



Agenda for 82nd PCC Meeting

Date: 19.08.2019
Eastern Regional Power Committee
14, Golf Club Road, Tollygunge
Kolkata: 700 033

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 82ND PROTECTION SUB-COMMITTEE MEETING TO BE HELD AT ERPC, KOLKATA ON 19.08.2019 (MONDAY) AT 11:00 HOURS

PART – A

ITEM NO. A.1: Confirmation of minutes of 81st Protection sub-Committee Meeting held on 18th July, 2019 at ERPC, Kolkata.

The minutes of 81st Protection Sub-Committee meeting held on 18.07.19 circulated vide letter dated 08.08.2019.

Members may confirm the minutes of 81st PCC meeting.

PART – B

ANALYSIS & DISCUSSION ON GRID INCIDENCES OCCURRED IN JULY, 2019

ITEM NO. B.1: Total Power failure at 220 kV Jorethang, 220 kV Tashiding & 220 kV New Melli S/s on 14.07.2019 at 10:35 Hrs.

At 10:35 hrs, 220 kv Jorethang – New Melli D/C, 220 kv Rangpo - Tashiding S/C, 220 kv Tashiding – New Melli S/C and 220 kV New Melli – Rangpo S/C tripped due to R-Y fault resulting total power failure at Jorethang, Tashiding and Melli (New) S/S. All the running units at Jorethang and Tashiding tripped due to loss of evacuation path.

Detailed report is enclosed at Annexure B1.

Generation Loss: 200 MW

Relay indications are as follows:

Name of the elements	Relay Indication at end 1	Relay Indication at end 2
220 kV Jorethang – New Melli D/C	Y-B, Z-I, Fault Current: 0.5kA in Y phase & 0.3 kA in B phase	Did not trip
220 kV Rangpo - Tashiding S/C	Did not trip	Y-B, Fault Current: 3.48kA in Y phase & 3.63 kA in B phase
220 kV Tashiding – New Melli S/C	Y-B, Fault Current: 3.81kA in Y phase & 3.61 kA in B phase	Yet to be received
220 kV New Melli – Rangpo – S/C	Details not received	Details not received

DANS Energy & Powergrid may explain.

ITEM NO. B.2: Disturbance at 400 kV Kahalgaon S/s on 26.07.2019 at 10:30 Hrs.

At 10:30 hrs, KhSTPP unit#3 tripped along with 400 kV Khalgaon bus-II. 400 KV KhSTPP - Lakhisarai - II also tripped at the same time due to DT receipt at Lakhisarai end.

As per the information received, Unit#3 tripped due to loss of auxiliary supply. 400 kV Bus-II tripped due to operation of LBB of main bay of U#3.

No fault has been observed in PMU data at the time of the event.

Generation Loss: 184 MW

NTPC & Powergrid may explain.

ITEM NO. B.3: Disturbance at 220 kV Siliguri S/s on 22.07.19 at 03:57 Hrs.

At 03:57 Hrs, 220kV Siliguri-Dalkhola-II tripped at Siliguri end. At the same time, 220kV Siliguri-Binaguri - II, 220/132 kV ICT-II at Siliguri also got tripped. As per preliminary report received, 220 kV bus – II tripped at Siliguri S/s.

Detailed report is enclosed at Annexure B3.

Load/Generation Loss: Nil

Powergrid may explain.

ITEM NO. B.4: Tripping Incidences in the month of July, 2019.

Other tripping incidences occurred in the month of July 2019 which needs explanation from constituents of either of the end is given in **Annexure-B4**.

In 36th TCC, all the constituents were advised to use the PDMS on-line portal for uploading the single line tripping details along with DR (comtrade files), EL and other relevant files for all trippings of August 2017 onwards. Otherwise, it will be considered as violation of compliance of clause 5.2(r) & 5.9 of IEGC.

In 74th PCC, all the constituents were requested to submit the disturbance report along with DR through the new version of on-line portal which was implemented from 01st Jan. 2019.

In 80th PCC meeting, all the transmission utilities were advised that they should place the details of transmission line tripping which is not attributable to them such as tripping of a transmission line on zone 3 due to a fault in adjacent line or any such cases related to protection.

In 81st PCC Meeting, PRDC was advised to give necessary access to the users of PDMS only for viewing & download the reports, DRs & other details for the lines belong to neighboring control area to whom the constituents share tie lines.

Members may discuss.

PART- C:: OTHER ITEMS

ITEM NO. C.1: Islanding Scheme at Kanti TPS- KBUNL

In 68th PCC Meeting, it was decided that the islanding of Kanti TPS would be implemented with the following scheme:

1. Stage II units (2x195 MW) of Kanti TPS will be islanded with station load of 40 MW and radial load of 150 MW (approx.) of 220kV Kanti TPS-Gopalganj D/C line.
2. Once the grid frequency falls to 48.2 Hz, the PLC at Kanti TPS would initiate the islanding process with 500 ms time delay.

In 78th PCC Meeting, NTPC suggested that a step wise islanding scheme may be planned considering different grid conditions and unit availability at Kanti TPS.

PCC advised NTPC to prepare a draft plan and submit to ERPC and ERLDC for detailed discussion in next PCC Meeting.

PCC also advised BSPTCL and Powergrid to check the healthiness of PLCC system in coordination with Kanti TPS.

In 80th PCC, NTPC was advised to clarify the inclusion of MTPS stage-I units and 220 kV MTPS-II –Muzzaffarpur(PG) lines in the draft islanding scheme.

BSPTCL was advised to check the healthiness of PLCC system for all the BSPTCL lines connected to MTPS-II.

Members may discuss.

ITEM NO. C.2: Implementation of differential protection for short distance lines in different substations connected to Powergrid ER-II.

In 40th ERPC &TCC Meeting, the implementation of differential protection for ten(10) no. of short distance lines has been approved. The list of the lines are as follows:

Sl. No.	Substation name	Name of the Line	Line length in km	Line owned by
1	Durgapur	220KV DGP (PG) - DVC Ckt.-I	1	DVC
2		220KV DGP (PG) - DVC Ckt.-II	1	DVC
3		400 kV DGP (PG) - Bidhan Nagar (WBSETCL) Ckt.-I	11	WBSETCL
4		400 kV DGP (PG) - Bidhan Nagar (WBSETCL) Ckt.-II	11	WBSETCL
5	Malda	132KV MLD (PG) - MLD (WBSETCL) Ckt.-I	5.94	WBSETCL
6		132KV MLD (PG) - MLD (WBSETCL) Ckt.-II	5.94	WBSETCL
7	Alipurduar	220KV ALPD (PG)- ALPD (WBSETCL) Ckt-I	6.377	WBSETCL
8		220KV ALPD (PG) - ALPD (WBSETCL) Ckt.-II	6.377	WBSETCL
9	Birpara	132KV BRP (PG) - BRP (WBSETCL) Ckt.-I	0.3	WBSETCL
10		132KV BRP (PG) - BRP (WBSETCL) Ckt.-II	0.3	WBSETCL

Members may update the latest status.

ITEM NO. C.3: FOLLOW-UP OF DECISIONS OF THE PREVIOUS PROTECTION SUB-COMMITTEE MEETING(S)

The decisions of previous PCC Meetings are given at Annexure-C3.

In 73rd PCC, it was observed that latest status on the implementation of the previous PCC recommendations were not updated by the constituents regularly. All the constituents were advised to update the latest status of the recommendations as per the list given in Annexure.

Members may update the latest status.

ITEM NO. C.4: Schedule of training program to be conducted by PRDC

PRDC, as per the AMC, is going to conduct 2nd training programme on PDMS and PSCT in state utility premises of Eastern Region. The tentative schedule is given below:

Sl no.	State	Location	Date	Training
1.	West Bengal	NJP	04.02.2019-05.02.2019	on PDMS
		Durgapur	07.02.2019-08.02.2019	
2.	Bihar	North Bihar	08.04.2019-09.04.2019	
		South Bihar	11.04.2019-12.04.2019	
3.	Sikkim	-	03.06.2019-04.06.2019	
4.	Odisha	-	08.07.2019-09.07.2019	
5.	Jharkhand	-	05.08.2019-06.08.2019	
6.	For All States	ERPC	02.09.2019-06.09.2019	on PSCT

PRDC informed that the training programme on PDMS has already been completed in West Bengal, Bihar & Sikkim as per the above schedule.

BSPTCL requested to conduct one more training programme for their personnel. PCC advised BSPTCL to coordinate with PRDC for arranging one more training at Bihar.

PRDC further informed that the training programme on PDMS for Odisha is scheduled to be held on 22nd & 23rd July 2019 at Bhubaneswar.

Members may update.

ITEM NO. C.5: Status of Third Party Protection Audit

The compliance status of 1st Third Party Protection Audit observations is as follows:

Name of Constituents	Total Observations	Complied	% of Compliance
Powergrid	54	46	85.19
NTPC	16	14	87.50
NHPC	1	1	100.00
DVC	40	26	65.00
WB	68	49	72.06
Odisha	59	42	71.19
JUSNL	34	25	73.53

BSPTCL	16	5	31.25
IPP (GMR, Sterlite and MPL)	5	5	100.00

* Pending observations of Powergrid are related to PLCC problems at other end.

The substation wise status of compliance are available at ERPC website (Observations include PLCC rectification/activation which needs a comprehensive plan).

In 77th PCC, BSPTCL has submitted the updated status.

In 79th & 80th PCC, BSPTCL was advised to submit the details of the compliance report.

BSPTCL may update.

ITEM NO. C.6: Non-commissioning of PLCC / OPGW and non-implementation of carrier aided tripping in 220kV and above lines.

According to CEA technical standard for construction of electric plants and electric lines -Clause 43(4) (c), transmission line of 220 KV and above should have single-phase auto-reclosing facility for improving the availability of the lines. However, from the tripping details attached June-August, 2016 it is evident that the some of 220kV above Inter & Intra-Regional lines do not having auto-reclose facility either at one end or at both ends. Out of these for some of the lines even PLCC/OPGW is not yet installed and carrier aided protection including Autorecloser facility is not yet implemented. Based on the trippings of June- August, 2016 and PMU analysis a list of such lines has been prepared and as given below:

List of line where auto reclose facility is not available(Information based on PMU data analysis)							
S. No	Transmission Lines name	Date of Tripping	Reason of Tripping	Owner Detail		Present Status	
				End-1	End-2	OPGW/P LCC Link available	AR facility functional
13	<u>220KV BUDIPADAR-KORBA-II</u>	23.06.16	Y-N FAULT	OPTCL	CSEB	PLCC available	will be activated in consultation with Korba
17	<u>220 KV TSTPP-RENGALI</u>	17.07.16	EARTH FAULT	NTPC	OPTCL		by March 2018
18	<u>220KV BUDIPADAR-RAIGARH</u>	21.07.16	EARTH FAULT	OPTCL	PGCIL	PLCC defective	
20	<u>220 KV FARAKKA-LALMATIA</u>	03.08.16	B-N FAULT	NTPC	JUNSL	Yes	Old Relay and not functional. 7-8 months required for auto re-close relay procurement.
23	<u>220 KV MUZAFFARPUR - HAZIPUR - II</u>	10.08.16	B-N FAULT	PGCIL	BSPTCL		Voice established. For carrier required shutdown
24	<u>220 KV ROURKELA - TARKERA-II</u>	11.08.16	B-N FAULT	PGCIL	OPTCL	OPGW available	Expected to install

							protection coupler by Jan 17
27	<u>220 KV BIHARSARIF-TENUGHAT</u>	07.09.16	B-N FAULT	BSPTCL	TVNL		
33	220KV Jamshedpur-Jindal-SC						

34th TCC advised all the respective members to update the above list along with the last tripping status in next PCC meeting.

TCC further advised all the constituents to give the latest status of PLCC of other 220kV and above lines under respective control area.

OPTCL:

1. 220kV Rengali(PG)-Rengali S/Y (Proposal for Commn. in OPGW is pending): *PSDF appraisal committee accepted the proposal*
2. 220kV Indravati(PG)-Indravati(PH) (Proposal for Commn. in OPGW pending): *PSDF appraisal committee accepted the proposal*
3. 132kV Baripada(PG)-Baripada (Tendering in Progress for OPGW): *Contract awarded*
4. 132kV Baripada(PG)-Rairangpur (Tendering in Progress for OPGW): *Contract awarded*

BSPTCL:

SI No.	Lines	Status
1	220 kV Purnea(PG)-Madhepura	<i>Protection through PLCC is working properly</i>
2	220 kV Biharsharif-BTPS new	<i>Commissioning of PLCC is under progress.</i>
3	220 kV BTPS new- Begusarai	<i>Commissioning of PLCC is under progress.</i>
4	220 kV Biharsharif-Bodhgaya line LILO at Khizersarai	<i>OPGW is present. Protection is done through DPC.</i>
5	220kV MTPS-Motiari line	<i>OPGW is installed.</i>
6	220KV Madhepura-New Purnea D/C	<i>Protection through PLCC is working properly</i>
7	220KV Muzaffarpur-Hajipur D/C line	<i>Protection through PLCC is working properly</i>
8	220KV Patna-Khagaul-SC	<i>PLCC Panel working properly.</i>
9	220 kV DMTCL(Darbhangha)-Laukhi Circuit-I	<i>PLCC Panel working properly</i>
10	220 kV Tenughat-Biharsharif S/C	<i>PLCC to be commissioned</i>
11	220 kV Gaya-Sonenagar New circuit-I	<i>Communication through OPGW</i>
12	220 kV Pusauli-Dehri S/C	<i>PLCC not working</i>
13	220 kV Begusarai-Purnea(PG) D/C	<i>PLCC working properly</i>
14	220 kV DMTCL-Motipur ckt-II	<i>PLCC to be commissioned.</i>
15	220 kV Dehri- Gaya D/C	<i>PLCC working properly</i>
16	220 kV Kishanganj(PG)-Kishanganj(B)-II	<i>PLCC working properly</i>

In 79th PCC, BSPTCL submitted PLCC status of some of the lines. The details have been updated in above table.

In 80th PCC meeting, BSPTCL was advised to rectify the PLCC & Autoreclose issues in coordination with their communication wing.

Members may update.

ITEM NO. C.7: Schedule for 2nd Third Party Protection Audit

The third party protection Audit for the following substations in Bihar has been planned to be carried out on 22nd & 23rd August, 2019.

1. 400 kV Patna S/s-Powergrid
2. 220 kV Fatuha S/s- BSPTCL

In addition to this, UFR Testing at 132/33 kV Fatuha, 132/33 kV Digha, 132/33 kV Gaighat & 132/33 kV Mithapur S/s has also been planned during the above visit.

Members may note.

ITEM NO. C.8: Agenda Items by ERLDC

1. Tripping of 400 kV Barh – Kahalgaon – I on 27-07-19 at 14:52 hrs.

On 27-07-19 at 14:52 hrs, Y-N fault occurred (F/C 5 kA, distance 58 km from Barh; F/C 3.3 kA, 160 km from Kahalgaon) at 400 kV Barh – Kahalgaon – I. As per line current measured by PMU (shown in Figure-1) installed at Barh, A/R attempt was taken in Y-phase 840 ms after initiation of the fault. As fault was in permanent nature, A/R attempt failed and Y pole breaker got opened. But R and B phase breaker did not open instantly. Again autoreclosure was attempted for all three poles after 1.32 seconds from unsuccessful A/R attempt of Y pole and tripped again after 6.2 seconds (approx.). During this time current was same as pre-fault condition.

As per DR received (Attached in annexure-C8.1) from Barh end, R and B phase tie breakers did not open after unsuccessful auto reclose attempt of Y phase main breaker.

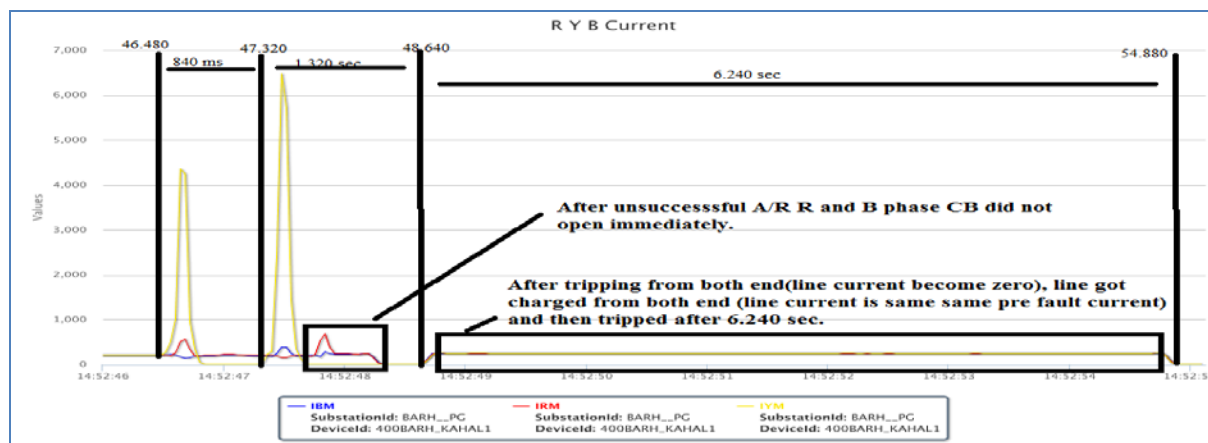


Figure 1: Current measured at Barh PMU for 400 kV Barh - Kahalgaon - I during the tripping incident

NTPC may explain.

2. Multiple tripping incident at Koderma s/s at 21:28 hrs on 24-07-19

At 21:28 hrs on 24-07-19, 400 kV Bus Reactor I & II at Koderma and 400 kV Bokaro - Koderma – II tripped at 21:28 hrs. As per relay indication received, B/R I & II tripped on REF and 400 kV Bokaro - Koderma – II tripped on B-N fault at Koderma and DT receipt at Bokaro. As per current of 400 kV Bokaro – Koderma – II recorded at Bokaro PMU data (shown in figure-2), fault was not observed at the event of the operation.

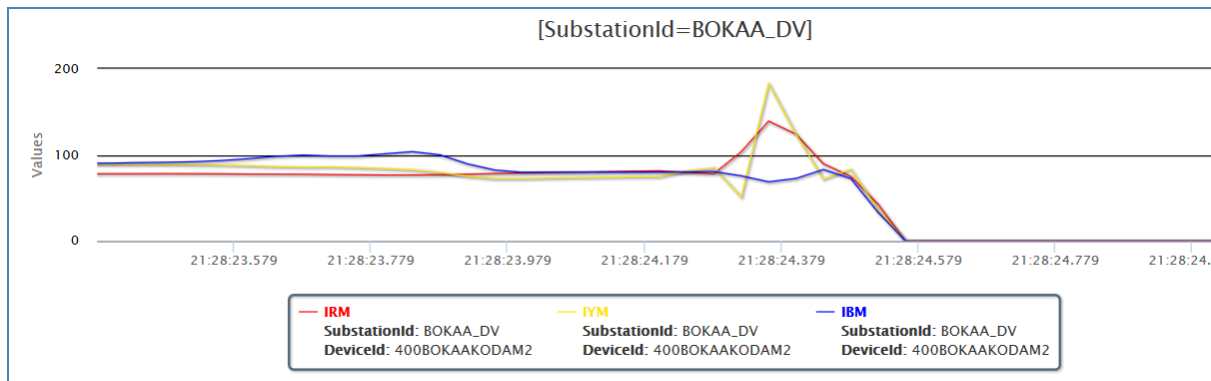


Figure 2: Three phase current recorded at Bokaro for 400 kV Bokaro - Koderam - II

DVC may explain.

3. 3-ph auto-reclose operation for 400 KV Kishangunj-Rangpo line at Kishangunj at 17:30 hrs on 31-07-19

400 KV Kishangunj-Rangpo S/C successfully auto-reclosed at 17:30 hrs on 31-07-2019 due to B-N fault. From PMU analysis it is observed that after 1 sec of the tripping, single phase Auto-reclose was successful from Rangpo end whereas from Kishangunj end 3-phase Auto-reclose attempt was taken and it was successful. PMU observation recorded at Kishangunj S/S and Rangpo S/S are shown in figure 3&4.

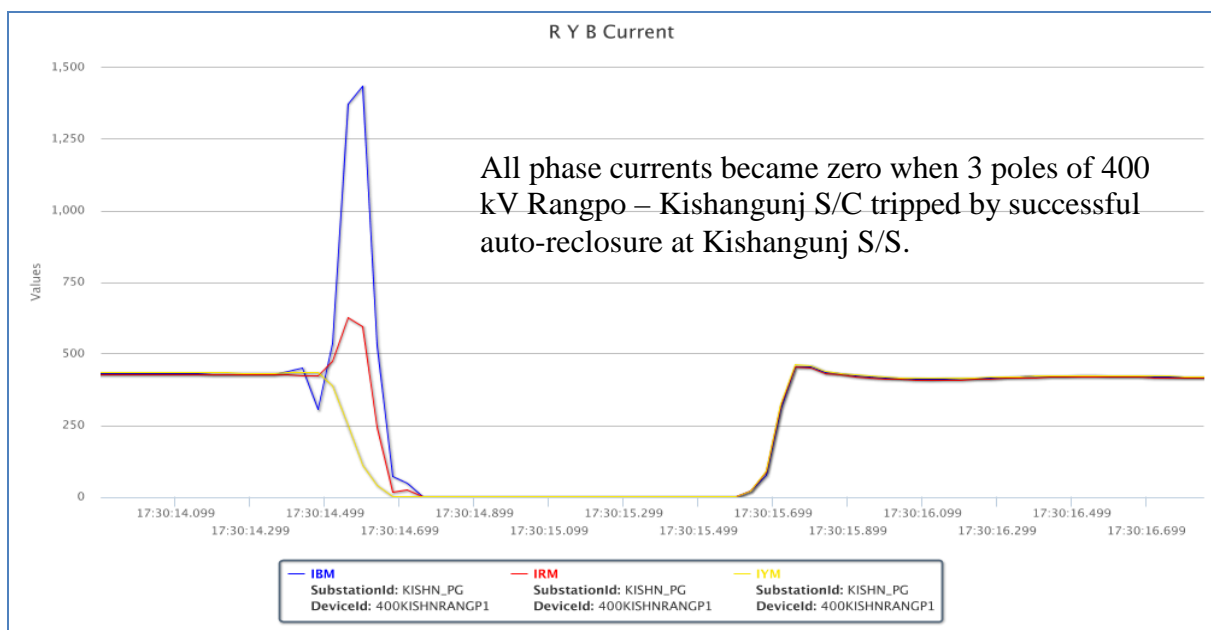


Figure 3: Three phase current recorded at Kishangunj end for 400 kV Rangpo - Kishangunj S/C

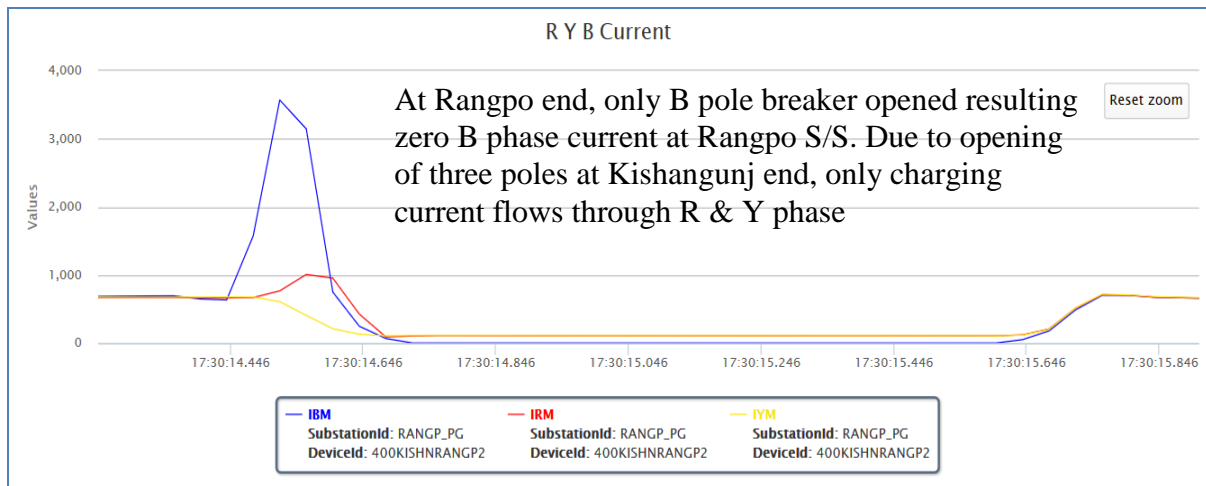
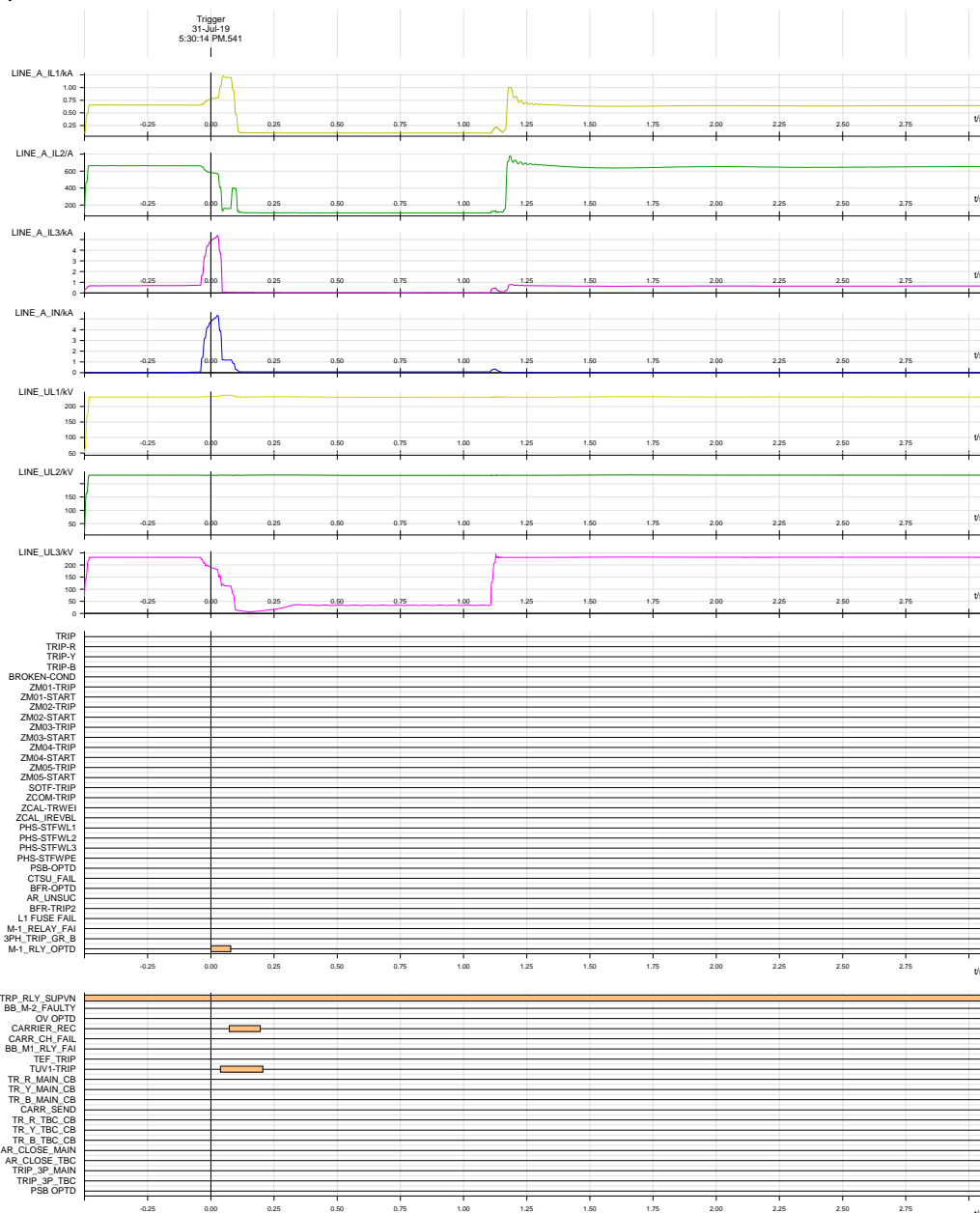


Figure 4: Three phase current recorded at Rangpo end for 400 kV Rangpo - Kishangunj S/C

As per DR recorded at Rangpo end, digital signal for D/P triggering, D/P trip, main CB/tie CB operation etc. are not recorded in DR.



POWERGRID and TVPTL may explain.

4. Tripping of 400 kV Alipurduar – Bongaigaon – II on 20-07-19 at 11:11 hrs.

On 20-07-19 at 11:11 hrs, 400 kV Alipurduar – Bongaigaon – II tripped on Y-N fault after an unsuccessful A/R attempt. As per line current captured in PMU (shown in figure 5) installed at Alipurduar, Y phase current became very low just before the fault. Event could not be analysed due to non-availability of DR.

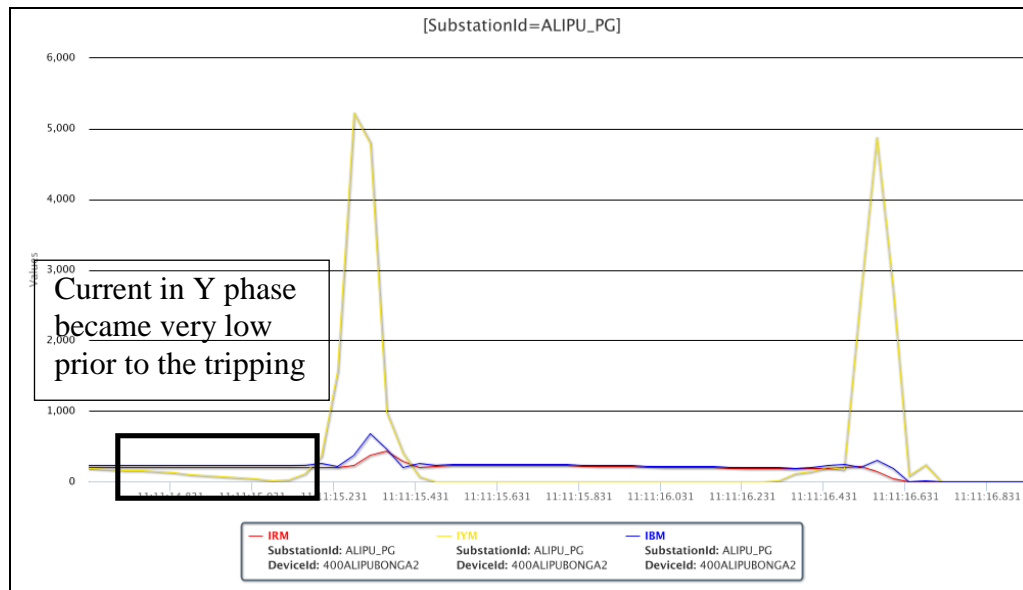


Figure 5: Three phase current captured for 400 kV Alipurduar - Bongaigaon - II at Alipurduar end

Powergrid may explain.

5. Repetitive tripping of 400 kV Alipurduar – Jigmelling – Mangdechu section on 17-07-19, 18-07-19 and 19-07-19

400 kV Alipurduar – Jigmelling – Mangdechu section tripped several times during 17-07-19 to 19-07-19. In all cases, delayed clearance of high resistance fault has been observed. After analysis of the events, following issues has been observed.

Issues observed at Bhutan
1. Complete DR files have not been submitted for immediate resolution of issue by analysing the DR.
2. The submitted DR files format are not standardised and many digital channel were found to be missing.
3. The complete detail on the protection on which the 400 kV Alipurduar-Jigmelling 1 & 2 and 400 kV Jigmelling-Mangdechu circuits have tripped are not evident from the DR. The reason was also not mentioned by BPC.
4. During submission of DR file, either Main-1 or Main-2 DR has been submitted. Non-Submission of complete protection system DR has led to incomplete analysis.
5. The DR received from Mangdechu were not in comtrade (.cfg,.dat) and due to which analysis was difficult.
6. Issues of high impedance fault were observed on 400 kV Jigmelling-Mangdechu

circuits causing multiple tripping.

- A.** Proper coordination on DEF setting may be advised for the 400 kV Jigmelling-Mangdechu circuits and 400 kV Alipurduar-Jigmelling circuits to isolate the fault within time and reduce the multiple tripping from the system
- B.** Patrolling of 400 kV Alipurduar-Mangdechu-Jigmelling circuits on regular interval in rainy season to avoid high resistive fault in the system.

Issues observed at PGCIL

1. It was observed that idle charge setting was kept in distance protection and O/C setting for 400 kV Alipurduar-Jigmelling circuit 2 in its main 2 protection at Alipurduar.

BPC & Powergrid may explain.

6. Multiple tripping incident at Bihar Sharif at 16:39 hrs on 12-06-19

400 kV Bihar Sharif – Balia D/C were out of service at the time of the incident. Between 16:39 hrs to 16:42 hrs, following elements got tripped from Bihar Sharif substation:

- 400kV Bihar Sharif – Banka – I & II
- 400 kV Bihar Sharif – Sasaram – I
- 400/220 kV ICT at Bihar Sharif II & III
- 400 kV Bihar Sharif – Varanasi – I

Details report is attached in Annexure-C8.6.

Based on the analysis following discrepancies have been observed during this incident:

Name of Element	Issues observed
400/220 kV ICT II & III	Reason for tripping is not known.
400 kV Sasaram – Bihar Sharif – I	At both ends, in DR some of the digital statuses are not configured.
400 kV Bihar Sharif – Banka – I	No A/R observed from Bihar Sharif end for this circuit.
400 kV Bihar Sharif – Sasaram – II	At Bihar Sharif end, B phase tiebreaker did not close after dead time of a transient fault and all three pole of tiebreaker tripped.
400 kV Bihar Sharif – Varanasi – I	Digital signals due to operation of tie breakers at Bihar Sharif end are not properly recorded in DR
400 kV Sasaram – Bihar Sharif – I	Dead time at Sasaram and Bihar Sharif are different

Powergrid may explain.

7. Tripping of 220 kV Arrah - Khagul S/C in idle charged condition on 12-06-19 at 15:24 hrs

As per decision taken 67th PCC meeting, during anti-theft charging Time delays for Zone-1, Zone-2 and Zone-3 should be made instantaneous. But 220 kV Arrah - Khagul S/C tripped on 12-06-19 at 15:24 hrs where fault clearing is zone-2 timing and the line was idle charged from Arrah end.

DR output of 220 kV Arrah – Khagul S/C at Arrah end for the tripping on 12-06-19 at 15:24 hrs is given below.

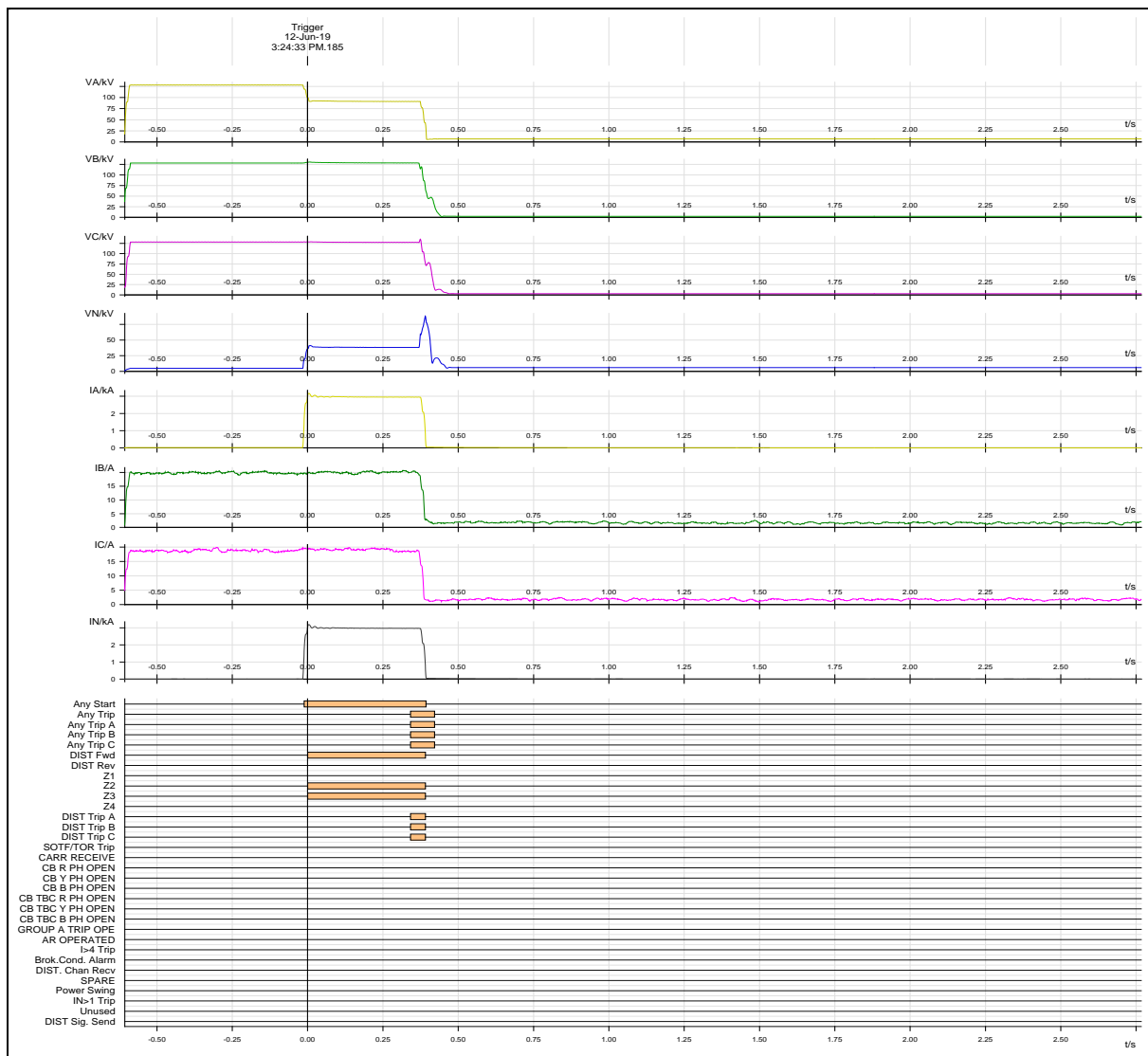


Figure 6: DR at Arrah end for tripping of 220 kV Arrah - Khagul S/C on 12-06-19 at 15:24 hrs

Powergrid may explain.

8. Discrepancies observed in the tripping in the month of May 2019

Sr No.	Tripping date & time	Line Name	Discrepancies observed in the tripping
1	04-05-2019 at 02:28 hrs	400 Kharagpur-Chaibasa-II	WBSETCL to share the reason for not sending the carrier from Kharagpur end. Fault cleared from Chaibasa end in Z-II timing in spite of being auto-reclose from Kharagpur end (Figure 7)
2	05-05-19 at 08:54 hrs	400 KV Malda Purnea-II	POWERGRID to share the reason for delayed fault clearance (140 ms) at Malda end . Dead time at Malda end may be reduced from 1320 ms to 1000 ms. (Figure 8) POWERGRID to share reason for opening of all the 3 poles of Main CB immediately after the fault and reason for auto reclose attempt of tie CB 2.1 sec after the fault. (figure 9)
3	11-05-19 10:34hrs	400 kV Tala Binaguri-II	During auto-reclose from Binaguri end, fault was cleared after 500 ms. POWERGRID may enable

			TOR protection at Binaguri end.
4.	13-05-19 10:44 hrs	400 KV Malbase Binaguri	POWERGRID may share the reason for opening of all three poles at Binaguri end 600 ms after the fault. In the faulted phase (which was in its AR cycle) suddenly 476 kV induced and TOV ST-1 started at Binaguri end. Reason for such high voltage induced in faulted phase may be investigated. Reason for non-operation of TOV ST-2 at Binaguri end may also be checked.

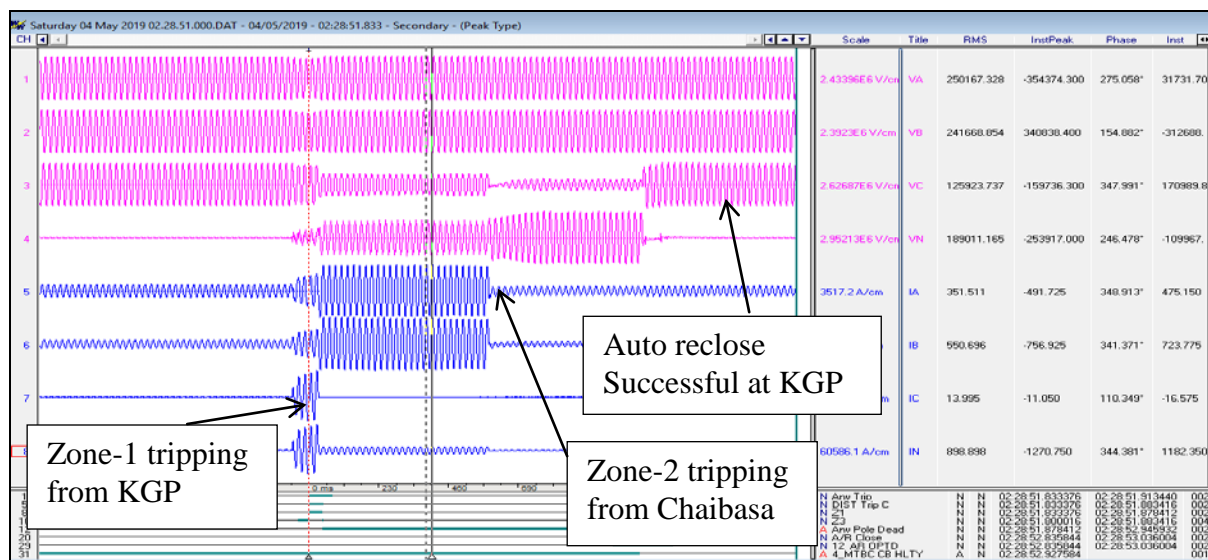


Figure 7: DR recorded at Kharagpur end for tripping of 400 Kharagpur-Chaibasa-II on 04-05-2019 at 02:28 hrs

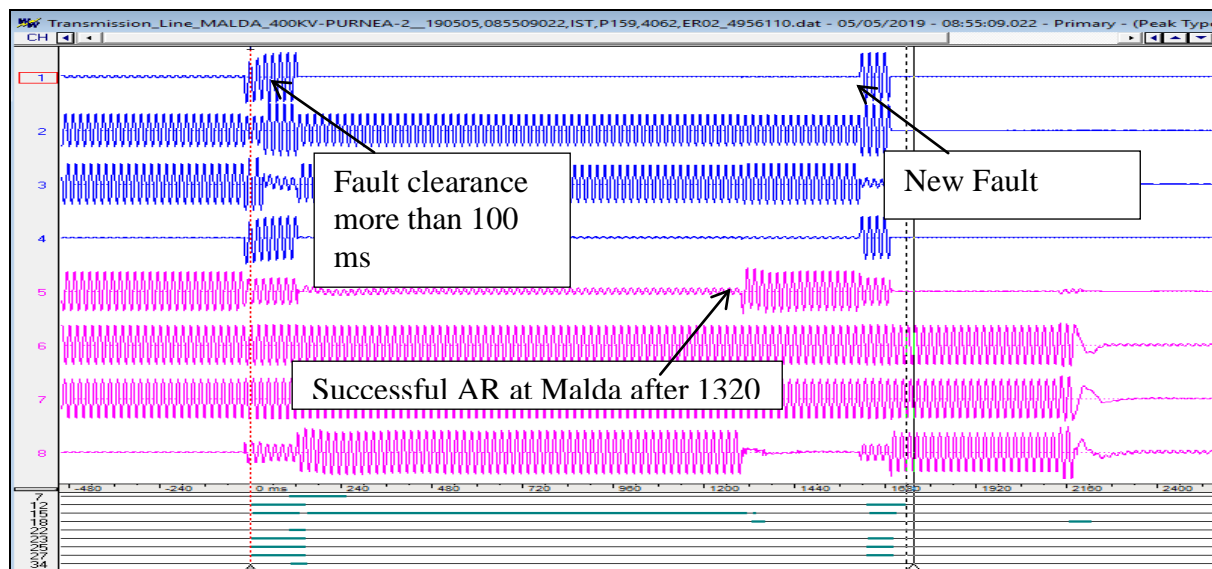


Figure 8: DR recorded at Malda end for tripping of 400 KV Malda Purnea-II on 05-05-19 at 08:54 hrs

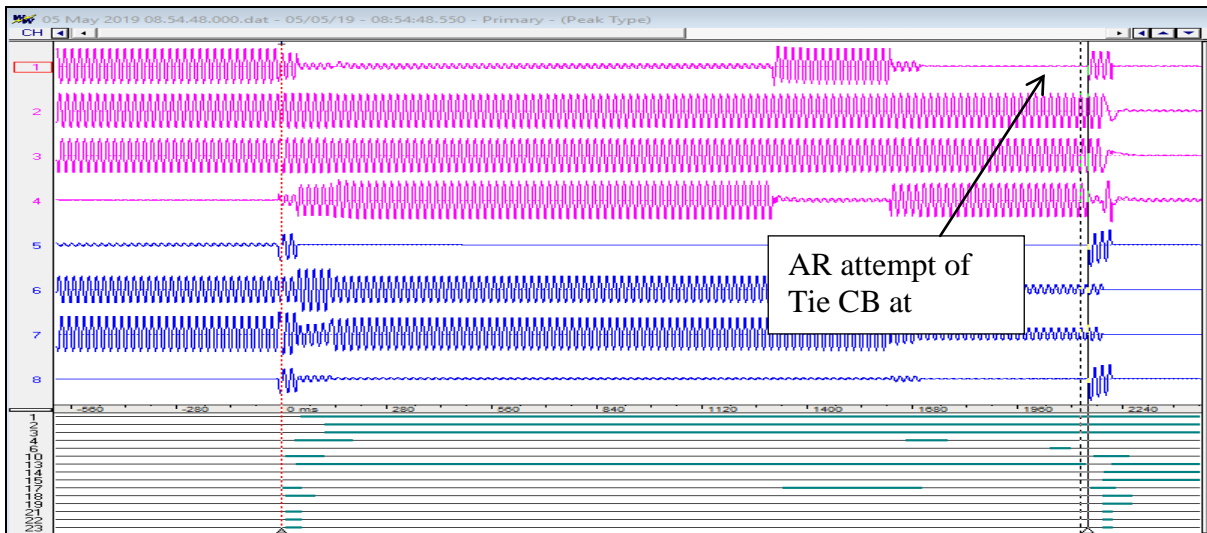


Figure 9: DR at Purnea end for tripping of 400 KV Malda Purnea-II on 05-05-19 at 08:54 hrs

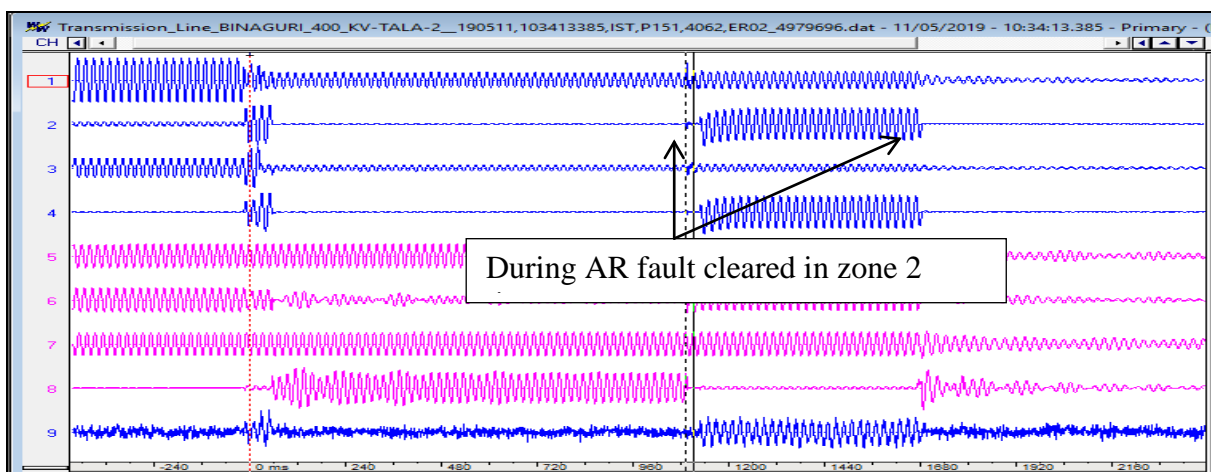


Figure 10: DR at Binaguri end for tripping of 400 kV Tala Binaguri-II on 11-05-19 10:34hrs

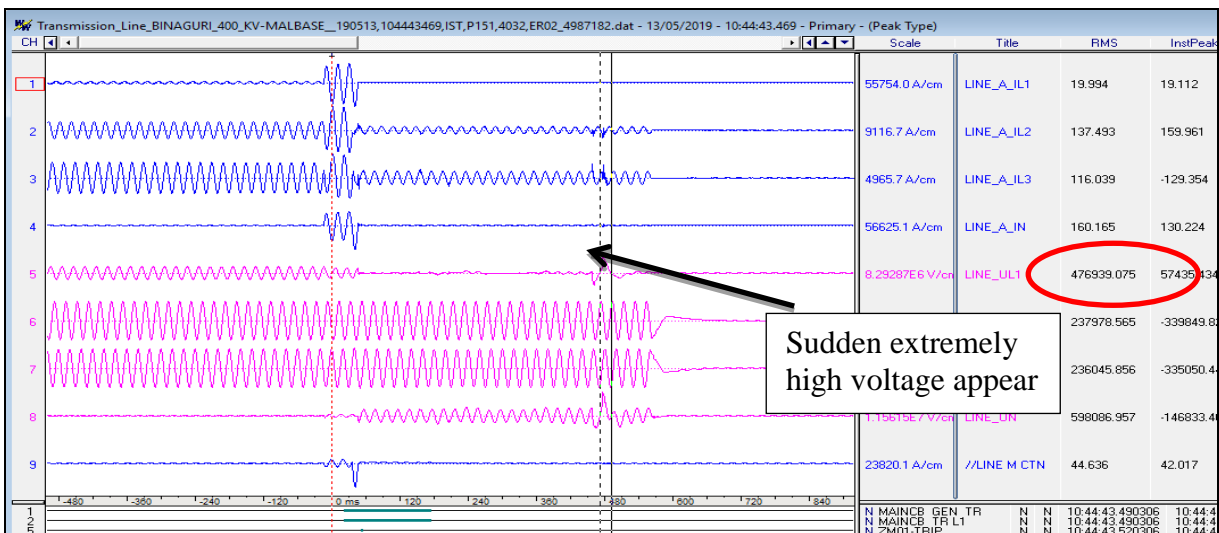


Figure 11: DR at Binaguri end for tripping of 400 kV Malbase Binaguri S/C on 13-05-19 10:44 hrs

9. Procedure to be followed during fuse failure of line CVT at Substation

- A.** 400 kV Hisar (PG) Blackout : At 01:54 Hrs and 02:32 Hrs “Fuse Fail” alarm was reported in D60 and P444 relay of 400 kV Hisar (end)-Kaithal ckt-2 respectively. After thoroughly

checking the secondary voltage circuit by 09:00 Hrs, it was concluded that “Fuse Fail” Alarm was due to “NO VOLTAGE OUTPUT” from CVT secondary circuit. Message was sent to CPCC/RTAMC for emergency shutdown of line from 11:00 Hrs to 15:00 hrs. All arrangement including Hydra crane was made and shifting of CVT from store to site is underway but at 10:16 Hrs the “R” Phase CVT blasted which lead to tripping of all element connected to 400 kV Hisar (PG) from remote end. However, At 10:16hrs of 22nd June 2019, R-phase CVT of 400 kV Hisar (end)-Kaithal ckt-2 bursted in Northern Region. It has resulted into R-phase to earth fault followed by Y-phase to earth fault. As the line distance protection was in block condition , this led to fault isolation from remote end in backup protection causing complete blackout of substation.

- B.** Multiple tripping in Western Region in 2015: 400 kV Akola2-Taptithanda 2 circuit which was idle charged for first time from Akola2 substation at 13:34 Hrs on 29th March 2015. The Line CVT secondary connections were loose due to which CVT secondary voltage were not available to distance relays and with CVT Fuse failure alarm the distance protection got blocked. At 14:04 Hrs, B phase fault occurred on the circuit and could not clear from Akola2 end as protection relay were in block condition. This has led to 400 kV dead bus at 400/220 kV Akola, 765/400 kV Akola2 substation and total power failure of 400 kV and Rattan India, Amrawati power plant.

Primary cause of complete station outage was blocking of both main distance protection in case of fuse failure. As a precaution during the failure of line CVT, voltage input may be automatically switched to voltage CVT.

Member may discuss.

10. Submission of Load Trimming Scheme in Eastern region from States

Many states may have implemented the load trimming scheme or any form of Overcurrent tripping in their system to avoid cascade tripping during N-1 contingency or overloading due to contingency in other part of system. The details of such Load Trimming scheme or overload rejection scheme may kindly be shared with ERLDC/ERPC for better monitoring.

Members may discuss.

पावर सिस्टम ऑपरेशन कर्पोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.

CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website: www.erldc.org, Email ID- erldc@posoco.in

Incident No. 14-07-19/1

Dtd: 22-07-19

Report on the incident in Eastern Region involving ISTS system

1) **Date / Time of disturbance:** 14-07-19, 10:35 hrs.

2) **Category** : - GD - I

3) **Systems/ Subsystems affected:** Jorethang, Melli (New) and Tashiding

4) **Quantum of load/generation loss:** 100 MW generation loss each at Jorethang and Tashiding HEP.

5) **Antecedent condition:**

ER demand was 16750 MW and frequency was 50.08 Hz. Antecedent generation at Jorethang and Tashiding HEP was 100 MW.

6) **Major elements tripped:**

- 220 kv Jorethang – New Melli D/C (from Jorethang end only)
- 220 kv Rangpo - Tashiding S/C (from Tashiding end only)
- 220 kv Tashiding – New Melli S/C
- 220 kV Melli (New) – Rangpo – S/C

7) **Network across affected area**

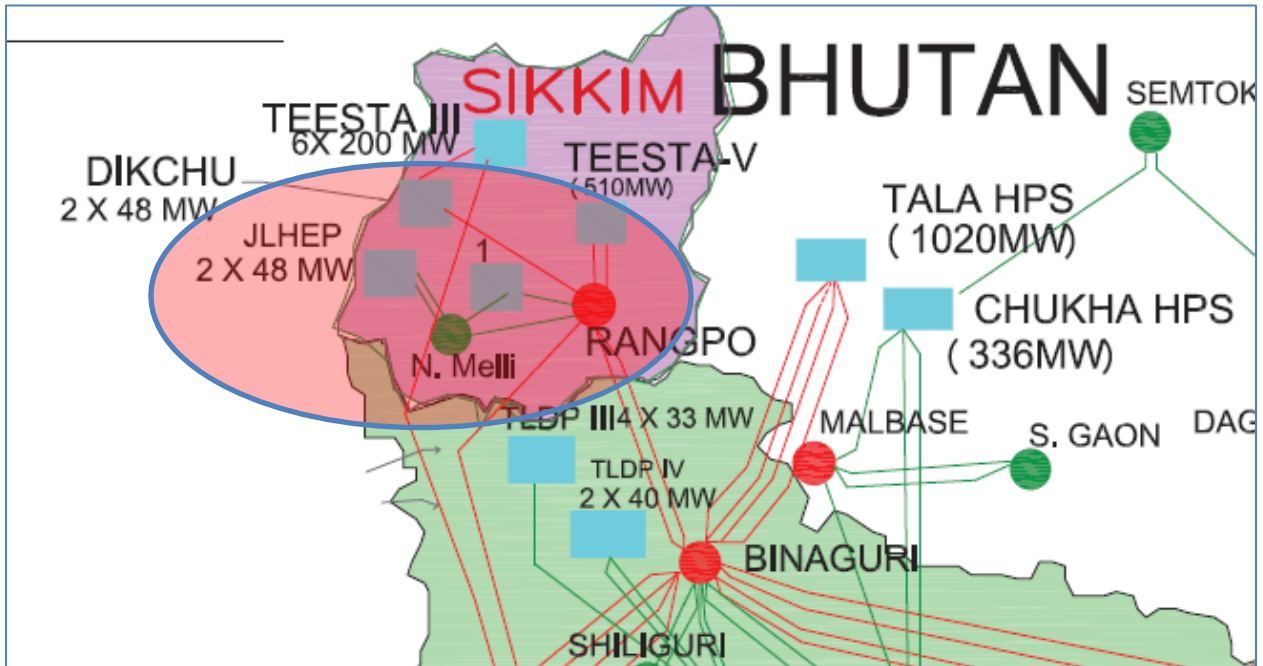


Figure 1: Network across affected area

8) **Sequence of events & Detailed Analysis:**

At 10:35:11 hrs, 220 kv Jorethang – New Melli D/C, 220 kv Rangpo - Tashiding S/C, 220 kv Tashiding – New Melli S/C and 220 kV Melli (New) – Rangpo – S/C tripped due to R-Y fault (Fault location is yet to be received) resulting total power failure at Jorethang, Tashiding and Melli (New) S/S. Sequence of events

and relay indication are given in table I & II respectively. All the running units at Jorethang and Tashiding tripped due to loss of evacuation path.

As per DR output data received from Jorethang and Tashiding, prior to the event current in B phase was higher than the other phase current. 220 kV Jorethang – New Melli D/C tripped from Jorethang end only in Z-I (though current in Y and B phase was 0.5 and 0.3 kA; Z-I reach setting at Jorethang end may be checked as per DR output data fault distance was more than 450 % of the protected portion). At the same time, 220 kV Tashiding – New Melli S/C and 220 kV Tashiding – Rangpo S/C tripped from Tashiding end only (F/C 3.81kA in Y phase & 3.61 kA in B phase, digital signal for distance protection pick up is not available in DR, As per DR output data, fault distance was less than 80% of protected section). It is suspected fault was in New Melli – Tashiding - Rangpo section. Reason for non- tripping of 220 kV Rangpo – Tashiding S/C at Rangpo may be investigated.

Time(Hrs)	Events
10:35:11.640	220 kV Jorethang – New Melli D/C tripped from Jorethang end (DR output data)
10:35:11.656	220 kV Tashiding – New Melli S/C tripped from Tashiding (DR output data)
10:35:11.669	220 kV Melli (New) – Rangpo – S/C tripped from Melli (New) end (ERLDC SOE data)
10:35:11.671	220 kV Tashiding – Rangpo S/C tripped from Tashiding (DR output data)

Table 1: Sequence of events at the time of the event

Name of the element	Relay indication at End 1	Relay indication at End 2
220 kV Jorethang – New Melli D/C	Y-B, Z-I, F/C 0.5kA in Y phase & 0.3 kA in B phase	Did not trip
220 kv Rangpo - Tashiding S/C	Did not trip	Y-B, F/C 3.48kA in Y phase & 3.63 kA in B phase
220 kv Tashiding – New Melli S/C	Y-B, F/C 3.81kA in Y phase & 3.61 kA in B phase	Yet to be received
220 kV Melli (New) – Rangpo – S/C	Yet to be received	Yet to be received

Table 2: Relay indication recorded at both ends of the tripped lines

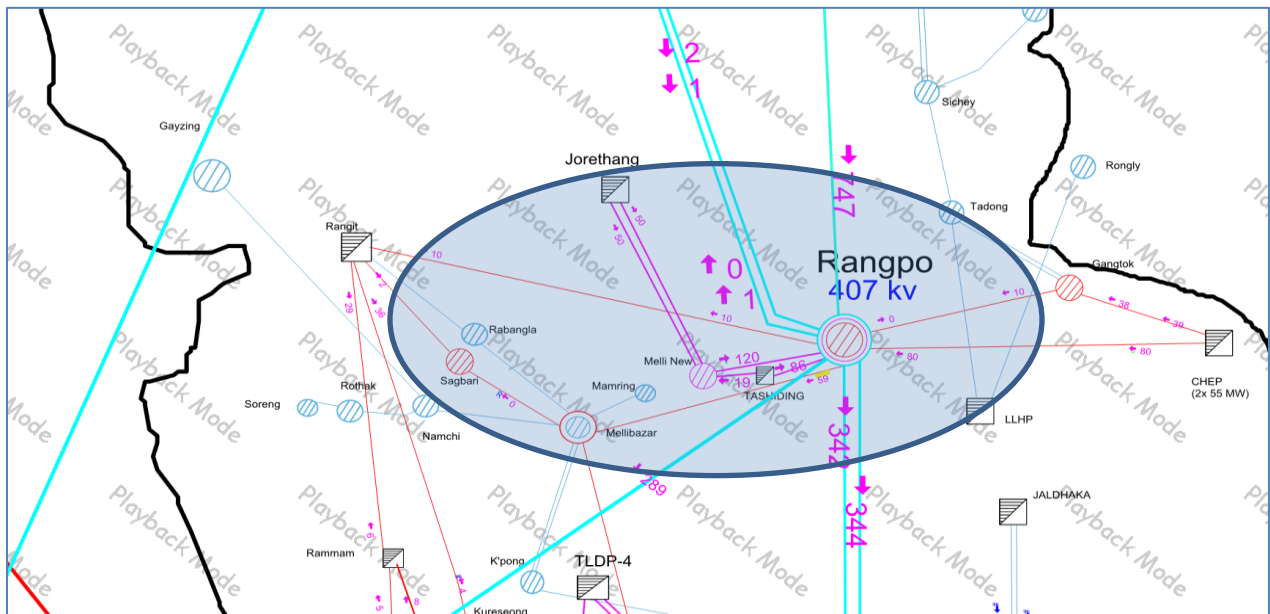


Figure 2: SCADA snapshot of the network before the event

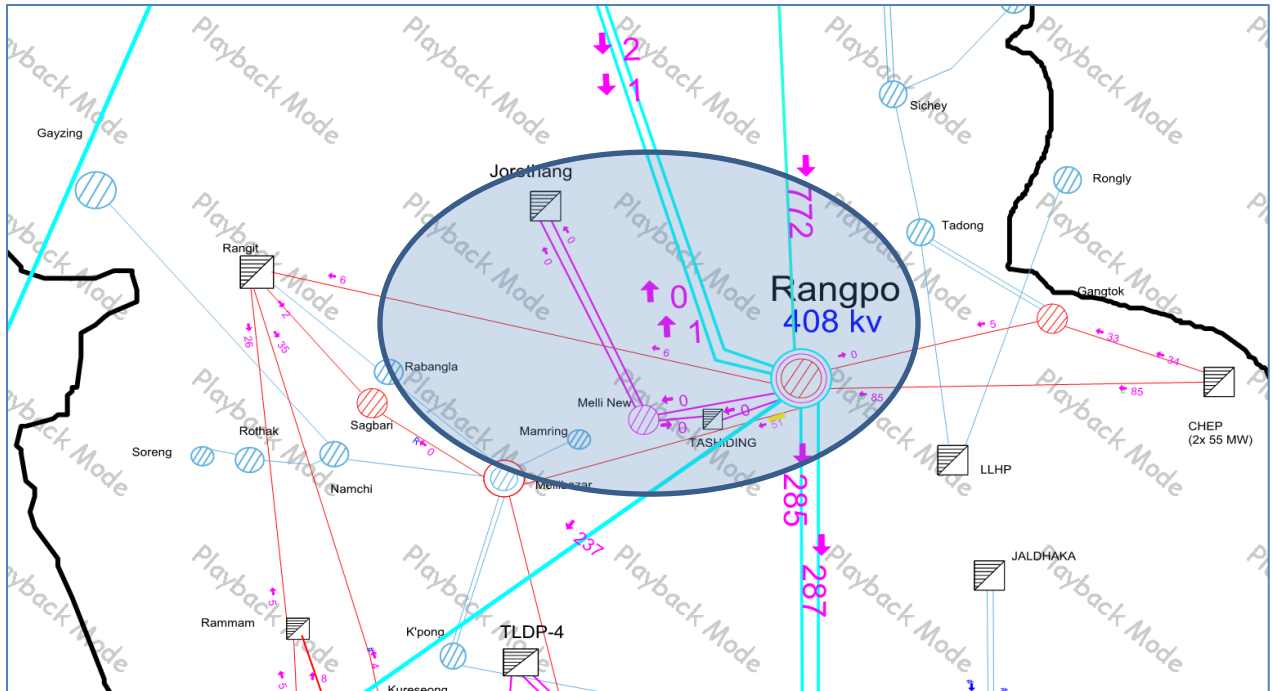


Figure 3: SCADA snapshot of the network after total power failure at Jorethang, Melli (New) and Tashiding

9) PMU observation:

At the time of the event, 30 kV voltage dip observed in Y and B in Binaguri PMU data.

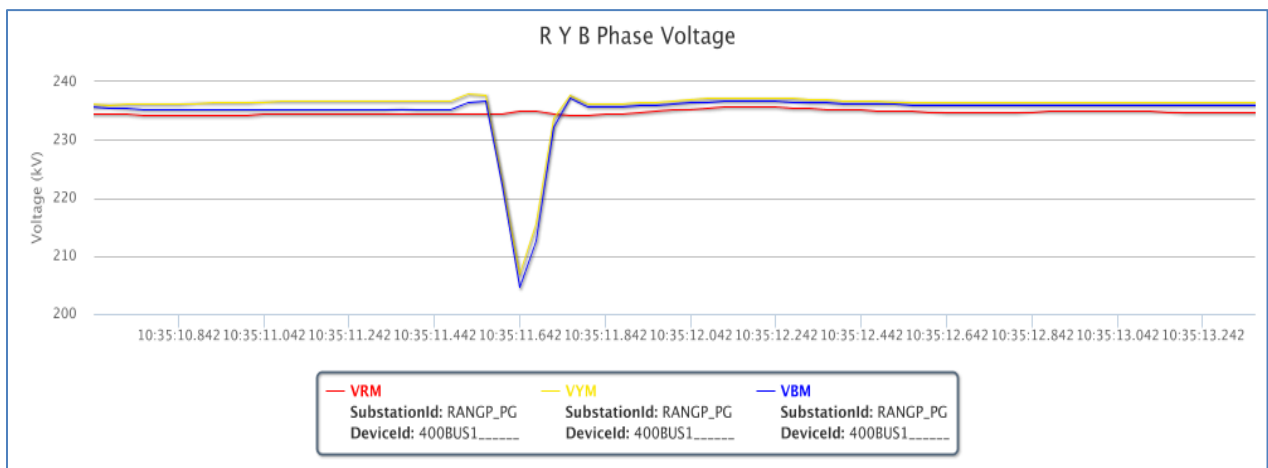


Figure 4: Three phase voltage of 400 kV Rangpo substation captured at the time of event

10) Restoration:

220 kV Jorethang – New Melli D/C restored by 10:48 hrs and both the units of Jorethang normalized by 10:50 Hrs. 220 kv Rangpo – Tashiding S/C restored at 11:09 hrs and both units of Tashiding restored by 11:11 hrs.

11) Observation:

In pre-fault condition, current in B phase was higher than other two phase current in case of 220 kV Jorethang – New Melli D/C and 220 kV Tashiding New Melli S/C. In case of 220 kV Tashiding – Rangpo S/C, current in B phase was lower than other two phase current.

12) Discrepancies observed

- Digital channels of DR outputs may be configured (Z-II, Z-III & Z-IV pickups was not available) at Jorethang and Tashiding as per recommendations given in 79th PCC meeting.
- Reason for non-tripping of 220 kV Tashiding – Rangpo S/C at Rangpo may be investigated by POWERGRID ER- II.
- Z-I reach setting of 220 kV Jorethang – Melli (New) D/C at Jorethang end may be checked by Jorethang.
- 220 kV Jorethang –New Melli I & II tripped on through fault due to wrong protection operation at 09:55 hrs on 30-06-19. Jorethang may review their protection setting as discussed in 80th ER PCC meeting.

13) Non-Compliance Observed during the event:

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

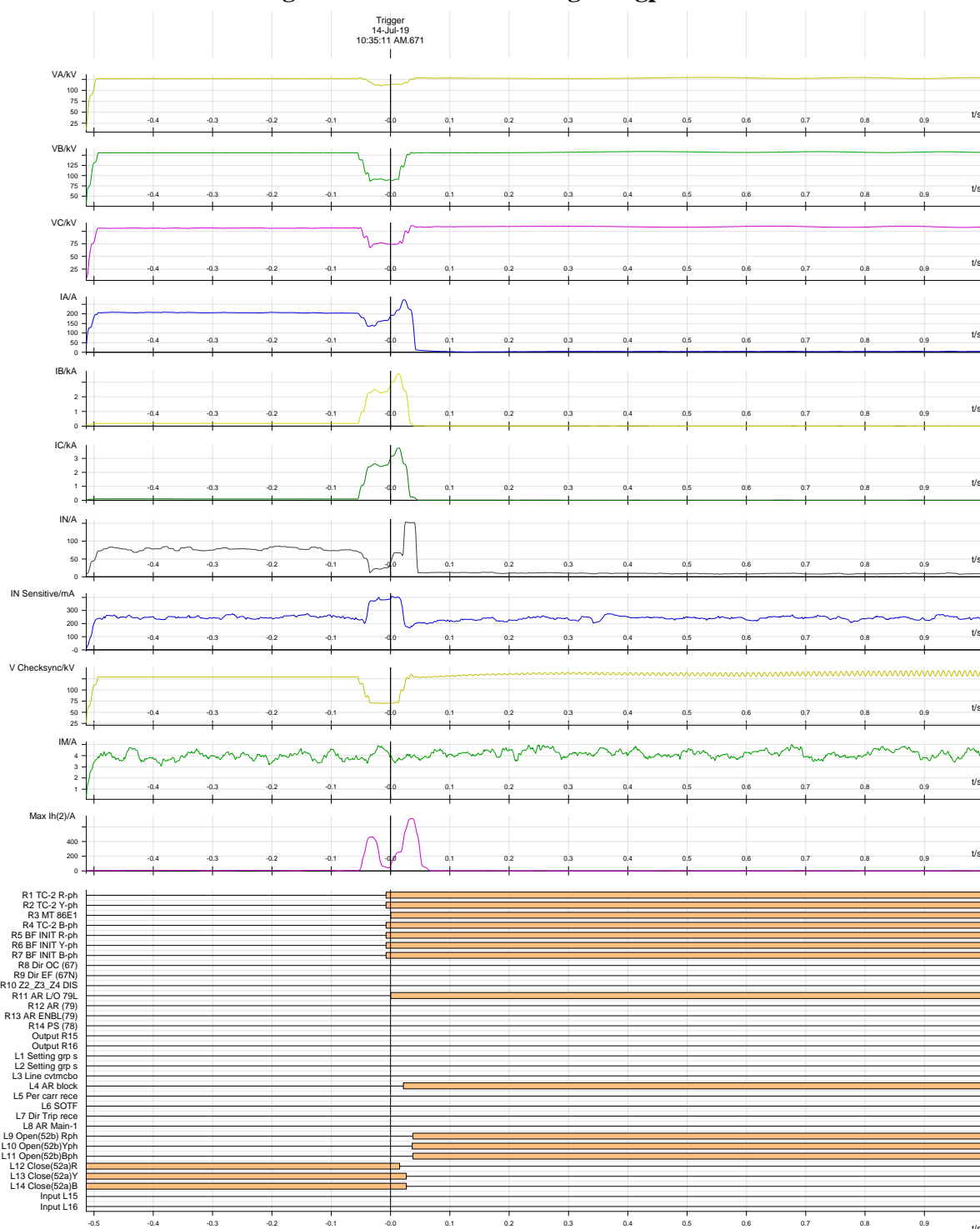
14) Status of Reporting:

DR/EL received from Jorethang and Tashiding. DR/EL are yet to be received from POWERGRID ER-II.

Annexure I: SOE recorded at ERLDC

TIME	MILLI_SEC	STATION	DESCRIPTION	STATUS
10:35:11	669	MELNW_PG	220_RANGP_PG_2_CB	Open
10:35:12	612	TASHI_PG	220_MELNW_PG_CB	Open
10:35:13	302	JORET_PG	220_MELNW_PG_2_CB	Open
10:35:13	302	JORET_PG	220_UNIT_H_2_CB	Open
10:35:13	785	JORET_PG	220_UNIT_H_1_CB	Open
10:35:13	785	JORET_PG	220_MELNW_PG_1_CB	Open
10:35:16	209	TASHI_PG	220_UNIT_H_2_CB	Open
10:48:25	397	JORET_PG	220_MELNW_PG_1_CB	Closed
10:48:32	823	JORET_PG	220_MELNW_PG_2_CB	Closed
10:52:23	906	JORET_PG	220_UNIT_H_1_CB	Closed
11:08:19	879	JORET_PG	220_UNIT_H_2_CB	Closed
11:11:09	606	TASHI_PG	220_UNIT_H_2_CB	Closed

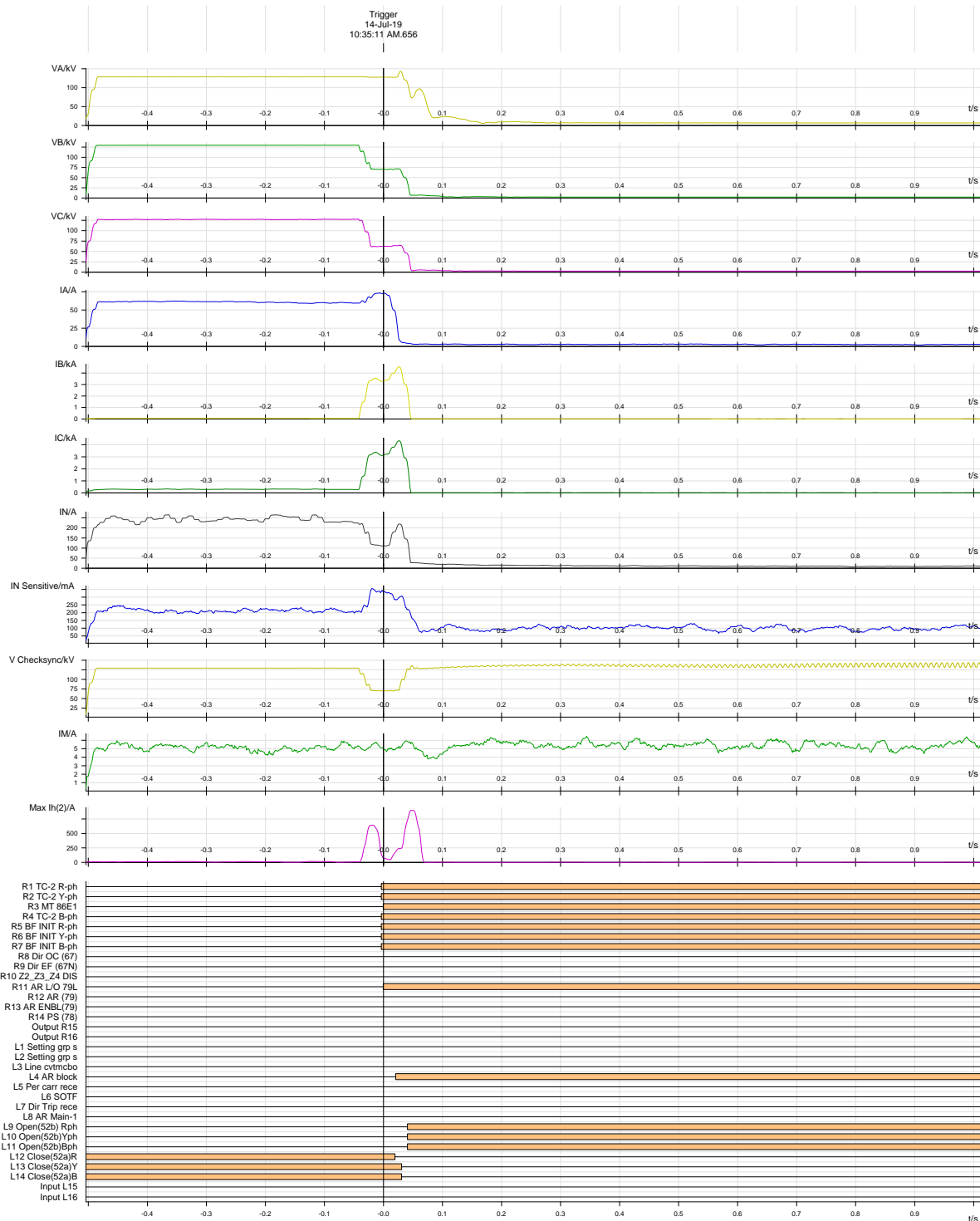
DR recorded at Tashiding end of 220 kV Tashiding Rangpo S/C at 10:35:11.671 hrs



Observation:

Y-B, F/C 3.48kA in Y phase & 3.63 kA in B phase. Digital channels of DR outputs may be configured as per recommendations given in 79th PCC meeting. **B phase current was low as 60 A (Other two phase current was around 200A) prior to the tripping.**

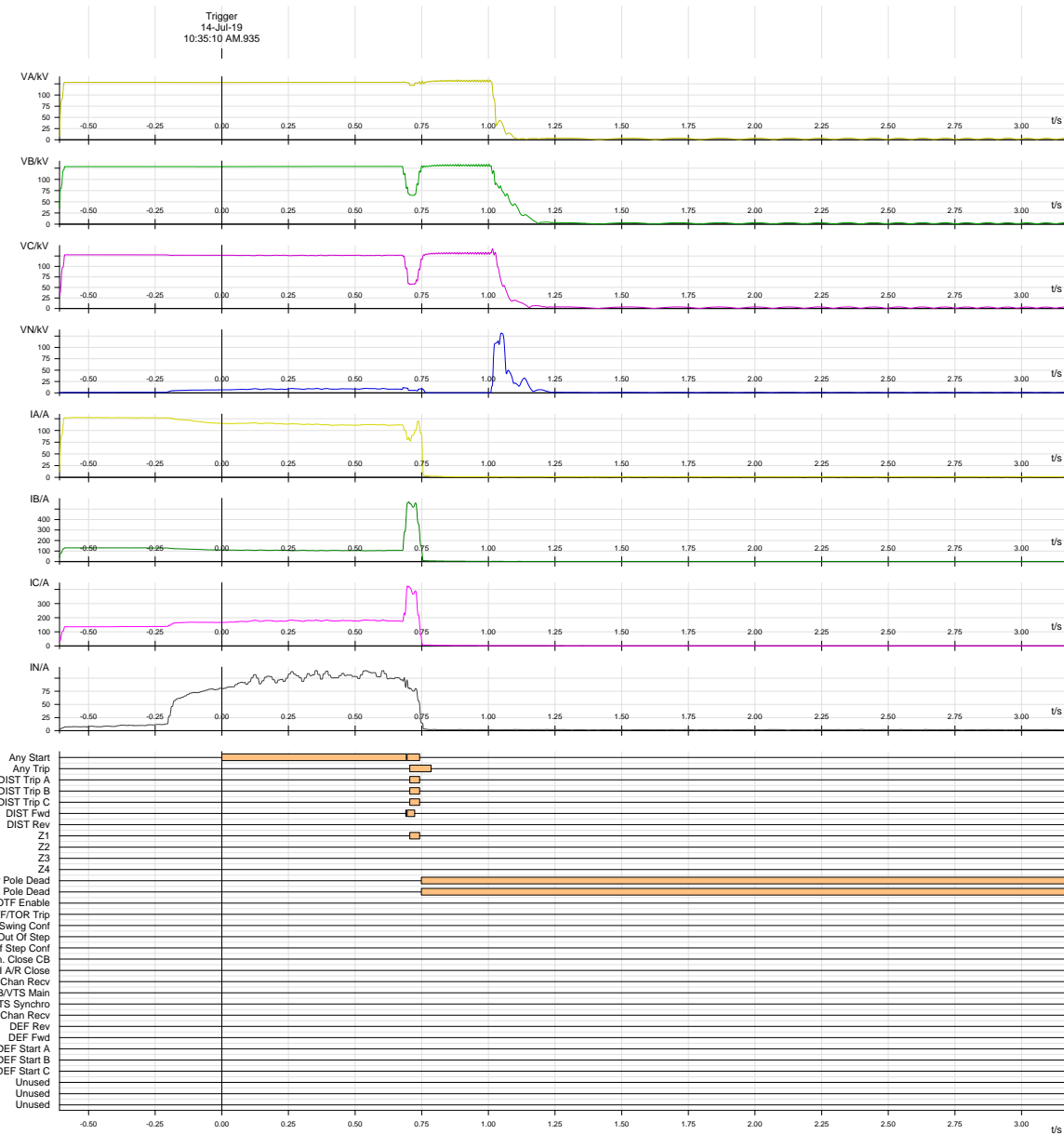
DR recorded at Tashiding end of 220 kV Tashiding New Melli S/C at 10:35:11.656hrs



Observation:

Y-B, F/C 3.81kA in Y phase & 3.61 kA in B phase. Digital channels of DR outputs may be configured as per recommendations given in 79th PCC meeting. **B phase current was high as 300 A (Other two phase current was 60 A) prior to the tripping.**

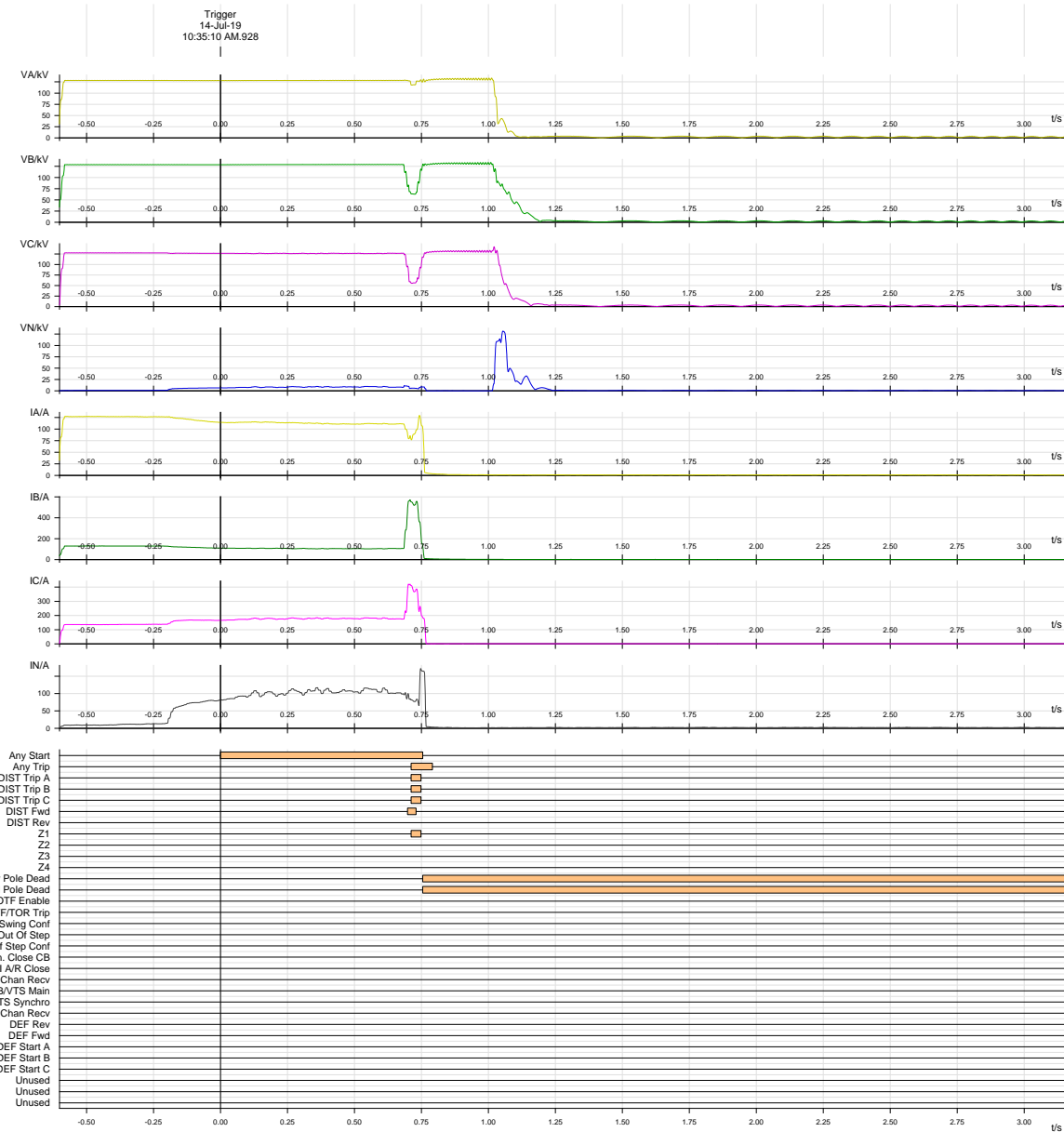
DR recorded at Jorethang end of 220 kV Jorethang New Melli I at 10:35:11.640 hrs



Observation:

Y-B, F/C 0.5kA in Y phase & 0.3 kA in B phase. Digital channels of DR outputs may be configured (Z-II, Z-III & Z-IV pick ups was not available) as per recommendations given in 79th PCC meeting. **B phase current was high as 180 A (Other two phase current was 100 A) prior to the tripping.**

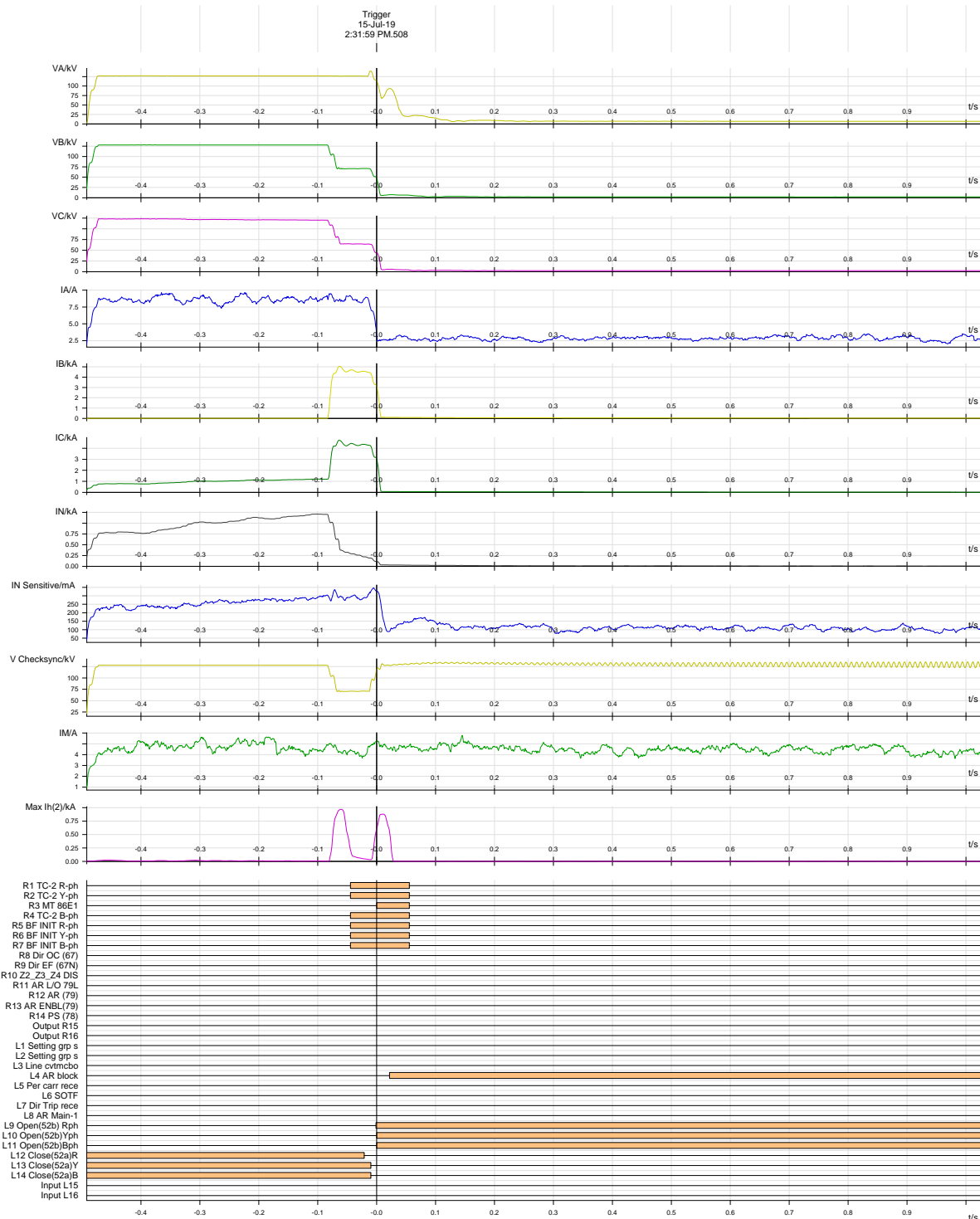
DR recorded at Jorethang end of 220 kV Jorethang New Melli II at 10:35:11.640 hrs



Observation:

Y-B, F/C 0.5kA in Y phase & 0.3 kA in B phase. Digital channels of DR outputs may be configured (Z-II, Z-III & Z-IV pick ups was not available) as per recommendations given in 79th PCC meeting. **B phase current was high as 180 A (Other two phase current was 100 A) prior to the tripping.**

DR recorded at Tashiding end of 220 kV Tashiding New Melli S/C at 14:31:59.472 hrs (while charging the line on next day)



Observation:

Y-B, F/C 3.53kA in Y phase & 3.65 kA in B phase. Digital channels of DR outputs may be configured (Z-II, Z-III & Z-IV pick ups was not available) as per recommendations given in 79th PCC meeting.

पावर सिस्टम ऑपरेशन कर्पोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



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CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website: www.erldc.org, Email ID- erldc@posoco.in

Incident No. 22-07-19/1

Dtd: 06-08-19

Report on the incident in Eastern Region involving ISTS system

- 1) **Date / Time of disturbance:** 22-07-19, 03:59 hrs.
- 2) **Category** : - GI-I
- 3) **Systems/ Subsystems affected:** Siliguri
- 4) **Quantum of load/generation loss:** No generation and load loss.
- 5) **Antecedent condition:** Kishanganj S/S was bypassed in 220 kV Siliguri – Kishanganj – Dalkhola D/C section (due to flood condition at Kishanganj S/S) and this section became 220 kV Siliguri – Dalkhola D/C.
- 6) **Major elements tripped:**
 - 220kV Siliguri-Binaguri - II
 - 220/132 kV ICT-II at Siliguri
 - 220 kV bus II at Siliguri
 - 220kV Siliguri-Dalkhola - II
- 7) **Network across affected area**

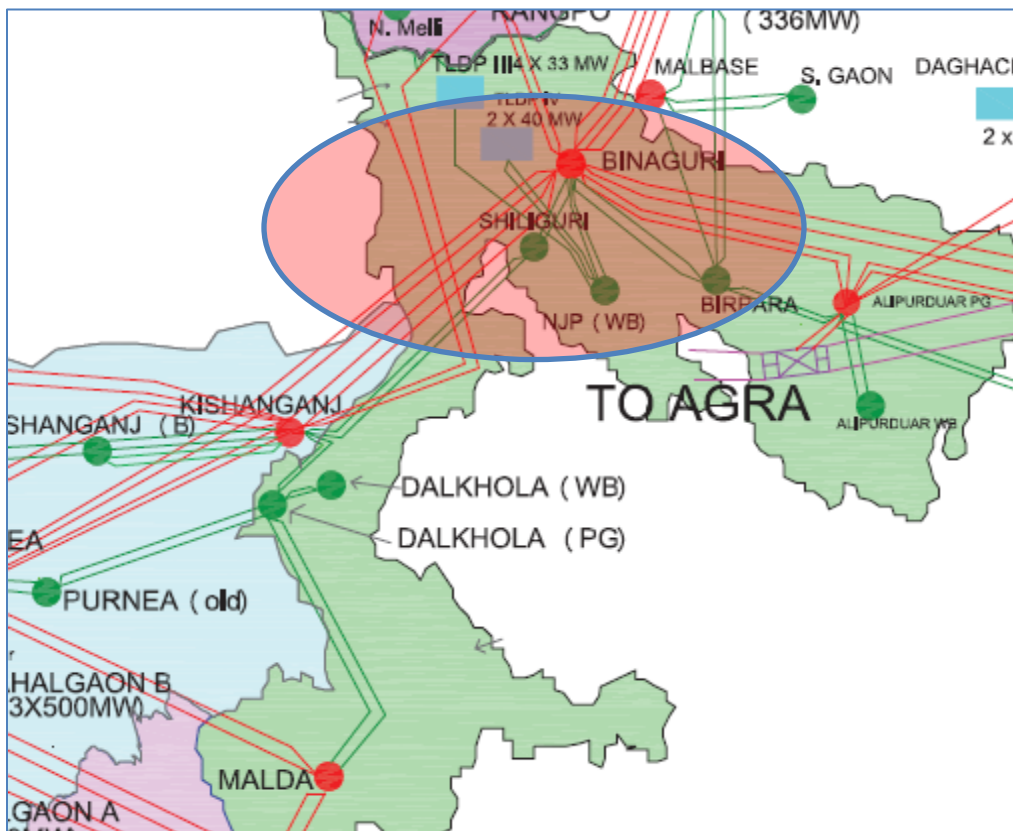


Figure 1: Network across affected area

8) Sequence of events & Detailed Analysis:

At 03:57 Hrs, 220kV Siliguri-Dalkhola - II tripped along with tripping of 220kV Siliguri-Binaguri - II, 220/132 kV ICT-II at Siliguri and 220 kV Bus-II at Siliguri; At same time, 220 kV Siliguri-Dalkhola - I successfully auto-reclosed at both ends.

As per voltage captured by PMU installed at Binaguri at 03:57 hrs, R-N fault has been observed at the time of the event. As per DR recorded at Siliguri S/S, R-N, Z-I operated for Dalkhola – II feeder followed by LBB operation (Annexure II). Reason for LBB operation at Siliguri end may be explained by POWERGRID ERTS-II. As per preliminary report received, 220 kV bus – II tripped at Siliguri S/S. But voltage measured at both buses at Siliguri did not become zero at the time of the incident.

Time(Hrs)	Events
03:57:36.182	220 kV Siliguri – Binaguri – I tripped from Siliguri end
03:57:36.335	220 kV B/C opened at Siliguri
03:57:36.342	220 kV Dalkhola Siliguri - II tripped from Siliguri end
03:57:37.443	220 kV Dalkhola Siliguri – II tripped from Dalkhola end

Table 1: Sequence of events at the time of the event

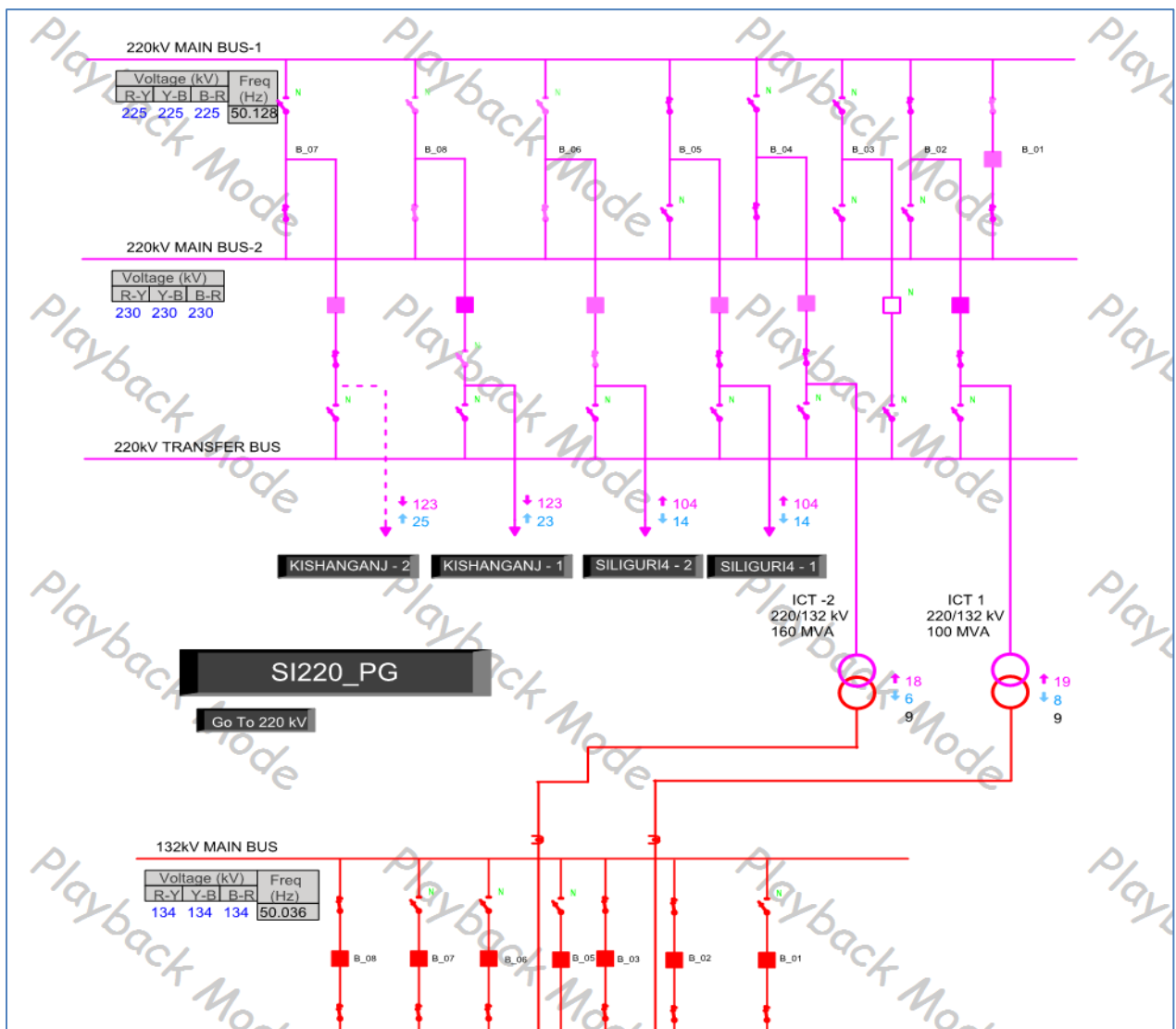


Figure 2: SCADA snapshot of the network before the event

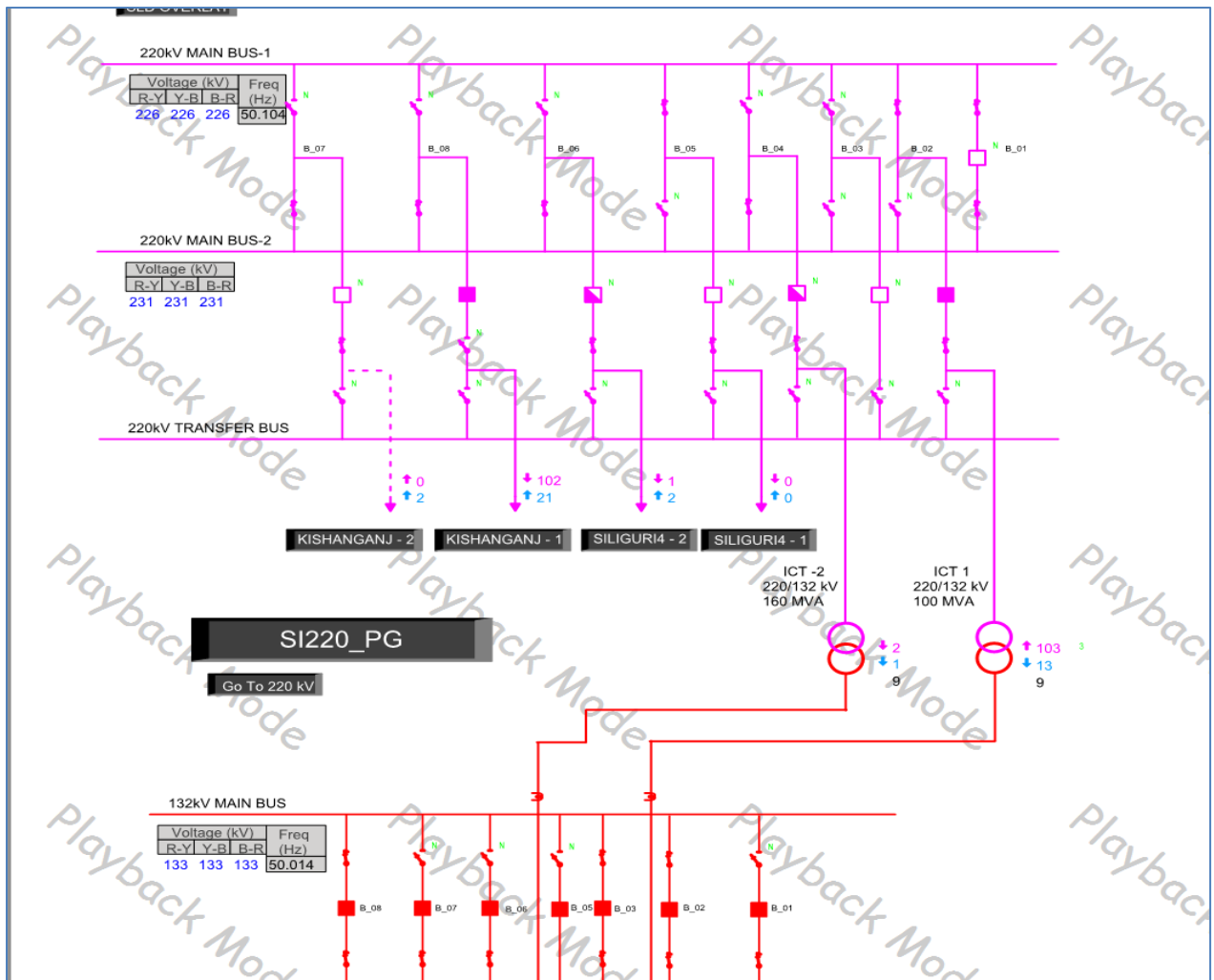


Figure 3: SCADA snapshot of the network after total power failure at Jorethang, Melli (New) and Tashiding

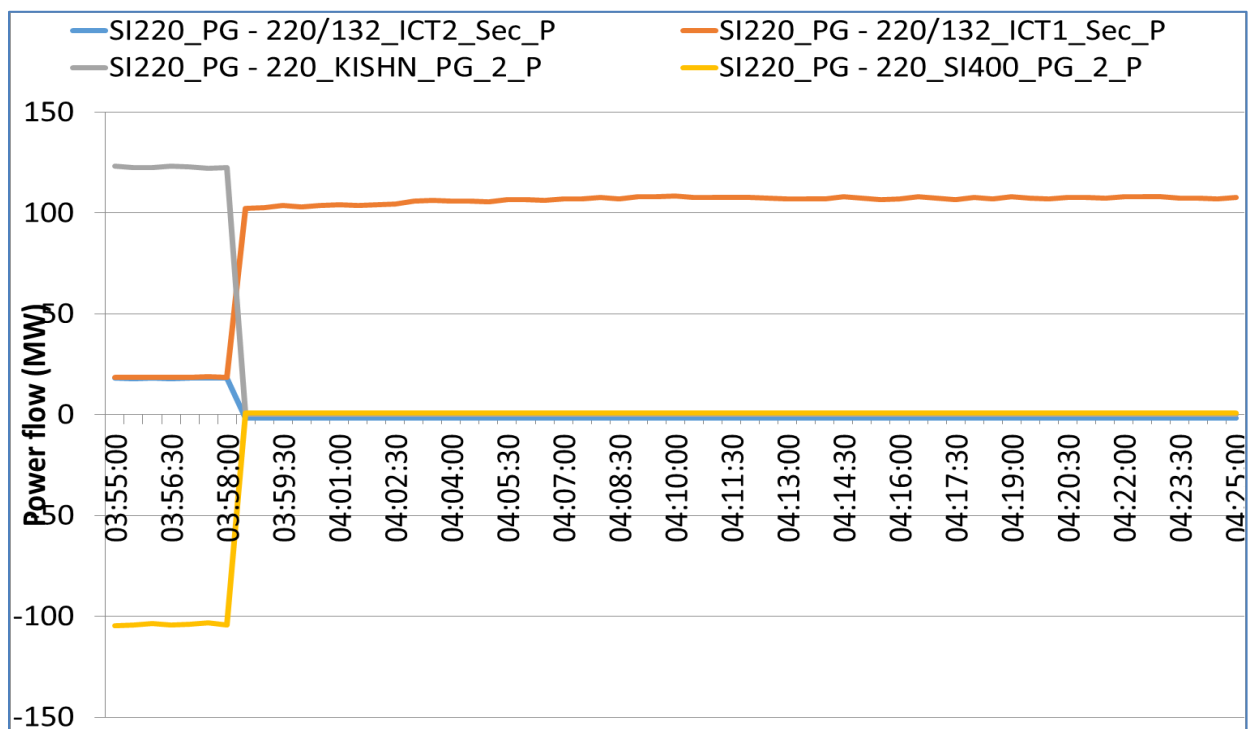


Figure 4: Power flow through various feeders at the time of the events

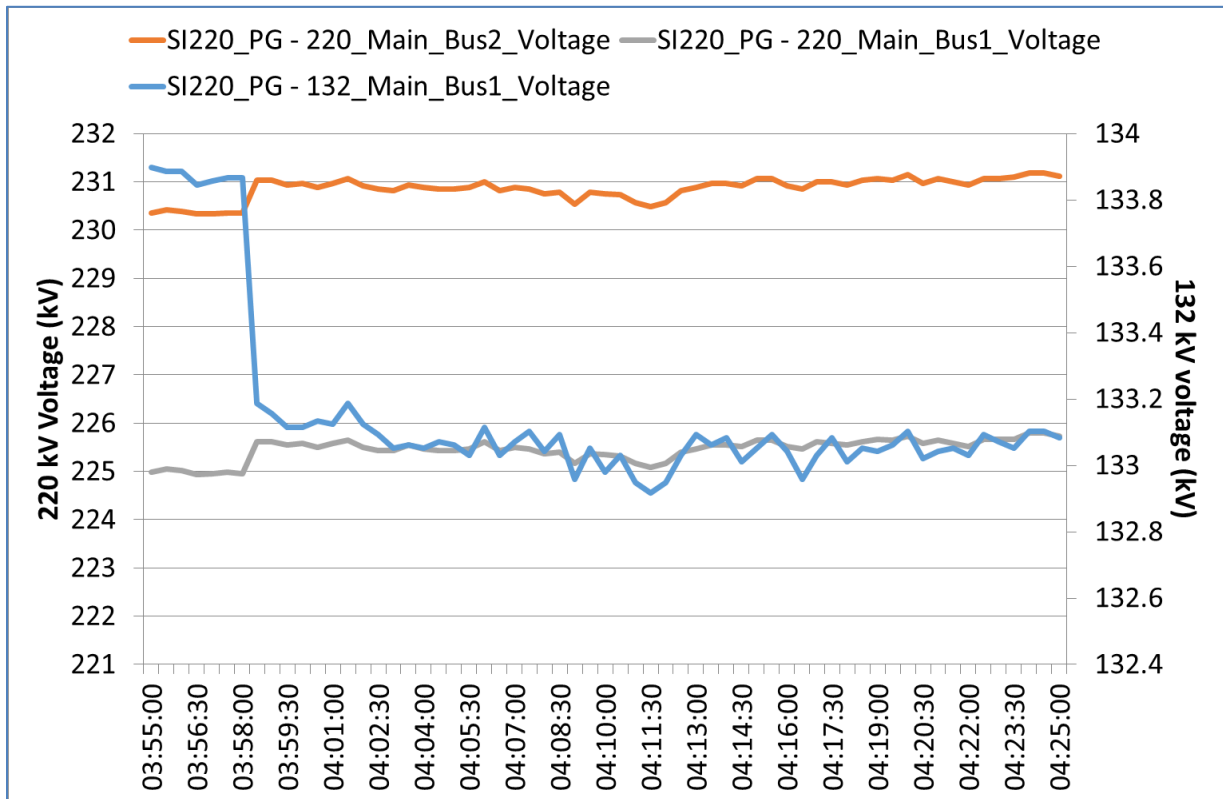


Figure 5: Voltage at 220 and 132 kV buses at Siliguri

9) PMU observation:

At the time of the event, 20 kV voltage dip observed in R phase in Binaguri PMU data.

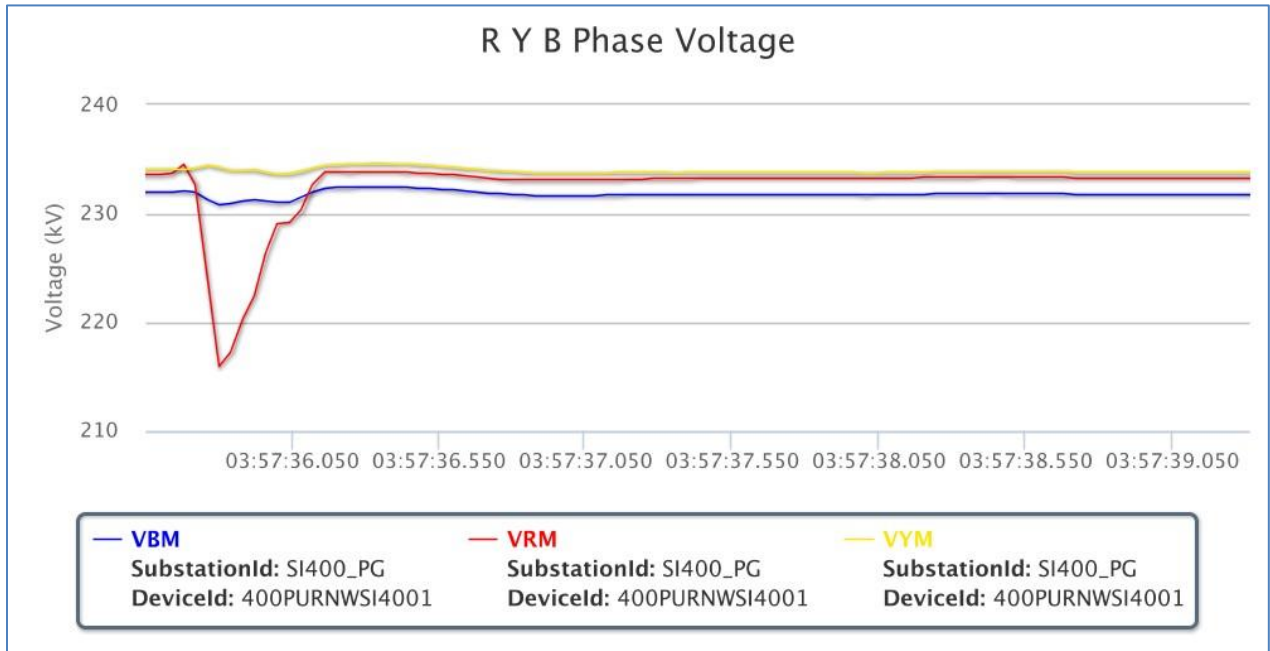


Figure 6: Three phase voltage of 400 kV Binaguri substation captured at the time of event

10) Restoration:

220/132 kV ICT-II at Siliguri and 220 kV Bus-II at Siliguri was charged by 06:04Hrs

220 kV Siliguri – Dalkhola - II charged at 06:38Hr and 220 kV Bus-coupler at Siliguri closed at 06:40Hrs.

Discrepancies observed

- Reason for tripping of LBB operation at Siliguri S/S may be explained by POWERGRID ERTS-II. DR is not time-synchronized at Siliguri S/S.
- Y-N fault occurred at 220 kV Siliguri – Dalkhola D/C at 03:26 hrs on 21-07-19 (Almost same time on previous day). Successful A/R occurred at both ends for circuit I. But A/R was unsuccessful for circuit II at Dalkhola end due to tripping of all three poles in pole discrepancy (DR attached in Annexure III). POWERGRID ERTS-II may explain.

11) Non-Compliance Observed during the event:

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

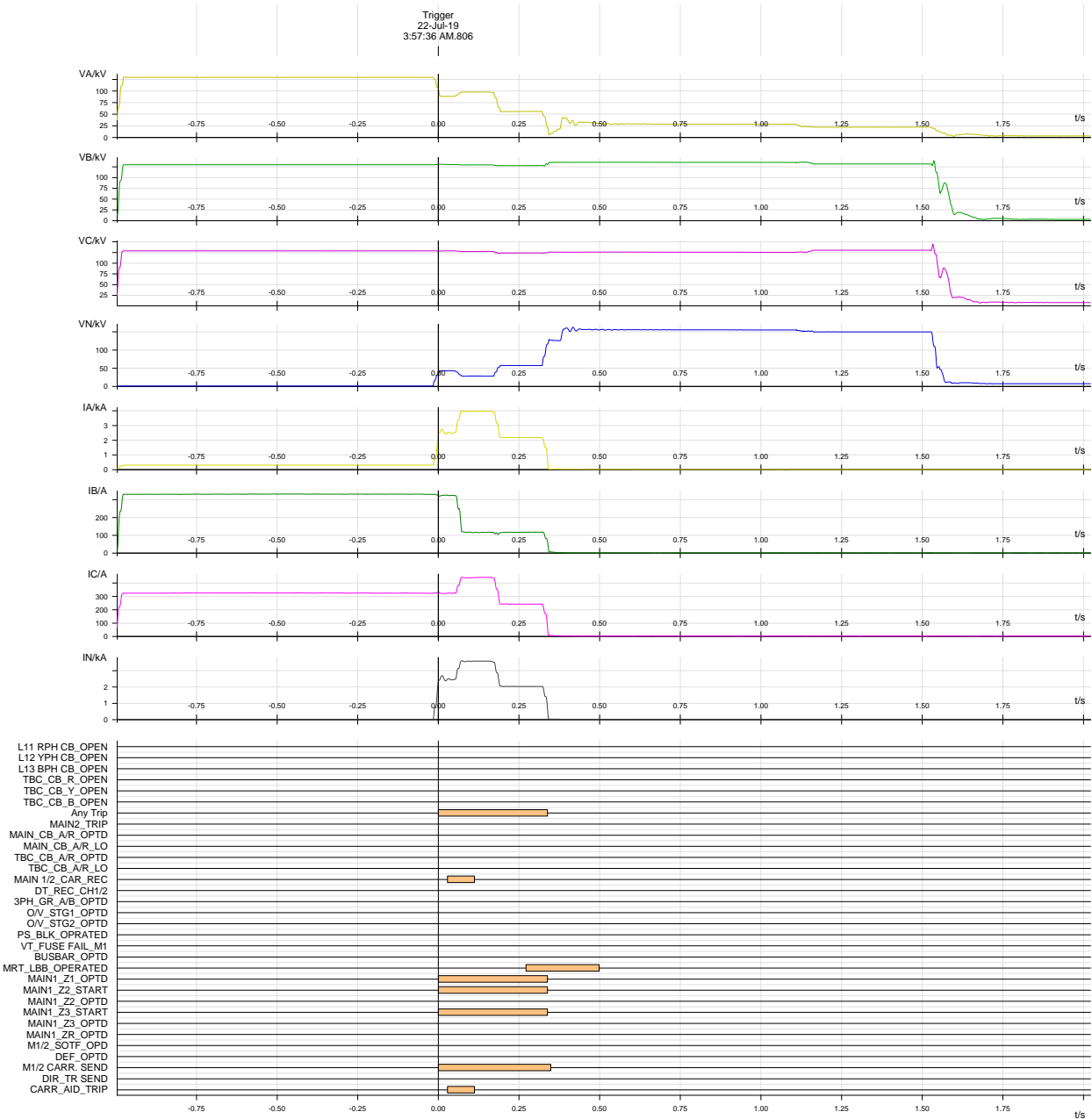
12) Status of Reporting:

DR received from only Siliguri S/S for 220 kV Dalkhola – Siliguri – II.

Annexure I: SOE recorded at ERLDC

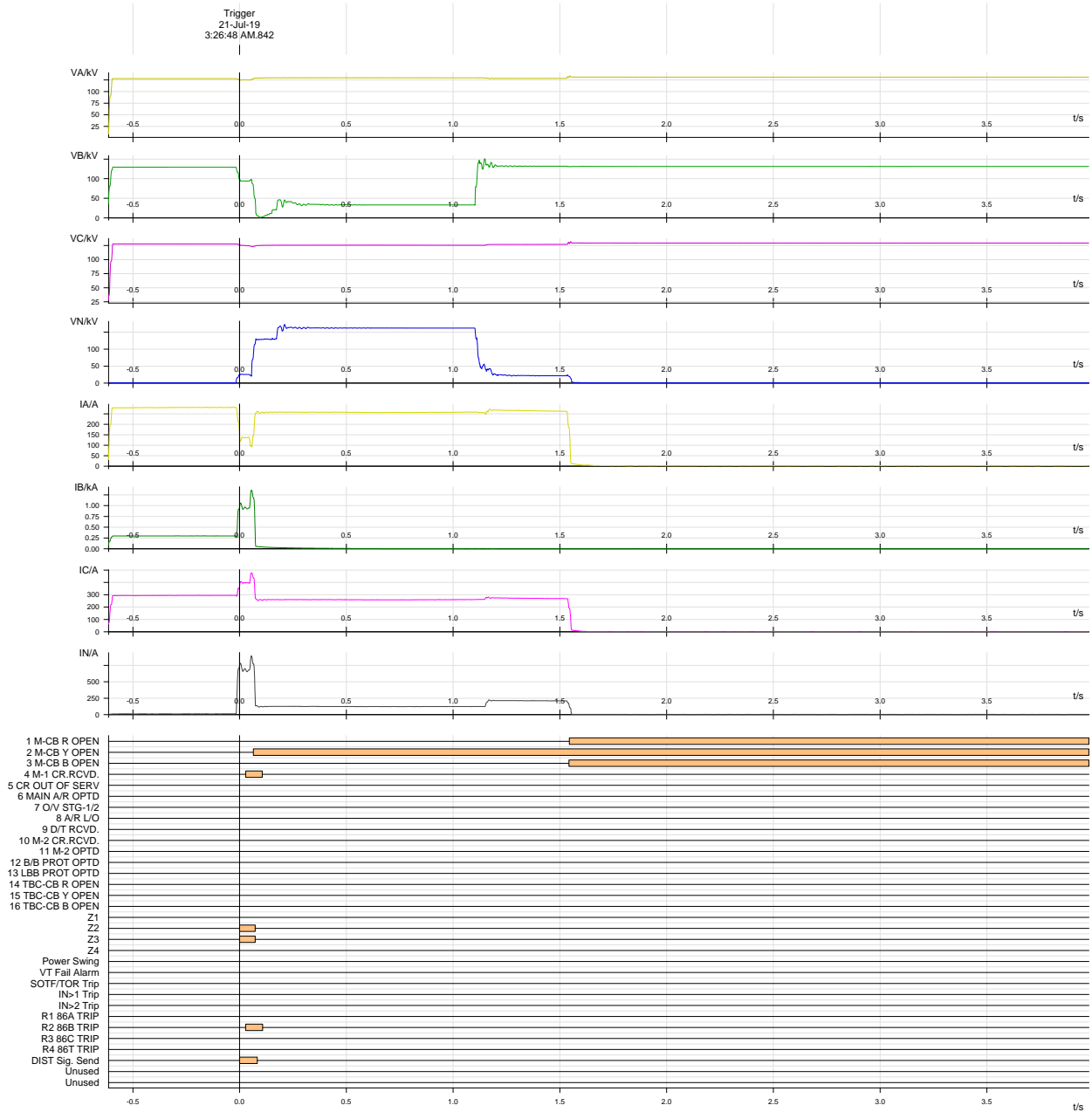
TIME	MILLI_SEC	STATION	DESCRIPTION	STATUS
03:57:36	182	SI220_PG	220_SI400_PG_1_CB	Open
03:57:36	335	SI220_PG	220_Main_BC_CB	Open
03:57:36	342	SI220_PG	220_KISHN_PG_2_CB	Open
03:57:37	443	DALKH_PG	220_KISHN_PG_2_CB	Open

Annexure II: DR for 220 kV Siliguri – Dalkhola – II at Siliguri at 03:57 hrs on 22-07-19



Remarks: R-N, Z-I, LBB operated; Digital signal for breaker operation is not recorded in DR.

Annexure III: DR for 220 kV Siliguri – Dalkhola – II at Siliguri at 03:28 hrs on 21-07-19



Remarks: Y-N, Z-II (carrier received), Y pole remained open for more than 1.5 seconds. Three pole tripped after that.

List of Intra Regional line tripping in the month of July 2019 where violation of protection standard has been observed

S.NO	LINE NAME	TRIP DATE	TRIP TIME	RESTORATION TIME	RESTORATION DATE	Relay Indication LOCAL END	Relay Indication REMOTE END	Reason	Fault Clearance time in msec	Remarks	DR From End	DR To End
Miscellaneous: High Fault clearance time (or) Tripping on DT (or) No Fault observed in PMU												
1	220KV ALIPURDUAR-ALIPURDUAR(WB)-I	01-07-2019	2:39	01-07-2019	3:13		TRIPPED FROM APD (WB) END ONLY	TRIPPED FROM APD (WB) END ONLY		No fault observed in PMU	NO	NO
2	220KV STPS(WBSEB)-CHANDIL-SC	04-07-2019	10:17	10-07-2019	0:00	B-n, z1, 2.179 km, 11.8 kA		B-N Fault	1500 msec		YES	NO
3	220KV ALIPURDUAR-ALIPURDUAR(WB)-I	04-07-2019	20:14	04-07-2019	23:25		TRIPPED FROM WB END , DT RCVD	DT received at WB end		No fault observed in PMU	NO	NO
4	400KV BINAGURI-KISHANGANJ-I	08-07-2019	5:45	08-07-2019	7:47	DT received at Binaguri		DT received at Binaguri			NO	NO
5	400KV FSTPP-KhSTPP-III	09-07-2019	14:51	10-07-2019	13:09		No Fault, 3-Ph open			No fault observed in PMU	NO	YES
6	400KV FSTPP-BAHARAMPUR-II	09-07-2019	16:16	09-07-2019	16:40	R-N Fault	No Tripping			No fault observed in PMU	NO	NO
7	400KV KISHANGANJ-NEW PURNEA-II	13-07-2019	4:54	13-07-2019	5:56	MOSTURE INGRESS IN TERMINAL BOX AT KISHANGANJ		DT received at New Purnea			NO	YES
8	400KV NEW PURNEA-KISHANGANJ-I	13-07-2019	23:52	14-07-2019	01:49		Water ingress in Terminal Block of Gas Pressure Monitor	DT received at New Purnea			NO	YES
9	220KV GAYA-SONENAGAR-II	16-07-2019	14:13	16-07-2019	15:15	DT received at Gaya		DT received at Gaya		No fault observed in PMU	NO	NO
10	400KV DURGAPUR-BIDHANNAGAR-I	18-07-2019	1:38	18-07-2019	3:12		Master trip and over voltage at bidhannagr	Over voltage at Bidhannagar			NO	NO
11	400KV JAMSHEDPUR-ADHUNIK-I	24-07-2019	8:04	24-07-2019	11:50	DT received	Over voltage	Over Voltage at APNRL			NO	NO
12	400KV BINAGURI-KISHANGANJ-II	24-07-2019	12:40	24-07-2019	13:33	DT received at Binaguri	Problem in gas chamber due to moisture inrush	DT received at Binaguri			NO	NO

Autoreclose related issues

1	220KV PATNA-FATUHA-SC	01-07-2019	15:13	01-07-2019	15:47	B-N, 9.47KA, 8.6Km	Z-I, B-N, 13Km	B-N Fault	< 100 msec	No Autoreclose	YES	NO
2	220KV RAJARHAT-JEERAT-I	03-07-2019	10:31	03-07-2019	10:48		B-NFAULT,Z-1,21.1 KM, A/R lockout	B-N Fault	< 100 msec	No Autoreclose	NO	YES
3	400KV KHARAGPUR-KOLAGHAT-I	08-07-2019	11:54	08-07-2019	12:10	B Ph , Z-1 , 66.34 KM, 4.933 KA.	B Ph, Z-1, 2.73 km, 12.07 KA, A/R successful.	B-N Fault	< 100 msec	No Autoreclose	YES	NO
4	400KV KhSTPP-BANKA (PG)-II	09-07-2019	13:35	09-07-2019	15:47		B-N , FC= 2.603 kA, FD= 50.6 km	B-N Fault	< 100 msec	No Autoreclose	YES	YES
5	220KV MADHEPURA-NEW PURNEA-I	15-07-2019	15:18	15-07-2019	15:46	B-N,Z1 ,61.9 KM	A/R successful	B-N Fault	< 100 msec	No Autoreclose	NO	NO
6	220KV CHANDIL-RANCHI-SC	16-07-2019	12:19	16-07-2019	12:36	Y-N, Z-1, 72.71KM, 1.98KA	A/R successful	Y-N Fault	< 100 msec	No Autoreclose	YES	NO
7	400KV FSTPP-GOKARNO-II	16-07-2019	13:54	16-07-2019	15:05	z1,76 km,R-N,5.686 KA	R-N,z1,48 km ,3.72 ka, A/R Successful	R-N Fault	< 100 msec	No Autoreclose	NO	YES
8	220KV ALIPURDUAR-SALAKATI-I	22-07-2019	2:19	22-07-2019	2:34	B-N, 100Km, 1.97KA		B-N Fault	< 100 msec	No Autoreclose	YES	YES
9	400KV KISHANGANJ(PG)-RANGPO-SC	22-07-2019	4:33	22-07-2019	6:11	Y-N, 137.6Km, 2.46KA		Y-N Fault	< 100 msec	No Autoreclose	YES	NO
10	400KV PATNA-BALIA-II	22-07-2019	14:04	22-07-2019	14:44	Y-N, 184.2 Km , 3.6 KA	No tripping	Y-N Fault	< 100 msec	No Autoreclose	YES	NO
11	220KV ALIPURDUAR-SALAKATI-I	23-07-2019	7:52	23-07-2019	8:22	RN, 2.33 KA, 70 KM	A/R successful	R-N Fault	< 100 msec	No Autoreclose	YES	YES
12	220KV ALIPURDUAR-SALAKATI-I	23-07-2019	9:58	23-07-2019	18:21		R-N,Z-I ,7ka ,13km, A/R successful	R-N Fault	< 100 msec	No Autoreclose	NO	YES
13	220KV GAYA-KHIZERSARAI-II	23-07-2019	14:23	23-07-2019	15:10	R-N, 4.48KM, FC=16.412KA	R-N, 158KM	R-N Fault	< 100 msec	No Autoreclose	YES	NO
14	220KV DEHRI-GAYA-I	24-07-2019	5:48	24-07-2019	5:49	RN, 5.268 KA, 3.68 KM	RN, 1.98 KA, 98 KM, A/R Successful	R-N Fault	< 100 msec	No Autoreclose	YES	YES
15	400KV ANGUL-TSTPP-SC	25-07-2019	15:25	25-07-2019	15:35	Y-N FAULT,11.67 KA		Y-N Fault	< 100 msec	No Autoreclose	YES	NO

Tripping of 220 KV Begusarai-New Purnea-DC

1	220KV BEGUSARAI-NEW PURNEA-I	11-07-2019	11:08			BEGUSARAI -86A OPERATED		BEGUSARAI -86A OPERATED		No fault observed in PMU	NO	NO
2	220KV BEGUSARAI-NEW PURNEA-II	13-07-2019	23:18	13-07-2019	23:40		Z1, B-N	B-N Fault	< 100 msec	No Autoreclose	NO	NO
3	220KV BEGUSARAI-NEW PURNEA-II	14-07-2019	9:45	14-07-2019	10:15	Tripped from only begusarai		Tripped from only begusarai		No fault observed in PMU	NO	NO
4	220KV BEGUSARAI-NEW PURNEA-I	15-07-2019	18:11	15-07-2019	19:03	Master trip	B-N,69.4 KM ,2.53 KA	B-N Fault	< 100 msec	No Autoreclose	NO	NO
5	220KV BEGUSARAI-NEW PURNEA-I	17-07-2019	14:26	17-07-2019	15:34	B_N Fault, 161.54 KM, 1.109 kA		B-N Fault	< 100 msec	No Autoreclose	NO	NO
6	220KV BEGUSARAI-NEW PURNEA-I	19-07-2019	16:21	19-07-2019	17:17		B-N, 71.8 km , 1.83 ka ,	B-N Fault	< 100 msec	No Autoreclose	NO	NO
7	220KV BEGUSARAI-NEW PURNEA-II	23-07-2019	11:28	23-07-2019	12:18		B-N,2.29 KA, f/d 4.4Km	B-N Fault	< 100 msec	No Autoreclose	NO	NO
8	220KV BEGUSARAI-NEW PURNEA-II	24-07-2019	13:54	24-07-2019	15:10	R-N fault	A/R successful (R-N, 46.9Km, 3.5KA)	R-N Fault	< 100 msec	No Autoreclose	NO	NO
9	220KV BEGUSARAI-NEW PURNEA-I	26-07-2019	10:10	26-07-2019	10:10	B_N Fault	B_N, 2.1 kA, 55.4 KM	B-N Fault		No fault observed in PMU	NO	NO
10	220KV BEGUSARAI-NEW PURNEA-II	28-07-2019	13:18			LINE PATROLLING WAS SUGGESTED FROM ERLDC BUT LINE CHARGED FROM BEGUSARAI END WITHOUT ERLDC CODE .	BN, z-1, 1.69 KA, 66.3 KM, A/R Successful	B-N Fault	< 100 msec	No Autoreclose	NO	NO
11	220KV BEGUSARAI-NEW PURNEA-II	29-07-2019	12:24	31-07-2019	20:26	B-N, Z-1, FD 143.6 km, FC -1.10KA	B-N,FD 38.1KM,FC 2.28KA	B-N Fault	< 100 msec	No Autoreclose	NO	NO
12	220KV BEGUSARAI-NEW PURNEA-I	30-07-2019	2:55	30-07-2019	3:21		R-N, 81.5Km, 2.13KA	R-N Fault	< 100 msec	No Autoreclose	NO	NO

SI No.	Name of the incidence	PCC Recommendation	Latest status
81st PCC Meeting			
1.	Disturbance at 400 kV Dikchu S/s on 30.06.2019 at 09:55 Hrs.	<p>PCC advised Dikchu to review the backup E/F time setting of the ICT and coordinate the setting with with the zone-3 timing of the transmission line.</p> <p>The time setting for the DEF relay at Jorethang end was 500 msec. PCC advised Jorethang to review the timer setting of DEF protection at Jorethang end.</p> <p>PCC advised Chuzachen to review the zone settings for 132 kV Chuzachen-Rangpo line.</p> <p>PCC advised Teesta-III & Dikchu to study the effect on their machine for synchronization at higher angular differences. Based on the study results, suitable settings for breaker closing conditions during synchronization can be evaluated.</p> <p>PCC advised TPTL to do line patrolling for 400 kV Rangpo-Dikchu line to find out the cause of such high resistive fault in the line.</p>	
2.	Disturbance at 400 kV TSTPS (NTPC) S/s & Talcher HVDC station on 05.06.2019 at 19:01 Hrs.	<p>PCC advised Powergrid to explore the feasibility of broken conductor protection at HVDC Talcher station end to avoid such kind of disturbances.</p> <p>From the DR analysis of the 220kV TSTPS-Meramundali-1, it was observed that OPTCL end relay has picked up a fault in zone-I but not in zone-2 & zone-3. PCC advised OPTCL to check the relay configurations & settings.</p>	
3.	Disturbance at 220 kV Budhipadar(OPTCL) S/s on 12.06.2019 at 00:37 Hrs.	PCC opined that the tripping of 220 kV Budhipadar-Tarkera_II line in overcurrent protection from Tarkera end within 600 msec is not desirable and advised OPTCL to review the backup overcurrent	

		<p>settings at Tarkera end.</p> <p>PCC advised OPTCL to properly configure the DRs for 220 kV Budhipadar – Korba D/C & 220 kV Budhipadar-Raigarh circuit at Budhipadar end and for 220 kV Budhipadar – Lapanga - II at Lapanga end as per the DR standard finalised in 79th PCC Meeting.</p> <p>PCC also advised OPTCL to check the time synchronisation of DRs at Lapanga end.</p>	
4.	Disturbance at 400 kV Meramundali (OPTCL) S/s on 03.06.2019 at 01:15 Hrs.	<p>For voltage rise issue, PCC advised to check for any CVT related issues in the substation. PCC also advised to carry out earthing audit of the complete substation.</p> <p>PCC advised OPTCL to review the timer setting of ICT highest protection and suggested to consider putting time delays in ICT highest settings so that a proper coordination can be achieved between the busbar protection and highest protection.</p>	
5.	Disturbance at 220/132 kV Dumka(JUSNL) S/s on 19.06.2019 at 13:02 Hrs.	PCC advised both Powergrid & JUSNL to configure the digital signal of DR output as per the DR standards finalized in 79th PCC Meeting. PCC also advised for time synchronization of the DR outputs at both Maithon & Dumka end.	
6.	Repeated auto-reclose operation of 400 kV Ranchi-RTPS- II at Ranchi end during the tripping at 14:50 hrs on 31.05.2019	Powergrid informed that the reason for repeated autoreclosure during persistent fault would be checked during next available shutdown.	
7.	Different A/R timing at two ends of 400 kV Kodarma-Bokaro-I circuit.	In 81st PCC Meeting, DVC informed that the issue of different autoreclose time was due to uploading of wrong settings file to the relay. They informed that the same would be rectified very soon.	
80th PCC Meeting			

8.	Disturbance at 400 kV Darabhangha S/s on 29.05.2019 at 21: 44 Hrs.	<p>After detailed deliberation, PCC advised KPTL to submit all the DR & ELs to further analyze the operation of busbar protection at Darbhanga end.</p> <p>PCC also opined that the shunt reactors shall be tripped whenever the corresponding line trips so that the overcompensation of the line can be reduced thus the ferroresonance effect can be avoided.</p>	
9.	Protection Coordination issue in 400 kV Kishanganj-Darbhangha D/C line along with Line Reactor at Darbhanga end	<p>PCC advised KPTL to analyze and find out the reason for tripping of 400 kV Kishanganj-Darbhangha D/C line in zone-3 protection for a fault in same line and simultaneous tripping of Line reactor at Darbhanga end.</p> <p>PCC also advised KPTL to submit the relevant relay settings to ERLDC/ERPC.</p>	

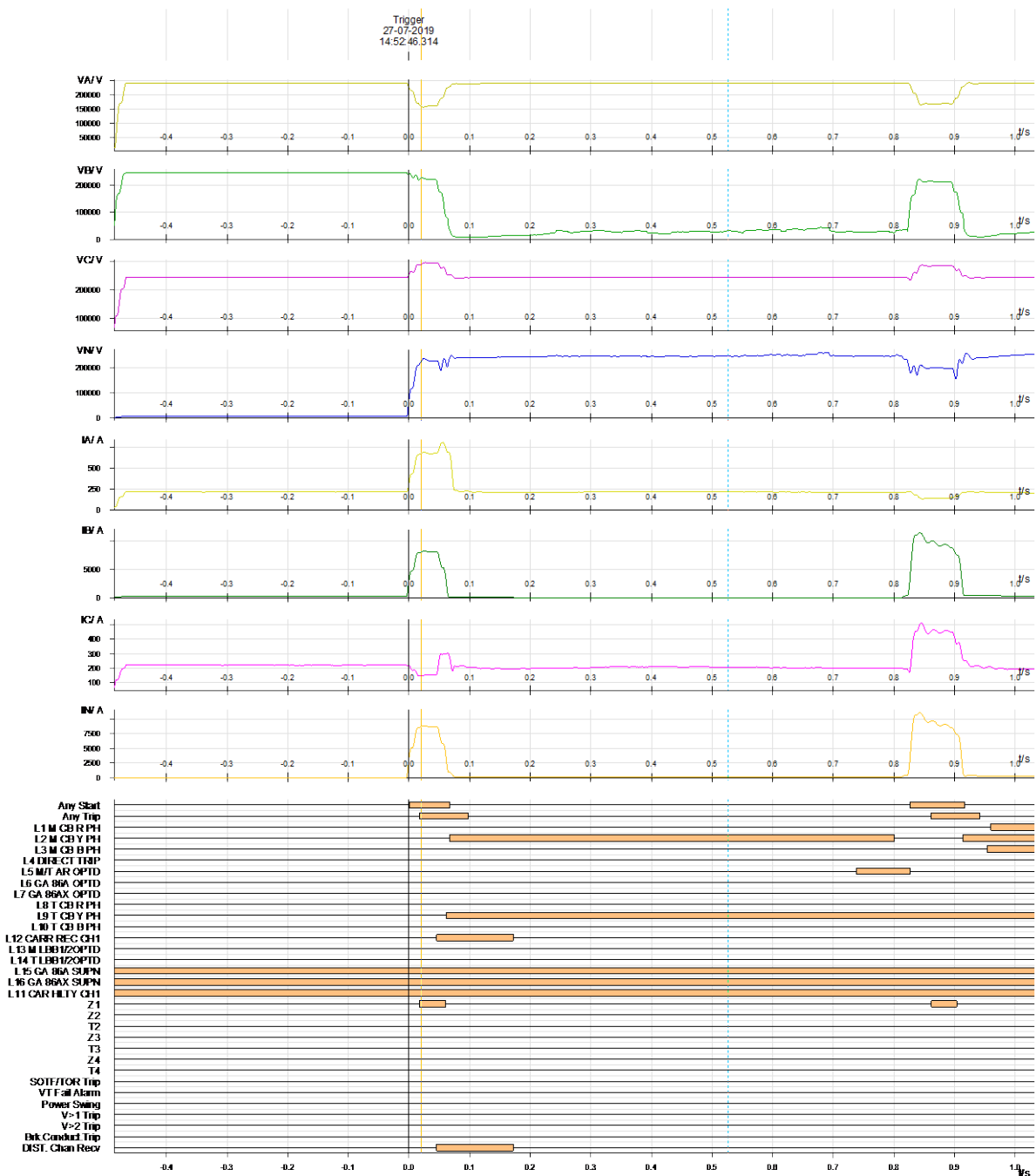
79th PCC Meeting

10.	Disturbance at Sikkim Hydro Complex on 12.04.19 at 23:55 hrs.	<p>PCC advised Powergrid to configure the DR settings properly at Kishanganj end as per the DR standard finalized in PCC meeting.</p> <p>PCC also advised to send all the relay settings at Kishanganj end to ERPC for updating of the settings in PDMS database.</p> <p>PCC observed the CT rating at Kishanganj for 400 kV Kishanganj-Rangpo line is quite low for a quad moose circuit and advised Powergrid to install a CT of higher rating.</p> <p>PCC advised PCC advised TPTL to enter into an agreement with Powergrid for Operation & Maintenance of the bays in view of reliability and security of the grid.</p> <p>In 80th PCC Powergrid was advised to submit a report on actions taken on 79th PCC observations.</p>	
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76th PCC Meeting

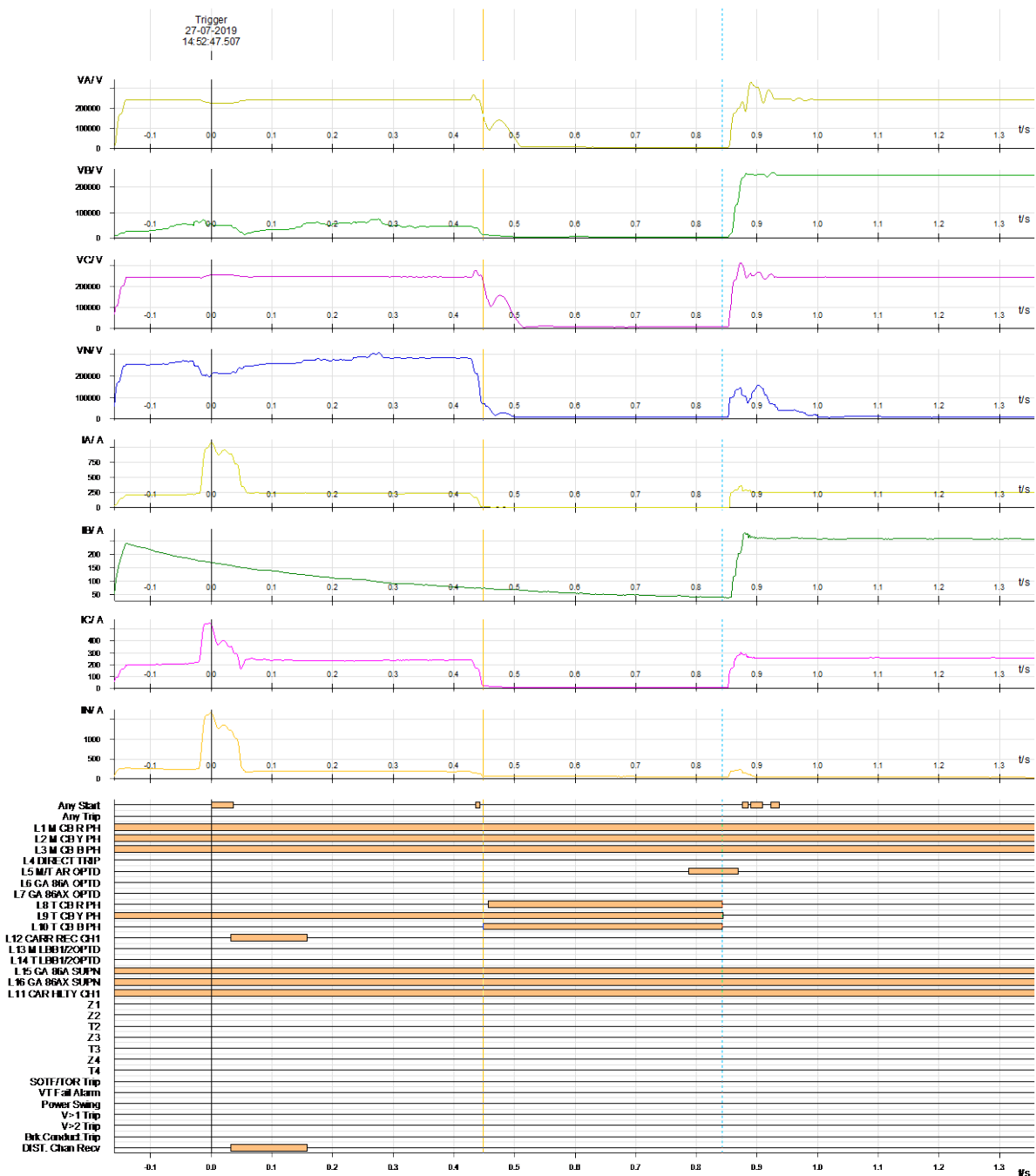
12.	Disturbance at 220 kV Katapalli S/s on 07.01.2019 at 15:40 hrs.	PCC advised OPTCL to send the details of Hindalco islanding scheme to analyze the reasons behind failure of the islanding scheme during this disturbance	OPTCL informed that they have received the scheme from Hindalco.
13.	Disturbance at 400kV Gaya(PG), 220kV Gaya and Bodhgaya on 05-01-19 at 11:20 hrs	PCC advised BSPTCL to review the Khijasarai end relay settings to avoid unwanted tripping at Khijasarai end and submit the relay settings to ERPC for inclusion in PDMS.	BSPTCL informed that they will send the relay settings at the earliest.
72nd PCC Meeting			
14.	HVDC TFR triggering standardization and reporting requirements.	PCC advised POWERGRID to submit TFR triggering criteria and TFR signal list for all HVDC station of Eastern region to ERLDC	It was informed that required information was received from Talcher HVDC station.
71st PCC Meeting			
15.	Disturbance at 220/132 kV Motipur(BSPTCL) S/s on 15.08.18 at 13:00 hrs.	PCC advised BSPTCL to check the disturbance recorders of all the lines in 220 kV Motipur S/s and communicate the findings to ERPC/ERLDC at the earliest.	BSPTCL informed that OEM is yet to visit the station.
16.	Disturbance at 400 kV Farakka S/s on 19.08.18 at 15:26 hrs.	PCC advised to check the reason for not sending carrier from Farakka to Kahalgaon and non-operation of Autorecloser.	NTPC informed that the carrier healthiness will be checked at next available shutdown.
68th PCC Meeting			
17.	Issues related with Generation Backing down during Talcher-Kolar SPS operation on 16th May 2018.	<p>PCC advised Powergrid to explore for inclusion of pole block with ground return mode signal in the SPS logic.</p> <p>PCC advised NTPC also to explore for inclusion of pole block with ground return mode signal in the SPS logic.</p>	<p>PCC advised Powergrid and NTPC to coordinate and implement pole block with ground return mode signal in SPS.</p> <p>Powergrid informed that confirmation from NTPC is awaited whether they are receiving the pole block signal or not.</p>

DR recorded at Barh for 400 kV Kahalgaon – I feeder at 14:52:46 hrs on 27th July 2019



Observation: Unsuccessful A/R attempt was taken at Barh end for Y phase fault. It has been observed, tie breaker at R and B phase did not open after the unsuccessful A/R attempt of Y phase main breaker. It resulted current to be flown in healthy phases even after unsuccessful A/R attempt.

DR recorded at Barh for 400 kV Kahalgaon – I feeder at 14:52:47 hrson 27th July 2019



Observation: Approximately 400 ms after opening of tie breaker in R & B phase (Y phase tie breaker was in already open condition), all three-phase tie breaker closed again. This time fault was not observed in Y phase. Current in all three phases was low as line was opened from remote end.

पावर सिस्टम ऑपरेशन कर्पोरेशन लिमिटेड

(भारत सरकार का उद्यम)

POWER SYSTEM OPERATION CORPORATION LIMITED

(A Government of India Enterprise)



Eastern Regional Load Despatch Centre: 14, Golf Club Road, Tollygunge, Kolkata-700 033.

CIN: U40105DL2009GOI188682

फ़ोन: 033- 24235755, 24174049 फ़ैक्स : 033-24235809/5029 Website: www.erldc.org, Email ID- erldc@posoco.in

Incident No. 120619/2

Dtd: 16-07-19

Report on the incident in Eastern Region involving ISTS system

1) Date / Time of disturbance: 12-06-19, 16:39 hrs.

2) Systems/ Subsystems affected: Biharshariff

3) Quantum of load/generation loss: No load loss or generation loss has been observed.

4) Antecedent condition:

400 kV Biharshariff – Balia I tripped at 15:24 hrs on Y-N fault and 400 kV Biharshariff – Balia II tripped at 15:57 hrs on R-N fault

5) Major elements tripped:

- 400kV Biharshariff – Banka – I & II
- 400 kV Biharshariff – Sasaram – I
- 400/220 kV ICT at Biharshariff II & III
- 400 kV Biharshariff – Varanasi – I
- 400 kV Biharshariff – Balia – I (line tripped approx. 2.5 minutes after the charging attempt)

6) Network across affected area

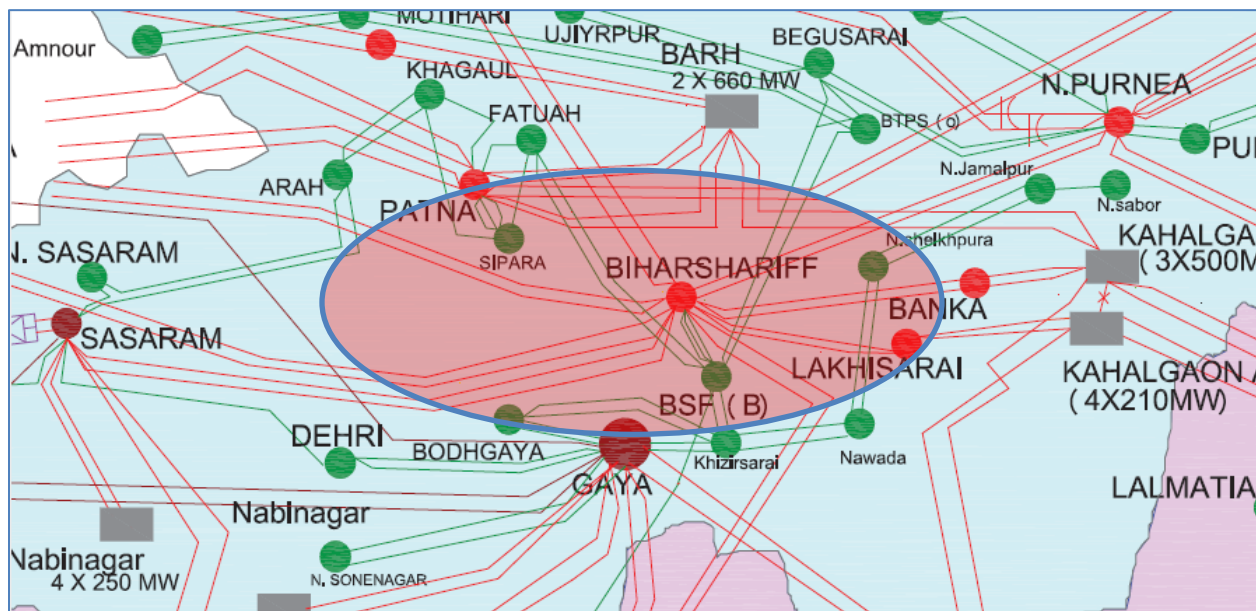


Figure 1: Network across affected area

7) Sequence of events & Detailed Analysis:

Time (Hrs)	Details of the events
16:39:17.500	400 kV Banka – Biharshariff – I tripped from Biharshariff end (From PMU data)
16:39:17.689	400 kV Banka – Biharshariff – II tripped from Banka end (From ERLDC SOE)
16:39:17.780	400 kV Biharshariff – Sasaram – I A/R started at both ends for B-N fault (From PMU data)
16:39:17.823	Tie breakers of 400 kV Biharshariff – Sasaram – I at Sasaram end (tie with Reactor 5) tripped (From DR output at Sasaram end)
16:39:18	Successful A/R occurred for 400 kV Biharshariff – Sasaram – I at both ends (At Sasaram end, three pole of tie breakers tripped and At Biharshariff end, B pole of tie breakers did not reclose and other two healthy pole i.e. R & Y pole opened after 2.5 seconds) (From DR output at Biharshariff end)
16:39:20	At Biharshariff end of 400 kV Biharshariff – Sasaram – I, B pole of tie breaker did not reclose and other two healthy pole i.e. R & Y pole opened after 2.5 seconds (From DR output at Biharshariff end)
16:39:23	Main breakers of 400 kV Biharshariff – Sasaram – I tripped from Biharshariff end due to fault in reclaim time. (From DR output at Biharshariff end)
16:39:23.161	400 kV Banka – Biharshariff – I tripped from Banka end (From ERLDC SOE)
16:40:40.785	400 kV Biharshariff – Balia – I was charged at Biharshariff end (From ERLDC SOE)
16:42:01	A/R operation started at Biharshariff end of 400 kV Biharshariff – Varanasi – I due to B-N fault (From DR output at Biharshariff end)
16:42:02	Three pole opened at Biharshariff end of 400 kV Biharshariff – Varanasi – I due to permanent fault (From DR output at Biharshariff end)
16:42:54.201	A/R started for 400 kV Biharshariff – Balia – I at Biharshariff end due to R-N fault (From PMU data)
16:42:54.137	400/220 kV ICT – II at Biharshariff end. As per SCADA data, 400/220 kV ICT – III also tripped at same time. (From ERLDC SOE and analog SCADA data)
16:42:55.201	Three pole opened at Biharshariff end of 400 kV Biharshariff – Balia – I due to permanent fault (From PMU data)

8) PMU observation:

More than one fault incidents have been captured in the voltage measured (Figure 2) by PMU installed at Biharshariff during 16:39 hrs and 16:43 hrs. During the first fault incident at 16:39 hrs, no auto reclose operation has been observed due to B-N fault at Biharshariff end for 400 kV Biharshariff – Banka – I in the three phase current measured by PMU data (Figure 3). As per three phase current measured for 400 kV Biharshariff - Sasaram - I at Biharshariff end, successful A/R operation occurred at both ends at 16:39:18 hrs due to B-N fault followed by three phase tripping at 16:39:23 hrs due to fault in reclaim time in same phase (Figure 4). As shown in figure 5, 400 kV Biharshariff - Balia – I was charged at 16:40 hrs. Same line tripped due to R-N fault after unsuccessful A/R attempt at Biharshariff end at 16:42 hrs.

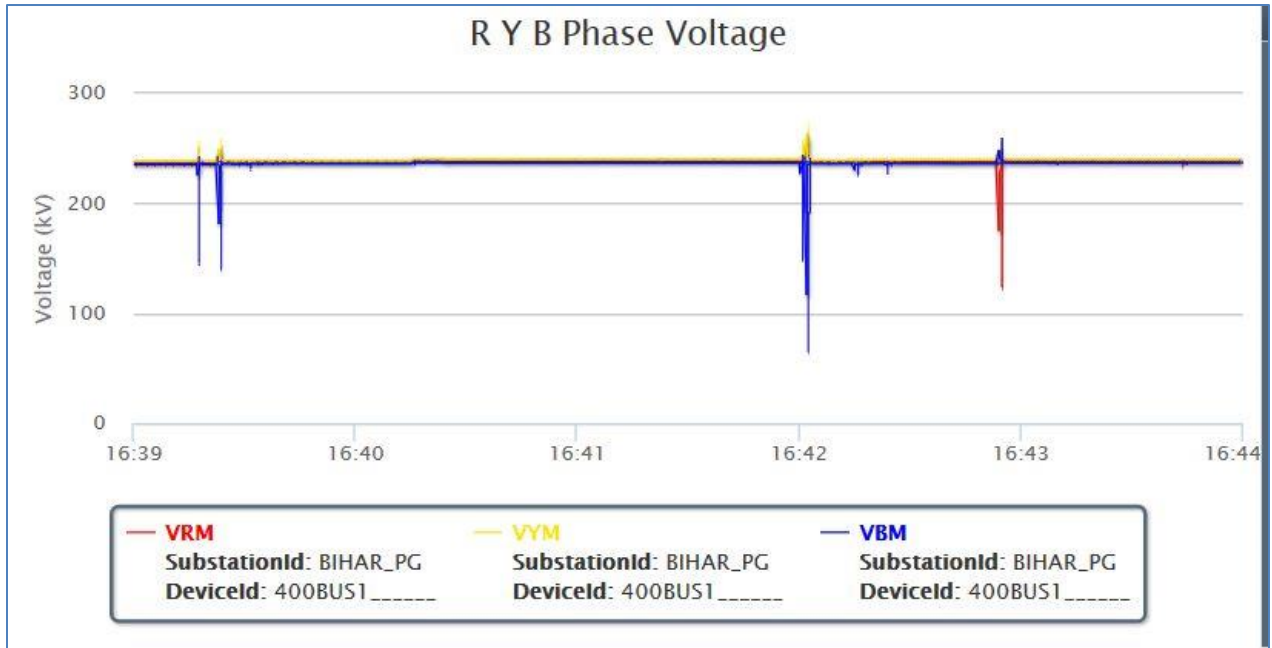


Figure 2: More than one fault incidents have been captured in the voltage measured by PMU installed at Biharshariff during 16:39 hrs and 16:43 hrs.



Figure 3: Three phase current and MW power flow measured for 400 kV Biharshariff - Banka - I at Biharshariff end shows the non - auto-reclose operation of 400 kV Biharshariff Banka – I

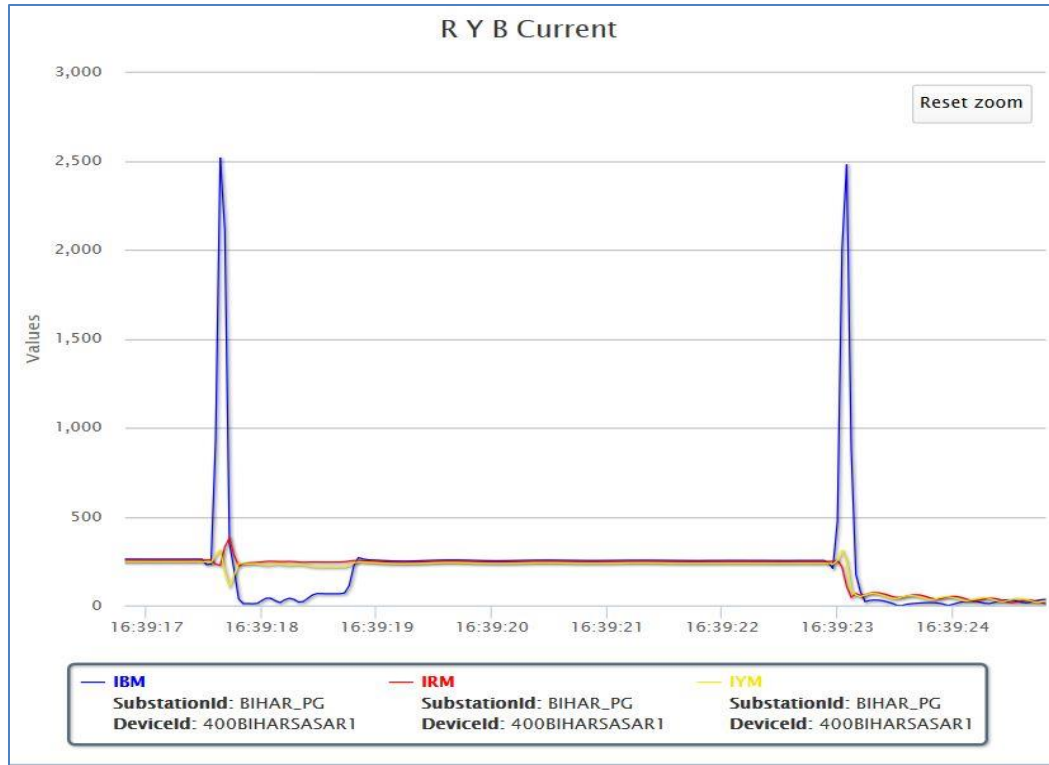


Figure 4: Three phase current measured for 400 kV Biharshariff - Sasaram - I at Biharshariff end showed successful A/R operation from both ends at 16:39:18 hrs followed by three phase tripping at 16:39:23 hrs due to fault in reclaim time

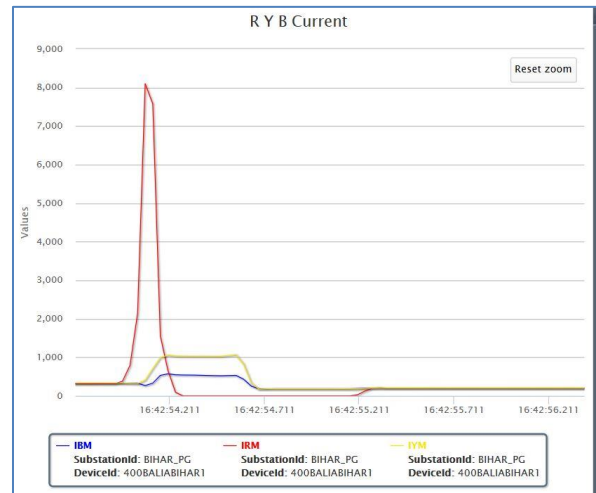
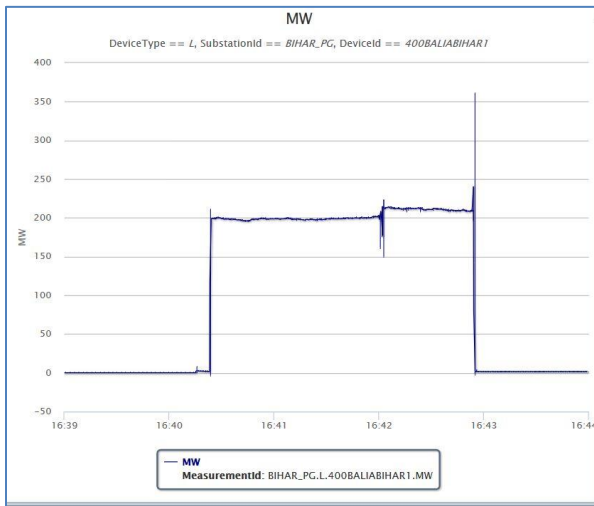


Figure 5: MW flow captured at Biharshariff end for 400 kV Biharshariff - Balia - I shows the charging of line at 16:40 hrs followed by tripping at 16:42 hrs due to unsuccessful auto-reclose attempt at Biharshariff end for R-N fault

9) Restoration:

S.No.	Name of the Element	Restoration Time (Hrs)
1	400kV Biharshariff – Banka – I	17:59
2	400kV Biharshariff – Banka – II	16:52
3	400/220 kV ICT at Biharshariff III	17:28
4	400 kV Biharshariff – Varanasi – I	18:57
6	400 kV Biharshariff – Balia – I	18:18

10) Discrepancies observed

- Reason for tripping of 400/220 kV ICT II & III may be shared by POWERGRID.
- Some digital signals of are not available in DR recorded both ends of 400 kV Sasaram – Biharshariff – I. POWERGRID ER- I may configure DR output as per recommendations given in 79th PCC meeting (Annexure II & III)
- A/R operation did not observed in PMU data for the tripping of 400 kV Biharshariff – Banka – I at Biharshariff end. As more than one elements tripped at same time, it is not possible to analyze the event without DR output for 400 kV Biharshariff – Banka D/C. POWERGRID may share the DR output along with reason for non-A/R attempt at Biharshariff end for 400 kV Biharshariff – Banka – I (Figure 3)
- As per DR recorded at Biharshariff end for the tripping of 400 kV Biharshariff – Sasaram – II, B phase tie breaker did not close after dead time of a transient fault and all three pole of tie breaker tripped. Reason for non-closing of tie breaker may be shared by POWERGRID. (Annexure III)
- Digital signals due to operation of tie breakers at Biharshariff end of 400 kV Biharshariff – Varanasi – I are not properly recorded in DR output. (Annexure IV)

11) Non-Compliance Observed during the event:

Issues	Regulation Non-Compliance	Utility
Non-Submission of Preliminary Report from User, STU, CTU,SLDC to RLDC	1. IEGC 5.9.6.a 2. CEA Grid Standard 12.2 (Applicable for SLDC,ALDC only)	POWERGRID
DR/EL not provided within 24 Hours	1. IEGC 5.2 (r) 2. CEA grid Standard 15.3	POWERGRID
Incorrect/ mis-operation / unwanted operation of Protection system	1. CEA Technical Standard for Construction of Electrical Plants and Electric Lines: 43.4 .A. 2. CEA (Technical standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)	POWERGRID
Single phase A/R in transmission lines at 220 kV and above levels is not present/enable	1. CEA Technical standards for construction of electric plants and electric lines –Clause 43(4) (c). 2. CEA Transmission Planning Criteria	POWERGRID

12) Status of Reporting:

DR/EL has been received from POWERGRID end for 400 kV Biharshariff – Sasaram – I & 400 kV Biharshariff – Varanasi – I.

Annexure I: SOE recorded at ERLDC during the event

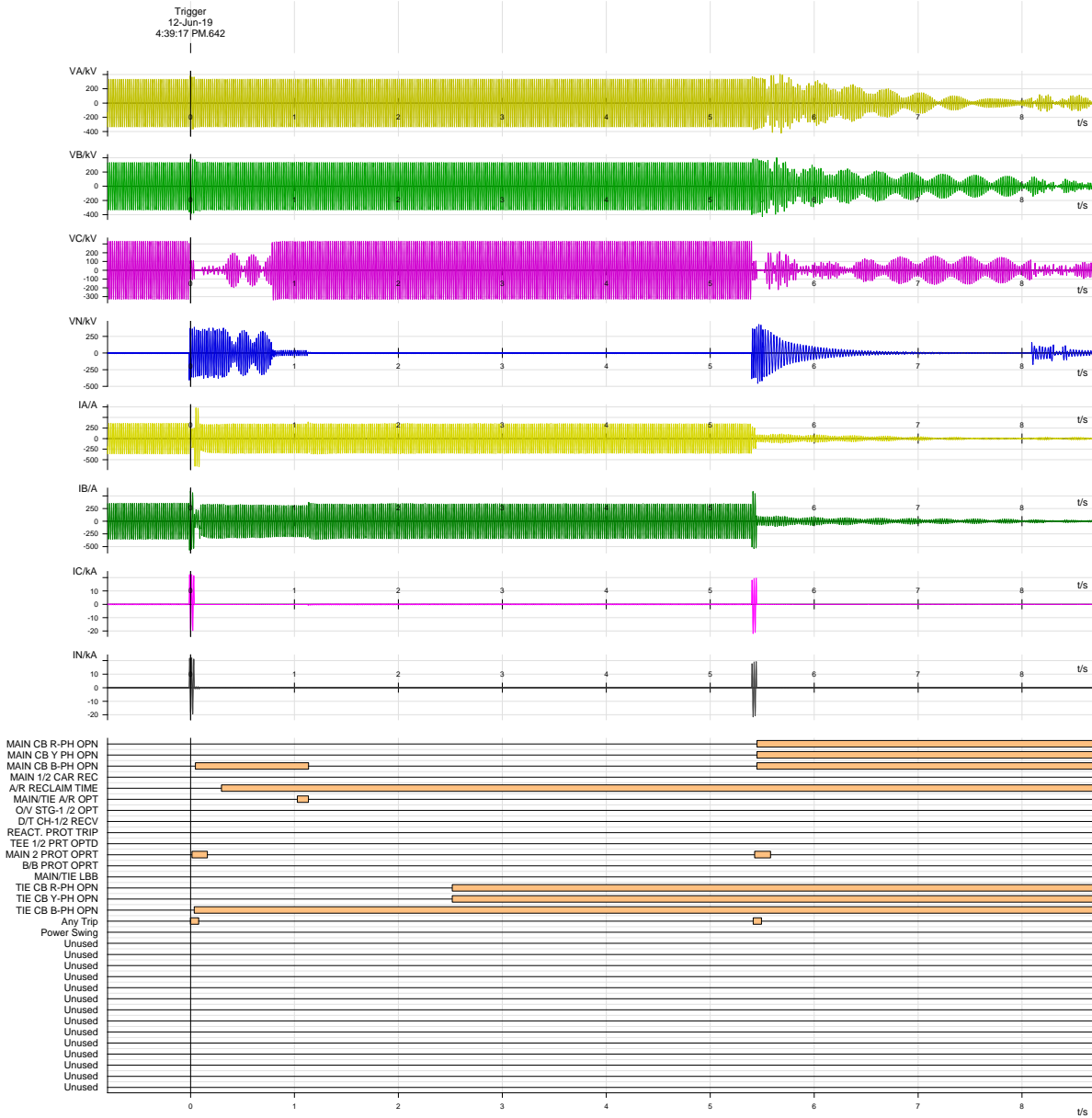
TIME	MILLI_SEC	STATION	DESCRIPTION	STATUS
16:39:17	686	BANKA_PG	400_BIHAR_PG_2_Main_CB	Open
16:39:17	689	BANKA_PG	400_BIHAR_PG_2_ICT2_Tie	Open
16:39:17	723	SASAR_PG	400_BIHAR_PG_2_Tie_ISO	Closed
16:39:17	768	SASAR_PG	400_BIHAR_PG_2_Reactor5_Tie	Open
16:39:17	805	SASAR_PG	400_BIHAR_PG_2_Tie_ISO	Open
16:39:17	974	SASAR_PG	400_Reactor6_Main_CB(SPARE_)	Closed
16:39:18	441	SASAR_PG	400_BIHAR_PG_1_Main_CB	Closed
16:39:19	496	BANKA_PG	400_BIHAR_PG_1_ICT1_Tie	Closed
16:39:23	135	SASAR_PG	400_BIHAR_PG_2_Tie_ISO	Closed
16:39:23	161	BANKA_PG	400_BIHAR_PG_1_ICT1_Tie	Open
16:39:23	162	BANKA_PG	400_BIHAR_PG_1_Main_CB	Open
16:39:23	182	SASAR_PG	400_BIHAR_PG_1_Main_CB	Open
16:39:23	217	SASAR_PG	400_BIHAR_PG_2_Tie_ISO	Open
16:40:15	440	BIHAR_PG	400_BALIA_NR_1_Main_CB	Closed
16:40:40	785	BIHAR_PG	400_BALIA_NR_1_PURNW_PG_2_Tie	Closed
16:42:01	958	BIHAR_PG	400_VRNSI_NE_1_Main_CB	Closed
16:42:02	26	BIHAR_PG	400_VRNSI_NE_1_Main_CB	Open
16:42:02	81	BIHAR_PG	400_VRNSI_PG_1_SPARE_7_Tie	Open
16:42:54	132	BIHAR_PG	400_BALIA_NR_1_PURNW_PG_2_Tie	Open
16:42:54	137	BIHAR_PG	400_ICT2_Main_CB	Open
16:42:55	208	BIHAR_PG	400_BALIA_NR_1_Main_CB	Closed
16:44:39	460	BIHAR_PG	400_BALIA_NR_1_Main_CB	Closed
16:44:43	410	BIHAR_PG	400_BANKA_PG_1_BANKA_PG_2_Tie	Open
16:45:19	694	PATNA_PG	400_BALIA_NR_1_BARH_PG_2_Tie	Closed
16:52:26	34	BANKA_PG	400_BIHAR_PG_2_Main_CB	Closed
16:52:41	180	BANKA_PG	400_BIHAR_PG_2_ICT2_Tie	Closed
17:02:49	638	BIHAR_PG	400_VRNSI_PG_1_SPARE_7_Tie	Open
17:12:03	430	BIHAR_PG	400_MUZAF_PG_2_Main_CB	Closed
17:12:03	439	BIHAR_PG	400_MUZAF_PG_1_MUZAF_PG_2_Tie	Closed
17:12:03	474	MUZAF_PG	400_BIHAR_PG_2_Main_CB	Closed
17:12:03	500	BIHAR_PG	400_MUZAF_PG_2_Main_CB	Open
17:12:03	507	BIHAR_PG	400_MUZAF_PG_1_MUZAF_PG_2_Tie	Open
17:12:03	537	MUZAF_PG	400_BIHAR_PG_2_GORAK_NR_4_Tie	Open
17:12:03	547	MUZAF_PG	400_BIHAR_PG_2_Main_CB	Open
17:33:21	203	BIHAR_PG	400_BALIA_NR_2_Main_CB	Closed
17:33:21	262	BIHAR_PG	400_BALIA_NR_2_Main_CB	Open
17:38:37	687	BIHAR_PG	400_ICT2_Main_CB	Closed
17:43:26	873	MUZAF_PG	400_BIHAR_PG_2_Main_CB	Closed
17:43:26	925	MUZAF_PG	400_BIHAR_PG_2_Main_CB	Open

[illegible]

Successful A/R from Sasaram end due to B-N fault. (DR for tripping at 16:39:23 hrs yet to be received).

All required digital channels are not available. DR channels may be configured as per discussion in 79th PCC meeting.

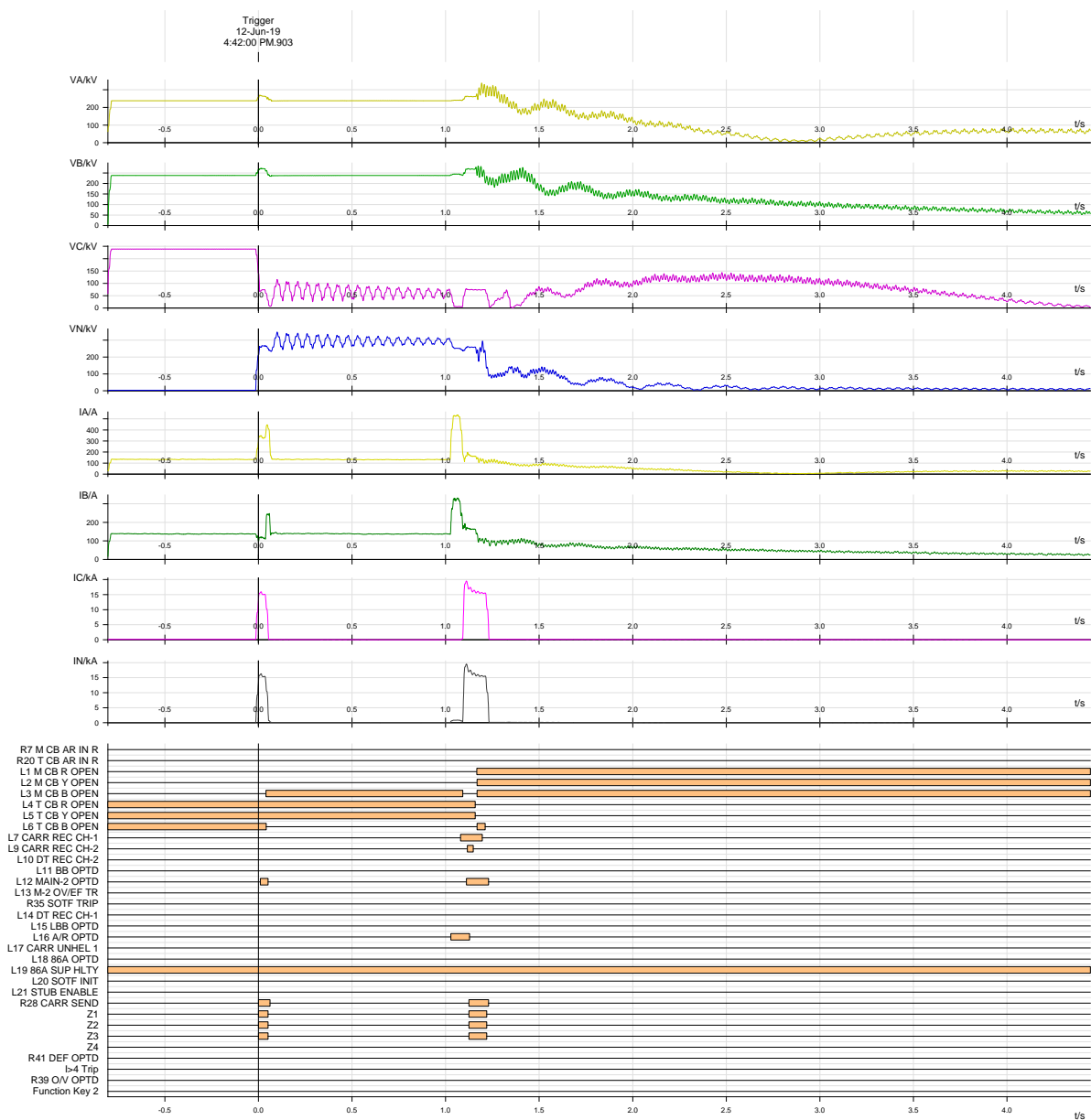
Annexure III: DR recorded at Biharshariff end for 400 kV Sasaram – Biharshariff - I

**Remarks:**

Successful A/R from Biharshariff end due to B-N fault. Tie breaker did not close. Hence other two breakers opened in pole discrepancy after 2.5 seconds. Three poles of main breaker tripped after 5.4 seconds due to another B-N fault in reclaim time.

All required digital channels are not available. DR channels may be configured as per discussion in 79th PCC meeting.

Annexure IV: DR recorded at Biharshariff end for 400 kV Sasaram – Varanasi - I



Remarks:

Digital signals due to operation of tie breakers at Biharshariff end of 400 kV Biharshariff – Varanasi – I are not properly recorded in DR output.

Annexure V: MW power flow captured in ERLDC SCADA data

