2D11-1988

M. Record the "As Found" reading on Data Sheet 1.

N. If any single reading is questionable, Then move the "Forward/Reverse" lever to "Reverse" and average the two readings. LAZ 12-

NOTE

The micro-ohm test is for the intercell strap and cable connections. The cable connections should be measured from the battery post to the terminal lug.

O. Micro-ohm the inter-tier connections from the battery terminal to battery terminal. LAZ 12-

P. Record the cell numbers and the micro-ohm reading on Data Sheet 1.

Randy M Kinney 2/28/88
QC Inspector Date

8.1.7 If the "As Found" reading in Step 8.1.6 exceeds 150 micro-ohms, Then initiate a RAC and have the supervisor perform an evaluation to determine if it is safe to proceed with the Performance Discharge Test, If not, Then mark this step N/A. N/A LAZ 12-

8.2 Battery Performance Discharge Test.

8.2.1 Obtain and record the average cell temperature for the ten cells listed on Attachment 1, record below and on Attach. 1 the avg. cell temperature that was calculated and the time the temperature was completed.

71.8 F° Temp, 0930 Time
(72°) Avg

Performer

8.2.2 Independent verifier repeat the average temperature calc. and record below.

71.82 F° Temp Avg.

George F. Holt 2
Verifier

8.2.3 Determine the discharge current correction factor (K Factor) based upon the Average Cell Temperature in 8.2.1 and the Table on Attachment 1.

(K Factor) Discharge Current Correction Factor: 1.029 LaL Perform WGM Verific

250.728 by HH

8.2.4 Calculate the actual Discharge Current by dividing 258 by the K Factor from Step 8.2.3:

$\frac{258 \text{ Amps}}{(K)}$ = 250.7 / (251) Amps LaL Perform

8.2.5 Independent verifier repeat the discharge current calculation and record below. (Ref. 8.2.4)

$\frac{258 \text{ Amps}}{(K)}$ = 250.72 / (251) Amps WGM Verifier

8.2.6 Set up the load tester to 251 amps calculated in steps 8.2.4 and 8.2.5 and 9 hours of discharge. WGM Performe LaL Verifier

8.2.7 Cognizant Supervisor review of calculations and permission to start. George F Helm Name

8.2.8 Perform the following steps.

A. Close disconnect switch 2D51
B. Start Discharge Test.
C. Record Start Time in Data Sheet 2
D. Adjust and maintain current throughout the test to the calculated value or greater. LaL

8.2.9 Monitor and record discharge rate and battery voltage at intervals established in Data Sheet 2 (Start through Stop). (Extra data may be taken and attached to for this test.) LM

NOTE

Print out from Albers unit may be attached to this procedure to accompany the previous step.

NOTE

If an individual cell or cells are approaching reversal of its polarity (plus 1 volt or less) but the terminal voltage has not yet reached its test limit, go to Attachment 2 and notify the Cognizant Supervisor immediately.

8.2.10 Attachment 2 was used in this procedure (N/A if not used.) N/A SM 12-

NOTE

The final readings need to be rapidly taken as the decaying overall battery voltage approaches and goes below the 105 VDC voltage level.

(N/A steps 8.2.11, 12 and 13 if a cell(s) was jumperer by Attachment 2.)

8.2.11 When the battery approaches 105 VDC, rapidly read the individual cell voltages and battery terminal voltage and record in the last column of Data Sheet 2.

* Final readings recorded. SM 12-

8.2.12 When overall battery voltage is 105 VDC, decrease the test load to "0" and:

A. Turn off test load.

B. Record Stop Time above the last column on Data Sheet 2. SM 12-

8.2.13 Open Disconnect Switch 2D51. SM 12-

We had to reprogram the Albers after 9 hours of test because we had not reached our 105 VDC cutoff. It took about 30 seconds to ~~do it~~ SM 12-7-7 Reprogram it.

WARNING

Opposite side of fuse connections are energized. Avoid contact when installin fuses and disconnecting cables.

8.2.14 Disconnect the test load cables from 2D41. CWB

NOTE

Perform the recharge (Section 8.3) as soon as possible after the discharge.

3-1-88 SM PC

8.3 Restore the battery to service with the help of Operations. 1

8.3.1 Replace the 800 Amp Fuses and pin indicating fuses in 2D41. SM 2 13

8.3.2 Close the Battery Disconnect Switch 2D51 SM 2 13

8.3.3 Verify that the electrical lineup is restored and the charger is working properly. Record charger being used 2D-31. SM 2 13

8.3.4 Place the battery bank on an equalize charge for 16 hours, record below the equalizing start and stop times.

0445 12-29-88 2045 ~~13-1-88~~ 2/29/88 SM
Start Time Date Stop Time Date SM 13-1

8.3.5 Record equalize voltage at the battery after 15 hours from the start of equalization.

-136.54 VDC Batt Terminal Voltage
-DMM-D5 # Equip 8-9-88 Cal Due SM 13-

8.3.6 Place charger on float and record below the battery charging current using A1 on 2D41. Amps to battery .5. (Less than 2 amps) SM 13-

NOTE: See Attachment 3 for operation of the current metering circuit.

8.3.7 Open the Disconnect Switch 2D51. SM 13-

8.4 Battery Capacity Calculation

8.4.1 Battery capacity is determined by completing the following equation:

$$\% \text{ capacity at } 77°F = \frac{T_A \times 100}{T_S}$$

T_A = Actual time of the test to specified terminal voltage in minutes (See data sheet 2)

T_S = Rated time to specified terminal voltage in minutes (8 hrs or 480 minutes)

T_A(minutes) 558 / 480 Minutes x 100 = ~~55800~~ SM 116.25 %capacity SM
Perfo

NOTE

T_A is obtained from Data Sheet 2 page 1 of 2 and it is the total discharge duration in minutes from start to stop. If a battery was by-passed (jumpe use the new calculated T_A from step 9 of Attachment 2.

8.4.2 Independent verifier to repeat T_A determination and capacity calculation.

T_A(minutes) 558 / 480 Minutes x 100 = 116.25 %capacity CW
Verifie

8.4.3 Previous performance test results (N/A this step if this is the first performance test.)

Control Copy #_____ Date Performed _____
% Capacity _____

Cognizant Supervisor N/A

8.5 Battery Maintenance

8.5.1 Disassemble and clean each battery connection per C&D Manual 12-800 TM C 173.0010 SM

8.5.2 Neutralize the battery post and connections per C&D Manual 12-800 TM C 173.0010 SM

* L. Leovel Lovel used his watch to start the test and L. Munson used his to stop the test. There was about a 2 min difference (in the "-" direction).

Attachment 1

DISCHARGE CURRENT CORRECTION
FACTOR K FOR TEMPERATURE

Cell No.	Temp.
1	71.8
7	72.2
13	72.8
19	72.0
25	71.4
31	71.4
37	71.4
43	71.6
49	71.8
55	71.8

TOTAL Temps. 718.2 / 10 = Avg.

8.2.1
AVERAGE TEMP. 71.8 °F (72°)

Date/Time 2-28-88 0930
Date Time

Test Equip. DT# 031

Calibration Due 8-15-88

Temperature (F)	Factor K
62	1.098
63	1.092
64	1.086
65	1.080
66	1.072
67	1.064
68	1.056
69	1.048
70	1.040
71	1.034
72 (71.82)	1.029
73	1.023
74	1.017
75	1.011
76	1.006
77	1.000
78	0.994
79	0.987
80	0.980
81	0.976
82	0.972
83	0.968
84	0.964
85	0.960
86	0.956
87	0.952
88	0.948
89	0.944
90	0.940
91	0.938
92	0.936

71.82 are temp of 10 cells
Indep. Verified by [illegible]
2/28/88

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: Data Sheet 2 | FORM NO. 2403.001B | REV. # 3

BATTERY BANK 2D11

Performance Discharge Test
Battery Bank and Cell Voltages

Start Time 1139 | Stop Time 2100

CELL NO.	START	3 HOURS	6 HOURS	7 HRS. 30 MINS.	STOP
1	1.97	1.96	1.92	1.89	1.82
2	1.97	1.96	1.91	1.88	1.81
3	1.97	1.96	1.91	1.88	1.82
4	1.97	1.96	1.91	1.88	1.81
5	1.96	1.96	1.91	1.88	1.81
6	1.96	1.96	1.91	1.88	1.80
7	1.96	1.96	1.91	1.88	1.81
8	1.96	1.96	1.91	1.88	1.81
9	1.96	1.95	1.91	1.88	1.80
10	1.96	1.96	1.91	1.88	1.82
11	1.96	1.96	1.91	1.88	1.82
12	1.96	1.96	1.91	1.88	1.81
13	1.96	1.96	1.91	1.88	1.82
14	1.96	1.95	1.91	1.87	1.80
15	1.98	1.96	1.92	1.89	1.82
16	1.98	1.96	1.92	1.89	1.83
17	1.97	1.96	1.91	1.88	1.81
18	1.97	1.96	1.91	1.88	1.82
19	1.97	1.95	1.91	1.88	1.81
20	1.95	1.93	1.88	1.85	1.79
21	1.96	1.95	1.90	1.86	1.78
22	1.96	1.95	1.90	1.87	1.79
23	1.97	1.96	1.91	1.88	1.82
24	1.98	1.96	1.91	1.88	1.82
25	1.99	1.97	1.93	1.90	1.84
26	1.97	1.96	1.91	1.88	1.81
27	1.97	1.96	1.91	1.88	1.81
28	1.97	1.95	1.91	1.87	1.80
29	1.97	1.95	1.91	1.87	1.80
30	1.98	1.96	1.91	1.88	1.81
31	1.97	1.96	1.91	1.88	1.81
32	1.97	1.96	1.91	1.88	1.83
Bank Volts	115.3	113.6	110.8	109.0	105.1

Performed by [signature] (Signature) 2-28-88 (Date)

ARKANSAS POWER & LIGHT COMPANY
Arkansas Nuclear One

TITLE: Data Sheet 2 | FORM NO. 2403.001B | REV. # 3

BATTERY BANK 2D11

Performance Discharge Test
Battery Bank and Cell Voltages

CELL NO.	START	3 HOURS	6 HOURS	7 HRS. 30 MINS.	STOP
33	1.97	1.95	1.91	1.88	1.81
34	1.97	1.96	1.91	1.88	1.81
35	1.99	1.95	1.91	1.87	1.80
36	1.99	1.96	1.91	1.87	1.80
37	1.99	1.96	1.91	1.88	1.81
38	1.99	1.96	1.91	1.88	1.82
39	1.99	1.95	~~1.85~~ 1.91	1.87	1.80
40	1.98	1.94	1.89	1.86	1.79
41	1.99	1.96	1.91	1.88	1.80
42	1.99	1.96	1.91	1.88	1.81
43	1.99	1.96	1.91	1.88	1.80
44	1.98	1.96	1.91	1.86	1.81
45	1.98	1.95	1.90	1.87	1.80
46	1.98	1.96	1.91	1.87	1.81
47	1.98	1.95	1.91	1.88	1.81
48	1.98	1.96	1.91	1.88	1.81
49	1.98	1.95	1.91	1.87	1.81
50	1.97	1.95	1.90	1.87	1.80
51	1.97	1.95	1.90	1.87	1.80
52	1.97	1.95	1.90	1.87	1.81
53	1.97	1.95	1.90	1.87	1.80
54	1.97	1.95	1.90	1.87	1.80
55	2.01	1.95	1.91	1.87	1.80
56	2.01	1.96	1.91	1.88	1.81
57	2.01	1.96	1.91	1.88	1.82
58	2.01	1.95	1.90	1.87	1.80
Disch Rate (Amps)	251	252	251	251	251

Performed by L. Munson (Signature) 2-28-88 (Date)

Test Equip. BCT# 001 Cal. Due 6-3-88