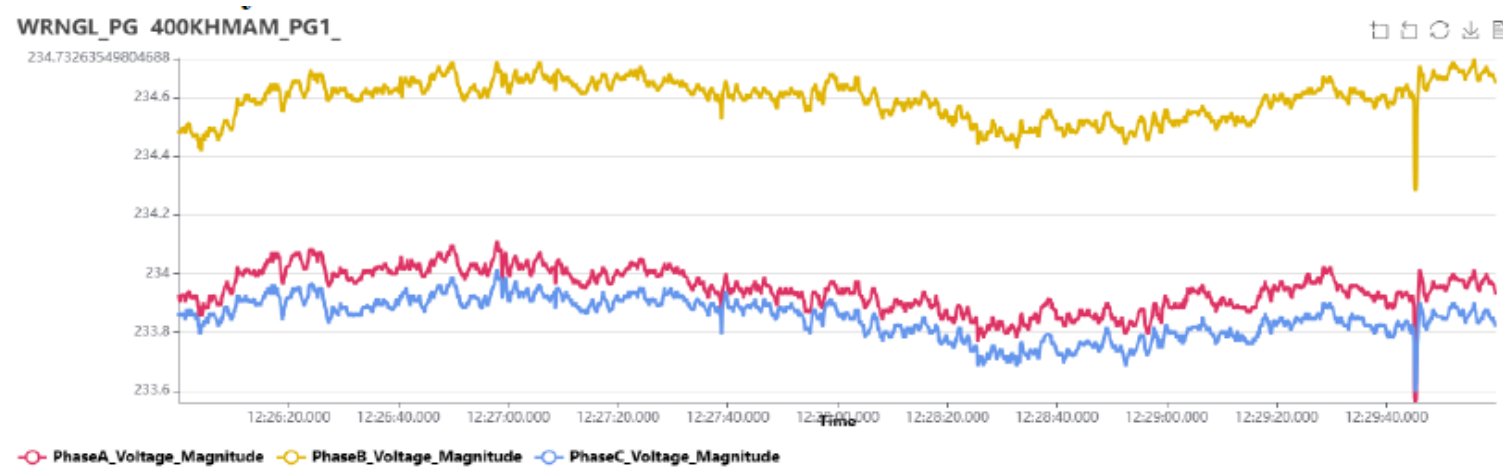


III. Single/Multiple Element Tripping with Protection Violation

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
1	400KV-TIPPAPUR-CHANDALAPUR-2	As per the reports submitted 400 kV Tippapur-Chandalapur line got tripped due to suspected earth leakage in Chandalapur end. The line got tripped at Chandalapur end. DT was sent from Chandalapur end and DT was received at Tippapur end and it tripped. As per the reports submitted 400 kV Chandalapur-Gajwel line tripped at Chandalapur end only due to earth leakage fault. No DR triggered at Gajwel end and line still in the service at Gajwel end.	16-03-2026 12:28	TGTRANSCO: 1. Tripping of the line due to DC earth leakage needs review	

	TIPPAPUR	CHANDALAPUR
FIR	Tripped on Direct Trip received indications at Tippapur end.	Tripped without indications at Chandalapur end due to suspected DC earth leakage.
DR	DR Trigger Time:16-03-2026 12:28:25.422 L9-DT-1 RECVD L1-M 86A OPTD L23-T 86A OPTD L18-T CB OPEN Y L17-T CB OPEN R L19-T CB OPEN B L13-M CB OPEN R L14-M CB OPEN Y L15-M CB OPEN B	DR Trigger Time:16-03-2026 12:28:25.499 L15-M CB OPEN B L13-M CB OPEN R, L14-M CB OPEN Y L15-M CB OPEN B L14-M CB OPEN Y L13-M CB OPEN R
EL	Same as DR	Same as DR
TR	Same as FIR	NA

PMU Analysis:



➤ From the PMU data no fault is observed during the event.

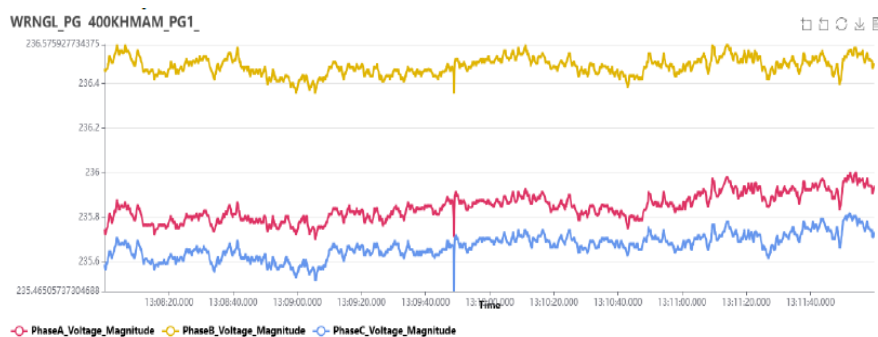
Deliberations:

1. TGTRANSCO informed that 400 kV Tippapur-Chandalapur line tripped at Chandalapur end due to suspected earth leakage in Chandalapur. DT was sent from Chandalapur end and. Tippapur end received DT & tripped.
2. TGTRANSCO also informed that prior to the tripping incident, it was observed that cell no. 106 was opened in DC Battery-1 at Chandalapur end.
3. TGTRANSCO stated that while switching OFF the 425 Ah Battery bank-1 in the DC charger-1, malfunctioning of 86A, 86B, 52XT relays were observed and multiple flickering, i.e., ON and OFF of 52XT relay was observed in C&R panel.
4. While closing the DC Bus coupler in the DCDB panel, 400kV Chandalapur-Gajwel-1 feeder tripped at Chandalapur end and TGTRANSCO stated that only due to malfunctioning of 86B trip relay, DT was received at Tippapur end.
5. As a remedial action the issue was referred to the OEM of DC Charger and rectified the issue by replacing the EFD relay of DC charger-1 and charged the lines.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
2	400KV-GAJWEL-CHANDALAPUR-1	As per the reports submitted 400 kV Chandalapur-Gajwel line tripped at Chandalapur end only due to earth leakage fault. No DR triggered at Gajwel end and line still in the service at Gajwel end.	16-03-2026 13:10	TGTRANSCO: 1. The tripping of the line only at CHANDALAPUR due to DC earth fault need review.	

	GAJWEL	CHANDALAPUR
FIR	Line is in service at Gajwel end.	Tripped without indications at Chandalapur end due to suspected DC earth leakage.
DR	NA	DR Trigger Time:16-03-2026 13:10:49.465 M CB Rph Open, M CB Yph Open, M CB Bph Open
EL	NA	M CB Rph Open, M CB Yph Open, M CB Bph Open INT--TIMESYNCHERROR
TR	Same as FIR	NA

PMU Analysis:



➤ From the PMU data no fault is visible.

Deliberations:

1. TGTRANSCO informed that 400 kV Tippapur-Chandalapur line tripped at Chandalapur end due to suspected earth leakage in Chandalapur was sent from Chandalapur end and. Tippapur end received DT & tripped.
2. TGTRANSCO also informed that prior to the tripping incident, it was observed that cell no 106 was opened in DC Battery-1 at Chandalapur end .
3. TGTRANSCO stated that while switching OFF the 425Ah Battery bank-1 in the DC charger-1 malfunctioning of 86A, 86B, 52XT relays were observed and multiple flickering, i.e., ON and OFF of 52XT relay was observed in C&R panel.
4. While closing the DC Bus coupler in the DCDB panel, 400kV Chandulapur-Gajwel-1 feeder tripped at Chandalapur end and TGTRANSCO stated that only due to malfunctioning of 86B trip relay, DT was received at Tippapur end.
5. As a remedial action the issue was referred to DC Charger OEM and rectified the issue by replacing the EFD relay of DC charger-1 and charged the lines.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
3	Multiple Trippings at 400kV JSW Thermal of JSW	As per the reports submitted, the triggering incident is the R-G fault in 400 kV-BPS-JAGALUR-2 line. The fault was sensed at both ends in Z1 and AR operated and was successful. During the same instance, 400 kV-JINDAL-BPS-3 & 4 breakers have opened only at JINDAL end without any trip indications (as per FIR). From the DRs at JINDAL end, it can be observed that Zone 3 has started in both the lines, but trip was not issued from the relay, but the breakers opened due to suspected ground potential rise (as per FIR). It can be observed that in 400 kV-JINDAL-BPS-3 at JINDAL end, the current in the Y-ph spike of 41 kA was observed.	16-03-2026 17:10	JSW THERMAL: 1. Tripping of the 400 kV-JINDAL-BPS-3 & 4 lines at JINDAL end without any relay trip indication needs review 2. Y-ph current (secondary) spike in 400 kV-JINDAL-BPS-3 at JINDAL end needs review	

400KV-BPS-JAGALUR-2

	BPS	JAGALUR
FIR	400kV BPS-HM Hole line-2 AR is successfully operated on single phase fault	NA
DR	DR Trigger Time:16-03-2026 17:10:55.186 Any Start T1 Any Trip, Z1, Z2, Z3, DIST Trip A, DIST Sig. Send, Z1X L10 CAR REC CH-1 L1 M_CB R OPN, L14 TIE CB R OPN L8 CAR REC CH-2 L18 M/T A/R OPTD L18 M/T A/R OPTD DR Trigger Time:16-03-2026 17:10:55.197 M2_TRIP, CARR SEND, Z1 TRIP, M2Z1_OP, M2Z2_ST, M2Z3_ST, M12CRSD, TRP1-TRIP, TRIP_R M2 CARR RECVD	NA
EL	RS_OP_PHR INI, AUTORECLOSER ST, RS_ST_PRI HLD ON, OP_CL_CB-R, OP_CL_CB_COMP, NM_AL_T_CB_R, POWER FACTOR, R-Y VOLTAGE, B-R VOLTAGE, Y-B VOLTAGE, RS_ST_S7_WT CB C, RS_ST_AR OPTD FB, AUTORECLOSER FLT, RS_ST_S8_RC TIM	NA
TR	Same as FIR	NA

400KV-JINDAL-BPS-4

	JINDAL	BPS
FIR	A Z1 R-G fault was sensed on the BPS-HM Hole line. Auto-reclosure (AR) was successful at	400kV JSWEL-BPS line-4 tripped at JSWEL end only

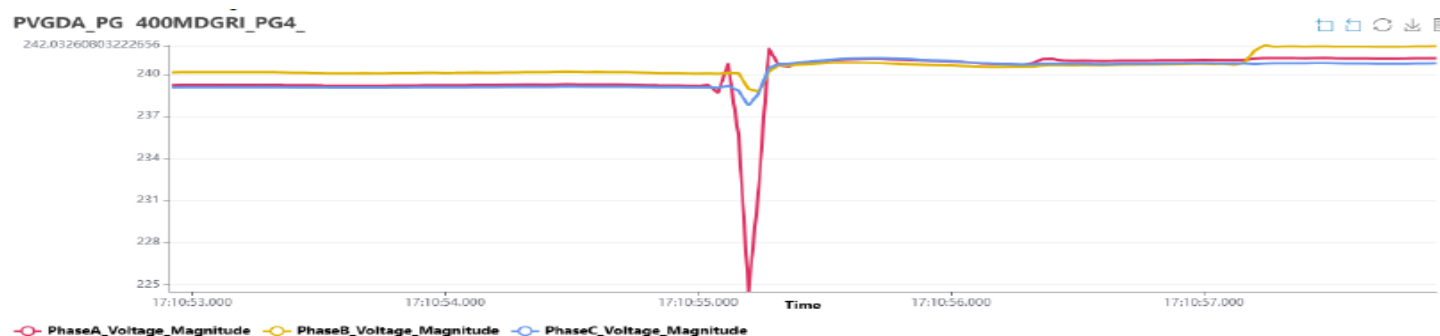
	the BPS end & HM Hole End. Simultaneously, the JSW–BPS line tripped at the JSW end, During the event, a Z3 start was detected in the M1 relay, but no master trip was initiated. The primary suspicion is that the trip at the JSW end occurred due to a rise in GPR.	
DR	DR Trigger Time:16-03-2026 17:10:55.185 Any Start DIST Fwd Z3	NA
EL	Same as DR	
TR	Same as FIR	Same as FIR

400KV-JINDAL-BPS-3

	JINDAL	BPS
FIR	A Z1 R-G fault was sensed on the BPS–HM Hole line. Auto-reclosure (AR) was successful at the BPS end & HM Hole End. Simultaneously, the JSW–BPS line tripped at the JSW end. During the event, a Z3 start was detected in the M1 & M2 relay, but no master trip was initiated. The primary suspicion is that the trip at the JSW end occurred due to a rise in GPR.	The line was charged condition at BPS end, tripped only at JSWEL end. During the incident 400kV BPS-HM Hole line-2 AR operated at BPS end sending RN fault in Zone-1, fault current 6kA and fault location indicated was 54km.
DR	DR Trigger Time:16-03-2026 17:10:55.184 CB R OPN, CB Y OPN, CB B OPN Z3_ST, CB B OPN, CB R OPN, CB Y OPN DR Trigger Time:16-03-2026 17:10:55.185 Any Start DIST Fwd, Z3	NA

EL	-	NA
TR	Same as FIR	Same as FIR

PMU Analysis:



➤ From the PMU data, R-G fault can be observed

Deliberations:

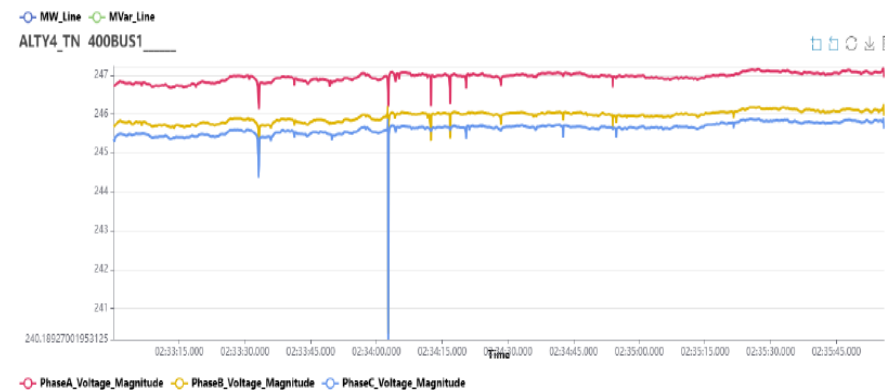
1. As per the reports submitted, the triggering incident was the R-G fault in 400 kV-BPS-JAGALUR-2 line. The fault was sensed at both ends in Z1 and AR operated and was successful. During the same instance, 400 kV-JINDAL-BPS-3 & 4 breakers opened only at JINDAL end, without any trip indications (as per FIR).
2. From the DRs at JINDAL end, it can be observed that Zone 3 had started in both the lines, but trip was not issued from the relay and breakers opened due to suspected ground potential rise (as per FIR). It can be observed that in 400 kV-JINDAL-BPS-3 at JINDAL end, Y-ph current spike of 41kA was observed.
3. JSW informed that ground potential rise was recurring at 400kV Jindal-BPS.
4. It was noted that as deliberated in the additional agenda of 142nd PCSC meeting a committee would be formed to analyze the ground potential issue at 400 kV Jindal SS.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
4	400KV-ALAMATHY-SUNGAVARACHATRAM-1	As per the reports submitted, at Sungavarachatram end overvoltage was sensed and overvoltage stage 1 protection operated and voltage in Y ph is observed to be higher than other 2 phases and DT was sent from Sungavarachatram end and upon receiving the DT signal from remote end 3 phase tripping was observed at Alamathy end.	19-03-2026 02:35	<u>TANTRANSCO:</u> 1. Y ph voltages are observed to be on the higher side than other phases in the line at SUNGAVARACHATRAM end needs review	

	ALAMATHY	SUNGAVARACHATRAM
FIR	DT signal from remote end 3 phase tripping was observed at Alamathy end.	At Sungavarachatram end overvoltage was sensed and overvoltage stage 1 protection operated and voltage in Y ph is observed to be higher than other 2 phases and DT was sent from Sungavarachatram end
DR	DR Trigger Time:19-03-2026 02:35:00.330 MCB-APh Trip, MCB-BPh Trip, MCB-CPh Trip, MCB-3PH.TRIP, TCB-APh Trip, TCB-BPh Trip, TCB-CPh Trip, TCB-3PH.TRIP, DT SEND-CH1, ANY TRIP TIMER, Trip Output A, Trip Output B, Trip Output C, Trip 3ph A/R BLOCK	DR Trigger Time:19-03-2026 02:35:55.729 TRIPBUS 6 OP, DIR SIG REC On 952 B CLOSED Off 952 A CLOSED Off, 952 C CLOSED Off 852 A CLOSED Off 852 B CLOSED Off, 852 C CLOSED Off
EL	NTRL DIR OC1 REV, DIR SIG REC On, OSCILLOGRAPHY TRIG'D, Cont OP 24 On, FAULT RPT TRIG, ARC BLOCK On, 952 B CLOSED Off, BREAKER 1 ANY P OPEN, BREAKER 1 ONE P OPEN, BREAKER 1 IB OPEN, 952 A CLOSED Off, 852 A CLOSED Off, BREAKER 1 OPEN, BREAKER 1 IA	-

	OPEN, BREAKER 1 IC OPEN, 852 B CLOSED Off, BREAKER 2 ANY P OPEN, BREAKER 2 ONE P OPEN, BREAKER 2 IA OPEN, OPEN POLE OP A, BREAKER 2 OPEN, BREAKER 2 IB OPEN, BREAKER 2 IC OPEN, OPEN POLE OP B, OPEN POLE OP C, PHASE UV1 PKP C, SRC1 VT FF VOL LOSS, AR BKR1 BLK, PHASE UV1 PKP A, PHASE UV1 PKP B, AR BKR2 BLK, DIR SIG REC Off, PHASE UV1 OP C, LINE U/V On, PHASE UV1 OP A, PHASE UV1 OP B	
TR	Same as FIR	Same as FIR

PMU Analysis:



- As per the PMU data, no fault can be observed during the event.

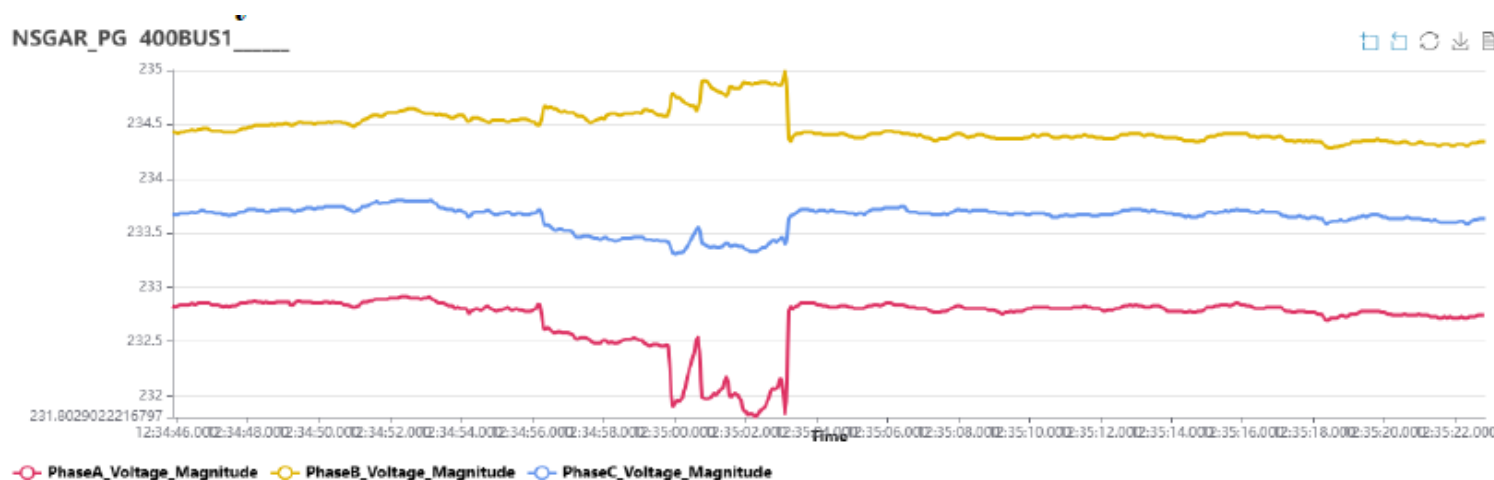
Deliberations:

1. As per the reports submitted, at Sungavarachatram end overvoltage was sensed and overvoltage stage 1 protection operated. Voltage in Y ph was observed to be higher than the other 2 phases and DT was sent from Sungavarachatram end and 3 phase tripping was observed at Alamathy end upon receiving the DT signal from remote end.
2. TANTRANSCO informed that as per the DR Y ph voltages were observed to be on the higher side than other phases of the line at SUNGAVARACHATRAM.
 - R phase voltage recorded as 248 kV
 - Y phase voltage recorded as 258 kV
 - B phase voltage recorded as 248 kV
3. TANTRANSCO also informed that the variation of voltage may be due to earthing issue in Line CVT.
4. SRPC advised TANTRANSCO to check the Y phase CVT earthing at 400 kV Sungavarachatram.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
5	220KV-SRISAILAM_RIGHT_BANK-NAGARJUNASAGAR_TS-1	As per the reports submitted the triggering incident was high resistance R-G fault in the line (based on the DR, it can be observed from R/X plot that the fault angle at Srisailam end is around 0 degrees and at Nagarjuna Sagar end the fault angle is around 13 degrees). From both the ends, DEF operated and 3 ph tripped.	26-03-2026 12:35	<u>APGENCO</u> : 1. Non configuration of DT for DEF needs review	

	SRISAILAM_RIGHT_BANK	NAGARJUNASAGAR_TS
FIR	Line tripped r-phase to ground phase	The 220kV Srisailam - Nagarjunasagar feeder was tripped at both ends on 26.03.2026 at 12:35 Hrs. At Nagarjunasagar end, Due to High Resistance nature of fault, feeder tripped on DEF Protection (R-N fault) with fault current of 0.626 kA.
DR	<p>DR Trigger Time:26-03-2026 12:35:38.031 EF Trip, Relay TRIP L1, Relay TRIP L2, Relay TRIP L3, Relay TRIP, Definitive TRIP, E/F Trip 3p GRP A OPD MAIN_CB-BO MAIN_CB-RO MAIN_CB-YO</p> <p>DR Trigger Time:26-03-2026 12:32:08.459 M1 21.1 OPTD A/R Lockout MAIN CB B OPEN MAIN CB R OPEN, MAIN CB Y OPEN</p>	<p>DR Trigger Time:26-03-2026 12:35:03.155 DIR_EF_TRIP TRIP_86B 86_A/B_OPTD CB_R_PH_OPEN, CB_Y_PH_OPEN, CB_B_PH_OPEN</p>
EL	E/F picked up FORWARD ON, E/F phase selector L1 selected ON, E/F 3I0p PICKED UP ON, E/F 3I0p TRIP ON, Fault Locator Loop L1E ON	Same as DR
TR	Same as FIR	Same as FIR

PMU Analysis:



- From the PMU data R-G fault can be observed with around 3.4s fault clearing time.

Deliberations:

1. As per the reports submitted the triggering incident was high resistance R-G fault in the line (based on the DR, it can be observed from R/X plot that the fault angle at Srisailam end is around 0 degrees and at Nagarjuna Sagar end the fault angle is around 13 degrees). From both the ends, DEF operated and 3 ph tripped.
2. No representation by APGENCO during the deliberations of the event.
3. APGENCO to review the Non configuration of DT for DEF.
4. APGENCO to submit the detailed report on the incident.

Recommendations:

- ❖ APGENCO to review the Non configuration of DT for DEF.

❖ APGENCO to review the Time Synch issue at N'Sagar RB

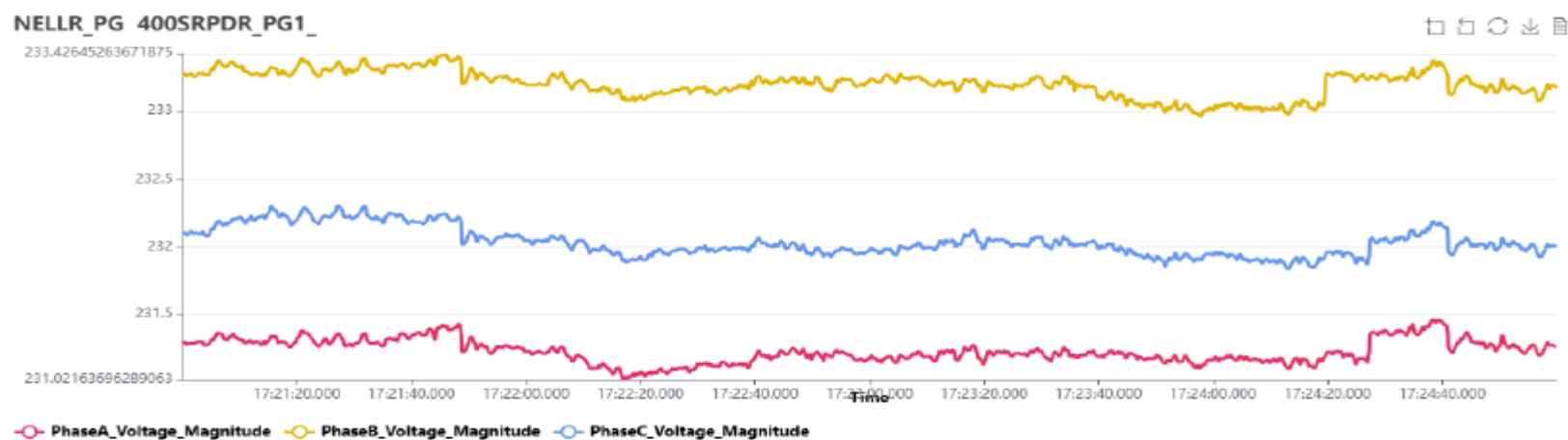
❖ APGENCO to submit the detailed report on the incident

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
6	400kV-KRISHNAPATNAM-SEIL_P2-1	In the antecedent condition, 409 Main CB which is connected to Bus-2 was under LC and the line was only connected through 408 Tie Breaker. As per the reports submitted, the triggering incident is the opening of Y-pole breaker without any fault in 400 kV-KRISHNAPATNAM-SEIL_P2-1 only at KRISHNAPATNAM end. After which Pole discrepancy operated after around 7.5 seconds leading to the tripping of R and B poles. This led to the 3ph tripping at KRISHNAPATNAM end. The line was holding at SEIL_P2 end.	28-03-2026 17:23	<u>APGENCO</u> : 1. Tripping of Y-ph pole without any fault needs review 2. Pole Discrepancy timer needs review	

	KRISHNAPATNAM	SEIL_P2
FIR	LINE TRIPPED DUE TO POLE DISCREPENCY OPERATION	<p>➤ At 17:23 Hrs Line 4, SDSTPS (KRISHNAPATNAM) end breaker got open, SEIL-P2 end breaker not opened, and no fault was recorded in SEILP2 side relay.</p> <p>➤ At 17:50 Hrs Line 4 charged from SDSTPS (KRISHNAPATNAM) end (Charging code - 6391).</p>

DR	DR Trigger Time:28-03-2026 17:24:27.278 CB_POLE_DISC1 52_BPH_CLOSE, 52_RPH_OPEN 52_BPH_OPEN TC2_FAULTY TC1_FAULTY	NA
EL	Same as DR	NA
TR	Same as FIR	Same as FIR

PMU Analysis:



➤ From the PMU plot, there is no fault during the event.

Deliberations:

1. As per the reports submitted, the triggering incident was the opening of Y-pole breaker without any fault in 400 kV-KRISHNAPATNAM-SEIL_P2-1 only at Krishnapatnam end. After which Pole discrepancy operated after around 7.5 seconds leading to the tripping of R and B poles. This led to the 3ph tripping at Krishnapatnam end. The line was holding at SEIL_P2 end.
2. No representation by APGENCO during the deliberations of the event.
3. APGENCO to review the tripping of Y-ph pole without any fault.

4. APGENCO to review Pole Discrepancy timer at 400 kV-KRISHNAPATNAM
5. APGENCO to submit the detailed report on the incident.

Recommendations:

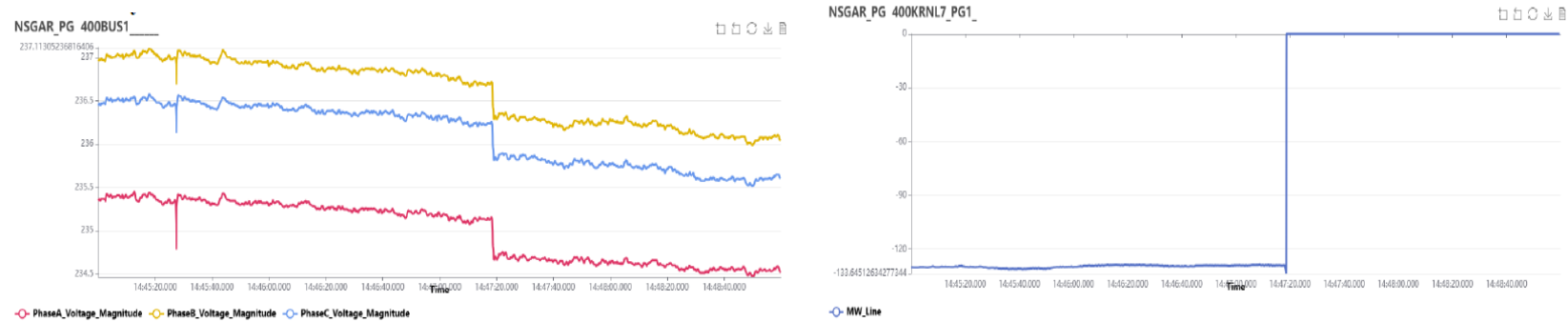
- ❖ APGENCO to review the tripping of Y-ph pole without any fault.
- ❖ APGENCO to review Pole Discrepancy timer at 400KV-KRISHNAPATNAM
- ❖ APGENCO to review the Time Synch issue at Krishnapatnam
- ❖ APGENCO to submit the detailed report on the incident.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
7	400KV-KURNOOL_PG-NAGARJUNASAGAR_PG-1	As per the reports submitted, the triggering incident is the relay maloperation at NAGARJUNASAGAR_PG end and 3ph tripped and DT was sent to remote end. At Kurnool end, DT was received and 3ph trip.	02-04-2026 14:47	PGCIL SR-1: 1. Tripping of the line at NAGARJUNASAGAR_PG end due to relay maloperation needs review	

	KURNOOL_PG	NAGARJUNASAGAR_PG
FIR	Line tripped due to DT receipt from N Sagar End.	Line tripped due to mal operation of Group relay at Nagarjunasagar End.
DR	DR Trigger Time:02-04-2026 14:47:18.918 DT REC CH1/2 3PH GR_A/B OPTD MAIN_CB_R_OPEN, MAIN_CB_Y_OPEN,	DR Trigger Time:02-04-2026 14:47:18.676 TIE_CB_AR_LO, 3PH_GR_A/B_OPTD MAIN_CB_R_OPEN MAIN_CB_Y_OPEN

	MAIN_CB_B_OPEN, TIE_CB_B_OPEN TIE_CB_R_OPEN, TIE_CB_Y_OPEN MAIN2_TRIP TIE CB AR LO MAIN2_TRIP TIE CB AR LO DT REC CH1/2 MAIN2_TRIP TIE CB AR LO MAIN CB AR LO MAIN2_TRIP DT REC CH1/2 MAIN2_TRIP	MAIN_CB_B_OPEN TIE_CB_Y_OPEN TIE_CB_R_OPEN TIE_CB_B_OPEN
EL	AR Lockout Reset, 86B TRIP, R_Y_B PHASE OPEN, M2 OV STG2 optd, Tir breaker AR ok, DT Send CH1/2, 86A Relay Optd	86A TRIP RLY OPT, TC 2 FAULTY, TC 1 FAULTY, DT SEND CH ½,
TR	Same as FIR	Same as FIR

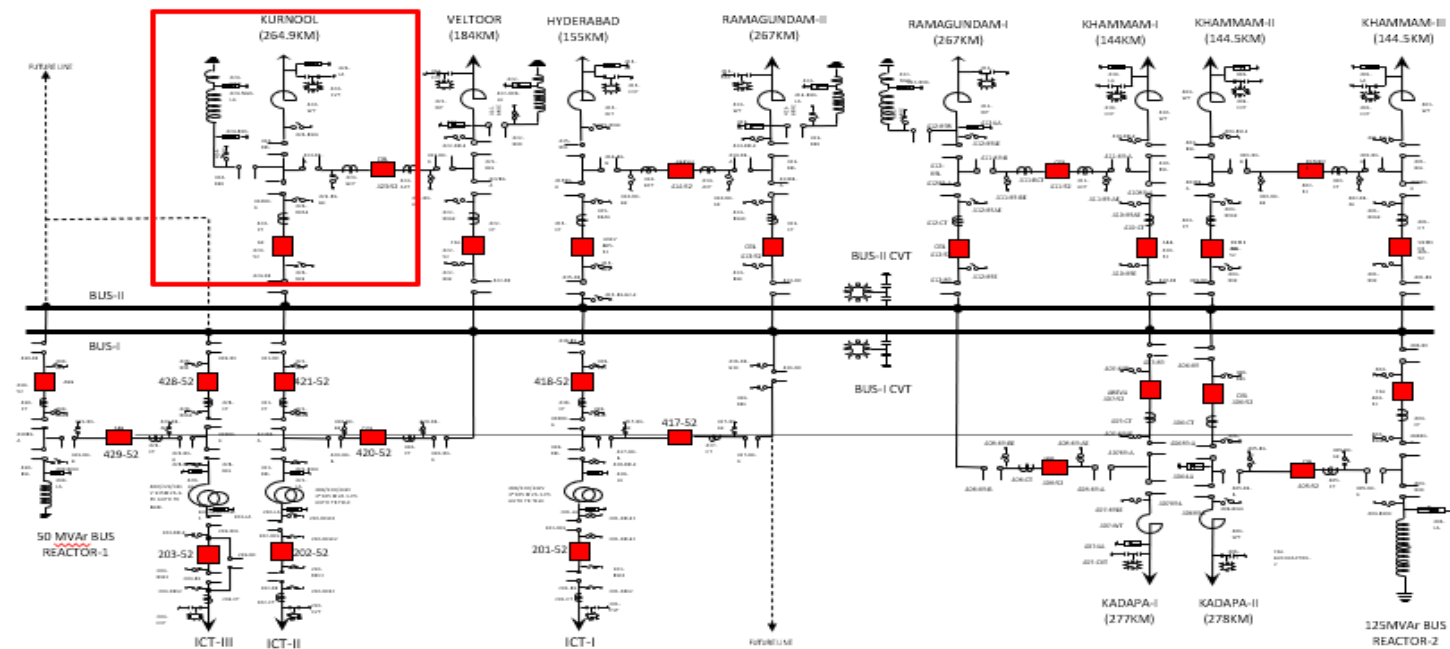
PMU Analysis:



- From the PMU plot, it can be observed that there is no fault during the event.

Deliberations:

NAGARJUNASAGAR 400kV S/S SINGLE LINE DIAGRAM



1. As per the reports submitted, the triggering incident was the relay maloperation at NAGARJUNASAGAR_PG end resulting in 3ph tripping and DT was sent to remote end. At Kurnool end, DT was received and all 3 phases were tripped.
2. PGCIL SR-I informed that as per the DR, there was no fault current and all the Voltages and currents were normal before tripping. Only indication was Group A/B operated.
3. PGCIL SR-I also informed Physical inspection of Switchyard was carried out and no abnormality was noticed.
4. As per the local relay flags, Group-A operated was found and the relay found in High condition after tripping. Finally, it was found that the Group-A pickup coil was failed.
5. PGCIL SR-I informed that failed Group-A pickup relay was replaced by a spare relay and checked. GR-A relay operation was observed normal. Line was taken Into Service after replacement of Relay.

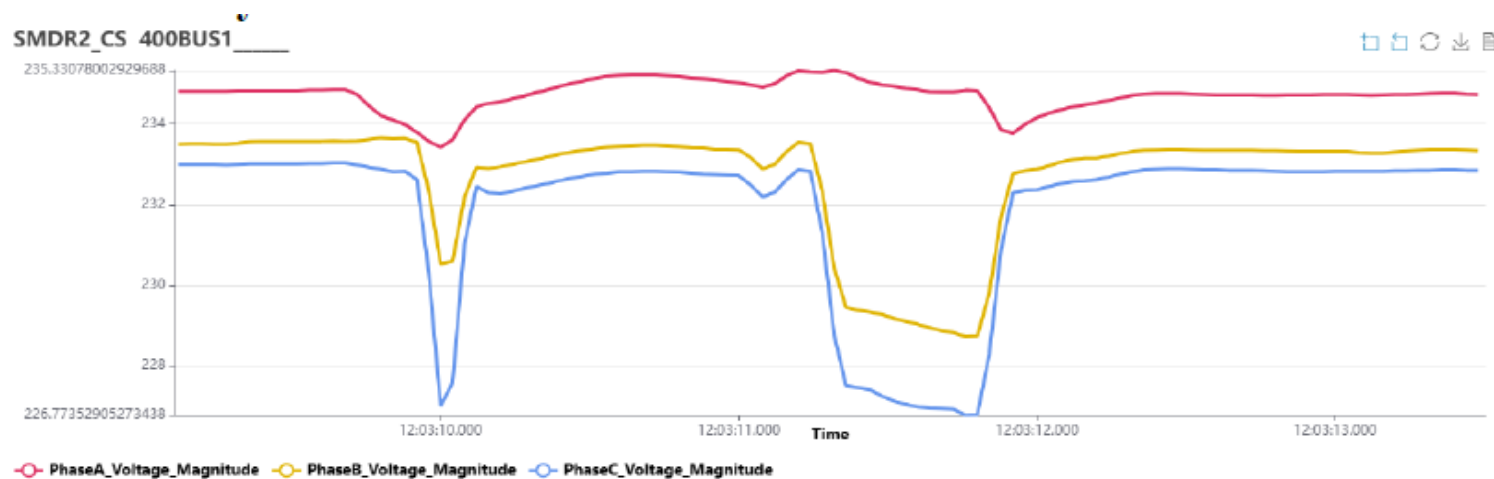
S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
8	400KV-KALPAKKA-ASUPAKA-1	As per the reports submitted, the triggering incident was B-G fault in the line. At Asupaka end, the fault was sensed in zone-1 and B-pole opened. After around 1000ms, A/R operated and the fault was sensed again in zone-1 and line tripped on persistent fault with no delay. At KALPAKKA end, the fault was sensed in carrier aided zone-2 and B-pole opened. After around 1200ms, A/R operated and the fault was sensed in zone-2 and the line tripped with a delay of 560ms.	03-04-2026 12:03	<p>APTRANSCO: 1. Non operation of SOTF at Kalpakka end after A/R operation.</p> <p>2. Difference in A/R dead time between Kalpakka and Asupaka end.</p> <p>TGTRANSCO: 1. Difference in A/R dead time between Kalpakka and Asupaka end.</p>	

	KALPAKKA	ASUPAKA
FIR	Feeder tripped on B-N fault	Tripped on B-phase to ground, Zone-1 indications at Asupaka end. AR operated and tripped again due to persistent fault.

DR	DR Trigger Time:03-04-2026 12:03:09.312 CAR REC ZONE-4 ST GEN TRIP, B-PH TRIP, ZONE-2 ST, ZONE-3 ST, ZCOM TRIP AR START M CB B OPN CAR REC FUSE FAIL AR OPTD ZONE-2 ST, ZONE-3 ST, ZONE-4 ST GEN TRIP, R-PH TRIP, Y-PH TRIP, B-PH TRIP, ZONE-2 TR AR BLOCK M CB Y OPN M CB B OPN M CB R OPN	DR Trigger Time:03-04-2026 12:03:09.748 Any Start, T1 DIST Fwd, T1 Any Trip, DIST Trip C, Z1, DIST Sig. Send CB B CLOSE Any Start Any Trip, SOTF/TOR Trip T1 DIST Fwd, Z1, DIST Sig. Send 86B OPTD Any Start Any Start
EL	Same as DR	TIE 86B OPTD: ON 86B OPTD: ON CAR SEND CH-2: ON CAR SEND CH-1: ON Z1 ON DIST Fwd ON DIST Start C ON SOTF/TOR Trip ON 3P Trip ON Any Trip ON Start Any C ON Any Start ON CB B CLOSE: ON CAR SEND CH-1: ON

		CAR SEND CH-2: ON Any Trip C ON DIST Trip C ON Any Start ON
TR	Same as FIR	Same as FIR

PMU Analysis:



➤ From the PMU plot, B-G fault can be observed during the event with a delay of around 560ms after the A/R operation.

Deliberations:

1. As per the reports submitted, the triggering incident was B-G fault in the line. At Asupaka end, the fault was sensed in Zone-1 and B-pole opened. After around 1000ms, A/R operated and the fault was sensed again in Zone-1 and line tripped on persistent fault with no delay. At KALPAKKA end, the fault was sensed in carrier aided Zone-2 and B-pole opened. After around 1200ms, A/R operated and the fault was sensed in zone-2 and the line tripped with a delay of 560ms
2. APTRANSCO informed that at Kalpakka end, ZCOM protection operated for B-ph fault in the line and B-Ph CB was opened. After dead time, B-Ph CB was reclosed on the fault, SOTF/TOR not operated and hence Zone-2 started and the line was tripped after Zone-2 time.
3. APTRANSCO stated that non-operation of SOTF/TOR during zone 2 pickup was addressed to OEM.

4. APTRANSCO also informed that AR feature was enabled in Siemens BCU with dead time of 1 sec., while AR operations during the reclose of breaker, the AR close command is being issued with 100 to 150 mS delay. The same was raised to M/s Siemens and was being pursued with M/s Siemens for proper operation of AR.
5. SRPC advised APTRANSCO to submit the detailed OEM report on the AR operation at Kalpakka.

Recommendations:

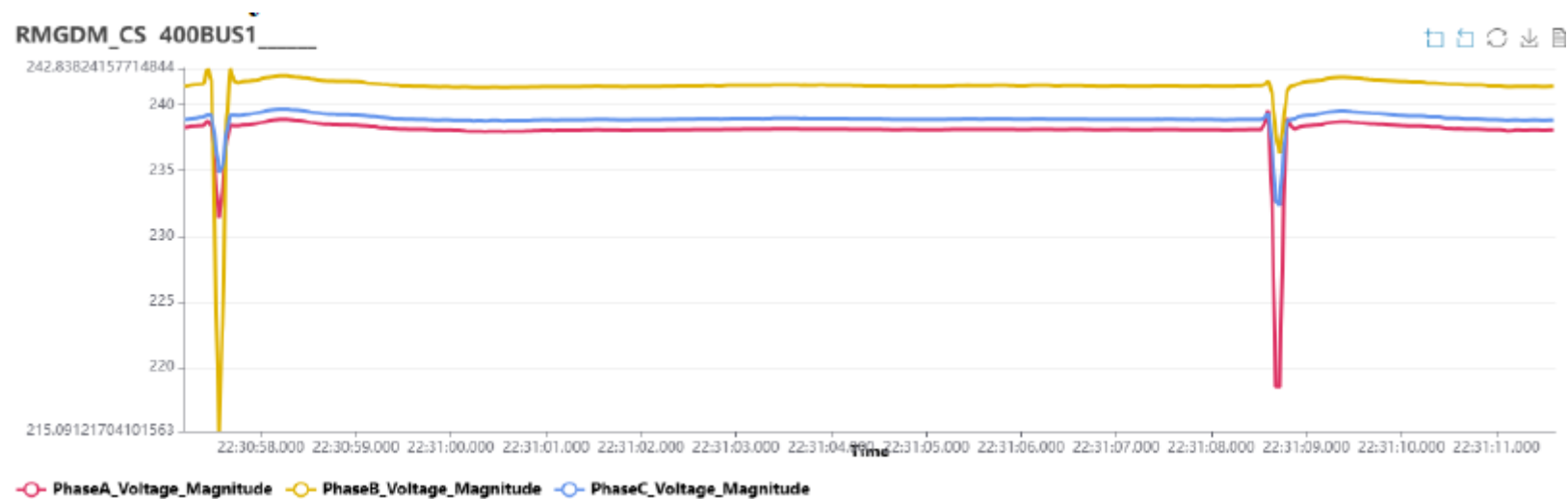
- ❖ APTRANSCO to submit the detailed OEM report on the AR operation at Kalpakka.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
9	400KV-DICHPALLY-NIZAMABAD-1	During the fault at Nirmal substation due to inclement weather, 400 kV-DICHPALLY-NIZAMABAD-1 line tripped only at NIZAMABAD end.	04-04-2026 22:31	PGCIL SR-1 : Tripping of the line only at NIZAMABAD end needs review	

	DICHPALLY	NIZAMABAD
FIR	Line is in service at Dichpally end.	A/R attempted on Y-N fault and tripped during fault in reclaim time due to BUS-2 fault at Dichpally SS. Line is holding from Dichpally SS.
DR	NA	Fault Time: 04-04-2026 22:30:57.5559 Z1_OPTD Z2_START Z3_START M1/2_CARR.SEND MAIN1_TRIP TIE_CB_Y_OPEN MAIN_CB_Y_OPEN TIE_CB_A/R_LO TIE_CB_R_OPEN

		TIE_CB_B_OPEN MAIN_CB_A/R_OPT
EL	NA	TIE__CB NOT READY FOR AR TIE__Y PHASE OPEN M1 ZONE 1 TRIP AR LO OPTD AR OPERATION RESET CTRL SPLY OK CARRIER SEND M1 ZONE 1 TRIP TIE__AR LO OPTD CB LOCKOUT OPTD
TR	Same as FIR	Same as FIR

PMU Analysis:



- From the PMU plot, Y-G fault followed by R-G fault can be observed.

Deliberations:

1. PGCIL SR-I informed that 400 kV Nizamabad- Dichpally line-1 tripped only at Nizamabad end on 04.04.2026 at 22:31:16Hrs. 400kV Dichpally 1 Line (4.4KMs) is between PGCIL Nizamabad Station and TGTRANSCO Dichpally Station.
2. PGCIL SR-I also informed that the 400 kV Nizamabad- Dichpally line-1 had Main-1 with distance Protection (Dist. Alstom-P444) and Main-2 with differential & backup distance Protection (Diff cum Dist. Schneider P546).
3. PGCIL SR-I informed the following incidents on 04-04-2026.
 - **Incidence 1:** At 22:30:57Hrs, single phase Y-G fault was detected in Zone-1 by main-1(P444) relay. During this incident, AR operated successfully.
 - **Incidence 2:** At 22:31:16Hrs, another single-phase R-G fault was detected in Zone-1 by main-1(P444) relay. As the fault occurred during reclaim time, the line tripped at Nizamabad end.
4. PGCIL SR-I stated that during both instances, the main-1 (P444) relay operated and resulted in tripping of Nizamabad- Dichpally line, for remote station faults.
5. After the incident PGCIL SR-I requested PCSC forum for increasing the time of operation of Zone-1 to 100 ms to avoid the distance protection operation for the remote end faults.
6. SRPC mentioned that as per the **Schedule-V of the CEA Technical Standards for Construction of Electrical Plants Lines Regulations 2022-23** for short lines (length less than 10 km) of 220kV and above, line differential protection shall be used with built-in backup distance protection in both main-I and main-II.
7. Hence, forum advised PGCIL SR-I to implement line differential protection with both built-in backup distance protection in main-I and main-II relays. PGCIL SR-I agreed for the same.
8. PGCIL SR-I also requested the forum to consider increasing the Zone-1 operating time of the distance protection to 100 ms to avoid recurrence of such incidents, until line differential protection is implemented in both relays.
9. PCSC forum informed that as per grid code fault clearing time for the 400 kV and 765 kV transmission lines must be less than 100msec and hence PCSC forum advised PGCIL SR-I to comply with the grid code and avoid intentional delay of 100msec for zone-1 distance protection.
10. SRPC advised PGCIL SR-I to provide the detailed report on the incident and same would be discussed in the 143rd PCSC meeting

Recommendations:

- ❖ PGCIL SR-I was advised to implement line differential protection with both built-in backup distance protection in main-I and main-II relays in 400KV-DICHPALLY-NIZAMABAD-1.
- ❖ PCSC forum advised PGCIL SR-I to comply with the grid code and avoid intentional delay of 100msec for zone-1 distance protection.
- ❖ PGCIL SR-I to provide the detailed report on the incident.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
10	400KV-MANALI-PULIYANTHOPE-2 Jumper cut event	As per the reports submitted, the triggering incident was R Phase Pilot Suspension Insulator flash over at Location No.8 from Manali end. At Manali end, the fault was sensed in line differential protection and R-pole of Main CB and Tie CB opened. After 1s, main CB A/R operated and all 3 poles of Main CB tripped on persistent R-B fault. However, Tie CB A/R did not operate by that time and Y and B-poles of Tie CB were closed. After 2.5s from the fault inception, Tie CB Y and B-poles opened on suspected pole discrepancy. At puliyanthope end, the fault was sensed in line differential protection, and R-pole of Main CB and Tie CB opened. After 1s, main CB A/R operated and all 3 poles of Main CB and Tie CB tripped on R-B persistent fault.	06-04-2026 05:20	TANTRANSCO: 1. Non operation of Tie CB A/R at Manali end	

400KV-MANALI-PULIYANTHOPE-1

	MANALI	PULIYANTHOPE
FIR	For a single line to ground fault in B phase AR successful. 400kV_Manali_Puliyanthope Line_2, R phase line cut in Multi circuit tower at Loc No.8 and fell on B phase of Line.1 initiated AR successful	For a single line to Ground fault in B phase, Main CB AR successful. Tie CB lockout due to fault in Line.2
DR	Fault Time: 06/04/2026 05:19:35.94 Diff Trip Any Trip CB1 Trip Output C Diff Inter Trip MCB Cph OPEN TCB Cph OPEN Any Pole Dead Phase Select C	Fault Time: 06/04/2026 05:19:35 IN>1 Start L4 T CB OPEN R P Any Trip CB2 Trip Output A_B_C AR Start ARIP AR Blocked Auto Close CB1 R18 M AR CLOSE
EL	Same as DR	1P AR ON, Output Contacts1, 1P Reclaim Time ON, Pole Dead C ON, Logic Inputs 1, Control CloseCB1 ON, Virtual Output 9 ON, Virtual Output 7 ON, Auto Close CB1 ON, Fault Recorded, I>4 Start C OFF, Pole Dead C ON, Output Contacts1, CB2 Open B ph ON, CB2 Open 3 ph ON, Logic Inputs 1, CB2 Open C ph ON, Started Phase N ON, Zone3 CN Element ON, 1P D Time ON, Diff Inter Trip C ON, AR Blocked ON, CB1 AR 1p InProg ON, Seq Counter - 1 ON, AR Start ON, CB2 Trip AR Mem C ON, CB2 Trip AR Mem B ON, CB2 Trip AR Mem A ON, CB1 Trip AR Mem C ON, Output Contacts1, Started Phase N ON, CB2 Trip 3ph ON, Virtual Output11 ON, Diff>Start C ON, Diff

		Trip C ON, Started Phase A ON, I>4 Start A ON, AR Force CB2 3P ON, Fault Recorded, CB2 Open A ph ON, Logic Inputs 1, Started Phase N ON, Any Start ON, Started Phase A ON, IN>1 Start ON, Zone2 AN Element ON, Any Dist Start ON, Zone3 AN Element ON
TR	Same as FIR	Same as FIR

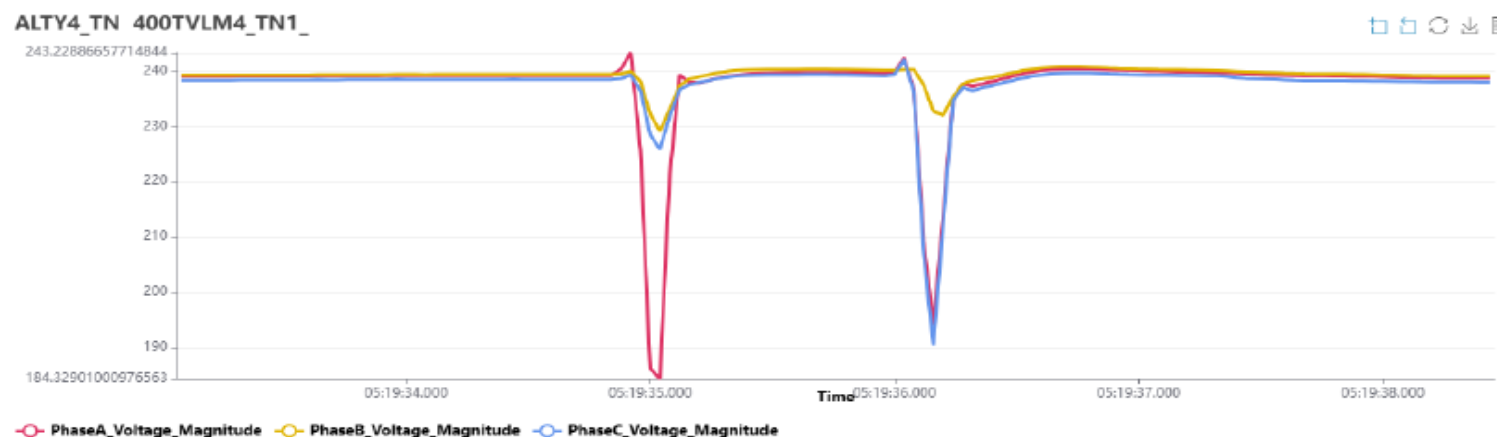
400KV-MANALI-PULIYANTHOPE-2

	MANALI	PULIYANTHOPE
FIR	Zone-1_A Phase to Ground fault operated. AR attempt was made in Main CB and Tie CB. AR success on Main CB. Within Reclaim time of MCB and dead time of TCB, a successive fault in same 'A' phase caused three pole trip through 86 Lockout relay.	Line to Ground fault occurred in A phase. A phase Pole opened in Main and Tie Breaker. After dead time of 1 sec when attempted reclose, sensed the fault due to permanent nature of fault. AR Lockout relay operated and tripped both Main and Tie breakers.
DR	DR Trigger Time:06-04-2026 05:19:34.810 Phase Select A Aided 1 Send Diff Trip, Diff Trip A Any Trip, CB1 Trip Output A Diff Inter Trip L5 TCB Aph OPEN Phase Select A Any Pole Dead L23 CAR RECV CH1 Phase Select B Diff Trip, Diff Trip A Any Trip, CB1 Trip Output A Diff Inter Trip	DR Trigger Time:06-04-2026 05:19:35.017 DEF BLOCK ON (VO34), GND DIST Z2 PKP, GND DIST Z3 PKP 87L TRIP OP, TRIP 1-POLE, TRIP OUTPUT OP, TRIP PHASE A OSC TRIGGER ON (VO64) 1.M CB OPEN R PH ON (CI1), 4. T CB OPEN R PH ON (CI4) AR 1-P RIP AR CLOSE BKR1 DEF BLOCK ON ON (VO34) 87L TRIP OP, NEUTRAL TOC1 PKP, TRIP 1-POLE, TRIP OUTPUT OP, TRIP PHASE A OSC TRIGGER ON (VO64), AR LO

	Any Pole Dead Phase Select B, Phase Select C Any Pole Dead L6 TCB Bph OPEN L7 TCB Cph OPEN Any Pole Dead All Poles Dead DR Trigger Time:06-04-2026 05:19:34.805 50DD SV OSC_TRIGGER ON (VO18), 87L TRIP OP, DIST/OV/DEF PKP ON (VO6), 87L TRIP OP A, 87L DIFF OP, 87L DIFF OP A L2 MCB OPEN A PH ON (CI2), L9 TCB OPEN A PH ON (CI9) 50DD SV 50DD SV DIST/OV/DEF PKP ON (VO6), 87L DIFF OP, 87L DIFF OP A DIST/OV/DEF PKP ON (VO6) L3 MCB OPEN B PH ON (CI3), L4 MCB OPEN C PH ON (CI4) 50DD SV L2 MCB OPEN A PH ON (CI2) L10 TCB OPEN B PH ON (CI10), L11 TCB OPEN C PH ON (CI11)	TRIP 3-POLE, TRIP PHASE B, TRIP PHASE C 6. T CB OPEN B PH ON (CI6), DEF BLOCK ON (VO34) 1.M CB OPEN R PH ON (CI1) 2.M CB OPEN Y PH ON (CI2), 3. M CB OPEN B PH ON (CI3), 5. T CB OPEN Y PH ON (CI5) DEF BLOCK ON (VO34)
EL	89L Open: ON TCB A_B_C Ph Open: ON All Poles Dead: ON General start: ON Any Trip: ON	Same as DR

TR	Same as FIR	Same as FIR
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PMU Analysis:



➤ From PMU, R-G fault followed by an RB fault is observed during the event with no delayed fault clearance.

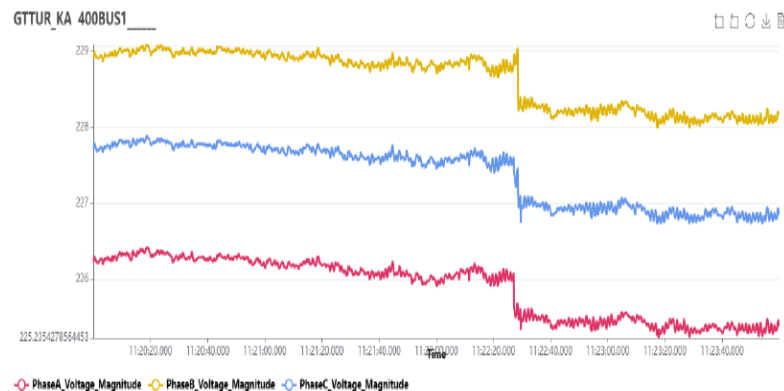
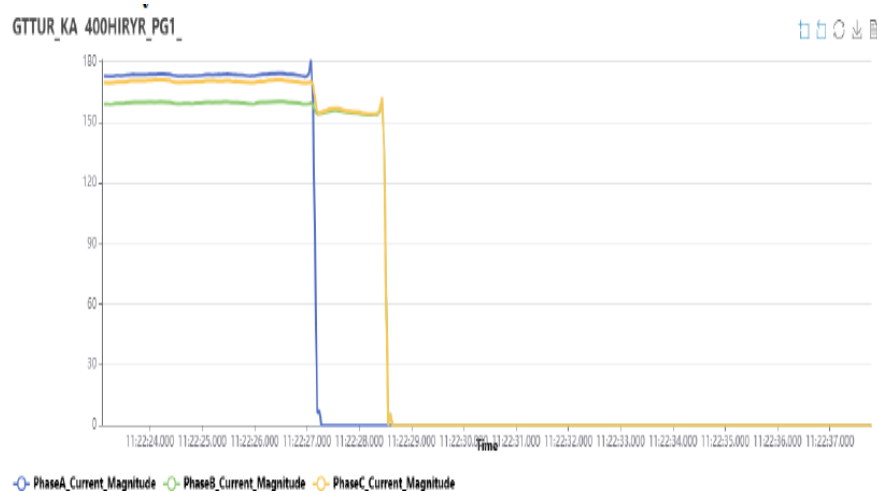
Deliberations:

1. The triggering incident was R Phase Pilot Suspension Insulator flash over at Location No.8 from Manali end. At Manali end, the fault was sensed in line differential protection and R-pole of Main CB and Tie CB opened. After 1s, main CB A/R operated and all 3 poles of Main CB tripped on persistent R-B fault. However, Tie CB A/R did not operate by that time and Y and B-poles of Tie CB were closed. After 2.5s from the fault inception, Tie CB Y and B-poles opened on suspected pole discrepancy.
2. At Puliyanthope end, the fault was sensed in line differential protection, and R-pole of Main CB and Tie CB opened. After 1s, main CB A/R operated and all 3 poles of Main CB and Tie CB tripped on R-B persistent fault.
3. TANTRANSCO informed that upon analyzing the event TANTRANSCO found the erratic initiation in the F50 relay of Tie CB because of that Auto Reclosure lockout was initiated and subsequently F50 relay was rectified.
4. TANTRANSCO further informed that after the incident TANTRANSCO disabled the Auto Reclosure function in Tie CB, 400KV-MANALI-PULIYANTHOPE- 1&2 as both the lines are composite conductors.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
11	400KV-GUTTUR-HIRIYUR-1	As per information from KPTCL, the 400 kV-GUTTUR-HIRIYUR-1 line tripped only at GUTTUR end due to the PD relay Aux contact connectivity cable failure leading to the tripping of only R-pole and after around 1.5s suspected PD operated and 3ph tripped (from PMU).	09-04-2026 11:22	KPTCL: 1. Tripping of the 400kV-GUTTUR-HIRIYUR-1 line at GUTTUR only due to PD relay Aux contact connectivity cable failure needs review	

	GUTTUR	HIRIYUR
FIR	Line tripped on PD relay Aux contact connectivity cable damage/carbonized extended PD relay to pick up results unwanted tripping	400 kV Hiriur Guttur Line tripped @ Guttur end only without any indications. Hiriur end no fault/trip events recorded.
DR	DR Trigger Time:09-04-2026 11:21:55.482 CB PDR OPRTD	NA
EL	Any Pole Dead ON All Pole Dead ON TOR Enable ON SOTF Enable ON	NA
TR	Same as FIR	Same as FIR

PMU Analysis:



➤ From the PMU data, tripping of the line can be observed without any fault and R-pole getting tripped before Y and B phases.

Deliberations:

1. KPTCL informed that the 400 kV-GUTTUR-HIRIYUR-1 line tripped at GUTTUR end due to the PD relay Aux contact connectivity cable failure, leading to the tripping of only R-pole and after around 1.5s suspected PD operated and 3ph tripped.
2. KPTCL also informed that at Guttur end line tripped on PD relay due to control cable extending auxiliary contact status to the relay.
3. Damaged control cable was isolated, cable was cleaned and properly insulated before restoring the normalcy. The line was restored at 15.03 Hrs on the same day
4. SRPC mentioned that the cable issues at Guttur station is perennial and advised KPTCL to rectify the same at the earliest. KPTCL informed that PO had been placed for the new cables at Guttur and replacement would be done at the earliest.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
12	Multiple trippings at BPS	As per the reports submitted, the triggering incident Y-G fault in BPS-YTPS_1 line. At YTPS end the fault was sensed in Zone 2 and at BPS end the fault was sensed in Zone 1. A/R didn't operate from both the ends. At YTPS end 3 phase tripping was observed and at BPS end upon receiving the DT 3 phase tripping was observed. After tripping of YTPS-BPS-1 line at JSW end of JINDAL-BPS-4 line the fault was sensed in Zone 3 but no master trip was initiated. Line got tripped at Jindal end due to suspected Ground Potential Rise. JINDAL-BPS-4 line was holding from BPS.	13-04-2026 15:52	JSW THERMAL: 1. Tripping of 400 kV-JINDAL-BPS-4 only at JINDAL end during fault in 400KV-BPS-YTPS-1 line needs review	

400KV-BPS-YTPS-1

	BPS	YTPS
FIR	<p>400kV BPS-YTPS line-1 tripped on Y-phase to ground fault. During the AR operation process, DT has been received from the YTPS end and line is tripped with the fault details as below.</p> <p>Main-1 Details: Fault location: 0.8km (Zone-1) Ir:943A Iy:24.3kA Ib:358A Vr:242kV Vy:13kV Vb:233kV</p> <p>Main-2 Details: Fault location:0.8km (Zone-1) Ir:945A Iy:24.3kA Ib:389A Vr:242kV VyL13kV Vb:231kV</p>	<p>Zone-02 fault occurred in Y-phase of YTPS-BPS-1 line at the location of 211.2 KM from YTPS end at 15:52:53 hrs with fault current magnitude of Ib- 1.971kA and faulted phase voltage being Vbn – 149.2KV.</p> <p>The A/R was initiated since carrier signal was not received from BPS end, the fault was fed for 540 ms, and the 3-phase trip was initiated by protection relays in Z2 trip at YTPS. Both main and Tie breakers tripped at YTPS.</p>
DR	DR Trigger Time:13-04-2026 15:52:53.978 Any Start	DR Trigger Time:13-04-2026 15:52:53.357 Z2, Z3

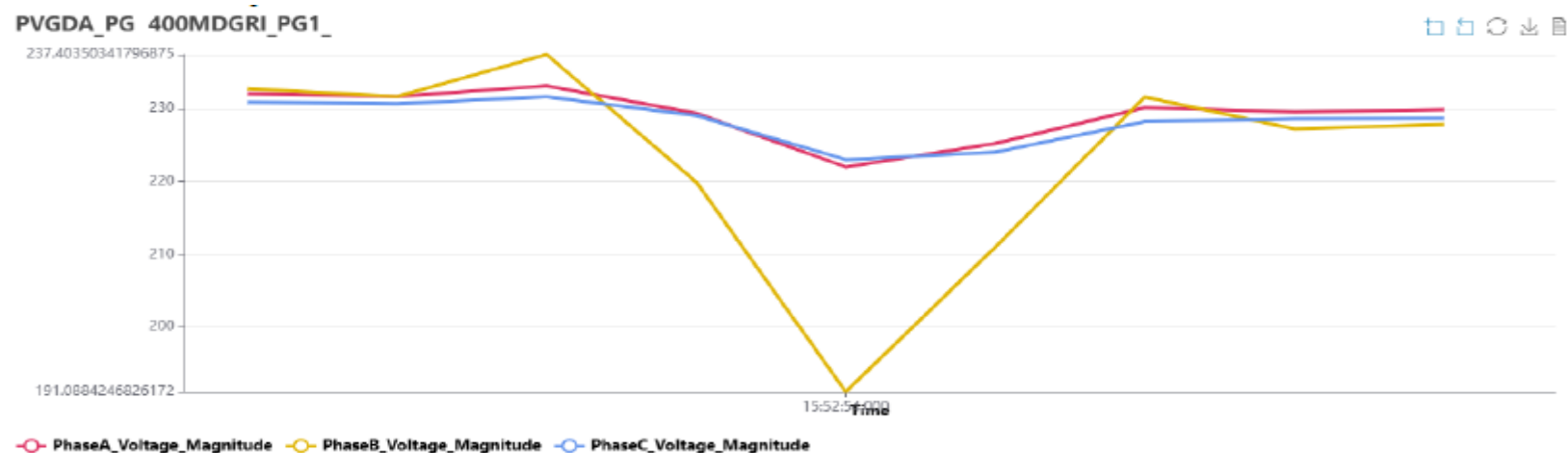
	<p>T1 Any Trip, Z1, Z2, Z3, DIST Trip B, DIST Sig. Send, Z1X L2 M_CB Y OPN, L15 TIE CB Y OPN L13 DT REC CH-2 L4 3-PH GR-A OP L3 M_CB B OPN L1 M_CB R OPN, L14 TIE CB R OPN, L16 TIE CB B OPN, Any Start</p> <p>DR Trigger Time:13-04-2026 15:52:53.987 Z1 TRIP, CARR. SEND, 1P TRIP, M2Z1_OP, M2Z2_ST, M2Z3_ST, M12CRSD, DRB#-INPUT34, DRB#-INPUT38</p>	<p>Any Trip, DIST Trip A, DIST Trip B, DIST Trip C, Relay 19 L12-A/R BLOCK, CB Aux A, CB Aux B, CB Aux C</p> <p>DR Trigger Time:13-04-2026 15:52:53.874 Any Trip, Trip Output A, Trip Output B, Trip Output C, Zone 2 Trip, R24-OV/DEF/STRUB L10-A/R BLOCK</p>
EL	-	Same as DR
TR	Same as FIR	Same as FIR

400KV-JINDAL-BPS-4

	JINDAL	BPS
FIR	<p>A Z1 Y-G fault was sensed on the BPS–YTPS line. BPS to YTPS line was tripped. Simultaneously, the JSW–BPS line tripped at the JSW end, whereas the BPS end breaker remained closed. During the event, a Z3 start was detected in the M1 relay, but no master trip was initiated. The primary suspicion is that the trip at the JSW end occurred due to a rise in GPR.</p>	<p>400kV BPS-JSW line-4 is only tripped at JSW end and was in charged condition from BPS end</p>
DR	<p>DR Trigger Time:13-04-2026 15:52:53.975 Any Start</p>	NA

	DIST Fwd Z3	
EL	Car HLTY CH1: ON Car HLTY CH2: ON 86A SUPVN: ON	NA
TR	Same as FIR	Same as FIR

PMU Analysis:



➤ From the PMU plot, Y-G fault can be observed without any delayed clearance.

Deliberations:

1. As per the reports submitted, the triggering incident was Y-G fault in BPS-YTPS-1 line. At YTPS end the fault was sensed in Zone 2 and at BPS end the fault was sensed in Zone-1. A/R did not operate from both the ends. At YTPS end 3 phase tripping was observed and at BPS end 3 phase tripping was observed, upon receiving DT.
2. After tripping of YTPS-BPS- line 1 at JSW end it was observed that JINDAL-BPS- line 4 sensed the fault in Zone 3, but no master trip was initiated. Line tripped at Jindal end due to suspected Ground Potential Rise. JINDAL-BPS- line 4 was holding from BPS.
3. KPTCL furnished the tripping details as below:

Tripping time:13-04-2026 14:02 Hrs and Restored at 16.57 Hrs:

- 400kV YTPS-BPS line-1 tripped on Y-phase to ground fault.
 - **AT BPS:** YN Fault in Zone-1, Fault location: 0.8km, Iy:24.3kA Carrier send, AR was in progress. After around 450msec DT received from the YTPS end the line was tripped.
 - **AT YTPS:** YN fault in Zone-2, Fault current 1.98kA, due to carrier fail, Zone-2 3 phase trip issued after around 450msec (from pick up) and DT signal was sent to Remote end.
 - During the above fault, JSWEL-BPS line-4 tripped at JSWEL end suspected due to ground potential raise in their switchyard while the line was holding from BPS end.
4. KPTCL informed that, in the BPS–YTPS- line 1, one carrier channel was under failed condition prior to the incident, and during the incident, failure of the carrier channel card was observed at the YTPS end in the other channel. Consequently, the carrier protection communication failed during the incident.
 5. SRPC advised KPCL to rectify the PLCC issues at the YTPS.
 6. KPTCL informed that the Line was restored after thorough inspection of yard at BPS at 16.57 Hrs on the same day.

Recommendations:

- ❖ KPCL to rectify the PLCC issues at the YTPS.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
13	Multiple trippings at 400kV Chandalapur	The triggering incident is the B-G fault in 400kV GAJWEL-CHANDALAPUR-2 line. At GAJWEL end, the fault was sensed in Z2 carrier aided trip, AR operated and tripped due to persistent fault. At CHANDALAPUR end, the fault was sensed in Z1 and 3ph tripped due to I>4 operation. Also, during the same time 400kV GAJWEL-CHANDALAPUR-1 line tripped only at CHANDALAPUR end due to I>4.	14-04-2026 13:41	TGTRANSCO: 1. Tripping of 400KV-GAJWEL-CHANDALAPUR-1 only at CHANDALAPUR end on I>4 due to fault in 400KV-GAJWEL-CHANDALAPUR-2 line needs review 2. Non operation of AR in 400KV-GAJWEL-CHANDALAPUR-2 at CHANDALAPUR end needs review	

400KV-GAJWEL-CHANDALAPUR-1

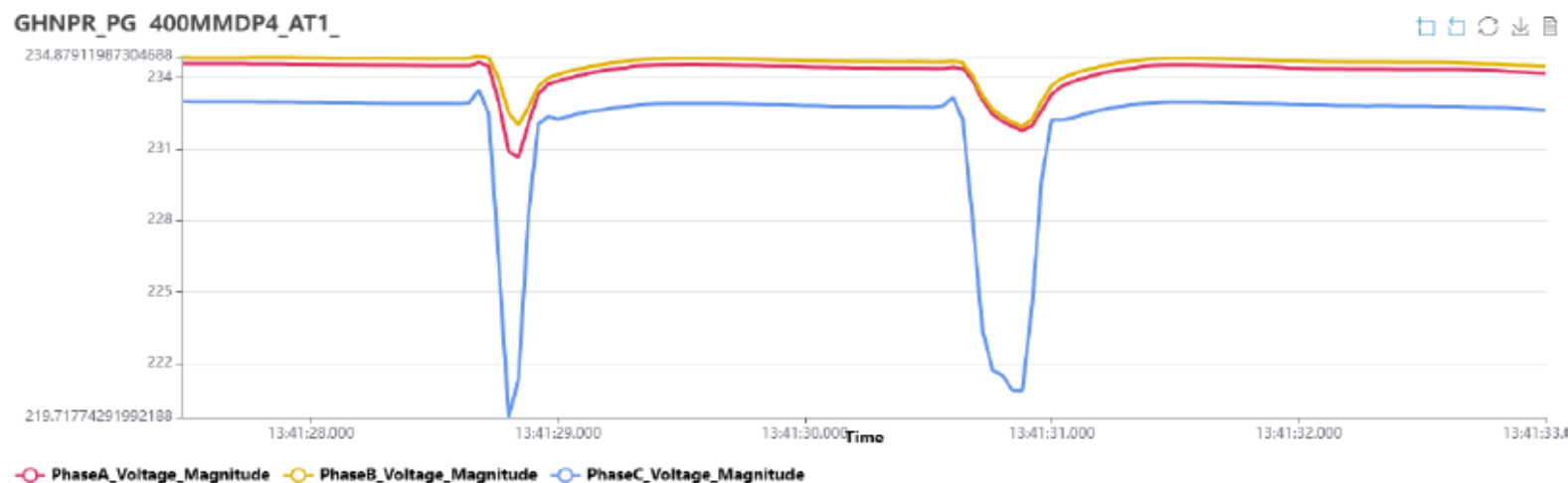
	GAJWEL	CHANDALAPUR
FIR	Line is in service at Gajwel end.	I>3 Trip operated in main-I MICOM relay for through fault on 400kV Chandalapur –Gajwel line-2.
DR	DR Trigger Time:14-04-2026 13:41:28.767 Any Start	DR Trigger Time:14-04-2026 13:41:28.837 Any Trip, Trip-R-Ph, Trip-Y-Ph, Trip-B-Ph, 1-Ph LBB Init, 3-Ph LBB Init 3-Ph Tr GR A/B L15-M CB OPEN B L13-M CB OPEN R, L14-M CB OPEN Y
EL	Same as DR	M CB OPEN R_Y_B: ON T CB OPEN R_Y_B: ON M 86A OPTD: ON T 86A OPTD: ON CB2 Trip 3ph ON CB1 Trip 3ph ON Any Trip ON I>3 Trip C ON Started Phase C ON
TR	Same as FIR	Same as FIR

400KV-GAJWEL-CHANDALAPUR-2

	GAJWEL	CHANDALAPUR
FIR	Tripped on B-Phase to Ground, Zone-1 indications at Gajwel end. A/R operated and tripped again due to persistent fault.	Tripped on B-Phase to Ground, Zone-1 indications at Chandalapur end. A/R not operated due to I>3 trip in main-1 MICOM P546 relay.

DR	DR Trigger Time:14-04-2026 13:38:57.981 Any Start Z3 CAR REC CH-1/2 Any Int. Trip C, DIST Sig. Send GRP-B OPTD MAIN Any Start Z2	Fault Time: 14/04/2026 13:41:28.76700 Any Trip, Trip-R-Ph, Trip-Y-Ph, Trip-B-Ph, 1-Ph LBB Init, 3-Ph LBB Init, Zone 1 Trip, Zone-1 Start, Zone-2 Start, R10-CARR-1 SND, 3-Ph TR GR A/B, L15-M CB OPEN B, M CB OPEN Y, M CB OPEN R, CARR-1 RECD
EL	Same as DR	M CB OPEN R_Y_B: ON T CB OPEN R_Y_B: ON M 86A TRIP: ON CARR-1 SND: ON T 86A TRIP: ON Zone 1 C Trip ON CB2 Trip 3ph ON CB1 Trip 3ph ON Any Trip ON Any Start ON Started Phase C ON I>3 Trip C ON
TR	Same as FIR	Same as FIR

PMU Analysis:



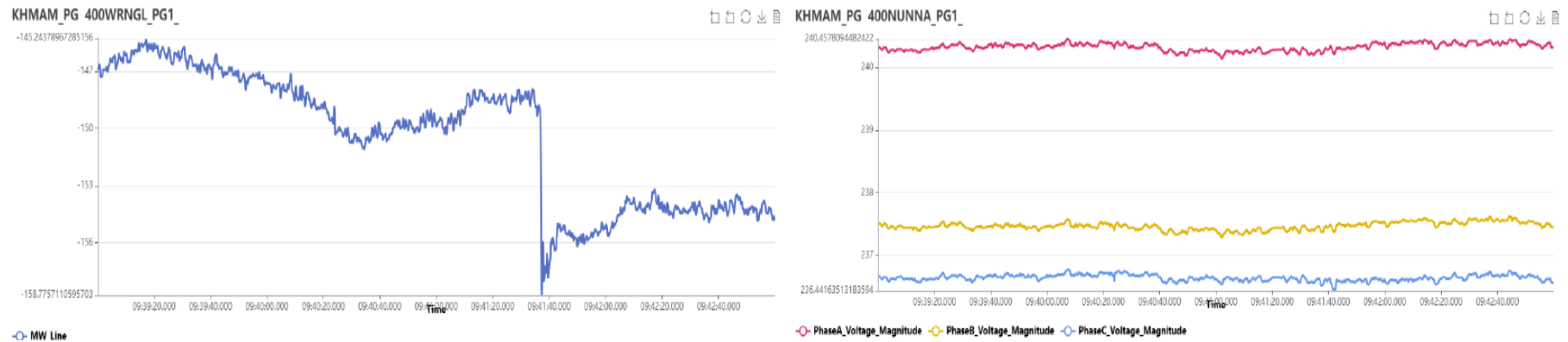
Deliberations:

1. TGTRANSCO informed that the triggering incident was a B-G fault in 400 kV GAJWEL-CHANDALAPUR-2 line. At GAJWEL end, the fault was sensed in Z2 carrier aided trip, AR operated and tripped due to persistent fault. At CHANDALAPUR end, the fault was sensed in Z1 and 3ph tripped due to I>4 operation. During the same time 400 kV GAJWEL-CHANDALAPUR-1 line tripped only at CHANDALAPUR end due to I>4.
2. TGTRANSCO also informed that AR not operated at Chandalapur end, due to operation of I>3 trip protection in Main-1 Micom P546 relay.
3. For fault on 400kV Chandulapur-Gajwel-2 feeder, 400kV Chandulapur-Gajwel-1 feeder also tripped on I>3 indications in main-I Micom P546 relay at Chandalapur end only. On analysis, it was observed that I>3 (SOTF) was enabled in Micom P546 Main-1 relay.
4. TGTRANSCO also informed that as a remedial action I>3 SOTF function was disabled in Micom P546 Main-1 relay in 400kV Chandulapur-Gajwel-1.
5. SRPC advised TGTRANSCO to review the DR time synchronization at Gajwel SS.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
14	400KV/6.9KV MANUGURU-ST-1	As per the reports submitted, the triggering incident is the opening of 403-89A R-ph isolator suspectedly due to power fluctuations (i.e. load transfer from Unit to station bus by FBTS), power supply might have been extended to the open contactor (as per FIR). Due to the opening of the isolator led to the imbalance current and earth fault picked and tripped after around 2s.	15-04-2026 09:41	TGGENCO: 1. Opening of isolator needs review 2. Enabling of non-directional EF needs review	

	MANUGURU-ST-1
FIR	TPS 270MW Unit-1 was tripped on flame failure protection on 15.04.2026 @ 09:41:40:576 Hrs. Subsequent to this incident @ 09:41:42:643 Hrs. ST-1 Tripped on operation of 51N ST HV E/f Protection relay. Immediately rushed to ST-1 bay in 400KV Switchyard and observed that ST-1 Bay 403-89A (bus isolator) is in partially opened condition i.e. contacts are apart more than a feet and arc is persisted and Opened the Isolator remotely. further investigated that, immediately after unit outage, due to power fluctuations (i.e. load transfer from Unit to station bus by FBTS), power supply might have been extended to the open contactor of 403-89A and thus isolator got opened by that much only. (Since ST tripped, there is an interruption in LT power supply which resulted in loss of AC to open contactor of isolator). It may be due to die electric failure of Open contactor of the Isolator in transient switching conditions.
DR	DR Trigger Time:15-04-2026 09:41:42.601 EF 1 IN>1 Trip
EL	Same as DR
TR	Same as FIR

PMU Analysis:



➤ From the PMU data there was no fault during the event.


Deliberations:

1. TGGENCO informed that in the antecedent condition BTPS Unit-1 (270 MW) was tripped on flame failure protection on 15.04.2026 at 09:41:40 Hrs.
2. Subsequent to this incident, immediately after 2 seconds Station Transformer-1 Tripped on operation of 51N ST HV E/F Protection relay. Upon observation in the field, it was seen that ST-1 Bay 403-89A (bus isolator) was in partially opened condition, i.e., contacts were more than a foot apart and arc was persisting.

403-89A at the time of incident:



3. On further investigation it was observed that there was difference in HV side currents; R Ph- 0A, Y Ph-40.65 A and B Ph-0A & HV neutral current of 40.65 A were recorded in P 643 relay. The earth fault relay setting current was 15A with 2 Seconds time delay. Hence, it was concluded that the protection system operation was intact.

	4x270 MW BHADRADRI TPS	Document No: PE-DC-411-510-E044
	RELAY SETTINGS CHART FOR ST PROTECTION	Revision: 03
		Date: 28-11-2019

TRANSFORMER HV BACK UP EARTH FAULT PROTECTION (51NT-HV):

Relay type:	P643		
CT Details:	CT primary :	150	A
	CT secondary :	1	A
Recommended setting:			
Current Setting:	0.1	In A	
Time Delay:	1.5	sec*	

*: The above time setting shall be coordinated at site with line side protection.

* The Time Delay setting changed to 2 Sec after Coordination with Line Backup Earth fault setting at site

4. TGGENCO further informed that the probable cause of the incident could be attributed to power fluctuations immediately following the unit outage, particularly during load transfer from the Unit to the Station Bus. During this process, power supply might have momentarily extended to the open contactor of isolator 403-89A, resulting in partial opening of the isolator. TGGENCO also stated that the incident may have been caused due to dielectric failure of the isolator open contactor under transient switching conditions.
5. TGGENCO stated that the following remedial actions were taken up on ST-1 isolator 403-89A
 - i. Complete alignment of 403-89A was carried out, open & close limits were set. Manual close/ open and Electrical local/remote open/close operations were carried out.
 - ii. Replaced the suspected Open Contactor of Isolator.
 - iii. Both power and control cables measured for IR and found normal.
 - iv. Tested the 51N ST HV E/f Protection relay and found normal.
 - v. Contacted the OEM M/s GR Power Engineers and they advised to check the play in J channel assembly, looseness in Gear Box and tandem coupling connections of isolator. As per the OEM advice required maintenance works were carried out on isolator.

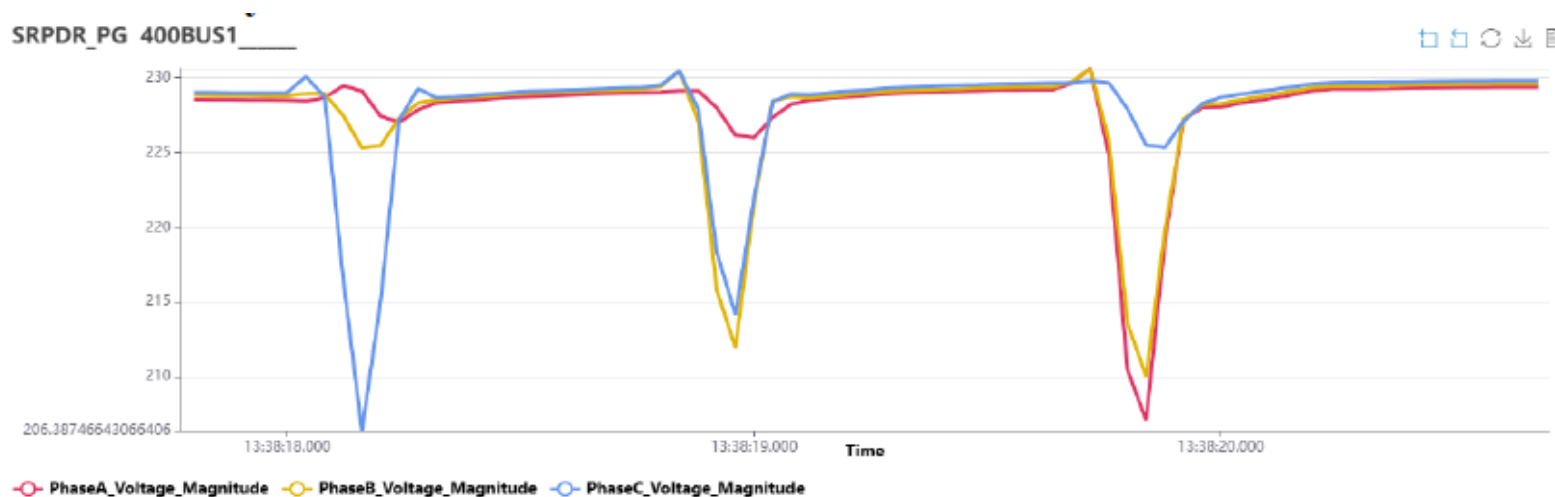
- vi. After the above works, closed the isolator and clearance was given for charging of ST.
 - vii. As per OEM advise, kept the isolator on remote and switched off both the AC & DC MCBs, not only for ST-1 but for all 89As of total switchyard also, to avoid repetition of mal operation.
 - viii. The Station Transformer was taken into service on 15.04.2026 at 13:42 Hrs and stage-1 loads transferred on ST-1 at 16:56Hrs and found normal.
6. SRPC enquired about the type of relay used for the earth fault protection. TGGENCO informed that they had implemented non-directional definite time relay with 2 seconds delay for the earth fault protection.
 7. SRPC advised TGGENCO to implement earth fault protection through a Directional Earth Fault (DEF) scheme using an IDMT or Definite time relay, in accordance with the station fault level.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
15	400KV/230KV SRIPERUMBADUR_TN-ICT-3	As per the reports submitted, the triggering incident was RY fault in external 230kV NCTPS feeder & 230kV Control S feeder. At the same time, 400KV/230KV SRIPERUMBADUR_TN-ICT-3 tripped on maloperation of Buchholz relay due to oil turbulence.	15-04-2026 13:38	TANTRANSCO: Tripping of 400KV/230KV SRIPERUMBADUR_TN-ICT-3 for external fault	

	SRIPERUMBADUR_TN
FIR	During simultaneous tripping of 230kV NCTPS feeder & 230kV Control S feeder due to heavy Push fire underneath DC tower, Y phase Buch trip initiated in ICT.3.
DR	DR Trigger Time:15-04-2026 13:30:38.456 IA2H Diff Start, IB2H Diff Start L5-BUCH.TRIP-YPH R2-GR B TRIP, R1-GR A TRIP

	<p>DR Trigger Time:15-04-2026 13:38:18.138</p> <p>Any Trip, Zone 1 Trip, RL7 FEEDBACK, Started Phase C, Started Phase N, RL10 CR1 SEND, RL11 CR2 SEND, Aided 1 Send, Aided 2 Send, Trip Output C</p> <p>L11 CR1 RECVD</p> <p>Aid 1 Dist Trip, Aided 1 Receive</p> <p>L3 CB OPN C</p> <p>Any Trip, TOR Trip Zone 3, Started Phase B, RL6 M 86A TRIP, RL7 FEEDBACK, Started Phase C, Trip Output A, Trip Output B, Trip Output C</p> <p>Zone 1 Trip, TOR Trip Zone 1, TOR Trip Zone 2, RL10 CR1 SEND, RL11 CR2 SEND, Aided 1 Send, Aided 2 Send</p> <p>L1 CB OPN A, L2 CB OPN B</p> <p>L3 CB OPN C</p> <p>DR Trigger Time:15-04-2026 13:38:19.801</p> <p>Started Phase A, Started Phase B</p> <p>Any Trip, Zone 1 Trip, RL6 M 86A TRIP, RL7 FEEDBACK, RL10 CR1 SEND, RL11 CR2 SEND, aided 1 Send, aided 2 Send, Trip Output A, Trip Output B, Trip Output C</p> <p>L3 CB OPN C</p> <p>L1 CB OPN A, L2 CB OPN B</p>
EL	Same as DR
TR	Same as FIR

PMU Analysis:



From the PMU plot R-Y fault can be observed.

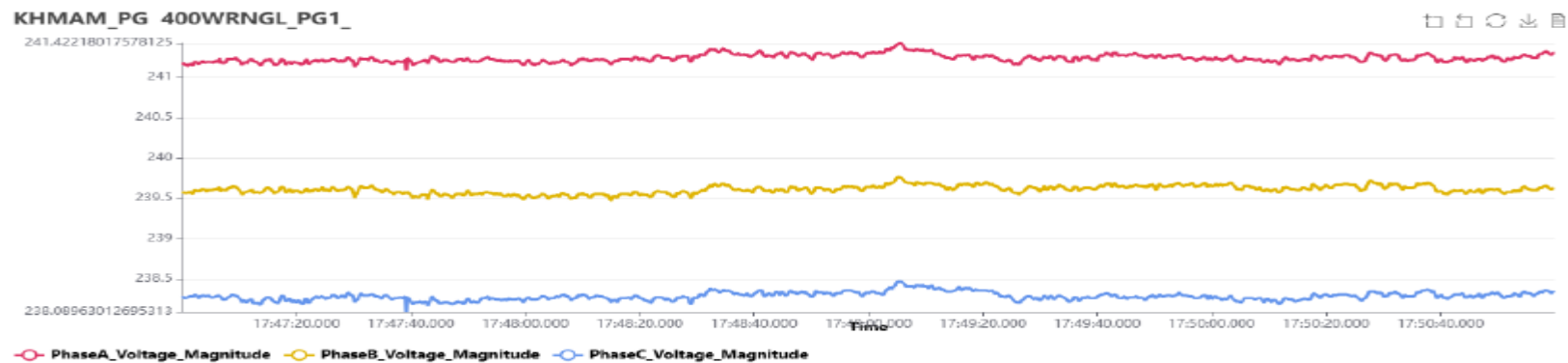
Deliberations:

1. The triggering incident was RY fault in external 230 kV NCTPS feeder & 230 kV Control S feeder. At the same time, 400 kV / 230 kV SRIPERUMBADUR_TN-ICT-3 tripped on maloperation of Buchholz relay due to oil turbulence.
2. TANTRANSCO informed that on analysing the DR, no internal fault was observed. Buchholz trip may have been initiated due to oil turbulence during external fault.
3. TANTRANSCO also informed that after the incident DGA test was conducted on Transformer & found normal. After line patrol, ICT was normalized.
4. SRPC advised TANTRANSCO to review the DR time synchronization at 230 kV SRIPERUMBADUR.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
16	400KV-HINDUJA-KALPAKKA-2	As per the reports submitted, line got tripped due to human error at Kalpakka end during the charging of Bus Reactors and no protection operation is seen in the DR. At Hinduja end DT was received and the line tripped.	16-04-2026 17:49	<u>APTRANSCO</u> : 1. The reason for tripping of line at Kalpakka end needs review	

	HINDUJA	KALPAKKA
FIR	DT Received from Kalpakka End	Tripped breaker at Kalpakka end
DR	DR Trigger Time:16-04-2026 17:49:35.945 DT RECI CH1/2 3PH GR A/B T, 3-PH INTIN UV STG1 START, UV STG2 START AR BLK UV	DR Trigger Time:16-04-2026 17:49:35.989 L11 CB B PH OPEN L9 CB RPH OPEN L10 CB YPH OPEN 3-ph trip perm
EL	Same as DR	Same as DR
TR	Same as FIR	Same as FIR

PMU Analysis:



➤ From the PMU data no fault was observed.

Deliberations:

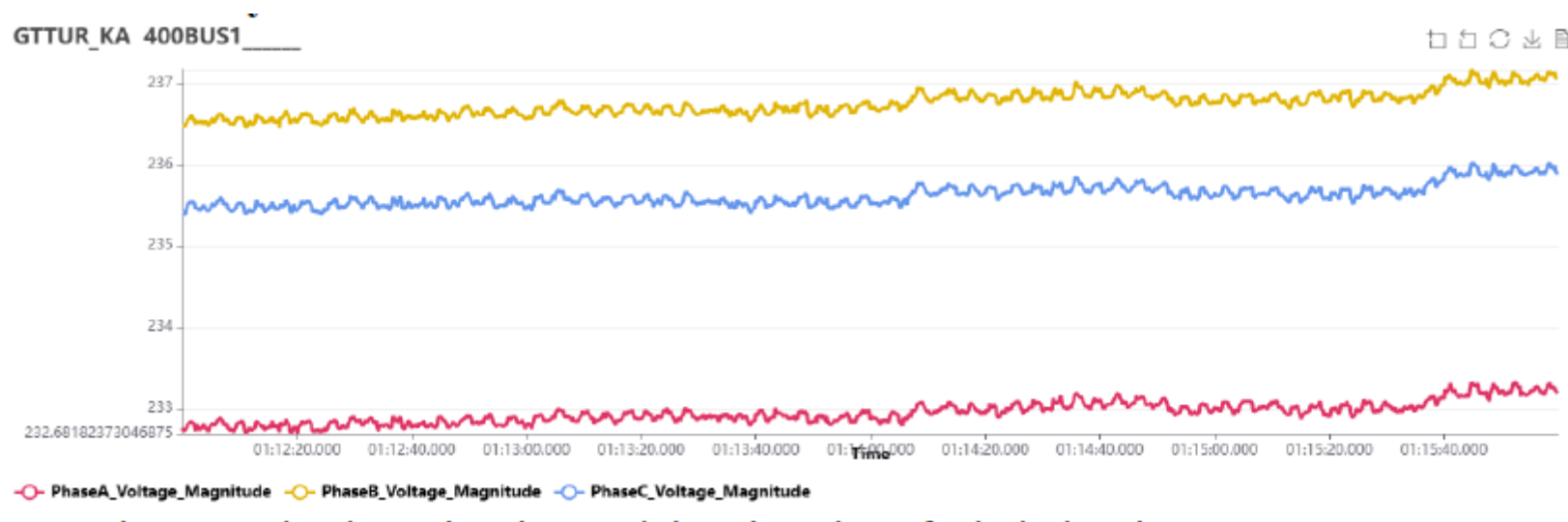
1. APTRANSCO informed that on 16/04/2026 at 17:49 Hrs closing codes were issued to 63 MVAR Bus reactor-3 and 125 MVAR Bus reactor-4. While charging of Bus reactor, Shift operator selected a wrong window (i.e., 400kV Kalapaka-HNPCL-1). Hence, trip command extended to CB of HNPCL-2 (402) feeder and Direct trip sent to remote end.
2. APTRANSCO informed that, strict instructions were issued to shift Engineers to avoid human errors and line trippings.
3. SRPC advised APTRANSCO to follow the SOP during the transmission element charging.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
17	400KV/220KV GUTTUR-ICT-1	As per reports submitted, the triggering incident was closing of TCIV of 400 kV/220 kV ICT-1. Due to closing of TCIV no oil circulated from conservator to main tank leading to Buchholz tripping of the transformer.	19-04-2026 01:16	<u>KPTCL</u> : Bucholz relay maloperation needs review	<u>KPTCL</u> : TCIV valve was reset & kept to back into service mode and observed no oil flow through the valve. Hence valve was kept in filtration mode to enable oil circulation. Air was released from all vents of the power transformer & Bucholz relay was reset. In this incident it was found that the Aircel bag of conservator was damaged and oil oozed out through breather. The breather set with silica gel was replaced by new one.

	GUTTUR
FIR	ICT-1 tripped on Bucholz relay, on inspection TCIV (CTR) valve found closed (mal-operation) hence no oil circulation from conservator to main tank leading to Bucholz -trip
DR	DR Trigger Time:19-04-2026 01:16:07.913 BUCH TRIP TO 86-A TRIP GR-A OPTD

EL	Same as DR
TR	Same as FIR

PMU Analysis:



➤ From the PMU plot, it can be observed that there was no fault during the event

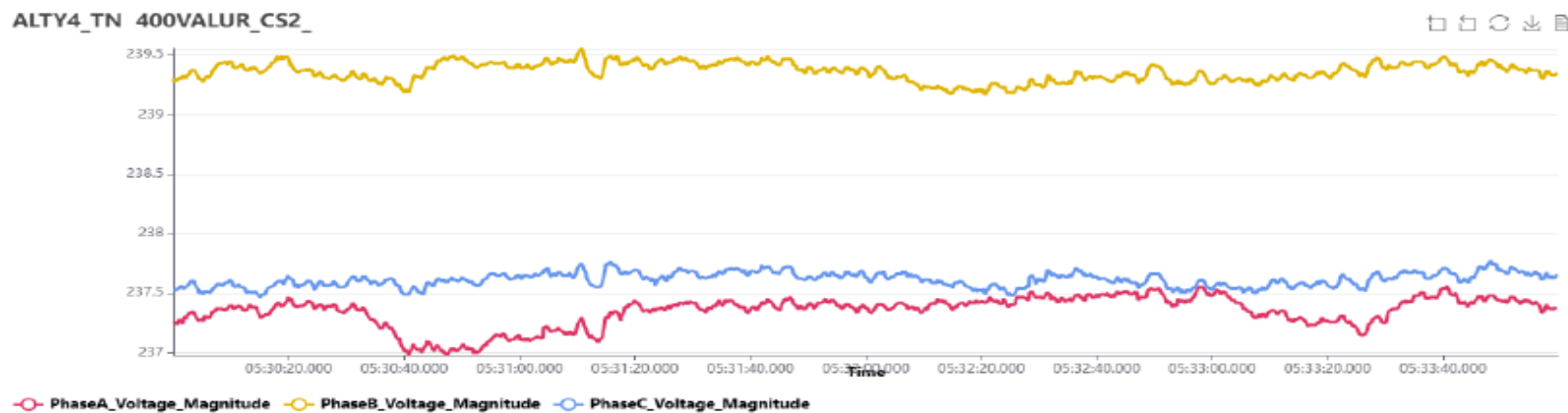
Deliberations:

1. As per reports submitted, the triggering incident was closing of TCIV (Transformer Conservation and Isolation Valve) of 400/220 kV ICT-1. Due to closing of TCIV no oil circulated from conservator to main tank leading to Buchholz tripping of the transformer.
2. KPTCL informed that at 01.14 Hrs on 19.04.2026 at Guttur, 315 ICT-1 tripped on Buchholz relay operation. On inspection TCIV CTR valve was found closed (suspected mal-operation) affecting oil circulation from conservator to main tank leading to Buchholz trip.
3. KPTCL also informed that as Remedial measures TCIV valve was reset & kept back into service mode and observed no oil flow through the valve. Hence, valve was kept in filtration mode to enable oil circulation.
4. In this incident it was found that the Aircel bag of conservator was damaged. Action had been taken for replacement of damaged Aircel and TCIV valve, material supply awaited.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
18	400KV/230KV PULIYANTHOPE-ICT-1	As per the reports submitted, the ICT tripped due to OLTC PRV maloperation due to sluggish contacts of the PRV.	19-04-2026 05:32	TANTRANSCO: Reason for PRV maloperation	TANTRANSCO: Both NO contacts of OLTC PRV were made series for Tripping to avoid spurious tripping

	PULIYANTHOPE
FIR	Y Phase OLTC PRV trip contact sluggish
DR	DR Trigger Time:19-04-2026 05:32:28.317 L17 PRV OLTC Y L1 M CB OPEN
EL	Same as DR
TR	Same as FIR

PMU Analysis:



- From the PMU data, the fault was not observed.

Deliberations:

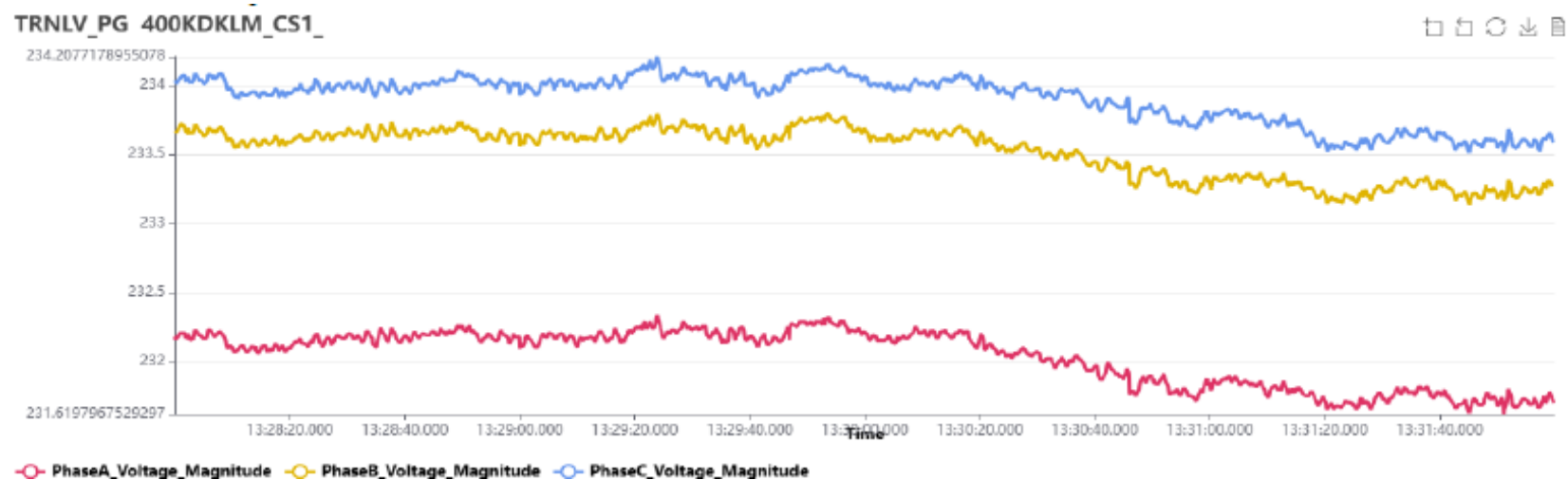
1. As per the reports submitted, the ICT tripped due to OLTC PRV maloperation due to sluggish contacts of the PRV.
2. TANTRANSCO informed that both NO contacts of OLTC PRV was made series to avoid spurious tripping.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
19	400KV-KAYATHAR-KANARPATTI-1	As per the reports submitted, tripping in the line initiated by human error during testing process of ICT in 400 kV Kayathar bay. Due to this testing error LBB protection at Kayathar end started and DT signal send to Kanarpatti end. After receiving the DT signal line got tripped at Kanarpatti end.	20-04-2026 13:30	<u>TANTRANSCO:</u> 1. The maloperation of LBB needs review.	

	KAYATHAR	KANARPATTI
FIR	During New ICT Bay testing LBB trip initiated in 400kV bay	DT RECEIVED FROM REMOTE END
DR	DR Trigger Time:20-04-2026 13:30:45.929 BI_52b_PhY1 BI_52b_PhR1 BI_52b_PhB1 FD. Pkp BI_52b_PhR2, BI_52b_PhB2 BI_52b_PhY2 DR Trigger Time:20-04-2026 13:30:45.655 QD, BI_BFI_1, BI_BFI_2 Op_BFP_BB1, 403, 406, 409, 412, 415, 418	DR Trigger Time:20-04-2026 13:30:45.919 DT RECEIVE Any Pole Dead All Pole Dead

	BI_BFI_1, BI_BFI_2 Op_BFP_BB1, 403, 406, 409, 412, 415, 418 DR Trigger Time:20-04-2026 13:30:45.655 QD, BI_BFI_1, BI_BFI_2 Op_BFP_BB1, 403, 406, 409, 412, 415, 418 BI_BFI_1, BI_BFI_2 Op_BFP_BB1, 403, 406, 409, 412, 415, 418	
EL	Op_BFP_BB1 EBI_BBP EBI_BFP BI_BFI_1 BI_BFI_2 VEBI_BBP VEBI_BFP	Same as DR
TR	Same as FIR	Same as FIR

PMU Analysis:



➤ From the PMU plot no fault was observed.

Deliberations:

1. As per the reports submitted, tripping of the line was initiated by human error during testing process of ICT in 400 kV Kayathar bay. Due to the testing error, LBB protection at Kayathar end started and DT signal was sent to Kanarpatti end. Kanarpatti end also tripped, after receiving the DT signal.
2. TANTRANSCO informed that during testing of New Bay, the LBB trip links were not isolated. During secondary injection in R phase of new bay, it was found that 86 operated & LBB initiation persisted with this condition, but while carrying out secondary injection in Y phase LBB operated. Hence main CB connected in Bus-1 got tripped and all elements were in service through Tie breaker.
3. During the LBB operation DT was sent to Kanarpatti end and TANTRANSCO informed that same would be rectified during upcoming LC.

IV. Non-operation of Auto recloses during transient fault

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
1	400KV-KALPAKKA-KHAMMAM_PG-1	As per the reports submitted the triggering incident was R-G fault in the line. At both ends fault was sensed in Zone 1. A/R didn't operate at both ends due to carrier fail Ch 1 & 2 (as per FIR) and 3 phase tripping was observed.	29-03-2026 13:52	<u>APTRANSCO</u> : 1. The non operation of AR need to be reviewed. <u>PGCIL SR-1</u> : 1. The non operation of AR need to be reviewed.	

Deliberations:

APTRANSCO, vide Mail dated 01.05.2026, furnished the following information

Details of tripping:

- Triggering incident was R-G fault in the line, for that fault, At Kalpakka end, Zone-1, 3-Ph trip operated due to presence of carrier fail during the time due to damage of coaxial cable connected to LMU.

Remedial action taken:

- Damaged of coaxial cable was rectified on the same day and the feeder was taken into service at 19:47 Hrs.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
2	400KV-PAVAGADA_PG-TUMKUR-2	As per the reports submitted the triggering incident was B-G fault in the line. At both ends fault was sensed in Zone 1 and A/R operated at Pavagada and was successful. From Tumkur end AR didn't operate and 3 phase tripping was observed.	31-03-2026 18:21	PGCIL SR-2: 1. Non operation of A/R at Tumkur end need review.	

Deliberations:

PGCIL SR-II, vide Mail dated 02.05.2026, furnished the following information:

- On dated 31.03.2026 at 18:21 Hrs. Bph-G fault Transient fault is triggered.
- At both ends fault was sensed in Zone 1 and A/R operated at Pavagada and was successful.
- At Tumkur end Line tripped on 3pole on Single Phase to ground fault.

ANALYSIS: - Tumkur End AR Unsuccessful:

- As per DR & Event Logs Bph Single phase trip initiated single pole Main & Tie pole tripped.
- After Tripping of Main CB Bph- 18:21:53:101 & Tie CB Bph- 18:21:53:098 hrs.
- DC Source-1 Earth Fault is observed @ 18:21:53:098 hrs.
- AR Block I/P from Main & Tie BCU got picked up due to DC earth fault causing AR Lockout signal Optd. Main CB AR LO (18:21:53:126 hrs.) & Tie CB AR LO (18:21:53:122 hrs.).

- Due to AR LO Optd. Main & Tie CB tripped R&Y poles (18:21:53:156 hrs.).

Remedial Actions: -

- 220V DC Earth Fault in the system was traced and located in the Auxiliary Contacts wiring in Bph 426 Tie CB Auxiliary switch wiring.
- Spare Core from the connecting Interpole wiring was changed.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
3	765KV-THIRUVALAM-ARIYALUR-1	As per the reports submitted, the triggering incident was Y-G fault in the line. At THIRUVALAM end, the fault was sensed in Zone-1, Y-pole opened and after 1s AR did not operate and 3ph tripped (main breakers) after which the tie breakers also did not attempt and tripped after around 2s from the fault. At ARIYALUR end, the fault was sensed in Z1, AR operated, AR was successful and the line was holding.	04-04-2026 19:36	PGCIL SR-2 : 1. Non operation of AR at THIRUVALAM end needs review	

Deliberations:

PGCIL SR-II, vide Mail dated 02.05.2026, furnished the following information:

Brief System Details

- 765 kV Thiruvalem (POWERGRID) – Ariyalur (TANTRANSCO) D/C Line
- Line Length 173.45 km
- Line -2 charged on 24.12.2023
- Line -1 charged on 22.12.2026

- **Maintenance Responsibility:** PGCIL maintains the line associated bays and 2*240 MVar Line reactors at Thiruvallam end as per MoU with TANTRANSCO.

Brief Description: -

1. On 04.04.2026 at 19:36:03 hrs. 765 kV Thiruvallam - Ariyalur -1 Tripped on Yph-G Fault in Line.
2. Line AR was successful at Ariyalur end. Line tripped at Thiruvallam end due AR LO optd. due to " CB Oil pressure Low Reclosing alarm" for both Main & Tie CB.
3. The Line & Bays at Thiruvallam SS belong to TANTRANSCO and the details was shared with TANTRANSCO for addressing the issue for concurrence for availing SD to check the CB Reclosing Pressure setting.
4. Similar incident of AR failure had occurred on 27.02.2026 / 08.03.2026 also.
5. As per Information received – TANTRANSCO had arranged GIS_CB OEM representative, during May 2026, for rectification.

Event Log: -

Historian Events - From 2026/04/04 7:30:49 PM To 2026/04/04 9:15:12 PM

58	2026/04/04 19:36:03.911	THIRUVALAM.765kV.R712_D60_21M2.SYSTEM	CAR SEND_CH2	cBSig	OPERATED	R71221M2	
59	2026/04/04 19:36:03.911	THIRUVALAM.765kV.R712_D60_21M2.SYSTEM	CAR SEND_CH1	cBSig	OPERATED	R71221M2	
60	2026/04/04 19:36:03.913	THIRUVALAM.765kV.BAY-711_TIE.52	OIL PRESSURE LOW RECLOSING ALARM	cBSig	ALARM	B711TIE	
61	2026/04/04 19:36:03.913	THIRUVALAM.765kV.BAY-712_LINE1_B1.52	OIL PRESSURE LOW RECLOSING LOCKOUT	cBSig	OPERATED	B712LB1	
62	2026/04/04 19:36:03.914	THIRUVALAM.765kV.BAY-711_TIE.52	OIL PRESSURE LOW RECLOSING LOCKOUT	cBSig	ALARM	B711TIE	
63	2026/04/04 19:36:03.915	THIRUVALAM.765kV.BAY-712_LINE1_B1.52	OIL PRESSURE LOW RECLOSING ALARM	cBSig	OPERATED	B712LB1	
64	2026/04/04 19:36:03.919	THIRUVALAM.765kV.R712_D60_21M2.SYSTEM	CARRIER RECEIVE CHANNEL-1	cBSig	SET	R71221M2	

- Zone-1 protection issued trip command correctly.
- BCU initiated Auto Reclosure Cycle

During Y-phase CB tripping:

- Oil pressure dropped below CB lock-out threshold
- Oil pressure lock-out signal became active

As a result:

- AR cycle terminated abnormally
- Main and Tie CBs went to Lock-out Condition

Conclusion: AR failure was due to oil pressure drop during CB tripping, not due to protection malfunction.

REMEDIAL ACTION: - OEM Deployment

- TANTRANSCO accorded concurrence to PGCIL for corrective action
- Issue communicated to OEM – M/s NHVS.
- OEM confirmed deputation of service engineer in the month of May 2026 for:
 - Detailed inspection of oil pressure circuit
 - Identification of leakage / valve / accumulator issues
 - Rectification and performance validation
- Shutdown of CB concerned required for inspection by OEM during first week of June 2026 was requested.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
4	400KV-CHOUTUPPAL-KHAMMAM_PG-1	As per reports submitted, the triggering incident was B-G fault in the line. At CHOUTUPPAL end, the fault was sensed in Z1 but A/R did not operate and 3ph tripped. At KHAMMAM end, the fault was sensed in Z1 and A/R operated the line tripped due to persistent fault.	06-04-2026 15:59	TGTRANSCO: 1. Non operation AR at CHOUTUPPAL end needs review	

TGTRANSCO, vide Mail dated 02.05.2026, furnished the following information:

- Tripped on B-Phase to ground, Zone-1 indications at Choutuppall end. A/R initiated but not successful.
- Observed issue with non-resetting of single-phase trip relay.

Remedial Actions taken:

- Single phase trip relay was manually reset and charged the feeder.

- AR operation would be tested during planned shutdown in first week of May 2026.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
5	220KV-NP_KUNTA PSS3-NP_KUNTA-1	As per the reports submitted, the fault triggering incident was B-G fault in the line. At NP_KUNTA end the fault was sensed in differential protection, A/R operated but due to persistent fault 3 phase tripping was observed. At NP_KUNTA PSS3 end fault was sensed in differential protection, A/R didn't operate and 3 phase tripped for the first fault itself.	13-04-2026 14:02	APSPCL: 1. Non-operation of AR at NP Kunta PSS3 end	

Recommendation:

APSPCL to review the AR operation at NP Kunta PSS3 end.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
6	400KV-SURYAPET-KETHIREDDYPALLY-1	As per the reports submitted, the triggering incident was B-G fault in the line. At SURYAPET end, the fault was sensed in Z2 and A/R operated and was successful and the line was holding. At KETHIREDDYPALLY end, the fault was sensed in Z1, A/R did not operate due to master trip relay operation in Main-I PCS relay and 3ph tripped	13-04-2026 18:06	TGTRANSCO: 1. Non operation of AR at KETHIREDDYPALLY end needs review	

Deliberations:

TGTRANSCO, vide mail dated 02.05.2026, furnished the following information

- Tripped on B-Phase to Ground, Zone-1 indications at Kethireddypally end.
- A/R not operated due to master trip relay operation in Main-I PCS relay.

Remedial Actions taken:

- Non operation of AR was already referred to OEM and response was awaited.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
7	220KV-NP_KUNTA PSS3-NP_KUNTA-1	As per the reports submitted, the triggering incident was B-G fault in the line. At NP_KUNTA end the fault was sensed in differential protection, A/R operated but due to persistent fault 3 phase tripping was observed. At NP_KUNTA PSS3 end the fault was sensed in differential protection, A/R didn't operate and 3 phase tripped for the first fault itself.	14-04-2026 11:59	APSPCL: 1. Non operation of A/R needs review	

Deliberations:

- APSPCL to review the AR operation at NP Kunta PSS3 end.

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
8	400KV-KAIGA-GUTTUR-2	As per the reports submitted, the triggering incident is the R-G fault in the line. At Kaiga end, the fault was sensed in Z1, AR operated, AR successful and the line was holding. At Guttur end, the fault was sensed in Z1, AR did not operate and 3ph trip.	20-04-2026 20:25	KPTCL : 1. Non operation of AR at Guttur end needs review	KPTCL : No visible fault found by tlm staff charged stood ok., during next shut down planned to test the relay

Deliberations:

KPTCL, vide mail dated 06.05.2026, furnished the following information:

Tripping time: 20-04-2026 at 20:25 Hrs and restored at 21-04-2026 12:42 Hrs.

- **At Guttur:** 400kV Kaiga line-2 tripped R –N fault in Zone-1, fault current 6.7kA, fault location 32.21kms;
- R phase opened within 30ms, AR was blocked and three phase trip was issued due to AR lock out initiation in main-1 relay.
- **At Kaiga:** Guttur line-2 tripped on R-N fault, in zone-1 protection operation. Auto Reclosure successful at Kaiga end.

Remedial Measures taken at Guttur end:

- Auto Reclosure was blocked by the Main-1 relay. Main-1 relay voltage circuit problem was rectified (neutral wire loose connection attended)

V. PLCC Maloperation-related Events

S. No.	Event	Event Analysis	Outage Date & time	Points for Review	Remedial Actions Furnished
	NIL				

VI. DR Time Synchronization Issues Related Events

Sl. No	Element	Date & Time	Station at which DR time synchronisation was not observed
1	TP SAURYA LIMITED - 220KV	17-03-2026 19:35	TP SAURYA LIMITED - 220KV
TP SAURYA LIMITED to rectify the DR Time Synchronization issue at TP SAURYA LIMITED - 220KV			
2	400KV-BPS-YTPS-1	17-03-2026 20:27	YTPS - 400KV
KPCL, vide mail dated 04.05.2026, furnished the following information: Remarks: ➤ From the above listed tripping events, it can be noted that the Relays at YTPS end are time synchronised with GPS and DR trigger time of both receiving end and sending end are matching up to the level of seconds.			
3	400KV-BPS-YTPS-2	17-03-2026 21:52	YTPS - 400KV
KPCL, vide Mail dated 04.05.2026, furnished the following information: Remarks: ➤ From the above listed tripping events, it can be noted that the Relays at YTPS end are time synchronised with GPS and DR trigger time of both receiving end and sending end are matching up to the level of seconds.			
4	220KV-RAICHUR_KA-UPPER_JURALA-2	18-03-2026 23:11	RAICHUR_KA - 220KV
KPCL to rectify the DR Time Synchronization issue at RAICHUR_KA - 220KV			
5	400KV-ALAMATHY-SUNGAVARACHATRAM-1	19-03-2026 02:35	SUNGAVARACHATRAM - 400KV
TANTRANSCO to rectify the DR Time Synchronization issue at SUNGAVARACHATRAM - 400KV			
6	400KV-ALAMATHY-SUNGAVARACHATRAM-1	19-03-2026 02:35	ALAMATHY - 400KV
TANTRANSCO to rectify the DR Time Synchronization issue at ALAMATHY - 400KV			

7	220KV-HIRIYUR-ZENATARIS_PSS-1	21-03-2026 14:09	HIRIYUR - 220KV
KPTCL to rectify the DR Time Synchronization issue at HIRIYUR - 220KV			
8	220KV-TP SAURYA LIMITED-KOPPAL-1	25-03-2026 16:23	TP SAURYA LIMITED - 220KV
9	TP SAURYA LIMITED - 220KV	25-03-2026 16:23	TP SAURYA LIMITED - 220KV
10	220KV-AMBEWADI-PONDA-2	25-03-2026 21:20	AMBEWADI - 220KV
KPTCL to rectify the DR Time Synchronization issue at AMBEWADI - 220KV			
11	220KV-SRISAILAM_RIGHT_BANK-DINDI-1	26-03-2026 12:17	SRISAILAM_RIGHT_BANK - 220KV
APGENCO to rectify the DR Time Synchronization issue at SRISAILAM_RIGHT_BANK - 220KV			
12	KARAIKUDI(TN) - 230KV	26-03-2026 17:57	KARAIKUDI(TN) - 230KV
TANTRANSCO to rectify the DR Time Synchronization issue at KARAIKUDI(TN) - 230KV			
13	400KV-NCTPS_STAGE_II-SUNGAVARACHATRAM-1	26-03-2026 18:33	SUNGAVARACHATRAM - 400KV
14	220KV-SRISAILAM_RIGHT_BANK-NAGARJUNASAGAR_TS-1	27-03-2026 11:40	SRISAILAM_RIGHT_BANK - 220KV
15	400KV-KALPAKKA-KHAMMAM_PG-1	29-03-2026 13:52	KHAMMAM_PG - 400KV
PGCIL SR-I, vide Mail dated 03.05.2026, furnished the following information: <ul style="list-style-type: none"> ➤ DR time synchronization is in order at KHAMMAM_PG - 400KV 			
16	400KV-KALPAKKA-KHAMMAM_PG-1	29-03-2026 13:52	KALPAKKA - 400KV
APTRANSCO, Vide Mail dated 01.05.2026, furnished the following information: <ul style="list-style-type: none"> ➤ DR time synchronization is in order at Kalapaka end 			

17	220KV-KURNOOL_PG_III-SAEL2-1	29-03-2026 15:55	SAEL2 - 220KV
SAEL to rectify the DR Time Synchronization issue at SAEL2 - 220KV			
18	400KV-PAVAGADA_PG-TUMKUR-2	31-03-2026 18:21	PAVAGADA_PG - 400KV
PGCIL SR-I, Vide Mail dated 02.05.2026, furnished the following information: <ul style="list-style-type: none"> ➤ Relay GPS Time Sync. is checked at both ends and found Main-2 @ Tumkur end GPS time Sync is found incorrect. Same is rectified. 			
19	400KV-ALAMATHY-TIRUVALAM_TN-1	03-04-2026 11:58	ALAMATHY - 400KV
TANTRANSCO to rectify the DR Time Synchronization issue at ALAMATHY - 400KV			
20	400KV-DONI-GUTTUR-1	03-04-2026 12:20	GUTTUR - 400KV
KPTCL to rectify the DR Time Synchronization issue at GUTTUR - 400KV			
21	400KV-ALAMATHY-TIRUVALAM_TN-2	03-04-2026 12:36	ALAMATHY - 400KV
22	400KV-DICHPALLY-NIRMAL-1	04-04-2026 22:26	DICHPALLY - 400KV
TGTRANSCO, Vide Mail dated 02.05.2026, furnished the following information: <p>Remedial Actions taken:</p> <ul style="list-style-type: none"> ➤ GPS server commissioned on 16-04-2026 and all feeders/ICTs' relays time Synchronization was done, except for Main-2 Siemens relays on 400kV Dichpally-Nirmal-1 & 2 feeders. ➤ The pending time Synchronization of relays would be done shortly. 			
23	DICHPALLY - 400KV	04-04-2026 22:26	DICHPALLY - 400KV
TGTRANSCO, Vide Mail dated 02.05.2026, furnished the following information: <p>Remedial Actions taken:</p> <ul style="list-style-type: none"> ➤ GPS server commissioned on 16-04-2026 and all feeders/ICTs' relays time Synchronization done, except for Main-2 Siemens relays on 400kV Dichpally-Nirmal-1 & 2 feeders. 			

	➤ The pending time Synchronization of relays would be done shortly.		
24	400KV/220KV DICHPALLY-ICT-4	04-04-2026 22:26	DICHPALLY - 400KV
TGTRANSCO, Vide Mail dated 02.05.2026, furnished the following information: Remedial Actions taken: ➤ GPS server commissioned on 16-04-2026 and time Synchronization of all feeders/ICTs' relays done except for Main-2 Siemens relays on 400kV Dichpally-Nirmal-1 & 2 feeders. ➤ The pending time Synchronization of relays would be done shortly.			
25	400KV-DICHPALLY-NIRMAL-1	04-04-2026 22:26	NIRMAL - 400KV
TGTRANSCO, Vide Mail dated 02.05.2026, furnished the following information: Remedial Actions taken: ➤ GPS server commissioned on 16-04-2026 and all feeders/ICTs relays time Synchronization done except for Main-2 Siemens relays on 400kV Dichpally-Nirmal-1 & 2 feeders. ➤ The pending time Synchronization of relays would be done shortly.			
26	230KV-ARNI-SINGARPET	05-04-2026 23:39	SINGARPET - 230KV
TANTRANSCO to rectify the DR Time Synchronization issue at SINGARPET - 230KV			
27	400KV-GUTTUR-HIRIYUR-1	09-04-2026 11:22	GUTTUR - 400KV
28	TADIPATHRI - 220KV	10-04-2026 14:56	TADIPATHRI - 220KV
APTRANSCO, Vide Mail dated 01.05.2026, furnished the following information: ➤ Existing relays (SEL311C and Argus2) do not support GPS time synchronization. ➤ GPS time synchronization would be provided by arranging compatible relays.			
29	400KV-KALABURAGI-YTPS-2	10-04-2026 15:25	YTPS - 400KV
KPCL, Vide Mail dated 04.05.2026, furnished the following information:			

Remarks: <ul style="list-style-type: none"> ➤ From the above listed tripping events, it can be noted that the Relays at YTPS end are time synchronised with GPS and DR trigger time of both receiving end and sending end were matching up to the level of seconds. 			
30	400KV-KALABURAGI-YTPS-2	10-04-2026 15:25	KALABURAGI - 400KV
KPTCL to rectify the DR Time Synchronization issue at KALABURAGI - 400KV			
31	220KV-SRISAILAM_RIGHT_BANK-NAGARJUNASAGAR_TS-1	12-04-2026 14:38	SRISAILAM_RIGHT_BANK - 220KV
32	220KV-NP_KUNTA PSS3-NP_KUNTA-1	13-04-2026 14:02	NP_KUNTA PSS3 - 220KV
33	400KV-BPS-YTPS-1	13-04-2026 15:52	YTPS - 400KV
KPCL, Vide Mail dated 04.05.2026, furnished the following information:			
Remarks: <ul style="list-style-type: none"> ➤ From the above listed tripping events, it can be noted that the Relays at YTPS end are time synchronised with GPS and DR trigger time of both receiving end and sending end were matching up to the level of seconds. 			
34	400KV-BPS-YTPS-1	13-04-2026 15:52	YTPS - 400KV
KPCL, Vide Mail dated 04.05.2026, furnished the following information:			
Remarks: <ul style="list-style-type: none"> ➤ From the above listed tripping events, it can be noted that the Relays at YTPS end are time synchronised with GPS and DR trigger time of both receiving end and sending end are matching up to the level of seconds. 			
35	220KV-PALLOM-NEW PALLOM-1	14-04-2026 16:40	NEW PALLOM - 220KV
KSEB to rectify the DR Time Synchronization issue at NEW PALLOM - 220KV			
36	220KV-SABARIGIRI-PALLOM-1	14-04-2026 16:40	SABARIGIRI - 220KV
KSEB to rectify the DR Time Synchronization issue at SABARIGIRI - 220KV			
37	220KV-PUNNAPRA-NEW PALLOM-1	14-04-2026 16:40	PUNNAPRA - 220KV

KSEB to rectify the DR Time Synchronization Issue at PUNNAPRA - 220KV			
38	220KV-IDDUKI-NEW PALLOM-1	14-04-2026 16:40	IDDUKI - 220KV
KSEB to rectify the DR Time Synchronization issue at IDDUKI - 220KV			
39	NEW PALLOM - 220KV	14-04-2026 16:40	NEW PALLOM - 220KV
40	400KV/6.9KV MANUGURU-ST-1	15-04-2026 09:41	MANUGURU - 400KV
<p>TGGENCO, Vide Mail dated 04.05.2026, furnished the following information:</p> <p>➤ All relays in 400KV switchyard of Bhadradri TPS, Manuguru are Time Synchronized with GPS time clock, which can be observed through SAS events and Relay (P643- 51N ST HV E/f Protection) Disturbance records submitted</p> <p>Conclusion</p> <p>➤ DR Time Synchronization issues related Events: All relays are Time Synchronized with GPS, which can be observed through events and Disturbance recorders Submitted</p>			
41	400KV/230KV SRIPERUMBADUR_TN-ICT-3	15-04-2026 13:38	SRIPERUMBADUR_TN - 400KV
TANTRANSCO to rectify the DR Time Synchronization issue at SRIPERUMBADUR_TN - 400KV			
42	220KV-SRISAILAM_RIGHT_BANK-NAGARJUNASAGAR_TS-1	16-04-2026 12:15	SRISAILAM_RIGHT_BANK - 220KV
43	220KV-SRISAILAM_RIGHT_BANK-NAGARJUNASAGAR_TS-1	18-04-2026 12:04	SRISAILAM_RIGHT_BANK - 220KV
44	400KV/230KV PULIYANTHOPE-ICT-1	19-04-2026 05:32	PULIYANTHOPE - 400KV
TANTRANSCO to rectify the DR Time Synchronization issue at PULIYANTHOPE - 400KV			
45	765KV-KURNOOL_PG-CUDDAPAH-2	19-04-2026 18:01	CUDDAPAH - 765KV
<p>PGCIL, SR-I Vide Mail dated 03.05.2026, furnished the following information:</p> <p>➤ DR time synchronization is in order at CUDDAPAH - 765KV</p>			

46	765KV-KURNOOL_PG-CUDDAPAH-2	19-04-2026 18:01	KURNOOL_PG - 765KV
PGCIL SR-I, Vide Mail dated 03.05.2026, furnished the following information: ➤ DR time synchronization is in order at KURNOOL_PG - 765KV			
47	220KV-KOTHAGUDEM_TPS-TIRUVURU-1	20-04-2026 15:04	TIRUVURU - 220KV
APTRANSCO to rectify the DR Time Synchronization issue at TIRUVURU - 220KV			
48	400KV-KAIGA-GUTTUR-2	20-04-2026 20:25	GUTTUR - 400KV
49	400KV-KAIGA-GUTTUR-2	20-04-2026 20:25	KAIGA - 400KV
NPCIL KAIGA to rectify the DR Time Synchronization issue at KAIGA - 400KV			