

AUXILIARY OIL PUMP
 SCHEME 3401
 E30151, SH 3, P 1A
 E-116, C-143

A-C EMERGENCY BRIS & S'AL OIL HARP
SCHEME 9402
E30761, N° 3, P-2A
R116 & R143

15
D-1 EMERGENCY BRG & SEAL OIL PUMP
SCHEME 3601

SCHEME 9402 EXEPT LOCATION P12 & ACB 52-1254			
CIRCUIT ELEMENT SCHEDULE			
DESCRIPTION	ACB	SCHEME LOCATION	PS

CIRCUIT ELEMENT SCHEDULE			
DESCRIPTION	ACB	SCHEM	LOCATION
AC GLAND SEAL CONDENSER EXHAUSTER NO.1	32-2412	9406	P22
AC GLAND SEAL CONDENSER EXHAUSTER NO.2	32-2821	9411	PR2

CIRCUIT ELEMENT SCHEDULE				
DESCRIPTION	ACB	SCHEME	LOCATION	PS
TURBINE BYPASS HYDRAULIC PUMP A	52-A34	940B	P12	PS/676
TURBINE BYPASS HYDRAULIC PUMP B	52-2451	941C	P22	PS/476

VAPOR EXTRACTOR OIL RESERVOIR, 3/4 HP
SCHEME 9407, POWER SCHEMATIC SIMILAR TO
SCHEME 9402 EXCEPT ACB-52-2A12

CIRCUIT ELEMENT SCHEDULE		
DESCRIPTION	ACB	SCHEMATIC

CIRCUITING WATER VACUUM PUM
SCHEM 2425. POWER SCHEMATIC SIMILAR
NO 9402 EXCEPT ACB 52-1A02
CIRCUIT ELEMENT SCHEDULE

CIRCUIT ELEMENT SCHEDULE				
DESCRIPTION	ACB	SCHEME	LOCATION	W/D
VAPOR EXTRACTOR OIL RESERVOIR	52-2A12	9407	P22	3/4
BIG DRAIN ENLARGEMENT EXHAUSTER	52-1A24	9403	P12	1/2

CIRCUIT ELEMENT SCHEDULE			
DESCRIPTION	ACB	SCHEME	LOCATION
CIR. WATER VACUUM PUMP NO. 1	52-1A62	2425	P12
CIR. WATER VACUUM PUMP NO. 2	52-2A62	2426	P22

Figure 1 is a ladder logic diagram for a motor control system. It includes an 'AUTO-START' button, a 'LIMIT SWITCH' (NO), a 'STOP' button (NC), and a 'REVERSE' button (NC). The logic involves two interlocking relays, 'FORWARD' and 'REVERSE', which control the 'MOTOR' through a 'START' relay. The 'LIMIT SWITCH' is used for forward limit protection, and the 'STOP' button is used for emergency stop. The 'REVERSE' button is used to reverse the motor direction.

STOP	START	CONTACTS		POSITION		
		HANDLE	END	START	NORMAL	STOP
		1	2	1	X	X
		2		X	X	
		3	4	X		
		4		X		

STOP / START	CONTACTS				POSITIONS		
	HANDLE END				START	NORMAL	STOP
+	1	2	3	4	1	X	X
	1	2	3	4	2	X	

ACCLAND SEAL CONDENSER EXHAUSTER
D-GLAND SEAL CONDENSER EXHAUSTER

OFF STAND BY RUN	CONTACTS		POSITIONS		
	HANDLE END		RUN	OFF	STANDBY
	1	2	1	X	
	3	4	2		X

TURBINE BYPASS HYDRAULIC PUMPS
CONTROL SWITCH 42/CS, GE CO. TYPE 3DM

EMERGENCY BRG & SEAL OIL PUMPS AND AUX OIL PUMP
CONTROL SW 42/CG. MAINTAINED IN RUN
SPRING RETURN FROM OFF TO AUTO-START
PULL TO LOCK IN OFF
GE CO TYPE SBM WITH OVAL HANDLE

TURNING GEAR DRIVE CONTROL SW C58
SPRING RETURN TO NORMAL
2E CO TYPE 58-1 WITH OVAL HANDLE

CONTROL SW 42/CS
SPRING RETURN TO NORMAL
42 CO TYPE SBM WITH OVAL HANDLE

CONTROL SWITCH 42/CS, GE CO. TYPE 3DM
NO SPRING RETURN, WITH OVAL HANDLE

240 V AC

CONTACTS
HANDLE END

		POSITIONING		
		AUTO	ISOLATE	CLOSE
1T	1-2			X
2T	2-3			X
3T	3-4		X	
4T	4-5			X
5T	5-6	X		
6T	6-7			

TURBINE SWITCH VALVE MANUAL OVER-RIDE
(CENTRAL BYPASS) ROP (60 GF-60 TYP. 1980)

TURBINE BYPASS VALVE MANUAL OVER-RIDE
CONTROL SWITCH 20BP/G5 GECO TYPE SBM
WITH LEVER HANDLE, SPRING
RETURN FROM CLOSE TO
HOLD MAINTAINED IN AUTO
& NO. 6.

APPROVED
FOR CONSTRUCTION

DEVICE TABLE			
DEVICE	DESCRIPTION	AFOR & MODEL	REMARKS
16,8A,18B	ACCELERATION CONTACTOR		
42	STARTER CONTACTOR		
52	AIRCUT AIR CIRCUIT BREAKER		
72	125 V D.C. AIR CIRCUIT BREAKER		
63-7	SEAL OIL PRESS SW		CLOSE ON LO PRESS
APR	AUX OIL PUMP DISCH PRESS SW		CLOSED WHEN PUMP IS OPERATING
APB	AUX OIL PUMP PRESS SW		CLOSE 182 PSI, OPEN 185 PSI
EPI	AT EMERG BRG OIL PUMP DISCH PRESS SW		CLOSED WHEN PUMP IS OPERATING
EPB	EMERG BRG & SEAL OIL PRESS SWITCH		CLOSE 30 PSI, OPEN 32 PSI
LPO	LOW BEARING OIL PRESS SWITCH		CLOSE 10 PSI, OPEN 12 PSI
OLC	LOBE OIL RESERVOIR, LEVEL ALARM SW		
TGS	TURNING GEAR SIGNAL SWITCH		
TTS	TURNING GEAR TRANSFER SW		CLOSED WHEN TURNING ON TURNING GEAR
TPI	TURNING GEAR OIL PRESS INTERLOCK SWITCH		CLOSE 12 PSI, OPEN 10 PSI
TPB	AT EMERG BRG SEAL OIL PRESS SW		CLOSE 80 PSI, OPEN 83 PSI
TPR	AT EMERG BRG & SEAL OIL PUMP DISCH PRESS SW		CLOSED WHEN PUMP IS OPERATING
TSR	LAND SEAL CONTACTOR		CLOSE ON LOW VACUUM
PIA17 PIA17-152	TURNING BYPASS ALARM & VACUUM DIS INDICATOR 152 PSI SW		CLOSE ON LOW PRESS
PIA16	LAND SEAL CONTACTOR		CLOSED ON HIGH VAC
SW/42W	COOLING WATER FLOW SWITCH		VALVE OPENS WHEN ENERGIZED
42	UNDERPUMP RELEASE TIME DELAYED	HASSTAN 8-80	2 SEC DELAY ON CLOSE
APB/PIA12	PRESS. VALVE CONTROL PRESS. OF POWER	HGA	CONTACTS CLOSE ON LOSS OF CONTROL POWER

LOCATION OF EQUIPMENT

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000 CONTROL PANEL - CONTROL ROOM
001 125 V D-E MCC
002 LOCAL CONTROL DISCONNECT
003 480 V MCC LA
004 480 V MCC BA & E
005 MOTOR
006 THERM. OIL OIL TANK
007 SUBM. TRANSFORMER OIL
008 LOCAL DEVICE

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REVELANT HANDS

1. SINGLE LINE MOTOR AND RELAY DIAGRAM - SHEET 1 3159-2101  
2. SINGLE LINE MOTOR AND RELAY DIAGRAM - SHEET 2 3159-2102

|   |      |                                   |      |     |     |
|---|------|-----------------------------------|------|-----|-----|
| D | 1666 | REVIEWED FOR RECORD               | 207X |     | 218 |
| C | 1666 | STANDARDIZATION REPORTS ARE FILED |      | 218 |     |
| B | 1666 | ADDITION TIME DELAYED UNDERAGE    | RS   | 218 | 46P |
| A | 1666 | DWG IF CHANGED + FLD. CHG'D'S     | 222  | 17  |     |

AS-BUILT

|   |     |                                                                                                                 |      |     |
|---|-----|-----------------------------------------------------------------------------------------------------------------|------|-----|
| 5 | 146 | REV. FOR REWARD                                                                                                 | 7/11 |     |
| 4 | 146 | ADD TURNING POINT AHEAD OVERHEAD CANTON<br>RD. 1/2 MI. TURN OFF                                                 | 7/11 | 146 |
|   |     | ADD 574/32E & SCHEME 2425                                                                                       |      | 146 |
| 2 | 240 | REV. SCHEMES 3401E & 940C AS<br>BUILT                                                                           | 8/1  | 146 |
|   |     | ADD TURNING PT. 1/2 MI. S. W. 140 E. 1/2 MI. ON<br>RD. FOR CANTON PUMP. REVISIONS 8401E & 140E                  | 8/1  | 146 |
| 1 | 146 | REV. SCHEME 5242E. 1/2 MI. S. 1/2 E. 1/2 MI. S. 1/2 E.<br>1/2 MI. S. 1/2 E. 1/2 MI. S. 1/2 E. 1/2 MI. S. 1/2 E. | 8/1  | 146 |
|   |     | ISSUED FOR CONSTRUCTION                                                                                         | 8/1  | 146 |
| 1 | 146 | REVISIONS                                                                                                       | 8/1  | 146 |

|      |      |                    |          |     |      |      |
|------|------|--------------------|----------|-----|------|------|
| Rev. | DATE | REVISIONE          | BY       | CPL | DATE | CURT |
| 2002 | NONE | DESIGNED <i>BL</i> | DESIGNED | NFG |      |      |

**BICHTAL CORPORATION**  
SAN FRANCISCO

**BIG ROCK POINT PLANT**  
CHARLEVOIX, MICHIGAN

CHARLEVOIX, MICHIGAN  
CONSUMERS POWER COMPANY

SCHEMATIC DIAGRAM

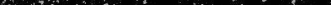
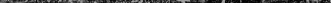
SCHEMATIC DIAGRAM  
TURBINE GENERATOR AUXILIARIES

|                                                                                       |        |                        |      |
|---------------------------------------------------------------------------------------|--------|------------------------|------|
|  | JOE H. | SHAWNEE E.             | REV. |
|                                                                                       | 2150   | FORMER DTG. NO.<br>108 | 5    |

|         |      |                          |   |
|---------|------|--------------------------|---|
| REC-115 | 3159 | FORMER ORG. NO.<br>E-108 | 5 |
|---------|------|--------------------------|---|

6-2-63

0740630108 REV. D





0740630108 D001 SCHEM DIAG TURB GENERATOR AUX

67

New #

8104270134

