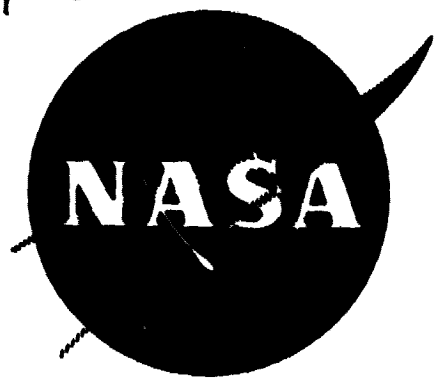

(NASA-CR-160015) INITIAL EVALUATION TESTS OF 20.0 AMPHERE-HOUR SEALED NICKEL-CADMIUM CELLS MANUFAC.URED FOR NASA'S STANDARD CELL PROGRAM (Naval Weapons Support Center, Crane, Ind.) 61 p HC A04/MF A01 CSCL 10C G3/44

N80-31887

Unclas
32502

INITIAL EVALUATION TESTS OF 20.0 AMPERE-HOUR SEALED NICKEL-CADMIUM CELLS MANUFACTURED FOR NASA'S STANDARD CELL PROGRAM

prepared for

GODDARD SPACE FLIGHT CENTER

Contract S-57075AG

WEAPONS QUALITY ENGINEERING CENTER

NWSC Crane, Indiana

DEPARTMENT OF THE NAVY
NAVAL WEAPONS SUPPORT CENTER
WEAPONS QUALITY ENGINEERING CENTER
CRANE, INDIANA 47522

INITIAL EVALUATION TESTS OF 20.0 AMPERE-HOUR SEALED NICKEL-CADMIUM CELLS MANUFACTURED FOR NASA'S STANDARD CELL PROGRAM

WQEC/C 79-144

9 MAY 1979

REPARED BY:

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REPORT BRIEF
INITIAL EVALUATION TESTS
OF
20.0 AMPERE-HOUR SEALED NICKEL-CADMIUM CELLS
MANUFACTURED FOR
NASA'S STANDARD CELL PROGRAM

Ref: (a) NASA Goddard Space Flight Center Purchase Order S-57075AG
(b) GSFC Test Procedure for Qualification Testing of the Standard 20 ah Nickel-Cadmium Cell, TP 711.2-77-03.
(c) Initial Evaluation Test Procedure for Nickel-Cadmium Sealed Space Cells: NAD 3053-TP324, 10 Apr 1973

I. TEST ASSIGNMENT BRIEF

A. The purpose of this initial evaluation test program is to insure that all cells put into the Standard life cycle program are of high quality. This is accomplished by the screening of cells found to have electrolyte leakage, internal shorts, low capacity, or inability of any cell to recover its open-circuit voltage above 1.150 volts during the internal short test.

B. The 116 cells were purchased by the National Aeronautics and Space Administration, Goddard Space Flight Center (GSFC) and provided to NAVWPNSUPPCEN Crane for evaluation on life test. The cells were purchased from four manufacturers in accordance with their Manufacturing Control Documents (MCDs) produced to meet the intent of the GSFC Specification 74-15000 with amendments: Eagle-Picher Industries (RSN 20-3), General Electric Company (232A2222AA-84), SAFT America Inc. (MCD NAS-0300), and Yardney Electric Division (MCD 21406). (See Appendix I for detailed cell description). Testing was funded and performed in accordance with references (a) and (b).

C. Test limits specify those values at which a cell is to be terminated from a particular charge or discharge. Requirements are referenced to as normally expected values based on past performance of aerospace nickel-cadmium cells with demonstrated life characteristics. A requirement does not constitute a limit for discontinuance from test.

II. SUMMARY OF RESULTS

A. Each manufacturer's group of cells, on the average, indicated an increase in plate stack thickness following test.

B. No limits or requirements were exceeded by any of the cells manufactured by GE.

C. Limits/requirements exceeded during the charge portion of the testing are as follows:

Test	Limits Exceeded	Number of Cells EP	SAFT	YD
Charge, c/10 for 24 hrs @ 20° C	1.480 volts	3		
	65 psia	2	2	1
	100 psia		1	
Charge c/10 for 24 hrs @ 20° C (Second charge at this temperature)	1.480 volts		2	
	65 psia	2	7	
	100 psia		3	
Charge, c/10 for 60 hrs @ 0° C	1.520 volts	22	4	27
	1.560 volts for 2 hours	3		
	65 psia	2	5	
Charge, c/10 for 24 hrs @ 35° C	65 psia	5	5	
	100 psia	3		

D. One Yardney cell delivered less (47%) than the requirement of 55% of the input capacity during the 20° C charge efficiency test.

E. Two Yardney cells did not deliver the required capacity following the 1 week stand period during the charge retention test, and three cells did not meet the open circuit voltage requirement.

F. Two Yardney cells had voltages, less than .9 volts, which did not meet the 24-hour open circuit voltage requirement of 1.15 volts following a short period of 16 hours during the internal short test.

G. During the pressure versus capacity tests, only the Eagle-Picher cells reached the 1.55 cut-off voltage before reaching the 20 psia cut-off pressure.

H. Figures 1 through 6 show the average voltage profiles of each manufacturer's cells during charge and discharge at 20° C, 0° C, and 35° C.

III. RECOMMENDATIONS

A. Manufacturing processes and controls should be such to prevent swelling of the plate stack, thereby preventing cell case distortion.

B. It was recommended that these cells be placed on life test under specified orbit regimes simulating specific spacecraft load requirements.

C. The last group of cells began life tests, as specified in reference (b), in November 1978.

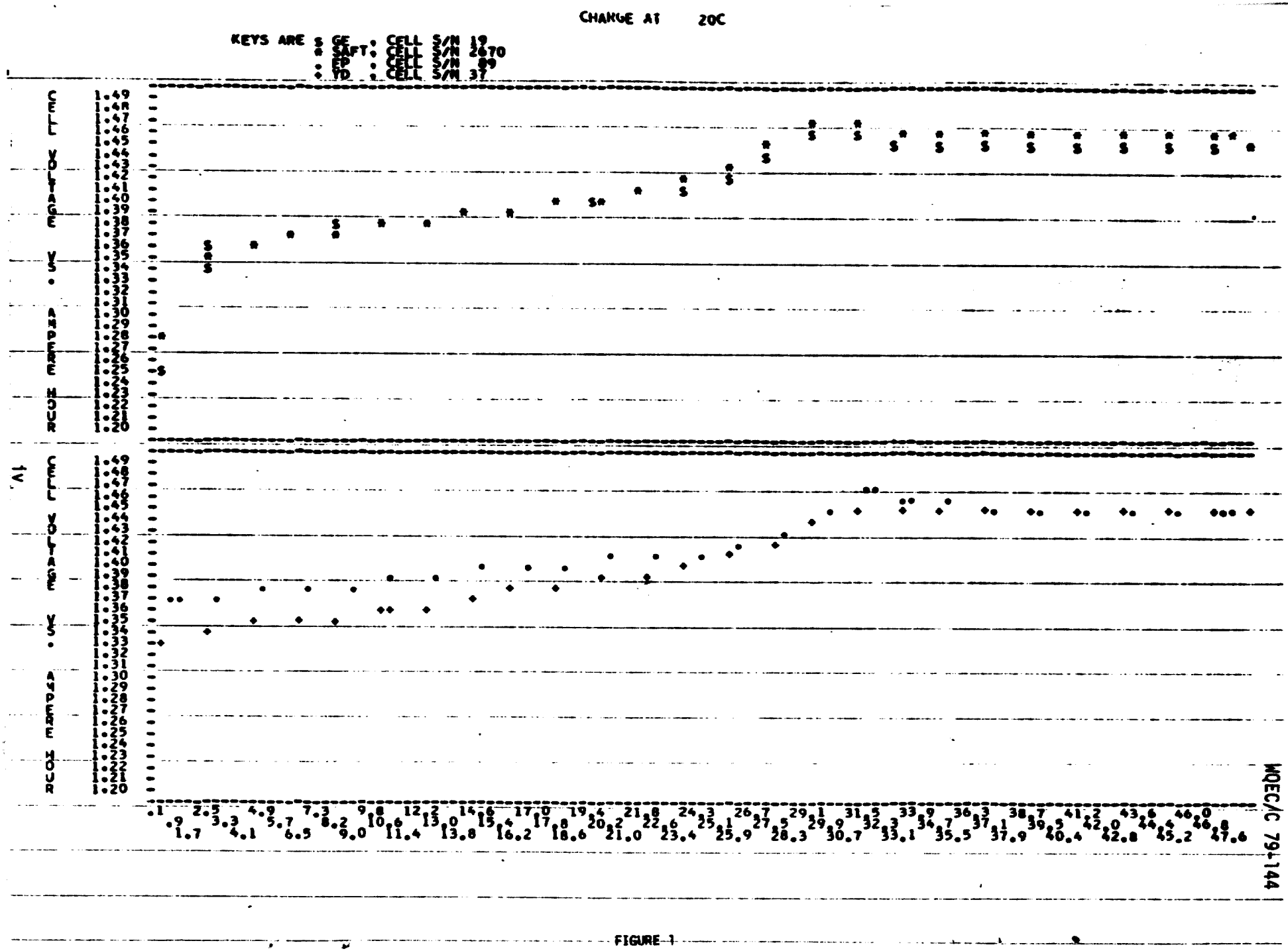
CHANGE AT 20C
KEYS ARE $ GE : CELL S/N 19
SAFT: CELL S/N 2670
: EP : CELL S/N 89
+ TD : CELL S/N 37
CELL VOLTAGE VS. FAILURE HOUR
CELL VOLTAGE VS. FAILURE HOUR
1V
WQEC/C 79-144

FIGURE 1

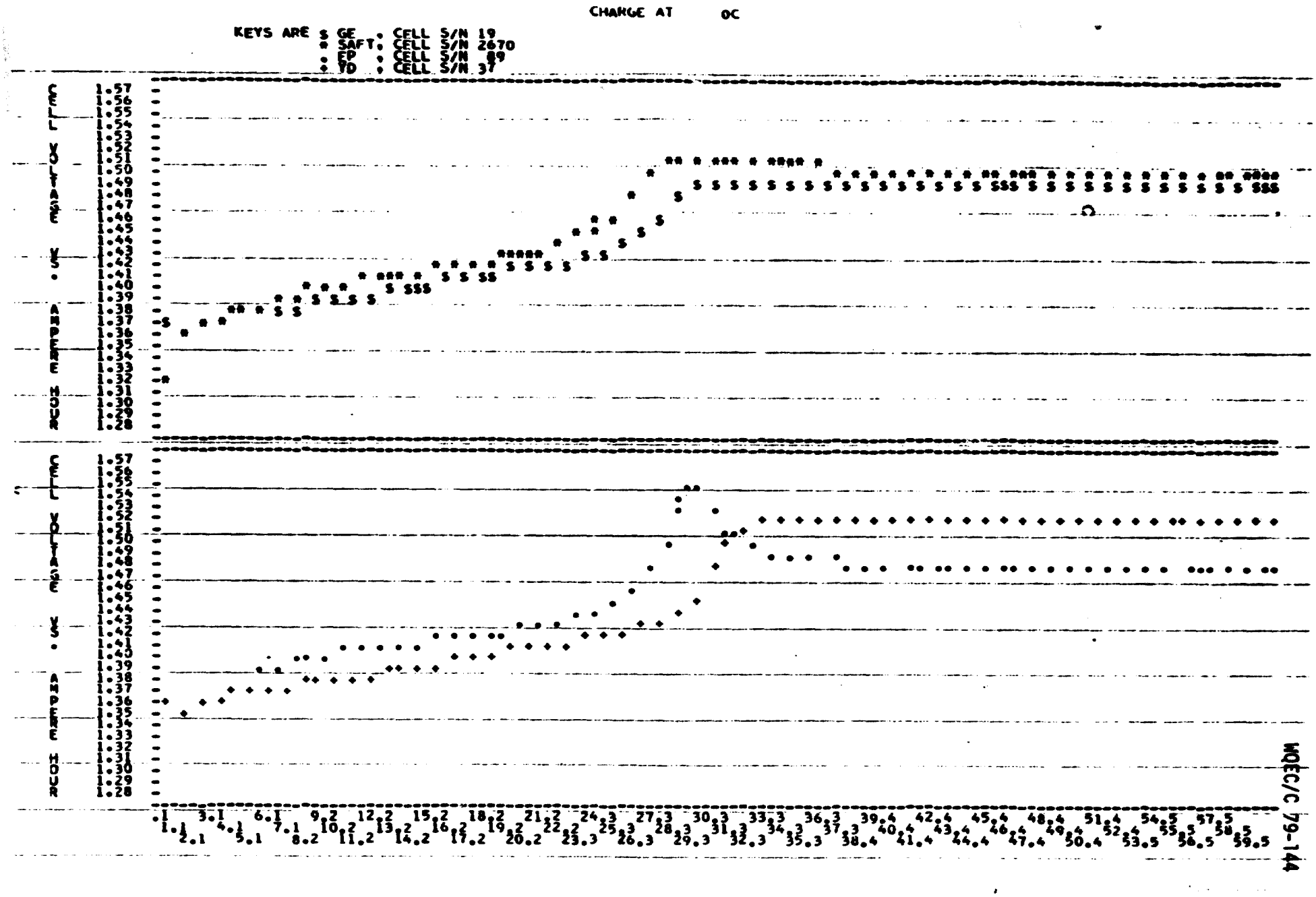
CHARGE AT 0C
KEYS ARE $ GE : CELL S/N 19
* SAFT: CELL S/N 2670
• FP : CELL S/N 89
+ YD : CELL S/N 37
CELL VOLTAGE VS. AMPERE HOUR
CELL VOLTAGE VS. AMPERE HOUR
WQEC/C 79-144

FIGURE 2

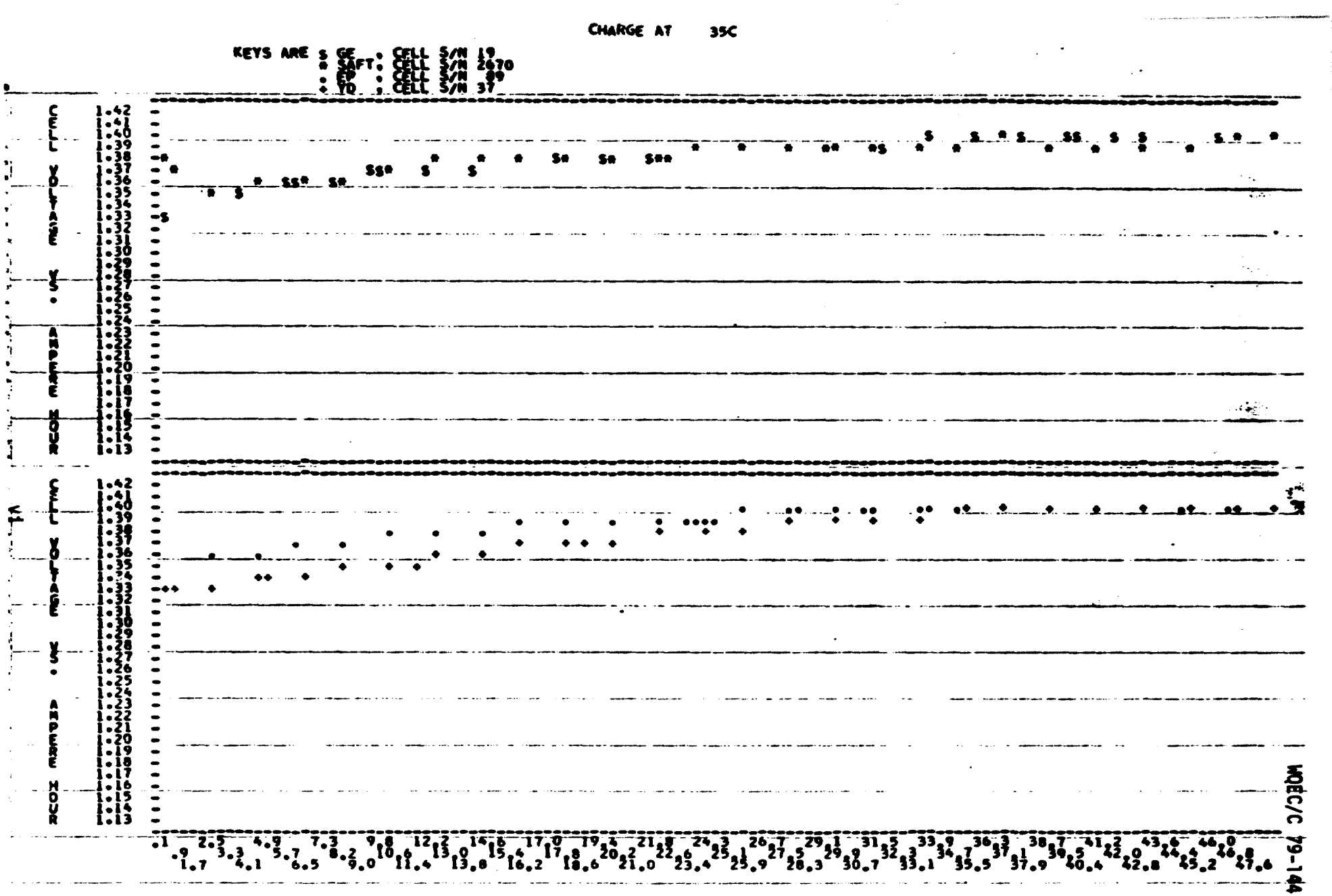
CHARGE AT 35C
KEYS ARE $ GE ; CELL S/N 19
* SAFT ; CELL S/N 2670
@ GE ; CELL S/N 89
+ TD ; CELL S/N 37
CELL VOLTAGE VS. AMP-HOUR
MOEC/C 79-144

FIGURE 3

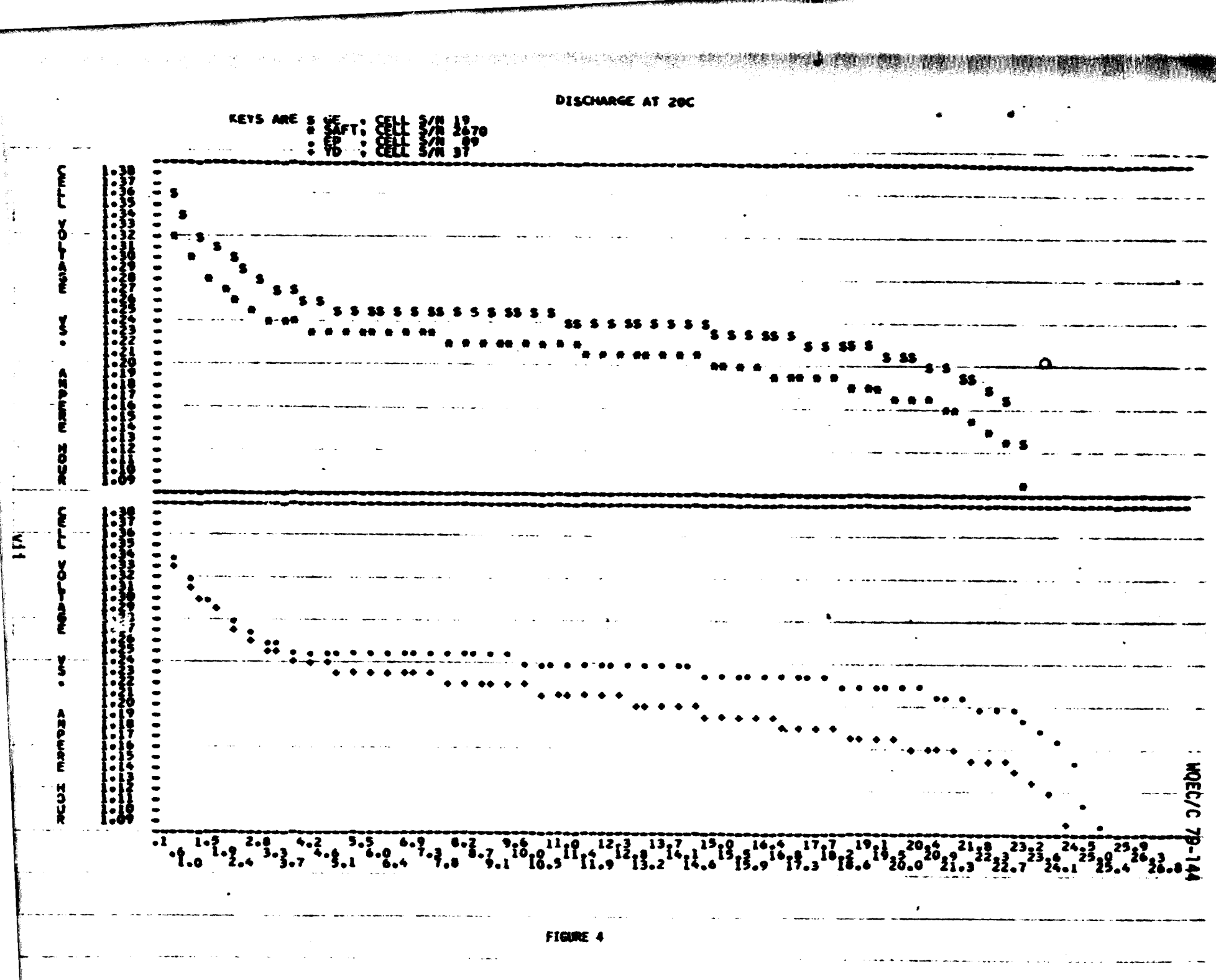
DISCHARGE AT 20C
KEYS ARE $ GE ; CELL S/N 19
GAFT ; CELL S/N 2470
: ED ; CELL S/N 89
+ YD ; CELL S/N 37
CELL VOLTAGE VS. AMPERE HOUR
CELL VOLTAGE VS. AMPERE HOUR
.1 .6 1.0 1.5 1.9 2.4 2.8 3.3 3.7 4.2 4.6 5.1 5.5 6.0 6.4 6.9 7.3 7.8 8.2 8.7 9.1 9.6 10.0 10.5 11.0 11.4 11.9 12.3 12.8 13.2 13.7 14.1 14.6 15.0 15.5 15.9 16.4 16.8 17.3 17.7 18.2 18.6 19.1 19.5 20.0 20.4 20.9 21.3 21.8 22.3 22.7 23.2 23.6 24.1 24.5 25.0 25.4 25.9 26.3 26.8
MQEC/C 78-144

FIGURE 4

DISCHARGE AT 0C

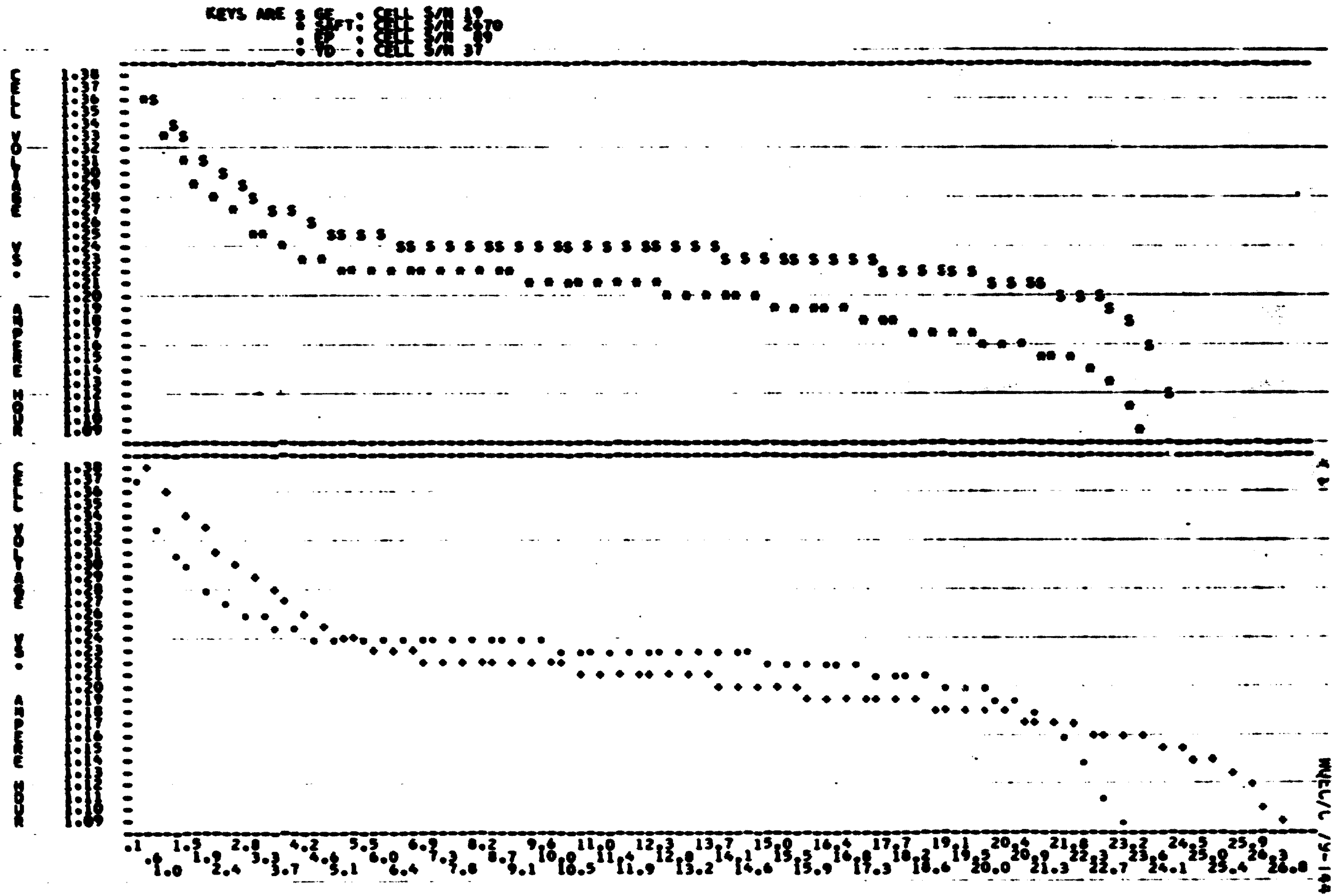

FIGURE 5

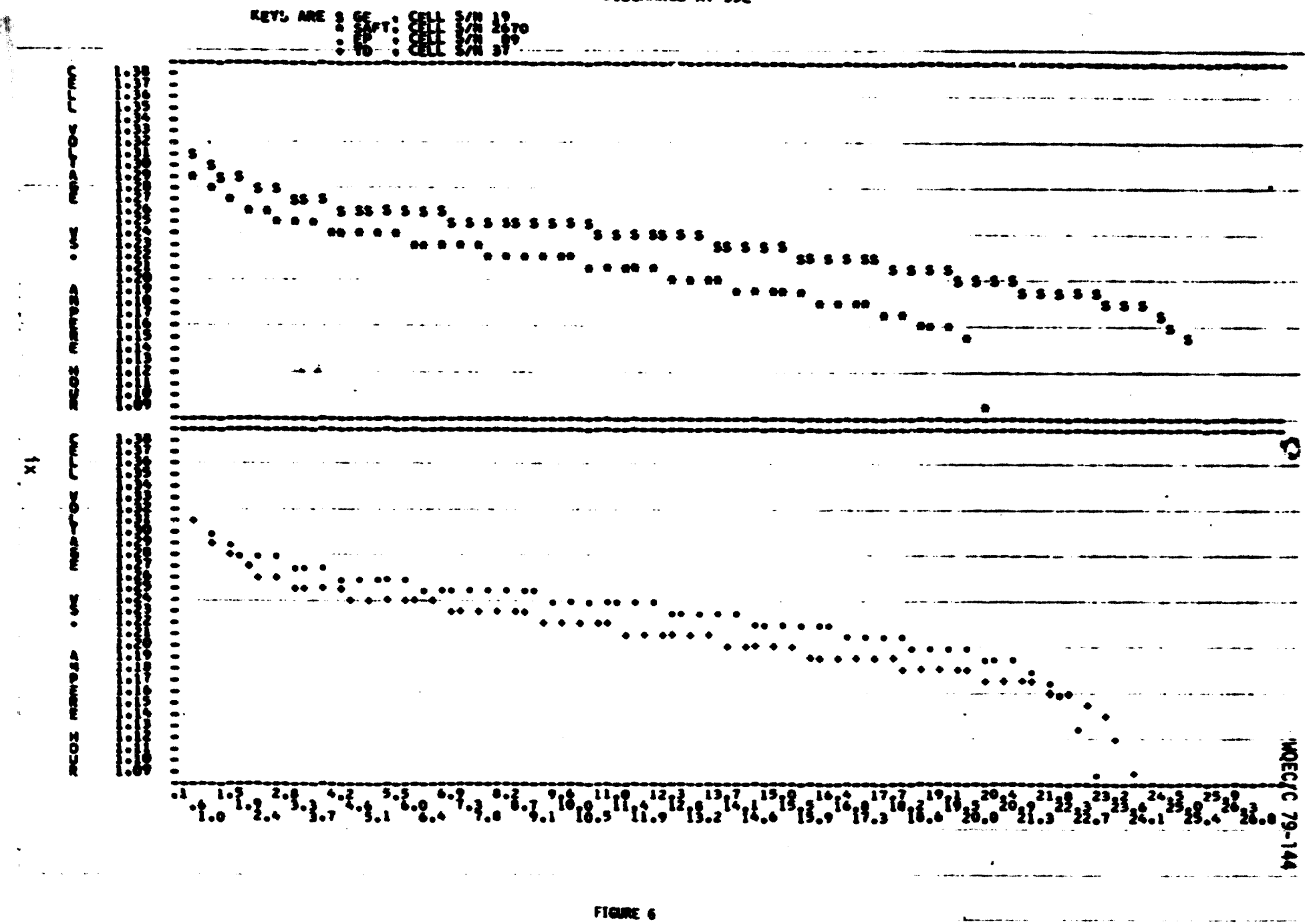
DISCHARGE AT 35C
KEYS ARE $ GE : CELL S/N 19
* SAFT : CELL S/N 2670
+ RW : CELL S/N 89
◆ TD : CELL S/N 37
MOEC/C 79-144

FIGURE 6

DEPARTMENT OF THE NAVY
NAVAL WEAPONS SUPPORT CENTER
CRANE, INDIANA 47522

IN REPLY REFER TO:
3053-JDH:mdw
8900 - WPE

9 MAY 1979

From: Commanding Officer, Naval Weapons Support Center, Crane IN 47522
To: National Aeronautics and Space Administration, Goddard Space Flight Center (711) Greenbelt MD 20771

Subj: Report WQEC/C 79-144 Initial Evaluation Tests of 20.0 Ampere-Hour Sealed Nickel-Cadmium Cells Manufactured for NASA'S Standard Cell Program

Ref: (a) NASA Purchase Order S-57075AG

Encl: (1) Report WQEC/C 79-144

1. In compliance with reference (a), enclosure (1) is forwarded for information and retention.

D. G. MILEY
By direction

Copy to:
Distribution List

RESULTS OF INITIAL EVALUATION TESTS OF 20.0 AMPERE-HOUR SEALED NICKEL-CADMIUM CELLS MANUFACTURED FOR NASA'S STANDARD CELL PROGRAM

I. TEST CONDITIONS AND PROCEDURE

A. All evaluation tests were performed at room ambient (RA) pressure and temperature (25° ± 2° C), with discharges at the 2-hour rate, in accordance with reference (c), unless otherwise specified, and consisted of the following:

1. Phenolphthalein leak tests (2).

2. Three capacity tests, third at 20° C, with internal resistance measurements during second charge/discharge.

3. Auxiliary electrode characterization test.

4. Charge retention test, 20° C.

5. Internal short test.

6. Charge efficiency test, 20° C.

7. Overcharge tests, 0° and 35° C.

8. Pressure versus capacity test.

9. Phenolphthalein leak test.

(See Appendix II for summary of test procedure.)

II. CELL IDENTIFICATION

A. The cells were identified by each manufacturer as follows:

Manufacturer	Model/Catalog No.	Part No.	Serial No.	Type Cell**	No. of Cells
Eagle-Picher (EP)	RSN20-3		85 to 96*	A	11
	RSN20-3		97 to 102	B	6
	RSN20-3		80 to 84	C	5
	RSN20-3		75 to 79*	D	4
General Electric (GE)	42B024AB06-G1		0228059-(05 to 49)*L02	A	18
	42B024AB06-G5		-(07 to 42)*	B	6
	42B024AB07-G1		-(55, 60)-	C	2
	42B024AB07-G4		-(53 to 61)*	D	4
SAFT America (SAFT)	VO20HS	805129	2653 to 2681*	A	18
	VO20HS	805129	2655 to 2700*	B	6
	VO20HSAD	805136	719, 722	C	2
	VO20HSAD	805136	725 to 729*	D	4
Yardney Electric (YD)	YNC 20-1	14188	01 to 76*	A	23
	YNC 20-1	14188	44, 60	B	2
	YNC 20-2	14178	21, 30	C	2
	YNC 20-2	14178	16, 22, 52	D	3

* - Noninclusive

** - A--Standard Cell
B--Standard Cell w/pressure transducer
C--Standard Cell w/signal electrode
D--Standard cell w/pressure transducer and signal electrode

The cells were placed in temporary pack configurations for initial testing in which each cell was individually restrained. The pack numbers were 526X to 528X(GE), 535X to 537X(SAFT), 539X to 541X(EP) and 544X to 546X(YD).

B. The standard type 20.0 ampere-hour cell is rectangular with an average weight and physical dimensions as follows:

			Thickness (in.)*			
				Pre-Test	Post-Test	
Manufacturer	Weight (g)	Height (in.)	Minimum	Maximum	Maximum	Width (in.)
EP	836.6	6.934	.891	.890	.894	2.998
GE	897.4	6.879	.894	.896	.901	3.095
SAFT	804.4	6.641	.877	.876	.884	2.971
YD	804.2	7.074	.905	.905	.907	3.000

* - Minimum measured at edge of can and maximum at center

C. The cell containers and covers are made of 304L stainless steel. The positive and negative terminals are insulated from the cell cover by ceramic seals and protrude through the cover as solder-type terminals.

D. The manufacture of these cells was to conform to the specifications as outlined in the GSFC Report 74-1500, Specification for the Manufacturing of Aero-Space Nickel-Cadmium Storage Cells.

III. RESULTS - The following was condensed from Tables I through VIII.

A. Each manufacturer's group of cells, on the average, indicated an increase in plate stack thickness following test.

B. No limits or requirements were exceeded by any of the cells manufactured by GE.

C. Limits/requirements exceeded during the charge portion of the testing are as follows:

Test	Exceeded Limits/Requirements	Number of Cells EP	SAFT	YD
Charge, c/10 for 24 hrs @ 20° C	1.480 volts	3		
	65 psia	2	2	1
	100 psia		1	
Charge, c/10 for 24 hrs @ 20° C (Second charge at this temperature)	1.480 volts		2	
	65 psia	2	7	
	100 psia		3	
Charge, c/20 for 60 hrs @ 0° C	1.520 volts	22	4	27
	1.560 volts for 2 hours	3		
	65 psia	2	5	
Charge, c/10 for 24 hrs @ 35° C	65 psia	5	5	
	100 psia	3		

D. One Yardney cell delivered less (48%) than the requirement of 55% of the input capacity during the 20° C charge efficiency test.

E. Two Yardney cells did not deliver the required capacity following the 1 week stand period during the charge retention test, and three cells did not meet the open circuit voltage requirement.

F. Two Yardney cells, had voltages less than .9 volts, which did not meet the 24-hour open circuit voltage requirement of 1.15 volts following a short period of 16 hours, during the internal short test.

G. During the pressure versus capacity tests, only the Eagle-Picher cells reached the 1.550 cut-off voltage before reaching the 20 psia cut-off pressure.

H. The auxiliary electrode characteristic test was performed in which maximum signal power was obtained with a 10-ohm resistance on the EP and SAFT cells, a 20-ohm resistance on the YD cells and a 50-ohm resistance on the GE cells. A 47-ohm resistance was used throughout the tests on all the cells, except those from GE which used a 300-ohm resistance, as instructed by Goddard Space Flight Center's Technical Officer.

IV. QUALIFICATION TESTS

A. In November 1978, the last group of cells were placed on life tests as specified in reference (b). A total of 20 test packs have been placed on test in which each manufacturer's cells are being evaluated at the following test parameters:

Orbit Period	Depth of Discharge (%)	Temp (°C)
90 min	40	10
90 min	25	20
90 min	40	20
90 min	40	30
Sync	60	20

TABLE I
Initial Evaluation Test Averages

Charge	EP Cells			GE Cells			SAFT Cells			YD Cells		
	Volts	psia	ah Out	Volts	psia	ah Out	Volts	psia	ah Out	Volts	psia	ah Out
c/20 for 48 hrs @ 25° C	1.440	28	25.9	1.442	3	24.6	1.438	2	24.1	1.439	3	26.7
c/10 for 24 hrs @ 25° C	1.447	45	25.1	1.452	16	23.4	1.446	29	23.2	1.447	21	24.4
c/10 for 24 hrs @ 20° C	1.459	44	24.6	1.454	18	22.8	1.457	82	22.8	1.458	29	24.1
c/10 for 24 hrs @ 20° C*	1.452	40	22.0	1.458	20	20.6	1.467	90	20.8	1.463	27	21.6
c/40 for 20 hrs @ 20° C**	1.376	6	6.1	1.368	0	6.9	1.365	0	7.2	1.357	3	6.1
c/20 for 60 hrs @ 0° C	1.492	43	23.3	1.488	12	23.5	1.505	59	23.5	1.522	10	26.6
c/10 for 24 hrs @ 35° C	1.400	71	20.9	1.398	0	24.5	1.397	60	20.4	1.405	20	23.1
Open-Circuit												
End-of-1 week*	1.301			1.320			1.291			1.286		
24 hrs after 16-hr short period	1.247			1.243			1.224			1.188***		
Internal Resistance (milliohms)												
30 min before end-of-charge (cycle 1)	2.3			2.5			3.4			2.2		
1 hr after start-of-discharge (cycle 2)	2.3			2.4			3.3			2.0		
2 hrs after start-of-discharge (cycle 2)	2.4			2.4			3.3			2.0		

* - Charge Retention Test
** - Charge Efficiency Test, 10.0 ah input
*** - Average does not include 2 cells below 1.0 volts

WQEC/C 79-144

TABLE II

Measurement and Leak Test Data

Eagle-Picher

WQEC/C 79-144

SERIAL NUMBER	WEIGHT (Grams)	HEIGHT (Inches)	LENGTH (Inches)			WIDTH (Inches)	PHENOLPHTHALEIN LEAK TESTS								
							INITIAL			POST HI VAC			POST TEST		
			EDGE MINIMUM	CENTER MAXIMUM (Pre-Test)	CENTER MAXIMUM (Post-Test)		Terminals		Other	Terminals		Other	Terminals		Other
							+	-		+	-		+	-	
075	853.4 *	6.909	.920	.900	.896	2.985									
076	859.2 *	6.935	.957	.976	.950	2.989									
078	855.2 *	6.927	.919	.928	.893	2.984									
079	860.2 *	6.925	.930	.936	.898	2.976									
080	840.8	6.929	.888	.890	.894	3.001									
081	842.5	6.925	.900	.891	.894	3.002									
082	838.9	6.927	.891	.890	.898	3.001									
083	837.9	6.913	.891	.889	.898	2.997									
084	843.3	6.935	.892	.890	.894	3.001									
085	835.6	6.933	.885	.887	.891	3.001									
087	839.0	6.933	.893	.891	.894	3.002	NO LEAKS			NO LEAKS			NO LEAKS		
088	834.3	6.931	.889	.891	.894	2.996									
089	834.6	6.921	.889	.891	.891	2.996									
090	835.0	6.915	.891	.889	.891	2.994									
091	839.6	6.935	.893	.891	.894	3.002									
092	836.0	6.933	.892	.889	.895	2.995									
093	835.3	6.947	.892	.891	.898	2.994									
094	838.3	6.944	.894	.892	.894	3.002									
095	837.1	6.923	.894	.891	.897	2.996									
096	838.4	6.925	.891	.888	.895	2.995									
097	855.5 *	6.935	.906	.908	.917	2.986									
098	857.5 *	6.927	.955	.941	.961	2.986									
099	853.9 *	6.931	.954	.932	.891	2.989									
100	853.5 *	6.933	.900	.907	.921	2.989									
101	856.6 *	6.925	.937	.952	.893	2.991									
102	853.1 *	6.925	.925	.909	.911	2.993									

* - cells with swagelok fittings

TABLE II
Measurement and Leak Test Data

General Electric

WQEC/C 79-144

SERIAL NUMBER	WEIGHT (Grams)	HEIGHT (Inches)	LENGTH (Inches)			WIDTH (Inches)	PHENOLPHTHALEIN LEAK TESTS								
			EDGE MINIMUM	CENTER MAXIMUM (Pre-Test)	CENTER MAXIMUM (Post-Test)		INITIAL			POST HI VAC			POST TEST		
							Terminals		Other	Terminals		Other	Terminals		Other
							+	-		+	-		+	-	
005	898.8	6.880	.895	.895	.897	3.094									
006	898.7	6.875	.892	.895	.901	3.098									
009	895.8	6.870	.893	.895	.899	3.094									
010	899.2	6.885	.895	.895	.901	3.094									
018	897.1	6.880	.895	.896	.900	3.093									
019	894.2	6.870	.895	.895	.892	3.092									
021	896.4	6.877	.892	.892	.890	3.097									
022	897.6	6.880	.898	.899	.900	3.100									
025	897.6	6.881	.895	.896	.898	3.092									
032	896.3	6.875	.891	.893	.904	3.095									
033	899.2	6.885	.893	.898	.911	3.094	NO	LEAKS		NO	LEAKS		NO	LEAKS	
038	897.0	6.885	.893	.895	.904	3.102									
039	899.7	6.888	.893	.896	.908	3.088									
040	893.8	6.885	.897	.897	.904	3.093									
043	896.0	6.880	.892	.898	.894	3.099									
048	897.3	6.875	.895	.899	.919	3.092									
049	900.4	6.875	.894	.897	.896	3.092									
007 *	1012.2	6.886	.895	.899	.899	3.001									
008 *	1011.0	6.888	.893	.896	.897	3.073									
026 *	1013.3	6.887	.893	.895	.893	3.093									
035 *	1011.4	6.889	.896	.899	.895	3.095									
037 *	1013.1	6.877	.892	.898	.894	3.076									
042 *	1011.2	6.878	.894	.900	.900	3.093									
041	897.6	6.880	.895	.899	.896	3.093									

TABLE II
Measurement and Leak Test Data

General Electric

WQEC/C 79-144

SERIAL NUMBER	WEIGHT (Grams)	HEIGHT (Inches)	LENGTH (Inches)			WIDTH (Inches)	PHENOLPHTHALEIN LEAK TESTS								
							INITIAL			POST HI VAC			POST TEST		
			EDGE MINIMUM	CENTER MAXIMUM (Pre-Test)	CENTER MAXIMUM (Post-Test)		Terminals		Other	Terminals		Other	Terminals		Other
							+	-		+	-		+	-	
053 *	1016.8	6.875	.896	.900	.908	3.095									
054 *	1016.7	6.877	.896	.898	.908	3.095									
055	900.0	6.880	.895	.896	.906	3.090	NO	LEAKS		NO LEAKS			NO	LEAKS	
057 *	1018.6	6.880	.892	.895	.903	3.107									
060	904.6	6.875	.892	.894	.904	3.089									
061 *	1014.3	6.872	.891	.895	.898	3.103									
*	Have pressure assemblies														

TABLE II
Measurement and Leak Test Data

SAFT America

WQEC/C 79-144

SERIAL NUMBER	WEIGHT (Grams)	HEIGHT (Inches)	LENGTH (Inches)			WIDTH (Inches)	PHENOLPHTHALEIN LEAK TESTS								
							INITIAL			POST HI VAC			POST TEST		
			EDGE MINIMUM	CENTER MAXIMUM (Pre-Test)	CENTER MAXIMUM (Post-Test)		Terminals		Other	Terminals		Other	Terminals		Other
							+	-		+	-		+	-	
2653	803.2	6.670	.878	.874	.881	2.971									
2654	802.3	6.629	.879	.876	.878	2.972									
2656	808.7	6.628	.876	.873	.880	2.976									
2657	804.5	6.628	.876	.877	.884	2.972									
2658	803.0	6.629	.878	.881	.885	2.969									
2662	803.5	6.629	.875	.873	.883	2.972									
2663	802.4	6.629	.878	.880	.886	2.972									
2666	803.8	6.629	.879	.880	.885	2.967									
2667	804.9	6.630	.880	.873	.885	2.970									
2668	804.6	6.629	.877	.873	.881	2.971		NO	LEAKS		NO	LEAKS		NO	LEAKS
2670	802.8	6.654	.876	.875	.880	2.970									
2671	805.9	6.627	.876	.874	.898	2.969									
2673	804.8	6.670	.877	.877	.879	2.974									
2674	804.9	6.629	.876	.876	.884	2.969									
2676	803.5	6.662	.879	.874	.887	2.970									
2677	805.8	6.670	.878	.876	.887	2.971									
2680	804.3	6.629	.876	.877	.885	2.969									
2681	806.2	6.671	.878	.875	.884	2.972									
2655 *	918.7	6.587	.875	.875	.897	2.969									
2660 *	917.0	6.573	.876	.875	.890	2.971									
2669 *	917.0	6.588	.870	.872	.879	2.972									
2675 *	916.3	6.570	.879	.877	.883	2.974									
2685 *	915.6	6.583	.875	.875	.886	2.967									
2700 *	915.7	6.575	.870	.877	.880	2.974									

SAFT America

TABLE II
Measurement and Leak Test Data

WQEC/C 79-144

SERIAL NUMBER	WEIGHT (Grams)	HEIGHT (Inches)	LENGTH (Inches)			WIDTH (Inches)	PHENOLPHTHALEIN LEAK TESTS								
			EDGE MINIMUM	CENTER MAXIMUM (Pre-Test)	CENTER MAXIMUM (Post-Test)		INITIAL			POST HI VAC			POST TEST		
							Terminals		Other	Terminals		Other	Terminals		Other
							+	-		+	-		+	-	
719	818.3	6.628	.872	.874	.879	2.970									
722	820.7	6.628	.872	.874	.880	2.972									
725*	927.1	6.566	.880	.880	.882	2.966									
726*	926.2	6.581	.881	.875	.881	2.968									
728*	929.6	6.579	.889	.890	.876	2.983									
729*	928.2	6.564	.878	.889	.878	2.975									
*	Have pressure assemblies														

TABLE II
Measurement and Leak Test Data

WQEC/C 79-144

Yardney Electric

SERIAL NUMBER	WEIGHT (Grams)	HEIGHT (Inches)	LENGTH (Inches)			WIDTH (Inches)	PHENOLPHTHALEIN LEAK TESTS								
			EDGE MINIMUM	CENTER MAXIMUM (Pre-Test	CENTER MAXIMUM (Post-Test)		INITIAL			POST HI VAC			POST TEST		
							Terminals		Other	Terminals		Other	Terminals		Other
							+	-		+	-		+	-	
01	801.5	7.059	.909	.904	.913	2.995									
03	802.7	7.093	.908	.903	.904	2.998									
08	805.1	7.059	.912	.912	.908	3.000									
12	799.9	7.069	.905	.905	.905	2.995									
14	806.9	7.076	.904	.913	.907	2.992									
24	806.7	7.068	.902	.902	.906	3.000									
26	804.5	7.071	.909	.902	.905	3.004									
28	804.4	7.079	.902	.906	.906	3.006									
30	824.9	7.067	.898	.905	.909	3.026									
34	801.1	7.079	.909	.904	.906	2.992									
35	800.6	7.075	.903	.908	.913	3.000									
37	809.4	7.060	.905	.904	.906	3.002	NO	LEAKS		NO	LEAKS		NO	LEAKS	
38	803.0	7.062	.904	.905	.906	3.002									
42	810.2	7.081	.906	.906	.906	3.000									
43	800.8	7.079	.898	.904	.905	3.017									
46	799.9	7.059	.904	.903	.904	3.002									
47	806.6	7.087	.904	.906	.909	3.002									
53	805.8	7.081	.906	.904	.905	3.001									
51	799.4	7.076	.903	.903	.909	2.997									
56	804.0	7.075	.901	.902	.902	3.003									
61	807.3	7.078	.906	.906	.906	3.004									
70	803.4	7.069	.907	.907	.912	2.998									
71	814.8	7.091	.911	.909	.915	2.998									
76	804.5	7.073	.908	.906	.912	2.998									

TABLE II
Measurement and Leak Test Data

WQEC/C 79-144

Yardney Electric

SERIAL NUMBER	WEIGHT (Grams)	HEIGHT (Inches)	LENGTH (Inches)			WIDTH (Inches)	PHENOLPHTHALEIN LEAK TESTS								
							INITIAL			POST HI VAC			POST TEST		
			MINIMUM	MAXIMUM (Pre-Test)	MAXIMUM (Post-Test)		Terminals		Other	Terminals		Other	Terminals		Other
							+	-		+	-		+	-	
21	835.1	7.061	.903	.906	.908	3.002									
16 *	944.1	7.071	.905	.913	.915	3.002									
22 *	939.7	7.064	.909	.909	.913	3.001									
44 *	912.1	7.091	.906	.908	.912	2.999									
52 *	944.2	7.065	.906	.905	.911	3.003									
60 *	918.2	7.076	.902	.911	.916	2.998									

* - Cells with passivated terminations

Eagle-Picher

TABLE III
Capacity Data

SERIAL NUMBER	Capacity Test 1						Capacity Test 2						Capacity Test 3 (20°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
075	1.442	.678	48	25.8	.277	19	1.440	.557	71	25.2	.353	27	1.456	.545	74	24.7	.264	28
076	1.441	.684	21	26.0	.270	0	1.443	.557	46	24.8	.332	2	1.465	.519	41	24.7	.284	1
078	1.444	.716	19	26.0	.282	0	1.450	.590	50	25.2	.238	0	1.460	.554	42	24.7	.245	0
079	1.441	.720	51	26.0	.340	14	1.454	.567	70	25.6	.303	12	1.458	.546	68	25.1	.250	12
080	1.441	.829		26.1	.391		1.449	.794		25.3	.570		1.462	.784		24.2	.410	
081	1.441	.708		26.5	.198		1.450	.553		25.9	.336		1.463	.527		25.0	.219	
082	1.439	.651		26.5	.379		1.448	.706		25.9	.250		1.460	.607		25.4	.222	
083	1.442	.721		26.1	.302		1.451	.557		25.3	.264		1.463	.551		25.0	.322	
084	1.440	.709		25.7	.235		1.449	.573		24.9	.284		1.460	.542		25.2	.219	
085	1.438			25.3			1.446			24.4			1.452			23.5		
087	1.439			25.3			1.447			24.8			1.453			23.9		
088	1.439			25.3			1.447			24.8			1.452			23.9		
089	1.441			26.0			1.447			25.2			1.453			24.7		
090	1.438			25.3			1.446			24.4			1.451			23.9		
091	1.442			25.6			1.450			24.8			1.455			24.3		
092	1.439			26.5			1.447			25.7			1.460			25.C		
093	1.435			26.1			1.444			24.9			1.455			23.8		
094	1.439			25.7			1.445			24.5			1.458			23.8		
095	1.440			26.5			1.447			25.7			1.458			24.7		
096	1.443			26.1			1.449			24.9			1.462			24.2		
097	1.439		34	25.6		21	1.442		52	24.7		23	1.464		51	24.6		23
098	1.441		21	26.4		0	1.444		37	25.5		1	1.467		36	25.4		3
099	1.436		32	25.6		12	1.441		55	24.7		13	1.464		49	24.6		13
100	1.440		28	26.0		5	1.443		50	25.1		8	1.466		42	24.6		8
101	1.440		1	26.0		0	1.448		1	25.5		0	1.467		28	25.8		7
102	1.438		26	26.0		0	1.445		13	25.9		0	1.468		12	26.8		0

SMD-BADC (RP 11/73)

General Electric

TABLE III
Capacity Data

SERIAL NUMBER	Capacity Test 1 END-OF-CHARGE CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	END-OF-DISCHARGE CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	Capacity Test 2 END-OF-CHARGE CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	END-OF-DISCHARGE CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	Capacity Test 3 (20°C) END-OF-CHARGE CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	END-OF-DISCHARGE CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
005	1.443			24.5			1.451			23.0			1.454			22.1		
006	1.445			24.9			1.454			23.8			1.457			23.3		
009	1.445			24.5			1.455			23.4			1.457			22.9		
010	1.443			24.5			1.453			23.4			1.455			22.9		
018	1.444			24.5			1.456			23.0			1.458			22.1		
019	1.442			24.5			1.450			23.4			1.457			22.9		
021	1.444			24.5			1.451			23.0			1.454			22.1		
022	1.443			24.5			1.451			23.8			1.458			23.3		
025	1.443			24.5			1.452			23.5			1.455			22.9		
032	1.443			24.5			1.454			23.5			1.458			22.9		
033	1.442			24.5			1.454			23.5			1.456			22.9		
038	1.443			24.5			1.456			23.1			1.457			22.5		
039	1.445			24.9			1.457			23.5			1.457			23.3		
040	1.443			24.5			1.453			23.1			1.455			22.9		
041	1.439			25.0			1.454			23.5			1.455			23.0		
043	1.440			25.0			1.455			23.5			1.456			23.0		
048	1.445			24.2			1.460			23.5			1.460			22.6		
049	1.442			24.6			1.456			23.5			1.457			23.0		
007	1.441		4	24.6		0	1.453		21	23.1		0	1.454		27	22.6		0
008	1.438		7	24.2		0	1.449		28	23.1		0	1.450		32	22.6		0
026	1.439		3	24.6		0	1.449		18	23.5		0	1.451		19	22.6		0
035	1.439		0	25.0		0	1.450		0	23.5		0	1.451		0	23.0		0
037	1.439		0	25.0		0	1.451		9	23.5		0	1.452		10	23.0		0
042	1.439		0	25.0		0	1.453		9	23.5		0	1.453		11	23.0		0

-NADC (SP 11/73) @ – changed to recharge, 30 AH, at start of charge.

General Electric

TABLE III
Capacity Data

SERIAL NUMBER	Capacity Test 1						Capacity Test 2						Capacity Test 3 (20°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
053	1.441	.487	5	24.5	.019	0	1.442	.546	20	22.7	.093	0	1.449	.532	21	22.9	.111	
054	1.442	.387	7	24.5	.047	0	1.452	.483	21	23.4	.103	0	1.455	.478	24	22.9	.113	0
055	1.440	.349		24.9	.034		1.439	.410		23.5	.077		1.447	.401		23.3	.095	
057	1.440	.360	3	24.9	.040	0	1.450	.455	16	23.4	.049	0	1.453	.444	19	22.5	.101	0
060	1.440	.364		24.9	.011		1.449	.480		23.8	.045		1.450	.476		23.3	.011	
061	1.441	.412	2	24.5	.065	0	1.451	.491	13	23.4	.082	0	1.455	.474	15	22.5	.126	0

SAFT America

TABLE III
Capacity Data

SERIAL NUMBER	Capacity Test 1						Capacity Test 2						Capacity Test 3 (20°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
2653	1.440			23.5			1.445			22.5			1.459			22.3		
2654	1.440			24.7			1.447			24.1			1.461			23.5		
2656	1.438			25.0			1.443			23.3			1.457			23.5		
2657	1.440			24.7			1.445			23.3			1.456			23.1		
2658	1.438			23.9			1.444			22.5			1.454			22.3		
2662	1.442			24.3			1.449			23.7			1.458			23.5		
2663	1.440			23.1			1.448			22.5			1.455			21.9		
2666	1.439			24.9			1.443			23.8			1.454			22.9		
2667	1.438			24.2			1.443			23.0			1.454			22.5		
2668	1.438			23.5			1.443			22.6			1.454			22.1		
2670	1.438			24.2			1.443			23.4			1.453			22.9		
2671	1.439			24.6			1.445			23.8			1.457			22.9		
2673	1.439			24.9			1.439			23.4			1.452			22.9		
2674	1.439			24.2			1.444			23.4			1.454			22.9		
2676	1.436			24.3			1.450			23.4			1.460			22.8		
2677	1.437			24.7			1.450			23.8			1.460			23.5		
2680	1.434			22.6			1.447			22.2			1.460			21.6		
2681	1.436			24.7			1.446			23.4			1.458			23.1		
2655	1.437		0	24.7		0	1.452		11	23.8		0	1.461		67	22.8		0
2660	1.435		0	22.5		0	1.450		13	23.0		0	1.459		81	22.8		5
2669	1.437		4	23.3		0	1.452		24	22.6		0	1.462		98	22.4		13
2675	1.435		3	22.9		0	1.450		15	22.2		0	1.459		60	22.0		0
2685	1.435		6	24.1		0	1.448		33	23.0		0	1.460		100*	21.6		0
2700	1.435		0	22.5		0	1.448		15	23.0		0	1.458		96	22.8		11

9MD-NADC (SP 11/73) *- OFF, High Pressure, 37.3 Ampere-Hours In

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NAEC/C 79-144

SAFT America

TABLE III
Capacity Data

SERIAL NUMBER	Capacity Test 1						Capacity Test 2						Capacity Test 3 (20°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
719	1.439	.377		23.8	-.017		1.443	.523		23.0	.023		1.452	.615		22.5	.249	
722	1.439	.405		23.8	.003		1.444	.534		23.4	.021		1.452	.632		22.5	.299	
725	1.442	.391	0	25.0	-.015	0	1.441	.533	40	24.1	.116	0	1.464	.623	83	23.9	.337	6
726	1.441	.416	1	24.7	.005	0	1.438	.649	79	22.9	.348	0	1.459	.650	92	23.1	.458	23
728	1.440	.408	1	25.0	-.003	0	1.446	.502	28	24.1	.063	0	1.461	.620	82	23.9	.427	6
729	1.440	.392	3	24.6	-.003	0	1.444	.503	28	23.8	.042	0	1.455	.595	61	24.0	.179	0

SMD-NADC (SP 11/73)

MQEC/C 79-144

Yardney Electric

TABLE III
Capacity Data

SERIAL NUMBER	Capacity Test 1						Capacity Test 2						Capacity Test 3 (20°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
01	1437			27.3			1.447			24.9			1.454			24.5		
03	1.440			26.9			1.451			24.9			1.455			24.0		
08	1.436			25.7			1.446			23.3			1.452			23.2		
12	1.438			26.5			1.450			23.3			1.455			22.8		
14	1.447			26.2			1.456			24.0			1.459			23.7		
24	1.439			26.6			1.451			24.4			1.452			23.2		
26	1.438			26.6			1.450			24.7			1.454			23.7		
28	1.442			27.8			1.450			25.1			1.454			24.5		
30	1.435	.411		25.0	.140		1.444	.408		23.6	-.007		1.450	.382		23.2	-.020	
34	1.436			27.4			1.442			25.9			1.452			25.3		
35	1.440			26.6			1.447			25.1			1.455			24.5		
37	1.437			26.6			1.445			24.7			1.451			24.1		
38	1.438			26.2			1.446			24.4			1.454			24.1		
42	1.437			27.8			1.447			24.7			1.454			24.1		
43	1.437			25.9			1.443			23.1			1.465			23.3		
46	1.438			27.5			1.443			23.9			1.463			24.5		
47	1.436			25.5			1.443			23.5			1.465			23.7		
53	1.440			25.5			1.445			23.1			1.464			23.3		
51	1.439			27.5			1.440			25.2			1.459			25.2		
56	1.442			26.3			1.445			24.8			1.464			25.2		
61	1.443			27.5			1.446			24.8			1.467			24.9		
70	1.440			26.7			1.442			23.9			1.459			24.1		
7	1.440			27.1			1.444			24.8			1.463			24.9		
76	1.440			26.7			1.444			24.4			1.465			24.5		

2ND-NADC (SP 11/73)

Yardney Electric

TABLE III
Capacity Data

SERIAL NUMBER	Capacity Test 1 END-OF-CHARGE CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	END-OF-DISCHARGE CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	Capacity Test 2 END-OF-CHARGE CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	END-OF-DISCHARGE CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	Capacity Test 3 (20°C) END-OF-CHARGE CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	END-OF-DISCHARGE CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
16	1.440	.454	8	27.3	.130	1	1.449	.663	41	24.5	.050	5	1.461	.748	68	24.5	.205	7
22	1.440	.386	6	26.9	.166	2	1.446	.454	23	24.5	-.046	4	1.462	.512	33	24.5	-.013	5
52	1.439	.406	0	27.3	.182	0	1.452	.467	22	24.5	.057	3	1.457	.448	24	24.5	.015	3
44	1.439		1	26.9		0	1.448		10	24.9		1	1.455		11	24.5		1
60	1.440		1	25.7		0	1.456		7	23.3		0	1.456		10	21.8		0
21	1.440	.390		27.3	.185		1.453	.434		24.9	.034		1.458	.417		24.5	.036	

* - Ambient temperature 29°C at end of charge and during discharge

NAEC-NADC (SP 11/73)

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NAEC/C 79-144

Eagle-Picher
SMD-MADC (SP 11/73)

TABLE IV
INTERNAL RESISTANCE AND SHORT TEST DATA

WQEC/C 79-144

SERIAL NUMBER	INTERNAL RESISTANCE (MILLIOHMS)			INTERNAL SHORT TEST		
	END-OF-CHARGE	ONE HOUR AFTER START-OF-DISCHARGE	TWO HOURS AFTER START-OF-DISCHARGE	AFTER 16 HR SHORT	AFTER 24 HOUR OCV STAND	
				CELL	CELL	PRESS
075	2.5	2.4	2.5	.021	1.247	11
076	2.5	2.5	2.4	.024	1.246	0
078	2.6	2.5	2.6	.021	1.248	0
079	2.5	2.4	2.5	.024	1.248	0
080	2.5	2.3	2.3	.020	1.249	
081	2.3	2.4	2.4	.019	1.250	
082	2.4	2.5	2.3	.020	1.247	
083	2.2	2.3	2.4	.024	1.246	
084	2.2	2.1	2.2	.021	1.251	
085	2.7	2.6	2.5	.024	1.247	
087	2.6	2.4	2.5	.026	1.247	
088	2.6	2.6	2.6	.031	1.250	
089	2.6	2.6	2.6	.027	1.245	
090	2.7	2.5	2.4	.026	1.246	
091	2.4	2.4	2.4	.024	1.246	
092	2.4	2.4	2.5	.020	1.244	
093	2.2	2.2	2.3	.027	1.250	
094	2.4	2.5	2.4	.021	1.246	
095	2.2	2.4	2.3	.020	1.243	
096	2.0	2.0	2.2	.020	1.246	
097	2.1	2.0	2.1	.024	1.248	19
098	2.0	2.1	2.1	.024	1.247	0
099	2.1	2.2	2.2	.019	1.246	4
100	2.1	2.2	2.3	.022	1.246	1
101	2.1	2.1	2.1	.022	1.246	5
102	2.0	2.0	2.1	.020	1.247	0

General Electric
GND-NADC (SP 11/73)

TABLE IV
INTERNAL RESISTANCE AND SHORT TEST DATA

WQEC/C 79-144

SERIAL NUMBER	INTERNAL RESISTANCE (MILLIOHMS)			INTERNAL SHORT TEST		
	END-OF-CHARGE	ONE HOUR AFTER START-OF-DISCHARGE	TWO HOURS AFTER START-OF-DISCHARGE	AFTER 16 HR SHORT	AFTER 24 HOUR OCV STAND	
				CELL	CELL	PRESS
005	2.6	2.6	2.4	.119	1.247	
006	2.6	2.4	2.4	.102	1.241	
009	2.4	2.4	2.2	.113	1.245	
010	2.5	2.4	2.3	.097	1.241	
018	2.6	2.4	2.4	.111	1.248	
019	2.6	2.3	2.5	.101	1.244	
021	2.4	2.4	2.4	.207	1.250	
022	2.3	2.4	2.3	.101	1.240	
025	2.3	2.5	2.3	.091	1.241	
032	2.3	2.4	2.2	.094	1.244	
033	2.4	2.4	2.4	.099	1.245	
038	2.4	2.4	2.4	.100	1.247	
039	2.4	2.4	2.3	.097	1.244	
040	2.2	2.4	2.3	.098	1.246	
041	2.6	2.4	2.3	.094	1.241	
043	2.4	2.4	2.5	.094	1.243	
048	2.4	2.3	2.3	.099	1.242	
049	2.2	2.2	2.3	.098	1.243	
007	2.6	2.3	2.4	.090	1.242	0
008	2.6	2.4	2.4	.113	1.242	0
026	2.6	2.5	2.4	.090	1.241	0
035	2.6	2.4	2.5	.098	1.242	0
037	2.6	2.4	2.5	.097	1.243	0
042	2.7	2.4	2.3	.113	1.244	0
053	2.4	2.4	2.2	.094	1.242	0
054	2.8	2.5	2.4	.098	1.242	0
055	2.6	2.5	2.2	.092	1.240	
057	2.9	2.6	2.4	.109	1.244	0
060	2.4	2.5	2.4	.091	1.241	
061	2.9	2.6	2.4	.096	1.244	0

SAFT America
GSD-NADC (SP 11/73)

TABLE IV
INTERNAL RESISTANCE AND SHORT TEST DATA

WQEC/C 79-144

SERIAL NUMBER	INTERNAL RESISTANCE (MILLIOHMS)			INTERNAL SHORT TEST		
	END-OF-CHARGE	ONE HOUR AFTER START-OF-DISCHARGE	TWO HOURS AFTER START-OF-DISCHARGE	AFTER 16 HR SHORT	AFTER 24 HOUR OCV STAND	
				CELL	CELL	PRESS
2653	3.1	3.2	3.2	.076	1.218	
2654	3.1	3.1	3.1	.063	1.219	
2656	3.6	3.4	3.5	.085	1.224	
2657	3.5	3.4	3.3	.090	1.226	
2658	3.6	3.6	3.4	.072	1.225	
2662	3.2	3.2	3.2	.071	1.224	
2663	3.2	3.3	3.3	.074	1.223	
2666	3.2	3.2	2.9	.099	1.228	
2667	3.3	3.3	3.4	.074	1.226	
2668	3.3	3.3	3.3	.069	1.222	
2670	3.4	3.4	3.3	.075	1.227	
2671	3.4	3.3	3.4	.071	1.225	
2673	3.5	3.3	3.4	.078	1.229	
2674	3.5	3.3	3.2	.074	1.227	
2676	3.6	3.4	3.2	.077	1.226	
2677	3.6	3.4	3.1	.073	1.225	
2680	3.4	3.2	3.2	.075	1.225	
2681	3.2	3.2	3.2	.083	1.227	
2655	3.4	3.2	3.3	.084	1.228	0
2660	3.1	3.1	3.3	.112	1.229	0
2669	3.2	3.3	3.1	.083	1.228	0
2675	3.6	3.4	3.3	.078	1.225	0
2685	3.6	3.5	3.4	.083	1.229	0
2700	3.6	3.3	3.3	.083	1.227	0
719	3.2	3.2	3.4	.054	1.213	
722	3.3	3.2	3.1	.059	1.215	
725	3.6	3.4	3.4	.065	1.214	0
726	3.4	3.3	3.2	.073	1.219	0
728	3.3	3.4	3.2	.061	1.220	0
729	3.5	3.5	3.4	.042	1.213	0

Yardney Electric
SWD-NADC (SP 11/73)

TABLE IV
INTERNAL RESISTANCE AND SHORT TEST DATA

WQEC/C 79-144

SERIAL NUMBER	INTERNAL RESISTANCE (MILLIOHMS)			INTERNAL SHORT TEST		
	END-OF-CHARGE	ONE HOUR AFTER START-OF-DISCHARGE	TWO HOURS AFTER START-OF-DISCHARGE	AFTER 16 HR SHORT	AFTER 24 HOUR OCV STAND	
				CELL *	CELL	PRESS
01	2.2	2.1	2.1	.040	1.183	
03	2.2	2.1	2.1	.037	1.178	
08	2.1	2.1	2.1	.068	1.203	
12	2.3	2.2	2.2	.058	1.198	
14	2.2	2.1	2.2	.039	1.188	
24	2.2	2.1	2.0	.053	1.192	
26	2.1	2.0	2.1	.043	1.180	
28	2.2	2.1	2.1	.055	1.179	
30	2.3	2.3	2.2	.051	1.190	
34	2.3	2.2	2.2	.029	1.162	
35	2.2	2.1	2.2	.039	1.172	
37	2.2	2.2	2.1	.046	1.181	
38	2.2	2.1	2.2	.037	0.786	
42	2.1	2.1	2.1	.039	1.189	
43	2.0	2.0	1.8	.061	1.205	
46	2.1	1.9	1.9	.042	1.200	
47	2.2	1.9	1.7	.066	0.883	
53	2.2	1.5	1.8	.052	1.200	
51	2.3	1.7	1.9	.032	1.177	
56	2.0	1.5	1.6	.034	1.190	
61	2.2	2.0	2.0	.039	1.197	
70	1.9	1.8	1.7	.053	1.193	
71	2.0	1.7	1.8	.038	1.194	
76	2.1	1.6	1.7	.051	1.192	
16	2.1	2.2	2.0	.033	1.178	3
22	2.3	2.1	2.1	.046	1.182	4
52	2.2	2.2	2.1	.041	1.191	3
44	2.2	2.1	2.1	.052	1.191	1
60	2.3	2.1	2.2	.065	1.199	0
21	2.2	2.1	2.2	.045	1.184	

* TEMPERATURE 23 → 25°C during this 16 hour period.

TABLE V
CHARGE RETENTION TEST DATA

WQEC/C 79-144

Eagle-Picher

SERIAL NUMBER	END-OF-CHARGE			24 HR. OCV			1 WEEK OCV			END-OF-DISCHARGE		
	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)	CELL (VOLTS)	AUX. ELECT (VOLTS	PRESS. (PSIA)	CAPAC-ITY (AH)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)
075	1.456	.550	73	1.342	.132	15	1.301	.019	12	22.7	-.027	11
076	1.453	.497	33	1.338	.104	0	1.299	.021	0	22.3	-.028	0
078	1.458	.549	35	1.341	.125	0	1.302	.019	0	23.1	-.046	0
079	1.456	.550	68	1.342	.121	0	1.302	.019	0	23.1	-.068	0
080	1.453	.778		1.340	.290		1.301	.033		22.5	.001	
081	1.455	.524		1.341	.129		1.301	.022		22.9	-.095	
082	1.453	.629		1.342	.113		1.303	.018		23.3	-.024	
083	1.454	.553		1.342	.120		1.301	.016		22.9	-.007	
084	1.452	.540		1.341	.100		1.301	.020		22.5	-.041	
085	1.450			1.344			1.305			22.7		
087	1.451			1.343			1.302			22.7		
088	1.449			1.343			1.304			22.7		
089	1.452			1.341			1.301			23.1		
090	1.449			1.342			1.303			22.7		
091	1.452			1.341			1.301			22.7		
092	1.451			1.341			1.301			22.9		
093	1.444			1.341			1.301			22.5		
094	1.447			1.338			1.299			22.5		
095	1.450			1.340			1.300			22.9		
096	1.452			1.340			1.300			22.5		
097	1.449		47	1.336		21	1.298		19	22.8		19
098	1.453		37	1.336		1	1.296		0	22.8		0
099	1.457		30	1.336		2	1.297		3	22.8		3
100	1.449		36	1.337		3	1.299		1	22.8		1
101	1.453		30	1.336		7	1.297		5	23.6		5
102	1.457		13	1.337		0	1.299		0	23.6		0

TABLE V
CHARGE RETENTION TEST DATA

General Electric

WQEC/C 79-144

SERIAL NUMBER	END-OF-CHARGE			24 HR. OCV			1 WEEK OCV			END-OF-DISCHARGE		
	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS (PSIA)	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)	CELL (VOLTS)	AUX. ELECT (VOLTS	PRESS. (PSIA)	CAPAC-ITY (AH)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)
005	1.458			1.359			1.319			20.2		
006	1.461			1.361			1.321			21.0		
009	1.461			1.360			1.320			20.6		
010	1.459			1.360			1.320			21.0		
018	1.461			1.360			1.320			20.2		
019	1.457			1.360			1.320			20.6		
021	1.458			1.359			1.319			20.2		
022	1.457			1.360			1.320			21.0		
025	1.458			1.360			1.320			20.6		
032	1.460			1.360			1.320			20.6		
033	1.461			1.359			1.320			20.6		
038	1.462			1.360			1.320			20.2		
039	1.462			1.360			1.320			20.6		
040	1.459			1.360			1.320			20.2		
041	1.458			1.359			1.320			20.6		
043	1.459			1.360			1.320			20.6		
048	1.463			1.360			1.318			20.6		
049	1.461			1.359			1.319			20.6		
007	1.456		27	1.361		0	1.320		0	20.6		0
008	1.454		32	1.359		0	1.320		0	20.6		0
026	1.454		21	1.360		0	1.320		0	20.6		0
035	1.454		0	1.359		0	1.319		0	21.0		0
037	1.455		14	1.360		0	1.320		0	20.6		0
042	1.456		13	1.360		0	1.320		0	21.0		0
053	1.457	.544	26	1.359	.044	0	1.318	.005	0	20.6	-.105	0
054	1.458	.468	26	1.360	.044	0	1.319	.006	0	21.0	-.052	0
055	1.454	.395		1.358	.040		1.318	.005		21.0	.030	
057	1.456	.439	21	1.360	.040	0	1.319	.006	0	20.6	.045	0
060	1.454	.468		1.360	.038		1.320	.006		21.0	.007	
061	1.457	.462	16	1.360	.046	0	1.319	.007	0	20.6	.003	0

TABLE V
CHARGE RETENTION TEST DATA

SAFT America

WQEC/C 79-144

SERIAL NUMBER	END-OF-CHARGE			24 HR. OCV			1 WEEK OCV			END-OF-DISCHARGE		
	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)	CELL (VOLTS)	AUX. ELECT (VOLTS	PRESS. (PSIA)	CAPAC-ITY (AH)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)
2653	1.469			1.339			1.289			20.3		
2654	1.470			1.339			1.292			21.5		
2656	1.466			1.338			1.294			21.5		
2657	1.468			1.338			1.294			21.1		
2658	1.464			1.339			1.293			20.3		
2662	1.468			1.339			1.290			21.5		
2663	1.466			1.337			1.291			19.9		
2666	1.468			1.338			1.293			21.3		
2667	1.466			1.337			1.292			20.9		
2668	1.465			1.337			1.290			20.1		
2670	1.466			1.337			1.292			20.5		
2671	1.468			1.338			1.290			21.3		
2673	1.465			1.337			1.294			20.9		
2674	1.464			1.337			1.293			20.9		
2676	1.465			1.337			1.289			20.4		
2677	1.468			1.337			1.287			20.8		
2680	1.464			1.334			1.288			19.6		
2681	1.464			1.337			1.292			20.8		
2655	1.463		77	1.334		0	1.289		0	20.4		0
2660	1.464		94	1.335		0	1.291		0	20.4		0
2669	1.467		100*	1.330		0	1.290		0	20.0		0
2675	1.463		90	1.333		0	1.287		0	19.6		0
2685	1.469		100*	1.333		0	1.292		0	20.0		0
2700	1.467		100*	1.335		0	1.292		0	20.4		0
719	1.465	.623		1.337	.042		1.289	.003		20.5	-.019	
722	1.466	.627		1.336	.046		1.288	.003		20.5	-.022	
725	1.473**	.606	74	1.341	.047	0	1.292	.003	0	22.3	-.040	0
726	1.473**	.629	91	1.341	.056	0	1.296	.004	0	21.5	-.012	0
728	1.469	.615	85	1.339	.045	0	1.293	.003	0	21.9	-.032	0
729	1.467	.626	86	1.337	.034	0	1.288	.002	0	21.7	-.057	0
* -	Removed	from	charge	due to	high	pressure,	36.0	AHrs				
** -	Exceeded	1.470	volts	during	charge							

TABLE V

CHARGE RETENTION TEST DATA

Yardney Electric — WQEC/C 79-144

SERIAL NUMBER	END-OF-CHARGE			24 HR. OCV			1 WEEK OCV			END-OF-DISCHARGE		
	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS (PSIA)	CELL (VOLTS)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)	CELL (VOLTS)	AUX. ELECT (VOLTS	PRESS. (PSIA)	CAPAC-ITY (AH)	AUX. ELECT. (VOLTS)	PRESS. (PSIA)
01	1.462			1.338			1.288			23.2		
03	1.464			1.340			1.293			23.2		
08	1.462			1.339			1.290			22.0		
12	1.465			1.341			1.289			21.6		
14	1.469			1.339			1.291			21.1		
24	1.464			1.339			1.288			20.7		
26	1.461			1.339			1.285			21.1		
28	1.465			1.337			1.288			21.5		
30	1.462	.390		1.335	.032		1.284	.014		20.7	-.046	
34	1.458			1.336			1.286			22.3		
35	1.462			1.337			1.287			21.5		
37	1.460			1.338			1.286			21.1		
38	1.460			1.339			1.286			12.4		
42	1.460			1.338			1.288			21.5		
43	1.461			1.336			1.290			21.5		
46	1.460			1.336			1.288			22.7		
47	1.461			1.314			1.254			16.9		
53	1.461			1.338			1.274			20.3		
51	1.458			1.335			1.287			23.1		
56	1.461			1.337			1.290			22.7		
61	1.464			1.337			1.291			22.7		
70	1.461			1.338			1.290			21.9		
71	1.460			1.340			1.291			22.7		
76	1.463			1.337			1.290			22.3		
16	1.471	.672	51	1.340	.058	6	1.292	.017	5	23.6	-.048	3
22	1.470	.495	33	1.340	.034	7	1.290	.017	6	23.2	-.092	4
52	1.464	.449	27	1.337	.044	5	1.289	.017	4	23.2	-.068	3
44	1.462		14	1.339		4	1.290		2	23.2		1
60	1.467		12	1.340		1	1.293		1	22.0		0
21	1.464	.458		1.340	.045		1.289	.021		22.8	-.026	

TABLE VI

Charge Efficiency and Overcharge Data

Eagle-Picher

SERIAL NUMBER	Charge Efficiency (20°C)						Overcharge Test (0°)						Overcharge Test (20°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
075	1.377	.336	12	5.8	.212	12	1.420	.459	72	23.8	.212	28	1.409	.675	106**	19.5	.415	34
076	1.377	.249	0	5.8	.227	0	1.484	.390	30	24.2	.132	6	1.369	.649	62	21.6	.317	13
078	1.377	.260	0	6.1	.223	0	1.577*	.475	49	21.7	-.034	2	1.408	.642	47	22.8	.387	9
079	1.377	.233	0	6.1	.219	0	1.424	.441	65	24.2	.214	27	1.408	.616	67	23.6	.295	16
080	1.378	.455		6.4	.416		1.483	.661		23.2	.212		1.402	.[illegible]		20.9	.530	
081	1.377	.389		6.4	.261		1.482	.417		23.6	.178		1.398	.[illegible]		20.5	.436	
082	1.377	.244		6.4	.129		1.573*	.450		23.2	.037		1.405	.728		22.1	.393	
083	1.377	.259		6.4	.221		1.483	.414		23.6	.120		1.401	.665		21.9	.304	
084	1.378	.343		6.4	.225		1.482	.436		22.4	.191		1.400	.704		20.[illegible]	.427	
085	1.377			6.1			1.476			22.6			1.405			23.2		
087	1.377			5.8			1.477			23.4			1.406			23.2		
088	1.376			6.1			1.478			22.6			1.[illegible]			23.2		
089	1.376			6.1			1.479			23.4			1.404			22.4		
090	1.376			6.1			1.477			22.6			1.402			22.8		
091	1.376			6.1			1.481			23.4			1.402			22.8		
092	1.377			6.4			1.480			23.2			1.400			21.7		
093	1.376			6.4			1.475			22.8			1.396			20.9	-	
094	1.376			6.4			1.481			23.6			1.390			19.7		
095	1.377			6.4			1.482			23.6			1.397			21.2		
096	1.376			6.4			1.485			23.2			1.399			20.1		
097	1.376		21	5.7			1.480		44	23.3		27	1.395		100**	15.2		28
098	1.375		1	5.9			1.482		32	24.1		8	1.390		82	18.[illegible]		24
099	1.375		8	6.0			1.481		36	23.7		17	1.394		89	19.7		24
100	1.375		5	5.9			1.483		32	24.1		11	1.[illegible]		10[illegible]**	16.0		17
101	1.375		8	5.9			1.482		35	24.1		19	1.391		89	19.2		22
102	1.375		4	6.0			1.587*		33	23.3		2	1.398		14	20.2		0

SID-NADC (SP 11/73)

* - Cells exceeded voltage limit, removed from charge: #s 078, 082 and 102 had 30.1 30.[illegible] and 29.5 Ampere-Hours In.

** - Cells exceeded pressure limit, removed from charge: #s 075, 097 and 100 had 33.9, 30.2 and 33.1 Ampere-Hours In.

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General Electric

TABLE VI

Charge Efficiency and Overcharge Data

SERIAL NUMBER	Charge Efficiency (20°C) CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (Ah)	AUX ELECT (Volts)	PRESS (PSIA)	Overcharge Test (0°C) CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (Ah)	Overcharge Test (35°C) CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (Ah)	AUX ELECT (Volts)	PRESS (PSIA)
005	1.368			7.1			1.488			22.1				1.398				23.9		
006	1.368			6.7			1.490			24.1				1.400				25.1		
009	1.368			7.1			1.490			24.1				1.401				25.1		
010	1.368			6.7			1.488			24.1				1.401				25.1		
018	1.368			7.1			1.491			22.1				1.400				24.7		
019	1.368			6.7			1.485			23.7				1.400				24.7		
021	1.369			7.1			1.487			22.1				1.399				23.9		
022	1.369			6.8			1.487			24.1				1.399				25.0		
025	1.369			6.4			1.488			24.1				1.402				25.0		
032	1.368			6.8			1.487			23.7				1.401				25.0		
033	1.368			6.8			1.485			22.5				1.401				24.6		
038	1.368			6.8			1.487			22.1				1.403				24.6		
039	1.368			6.8			1.488			24.1				1.404				25.4		
040	1.368			6.8			1.485			22.1				1.402				24.6		
041	1.368			7.0			1.489			24.2				1.391				23.7		
043	1.368			7.0			1.489			23.8				1.396				23.7		
048	1.368			6.6			1.492			24.2				1.399				24.9		
049	1.368			6.6			1.491			23.8				1.400				24.9		
007	1.369		0	7.0		0	1.489		15	23.8		0		1.397		0		24.5		0
008	1.369		0	7.0		0	1.488		26	23.8		0		1.394		0		24.1		0
026	1.369		0	7.0		0	1.488		11	23.8		0		1.393		0		24.1		0
035	1.368		0	7.0		0	1.489		0	24.2		0		1.390		0		23.7		0
037	1.368		0	7.0		0	1.488		6	23.8		0		1.390		0		23.7		0
042	1.368		0	7.0		0	1.488		6	24.2		0		1.391		0		23.7		0

TABLE VI

General Electric

Charge Efficiency and Overcharge Data

Charge Efficiency (20°C)

Overcharge Test (0°C)

Overcharge Test (35°C)

CELL NUMBER	CELL (Volts)	ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	ELECT (Volts)		CAPACITY (Ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (Ah)	AUX ELECT (Volts)	PRESS (PSIA)
053	1.368	.028	0	6.8	.006	0	1.487	.414	16	22.1	.102	0	1.397	.423	1	24.2	.100	0
054	1.368	.030	0	6.7	.010	0	1.490	.374	19	23.7	.109	0	1.397	.346	3	23.9	.064	0
055	1.368	.024		6.8	.005		1.485	.264		24.5	.058		1.395	.307		24.6	.002	
057	1.368	.025	0	7.1	.003	0	1.487	.272	12	23.7	.075	0	1.394	.313	0	24.3	.044	0
060	1.368	.021		6.8	-.011		1.484	.324		23.7	.079		1.398	.346		24.6	.048	
061	1.368	.027	0	6.7	.009	0	1.488	.308	6	23.7	.090	0	1.397	.379	0	24.7	.137	0

SAFT America

TABLE VI
Charge Efficiency and Overcharge Data

SERIAL NUMBER	Charge Efficiency (20°C)						Overcharge Test (0°)						Overcharge Test (35°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL* (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
2653	1.365			7.0			1.505			23.5			1.407			21.8		
2654	1.364			7.0			1.506			24.3			1.400			22.2		
2656	1.364			7.0			1.504			24.3			1.399			21.8		
2657	1.365			7.0			1.504			23.9			1.402			21.8		
2658	1.364			7.0			1.502			22.7			1.400			21.0		
2662	1.364			7.0			1.506			23.9			1.402			22.2		
2663	1.366			7.0			1.503			23.1			1.405			21.4		
2666	1.366			7.0			1.506			23.9			1.400			20.8		
2667	1.366			7.0			1.502			23.1			1.396			20.6		
2668	1.367			7.0			1.502			22.7			1.400			20.0		
2670	1.366			7.0			1.504			23.5			1.396			20.0		
2671	1.365			7.0			1.509			24.3			1.397			20.8		
2673	1.366			7.0			1.503			23.9			1.396			20.0		
2674	1.366			7.0			1.505			23.5			1.395			20.0		
2676	1.366			7.5			1.505			23.7			1.391			19.1		
2677	1.366			7.5			1.508 □			24.1			1.390			19.1		
2680	1.367			7.1			1.506			22.5			1.392			18.3		
2681	1.366			7.5			1.504			23.7			1.390			19.1		
2655	1.366		0	7.5		0	1.510 □		39	22.9		8	1.390		46	18.3		0
2660	1.366		0	7.5		0	1.506		62 △	22.9		22	1.390		66	18.7		3
2669	1.367		0	7.1		0	1.506 □		86	22.9		39	1.393		75	18.7		12
2675	1.366		0	7.1		0	1.505		63 △	22.5		22	1.393		61	18.3		1
2685	1.366		0	7.5		0	1.506 =		73	22.9		32	1.390		68	18.7		9
2687	1.365		0	7.5		0	1.504		64	22.9		26	1.390		67	19.1		6

9ND-NADC (SP 11/73)

TABLE VI

Charge Efficiency and Overcharge Data

SAFT America

SERIAL NUMBER	Charge Efficiency (20°C)						Overcharge Test (0°C)						Overcharge Test (35°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	* CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPACITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
719	1.366	.132		7.4	.051		1.504	.504		23.1	.354		1.401	.576		21.2	.184	
722	1.365	.134		7.4	.050		1.504	.538		23.5	.349		1.402	.587		21.2	.300	
725	1.363	.099	0	7.0	.069	0	1.512	.485	39	24.7	.334	10	1.405	.550	50	21.4	.277	0
726	1.364	.131	0	7.0	.096	0	1.505	.520	56	23.9	.387	21	1.405	.623	71	23.0	.285	6
728	1.363	.104	0	7.0	.048	0	1.507	.516	54	24.3	.376	19	1.401	.548	55	23.0	.270	2
729	1.365	.110	0	7.4	.043	0	1.508	.507	51	24.7	.365	15	1.400	.532	43	21.6	.274	0
	* — Temperature chamber 37° to 39°C for 16 hrs during charge																	
	□ — Cells exceeded 1.520 volts during charge																	
	Δ — Cells exceeded 65 PSIA during charge																	

9ND-NADC (SP 11/73)

Yardney Electric

TABLE VI
Charge Efficiency and Overcharge Data

SERIAL NUMBER	Charge Efficiency (20°C)						Overcharge Test (0°)						Overcharge Test (35°C)					
	END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE			END-OF-CHARGE			END-OF-DISCHARGE		
	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)	CELL (Volts)	AUX ELECT (Volts)	PRESS (PSIA)	CAPAC-ITY (ah)	AUX ELECT (Volts)	PRESS (PSIA)
01	1.358			6.6			1.514			27.5			1.405				23.2	
03	1.359			6.6			1.513			24.3			1.407				21.8	
05	1.359			5.8			1.516			25.9			1.403				22.8	
12	1.358			5.8			1.519			25.5			1.407				22.4	
14	1.360			6.0			1.527			25.8			1.409				23.3	
24	1.355			6.0			1.523			26.6			1.405				23.3	
26	1.356			6.4			1.521			27.0			1.405				23.3	
28	1.353			6.4			1.527			27.8			1.405				24.	
30	1.356	.025		6.0	-.005		1.525	.286		27.0	-.034		1.400	.366			22.9	-.014
34	1.355			6.8			1.520			28.6			1.401				23.3	
35	1.360			6.8			1.528			27.0			1.406				23.3	
37	1.355			6.4			1.519			26.3			1.405				23.3	
38	1.352			5.6			1.514			25.8			1.403				22.9	
42	1.358			6.4			1.514			27.4			1.404				23.3	
43	1.361			5.5			1.517			25.5			1.403				22.5	
46	1.357			5.9			1.521			27.1			1.403				22.9	
47	1.354			4.7			1.517			24.7			1.403				22.5	
53	1.359			5.5			1.522			25.5			1.402				22.9	
51	1.355			6.3			1.520			27.1			1.403				23.3	
56	1.359			6.2			1.528			26.7			1.405				22.9	
61	1.360			5.9			1.533			26.5			1.406				22.9	
70	1.358			5.9			1.522			26.3			1.401				22.5	
71	1.359			6.3			1.518			25.9			1.405				22.9	
76	1.357			5.9			1.525			26.3			1.402				22.5	

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TABLE VI

Charge Efficiency and Overcharge Data

Yardney Electric

SERIAL NUMBER	Charge Efficiency (20°C) END-OF-CHARGE CELL (Volts)	Charge Efficiency (20°C) END-OF-CHARGE AUX ELECT (Volts)	Charge Efficiency (20°C) END-OF-CHARGE PRESS (PSIA)	Charge Efficiency (20°C) END-OF-DISCHARGE CAPACITY (ah)	Charge Efficiency (20°C) END-OF-DISCHARGE AUX ELECT (Volts)	Charge Efficiency (20°C) END-OF-DISCHARGE PRESS (PSIA)	Overcharge Test (0°) END-OF-CHARGE CELL (Volts)	Overcharge Test (0°) END-OF-CHARGE AUX ELECT (Volts)	Overcharge Test (0°) END-OF-CHARGE PRESS (PSIA)	Overcharge Test (0°) END-OF-DISCHARGE CAPACITY (ah)	Overcharge Test (0°) END-OF-DISCHARGE AUX ELECT (Volts)	Overcharge Test (0°) END-OF-DISCHARGE PRESS (PSIA)	Overcharge Test (35°C) END-OF-CHARGE CELL (Volts)	Overcharge Test (35°C) END-OF-CHARGE AUX ELECT (Volts)	Overcharge Test (35°C) END-OF-CHARGE PRESS (PSIA)	Overcharge Test (35°C) END-OF-DISCHARGE CAPACITY (ah)	Overcharge Test (35°C) END-OF-DISCHARGE AUX ELECT (Volts)	Overcharge Test (35°C) END-OF-DISCHARGE PRESS (PSIA)
10	1.359	.030	4	6.6	-.01[illegible]	4	1.525	.324	16	27.	.040	5	1.410	.679	32	23.2	.006	5
22	1.357	.022	5	6.2	-.012	5	1.523	.272	14	27.[illegible]	-.024	6	1.411	.425	24	23.2	-.051	7
52	1.356	.024	4	5.8	-.005	4	1.526	.30[illegible]	12	[illegible].5	-.024	4	1.403	.356	21	23.6	.004	5
44	1.357		1	6.2		1	1.520		5	26.7		2	1.406		11	23.2	.046	3
60	1.358		0	5.8		0	1.526		4	25.[illegible]		0	1.[illegible]		10	22.8		1
21	1.357	.020		6.2	-.015		1.519	.293		26.[illegible]	.042		1.[illegible]5	.357		23.6	-.018	

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9ND-NADC (SP 11/73)

Eagle-Picher

TABLE VII
PRESSURE VS. CAPACITY TEST DATA

Serial No.	075	076	078	079	097	098	099	100	101	102						
Start-of-Charge, Press.	11	0	0	0	20	0	2	1	9	0						
AH in to 5 PSIA	NA			26.0	DNT	25.8	23.4		NA	NA						
Cell (volts)				1.557		1.502	1.458									
Aux (volts)				.403		NA	NA									
AH in to 10 PSIA	NA					27.4	26.7	26.3	13.3							
Cell (volts)						1.549	1.556	1.515	1.421							
Aux (volts)						NA	NA	NA	NA							
AH in to 15 PSIA	24					27.8		27.8	25.4							
Cell (volts)	1.502					1.558		1.545	1.514							
Aux (volts)	.327					NA		NA	NA							
AH in to 20 PSIA	26.0								26.7							
Cell (volts)	1.552								1.560							
Aux (volts)	.419								NA							
AH in to V/L (1.55V)	26.0	28.0	28.0	28.0		27.8	26.7	28.1	26.7	23.8						
Aux (volts)	.419	.420	.414	.403		NA	NA	NA	NA	NA						
Press (PSIA)	20	3	0	7		15	10	18	20	0						
30 Min OCV, Cell	1.379	1.380	1.383	1.382		1.376	1.376	1.378	1.376	1.375						
Aux (volts)	.340	.326	.339	.324		NA	NA	NA	NA	NA						
Press (PSIA)	23	5	0	9		14	12	17	20	0						
1 hour OCV, Cell	1.372	1.373	1.375	1.375		1.370	1.369	1.371	1.369	1.368						
Aux (volts)	.338	.314	.332	.320		NA	NA	NA	NA	NA						
Press (PSIA)	23	5	0	9		12	11	15	18	0						
EOD AH out	21.1	22.7	22.7	22.7		22.2	21.4	22.2	21.8	20.2						
Aux (volts)	.234	.087	.246	.243		NA	NA	NA	NA	NA						
Press (PSIA)	18	0	0	0		4	7	8	12	0						

NA - not applicable
DNT - Did Not Test

9ND-NADC (SP 11/73)

TABLE VII
PRESSURE VS. CAPACITY TEST DATA

General Electric

Serial No.	007	008	026	025	027	042	053	054	057	061
Start-of-Charge, Press.	0	0	0	0	0	0	0	0	0	0
AH in to 5 PSIA	30.1	30.5	30.5	32.1	31.3	31.3	29.9	30.2	30.6	31.0
Cell (volts)	1.503	1.508	1.510	1.512	1.514	1.515	1.512	1.514	1.512	1.514
Aux (volts)	NA	NA	NA	NA	NA	NA	.439	.283	.289	.371
AH in to 10 PSIA	30.9	30.9	30.9	32.5	31.7	31.7	30.3	30.6	31.0	31.4
Cell (volts)	1.514	1.513	1.515	1.510	1.514	1.514	1.517	1.519	1.515	1.514
Aux (volts)	NA	NA	NA	NA	NA	NA	.474	.312	.316	.391
AH in to 15 PSIA	31.3	31.3	31.3	33.3	32.5	32.5	30.7	31.4	31.4	31.8
Cell (volts)	1.515	1.514	1.516	1.505	1.510	1.509	1.519	1.521	1.515	1.512
Aux (volts)	NA	NA	NA	NA	NA	NA	.506	.369	.344	.411
AH in to 20 PSIA	32.1	31.7	31.7	34.1	32.9	32.9	31.1	31.8	32.2	32.6
Cell (volts)	1.512	1.513	1.515	1.500	1.507	1.509	1.518	1.519	1.511	1.508
Aux (volts)							.530	.396	.394	.453
AH in to V/L (1.55V)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aux (volts)										
Press (PSIA)										
30 Min OCV, Cell	1.407	1.406	1.406	1.406	1.407	1.408	1.406	1.405	1.406	1.408
Aux (volts)	NA	NA	NA	NA	NA	NA	.471	.369	.338	.399
Press (PSIA)	12	9	9	0	7	9	13	12	8	6
1 hour OCV, Cell	1.400	1.399	1.399	1.398	1.399	1.400	1.399	1.399	1.399	1.401
Aux (volts)	NA	NA	NA	NA	NA	NA	.431	.318	.288	.340
Press (PSIA)	4	2	2	0	0	0	6	6	2	0
EOD AH out	25.4	25.4	25.4	25.8	25.8	25.8	25.1	25.6	25.6	25.6
Aux (volts)	NA	NA	NA	NA	NA	NA	.122	.105	.020	.104
Press (PSIA)	0	0	0	0	0	0	0	0	0	0

NA - not applicable

9ND-NADC (SP 11/73)

SAFT America

TABLE VII
PRESSURE VS. CAPACITY TEST DATA

Serial No.	725	726	728	729	2655	2660	2669	2675	2685	2700						
Start-of-Cnerge, Press.	0	0	0	0	0	0	0	0	0	0						
AH in to 5 PSIA	NA	NA	NA	NA	30.1	NA	NA	NA	NA	NA						
Cell (volts)					1.538											
Aux (volts)																
AH in to 10 PSIA	30.5	29.6	30.5	27.8	30.5	29.7	29.3	28.9	30.0	28.9						
Cell (volts)	1.513	1.525	1.510	1.501	1.543	1.527	1.522	1.526	1.526	1.524						
Aux (volts)	.385	.410	.389	.383												
AH in to 15 PSIA	31.0	30.1	30.8	28.5		30.1	29.7	29.3	30.4	29.3						
Cell (volts)	1.527	1.530	1.524	1.508		1.541	1.530	1.532	1.535	1.531						
Aux (volts)	.415	.433	.422	.401												
AH in to 20 PSIA	31.5	30.5	31.5	28.9		30.9	30.1	29.7	30.9	29.7						
Cell (volts)	1.530	1.534	1.531	1.512		1.550	1.541	1.541	1.546	1.540						
Aux (volts)	.432	.451	.442	.421												
AH in to V/L (1.55V)					30.9	30.9										
Aux (volts)																
Press (PSIA)					13	20										
30 Min OCV, Cell	1.394	1.395	1.393	1.394	1.395	1.394	1.395	1.394	1.394	1.395						
Aux (volts)	.405	.420	.407	.401												
Press (PSIA)	17	15	18	15	11	19	27	18	22	18						
1 hour OCV, Cell	1.386	1.385	1.384	1.386	1.387	1.386	1.386	1.384	1.386	1.386						
Aux (volts)	.411	.426	.415	.406												
Press (PSIA)	14	12	16	13	8	17	25	15	19	15						
EOD AH out	23.3	22.9	23.3	22.7	22.9	22.9	22.5	21.7	22.5	22.9						
Aux (volts)	.297	.290	.315	.241												
Press (PSIA)	0	0	0	0	0	0	2	0	0	0						

NA - not available

9MD-NADC (SP 11/73)

Yardney Electric

TABLE VII
PRESSURE VS. CAPACITY TEST DATA

Serial No.	16	22	52	44	60											
Start-of-Charge, Press.	3	4	3	1	0											
AH in to 5 PSIA	18.8	9.7	20.7	27.8	28.2											
Cell (volts)	1.421	1.393	1.422	1.491	1.504											
Aux (volts)	.050	.031	.063	NA	N.A											
AH in to 10 PSIA	27.4	27.0	27.6	29.9	29.9											
Cell (volts)	1.493	1.482	1.491	1.511	1.514											
Aux (volts)	.222	.162	.175	NA	NA											
AH in to 15 PSIA	28.2	27.8	29.9	31.0	31.4											
Cell (volts)	1.506	1.497	1.507	1.511	1.514											
Aux (volts)	.346	.206	.265	NA	NA											
AH in to 20 PSIA	28.6	28.6	30.3	31.8	32.9											
Cell (volts)	1.509	1.505	1.509	1.511	1.513											
Aux (volts)	.407	.292	.290	NA	NA											
AH in to V/L (1.55V)	NA	NA	NA	NA	NA											
Aux (volts)																
Press (PSIA)																
30 Min OCV, Cell	1.399	1.398	1.396	1.396	1.395											
Aux (volts)	.417	.240	.280	NA	NA											
Press (PSIA)	15	14	13	11	9											
1 hour OCV, Cell	1.388	1.388	1.388	1.385	1.385											
Aux (volts)	.352	.187	.213	NA	NA											
Press (PSIA)	12	11	11	6	6											
EOD AH out	21.7	21.7	23.5	22.9	23.4											
Aux (volts)	.041	-.089	.011	NA	NA											
Press (PSIA)	5	6	4	2	1											

NA - Not applicable

Eagle-Picher

TABLE VIII

WQEC/C 79-144

SPECIAL RESISTANCE CHARACTERISTIC DATA ON THE AUXILIARY ELECTRODES

SERIAL NO.	075		076								AVERAGE	
OHMS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	MILLIWATTS
10,000	.852	36	.856	17							.854	.073
5,000	.852	36	.857	17							.854	.146
2,000	.847	36	.851	17							.849	.360
1,000	.833	36	.845	17							.839	.704
500	.774	36	.798	17							.786	1.236
200	.614	36	.642	17							.628	1.972
100	.505	36	.517	17							.511	2.611
50	.402	36	.404	17							.403	3.248
20	.298	36	.269	17							.283	4.004
10	.229	36	.208	17							.218	4.752
5	.164	36	.145	17							.154	4.743
2	.096	36	.081	17							.087	3.785
1	.059	36	.051	17							.055	3.025
0.5	.036	36	.033	17							.034	2.312
0.2	.022	36	.020	17							.021	2.205
0.1	.016	36	.015	17							.015	2.250

Note: All pressures in PSIA.

$$\text{POWER} = \frac{V^2}{R} \text{ Watts } 10^3 \frac{\text{Milliwatts}}{\text{Watt}} : \text{Milliwatts}$$

WQEC/C 79-144

TABLE VIII

General Electric — SPECIAL RESISTANCE CHARACTERISTIC DATA ON THE AUXILIARY ELECTRODES

SERIAL NO.	53		55								AVERAGE	
OHMS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	MILLIWATTS
10,000	.835	9	.751	NA							.793	.063
5,000	.804	9	.734								.769	.118
2,000	.713	9	.656								.685	.235
1,000	.630	9	.568								.599	.359
500	.551	9	.437								.494	.488
200	.442	8	.275								.359	.644
100	.351	8	.176								.264	.697
50	.261	8	.112								.187	.699
20	.161	8	.059								.110	.605
10	.104	8	.035								.070	.490
5	.063	8	.019								.041	.336
2	.033	8	.010								.022	.242
1	.021	8	.007								.014	.196
0.5	.016	8	.005								.011	.242
0.2	.012	8	.004	Y							.008	.320
0.1	.010	8	.004	NA							.007	.490

Note: All pressures in PSIA.
NA - not applicable

$$\text{POWER} = \frac{V^2}{R} \text{ Watts } 10^3 \frac{\text{Milliwatts}}{\text{Watt}} : \text{Milliwatts}$$

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WQEC/C 79-144

TABLE VIII

SAFT America

SPECIAL RESISTANCE CHARACTERISTIC DATA ON THE AUXILIARY ELECTRODES

SERIAL NO.	725		726								AVERAGE	
OHMS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	MILLIWATTS
10,000	.882	6	.886	11							.884	.078
5,000	.880	6	.884	11							.882	.156
2,000	.863	6	.875	11							.869	.378
1,000	.804	6	.842	11							.824	.678
500	.710	6	.766	11							.738	1.089
200	.576	6	.644	11							.610	1.861
100	.477	6	.537	11							.507	2.570
50	.396	6	.437	11							.417	3.478
20	.290	6	.331	11							.310	4.805
10	.215	6	.256	11							.235	5.523
5	.138	6	.170	11							.154	4.743
2	.071	6	.092	11							.081	3.281
1	.044	6	.060	11							.052	2.704
0.5	.028	6	.038	11							.033	2.178
0.2	.017	6	.023	11							.020	2.000
0.1	.013	5	.018	11							.015	2.250

Note: All pressures in PSIA.

$$\text{POWER} = \frac{V^2}{R} \text{ Watts} \quad 10^3 \frac{\text{Milliwatts}}{\text{Watt}} : \text{Milliwatts}$$

TABLE VIII

Yardney Electric — SPECIAL RESISTANCE CHARACTERISTIC DATA ON THE AUXILIARY ELECTRODES

SERIAL NO.	16		22								AVERAGE	
OHMS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	PRESS	VOLTS	MILLIWATTS
10,000	.898	20	.585	10							.741	.055
5,000	.899	20	.588	10							.744	.111
2,000	.893	20	.619	10							.756	.286
1,000	.872	20	.624	10							.748	.560
500	.859	20	.603	10							.731	1.07
200	.761	20	.480	10							.620	2.38
100	.619	20	.377	10							.498	3.12
50	.471	20	.287	10							.379	3.61
20	.304	20	.188	10							.246	3.78
10	.130	20	.118	10							.124	1.61
5	.125	20	.077	10							.101	1.58
2	.065	20	.048	10							.057	1.39
1	.039	19	.032	10							.034	1.26
0.5	.023	19	.016	10							.020	.800
0.2	.013	19	.009	10							.011	.605
0.1	.011	19	.006	10							.009	.810

Note: All pressures in PSIA.

$$\text{POWER} = \frac{V^2}{R} \text{ Watts } 10^3 \frac{\text{Milliwatts}}{\text{Watt}} : \text{Milliwatts}$$

APPENDIX I

APPENDIX I

STANDARD CELL MANUFACTURING INFORMATION

GENERAL

	E-P	G.E.	SAFT	YARDNEY
MANUFACTURER				
CELL DESIGNATION	RSN-20-3/S	42B024AB06/07	305129/36	YNC20.1/.2
LOT NO.	2	2	2	2
MCD NO.	RSN-20-3/S	232A2222AA-84	MCD NAS-0300	21406-1
REVISION	MAY 1976	4	1-20-76	7-19-78
NOMINAL CELL CAPACITY	20AH	20AH	20AH	20AH
FILL DATE	2-78	12-76	1-78	7-77

MECHANICAL DESIGN

NOMINAL DIMENSIONS (H,W,Th)	6.95* x 3.00 x .895	6.95* x 2.99 x .89	6.68* x 2.96 x 0.87	7.05* x 3.00 x 6.58
NOMINAL WEIGHT (grams)	840	895	805	805
CASE MATERIAL	304L ST. STEEL	304L ST. STEEL	304L ST. STEEL	304L ST. STEEL
THICKNESS (in)	.022	.019	.019	.019
COVER MATERIAL	304L ST. STEEL	304L ST. STEEL	304L ST. STEEL	304L ST. STEEL
THICKNESS (in)	.020	.019	.019	.019
TERMINAL TYPE	GE NICKEL BRAZE	GE NICKEL BRAZE	GULTON	ILC
NUMBER	(2)	(2)	(2)	(2)
LINER MATERIAL	POLYETHYLENE	POLYPROPYLENE	NYLON	TELFON
THICKNESS (in)	.007	.005	.005	.005
SEPARATOR MATERIAL	PELLON 2505 BAG	PELLON 2505 BAG	PELLON 2505 WRAP	PELLON 2505 BAG
TREATMENT	-	TRIPLE WASH	TRIPLE WASH	-
ELECTROLYTE	KOH	KOH	KOH	KOH
CONCENTRATION	32%	31%	34.5%	34.4%
SIGNAL ELECTRODE TYPE	COUPON	U WRAP	U WRAP	U WRAP
AREA (dm^2)	0.10	0.52	0.75	0.47

* TOP OF TERMINAL

	E-P		GE		SAFT		YARDNEY	
PLATE INFORMATION	+	-	+	-	+	-	+	-
NUMBER	11	12	11	12	9	10	8	9
PLAQUE TYPE	Dry	Dry	Slurry	Slurry	Slurry	Slurry	Slurry	Slurry
IMPREGNATION METHOD	FLEISCHER	FLEISCHER	CHEMICAL	CHEMICAL	CHEMICAL	CHEMICAL	EI	EI
DRY THICKNESS (in)	.023	.030	.027	.0315	.034	.035	.038	.042
TOTAL PLATE AREA (dm^2)	11.98	13.08	10.45	11.39	8.19	9.10	7.86	8.85
ELECTROCHEMICAL DESIGN								
LOADING g/dm^2	8.60	14.35	11.69	14.92	12.60	16.69	13.02	16.28
FLOODED PLATE CAPACITY (AH)	2.36	4.63	2.30	4.06	3.03	4.32	3.73	4.40
Plate Designation	5616	5616	-5(PM)**	-6(PM)**	804044-9	804945-9	14185	14185
Plate Treatment	Co	-	Cd,Co	Teflon	Co	-	Co	-
PRECHARGE AH (O_2 Vent)	0		9.4		6.2		6.0	
ELECTROLYTE VOLUME	84cc		85cc		75cc		96cc	
CAPACITY MEASUREMENTS								
24°C Capacity (AH)	24.30		22.75		23.57		26.29	
35°C Capacity (AH)	23.06		23.31		21.18		23.87	
0°C Capacity (AH)	21.16		20.03		26.63		25.23	
Charge efficiency (%)	58.7%		68.6%		60.8%		69.1%	
FINAL 24°C Capacity (AH)	24.90		23.96		24.10		2694	

** Prefix is 152B5460XX

APPENDIX II

APPENDIX II

I. TEST PROCEDURE

A. Phenolphthalein Leak Tests:

1. This test is a determination of the condition of the welds and ceramic seals on receipt of the cells and following the last discharge of the cells (Cycle 8).

2. The cells were initially checked with a one-half of one percent phenolphthalein solution applied with a cotton swab and then placed in a vacuum chamber and exposed to a vacuum of 40 microns of mercury or less for 24 hours. Upon removal they were rechecked for leaks and then received a final check following test completion. The requirement is no red or pink discoloration which indicates a leak.

B. Capacity Tests:

1. The capacity test is a determination of the cells' capacity at the c/2 discharge rate to 0.75 volt per cell, where c is the manufacturer's rated capacity. This type discharge follows all charges of this evaluation test.

2. The charges for the capacity tests are as follows:

a. c/20, 48 hours, room ambient (RA), cycle 0, with a test limit of 1.52 volts or pressure of 100 psia;

b. c/10, 24 hours, RA, cycle 1, with a test limit of 1.52 volts or 100 psia pressure and a requirement of maximum voltage (1.48) or pressure (65 psia);

c. c/10, 24 hours, 20° C, cycle 2, with the same limits and requirements as the charge of cycle 1.

C. Special Resistance Characterization Tests for Auxiliary Electrode Cells:

1. The purpose of this test is to determine the resistance to be placed across the cell's auxiliary electrode and negative terminals which will provide maximum signal when the cell is fully charged.

2. The cells are charged at c/10 for 24 hours at the room ambient temperature following their initial charge/discharge cycle. Following this the cells are continued on charge with the current reduced, if necessary, to maintain the cell's voltage below 1.520 volts and to stabilize the pressure between 10-20 psia. Resistance values, between 10,000 ohms and

0.1 ohm are then placed between the auxiliary electrode and the negative terminal. The cells are allowed a minimum of 5 minutes, at each resistance value, to obtain an equilibrium voltage across this resistance. This voltage value is then recorded and by calculation using the equation $P = E^2/R$ the resistance that produces maximum power is determined.

D. Internal Resistance:

1. Measurements are taken across the cell terminals 0.5 hour before the end-of-charge (EOC) on cycle 1; and 1 and 2 hours after the start-of-discharge of cycle 2. These measurements were made with a Hewlett-Packard milliohmmeter (Model 4328A).

E. Special Charge Retention Test, 20° C:

1. This test is to establish the capacity retention of each cell following a 7-day open-circuit stand in a charge mode.

2. The cells are charged at c/10 for 24 hours with the same limits and requirements as the charge of cycle 1. They then stand on open-circuit for 7 days, with the requirement that the open-circuit voltage of each cell, following this period, is within $\pm$ 5 millivolts of the average cell voltage. The cells are then discharged and 80 percent capacity out of that obtained in cycle 3 is required.

F. Internal Short Test:

1. This test is a means of detecting slight shorting conditions which may exist because of imperfections in the insulating materials, or damage to element in handling or assembly.

2. Following completion of the charge retention test capacity discharge, the cells are shunted with a 0.5-ohm, 3-watt resistor for 16 hours. At the end of 16 hours the resistors are removed and the cells stand on open-circuit voltage (OCV) for 24 hours. A minimum voltage of 1.15 is required at the end of 24 hours.

G. Charge Efficiency Test, 20° C:

1. This test is a measurement of the cells' charge efficiency when charged at a low current rate.

2. The cells are charged at c/40 for 20 hours with a test limit of 1.52 volts or 100 psia pressure. They are then discharged and the requirement is that the minimum capacity out equals 55 percent of capacity in during the preceding charge.

H. Overcharge Test 1, 0° C:

1. The purpose of this test is to determine the degree to which the cells will maintain a balanced voltage, and to determine the cells' capability to be overcharged without overcharging the negative electrode.

2. The cells are charged at c/20 for 60 hours. The test limits are cell voltages of 1.56 or greater for a continuous time period of 2 hours or pressures of 100 psia. The requirement if a voltage of 1.520 or a pressure of 65 psia. The cells are then discharged and 85 percent capacity out of that obtained in cycle 3 is required.

I. Overcharge Test 2, 35° C:

1. This test is a measurement of the cells' capacity at a higher temperature when compared to its capacity at 20° C. This test also determines the cells' capability of reaching a point of pressure equilibrium; oxygen recombination at the negative plate at the same rate it is being generated at the positive plate.

2. The cells are charged at c/10 for 24 hours with a test limit of 1.52 volts or 100 psia pressure and a requirement of 1.45 volts or 65 psia pressure. The cells are then discharged with a requirement that capacity out equals 55 percent capacity out as obtained in cycle 3.

J. Pressure Versus Capacity Test:

1. The purpose of this test is to determine the capacity to a pressure and the pressure dacay during charge and open-circuit stand respectively.

2. Each cell is charged at c/2 to either a pressure of 20 psia or a voltage of 1.550. Recordings are taken on each cell when it reaches 5, 10, 15 and 20 psia pressure. The cells then stand OCV for 1 hour with 30-minute recordings and then are discharged, shorted out and leak tested.