



- PROTECTION AND CO-ORDINATION SCHEME**
- THE 25KV FUSES WILL ACT AS THE SOLE PROTECTION ELEMENT FOR TRANSFORMER T1 AT PRIMARY AND SECONDARY WINDINGS.
 - GENERATOR C.B.105 WILL ACT AS THE INTERFACE BREAKER AS WELL AS PRIMARY PROTECTION ELEMENT FOR THE GENERATOR WHEN IT IS CONNECTED IN PARALLEL OPERATION MODE. C.B. 52-A WILL ACT AS SECONDARY PROTECTION ELEMENT.
 - IN PARALLEL OPERATION MODE, IF A SHORT CIRCUIT OCCURS BETWEEN THE GENERATOR TERMINALS AND BUS BAR BB-1, C.B.105 WILL TRIP FASTER THAN C.B. 52-A TO CLEAR THE FAULT AND MAINTAIN THE POWER SUPPLIED BY THE UTILITY FEEDING THE BOP LOADS.
 - C.B. 52-B WILL ACT AS THE PRIMARY PROTECTION FOR THE B.O.P. LOADS
 - C.B. 52-C WILL ACT AS THE PRIMARY PROTECTION ELEMENT FOR ORC SYSTEM LOADS
 - C.B. 52-E WILL ACT AS THE PRIMARY PROTECTION ELEMENT FOR THE POWER FACTOR CORRECTION CAPACITORS (PFCC)
 - C.B. 52-F WILL ACT AS THE PRIMARY PROTECTION ELEMENT FOR THE MCC LOADS
 - C.B. 52-G WILL ACT AS THE PRIMARY PROTECTION ELEMENT FOR THE AIR-COOLED CONDENSER AND ITS MOTORS
 - C.B. 52-A WILL ACT AS THE SECONDARY PROTECTION ELEMENT FOR C.B. 52-B, C.B. 52-C, C.B. 52-E, C.B. 52-F AND C.B. 52-G

NOTES:

- 1CT, 2000/5A IS SUPPLIED BY THE PFCC MANUFACTURER AND HAS AN INTERNAL OPENING WHICH IS 4.1" X 7.1" (104 x 180mm). THE BUS BAR MUST BE ABLE TO ACCOMMODATE THIS
- BREAKERS AS FOLLOWS

- 52 - A - MOTORISED BREAKER (ELECTRICALLY AND/OR MANUALLY OPERATED)
- 52 - B - M.C.C.B.
- 52 - C - M.C.C.B.
- 52 - E - M.C.C.B.
- 52 - F - M.C.C.B.
- 52 - G - M.C.C.B.

- SEQUENCE OF OPERATION - CONNECT G1 TO THE GRID**
- CLOSE SWITCH S1; THE PRIMARY WINDING OF TRANSFORMER T1 WILL BE ENERGIZED
 - CLOSE ISOLATING SWITCH HA (OR HB) INSIDE T1
 - CLOSE TRANSFORMER ISOLATING SWITCH AT 25KV SIDE OF T1
 - CLOSE UTILITY MAIN CIRCUIT BREAKER AT 480V SIDE OF T1
 - CLOSE CIRCUIT BREAKER 52-A; 480V WILL BE AVAILABLE AT BUS-BAR BB-1
 - CLOSE CIRCUIT BREAKER 52-B; 480V WILL BE AVAILABLE AT BUS-BAR BB-2
 - CLOSE C.B. 52-F; POWER WILL BE AVAILABLE TO THE M.C.C. TO START/RUN THE PLANT AUXILIARY LOADS
 - CLOSE THE C.B. FEEDING TRANSFORMER T2; VOLTAGE SIGNAL 208V/120V WILL BE SUPPLIED TO THE PLC AND INSTRUMENT SYSTEM THROUGH THE U.P.S. (NOTE: IT IS POSSIBLE TO START THE PLC & INSTRUMENTATION THROUGH THE UPS BATTERIES BEFORE ENERGIZING TRANSFORMER T2)
 - CLOSE C.B. 52-C; 480V WILL BE SUPPLIED TO THE ORC CU/BOARD; START THE ORC LOADS ON THE SKID.
 - CLOSE C.B. 52-G; 480V WILL BE SUPPLIED TO AC CONDENSER VFD. THE SPEED OF ALL CONDENSER FANS WILL BE DETERMINED BY THE OUTLET WATER TEMPERATURE.
 - START THE ORC SYSTEM & RUN THE GENERATOR UNTIL IT REACHES A SPEED HIGHER THAN SYNCHRONIZING SPEED
 - AS SOON AS THERE IS PROOF OF RECOMMENDED SPEED, PROOF OF GENERATOR AND TRANSFORMER RESET, THE PLC WILL SEND A SIGNAL TO CLOSE C.B. CB 105 AND POWER WILL FLOW FROM THE GENERATOR TO THE GRID
 - WHEN THE GENERATOR IS AT PARALLEL OPERATION MODE, THE PLC WILL SEND A "START" SIGNAL TO THE PFCC TO LOAD/UNLOAD THE CAPACITORS (AS REQUIRED) IN STAGES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

THE FOREGOING IS SUBJECT TO RECEIPT OF FINAL/FULL INFORMATION

NOTE:

PROTECTION FUNCTIONS ARE EMBEDDED/INTEGRAL TO THE CBS

- KEY:**
- MAIN FUSED DISCONNECT
 - LIGHTNING ARRESTER (OW SURGE CAPACITOR)
 - VOLTAGE TRANSFORMER
 - ZIG-ZAG TRANSFORMER
 - CIRCUIT BREAKER
 - CONTROL FUSE & POTENTIAL TRANSFORMER
 - CURRENT TRANSFORMER
 - MINIATURE MOULDED CASE CIRCUIT BREAKER
 - THERMAL OVERLOAD
 - MOTOR STARTER
 - CAPACITOR (BANK)
 - UNDER VOLTAGE RELAY
 - DIRECTIONAL POWER RELAY
 - UNDER POWER RELAY
 - REVERSE PHASE/PHASE BALANCE CURRENT RELAY
 - PHASE SEQUENCE OVERCURRENT RELAY
 - THERMAL RELAY
 - INSTANTANEOUS OVERCURRENT RELAY
 - BREAKER FAILURE RELAY
 - INSTANTANEOUS OVERCURRENT RELAY (PHASE)
 - VOLTAGE RESTRAINED INSTANTANEOUS OVERCURRENT RELAY
 - INSTANTANEOUS / A.C. TIME OVERCURRENT RELAY (PHASE)
 - INSTANTANEOUS / A.C. TIME OVERCURRENT RELAY (GROUND)
 - A.C. TIME OVERCURRENT RELAY
 - VOLTAGE RESTRAINED A.C. TIME OVERCURRENT RELAY
 - OVERVOLTAGE RELAY
 - GROUND FAULT RELAY
 - FREQUENCY RELAY
 - VOLTAGE TRANSFORMER FUSE FAILURE
 - METERING - CURRENT
 - METERING - VOLTAGE
 - METERING - FREQUENCY
 - METERING - POWER FACTOR
 - METERING - KILOVOLT AMPERES REACTIVE
 - METERING - KILOWATT HOURS
 - METERING - KILOWATT AMPERES

Note: FOR INTERNAL WIRING & SIGNALS RE: TURBODEN, SEE T'DEN SCHEMATICS

CAN-ECOSSE ENGINEERING INC.

AS BUILT

06.06.2012

REFERENCE DRAWINGS	REVISED BY	DATE	APPROVED BY	REVISION	CONTRACTOR'S LOGO	ENGINEERS STAMP	DRAFTING DEPT.	ACAD FILE:
1. C.197.5600.09 Sht 1-2, (PLC DIAGRAM)	D. CRAIG	06.06.2012	N. SAAD	G				
2. SRC-BP3C-460-100-T1, (SUPERIOR'S VFD DWGS.)	D. CRAIG	21.04.2011	K. STEWART	F				
3. M-BKR12-10264-A, (ABB'S PFCC DWG.)	D. CRAIG	19.01.2011	K. STEWART	E				
4. TURBODEN SCHEMATICS	D. CRAIG	29.09.2010	K. STEWART	D				
	D. CRAIG	22.07.2010	K. STEWART	C				
	D. CRAIG	25.06.2010	K. STEWART	B				
	D. CRAIG	14.06.2010	K. STEWART	A				

TransGas
A SouthEnergy Company

ACAD FILE: C806-5101

SCALE: NTS

DRAWING NO. C.197.7600.01

SHEET 1 OF 1

PLOT DATE: _____

REV. G

SINGLE LINE DIAGRAM OVERALL SYSTEM

TRANS GAS O.R.C. CO-GEN ROSETOWN, SASKATCHEWAN