HOPE CREEK GENERATING STATION

BAILEY 862 SYSTEM LOGIC MODULE

FAILURE DATA REPORT

PERIOD: THIRD QUARTER 1990

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APPROVED BY: John R. Thompson — TECHNICAL ENGINEER — 10/1/90 — DATE

BAILEY SSLM REPORT

A. SUMMARY OF FAILURES BY MONTH DURING REPORT PERIOD

JULY 1990

1) 07/02/90 1DC652 SLOT 5-4-12 O-1227 N-2595
INPUT BUFFER #2 FAILED. CONFIRMED FAILURE
W.O. 900702079
PROBLEM: DUAL VALVE POSITION INDICATION AT MCR FOR 1EAHV-2197D, BACKWASH WTR FROM STRAINER DF509.

2) 07/10/90 1CC652 SLOT 1-3-2 O-2202 N-0652
INPUT/OUTPUT BUFFER #7 FAILED. CONFIRMED FAILURE
PROBLEM: CONTROL/DIESEL 1E SWGR BRKR 10-A-403-01 DID NOT REMAIN CLOSED UPON DEMAND FROM MCR.

3) 07/17/90 1CC652 SLOT 4-10-10 O-0870 N-0556
T/S-CARD REPLACEMENT ONLY. NOT A FAILURE
W.O. 900718144
PROBLEM: DUAL 1AP400 (HVAC) PUMP RUN INDICATION, CARD REMOVED AND TESTED ON SSLM TESTER. NO PROBLEM FOUND ON LOGIC MODULE. DECISION MADE TO REPLACE CARD.

4) 07/30/90 1BC652 SLOT 8-9-5 O-1228 N-0110
OUTPUT BUFFER #3 INTERMITTENT CONFIRMED FAILURE
W.O. 900730093
PROBLEM: 1FCHV-F059 (RCIC STM EXH VLV) LOSS OF MCR POSITION INDICATION.

TOTAL MONTHLY FAILURES = 3 SSLM'S

AUGUST 1990

1) 08/11/90 1DC653 SLOT 9-9-9 O-1549 N-2242
INPUT/OUTPUT BUFFER #1 FAILED. CONFIRMED FAILURE
W.O. 900811112
PROBLEM: 1BBHV-F031B (RX RECIRC PMP "B" DISCH), LOSS OF VALVE POSITION INDICATION.

2) 08/14/90 1CC652 SLOT 5-10-12 O-0872 N-0183
T/S-CARD REPLACEMENT ONLY. CONFIRMED FAILURE
W.O. 900813167
PROBLEM: 1ABHV-3631B (CNTMNT ISOL VALVE OVRLD/PF LOGIC) CAUSING ANN D1-B3 TO ALARM. FOUND FLPA CHIP LOOSE IN SOCKET. SLIGHTEST VIBRATION CAUSED INTERMITTENT FAILURES. REWORKED FLPA AND CARD RETESTED SAT.

3) 08/20/90 1BC653 SLOT 8-3-8, O-0241 N-0342
T/S-CARD REPLACEMENT ONLY. NOT A FAILURE
W.O. 900820122
PROBLEM: 1B-P-209 (RACS "B" PMP) WOULD NOT STOP FROM MCR. T/S FOUND LOOSE CONNECTOR ON 7-1-3. DURING T/S CAUSED LOGIC INPUT FAILURE ON LOGIC CARD. REQUIRED REPLACEMENT. T/S FAILURE AND NOT A SERVICE FAILURE.

TOTAL MONTHLY FAILURES = 2 SSLM

SEPTEMBER 1990

TOTAL MONTHLY FAILURES = 0 SSLM

TOTAL QUARTERLY FAILURES = 5 SSLM'S

B. FAILURE RATE DATA

1) 24 CONFIRMED FAILURES FROM 10/01/89 THRU 09/30/90.

2) 2278 SSLM POPULATION

3) ANNUAL FAILURE RATE PERCENTAGE:

a. $24 \div 2278 = 0.01009 \times 100 = 1.01\ \%$

4) MEAN TIME BETWEEN FAILURES DETERMINATION:

MTBF FROM 10/01/89 THRU 09/30/90.

a. 12 MONTH SERVICE HOURS = 8760 HOURS

b. TOTAL MODULE SERVICE HOURS

$8760 \times 2278 = 19.95 \times 10^6$

$19.95 \times 10^6 \div 24$ FAILURES = 831,250 HOURS

c. $24 \div 19.95 \times 10^6 = 1.20$ FAILURES PER MILLION HOURS FAILURE RATE.

C. COMPARISON STANDARD

1) THE IEEE 500 STANDARD EXPECTED FAILURE RATE OF SOLID STATE COMPUTATION DEVICES IS EQUAL TO **1.19 FAILURES PER MILLION HOURS FAILURE RATE.**

2) THE HCGS BAILEY 862 SSLM FAILURE RATE FROM OCT 1989 THRU SEPT 1990 IS EQUAL TO **1.20 FAILURES PER MILLION HOURS FAILURE RATE.**

D. ANALYSIS

1) HCGS BAILEY 862 SSLM FAILURE RATE APPEARS TO HAVE STABILIZED IAW IEEE 500 STANDARD.

2) THE CONFIRMED FAILURE DATED 07/10/90 DID AFFECT A SAFETY RELATED FUNCTION (LOSS OF "C" VITAL BUS). THE PROBLEM WAS ENCOUNTERED DURING A RELAY DEPARTMENT 31 DAY DEGRADED VOLTAGE SURVEILLANCE TEST ON THE 10A403 BUS. THE SSLM FAILURE CAUSED THE LOSS OF POWER ON THE 10A403 BUS DURING A TRANSFER OF BREAKERS 52-40301 AND 52-40308. VARIOUS FUNCTIONS THEN TOOK PLACE, CAUSING A POWER REDUCTION TO 95% RX PWR. UPON STABILIZATION, SYSTEMS WERE RESET AND PWR RESTORED TO 100%.
ALL OTHER FAILURES AFFECTED INDICATION ONLY.

E. RECOMMENDATIONS

1) NONE