TDDP.1 PLD (ADD)

PROTECTIVE DEVICE AND THEIR DESIGNATIONS

	115 kV. MAIN BUS NO.1			115 kV. MAIN BUS NO.2			115 kV CB FAILURE RELAYING								
	115 kV. BUS NO.1 DIFFERNTIAL RELAY	CT SUPERVISION RELAY	UNDER & OVER VOLTAGE RELAY	115 kV. BUS NO.2 DIFFERNTIAL RELAY	CT SUPERVISION RELAY	UNDER & OVER VOLTAGE RELAY	LINE NO.1 BREAKER FAILURE RELAYING	LINE NO.2 BREAKER FAILURE RELAYING	CENTER BREAKER FAILURE RELAYING (01YB–02)	LINE NO.3 BREAKER FAILURE RELAYING	LINE NO.4 BREAKER FAILURE RELAYING	CENTER BREAKER FAILURE RELAYING (02YB–02)	TP1 BREAKER FAILURE RELAYING	LINE NO.6 BREAKER FAILURE RELAYING	CENTER BREAKER FAILURE RELAYING (03YB–02)
LOCATION OF DEVICE (PNL.NO.)	BZP						CBF								
DEVICE NO.	87 B1	95 B1	27 59	87 B2	95 B2	27 59	50 BF	50 BF	50 BF	50 BF	50 BF	50 BF	50 BF	50 BF	50 BF
AUXILIARY TIMING RELAY															
AUXILIARY TRIPPING RELAY	86 B1			86 B1			86B1 86BF	86B2 86BF	86BF	86B1 86BF	86B2 86BF	86BF	86B1 86BF	86B2 86BF	86BF
TRIPPING RELAY CHARACTERISTICS	HS MR			HS MR			HS MR	HS MR	HS MR	HS MR	HS MR	HS MR	HS MR	HS MR	HS ER
OPERATION TARGET/AUDIBLE ALARM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
FUNCTION OF DEVICE 01YB–01	T_L						T_L		T_L	T_L			T_L		
01YB–02							T_L	T_L	T_L						
01YB–03				T_L				T_L	T_L		T_L			T_L	
02YB–01	T_L						T_L			T_L		T_L	T_L		
02YB–02										T_L	T_L	T_L			
02YB–03				T_L				T_L			T_L	T_L		T_L	
03YB–01	T_L						T_L			T_L			T_L		T_L
03YB–02													T_L	T_L	T_L
03YB–03				T_L				T_L			T_L			T_L	T_L
04YB–01 (FUTURE)	T_L						T_L			T_L			T_L		
04YB–02 (FUTURE)															
04YB–03 (FUTURE)				T_L				T_L			T_L			T_L	
EGAT'S UPSTREAM CB NO.1							T_L								
EGAT'S UPSTREAM CB NO.2								T_L							
1BVB–01															

	LINE NO.2 TO PHITSANULOK 2 SUBSTATION (EGAT) (OVERHEAD LINE)					LINE NO.1 TO PHITSANULOK 2 SUBSTATION (EGAT) (OVERHEAD LINE)					LINE NO.4 TO PICHAI SUBSTATION (OVERHEAD LINE)				
	PRIMARY PROTECTION		BACKUP PROTECTION			PRIMARY PROTECTION		BACKUP PROTECTION			MAIN 1 PROTECTION & MAIN 2 PROTECTION				
	LINE CURRENT DIFFERENTIAL RELAY	DISTANCE RELAY, PHASE & GROUND ZONE #1	DISTANCE RELAY, PHASE & GROUND ZONE #2	DISTANCE RELAY, PHASE & GROUND ZONE #3	DIRECTIONAL PHASD AND GROUND OVERCURRENT RELAY	LINE CURRENT DIFFERENTIAL RELAY	DISTANCE RELAY, PHASE & GROUND ZONE #1	DISTANCE RELAY, PHASE & GROUND ZONE #2	DISTANCE RELAY, PHASE & GROUND ZONE #3	DIRECTIONAL PHASD AND GROUND OVERCURRENT RELAY	DISTANCE RELAY, PHASE & GROUND ZONE #1	DISTANCE RELAY, PHASE & GROUND ZONE #2	DISTANCE RELAY, PHASE & GROUND ZONE #3	DIRECTIONAL PHASD AND GROUND OVERCURRENT RELAY
LOCATION OF DEVICE (PNL.NO.)	LRP1					LRP2					LRP3				
DEVICE NO.	87L	21–1 21N–1	21–2 21N–2	21–3 21N–3	67 67N	87L	21–1 21N–1	21–2 21N–2	21–3 21N–3	67 67N	21–1 21N–1	21–2 21N–2	21–3 21N–3	67 67N
AUXILIARY TIMING RELAY															
AUXILIARY TRIPPING RELAY															
TRIPPING RELAY CHARACTERISTICS															
OPERATION TARGET/AUDIBLE ALARM	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
FUNCTION OF DEVICE 01YB–01						T_R	T_R	T	T	T					
01YB–02	T_R	T_R	T	T	T	T_R	T_R	T	T	T					
01YB–03	T_R	T_R	T	T	T										
02YB–01															
02YB–02											T_R	T	T	T	
02YB–03											T_R	T	T	T	
03YB–01															
03YB–02															
03YB–03															
04YB–01 (FUTURE)															
04YB–02 (FUTURE)															
04YB–03 (FUTURE)															
EGAT'S UPSTREAM CB NO.1															
EGAT'S UPSTREAM CB NO.2															
1BVB–01															

	LINE NO.3 TO WANG THONG SUBSTATION (OVERHEAD LINE)					LINE NO.6 TO PHITSANULOK 3 SUBSTATION (OVERHEAD LINE)					115–22 kV.TRANSFORMER–TP 1			
	MAIN 1 PROTECTION & MAIN 2 PROTECTION					MAIN 1 PROTECTION & MAIN 2 PROTECTION								
	DISTANCE RELAY, PHASE & GROUND ZONE #1 OR TELE–PROTECTION	DISTANCE RELAY, PHASE & GROUND ZONE #2	DISTANCE RELAY, PHASE & GROUND ZONE #3	DIRECTIONAL PHASD AND GROUND OVERCURRENT RELAY		DISTANCE RELAY, PHASE & GROUND ZONE #1 OR TELE–PROTECTION	DISTANCE RELAY, PHASE & GROUND ZONE #2	DISTANCE RELAY, PHASE & GROUND ZONE #3	DIRECTIONAL PHASD AND GROUND OVERCURRENT RELAY		TP1 INTERNAL PROTECTIVE DEVICES	TP1 TRNSFORMER DIFFERENTIAL RELAY WITH RESTRICTED EARTH FAULT RELAY	TP1 115 kV. SIDE PHASE AND GROUND OVERCURRENT RELAY	TP1 OVERCURRENT GROUND BACKUP RELAY
LOCATION OF DEVICE (PNL.NO.)	LRP4					LRP5					TPP1			
DEVICE NO.	21–1 21N–1	21–2 21N–2	21–3 21N–3	67 67N		21–1 21N–1	21–2 21N–2	21–3 21N–3	67 67N		TP1 DEVICES	87T 87REF	50 51 50N 51N	51 GB
AUXILIARY TIMING RELAY														
AUXILIARY TRIPPING RELAY											86T1–2		86T1–2	
TRIPPING RELAY CHARACTERISTICS											HS ER		HS ER	
OPERATION TARGET/AUDIBLE ALARM	Y	Y	Y	Y		Y	Y	Y	Y		Y	Y	Y	Y
FUNCTION OF DEVICE 01YB–01														
01YB–02														
01YB–03														
02YB–01	T_R	T	T	T										
02YB–02	T_R	T	T	T										
02YB–03	T_R	T	T	T										
03YB–01											T_L	T_L	T_L	T_L
03YB–02						T_R	T	T	T		T_L	T_L	T_L	T_L
03YB–03						T_R	T	T	T					
04YB–01 (FUTURE)														
04YB–02 (FUTURE)														
04YB–03 (FUTURE)														
EGAT'S UPSTREAM CB NO.1														
EGAT'S UPSTREAM CB NO.2														
1BVB–01											T_L	T_L	T_L	T_L

NOTES

1. EACH RELAY LINE TERMINAL SHALL UTILIZE A LINE CURRENT DIFFERENTIAL RELAY OR A DISTANCE RELAY AS A PRIMARY PROTECTION WITH/WITHOUT PILOT TRIPPING SCHEME FOR PROTECTION OF 115 kV LINE AGAINST BOTH PHASE AND GROUND FAULTS AS FOLLOWS :

   FOR 115 kV INCOMING LINE FROM EGAT'S SUBSTATION, A LINE CURRENT DIFFERENTIAL RELAY AND DISTANCE RELAY SHALL BE USED WITH A DEDICATED FIBER–OPTIC CABLE AS A PRIMARY PROTECTION. THE DEDICATED FIBER–OPTIC CABLE SHALL BE USED AS A COMMUNICATION LINK TO PERMIT HIGH SPEED THREE–POLE INTERTRIPPING OF THE BREAKERS AT BOTH ENDS OF THE LINE. THE RECLOSURE FOR BOTH LINE CURRENT DIFFERENTIAL RELAY AND DISTANCE RELAY ZONE #1 SHALL BE DONE THROUGH A SYNCHRO–CHECK RELAY.

   FOR 115 kV OUTGOING LINE, A DISTANCE RELAY SHALL BE USED AS A PRIMARY PROTECTION WITH/WITHOUT PILOT TRIPPING SCHEME. THE ZONE #1 OR TELE – PROTECTION SHALL BE USED FOR HIGH SPEED THREE–POLE TRIPPING AND RECLOSING. THE RECLOSURE SHALL BE DONE THROUGH A SYNCHRO–CHECK RELAY.

   FOR ZONE#2 AND ZONE #3, OF EACH DISTANCE RELAY, THERE SHALL BE FURNISHED WITH A TIMING RELAY WITH TWO SEPARATE TIMING UNITS THAT WILL PROVIDE TIME–DELAYED TRIP FOR ZONE#2 AND ZONE #3.

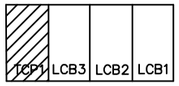
   THE BACKUP PROTECTION FOR BOTH 115 kV LINES, THERE SHALL BE DIRECTIONAL PHASE AND GROUND OVERCURRENT RELAYS FOR PHASE AND GROUND FAULT PROTECTION FOR BOTH TYPES OF THE 115 kV LINES. EACH PHASE AND GROUND RELAY SHALL BE PROVIDED WITH A PROVISION OF VOLTAGE–POLARIZED DIRECTIONAL UNIT.

2. EACH BREAKER FAILURE RELAY (50BF) SHALL INITIATE THE RELEVANT BUS DIFFERENTIRY AUXILIARY TRIPPING AND LOCKOUT RELAY (86B) AND/OR THE RELEVANT BREAKER FAILURE AUXILIARY TRIPPING AND LOCKOUT RELAY (86BF) TO TRIP AND BLOCK CLOSING CIRCUITS OF ALL BREAKER WHICH CONNECTED TO THAT MAIN BUS AND THE ASSOCIATED CENTER BREAKER
   IN CASE OF THE INCOMING BREAKER FAILS, THE INCOMING BREAKER FAILURE RELAY (50BF) SHALL, IN ADDITION TO THE ABOVE FUNCTIONS. SEND A TRIP COMMAND TO EGAT (T) VIA A REMOTE I/O MODULE.

4. FOR NEW INSTALLATION, THE CONTRACTOR SHALL PROVIDE ALL AUXILIARY EQUIPMENT AND ACCESSORIES TO COMPLETE THE ABOVE FUNCTIONS.
5. ALL PROTECTIVE TRIPPING FUNCTION ENERGIZED BOTH TRIP COILS OF 115 kV. CIRCUIT BREAKER.

SWING RACK TYPE PROTECTIVE RELAY PANEL

SWING RACK TYPE PROTECTIVE RELAY PANEL



ENCLOSED TYPE CONTROL SWITCHBOARD

REFERENCE DRAWING

METERING AND RELAYING DIAGRAM.....DWG NO. FA4–011/62045

LRP – LINE RELAY PROTECTION PANEL
BZP – BUS ZONE PROTECTION PANEL
LCB – LINE CONTROL SWITCHBOARD
TPP – TRANSFORMER PROTECTION PANEL
RCC – REMOTE CONTROL CUBICLE OF A POWER TRANSFORMER
CBF – CIRCUIT BREAKER FAILURE RELAY PROTECTION PANEL
TCP – TRANSFORMER CONTROL PANEL

LEGEND	EXPLANATION
Y	YES
HS	HIGH SPEED
ER	ELECTRICAL RESET
MR	MANUAL RESET
SR	SELF RESET
T_R	3–POLE TRIP AND RECLOSE
T	3–POLE TRIP– NO RECLOSING
T_L	3–POLE TRIP AND LOCKOUT

SCOPE OF ADDITIONAL WORK

SCOPE OF MODIFIED WORK

PLD–M

กองออกแบบสถานีไฟฟ้า ฝ่ายงานสถานีไฟฟ้า	การไฟฟ้าส่วนภูมิภาค	ใช้แทนแบบ —
ผู้เขียน ฉัตรชัย ดินทร์	ผู้ว่าการ (แทน)	ถูกแทนโดยแบบ —
ผู้สำรวจ ฉัตรชัย ดินทร์	สถานีไฟฟ้าพิษณุโลก 4 (ลานไก่) (เพิ่มเติม)	เขียนเสร็จวันที่ 2 พ.ค. 2562
วิศวกร	พังก์ชั่นการทำงานของอุปกรณ์ป้องกัน	แก้แบบวันที่ —
หัวหน้าแผนก วรเวช	PHITSANULOK 4 SUBSTATION (ADD)	มิติเป็น —
ผู้อำนวยการกอง	PROTECTIVE DEVICE FUNCTION	มาตราส่วน —
ผู้อำนวยการฝ่าย (แทน)		แบบเลขที่ FA4–011/62046
รองผู้ว่าการวิศวกรรม		แผ่นที่ 1 ของจำนวน 2 แผ่น