% of the protected line (in case of Single circuit line) as per RK Committee.	A	Yes		As per R K committee guidelines
63	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud-Solapur line -** Zone-3 reach is not set to cover 120% of the total of protected line section plus longest line at remote end as a minimum as per RK.	A	No		Will be carried out
64	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud-Solapur line -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes		As per R K committee guidelines
65	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud-Solapur line -** No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	No		Said arrangement is as per Approved Schematics during commissioning of substation.
66	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud-Solapur line -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes		As per R K committee guidelines
67	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud- Kolhapur line -** Zone-2 reach is not set 120% of the protected line (in case of Single circuit line) as per RK Committee.	A	Yes		As per R K committee guidelines
68	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud- Kolhapur line -** Zone-3 reach is not set to cover 120% of the total of protected line section plus longest line at remote end as a minimum as per RK.	A	No		Will be carried out
69	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud- Kolhapur line -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes		As per R K committee guidelines
70	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud- Kolhapur line -** No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	No		Said arrangement is as per Approved Schematics during commissioning of substation.

71	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400KV Alkud- Kolhapur line -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes		As per R K committee guidelines
72	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**400kV bus bar -** Duplicated bus bar protection is not provided for 400kV bus. MSETCL has to confirm the provision of Reverse zone in case of single bus bar protection at s/s.	A	Yes		At 400kV R S Alkd, there is arrangement of one and half breaker system and TEED1 &TEED2 protection
73	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	No provision of two indpendent 48 V DC system for PLCC.	B	Yes		Said arrangement is as per Approved Schematics during commissioning of substation.
74	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**220KV Alkud Mhaishal Line -** Zone-2 reach is not set 120% of the protected line (in case of Single circuit line) as per RK Committee.	A	Yes		As per R K committee guidelines
75	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**220KV Alkud Mhaishal Line -** Zone-3 reach is not set to cover 120% of the total of protected line section plus longest line at remote end as a minimum as per RK.	A	Yes		As per R K committee guidelines
76	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**220KV Alkud Vita Line -** Zone-2 reach is not set 120% of the protected line (in case of Single circuit line) as per RK Committee.	A	Yes		As per R K committee guidelines
77	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**220KV Alkud Vita Line -** Zone-3 reach is not set to cover 120% of the total of protected line section plus longest line at remote end as a minimum as per RK.	A	Yes		As per R K committee guidelines
78	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**220KV Alkud Mendhegiri Line 1 & 2 -** Zone-2 reach is not set 150% of the protected line (in case of double circuit line) as per RK Committee.	A	Yes		As per R K committee guidelines
79	400kV Alkud	GETCO	18-Dec-2023 to 21-Dec-2023	**220KV Alkud Mendhegiri Line 1 & 2 -** Zone-3 reach is not set to cover 120% of the total of protected line section plus longest line at remote end as a minimum as per RK.	A	Yes		As per R K committee guidelines
80	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	As the lines emanating from this substation are of short length (only 2.3 Km each). it is recommended to have Line Differential protection in addition to the Distance protection for more reliable and effective isolation of faulty lines.	A	Yes		For 400kV SWITCH Ckt-1 & 2, ABB make line differential relay (Main I relay) commisioned on Ckt II dtd 26.07.2024 & Ckt I 01.08.2024. However Main II relay is very old procurment for same is under process.
81	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	This substation is a switching substation between Generating Station and another 400 KV Grid Substation that too with line length of 2.3 Km only, need of auto- reclosing may be reviewed in this short lines.	A	Yes		The Auto-reclosing Feature is already being used for these short lines and as this S/Stn is having severe fault level, the A/R feature is kept OFF since commissioning of these short lines . In Chandrapur area there are too many Generating station, hence to avoid unwarranted tripping AR is kept OFF
82	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	Existing bus bar protection is having only one DC source, it is recommended to provide change over DC Source.	B	No		The matter is taken with higher authorities and the scheme praposal is in progress.
83	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	Second set of Bus bar protection may be provided for redundancy.	B	No		As per the MSETCL guidelines only one set of Busbar protection is provided at ss.

84	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	In case of short lines, is manufacturers recommendation considered in respect of resistive setting vis a vis reactance setting to avoid overreach. MSETCL has to verify the same.	A	Yes		The settings has been provided as per the relay manual.
85	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes		As in Chandrapur area there are too many Generating station and short lines.hence to avoid unwarranted trippings in zone-4, time delay of 500 ms are adopted as per the recommendations from SE PAC office nagpur.
86	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	MSETCL has to confirm DR automatic fault record download facility to a central SCADA PC	A	Yes		In ABB make Scada ,Automatic DR download facilty is not available.
87	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	Duplicated bus bar protection is not provided for 400kV bus.	A	Yes		As pr MSETCL Standard only one bus bar relay is installed. Provision of revese zone is confirmed.
88	400kV Chandrapur Switching	CSPTCL	17-Jan-2024 to 18-Jan-2024	Two-stage breaker failure protection is not provided.	B	No		For two-stage BFP Scheme, modification is required in exsting scheme. Hence necessary guildelines required.
89	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	This substation has two short critical 400kV lines (1.1 & 1.3 Km) connected to 400kV CHD2 S/S, both of the S/S are having S/S fault level around 58kA, need of auto-reclosing may be reviewed in this short lines, at present the auto-reclose feature for	A	Yes		The A/R feature is kept OFF since commissioning of these short lines . In Chandrapur area there are too many Generating station , alsofaults level is increase nearly upto 58kA , further Distance between both the lines are very short , so they are as good as
90	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	Bus bar protection scheme for 220kV is of Static type (ABB RADSS). Needs replacement by Numerical one.	B	No		New CTR make Numerical B/B Relay will be commissioned soon as panels already received .
91	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	ZIV Numerical Busbar Protection is commissioned for 400kV in recent past; however old static ABB RADSS busbar protection is still in service, it should be made out of service if is of no use.	A	No		Old 400 kV Static ABB RADSS busbar protection will be removed from the service ,after disussion with higher authority.
92	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	LBB relays for 400kV/220kV feeders are of Static type, needs to be replaced with standalone numerical type.	B	No		Proposal for LBB scheme is under process at PAC Circle Nagpur
93	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400KV Chandrpur GCR -Parli-3** - Main-I & II protection relay is not of different make.	B	Yes		MSETCL Policy Matter
94	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400KV Chandrpur GCR - Parli-3** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		As a back-up to B/B, Back-up O/c Relay of 400 kV B/c is in service and set for 200 ms DT.
95	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400KV Chandrpur GCR - Khaperkheda -** Main-I & II protection relay is not of different make.	B	Yes		MSETCL Policy Matter

96	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400KV Chandrpur GCR - Khaperkheda -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		As a back-up to B/B, Back-up O/c Relay of 400 kV B/c is in service and set for 200 ms DT.
97	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400KV Chandrpur GCR - CHD2 CKT-1 & 2** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		As a back-up to B/B, Back-up O/c Relay of 400 kV B/c is in service and set for 200 ms DT.
98	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400KV Chandrpur GCR - CHD2 CKT-1 & 2** - No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	Yes		Being very short critical lines DEF settings are not implemented as per Guidelines.
99	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400kV Chandrpur GCR - PGCIL CKT-1 & 2** - No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	Yes		Being under PGCIL jurisdiction, settings provided by PGCIL as per their policy.
100	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400kV Chandrpur GCR -PGCIL CKT-2, 3 & 4** - It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes		As a back-up to B/B, Back-up O/c Relay of 400 kV B/c is in service and set for 200 ms DT. Being under PGCIL jurisdiction, settings provided by PGCIL as per their policy.
101	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400/220/33 kV, 315 MVA ICT-I** - Harmonic restrain feature is not available in back up earth fault relay.	B	No		The existing HV/LV back-up relays are of Sifang make (CSC211). These relays needs to be replaced for this feature.
102	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400/220/33 kV, 3*105 MVA ICT-II** - Harmonic restrain feature is not available in back up earth fault relay.	B	No		The existing HV/LV back-up relays are of Alstom make (P-143). These relays will be replaced by Siemens make relays soon.
103	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**400kV bus bar** - Duplicated bus bar protection is not provided for 400kV bus.	A	Yes		As pr MSETCL Standard only one bus bar relay is installed. Provision of revese zone is confirmed.
104	400kV Chandrpur GCR	CSPTCL	30-01-2024 to 31-01-2024	**220/33kV 50MVA TFR** - Harmonic restrain feature is not available in back up earth fault relay.	B	No		The existing HV/LV back-up relays are of Sifang make (CSC211). These relays needs to be replaced for this feature.
105	400kV Khaperkheda	CSPTCL	21.03.2024 to 22.03.2024	ERL MVT 181 O/v stage-I protection relays are provided for 400 kV lines are static (Non- numerical) relays, should be of Numerical type.	B	No		Proposalis under process for replacement with numerical relay.
106	400kV Khaperkheda	CSPTCL	21.03.2024 to 22.03.2024	It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes		Existing Setting for Z4 timing is 300 msec for 400 kV & 220 kV line .
107	400kV Khaperkheda	CSPTCL	21.03.2024 to 22.03.2024	Harmonic restrain feature is not available in back up earth fault relay.	B	No		Requirment will be submitted shortly

108	400kV Khaperkheda	CSPTCL	21.03.2024 to 22.03.2024	CBF (LBB) current level detector is not set to 0.8A	A	Yes	13.06.2024	Attended
109	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	For both the ICTs, main 2 differential protection may be provided.	A	Yes		As per the MSETCL standard, only one differential protection is provided.
110	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	Main 2 Protection may be provided in 220 KV Feeders for increased reliability.	A	Yes		As per the MSETCL standard, one Distance and one OC+EF Backup protection is provided for reliability
111	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	Separate Relays for Backup protection, LBB protection may be provided.	B	No		For standalone LBB, modification is required in exsting scheme. Hence necessary guildelines required.
112	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	Some of the IEDs are having their local HMI display not functioning such as ABB REF615 relay in Bay no 426, 414, & 408.	B	No		The matter is taken with O&M.
113	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	Second set of Bus bar protection may be provided for redundancy. Existing Bus bar protection is having only one DC source, it is recommended to provide change-over DC Source.	B	No		The matter is taken with higher authorities and the scheme proposal is in progress.
114	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	Line Differential protection may be provided in 400 KV Chandrapur Switching Ckt 1 and Ckt 2.	A	Yes		For 400kV SWITCH Ckt-1 & 2, ABB make line differential relay (Main I relay) commisioned on Ckt II dtd 26.07.2024 & Ckt I 01.08.2024 . However Main II relay is very old procurment for same is under process.
115	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	Check zone may be provided in Bus Bar protection of 220 KV Bus.	B	No		No separate CT input available in ABB REB500 for check zone.
116	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	In case of short lines, is manufacturers recommendation considered in respect of resistive setting vis a vis reactance setting to avoid overreach. MSETCL has to verify the same.	A	Yes		The settings has been provided as per the relay manual.
117	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes		As in Chandrapur area there are too many Generating station and short lines.hence to avoid unwarranted trippings in zone-4, time delay of 500 ms are adopted as per the recommendations from SE PAC office nagpur.
118	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	MSETCL has to confirm DR automatic fault record download facility to a central SCADA PC	A	Yes		In existing ABB make SCADA ,Automatic DR download facilty is not available.
119	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	Duplicated bus bar protection is not provided for 400kV bus.	A	Yes		As pr MSETCL Standard only one bus bar relay is installed. Provision of revese zone is confirmed.
120	400kV Chandrapur 2	CSPTCL	23.04.2024 to 25.04.2024	It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes		As in Chandrapur area there are too many Generating station and short lines.hence to avoid unwarranted trippings in zone-4, time delay of 500 ms are adopted as per the recommendations from SE PAC office nagpur.

121	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Diff. make or Diff. type distance protection are not available in Following Line. (A) 400kV Babhaleshwar line, (B) 400kV Aurangabad line, (C) 400kV Akola line.	B	No		Matter will be taken with competent authority.
122	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	In distance protection of 400kV, 220kV and 132kV lines, reach setting and time setting of Zone -2 should be revise with considering adj. Short line at remote end sub-station.	A	Yes	4-Mar-24	Complied
123	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	In distance relay, reach setting and time setting of zone-4 should be universal in same voltage level.	A	Yes	3-Apr-24	Complied
124	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Zone-4 protection is not available in distance protection relay which are in service for line protection, should be replaced it.	A	No		All such relays in 400kV will be replaced. New GE make P443 relays received at Khadka.
125	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	It is advisable to active both Over Voltage protection stage in both distance M1 and M2, in place of one stage in one relay and other one in second relay.	A	Yes		As per MSETCL protection philosophy, dedicated standalone over voltage stage-1 & stage-2 relays are used in 400kV line bays. Wherever, there are no standalone overvoltage prot relays in-built function of distance relays are used.
126	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	It is more usefull to active PUR in distance - M1 and POR in distance-M2, in place of both distance relay working with PUR.	A	Yes		Settings adopted as per MSETCL protection philosophy
127	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Pick up setting of LBB relay should be considering with minimum fault current.	A	Yes	1-Mar-24	Pickup setting of 0.8A incorporated as per protection manual dtd. 01.03.2023
128	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Re-Trip function is not available in LBB Scheme.	B	No		Centralized LBB protection scheme for all feeders is already proposed.Retrip enabled for 3 nos of 220kV Feeeders
129	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Resistive reach of Zone-4 to be revised with considering multi ckt feeding (should be taken same as Zone-3).	A	Yes	3-Apr-24	Complied
130	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	In DR configuration, MI relay does not trigger DR from M2 relay operated input and via vise, should be revised.	A	Yes		Distance protection relay retrofitting scheme is in progress, this logic will be implemented in new relays as PSL editing is not available in current old ABB relays (REL 521 v2.0).
131	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Remove time delay in tripping of REF protection in ICT/TR.	A	Yes	03.02.2024	Complied
132	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Time syn is not available in all OC-EF relay in all voltage class.	B	No		Order for Backup relay retrofitting is under progress and said issue of time sync will be attended at the time of retrofitting.
133	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	LBB protection is not available in 220kV Kekat-Nimbhora line, 220kV Chalisgaon-1 and 220/132kV, ICT-5 (220kV Side).	B	Yes	27.04.2024, 29.04.2024 and 21.05.2024	Complied. LBB protection relay commissioned with following details: 1. 220/132kV, 200MVA ICT-5 (HV): 27.04.2024 2. 220kV Khadka-Chalisgaon Ckt-1: 29.04.2024 3. 220kV Khadka-Kekatnimbhora Ckt-

134	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Zone-2 reach found wrong (More than 200% of line length) and dead time for AR found 0.8 sec in 220kV Kekat-Nimbhora line.	A	Yes	03.02.2024	Complied
135	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Single Phase LBB initiation is not give to LBB relay of 220kV TBC.	A	Yes		AR scheme is not available in TBC. Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
136	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Distance relay found fault of 132kV Deepnagar line-1, only one OC-EF relay protection in service.	B	Yes	23.05.2024	Complied. GE make P443 distance protection relay retrofitted on dt. 23.05.2024
137	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	TOR should active in Distance protection relay.	A	Yes	03.04.2024	TOR function is applicable only in 400kV Koradi Ckt (Main-1: Micom P442) and same has been implemented. TOR function will be activated in other relays during relay retrofitting work.
138	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Distribution of DC supply is not properly in HV & LV panel of 220/132kV, ICT-4 & 5.	B	Yes	06.03.2024 & 07.03.2024	Complied
139	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	DC supply supervision and T/C-2 supervision are not available in HV & LV panel of 220/132kV, ICT-4 & 5.	B	No		Relays are arranged and will be attended during outage.
140	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	DC supply supervision is not available in LV panel of 220/132kV, ICT-1 & 2	B	Yes		DC supply supervision is available in HV panel and same DC supply is extended from HV to LV panel.
141	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	PLCC protection is not available in 132kV Deepnagar line-03.	B	No		Requirement of PLCC equipment at other end is submitted.
142	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	PLCC protection is not working in 220kV Deepnagar line due to card fail.	B	No		Scheme for retrofitting of old BPL make panel is under process for approval.
143	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Over Flux tripping is not provided in all ICT/TR (Only OF alarm configure).	A	Yes		Settings adopted as per MSETCL protection philosophy.
144	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	DT is not send by 400kV TBC.	A	Yes		DT send scheme is in service.
145	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	DR and event are not extracted from Diff relay (Siem-7SR54) of 400/220kV, ICT-1 & 2.	A	Yes	03.02.2024	complied
146	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Koradi ckt, 400kV Khadka - Akola ckt, 400kV Khadka - Aurangabad ckt**- No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	B	No		There is no provision for DEF setting in distance protection relays of 400kV Akola, 400kV Koradi, 400kV Aurangabad Ckt; same will be incorporated during relay retrofitting work in the month of July-2024.

147	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Koradi, 400kV Khadka - Akola, 400kV Khadka - Deepnagar 1 & 2 -** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	Yes	03.02.2024	Complied
148	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Akola** - Main-I & II protection relay is not of different make.	B	Yes		MSETCL Policy
149	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Babhaleshwar** - Main-I & II protection relay is not of different make.	B	Yes		MSETCL Policy
150	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Babhaleshwar** - It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	No		There is no provision for Z-4 setting in M-1 & M-2 distance protection relays of 400kV Khadka-Babhaleshwar Ckt; same will be implemented in relay retrofitting scheme under progress. (This issue is not raised in MoM of Third party protection audit)
151	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Aurangabad ckt-** It is observed that Reverse zone Z4 Time set is not as per RK Committee. MSETCL has to revised the same.	A	No		There is no provision for Z-4 setting in M-1 distance protection relays of 400kV Khadka-Aurangabad Ckt; same will be implemented in relay retrofitting scheme under progress. M-2 distance protection relay Z-4 timer is set as per RK committee
152	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Deepnagar 1 & 2 -** No provision of sensitive IDMT directional E/F relay/protection against high resistive earth faults.	A	Yes		IDMT DEF protection is in service for 400kV Deepnagar Ckt-1 & 2 through M-2 relay (Siemens 7SA522) and the feature is not available in M-1 relay (CSC-101).
153	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Koradi -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
154	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Akola -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
155	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Babhaleshwar -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
156	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Aurangabad -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
157	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Deepnagar 1 -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
158	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Khadka - Deepnagar 2 -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
159	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV TBC -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.

160	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV Bus Coupler** - In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
161	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Deepnagar -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes	03.02.2024	Complied
162	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Chalisgaon 3 -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes	03.02.2024	Complied
163	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Chalisgaon 1 -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes	03.02.2024	Complied
164	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Kekatnimbhora -** Zone-2 reach is not set 120% of the protected line (in case of Single circuit line) as per RK Committee.	A	Yes	10.02.2024	Complied
165	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Kekatnimbhora** - It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes	03.02.2024	Complied
166	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Kekatnimbhora -** 1-ph Auto recloser is not taken into service.	A	Yes		1-ph auto-recloser is already in service.
167	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Bhadli 1 & 2** - For Main-1 & 2, zone-1 is not set to 80% of the protected line section, setting needs to be reviewed as per RK recommandation.	A	Yes	03.02.2024	Complied
168	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Bhadli 1 -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes	03.02.2024	Complied
169	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Bhadli 2 -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	Yes	03.02.2024	Complied
170	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**132kV Khadka - Deepnagar 2 -** Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same	A	Yes	03.02..2024	Complied
171	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**132kV Khadka - Tighra Solar -** Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same	A	Yes		Z-2 timer has been set with 50msec additional delay, considering adj. Short line at remote end sub-station.
172	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	No Provision of duplicated PRD & Buchhloz initiating contact for All ICTs	A	No		

173	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	Harmonic restrain feature is not available in back up earth fault relay of all ICTs	B	No		
174	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**400kV bus bar, 132kV Bus-bar -** Duplicated bus bar protection is not provided for 400kV bus. MSETCL has to confirm the provision of Reverse zone in case of single bus bar protection at s/s.	A	Yes		As pr MSETCL Standard only one bus bar relay is installed. Provision of revese zone is confirmed.
175	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Bhadli 2 -** MSETCL has to confirm DR automatic fault record download facility to a central SCADA PC	A	Yes	03.02.2024	Complied
176	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**132kV Khadka - Deepnagar 1-** MSETCL has to confirm DR automatic fault record download facility to a central SCADA PC	A	Yes	03.02.2024	Complied
177	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Chalisgaon 3 -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
178	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Chalisgaon 1 -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	Yes	29.04.2024	Standalone LBB protection relay is commissioned on dt. 29.04.2024.
179	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Bus Coupler** - In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
180	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	400/220kV 3x105 MVA ICT 3 - In built function of **distance relay** is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	Yes		Standalone LBB protection relay is already in service for ICT-3.
181	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220kV Khadka - Deepnagar -** In built function of distance relay is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
182	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220/132kV 200MVA ICT 4 -** In built function of **distance relay** is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	No		Centralized LBB protection scheme for all feeders is approved by competent authority and is in tendering stage at zone level.
183	400kV Bhusawal (Khadka)	GETCO	01-02-2024 to 02-02-2024	**220/132kV 200MVA ICT 5-** In built function of **distance relay** is enabled for LBB. However, there is no provision of stand alone LBB relay. Provision of LBB stand alone relay shall be made as per RK.	B	Yes	27.04.2024	Standalone LBB protection relay is commissioned on dt. 27.04.2024.
184	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	In 400KV Auragabad feeder bay, Over voltage protection MVT 181 relay is defective, Same is configured in SEL 421 Main II protection relay. Autoreclose function is disabled in both Main I & Main II Distance protection relays	B	No		Requirement of Over Voltage relays is submitted at 400kV RS Dn., Deepnagar vide TOL No.AdEE/400kV/BSL-II/2023-24/ No.-64, dtd 29.02.2024 and SE/EHV O&M/KDK/BSL/Tech/No.-1125, dtd-05.07.2017
185	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	In 400KV Khadka.ckt. I feeder bay, Over voltage protection MVT 181 relay is defective. Same is configured in SEL 421 Main II protection relay.	B	No		Requirement of Over Voltage relays is submitted at 400kV RS Dn., Deepnagar vide TOL No.AdEE/400kV/BSL-II/2023-24/ No.-64, dtd 29.02.2024

186	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	In 400kV Aurangabad feeder bay, Auto reclose function is also disabled in Main- I & II Relay	A	No		Permission for taking A/R function in service submitted to Genco Authorities vide No.SE/EHV O&M/KDK/BSL/Tech/ No.-1125, dtd-05.07.2017
187	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	Few relays are not synchronised with GPS.	A	No		It will be followed up by automation team under PAC Division Dhule.
188	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	In 220KV feeder panels, second Distance protection relays for Main II protection are not installed.	A	Yes		As per MSETCL philosophy there is no such provision of Second Distance Protection relay for Main-2 protection .
189	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	Load encroachment function is not available in Sifang CSC 101 relays.	A	No		Load Encroachment function is not available in Sifang CSC 101 Relays
190	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	Direct trip is not available for 220KV Lines.	A	Yes		As per MSETCL philosophy there is no such provision of DT send in existing 220kV feeders scheme .
191	400kV Deepnagar	MPPTCL	04.03.2024 to 07.03.2024	Duplicate BUSBAR protection may be provided	A	Yes		As per MSETCL philosophy there is no such provision of Duplicate BB Protection relay for existing commissioned schemes
192	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	In Distance Protection relays, Zone-2 reach settings is found 120% instead of 150% for partial D/C lines as per CEA guideline.	A	No		
193	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	In Distance Protection relays, Zone-4 reach set to fixed 5kM (for 400kv lines) and 3 KM (for 220kv lines). Zone 4 reach and timing is not as per CEA guideline, it shall be as per CEA guideline.	A	No		
194	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	In 220kV Volkswagen line 2 is disabled at both ends as that line is short i.e. 2.4 KM. And also, AR is disabled at both the ends. Also other zone timings are reduced as per attached setting file. Zone 2 timing in line is set to 250 mSec due to Busbar	A	No		
195	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	In all 220kv lines instead of two different make distance relays only one distance relay and backup relay are there.	B	No		
196	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	LBB protection re-trip is not configured for the entire substation. Only external back trip LBB protections in service with 0.8 A. It is suggested to reduce the LBB settings.	A	No		
197	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	Second DC source not connected in 220kV & 400kV Busbar Protection Scheme.	A	No		
198	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	LBB timing for entire substation is found higher i.e. 1500 mSec, it is suggested to reduce that timing to 1000 mSec for 220kv lines and 1250 mSec for 400kv lines, for ICT /TR/BC breakers such timing needs to be kept 200 mSec.	A	No		

199	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	It is suggested to keep Auto-Reclose Dead time setting for 220kv line 800mSec instead of 1 Sec.	A	No		
200	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400KV Chakan-Lonikand-1 Line -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	No		
201	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400KV Chakan-Lonikand-1 Line -** TNC switch contact (hard wire) is not used for SOTF initiation.	A	No		
202	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400KV Chakan-Lonikand-1 Line -** IDMT DEF inbuilt function of distance relay is not enabled.	A	No		
203	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400KV Chakan-Talegaon (PGCIL) Line -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	No		
204	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400KV Chakan-Talegaon (PGCIL) Line -** TNC switch contact (hard wire) is not used for SOTF initiation.	A	No		
205	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400KV Chakan-Talegaon (PGCIL) Line -** IDMT DEF inbuilt function of distance relay is not enabled.	A	No		
206	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Volkswagen Line -** Zone-2 time of Main-I & Main-II distance relay is not set as per RK. MSETCL has to revised the same	A	No		
207	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Volkswagen Line -** TNC switch contact (hard wire) is not used for SOTF initiation.	A	No		
208	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Chinchwad-2 Line -** Zone-2 time of Main-I distance relay is not set as per RK. MSETCL has to revised the same	A	No		
209	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Chinchwad-2 Line -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	No		
210	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Chinchwad-2 Line -** TNC switch contact (hard wire) is not used for SOTF initiation.	A	No		
211	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Mahindra Line -** TNC switch contact (hard wire) is not used for SOTF initiation.	A	No		

212	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Bhosari-1 -** Zone-2 time of Main-I distance relay is not set as per RK. MSETCL has to revised the same	A	No		
213	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Bhosari-1 -** It is observed that Reverse zone Z4 Time set to 500 msec instead of Zone-2 time as per RK Committee. MSETCL has to revised the same.	A	No		
214	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Bhosari-1 -** TNC switch contact (hard wire) is not used for SOTF initiation.	A	No		
215	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400/220/33kV, 3*105MVA ICT-1 -** Harmonic restrain feature is not available in back up earth fault relay.	B	No		
216	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400/220/33kV, 3*105MVA ICT-2 -** Harmonic restrain feature is not available in back up earth fault relay.	B	No		
217	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400/220/33kV, 315MVA ICT-3 -** Harmonic restrain feature is not available in back up earth fault relay.	B	No		
218	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220/22kV, 50MVA TF 1** - Harmonic restrain feature is not available in back up earth fault relay.	B	No		
219	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220/22kV, 50MVA TF 2 -** Harmonic restrain feature is not available in back up earth fault relay.	B	No		
220	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220/22kV, 50MVA TF 3 -** Harmonic restrain feature is not available in back up earth fault relay.	B	No		
221	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Volkswagen Line** - CBF (LBB) current level detector is not set to 0.8A	A	No		
222	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Chinchwad-2 Line -** CBF (LBB) current level detector is not set to 0.8A	A	No		
223	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Mahindra Line -** CBF (LBB) current level detector is not set to 0.8A	A	No		
224	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Chakan-Bhosari-1 -** CBF (LBB) current level detector is not set to 0.8A	A	No		

225	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kV Bus Coupler -** CBF (LBB) current level detector is not set to 0.8A	A	No		
226	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220kv TBC -** CBF (LBB) current level detector is not set to 0.8A	A	No		
227	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220/22kV, 50MVA TF 1 -** CBF (LBB) current level detector is not set to 0.8A	A	No		
228	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220/22kV, 50MVA TF 2 -** CBF (LBB) current level detector is not set to 0.8A	A	No		
229	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**220/22kV, 50MVA TF 3 -** CBF (LBB) current level detector is not set to 0.8A	A	No		
230	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400/220/33kV, 3*105MVA ICT-1 -** CBF (LBB) current level detector is not set to 0.8A	A	No		
231	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400/220/33kV, 3*105MVA ICT-2 -** CBF (LBB) current level detector is not set to 0.8A	A	No		
232	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400/220/33kV, 315MVA ICT-3 -** CBF (LBB) current level detector is not set to 0.8A	A	No		
233	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400kV Bus Coupler -** CBF (LBB) current level detector is not set to 0.8A	A	No		
234	400kV Chakan	GETCO	05-02-2024 to 07-02-2024	**400kv TBC -** CBF (LBB) current level detector is not set to 0.8A	A	No		

Name of Utility - MADHYA PRADESH POWER TRANSMISSION CO. LTD .JABALPUR													As on 30-04-24
S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
A	B	C	D	F	G	H	I	J	K	L	M	N	O
1	Bhopal 400	Ashta 400	400		For 400KV, Satpura 1 & 2 Line Main 1 and Main 2 relay are of same Make and Type. (GE – D60)	B				Yes	No	Will replace the relay by other make when available	
2	Bhopal 400	Ashta 400	400		For 400KV, Ujjain 1 & 2 Line has single DC source from battery. Two separate DC to be given to C&R panel from separate battery set.	A	Yes	Yes					Done
3	Bhopal 400	Ashta 400	400		It is recommended to check and correct setting and timing of all zones in main protection as per CBIP guidelines in 400 KV Lines relay.	A	Yes	Yes					Verified OK
4	Bhopal 400	Ashta 400	400		It is recommended to use sensitive IDMT directional E/F relay (either separate relay or built-in function of Main relay) for protection against high resistive earth faults.	A	Yes	Yes					Done in DPR Relay
5	Bhopal 400	Ashta 400	400		It is recommended check line current, Voltage and Load angle for Load encroachment blinder setting	A	Yes	Yes		No			
6	Bhopal 400	Ashta 400	400	26.12.2023 to 30.12.2023	GPS Time is not synchronising with 400 KV Ujjain Line 1 & 2	A	Yes	No	In process	No			In process
7	Bhopal 400	Ashta 400	400		For 400/220 KV Transformer-3 has single DC source from battery. Two separate DC needs to be given to C&R panel from separate battery set.	B	-	-	-	Yes	Yes		
8	Bhopal 400	Ashta 400	400		OC & EF relays provided as back-up protection of Transformer 1 & 2 are of static type. It should be numerical type with Harmonic restrain feature.	A	Yes	Yes		No			Done in Differential relay
9	Bhopal 400	Ashta 400	400		400/220 KV 315 MVA ICT 3, HV side OC& EF relay found faulty and out of service.	B				Yes	Yes		
10	Bhopal 400	Ashta 400	400		1) 96 TRIP relay should be taken for initiation of LBB.	A	Yes	NO					Available in Bus Bar protection relay
11	Bhopal 400	Ashta 400	400		2) Current level detector setting of LBB to be check and revised as per guidelines.	A	Yes	Yes					
12	Bhopal 400	Ashta 400	400		3) Retrip function to be take in service for tripping of own CB afterb100msec delay.	A	Yes	No	Work in progress				Work in progress
13	Bhopal 400	Ashta 400	400		4) Single phase trip relay initiation for lines is not taken for LBB initiation.	A	Yes	Yes					
14	Bhopal 400	Ashta 400	400		5) DT send is not in wired up for 400kV Ujjain ckt-1 &2.	A	Yes	Yes					

S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
15	Bhopal 400	Ashta 400	220	: 26.12.2023 TO 30.12.2023.	220KV Shajapur 1 & 2, Jetpura 1 & 2, 220KV Mungliya Chhap and 220 KV Bairagarh Lines are connected to single DC source from battery. Two separate DC to be given to C&R panel from separate battery set.	B				Yes	No	In process	02 No. DCDB Required
16	Bhopal 400	Ashta 400	220		It is recommended to check and correct setting and timing of all zones in main protection as per CBIP guidelines in 220 KV Lines relay.	A	Yes	Yes					Done
17	Bhopal 400	Ashta 400	220	: 26.12.2023 TO 30.12.2023.	Revise the CB Dead time and Reclaim time setting in 220KV lines as per guidelines.	A	Yes	Yes					Done
18	Bhopal 400	Ashta 400	220		SOTF is disable for 220kV Jetpura-1 feeder.	A	Yes	Yes					Done
19	Bhopal 400	Ashta 400	220		It is recommended check line current , Voltage and Load angle for Load encroachment blinder setting	A	Yes	Yes					Done
20	Bhopal 400	Ashta 400	220		REF protection for 100 MVA 220/33 KV Transformer was not in service.	A	Yes	Yes					Done
21	Bhopal 400	Ashta 400	220		OC & EF relays provided as back-up protection of 220/132 KV 160 MVA TF 1 & 2 and 220/33 KV 100 MVA Transformer are of static type. It should be numerical type with Harmonic restrain feature	B				Yes	Yes		Done in Differential relay
22	Bhopal 400	Ashta 400	220		GPS Time is not synchronising with 220/33kV 50 MVA TF	A	Yes	No	In Process				In Process
23	Bhopal 400	Ashta 400	220		1) 96 TRIP relay should be taken for initiation of LBB.	A	Yes	NO					Available in Bus Bar protection relay
24	Bhopal 400	Ashta 400	220		2) Current level detector setting for LBB to be check and revised as per guidelines.	A	Yes	Yes					
25	Bhopal 400	Ashta 400	220		3) Retrip function to be take in service for tripping of own CB afterb100msec delay.	A	Yes	No	Work in progress				Work in progress
26	Bhopal 400	Ashta 400	220		4) Single phase trip relay initiation for lines is not taken for LBB.	A	Yes	Yes					
27	Bhopal 400	Ashta 400	220		5) CT supervision setting is disable in Busbar relay.	A	Yes	Yes					
28	Bhopal 400	Ashta 400	220		6) 220/132kV ICTs and 220/33kV T/Fs LV tripping is not wired up on BB tripping.	A	Yes	Yes					
29	Bhopal 400	Ashta 400	132		It is recommended to check and correct setting and timing of all zones in main protection as per CBIP guidelines in 220 KV Lines relay.	A	Yes	Yes	-	-	-	-	Will be adopted as per guidelines
30	Bhopal 400	Ashta 400	132		SOTF is disable for 132kV Ichawar-2 feeder.	A	Yes	Yes	-	-	-	-	In Process
31	Bhopal 400	Bhopal 400	400	10 Feb 2024 To 13 Feb 2024.	a) For 400KV Panels (New panels commissioned in 2023 i.e. Itarsi 2 & Bina 1), LBB initiation is taken from Main I to Main II Protection and vice versa, needs to be reviewed as per RKC and CBIP guidelines.	A	No	Yes					

S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
32	Bhopal 400	Bhopal 400	400		b) 220KV LBB initiation is taken in 220KV Busbar for LBB operation as common input for single Phase and three Phase trip. It needs to be provided individually for single phase and three phase.	A	Yes	Yes					
33	Bhopal 400	Bhopal 400	400		c) LBB re-trip function is not used for 400KV and 220KV LBB Protection.	A	Yes	Yes	Logic is to be modified accordingly. Will be done by May 2024.				In process
34	Bhopal 400	Bhopal 400	400		(3) Zone 3 distance reach setting for most of 400KV and all 220KV lines is not adopted as per RKC guidelines needs revision.	A	Yes	Yes					
35	Bhopal 400	Bhopal 400	400	10 Feb 2024 To 13 Feb 2024.	(4) Resistive reach for Ground fault element and Phase fault element for all 400 KV and 220 KV lines is not adopted as per RKC and CBIP guidelines needs revision.	A	Yes	Yes					
36	Bhopal 400	Bhopal 400	400		(5) Load encroachment settings for all lines should be reviewed.	A	Yes	Yes					
37	Bhopal 400	Bhopal 400	400		(6) Auto-reclose for 400 KV TIE bays not in auto mode due care to be taken.	A	Yes	No					To be reviewd
38	Bhopal 400	Bhopal 400	400		(8) Over current and Earth Protection settings adopted for ICT's is observed not in co-ordination with Distance Protection operation time of lines.	A	Yes	Yes					
39	Bhopal 400	Bhopal 400	400		(9) 220KV Lines Over current and Earth Protection settings needs revision as per latest Bus fault level.	A	Yes	Yes					
40	Bhopal 400	Bhopal 400	400		(11) For 400 KV ITARSI -I line Power Swing block feature is in service for Main 2 Distance Protection relay but not in service for Main 1 Distance Protection relay.	A	Yes	Yes					
41	Bhopal 400	Bhopal 400	400	10 Feb 2024 To 13 Feb 2024.	(12) The Differential Pick up setting of 220 KV Bus bar Protection is 0.1pu. Calculations seems to be with old bus fault level. To be revised with latest Bus fault level and as per RKC and CBIP guidelines.	A	Yes	Yes					
42	Bhopal 400	Bhopal 400	400		(13) Its seems that number of earth Pits are insufficient for providing healthy earthing same needs to be reviewed.	A	Yes	Yes	It is reviewed and earth pits are sufficient.				
43	Bhopal 400	Bhopal 400	400		(14) DC supervision is provided only for Main DC Source 1 and 2. DC Supervision to be provided for all DC subcircuit i.e. Protection and Control Circuit.	A	Yes	Yes					
44	Bhopal 400	Bhopal 400	400		(15) DR channels and DR trigger signals for all Protection relays are not set as per RKC and CBIP guidelines.	A	Yes	Yes					
45	Bhopal 400	Bhopal 400	400		(16) Testing frequency of switchgear needs to be reviewed.	A	Yes	Yes					

S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
46	Indore	Indore 400	400	04.03.2024 to 06.03.2024	All Distance Relay Reach setting for Zone-2 and Zone-3 should be as per CEA/ Ram Krishna Committee guideline.	A	Yes	Yes					Zone-2 and Zone-3 setting revised as per CEA/ Ram Krishna Committee guideline.
47	Indore	Indore 400	400		Over Voltage Stage-2 recommended to 150% with time delay of 100ms	A	Yes	No	At present settings are adopted vide letter no. CE (T&C) JBP L. No. 040 / 1766 / 22.07.2000. Over Voltage Stage-2 130% with time delay of 0.0 sec also mailed to LD Jabalpur for providing revised setting if required.				Over Voltage stage 2 setting will be provided in Existing Numerical DPR
48	Indore	Indore 400	400	04.03.2024 to 06.03.2024	Electromagnetic & Static should be replaced by Numerical Relay	B				Yes	Yes	Relay will be replaced after 3 no. 3 ph. O/C & E/F Directional relay Recived	O/C & E/F feature enabled in existing Numerical DPR/Diff.
49	Indore	Indore 400	400		Breaker failure protection (LBB) recommended that is in 2 steps. First stage is the re-trip of the own CB and second stage is the trip the all associated CB's	A	Yes	Yes		No			At Indore 400 KV Substation existing LBB setting adopted as per guideline.
50	Indore	Indore 400	400		The O/C, E/F Back Up protection with Direction feature are recommended for both HV and IV side of all ICTs.	B				yes	YES	Relay will be replaced after 3 no. 3 ph. O/C & E/F Directional relay Recived	Directional O/C & E/F feature enabled in existing Numerical Diff. Relay
51	Indore	Indore 400	400		The Required Time of Operation (ROT) is kept as coordinated with 220kV Line B/U O/C protection for the fault current contribution by the ICT for fault at 220kV Bus	A	Yes	Yes					Presently at Indore 400 KV Substation 220kV Line B/U O/C protection are cordinated with 220 KV Incoming for the fault current contribution by the ICT and no any mal oeration occurred at Substation till date.
52	Indore	Indore 400	400		For 220kV Line power swing block is not available.	A	Yes	Yes		No			For 220kV Line power swing block has been taken in service.
53	Indore	Indore 400	400		E/F feature in r/o 400kV ISP- 1, 400kV ISP-2 and 400KV Nagda in Distance relay have IDMT characteristic instead of Definite Time characteristic	A	Yes	Yes					DMT protection is not recommended on 400 kV Lines
54	Indore	Indore 400	400		220KV ICT-I Rph TCSR of TC-II is faulty	B				Yes	Yes		1 no.TCSR relay Replaced
55	Indore	Indore 400	400		220KV ICT-III TCSR for TC-II are not provided	B				Yes	No		400 KV ICT-III C&R panel will be replaced shortly and after replacement of this panel old panel TCSR relay will be utilized in 220 KV side of ICT-III.
56	Khandwa 400	Chhegaon 400	400	19.02.2024 to 20.02.2024	1) For 400 KV Malwa & Julwaniya Line Main 1 and Main 2 relay are of same Make & Type (D60)	B				Yes	No	Will replace the relay by other make when available	

S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
57	Khandwa 400	Chhegaon 400	400		2) It is recommended to check & correct all the zone setting and timing of all zones in main protection as per Annexure 3.2 (forment A) guidlines in 400 KV lines relay	A	Yes	Yes					
58	Khandwa 400	Chhegaon 400	400		3) It is recommended to use sensitive IDMT directional E/F relay) for protection against high resistive earth faults.	A	Yes	Yes					
59	Khandwa 400	Chhegaon 400	400		4) It is recommended to are check line current, Voltage and Load angle for Load encroachment blinder setting.	A	Yes	Yes					
60	Khandwa 400	Chhegaon 400	400		5) OC & EF relays are provided for back-up protection of 400/220KV, 315 MVA ICT 1 is not numerical type. it should be of numerical design with Harmonic restrain feature is not services.	A	Yes	Yes					Inbuilt feature of diffrencial relay is used
61	Khandwa 400	Chhegaon 400	400		6) In 400/220 KV ,315 MVA ICT 1 & 2 Harmonic restrain feature is not in services.	A	Yes	Yes					Inbuilt feature of diffrencial relay is used
62	Khandwa 400	Chhegaon 400	400		7) Busbar trip realy (96 Trip realy initiation is not considered for LLB protection.	A	Yes	NO					AVAILABLE IN BB RELAY
63	Khandwa 400	Chhegaon 400	400	19.02.2024 to 20.02.2024	8) Retrip function to be take in service to own trip CB after 100 msec. delay.	A	Yes	NO					Work Under Process
64	Khandwa 400	Chhegaon 400	400		9) Single phase trip relay initiation is not taken for LBB protection of lines	A	Yes	Yes					
65	Khandwa 400	Chhegaon 400	220		1) it is recommended to check and correct setting and timing for all zones in main proctection as per as per guidlines in Annexure 3.2 (formet A) in 220 KV line relay	A	Yes	Yes					
66	Khandwa 400	Chhegaon 400	220		2) Revise the dead time and reclaim time setting for AR in 220 KV line distance relayas per guidline in Annexere 3.2 (formet A).	A	Yes	Yes					
67	Khandwa 400	Chhegaon 400	220		3) PSB blocking feature is not in service except of all 220 KV lines except 220 KV Omkareshvar line.	A	Yes	Yes					
68	Khandwa 400	Chhegaon 400	220		4) it is recommended check line current, Voltage and Load angle for Load encroachment blinder setting.	A	Yes	Yes					
69	Khandwa 400	Chhegaon 400	220		5) OC EF relays provided for back-up protection of 220 KV Nepanagar line is of Non- Numerical type.	A	Yes	Yes					Inbuilt feature of DPR relay is used
70	Khandwa 400	Chhegaon 400	220		6) OC & EF realays provided for back protection of 220/132 KV, 160 MVA ICT 1 & 2 are of Non.-numerical type.	A	Yes	Yes					Inbuilt feature of diffrencial relay is used
71	Khandwa 400	Chhegaon 400	220		7) In 220/132 KV, 160 MVA ICT 1,2 & 3 Harmonic resrain feature in not in service.	A	Yes	Yes					

S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
72	Khandwa 400	Chhegaon 400	220		7) Busbar trip realy (96 Trip realy initiation is not considered for LLB protection.	A	Yes	NO					
73	Khandwa 400	Chhegaon 400	220		8) Retrip function to be take in service to own trip CB after 100 msec. delay.	A	Yes	NO					Work Under Process
74	Khandwa 400	Chhegaon 400	220		9) Single phase trip relay initiation is not taken for LBB protection of lines	A	Yes	Yes					
75	Khandwa 400	Chhegaon 400	132		1) Single DC source wired up for All 132 KV C&R panel.	A	Yes	Yes	-	-	-	-	
76	Khandwa 400	Chhegaon 400	132		2) it is recommended to check & correct zone setting and timing of all zones in main protection as per guidlines in Annexure 3.2 (formet A) for 132 KV Lines.	A	Yes	Yes	-	-	-	-	
77	Khandwa 400	Chhegaon 400	132		3) It is recommended check line currunt, Voltage and Load angle do Load encroacgment blinder setting.	A	Yes	Yes	-	-	-	-	
78	Khandwa 400	Chhegaon 400	132	19.02.2024 to 20.02.2024	5) PSB setting needs to be revised as per guidelines.	A	Yes	Yes	-	-	-	-	
79	Nagda	Badnawar 400			Load enchroacement settings should be adopted for all 400KV & 220KV lines.	A	Yes	Yes	-	-	-	-	-
80	Nagda	Badnawar 400			All Distance Relay Reach settings for Zone-2 and Zone-3 should be as per CEA/Ram Krishna Committee guideline.	A	Yes	Yes	-	-	-	-	-
81	Nagda	Badnawar 400			In 400KV distance relay for PSB all zones-I should be unblocked.	A	Yes	Yes	-	-	-	-	-
82	Nagda	Badnawar 400		22.01.2024 to 26.01.2024	220KV Barnagar Ckt-I & Ckt-II Distance relay impedance are not as per Calcutation.	A	Yes	Yes	-	-	-	-	-
83	Nagda	Badnawar 400			Back up relays time gradutaion should be as per fault level for lines and ICT.	A	Yes	Yes	-	-	-	-	-
84	Nagda	Badnawar 400			For ICT HV&LV Backup TMS should be revised as existing settings seems to be on higher side. (Existing TMS is 0.34 & 0.4)	A	Yes	Yes	-	-	-	-	-
85	Nagda	Badnawar 400			Auto DR dwonloding facility should be available for all numerical relays.	B	-	-	-	Yes	No	-	-
Audit Points which may be dropped													
1	Bhopal 400	Bhopal 400	400		(1) Stand-alone LBB Protection is not Provided for most of 400 KV bays and all 220 KV bays, LBB Protection from Main Protection for 400 KV and from Busbar Protection for 220 KV is used.	B	Yes	Yes					Not Mandatory
2	Bhopal 400	Bhopal 400	400		(2) Stand-alone Overvoltage Protection is not provided for all 400kV lines except 400 KV Itarsi -I, also the setting provided are not as per RKC and CBIP guidelines needs revision.	B	Yes	Yes					Not Mandatory

S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
3	Bhopal 400	Bhopal 400	400		(7) Over fluxing Protection is used from differential relay inbuilt function so for same Protection stand - alone relay should be used. Tripping is incorporated with this Protection same need to be reviewed as per RKC and CBIP guidelines.	B	Yes	Yes					Inbuilt feature of both the Differential relay used for Over flux Protection.
4	Bhopal 400	Bhopal 400	400		(10) Restricted earth fault Protection for ICT 3 and 4 is used from main Differential Protection. Same needs to be used from stand-alone REF Protection relay.	B	Yes	Yes					Not Mandatory
5	Nagda	Badnawar 400			LBB protection is incroprated in Busbar Protection reiay & no separate LBB relay for 400KV & 220KV Lines & ICT is provided. It is suggested to provide standlone LBB relay for all bays.	B	-	-	-	Yes	No	-	
6	Nagda	Badnawar 400			In ICT HV Backup relay only Phase TOC protection is in service. It is suggested to enable E/F TOC protection. Also HV & LV B/U protection should be directional as existing protection are non directional.	A	Yes	No	-	-	-	-	-
7	Nagda	Badnawar 400			Setting document for all relays should be available at Station & it should contain all settings for all functions that are used/enabled and indicate the function disbaled. Settings should be verified as per setting document.	A	Yes	Yes	-	-	-	-	-
8	Nagda	Badnawar 400			Relay testing should be carried out for all bays for all features and record should be maintained in register. Feeder relay testing is not carried out since commissioning.	A	Yes	No	-	-	-	-	
9	Nagda	Badnawar 400			Dedicated set of Relay Test kit Diognostic Test Kit (Tan Delta, CB timing and CRM)	B		-	-	Yes	No	-	-
10	Bhopal 400	Ashta 400	132		All 132kV Lines CR panel are connected with single DC source from battery. Two separate DC to be given to C&R panel from separate battery set.	B	-	-	-	Yes	No	-	DCDB Required 1No
11	Bhopal 400	Ashta 400	132		It is recommended check line current , Voltage and Load angle for Load encroachment blinder setting	A	Yes	No	-	-	-	-	Will be adopted as per guidelines
12	Bhopal 400	Ashta 400	132		Carrier Aided Protection is disable in all line distance relay.	A	Yes	No	-	-	-	-	Will be adopted as per guidelines
13	Bhopal 400	Ashta 400	132		Correct the setting of PSB as per guidelines.	A	Yes	No	-	-	-	-	Will be adopted as per guidelines
14	Bhopal 400	Ashta 400	132		Auto reclose for 132 KV lines was found disable. It could be taken in service for decreasing line breakdown time.	A	Yes	No	-	-	-	-	Will be adopted as per guidelines

S. No.	Name of Circle	Name of Sub-Station identified for Protection Audit	Voltage (in kV)	Date of which Audit Conducted	Observation of Protection Audit	Category	Deficiencies that can be corrected without			Deficiencies involving procurement (Category-B)			Remarks
							Yes/ No	Whether attended (Yes/No)	If not attended, reason	Yes/ No	Whether attended (Yes/No)	If not, expected date to attend	
15	Khandwa 400	Chhegaon 400	400		1) For 400 KV Malwa & Julwaniya Line Main 1 and Main 2 relay are of same Make & Type (D60)	B							
16	Khandwa 400	Chhegaon 400	132		4) Carrier Aided Protection found disable for all 132 KV line distance realy.	B	-	-	-	Yes	No	-	
17	Khandwa 400	Chhegaon 400	132		6) Auto reclose function for 132 KV lines found disable, is could be taken in services to improve availability of lines	A	Yes	No	-	-	-	-	Will be implimented after Approvel form Higher official
18	Indore	Indore 400	400		Fire Extinguisher quantities are not sufficient	B				No	No		Available as per the norms

Annexure 5.2

Utility: CSPTCL					
S.NO	**Substation name**	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
1	**400/220kV switchyard of ABVTPS, CSPGCL, Marwa**	1) Main 1 and Main 2 protection of lines- Main 1 and main 2 protection relays are of same make and type for all 400 kV and 220 kV lines (GE-D-60)	B		
		2) In addition to Main 1 and Main 2 distance protection relays in 400 kV lines feeders, it is recommended to use Directional Earth fault relay protection (Built in function of main relay or separate relay)	A		
		3) Percentage Differential Protection- It is recommended to use two separate differential protection relay with separate DC source for ICTs	A		
		4) It is recommended to review Percentage Differential relay settings along with second and fifth harmonic blocking settings of 400/220 kV ICT as the slope 2 setting of the differential protection relay seems higher side	A		
		5) Transformer body protection (Buchholz, PRV, OSR) relays not covered properly to avoid ingress of moisture, it may cause mal-operation of the relay.	A		
		6) Over Voltage protection- Only one stage of over voltage protection available in Main 1 and Main 2 distance relay with same settings, it is recommended to adopt 2 stages over voltage protection for lines.	A		
		7) OLTC oil sample not tested, it is recommended to test the oil sample annualy to ensure the healthiness of oil	A		

Utility:GSECL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
440/220 KV switch yard of Ukai GSECL	1. On review of earth resistance records it is found comparatively higher & uneven. As per physical inspection Strata of yard soil observed hard muram ,hence additional pile earthing may be provided in both switch yards. Existing very old earth pits having single pipe/ rod may be renovated and standardized. Also existing risers for equipment earthing may be renovated by standard sized with double MS flats. UTPS has published the tender for construction of new earth pit in place of high resistance value/ damaged pit.	B		
	2) Existing 220 volt HBL knife battery set was commissioned in 2011 , specific gravity of some cells are comparatively low & it served more than 12 years and complete battery set may be replaced. UTPS has carried out both battery load test during last AOH i.e.Dec-2023 & found capacity more than 85%. However, UTPS has planning to replace BATTERY set 1 &2 in phase manner. Also, HBL has recommended to battery minimum life of cell is 20 Year.	B		
	3) Differential pickup setting in GT6 found 0.40IB and corrected to normal setting is 0.2018	A		
	4) Main -1 and main -2 protections relays are same make for all 400KV lines as per guideline it should be different make. UTPS has adopted both relays setting on different characteristic i.e. polygon & Quadrilateral.	B		
	5) Old hydraulic & pneumatic breakers may be replaced with latest breakers. In 220Kv & 400Kv UTPS has planned for total 10 Nos. Old /absolute designed circuit breaker replacement which is already proposed in PSDF scheme	B		
	6) In both switch yards & around ICTs ST#2, 3 & GT#3 to 5 metalling are not provided. UTPS is already initiated providing of same in 220KV Switch yard.	A		
	7. Water leakages found from the emulsifier valves it should be attended, foam type fire extinguisher and sand bucket are to be provided in both switch yards.	A		
	8. Line differential protection in short distance 220 KV Tie lines may be proposed.	B		
	9. Oil leakages observed in GT4 (LV terret) & ST2 (top plate and LV cable box) may be rectified . ST #2 complete over hauling & GT#4 LV turret leakage attending work tender published on web. Same will be attended by UTPS.	A		
	10. Battery maintenance is being done monthly basis and it should be weakly, also pilot cell measurement not is practice it should be on daily basis to ensure healthiness of DC system. Switch yard operation staff check the charger & battery cell voltage. However, UTPS will adopt the practice of measurement of pilot cell voltage.	A		
	11. Over voltage protection stage-1&2 setting should be incorporated in all 220KV feeders. Presently GETCO has not issues any guidelines for providing Over voltage protection in 220KV lines in Gujarat.	A		
	12. Direct trip should be enable in 220 kV feeders (hydro tie 1&2 and Virpore 1&2). DT trip protection implementation in 220kV Lines are under progress at UTPS & GETCO ends.	A		
	13. Zone-4 timing in main 2 relay in 220 kV feeders arhhaliya-1 and mota-1&2 found 200 ms while setting in main 1 was 450ms. Corrected by UTPS	A		
	14. OLTC oil samples not tested, it is recommended to test the oil samples annually. In GT#3, GT#5, GT#6,R,Y,B,ST#4 & 5, UAT#6A/B, UAT#3B transformer oil filtration recently carried out during last AOH of units. In on load tap changer OLTC oil filtration also carried out & UAT #3B, ST#4 & 5 OLTC oil replaced with new one. However, UTPS will adopt the practice of OLTC oil testing for BDV & PPM.	A		

Utility:CSPTCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
400 KV Bhilai Sub-Station	1) 1. Line reactor of 400kV Bhadrawti and 400kV Koradi line found heavy oil leakage.	A		
	2) Heavy oil leakage observed in 400/220KV ICT-2.	A		
	3) Dedicated water source for switch yard earthing is not available, needs to be provided.	A		
	4) Vermin and proofing is required in 400kV and 220kV RP/CP.	A		
	5) 400kV Madwa line LBB relay display found faulty.	B		
	6) 400kV Madwa line reactor REF relay display found faulty.	B		
	7) 220kV Bemetara line OCEF relay display is faulty.	B		
	8. Phase identification is not proper in 400kV and 220kV switch yard.	A		
	9. Over voltage relay are of static type needs to be replaced by numerical relay of 400KV PGCIL line.	B		
	10. 400/220kV ICT-3 , differential relay key pad is faulty.	B		

Utility: MPPTCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
	B. For 400 kV Line Protection			
	1) Manufacturers recommendation for the selection of resistive reach of ground and phase faults needs to be adopted. (i.e Arc resistance & tower footing resistance)	A		
	2) LBB protection is inbuilt in Busbar protection relay ABB REB 670; hence standalone LBB protection scheme shall be provided for 400 kV bays.	B		
	3) Independent LBB protection is required with a. Separate CT core to be used. b. Phase segregated & 3 phase LBB protection relay scheme shall be provided. c. Trip fuse isolation links for LBB initiation, LBB trip, 96 trip and After 96 for TC 1 and TC 2 to be used. d. Contacts of 186R, 186Y, 186B, 286R, 286Y, 286B, 3 phase 186, 286 and 96 to be taken for LBB initiation. e. LBB re-trip should be adopted as 100 ms and LBB trip as 200 ms.	B		
	4) Presently the 400kv Busbar protection is fail hence both Busbar & LBB protection is out of service. It is recommended to repair the 400 kV Busbar protection relay on top priority.	A		
	5) The DC supply of LBB trip circuit & Busbar protection relays shall be independent.	A		
	6) ABT / AMR / MFM at interface location needs to be calibrated once in 03 year.	A		
	7) The isolator and CB contacts shall be wired up from to isolator / CB CMR in the control panel. Contacts to be wired up for mimic diagram indication, Busbar inputs, Main relay inputs, closing circuit interlocks and LBB hardwired logic.	A		
	8) For auto recloser scheme at 400 kV line, dead time of own and TBC CB shall be 1 sec & the timing of CB PDR shall be 1.5 sec for Own & TBC CB for line bay.	A		
	9) Over-voltage time settings to be kept uniform as per Ramakrishna Committee guidelines. a. Low set stage (Stage-I) may be set in the range of 110% - 112% (typically 110%) with a time delay of 5 seconds. High set stage (Stage-II) may be set in the range 140% - 150% with a time delay of 100 milliseconds. b. For over voltage Stage-I protection, a time grading of 1 to 3 seconds may be provided between over-voltage relays of double circuit lines. Grading on over-voltage tripping for various lines emanating from a station may be considered and same can be achieved using voltage as well as time grading. Longest timed delay should be checked with expected operating time of Over-fluxing relay of the transformer to ensure disconnection of line before tripping of transformer.	A		
	10) For all 400 kV lines, both Main 1 and Main 2 relays are of same make. The Main 1 & Main 2 distance protection relays shall be of different make so that all kind of line faults can be isolated & can not be remain unprotected due limitation of relay algorithm.	B		
	11) For 400 kV Birsinghpur line 1 the trip circuit supervision relays and CB supervision relays (Gas , Air/ Spring Charge) are included in distance protection relay. Same to be segregated and separate relays to be provided for Trip circuit supervision of TC1 and TC2.	A		
	12) For Generation 400 kV Birsinghpur 1 & 2 lines, the No volt relay for dead line charging shall be provided for synchronization at Birsinghpur end. For AR scheme also the AR scheme functionality & adaptation shall be reviewed in view of generation line & to avoid hunting on generator due to frequent AR trails on faulted line.	B		
	13) 400 kV Birsingpur 1 & 2 line settings have been retrieved as a sample. Some observations regarding this are a. Manufacturers recommendation to be ascertained regarding the values of resistive reaches (Arc & tower footing resistance for phase and ground fault) for detecting high resistive fault & to avoid the overreaching of distance relay. b. Zone 4 (reverse) reach is to be kept as 10% of reverse shortest line or 2 KM which is minimum. According to Ramakrishna Committee, Zone 4 timing is suggested as equivalent to Zone 2 timing. c. Proper logic for SOTF initiation both for Main and TBC Bay CB to be implemented. When the bay is on TBC then SOTF CB close input is to be wired up to distance protection relay of line which is on TBC. d. Implementation of zone 4 as backup to busbar to be reviewed with concerned authorities if possible. e. The use of own protection relay & tripping to TBC CB in case of transfer position may be explore instead of using separate setting group in TBC RP. f. The load encroachment setting can be disable if zone reach settings are less than load encroachment region as per Ramakrishna Committee.	A		
	14. The settings of 400/ 220 kV, 315 MVA ICT 1 checked. Following are the observations a. Overload Plug setting (Stage 1 and stage 2) and timing are not in order. The same needs to be reviewed and revised with higher authorities. b. HV & IV backup relay is Non-directional. Directional numerical relays shall be provided. c. Relay Operating Timing (ROT) to be calculated from actual fault level. Backup relay coordination to be carried out accordingly. d. The differential relay GE T60; slope breakup points setting needs to be reviewed in order to avoid unwanted tripping of differential relay during CT saturation.	A		
	15) All ICTs internal fault alarm & trip signals needs to be wired up as Binary inputs to differential / backup relays so that in case of any alarm / trip the DR can be easily fetch so that exact analysis of fault can be done for ease of decision making.	A		

Katni substation	16) The carrier send Main -1 own & parallel, Main -2 own & parallel send shall be send from distance relay from relay panel instead of duplicating at PLCC panel. The carrier received command shall be also separate.	A		
	17) The PLCC counter shall be provided on PLCC panel.The PLCC counter reading shall be taken daily & after tripping in PLCC counter register.	A		
	18) In case of operation of 400 kV line reactor LBB operation the DT command shall be send to remote end.	A		
	19) The standalone distance & REF / differential relay shall be provided for 400 kV Bus reactor.	B		
	20) The impedance relay reach setting of 400 kV reactor shall cover at least 90 % of reactor winding; accordingly the same needs to be reviewed.	A		
	21) In ABB make distance protection relays the 3 phase VT fuse fail shall be enable & confirmed.	A		
	22) The Air Conditioner (AC) shall be provided to Relay room in order to avoid frequent failure of protection relays due to high temp. The room temperature shall be maintain between 22 deg to 25 deg.	A		
	23) The relay room shall be clean & cable duct / trench shall be clean & properly closed.	A		
	24) The panel vermin proofing shall be done for RP / CTMB/isolator MB/FCCB.	A		
	25) The WTI , OTI, TPI repeater on the RTCC panel shall be replaced by new one & taken into service.	B		
	26) The WTI, OTI meters in the yard FCCB needs to be checked for correct measurement of temperature.	A		
	27) The FAN ON / OFF shall be in auto mode operation in case of temperature rise.	A		
	28) The CTMB shall be of proper size & CTMB shall be installed at safe distance away from CT structure.	A		
	29) The 25 mm metal spreading shall be done in 400 kV , 220 kV , 132 kV & 33 kV yard.	B		
	30) The grass cutting & weed control shall be done regularly in the 400 kV , 220 kV , 132 kV & 33 kV yard.	A		
	31) The sufficient substation yard lightening shall be provided in the substation.	A		
	32) All motorised isolator shall be operated electrically from remote end control room or from safe distance for safety point of view.	A		
	33) There should be isolator interlocks in Circuit breaker closing and vice versa. This will ensure safety of operating person.	B		
	34) The control cables, AC cables, DC cables shall be properly laid through provided cable trench in the yard, control room, DCDB, ACDB room.	A		
	B. For 400 kV & 220 kV Busbar protections —			
	1. Presently both the Busbar protection relays are out of service needs to be taken into service immediately. (For 400 kV ABB make REB 670 & for 220 kV Sifang make (CSC 150).	B		
	2) Busbar differential pickup to be kept as 120% of highest loaded line / bay connected to bus to avoid operation of busbar in case of loss of CT inputs to busbar.	A		
	3) CT supervision / CT fail pickup to be kept ON so as to detect the absence of minimum loaded feeder CT abnormalities. The setting shall be lightly loaded line load current. Along with Busbar block in case of any abnormality in CT Ckt.	A		
	4) The isolator discrepancy & blocking thereof may be adopted for busbar relay selective operation.	A		
	5) Periodic online testing of busbar protection scheme ensures proper system check of such important protections. This needs to be reviewed with higher authorities.	A		
	C. For LBB protection -			
	1. LBB protection presently in life in Busbar protection itself. Separate LBB protection apart from Busbar is required along with dedicated LBB trip bus & scheme.	B		
	2. There should be hardwired trip buses for selective tripping according to bus zones.	B		
	3. This will ensure that LBB will be in service even in case of busbar relay failure / out of service & vice versa.			
	4. LBB re-trip with 100ms to trip own CB to be incorporated in LBB relay.	A		
	5. LBB pickup settings to be reviewed in accordance with Ramakrishna Committee. The LBB current detection setting shall be 80 % of line CTR to avoid mal operation & it will cover TF low incipient fault also in case of TF/ ICT CB lockout.	A		
	D. For 220 kV & 132 kV Lines: -			
	1. The line differential protection relays shall be provided to 220 kV TRAC-1 & TRAC -2 lines being line length is less than 2 KM. Accordingly the OPGW / ADSS cable shall be laid for selective tripping of line in case of line fault.	B		
	2. The carrier aided protection scheme shall be provided for 220 kV Satana line. The carrier aided protection scheme shall be taken into service immediately.	A		
	3. The phase to phase coupling PLCC coupling shall be taken into service for 220 kV Damoh line & 220 kV Maihar line.	A		
	4. The Zone-2 timing of distance protection relays shall be reviewed / coordinated in case the remote ss bus adjacent line is short line and the reaches of Zone 2 are overlapped.	A		
	5. The reaches of Zone -3 need to be reviewed as 120 % of (100 % of PL + 100 % of adjacent LL).	A		
	6. In case the zone 3 reach crosses the remote bus ICT / TF next voltage level bus; the distance relay zone -3 time coordination needs to be reviewed / done with remote end TF / ICT HV & LV backup protection relays for selective tripping.	A		

	7. The 220 kV TBC protection & tripping philosophy needs to be reviewed in view of protection tripping, PT selection, LBB protection etc. Avoid the protection setting switching during TBC operation for simplicity of protection scheme.	A		
	E. Common Points: -			
	1. The 220 kV Bus - 1 CVT needs to be reviewed for replacement with Bus PT (IVT).	A		
	2. The PT selection & change over relays on isolator status shall be provided for protection &metering.	A		
	3. Permissive Over Reach (POR) to be adopted for short lines for selective & reliable distance protection operation.	A		
	4. Being an old substation, CTMBs in yard are too older one. Some CTMB is already replaced & the remaining CTMB to be replaced with suitable earthing arrangements & vermin proofing.	B		
	5. The Pole Discrepancy Timer for ICTs and reactor needs to be corrected to 100 ms.	A		
	6. All backup protection relays proper time gradation to be ensured as per latest Fault levels.	A		
	7. There are too many Electromechanical relays on the existing panels. Numerical relays will be the only solution for this. In fact being older panels; it will be difficult to maintain and trouble shoot the scheme. As per Ramakrishna committee guideline modification in existing old panel is very much difficult. Hence it is recommended to replace old panels with new numerical relay panel. This needs to be reviewed with higher authorities. Available new 220kv Line/ Transformer panels to be expeditiously retrofitted incorporating all requirements of Ramakrishna Committee.	B		
	8. At some places, 2 protections scheme are clubbed altogether in one relay . Same needs to be worked out and separate / standalone relays to be kept for different dedicated protections.	B		
	9. The periodic relay testing shall be carried out.	A		
	10. In the yard needs weed control / grass cutting needs to be done regularly. The mango tree is in the yard. The presence of foreign object in the yard may leads to bus fault & very hazardous for operational personnel.	A		
	11. The oil level in the breather cup needs to be check regularly & to be filled with oil upto given oil level of breather.	A		
	12. The healthiness of balloon in the conservator tank of ICT/ TF needs to be ensured.	A		
	13. The gasket of CTMB , isolator MB to be replaced to avoid water ingress in yard MB.	B		
	14. The cement / tar road shall be maintain in 132 kV & 33 kV yard for ease of operation & to avoid dust & dirt on the electrical equipment.	A		
	15. PLCC counter needs to be recorded once in a shift / day & after fault on line.	A		
	16. Centre zero DC voltmeter / DC leakage meter is not available on charger . Same to be provided on charger as well as in control room.	B		
	17. The substation 220 V DC both sources DC leakage shall be attended.	A		
	18. Battery capacity test for ascertaining healthiness of individual battery cells can be done. This needs to be reviewed with higher authorities.	A		
	19. The DC lighting shall be provided in the control room & near ICT & TM MB.	A		
	20. The Ammeter, Voltmeter on the charger which is not working shall be replaced immediately.	B		
	21. The battery room shall be closed & prevented from entering sun light in the battery room.	A		
	22. The battery room shall have black oil paint from inside to avoid sun rays reflection in battery room & properly illuminated.	A		
	23. The DR channels standardization shall be reviewed as per Ramakrishna Committee for 400 kV lines, 220 kV lines, 132 kV lines, ICT's & TP.	A		

Utility: MPPTCL

Substation name	Observation details	Category A or B	Attended date	Reason if not attended
	A. For 400 kV Line / ICT bays protection:-			
	1. Manufacturers recommendation for the selection of resistive reach of ground and phase faults to be adopted for taking care of highly resistive fault selective tripping & load encroachment.	A		
	2. Presently the LBB protection is inbuilt in Busbar protection relay GE B90; hence standalone LBB shall be provided for 400 kV line.	A		
	3. The LBB protection scheme should have following feature & philosophy **a.** Separate CT core to be used if available. **b.** Phase segregated & 3 phase LBB protection relay scheme shall be provided. **c.** Trip fuse isolation links for LBB initiation, LBB trip and After 96 in positive ckt. of trip circuit 1 & trip circuit 2 shall be used. **d.** Contacts of 186R, 186Y, 186B, 286R, 286Y, 286B, 3 phase 186, 286 and 96 shall be taken for LBB initiation. e. LBB re-trip shall be adopted as 100 ms and LBB trip as 200 ms.	A		
	4. The isolator and CB contacts shall be wired up from to isolator / CB CMR in the control panel. Contacts to be wired up for mimic diagram indication, Busbar inputs, Main relay inputs, closing circuit interlocks and LBB hardwired logic.	A		
	5. For auto recloser scheme at 400 kV line; it is recommended to adopt the dead time of own CB as 1 sec & dead time of Tie CB 1.5 sec & the timing of CB PDR shall be 1.5 sec & 2 sec for own & Tie CB respectively. There shall be some time delay between re-closing of own Cb & Tie CB in order to avoid unnecessary operation of Tie CB in case of permanent fault on the line.	A		
	6. ABT / AMR / MFM at interface location needs to be calibrated yearly.	A		
	7. Over-voltage time settings to be kept uniform as per Ramakrishna Committee guidelines. **a.** Low set stage (Stage-I) may be set in the range of 110% - 112% (typically 110%) with a time delay of 5 seconds. High set stage (Stage-II) may be set in the range 140% - 150% with a time delay of 100milliseconds. **b.** For over voltage Stage-I protection, a time grading of 1 to 3 seconds may be provided between over-voltage relays of double circuit lines. Grading on over-voltage tripping for various lines emanating from a station may be considered and same can be achieved using voltage as well as time grading. Longest timed delay should be checked with expected operating time of Over-fluxing relay of the transformer to ensure disconnection of line before tripping of transformer.	A		
	8. Wherever, Line Differential cum Distance relay is used, there should be redundant second communication port for relay-to-relay communication.	A		
	9. Distance and Line Differential protections to be in service with healthy communication. After FO communication failure, distance protection to be activated after blocking line differential protection.	A		
	10. For 400 kV Guna 2 line, both Main 1 and Main relays are of same make. The Main 1 & Main 2 distance protection relays shall be of different make so that all kind of line faults can be isolated & can not be remain unprotected due limitation of relay algorithm.	B		
	11. For 400 kV Bina JP line the trip circuit supervision relays and CB supervision relays (Gas , Air/ Spring Charge) are included in distance protection relay itself. Same shall be segregated and separate relays shall be provided for Trip circuit supervision of TC1 and TC2, CB trouble supervision signals.	B		
	12. For Generation 400 kV Bina JP lines, the No volt relay for dead line charging shall be provided for synchronisation at Bina JP end. For AR scheme also the AR scheme functionality & adaptation shall be reviewed in view of generation line. The priority of re-closing of line shall be set instead of re-closing faulted line from both end.	A		
	13. For 400 kV Bina JP lines, only one over-voltage stage is used due to limitation of GE D60 make distance protection relay. Both over-voltage as per scheme can be taken into service either providing standalone relay or by taking one stage from Main -1 & other stage from Main -2 relay.	A		

	14. 400 kV Bhopal 1-line settings have been retrieved as a sample & other 400 kV line settings are reviewed. Some observations regarding this are as follows **a.** Main 1 relay is GE make D60 distance relay Main 2 relay is GE make P446 . According to Ramakrishna Committee, Main 1 and Main 2 relays should be of different make. Same to be re-viewed with concerned authorities. The case is applicable to all 400 kV lines in order to cover all type of faults & selective tripping. **b.** For parallel line , Zone 2 is kept as 150% of protected line to take care of under reaching due to mutual coupling effect. But Zone 2 for this line overlaps the next shortest line zone 2 at 400kv Bhopal 1; in such cases the timing for Zone 2 shall be reviewed / change to avoid overlapping & zone time racing. **c.** Manufacturers recommendation to be ascertained regarding the values of resistive reaches (Arc & tower footing resistance for phase and ground fault) for detecting high resistive fault & to avoid the overreaching of distance relay. **d.** Zone 4 (reverse) reach is kept as 10% of reverse shortest line (a reverse reach setting shall be less than the Zone-1 reach of distance protection for the shortest line connected to the local bus bar) according to Ramakrishna Committee, Zone 4 timing is suggested to coordinate as per Zone 2 timing setting guidelines. **e.** Proper logic for SOTF initiation both Main and Tie Bay CB to be implemented. In the case of one & half CB scheme, in case one of the CB between own & tie is out of service & other CB is ON in that case SOTF scheme will not require. **f.** Dead time for Auto re-closing of Main CB and Tie CB to be coordinated with concerned authorities as mentioned in point no. A.05. **g.** Implementation of zone 4 as backup to busbar to be reviewed with concerned authorities which may give additional support in case of bus fault & busbar protection is out of service or unable to operate in worst case.	B		
	15. Wherever tertiary is loaded, possibility of taking available tertiary CT in three winding differential protection can be explorer for instantaneous isolation of 33 kV bushing / terminal fault.	A		
	16. For 400 / 220 kV ICTs IV & HV 03 OC + 1 EF backup relay protection shall have be directional feature. Accordingly respective selected bus PT / CVT shall be wired up to HV & IV backup relays. For outgoing bay / feeder fault the another non directional feature in backup protection relay of ICT can be activated with separate trip relay.	B		
	17. The settings of 400/ 220 kV, 315 MVA ICTs checked. Following are the observations a. NDR and HV backup protections are clubbed together in one relay P141D. Failure of this relay will keep both protections out of service. For unit protection the use stand alone relays shall be explore. b. Overload Plug setting (Stage 1 and stage 2) and timing are not in order. The same needs to be reviewed and revised with concerned authorities. c. IV backup relay is electromechanical and Non-directional. Numerical directional relays shall be provided for better analysis, sensitivity & flexibility during operation. d. Relay Operating Timing (ROT) to be calculated from actual fault level. Backup relay coordination to be carried out accordingly.	B		
	18. All ICTs internal fault alarm & trip signals needs to be wired up as Binary inputs to differential / backup relays so that in case of any alarm / trip the DR can be easily fetch so that exact analysis of fault can be done for ease of decision making.	A		
	19. The carrier send Main -1 own & parallel, Main -2 own & parallel send shall be send from distance relay from relay panel instead of duplicating at PLCC panel. The carrier received command shall be also separate.	A		
	20. The PLCC counter shall be provided on PLCC panel.	A		
400 kV MPPTCl Bina	21. In case of operation of 400 kV line reactor LBB operation the DT command shall be send to remote end.	A		
	B. For 400 kV & 220 kV Busbar protections –			
	1. Busbar differential pickup shall be kept as 120% of highest loaded line / bay connected to bus to avoid operation of busbar in case of loss of CT inputs to busbar.	A		
	2. CT supervision / CT fail pickup to be kept ON so as to detect the absence of minimum loaded feeder CT abnormalities. The setting shall be lightly loaded line load current or 40 Amp which ever is minimum. Along with auto reset busbar block in case of any abnormality in CT Ckt.	A		
	3. The isolator discrepancy & blocking thereof may be adopted for busbar relay selective operation.	A		
	4. Periodic online testing of busbar protection scheme ensures proper system check of such important protections. This needs to be reviewed with higher authorities.	A		
	C. For LBB protection -			
	1. LBB protection feature is inbuilt in Busbar protection itself. However separate LBB protection apart from Busbar shall be used along with dedicated LBB trip bus & scheme. The Busbar protection scheme & LBB scheme shall not depend upon each other. This will be ensure that LBB shall be in service even in case of busbar relay failure / out of service & vice versa.	B		
	2. There should be hardwired trip buses for selective tripping according to bus zones.	B		
	3. LBB re-trip with 100ms to trip own CB shall be incorporated in LBB relay & scheme.	A		
	4. LBB pickup settings to be reviewed in accordance with Ramakrishna Committee. The LBB current detection setting shall be 80 % of line CTR to avoid mal-operation. However the LBB protection relay used for ICTs / TF shall cover TF low incipient fault / mechanical relay operation (i.e Buchholz trip, WTT, OTT, PRV, OSR etc. due to abnormalities inside the ICT / TF) also in case of TF/ ICT CB lockout.	A		
	D. For 220 kV Lines: -			

	1. Unequal lengths of transmission circuit or protected line is followed by very short line or the reach of zone 2 of protected line overlapped with zone 2 reach of adjacent shortest line then it is difficult to meet the Zone-2 secondary reach setting criterion. In such cases it will be necessary to co-ordinate Zone-2 with longer time delay. However the Zone-2 timing of distance protection relays shall be reviewed / coordinated in case the remote ss bus adjacent short line reach of Zone 2 is overlapped.	A		
	2. The reaches of Zone -3 need to be reviewed / corrected as 120 % of (100 % of PL + 100 % of adjacent LL). Zone-3 should overreach the remote terminal / bus of the longest adjacent line by an acceptable margin (typically 20% of highest impedance seen) for all kind of fault conditions. In case the zone 3 reach crosses the remote bus crossing ICTs / TFs impedance to next voltage level bus; the distance relay zone -3 time coordination needs to be reviewed / done with TF / ICT HV & LV backup protection relays. Accordingly the time zone 3 with backup relays of ICTs / TFs at remote end shall be done.	A		
	3. Zone 4 (reverse) reach is kept as 10% of reverse shortest line (a reverse reach setting shall be less than the Zone-1 reach of distance protection for the shortest line connected to the local bus bar) according to Ramakrishna Committee, Zone 4 timing is suggested to coordinate as per Zone 2 timing setting guidelines.	A		
	4. The 220 kV TBC protection & tripping philosophy needs to be reviewed in view of protection tripping, PT selection, LBB protection etc. Avoid the protection setting switching during TBC operation for simplicity of protection scheme. Some observations are as below a. The use of Normal / inter / transfer switch (NIT switch / NT switch) for protection trip transfer to respective own CB in case of normal position, own & TBC CB in case of inter position & to TBC CB in case of transfer position shall be strictly used. The TBC shall have only own LBB protection relays. The backup protection relay (if required) can be used for backup to busbar in case to cleared the fault of either on main bus or on auxiliary bus. c. There is no need to change setting or change setting group each time once any bay is transfer to TBC bay. d. The TBC protection trip trails from respective bay protection on own bay in view of three phase trip, single phase trip, AR trials needs to be tested through NIT switch interlock.	A		
	E. Common Points: -			
	1. Permissive Overreach Reach (POR) to be adopted for short lines (line length < 5 KM) for selective & reliable distance protection operation.	A		
	2. 400 kV Bina ss is an old substation, CTMB s in yard are too older one. Some CTMB is already replaced & the remaining CTMBs to be replaced with suitable earthing arrangements & vermin proofing urgently.	B		
	3. The tower & equipment earthing running strip plate is rusted the same needs to be painted with anti-rusting oil paint with due care/ safety.	A		
	4. All motorised isolator shall be operated electrically from remote end control room or from safe distance for safety point of view.	A		
	5. There should be isolator interlocks in Circuit breaker closing and vice versa. This will ensure safety of operating person.	A		
	6. The Pole Discrepancy Timer for ICTs and reactors observed 500 msec. The Same to be corrected to 100 ms.	A		
	7. For all backup protection relays proper time gradation to be ensured as per latest Fault levels.	A		
	8. There are too many old electromechanical relays on the existing panels, having number of problems i.e sluggish operation, non operation, can not be self diagnosis, can not be self monitored & generate audible alarm, absence of DR after fault. Numerical relays will be the only solution for this. In fact being older panels; it will be difficult to maintain and trouble shoot the schemes. For achieving protection scheme & philosophy as per Ramakrishna committee guideline modification in existing old panel is very much difficult. Hence it is recommends to replace old panels with new BCU based numerical relay panels along with SAS.	B		
	9. At some bay location two protection scheme/elements are clubbed altogether in one relay. The same needs to be worked out and seperate/standalone relays to be kept for different didicated protections as per guidelines.	A		
	10. Yard is maintained properly with metal screen but some areas needs to be worked on for grass cutting & weed control.	A		
	11. Silica gel in Reactor breather to be recycled for further use. The gasket of TF/reactor FCCB to be repleaced to avoid water ingress in TF/reactor FCCB.	A		
	12. PLCC counter needs to be recorded once in a shift/day & after fault on line.	A		
	13. Centre zero DC voltmeter/DC leakage meter is not available on charger. Same to be provided on charger as well as in control room.	B		
	14. The substation 220 VDC both sources have DC leakage & the same shall be attended on priority.	A		
	15. Battery capacity test for ascertaining healthiness of individual battery cells can be done once in a year. This needs to be reviewed with higher authorities.	A		
	16. Regular trials for DC lighting to be ascertained.	A		
	17. The DR channels standardisation shall be carried out as per Ramkrishna committee for 400 kV lines, 220 kV lines & ICT.	A		
	18. Almost all IEDs are GPS synchronized. The remaining IEDs shall be GPS synchronised if required the GPS device two ports can be used simultaneously by spliting IED network if number of IEDs are more to avoid network contingencies/to loss GPS synchronisation signal.	A		

Utility: GETCO				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
400kV Pachcham GIS, Gujarat	1. Resistive reach Ph-G and Ph-PH are standardized in two categories i) Below 50 Km and ii) Above 50 KM by GETCO and adopted accordingly. Specific tower footing and arc resistance are not adopted as per voltage level.	A		
	2) Zone 4 reach is set as 10% of protected line length. As per Ramakrushna Committee it should be set 50% of shortest line connected to local bus or limited to 2kM reach, whichever is minimum.	A		
	3) Zone 4 (reverse) time delay is kept as 500 mSec should be reviewed.	A		
	4) For 400 kV level Stand-alone Over voltage protection relay is provided with two stages & also in both M1 and M2 relays overvoltage settings are adopted for stage 1 and stage 2.			
	5)LBB protection is not having stand-alone relay, it is incorporated in the busbar protection and in main 1 distance relay.	A		
	6) M1 distance relay is having internal LBB initiation for single phase fault and external initiation from M2 relays.	A		
	7) For single phase trip, CB trip command is wired up from relays BO instead of auxiliary trip relays.	A		
	8) Busbar to LBB initiation command is not used.	A		
	9) Busbar trip command is directly given to CB TC1 and TC2 instead of routed through 96 trip relays.	A		
	10) Busbar PU relay NC contact is used in closing interlock circuit for CB.	A		
	11) 48 V DC battery set and charger is not used. However, 220/48 VDC Converter is used in FOTE panel.			

Utility: CSPTCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
400/200 kV Substation CSPTCL Raita, Dist Raipur	1. DC +Ve leakage in both the dc source i.e. 220 Volt DC-1 and 220 Volt DC-2, rectification required after identification.	A		
	2. Grass cutting and cleaning required in switchyard.	to be dropped		
	3. AR function are not active in all 200 kV feeders.	A		
	4. For breaker failure, protection of all 400 kV and 220 kV breakers tripping time for BFP. is 200 ms , also the retrip and back trip timings are 200 ms , it is recommended to review the same as per guidelines.	A		
	5. DR and EL not configured as per CE PS letter 21.01.2021.	A		
	6. For 400 kV lines it is recommended to review the over voltage protection settings as per guidelines.	A		

Utility: MPPTCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
400/220/132 kV Mandsaur S/Stn.	1. Broken Conductor Alarm time delay should be 5 Sec. instead of 20 sec	A		
	2.In distance protection relays, load encroachment settings should be enabled and adopted according to R.K Committee suggestions.	A		
	3. It is suggested to adopt standalone LBB Protection Relay for lines and ICTs. At present it is incorporated in main/Backup protections.	A		
	4. Over Current time delay for ICT HV and LV seems to be on higher side and should be revised.	A		
	5.For 315 MVA ICT Differential Protection (T60) slope 2 break point is set on higher side (30 PU). It should be revised.	A		
	6.For ICT Overcurrent and & E/F protections should be in directional mode.	A		
	7. Provision of protection against direct Lightening stroke should be provided for 125 MVAr Reactor as no earth wire screening is provided over bay.	B		
	8. Fire extrirjuishers should be provided in adequate quantity in Control Room/Battery Room/ Cable Room.	A		
	9.Over Current & Earth Fault protections time gradations should be verified as per fault level.	A		
	10. Dedicated Test Kits (Relay Test Kits & Diagnostic Test Kits such as Tan Delta, CB Timing and CRM, WRM etc.) should be available for 400 kV S/Stn.	B		
	11. Overall switchyard and control Room is well maintained.	A		

Utility: MPPTCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
kirnapur	**A) 400 kV Level**			
	1 It is recommended to check & correct Zone-4 setting and timing in main protection as per Annexure 3.2 (format A) guidelines in 400 KV lines relay.	A		
	2. out of step trip is not enabled. Same needs to be reviewed.	A		
	3.Power swing blocking is given to all zones. The blocking should not be present for zone-I fault.	A		
	4. For 400/132 kV, 100 MVA ICT-1,2&3, only O/C proctection feature is used and set as non-directional. Earth fault feature is disabled.	A		
	5.For 400/132 kV, 100 MVA ICT-1,2 & 3 Harmonic restrain feature is not in services.	A		
	6. 1) Busbar trip relay (96 Trip relay) initiation is not considered for LBB protection. 2) Time delay for LBB Retrip is set as 60m sec, same needs to be reviewed	A		
	B) 132 kV Level			
	1 It is recommended to check and correct, Zone-4 setting and timing in main protection for 132 KV lines.	A		
	2 It is recommended to check & correct, Zone-2 setting and timing in main protection for 132 KV Balaghat circuit - 1&2	A		
	3. It is recommended check line current, Voltage and Load angle for Load encroachment blinder setting.	A		
	4. Carrier Aided protection function found disable for all 132kV line distance relay.	A		
	5. PSB setting needs to be revised as per guidelines	A		
	6. Auto reclose function for 132 KV lines found disable. It could be taken in service to improve availability of lines.	A		
	Apart from above, following are the common observations	A		
	1) Relay/Equipment testing and periodic maintenance frequency needs to be improved.	A		
	2) Busbar protection scheme is not provided for 132 KV level	B		
	3) In 220 V DC source 1&2, DC leakage is present at positive side, same needs to be attend.	A		

Utility: GED				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
Amona Substation	1. Independent Main 1 & Main 2 protection is provided with carrier aided scheme but carrier scheme is not in service. For colvale line Main 2 line relay is faulty and to be taken in service at the earliest	A		
	2. Zone 2 time delay is 0.4 instead of 0.35	A		
	3. Zone 4 reach setting is set to 0.2% of protected line. To be revised to 2 km reach	A		
	4. Zone 4 time delay is 0.5 sec. To be revised to 0.35 sec.	A		
	5. A/R not in service	A		
	6. PLCC is provided but not working .	A		
	7. For main 2 relay all zones are blocked on power swing detection. Zone 1 to be unblocked	A		
	8. GPS is out of service.	A		
	9.Bus Bar protection is provided but in error mode and for TF 2 peripheral unit is faulty and the same to be taken in service at the earliest.	A		
	10.For lines : 96 trip and for transformer : 96 trip, LBB trip, all auxiliary protection trip signals to be included in DR.	A		
	11.some relays are tested and balanced to be tested at the earliest. Test frequency & records of testing to be maintained .	A		
	12. Diagnostic testing (CT, bushing, winding tan delta, LA LCM, CB timing & CRM, thermo-vision, Earth pit resistance etc.) to be carried out periodically and records to be maintained.	A		
	13. PLCC not in service.	A		

In addition to above following are common observations:

1. OLTC remote trials to be confirmed during outage.
2. Battery routine maintenance to be carried out regularly and records to be maintained .
3. Healthiness of Emulsifier (for fire protection of transformer) to be ensured.

UTILITY:GED				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
220/110/33/11 KV Thivim substation	1) For 220 kV independent Main 1 & Main 2 protection is provided with carrier aided scheme, but carrier scheme is not in service.	**A**		
	2) For 110 kV Ponda 2, Binani line static relays are available needs to replaced by numerical distance relay	To be Dropped		
	3)A/R not in service for 220 kV lines	B		
	4) PLCC is provided but not workig for 220kV lines	A		
	5) GPS is not available	To be Dropped		
	6) For 220 kV, Bus bar protection is provided of static type, neeed to be replaced by numerical.	B		
	7)for transformer : 96 trip, LBB trip, All auxiliary protection trip signals to be included in DR.	A		
	8)Diagnostic testing (CT,bushing, winding tan delta, SFRA, LALCM, CB timing & CRM , thermo-vision, Earth pit resistance etc.) to be carried out periodically and records to be maintained.	A		
	9) DC leakage in both DC sources to be attended for healtiness of protection.	A		
	10)OLTC remote trials, fan & pump trials and auxiliary protection trials to be confirmed during outage.	A		
	11) Healthiness of Emulsifier (for fire protection of transformer) to be ensured	A		

Utility: MPPTCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
Substation MPPTCL Julwania, Madhyapradesh	**1) LBB Protection:** a) Stand-alone LBB Protection Relay is not Provided for all 400 kV (Line and ICT) bays and all 220 KV (Line and ICT) bays.	B		
	b) LBB Protection feature from Main Protection is used for 400 kV and 220kV Lines and ICTs.	A		
	c) For 400kV and 220kV Bus-Coupler Standalone Static LBB relay is provided. For 400kV and 220kV TBC LBB relay is not Provided. LBB protection feature from Own Main Protection (Distance) is used, hence No LBB protection in service for ICTs while on TBC.	A		
	d) Only 3Ph LBB initiation is used, needs to be reviewed as per RKC and CBIP guidelines.	A		
	e) LBB re-trip function is not used for 400KV and 220KV LBB Protection.	A		
	f) LBB protection not provided for 132kV Bays.	A		
	2)Distance Protection :			
	a) Zone-2 Distance Reach Settings to be reviewed as per RKC and CBIP guidelines.	A		
	b) Zone 3 Distance Reach setting for all 400kV, 220kV and 132kV lines are not adopted as per RKC guidelines, needs revision as per said guidelines.	A		
	c) Zone-4 Distance Reach adopted for all 400kV and 220Kv lines is set to 10% of Line length, needs to be reviewed as per RKC and CBIP guidelines.	A		
	d) Zone-4 Time settings adopted for all 400kV and 220 kV lines is set to 1.0 sec, needs to be reviewed as per RKC and CBIP guidelines.	A		
	e) Resistive reach for Ground fault element and Phase fault element for all 400 KV and 220 KV lines is not adopted as per RKC and CBIP guidelines, the same needs revision.	A		
	f) PSB settings; for 400kV Lines Zone Blocking and Unblocking Delay not provided as per RKC and CBIP guidelines. For all 220kV Lines PSB feature is disabled except for 220kV Sendhwa-I & II, wherein unblocking timer delay needs to be reviewed.	A		
	g) SOTF feature is only current enabled (except for 220kV Julwania I & II), manual close input is not configured for SOTF logic for all 400KV and 220KV lines.	A		
	h) Load encroachment settings are Disabled for all (400kV and 220Kv Lines). The same should be enabled with settings as per RKC and CBIP guidelines.	A		
	i) Auto-reclose Settings for Dead time and Reclaim time should be standardized for all 220kV lines. Also, AR operation with Carrier aided Trip condition to be verified and corrected accordingly for all 400KV and 220KV lines.	A		
	j) Auto-Reclose feature is disabled for 132kV Lines.	A		
	3) over-voltage protection:-			
	a) Stand-alone Overvoltage Protection is not provided for all 400kV lines.	A		
	b) Over-Voltage (Stage-1)/ Over-voltage Stage-2 feature from Main Protection is used. Also the setting provided are not as per RKC and CBIP guidelines needs revision.	A		
	4) Differential Protection Slope settings for all ICTs to be reviewed.	A		
	5) Over fluxing Protection feature of differential relay is used. Standalone relay should be used. Tripping is incorporated with this Protection, same need to be reviewed as per RKC and CBIP guidelines.	A		
	6) REF protection not provided for 400kV 315MVA ICT-I & II and 220kV 160MVA ICT-I & **II.** Also, for 400kV Bus Reactor the REF time delay is set to lsec, to be reviewed as per RKC and CBIP guidelines.	A		
	7) Duplicated PRD and Buchholz initiating contacts for ICT and Reactor are not Provided.	A		
	8) Back-up protection: (over current and earth protection)			
	a) Earth Fault Protection is disabled for all 400kV and 220 kV ICTs.	A		
	b) Overcurrent protection settings adopted for ICT's are not in co-ordination with Distance Protection ROT of lines.	A		
	c) Overcurrent / Earth Fault protection for ICT and Lines are Non-Directional, needs to be reviewed	A		
	d) 220 kV Lines over current and Earth Protection settings needs revision as per latest Bus fault level.	A		
	9) BusBar Protection:			
	a)Busbar Protection Pick up setting (for 400 kV & 220 kV) is 0.2PU, to be reviewed as per RKC and CBIP guidelines.	A		
	b) Biased Slope settings found similar for both Main and Check Zone, to be reviewed as per RKC and CBIP guidelines.	A		
	c) Inter-tripping on 220KV Bus-bar Protection Operation for ICT's 400/220kV 315 MVA and 220 /132 kV 160 MVA are not provided	A		
	d) Bus-tie Blind Zone not provided in 400KV and 220 KV Busbar protection	A		
	e) 96 Trip Relay initiation not wired up for LBB initiation for 220 kV Julwania (Interconnector) I & II Line.	A		
	f) Busbar Protection is not provided for 132kV voltage level.	B		
	10) The number of earth Pits seem to be insufficient for providing healthy earthing same needs to be reviewed	A		
	11)DC supervision is provided only for Main DC source 1 and 2. DC supervision to be provided for all DC subcircuit i.e. Protection and Control Circuit.	A		
	12) DR channels and DR trigger signals for all Protection relays are nto set as per RKC and CBIP guidelines.	A		
	13) Testing frequency of switchgear needs to be reviewed. Circuit breaker diagnostic to be strictly followed as per defined testing frequency.	A		
	14) Equipment Diagnostic test results to be analyzed. Also, Tripping/occurrences analysis to be done.	A		
	15) Pole Discrepancy Timing for 400kV and 220 kV Circuit Breakers to verified and rectified.	A		
	16) The Data submitted in the TPPA Annexure EV has discrepancies, when verified with actual fiedl Data. The same needs to be corrected and resubmitted.	A		

Utility: MSETCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
400 kV Deepnagar	1) 3 No. Battery set of 220V are available, Set I and Set II are of 500AH capacity and installed for DC source I & DC Source H of 400KV System. Among these Battery set 1 is defective and battery set II is in very bad condition (Dt. Of Comm.26.04.11). All protection system of 400KV is on single DC source.			
	2) Battery Set III is of 300AH and installed for DC supply of 220KV System. This Battery set was commissioned on dt.26.04.11 And is in very bad condition. All protection of 220KV Yard is on single DC source.			
	3) 48V battery set was commissioned on dt.26.04.11 Is also in very bad condition, second battery set of 48V is not available.			
	4) Oil leakage observed from gaskets of neutral Bushings in all units of both ICT's			
	5) Oil of OLTC is not replaced since commissioning.			
	6) OLTC of both ICT are defective.			
	7) In 400KV Auragabad feeder bay, Over voltage protection MVT 181 relay is defective, Same is configured in SEL 421 Main II protection relay. Autoreclose function is disabled in both Main I & Main II Distance protection relays.			
	8) In 400KV Khadka ckt. I feeder bay, Over voltage protection MVT 181 relay is defective. Same is configured in SEL 421 Main II protection relay.			
	9) Few relays are not synchronised with GPS.			
	10) 10. In 220KV feeder panels, second Distance protection relays for Main II protection are not installed.			
	11) Load encroachment function is not available in Sifang CSC 101 relays.			
	12) Direct trip is not available for 220KV Lines, required for LBB operation /Hand trip / Over voltage protection.			
	13) Duplicated bus bar protection may be provided as suggested in Annexure 3.2 at point no. D [2].			
	14) Extended 400KV Yard for new 660MW generating plant is not easily accessible.			

Utility: MSETCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
Alkud Substation	1) ICT / Reactor Low Voltage Routine Testing not carried out.	A		
	2) Relay Testing test reports are maintained in Register manually. Also, Full functionality of Numerical relays are not tested during Relay testing.	A		
	3) As per study of Relay Panel drawings for all bays, DC changeover is not applicable to Main-1 and Main-2 Numerical relays. If DC Source-1 fails, Main-1 Protection relay also fails.			
	4) 220kV Lines have Main-1 (21) & Backup (67N) protection.	B		
	5) All Distance Relay Reach settings for Zone-2 and Zone-3 are not as per CEA guidelines.	A		
	6) Phase Selection setting for REL670 relays found kept lower than Zone-3 reach. Same required to be corrected	A		
	7) ICT load surpasses 90% of Full capacity daily.			

Utility:MSETCL				
Substation name	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
Chakan Substation	1). Only single DC source (220VDC Battery Set -1) is working, 220VDC Battery set-2 along with its charger is not in service. Hence only single sources are available for entire substation. Hence battery charger and battery set replacement is proposed and procurement process is going on.			
	2). PLCC battery charger and battery set is very old. Hence battery charger and battery set replacement is proposed and procurement process is going on. And another spare charger is arranged from another substation and kept the 48V DC healthy			
	3) In all the C&R Panels no any DC change over scheme is availaible for all the relays.			
	4) No any separate relay failure supervision is available for 86 and 96 relays and any numerical relay .			
	5) All yard Kiosk Air Conditioning machines are not working properly. AC system needs to be maintained efficient cooling for better and proper working of protective relays.			
	6) PLCC room and SCADA control room Air conditioning system is not working properly.			
	7) Currently from EWS- Engineering work station (DR) PC configuration and seetings of all "Sifang"Make numerical relays could not be extracted. Initially it is functioning properly, but after upgradation of SCADA by siemens, DR PC is not functioning. Hence all " Sifang" relay database is not available.			
	8) No any auto DR facility is available for all the relays. DR was extracted manually using third party tool 'CoreFTP'.			
	9) DR channels in all numerical relays not as per CEA guideline.			
	10) Oil leakages from Top plate, Bushings Turrets, Radiator Finns, oil pumps observed in Single phase units of 315MVA ICT-1[EMCO], 315MVA ICT-2[EMCO], and light oil leakage found from ICT spare phase and 315 MVA ICT-3[BHEL]			
	11) Light Oil leakages from Top plate, Bushings Turrets, Radiator Finns observed in 220/22kV 50MVA TR-1[Alstom], 220/22kV 50MVA TR-2[Atlanta] and 220/22kV 50MVA TR-3 [EMCO].			
	12) . In Distance Protection relays, Zone-2 reach settings is found 120% instead of 150% for partial D/C lines as per CEA guideline			
	13) In Distance Protection relays, Zone-4 reach set to fixed 5kM (for 400kv lines) and 3 KM (for 220kv lines). Zone 4 reach and timing is not as per CEA guideline, it shall be as per CEA guideline			
	14) In 220kv Volkswagen line Z1 is disabled at both ends as that line is short i.e. 2.4 KM. And also, AR is disabled at both the ends. Also other zone timings are reduced as per attached setting file. Zone 2 timing in line is set to 250 mSec due to Busbar protection is out of service at 220kv Volkswagen end			
	15) In all 220kv lines instead of two different make distance relays only one distance relay and backup relay are there.			
	16) Dew point is not measured for any of the breaker since commissioning			
	17) LBB protection re-trip is not configured for the entire substation. Only external back trip LBB protections in service with 0.8A. It is suggested to reduce the LBB settings.			
	18) Second DC source not connected in 220 kV & 400 kV Busbar Protection Scheme			
	19) Online DGA and FOTS is not working since many time.			
	20) . Oil test results of R phase of ICT 2 is having BDV and water content is having abnormal values. Hence its oil filtration is proposed on Dt: 04-07-23. But still it pending to attend.			
	21) DGA results of ICT 1 and ICT2 is having increasing trend in its gases.			
	22) Density monitor is missing in Y phase CB of 400kV Talegaon (PGCIL) line.			
	23. Cable trench covers are damages / in very deteriorated condition, it needs to be replaced at the earliest for healthiness of substation control wiring.			
	24) Earthing measurement are done along with grid only. It should be measured for individual pit wise as well as along with grid. Earth strips are found rusted, hence it should be properly cleaned and coloured at adequate locations.			
	25) PDR setting for entire substation is found higher i.e. 1500 mSec, it is suggested to reduce that timing to 1000 mSec for 220kv lines and 1250 mSec for 400kv lines, for ICT / TR / BC breakers such timing needs to be kept 200 mSec.			
	26) It is suggested to keep Auto-Reclose Dead time setting for 220kv line 800mSec instead of 1 Sec			
	27) CRM test value of CB of Y phase of 220kv Volkswagen line is found higher 140 Micro-ohms where as other phases are having 50 / 54 micro-ohms.			
	28) CRM test value of CB of ICT 1 LV is found higher 491 / 483 / 383 Micro-ohms on Dt: 24-11-22 and remarked as retest needs to be done. But till now retesting not carried out			
	29) While routine testing of relays all the functionalities are not tested. Only trip test is carried out for most of the relays. And also relay test results are not maintained properly for confirmation of zone reach and zone timings.			
	30) Tan delta testing of Bus PT / Bus CVT is not carried out periodically.			
	31) No any records are available for PLCC panel periodic testing for verification.			
	32) Some of the relay communication was found faulty, while checking its found that such communication failure is due to old EFS switch — Ruggedcom of Siemens make. It is suggested to replace such problematic EFS for better SCADA performance.			
	33) In all the RTCC panels of ICT and transformers some abnormalities is found i.e. TPI & OTI-WTI not working, some other annunciator are found high, hence it needs to be rectify at earliest.			
	34) Oil leakage observed in NIFPS Nitrogen Cubicle in ICT 1B Phase and ICT 2R Phase. And glass found broken in NIFPS nitrogen cubicle oil drain pipe for ICT1 BPhase			

Substation name	Observation details	Category A or B	Attended date	Reason if not attended
	1. Diff make or Diff. type distance protection are not available in Following Line. (A) 400kV Babhaleshwar line, (B) 400kV Aurangabad line , (C) 400kV Akola line.	B		
	2) Two separate DC source -1 & 2 are available but no any DC supply change over facility available in 400kV CRP (Like- Manual DC source Change over switch/ Auto DC source Change Over switch) .	B		
	3) Only Single DC supply source is available in 220kV side (DC supply-2) and 132kV side (DC supply-1) system, Two DC source should be required with DC source change over facility.	B		
	4) In distance protection of 400kV, 220kV and 132kV lines, reach setting and time setting of Zone -2 should be revise with considering adj. Short line at remote end sub-station.	A		
	5) In distance relay, reach setting and time setting of zone-4 should be universal in same voltage level.	B		
	6. Zone-4 protection is not available in distance protection relay which are in service for line protection, should be replaced it.	A		
	7. It is advisable to active both Over Voltage protection stage in both distance MI and M2, in place of one stage in one relay and other one in second relay.	A		
	8. It is more usefull to active PUR in distance - M1 and POR in distance- M2 , in place of both distance relay working with PUR.	A		
	9. Pick up setting of LBB relay should be considering with minimum fault current.	A		
	10. In 400kV and 220kV voltage class, setting of PDR is found higher, should be rectify.	A		
	11. Re-Trip function is not available in LBB Scheme.	B		
	12. Dew points is not measured in 220kV Deepnagar line-1 and 2.	A		
	13. PT supply given to MFM from PS class core , should be connected with 0.2/ 0.5 class core of PT.	A		
	14. Tan-Delta value found out of limit in B-Ph Bus CVT of 400kV Bus-2.	B		
	15. Resistive reach of Zone-4 to be revised with considering multi ckt feeding (should be taken same as Zone-3).	A		
	16. In DR configuration, M1 relay does not trigger DR from M2 relay operated input and via vise, should be revised.	A		
	17. If line length is very short, it is very advisable to use line diff, relay for line protection in place of distance protection.	to be dropped		
	18. Remove time delay in tripping of REF protection in ICT/TR.	A		
	19. Time syn is not available in all OC-EF relay in all voltage class.	A		
	20. LBB protection is not available in 220 kV kekat-Nimbhora line, 220 kV chalisgaon-I and 220/132kV, ICT-5 (220kV side)	B		
00 Substation Khadka (Bhusawa	21. Zone-2 reach found wrong (More than 200% of line length) and dead time for AR found 0.8 sec in 220kV Kekat-Nimbhora line.	A		
	22. Single Phase LBB initiation is not give to LBB relay of 220 kV TBC.	A		
	23. Distance relay found fault of 132kV Deepnagar line-1, only one OC-EF relay protection in service.	B		
	24. TOR should active in Distance protection relay.	A		
	25. Distribution of DC supply is not properly in HV & LV panel of 220/132 kV, Ict-4 &5	A		
	26. DC supply supervision and T/C-2 supervision are not available in HV & LV panel of 220/132 kV, ICT-4&5	A		
	27. DC supply supervision is not available in LV panel of 220/132 kV, IC T-1 & 2	A		
	28. Hydrogen gas found higher in 220/132 kV, 200 MVA ICT-02	A		
	29. Only single DC supply source is available in 220 kV BBP side (DC supply-2 and 132kV BBP side (DC supply-1) system, Two DC source should be required with DC source change over facility.	B		
	30. No any Dew points measurments record available of 132kV breakers.			
	31. Healthiness issue of 48V DC-2 supply battery set.	A		
	32. 220 V DC supply voltage & Earth leakage detector meter/Indicator are not available.	B		
	33. 48V DC supply voltage & Earth leakage detector meter/Indicator are not available	B		
	34. PLCC protection is not available in 132 kV Deepnagar line-03	B		
	35. PLCC protection is not working in 220 kV Deepnagar line due to card fail	A		
	36. No any standard protection philosophy available.	to be dropped		
	37. Over Flux tripping is not provided in all ICT/TR (only of alarm configure)	A		
	38. DT is not send by 400 kV TBC.	A		
	39. DR and event are not extracted from Diff relay (Siem-7SR 54) of 400/220kV, ICT-1 & 2.			
	40. Fire wall should be requiring between 220/132 kV ICT-4 and 5.			
	41. Variation in Tan-Delta value of following Current-Transformer found higher than 0.1% and Capacitance variation higher than (+/-%)			
	a. 220 kV Deep-Nagar Line-2(R,Y,B- Phase)			
	b. 400 kV Deepnagar Line-1 (Y-Phase)			
	c. 400 kV TBC (Y-Phase)			
	d. 132 kV Deepnagar Line-1 (R,Y,B-Phase)			
	e. 400/132 kV, 200 MVA ICT-02 (R,Y,B- Phase)			
	42. Variation in Tan-Delta value of 400/132 kV, ICT-02 (HV-B Phase, LV-R, Y,B Phase, Neutral) bushing found higher than 0.1%			

Utility: MSETCL					
S.NO	**Substation name**	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
1	**General observation and remark**	1)LBB protection is incorporated in Busbar protection relay & no separate LBB relay for 400 kV & 220kV lines & ICT is provided. It is suggested to provide standlone LBB relay for all bays.	B		
		2) Load enchroachment settings should be adopted for all 400 kV & 220 kV lines.	A		
		3) All Distance Relay Reach settings for Zone-2 and Zone-3 should be as per CEA/Ram Krishna committee guideline.	A		
		4) In 400 kv distance relay for PSB all zones are blocked. Zone-I should be unblocked.	A		
		5) 220 kV Badnagar Ckt-I & Ckt-II Distance relay impedance are not as per calculation	A		
		6) Back up relays time gradation should be as per fault level for lines and ICT.	A		
		7) For ICT HV & LV backup TMS should be revised as existing settings seems to be on higher side.(Existing TMS is 0.34 & 0.4)	A		
		8) In ICT HV Back up relay only phase TOC protection is in service. It is suggested to enable E/F TOC protection. Also HV & LV B/U protection should be directional as existing protection are non directional.	A		
		9) Setting document for all relays should be available at Station & it should contain all settings for all functions that are used/enabled and indicate the function disabled. Settings should be verified as per setting document.	A		
		10) Relay testing shoud be carried over for all bays for all features and record should be maintained in register. Feeder relay testing is not carried out since commissioning.	A		
		11) Dedicated set of Relay Test kit, Diagnostic Test Kit (Tan Delta, CB timing and CRM) should be available for 400 kV station.	B		
		12) Auto DR downloading facility should be available for all numerical relays	A		

Annexure 5.3

Utility											
S.NO	Voltage Level	No. of s/s Audit carried out	No. of deficiencies			No. of deficiencies attended			No. of deficiencies not yet attended		
			Total	Category-A	Category-B	Total	Category-A	Category-B	Total	Category-A	Category-B
1	765 KV										
2	400KV										
3	220KV										

Utility					
S.NO	**Substation name**	**Observation details**	**Category A or B**	**Attended date**	**Reason if not attended**
1		**1)……...**			
		2)……			
		3)…….....			
		4)…….			
		5)…….			

Annexure -7.1

220 kV Substation TPPA Draft Plan For Jan25 -Dec 25

Sr. No	Name of Substation	OWNERSHIP	State	TPPA Team	Audit Team	Month of Audit
1	220 KV S/S SARNI	MPPTCL	Madhya Pradesh	MSETCL	MH TEAM -A	2nd Week Of January
	220 KV S/S ITARSI					
	220 KV S/S HANDIA					
2	220 KV S/S PANAGAR	MPPTCL	Madhya Pradesh	MSETCL	MH TEAM -B	4th Week of January
	220 KV S/S JABALPUR					
	220 KV S/S GORABAZAR					
3	220 KV S/S NIMRANI	MPPTCL	Madhya Pradesh	MSETCL	MH TEAM -C	1st Week of February
	220 KV S/S JULWANIYA					
4	GUDGAON	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -D	3 rd Week of February
	PANDHURNA					
	BETUL					
5	VIDISHA	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -E	1st Week of March
	PIPALANI					
6	SENDHWA	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -B	3rd Week of March
7	NARSINGPUR	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -G	2nd Week Of April
	SUKHA					
8	SEONI	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -B	4th Week of April
	CHHINDWARA					
9	NEPA NAGAR	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -C	2nd Week of May
	CHHANERA					
10	MANDIDEEP	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -D	4th Week of May
	HOSANGABAD					
	BUDHNI					
11	ADAMPUR	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -F	1st Week of June
	BHOPAL					
	BAIRAGARH					
12	SHUJALPUR	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -E	2nd Week of July
	MUGALIYACHAP					
13	PIPARIYA	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -A	3rd Week of June
14	UDAIPURA	State Control Area	Madhya Pradesh	MSETCL	MH TEAM -G	1st Week of August
	CHICHLI					
15	220 KV S/S KOTAR	MPPTCL	Madhya Pradesh	CSPTCL	CS TEAM -A	1st Week of January
	220 KV S/S SATNA					
16	220 KV S/S BIRSINGHPUR	MPPTCL	Madhya Pradesh	CSPTCL	CS TEAM -B	3rd Week Of January
	220 KV S/S SHAHDOL					
17	220 KV S/S ANUPPUR	MPPTCL	Madhya Pradesh	CSPTCL	CS TEAM -C	2nd Week Of February
	220 KV S/S AMARKANTAK					
18	220 KV S/S SIDHI	MPPTCL	Madhya Pradesh	CSPTCL	CS TEAM-A	3rd Week of April
	220 KV S/S SIRMOUR					
	220 KV S/S REWA					
19	NEPANIYA	State Control Area	Madhya Pradesh	GETCO	GJ-A	1st Week of January
	BHANPURA					
20	GUJARKHEDI	State Control Area	Madhya Pradesh	GETCO	GJ-B	3rd Week of January
	SUWASRA					
21	INDORE EAST BICHOLI	State Control Area	Madhya Pradesh	Goa	GOA TEAM	2nd Week Of February
	INDORE SOUTH ZONE					
22	NAGDA	State Control Area	Madhya Pradesh	Goa	GOA TEAM	2nd Week of October
	UJJAIN					
23	220 kV Pusad	State Control Area	Maharastra	MPPTCL	MP-A	1st Week of January
	220 kV Ghatodi	State Control Area				
24	220 kV Paras	Generation attached S/s	Maharastra	MPPTCL	MP-B	3rd Week Of January
	220 kV Balapur	Generation attached S/s				
25	220kV Akola	State Control Area	Maharastra	MPPTCL	MP-C	2nd Week Of February
	220 kV Anjangaon (Vihigaon)	State Control Area				
26	220 kV Yavatmal	State Control Area	Maharastra	MPPTCL	MP-D	4th Week of February
	220 kV Ner	Generation attached S/s				
27	220 kV Nandgaon Peth	Generation attached S/s	Maharastra	MPPTCL	MP-E	2nd Week Of January
	220 kV Amravati	State Control Area				
28	220 kV Dhamangaon	State Control Area	Maharastra	MPPTCL	MP-A	2nd Week of March
	220 kV Badnera	State Control Area				
29	220 kV Beed	State Control Area	Maharastra	MPPTCL	MP-B	4th Weak of March
	220 kV Jalna	State Control Area				
30	220 kV Butibori-I	Generation attached S/s	Maharastra	MPPTCL	MP-C	1st Week of April
	220 kV Butibori 3	Generation attached S/s				
31	220 kV Kalmeshwar	State Control Area	Maharastra	MPPTCL	MP-D	3rd Week Of April
	220 kV Ambazari	Generation attached S/s				
32	220 kV Khaperkheda	Generation attached S/s	Maharastra	MPPTCL	MP-E	3rd Week of March
	220 kV Kanhan	State Control Area				
31	220 kV Kaulewada	State Control Area	Maharastra	MPPTCL	MP-A	4th Week of May
32	220 kV Bale	Generation attached S/s		MPPTCL	MP-B	1th Week of June
33	220 kV Malegaon	State Control Area	Maharastra	MPPTCL	MP-E	3 Week of June
34	220/132/33/11kV Manmad	State Control Area	Maharastra	MPPTCL	MP-A	1st Week of September
	220 kV Chalisgaon - II	State Control Area				
35	220 kV Amalner	State Control Area	Maharastra	MPPTCL	MP-B	3rd Week Of September
	220 kV Dondaicha	State Control Area				

36	220 kV Parbhani	State Control Area	Maharastra	MPPTCL	MP-E	1 st Week of October
	220 kV Limbala MIDC Hingoli	State Control Area				
37	220 kV Warora	Generation attached S/s	Maharastra	MPPTCL	MP-C	4th Week Of September
	220 kV Chandrapur MIDC	Generation attached S/s				
	220 kV Gadchandur	Generation attached S/s				
38	220 kV GCR Parli	Generation attached S/s	Maharastra	MPPTCL	MP-D	2nd Week of October
	220 kV New TPS Parli	Generation attached S/s				
	220 kV Parli Unit-8	Generation attached S/s				
39	220 kV Wani	State Control Area	Maharastra	CSPTCL	CS TEAM -B	1st Week of October
	220 kV Waghala (Nanded-II)	State Control Area				
40	220 kV Chitegaon	State Control Area	Maharastra	GETCO	GJ-A	1st Week Of April
	220 kV Deogaon Rangari	Generation attached S/s				
41	220 kV Eklahare (Gcr)	Generation attached S/s	Maharastra	GETCO	GJ-B	3rd Week of April
	220 kV Eklahare (Ocr)	Generation attached S/s				
42	220 kV Ranjangaon	State Control Area	Maharastra	GOA	GOA TEAM	1st Week of December
43	220kV Sevaliya s/s	GETCO	Gujarat	MPPTCL	MP-A	4th Week Of October
	220kV Barejdai					
44	220kV Mera s/s	GETCO	Gujarat	MPPTCL	MP-B	1st Week of November
	220kV Radhanesda					
45	220kV Charkha s/s	GETCO	Gujarat	MSETCL	MH TEAM-C	2nd Week of October
	220kV Mesanka s/s					
46	220kV Shelavadar s/s	GETCO	Gujarat	MSETCL	MH TEAM -E	4th Week Of October
	220kV Rajula s/s					
47	220kV Kalawad s/s	GETCO	Gujarat	CSPTCL	CS TEAM-C	2 nd Week of November
	400kV Motigop s/s					
48	220 kV S/s Banari	CSPTCL	Chhattisgarh	MPPTCL	MP-C	3rd Week of November
	220 kV S/s Dhardehi					
49	220 kV S/s Korba-East	CSPTCL	Chhattisgarh	MPPTCL	MP-D	1st Week of December
	220 kV S/s DSPM					
50	220 kV S/s Korba West	CSPTCL	Chhattisgarh	MPPTCL	MP-E	3rd Week Of December
	220 kV S/s Churri					
51	220 kV S/s Kotmikala	CSPTCL	Chhattisgarh	MSETCL	MH TEAM-A	2nd Week Of December
52	220 kV S/s Raigarh	CSPTCL	Chhattisgarh	MSETCL	MH TEAM -G	1st Week of November
	220 kV S/s Saraipali					
53	220 kV S/s Urla	CSPTCL	Chhattisgarh	MSETCL	MH TEAM -F	3 rd Week of November
	220 kV S/s Borjhara					
	220 kV S/s Doma					
54	220 kV S/s Kawardha (Gendpur)	CSPTCL	Chhattisgarh	GETCO	GJ-A	2nd Week Of November
55	220 kV S/s Thelkadih	CSPTCL	Chhattisgarh	GETCO	GJ-B	4th Week Of November

	Transmission Line Setting Data					
		Line 1	Line 2	.....		
	Name Of line					
	Voltage Level Of Line					
	Type of Line					
	SC/DC/MC					
	OH/Cable/Hybrid					
	Tower Type					
	Horrizantal/Vertical/UG/Others					
	Connected at					
	Local End					
	Local Station Name					
	Local Station Owner					
	Bus Configuration					
	Local s/s fault MVA					
	Remote End					
	Remote Station Name					
	Remote Station Owner					
	Remote s/s fault MVA					
	Line Owner					
	Lenth Of Line Km					
	Whether OPGW Provided Y/N					
	Conductor Size					
	Conductor Type					
	Positive Sequence Impedance Z1					
	Zero Sequence Impedance Z0					
	Mutual Impedance Zm					
	Line Angle					
	E/F compensation					
	Tower footing Resistance					
	Arc Resistance					
	Line Thermal Capacity					
	Technical					
	Declared					
	Max MVA Considered at 0.85 KV					
	ZL Load Impedance					
	CT					
	Bay CT/Line CT					
	CTR					
	PT					
	Bus PT/Line PT					
	PTR					
	Adjacent Shortest Line					
	Name					
	KM					
	Positive Sequence Impedance Z1					
	Adjacent Longest Line					
	Name					
	KM					
	Positive Sequence Impedance Z1					
	Shortest Line connected at Local Bus					
	Name					
	KM					
	Positive Sequence Impedance Z1					
	Distance Protection					
	Main 1					
	Make					
	Type/Model					
	Operating Characteristic					
	Ph-G					
	Ph-Ph					
	Zone 1 Fwd					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 2 Fwd					
	%					
	Km					
	Time					
	Ph-G					

	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 3 Fwd					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 4 Rev					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 5					
	Kept Out/Used for					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone Extension					
	Kept Out/Used for					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Main 2					
	Make					
	Type/Model					
	Operating Characteristic					
	Ph-G					
	Ph-Ph					
	Zone 1 Fwd					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 2 Fwd					
	%					
	Km					
	Time					
	Ph-G					
	R					

	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 3 Fwd					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 4 Rev (Used as Bus Bar B/U Protection)					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone 5 (Non Trip /Alarm Purpose only)					
	Kept Out/ Active for (As Non directional fault detector etc)					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Zone Extension Fwd					
	Kept Out/ Active for (Z ex /Carrier aided Protection)					
	%					
	Km					
	Time					
	Ph-G					
	R					
	X					
	Z					
	Ph-Ph					
	R					
	X					
	Z					
	Starter Setting					
	Phase fault Starter : Impedance/Current : Ohm/Amp					
	E/F Starter/Detection : Current					
	PSB Setting					
	PSB Outer Impedance					
	PSB Inner Impedance					
	PSB detection Time					
	PSB Blocked for all Zones exept Zone 1 Y/N					
	Out of step blocking /PSB unblocking time					
	SOTF:					
	Enabled for Impedance Ohm / Current Ohm					
	Enable Time					
	SOTF Reach up to					
	SOTF through manual closing & AR					
	Carrier Aided Protection :					
	PLCC/ FB					
	PU/PO /PB					
	for PU scheme Carrier send for Zone 1 Only : Y/N					
	for PU scheme Carrier Recive accelerates up to which Zone					
	Carrier Time					
	Carrier fail enabled Y/N					
	VT fuse fail :					
	Used for blocking Distance Prot/Voltage dependent function					
	Voltage setting					

	Current (I2/I0) setting to enable fuse fail					
	Time delay for Alarm					
	Unblocking of VT fuse fail with detection of I0/I2 : Y/N					
	Open Coductor Alarm:					
	Current					
	Time					
	A/R :					
	Breaker - Single pole /Gang Operated					
	Breaker Pole descrepancy Time					
	Single Shot/Multi Shot					
	1Ph/3Ph					
	Dead Time					
	Reclaim Time					
	Check Syn Relay					
	In /Out					
	Dead line Charging : Y/N					
	Breaker Manual Close /AR Routed through Check Syn Relay Y/N					
	Confirmed that Max Load impedance is not enchroached in Zone 3 impedance Y/N					
	Line Differential Protection/Pilot wire Protection					
	Main 1:					
	Make					
	Type/Model					
	PU Current Setting					
	Time					
	Slope 1					
	Slope 2					
	Slope 1 Cut Off					
	Current Supervision : Y/N & setting					
	Main 2:					
	Make					
	Type/Model					
	PU Current Setting					
	Time					
	Slope 1					
	Slope 2					
	Slope 1 Cut Off					
	Current Supervision : Y/N & setting					
	O/C + E/F Protection					
	O/C					
	Y/N					
	PU Current					
	Time/TMS					
	DT/IDMT 3 sec/IDMT 1.3 Sec					
	Direction : Fwd/Rev/Non Directional					
	LBB Protection					
	PU Current					
	Re TripTime					
	LBb Time					
	Over Voltage Protection					
	Stage 1					
	Pick up					
	Reset ratio					
	Time					
	Stage 2					
	Pick up					
	Reset ratio					
	Time					
	Load Trimming Scheme					
	Y/N					
	PU Alarm					
	Time					
	PU Trip					
	Time					
	Expexted load Relief					
	Direction : Fwd/Rev/Non Directional					
	LA					
	Make/Model					
	Type					
	KV					
	LA rating					
	Note					
	Add/ Strike out whichever necessary					
	Any Additional Protection if any					

	ICT/TF Settings Data						
	Name Of s/s						
	s/s Owner						
	Bus Configuration :						
	HV						
	IV/MV						
	LV1/Tertiary						
	LV2						
	Bus Fault MVA :						
	HV						
	IV/MV						
	LV1/Tertiary						
	LV2						
	Details Of ICT /TF						
	Type						
	ICT/Transformer						
	Auto /2Wdg/3Wdg						
	MVA						
	HV						
	IV/MV						
	Tertiary						
	LV1						
	LV2						
	Whether Tertiary Used for : Loaded /Unloaded/Stabilized						
	Nominal Ratio/KV Level		KV	Amp			
	HV						
	IV/MV						
	Tertiary						
	LV1						
	LV2						
	FL Current		KV	Amp			
	HV						
	IV/MV						
	Tertiary						
	LV1						
	LV2						
	Tap Max/Min Tap Voltage						
	Whether NGT Provided for main delta connected winding						
	CTR		Bay	Used for	Turret/Bushing	Used for	
		HV					
		IV/MV					
		Tertiary					
		LV1					
		LV2					
		HV -N					
		LV1-N					
		LV2-N					
		NGT					
	PTR	HV					
		IV/MV					
		Tertiary					
		LV1					
		LV2					
	Vector Group						
	% Impedance at Normal Tap						
		HV-IV					
		HV-Tertiary					
		IV-Tertiary					
		HV-LV1					
		HV-LV2					
	Differential Protection	Make					
		Type/Model					
	Pick Up		Current	Time			

		Low Set					
		HS1					
		HS2					
	Slope 1						
	Slope 2						
	Slope 1 Cut Off						
	2nd Harmonic Restraint						
	Cross Blocking	Y/N					
	5th Harmonic Restraint						
	Zero Sequence Current	ON/OFF					
	Current Supervision	Y/N					
	REF Protection		HV	LV1/NGT	LV2		
	HV						
	Type	High/Low Impedance					
	Calculated Through fault Voltage						
	Pick up	Current/Voltage					
	Time						
	Stabilizing Resistance						
	Current Supervision						
	Backup Protection						
	HV O/ C +E/F			O/C		E/F	
				PS/PU	TMS/Time	PS/PU	TMS/Time
		PS/PU					
		% FL for O/C					
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					
	Direction	Fwd/Rev/Non Directional					
	2nd Harmonic Restraint	ON/OFF					
	IV/MV O/ C +E/F			O/C		E/F	
				PS/PU	TMS/Time	PS/PU	TMS/Time
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					
	Direction	Fwd/Rev/Non Directional					
	2nd Harmonic Restraint	ON/OFF					
	LV1/Tertiary O/ C +E/F			O/C		E/F	
				PS/PU	TMS/Time	PS/PU	TMS/Time
		PS/PU					
		% FL for O/C					
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					
	Direction	Fwd/Rev/Non Directional					
	2nd Harmonic Restraint	ON/OFF					
	LV2 O/ C +E/F			O/C		E/F	
				PS/PU	TMS/Time	PS/PU	TMS/Time
		PS/PU					
		% FL for O/C					
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					
	Direction	Fwd/Rev/Non Directional					
	2nd Harmonic Restraint	ON/OFF					
	Sensetive E/F			HV	LV1/Tertiary	LV2	
	PS/Pickup						
	Time/TMS						
	Operating Curve	DT/IDMT 3 Sec /1.3 Sec					
	Overload			HV	LV1/Tertiary	LV2	
	PU for Alarm						
	% FL						
	Time						
	PU for Trip						
	% FL						
	Time						
	Expected Load Relief	MW					
	Tertiary delta NDR Protection						
		Open delta Voltage	Internal		External		
			Stage 1	Stage 2	Stage 1	Stage 2	
		Pick up Voltage					
		Time					
		Alarm/ Trip					
	Over excitation	V/F setting					

		Time					
		Alarm/Trip					
	LBB Protection		HV	IV/MV	Tertiary	LV1	LV2
		Current					
		Re TripTime					
		LBb Time					
	Transformer Auxilaries		Y/N	Setting			
	Bucchholz Alarm						
	Bucchholz Trip						
	OLTC Bucchholz/OSR Alarm						
	OLTC Bucchholz/OSR Trip						
	PRV 1 Trip						
	PRV 2 Trip						
	SPR Trip						
	Oil Temp Alarm						
	Oil Temp Trip						
	Winding Temp Alarm						
	Winding Temp Trip						
	MOG Alarm						
	Fire Protection Provided	Y/N					
	Type of Fire Protection	Water/N2 injection/TP/Others					
	LA		HV	IV/MV	Tertiary	LV1	LV2
		Make/Model					
		Type					
		KV					
		LA rating					
	Note						
	Add/ Strike out whichever necessary						
	Any Additional Protection if any						

	Bus Bar Protection						
	Name of s/s						
	s/s Owner						
	Voltage levels at s/s	KV	Bus Configuration	Fault MVA	CT Location	B/C	TBC
					Bay/Line	Y/N	Y/N
	Bus 1						
	Bus 2						
	Bus 3						
	Bus 4						
	Bus 5						
A	**Bus Bar Protection**						
1	**Bus 1**	Make					
		Type / Model					
	Calculated Through fault Voltage						
	High/Low Impedance						
	No of Bays						
	No of Main Zones						
	CTR						
	Check Zone	External/Internal					
	Pick Up						
	Slope 1						
	Slope 2						
	Slope 1 Cut Off						
	Stabilizing Resistance						
	End Zone Protection	ON/OFF					
	DT send	Provided/Not Provided					
	BB Trip to ICT/TF Master Trip	Provided/Not Provided					
	Whether internal LBB Protection function is used for Bay						
2	**Bus 2**	Make					
		Type / Model					
	Calculated Through fault Voltage						
	High/Low Impedance						
	No of Bays						
	No of Main Zones						
	Check Zone	External/Internal					
	Pick Up						
	Slope 1						
	Slope 2						
	Slope 1 Cut Off						
	Stabilizing Resistance						
	End Zone Protection	ON/OFF					
	DT send	Provided/Not Provided					
	BB Trip to ICT/TF Master Trip	Provided/Not Provided					
	Whether internal LBB Protection function is used for Bay						
3	**Bus 3**	Make					
		Type / Model					
	Calculated Through fault Voltage						
	High/Low Impedance						
	No of Bays						

	No of Main Zones						
	CTR						
	Check Zone	External/Internal					
	Pick Up						
	Slope 1						
	Slope 2						
	Slope 1 Cut Off						
	Stabilizing Resistance						
	End Zone Protection	ON/OFF					
	DT send	Provided/Not Provided					
	BB Trip to ICT/TF Master Trip	Provided/Not Provided					
	Whether internal LBB Protection function is used for Bay	Y/N					
4	**Bus 4**	Make					
		Type / Model					
	Calculated Through fault Voltage						
	High/Low Impedance						
	No of Bays						
	No of Main Zones						
	CTR						
	Check Zone	External/Internal					
	Pick Up						
	Slope 1						
	Slope 2						
	Slope 1 Cut Off						
	Stabilizing Resistance						
	End Zone Protection	ON/OFF					
	DT send	Provided/Not Provided					
	BB Trip to ICT/TF Master Trip	Provided/Not Provided					
	Whether internal LBB Protection function is used for Bay						
5	**Bus 5**	Make					
		Type / Model					
	Calculated Through fault Voltage						
	High/Low Impedance						
	No of Bays						
	No of Main Zones						
	CTR						
	Check Zone	External/Internal					
	Pick Up						
	Slope 1						
	Slope 2						
	Slope 1 Cut Off						
	Stabilizing Resistance						
	End Zone Protection	ON/OFF					
	DT send	Provided/Not Provided					
	BB Trip to ICT/TF Master Trip	Provided/Not Provided					
	Whether internal LBB Protection function is used for Bay						
B	**Bus Coupler**		Bus1	Bus 2	Bus 3	Bus 4	Bus 5
	CTR						
1	**O/C**						
	PS/PU						
	TMS/Time						
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					

2	**E/F**						
	PS/PU						
	TMS/Time						
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					
3	**REF Protection**		Bus1	Bus 2	Bus 3	Bus 4	Bus 5
	HV						
	Type	High/Low Impedance					
	Calculated Through fault Voltage						
	Pick up	Current/Voltage					
	Time						
	Stabilizing Resistance						
	Current Supervision						
C	**TBC**		Bus1	Bus 2	Bus 3	Bus 4	Bus 5
	CTR						
1	**O/C**						
	PS/PU						
	TMS/Time						
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					
2	**E/F**						
	PS/PU						
	TMS/Time						
	Operating Curve	DT/IDMT 3 Sec /IDMT 1.3 Sec					
3	**REF Protection**		Bus1	Bus 2	Bus 3	Bus 4	Bus 5
	HV						
	Type	High/Low Impedance					
	Calculated Through fault Voltage						
	Pick up	Current/Voltage					
	Time						
	Stabilizing Resistance						
	Current Supervision						
	Note						
	Add/ Strike out whichever necessary						
	Any Additional Protection if any						

Special Protection						
	Name Of s/s					
	Owner Of s/s					
	Voltage levels Available					
A	**UFR**	1	2	3	4	5
	Bus PT Connected					
	Set frequency					
	Reset ratio					
	Time					
	Max Load Relief MW					
B	**df/ dt**	1	2	3	4	5
	Bus PT Connected					
	Set frequency					
	Reset ratio					
	rate of fall Hz/sec					
	No of cycles					
	Time					
	Max Load Relief MW					
C	**Under voltage**	1	2	3	4	5
	Bus PT Connected					
	Pick up					
	Reset ratio					
	Time					
	Max Load Relief MW					
D	**Islanding Schme**					
	whether duplicated Y/N					
	Type of Scheme : UFR					
	/FTR/RPUF+UFR/RPUF+FTR					
	Connected to :					
	CT					
	PT					
	Current setting					
	Voltage setting					
	RPUF setting					
	UFR setting					
	df/dt + Limit frequency setting					
	Time delay					
	No. of cycles for detection					
	Reset/ Reset ratio					
	Note					
	Add/ Strike out whichever necessary					
	Any Additional Protection if any					