DEPARTMENT OF THE NAVY
NAVAL AMMUNITION DEPOT
CRANE, INDIANA 47522

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21 JAN 1969

From: Commanding Officer, U. S. Naval Ammunition Depot, Crane, Indiana
To: National Aeronautics and Space Administration, Goddard Space Flight Center (Code 716.2, Mr. T. J. Hennigan), Greenbelt, Maryland 20771

Subj: Monthly Progress Report on National Aeronautics and Space Administration Space Cell Test Program (4 copies)

Ref: (a) NASA Purchase Order W11,252B of 19 March 1962 to CO NAD Crane

Encl: (1) Explanation of Data
(2) Information on Active Tests as of 31 December 1968
(3) Information on Completed Tests as of 31 December 1968
(4) Data Available

1. The monthly status report of the Spacecraft Cell Testing program being done at NAD Crane for the National Aeronautics and Space Administration, under the direction of Goddard Space Flight Center, is submitted in accordance with reference (a). This status report lists the types of cells on test and their test parameters; and includes those cells which have completed tests.

2. Enclosure (1) is an explanation of the symbolic names used for the information on each pack listed in enclosures (2) and (3).

3. Enclosure (2) contains information on current tests; and enclosure (3) contains that on cells which have completed tests.

4. Data available in the form of printed lines, punched cards, or magnetic tape is listed in enclosure (4).

C. G. LYNCH
By direction

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NASA (Mr. Ernst M. Cohn, RNW), Washington, D. C. 20546
NASA, Scientific and Technical Information Division (Winnie M. Morgan, SU), Washington, D. C. 20546
NASA, Goddard Space Flight Center (Code 716.5. Mr. Charles MacKenzie), Greenbelt, Maryland 20771
NASA, Lewis Research Center (M.S. 309-1, Mr. B. Nagle), 21000 Brookpark Road, Cleveland, Ohio 44135
Douglas Missile and Space Systems Div., Astropower Lab., (Mr. Albert Himy, Section Chief), 2121 Campus Drive, Newport Beech, California 92663
General Electric Company (Mr. Guy Rampell), Gainesville, Florida 32601
General Electric. Spacecraft Department (Mr. M. Read, Room M-2614), P. O. Box 8555, Philadelphia, Pennsylvania 19101
Gulton Industries, Inc. (Mr. Carl Preusse), Metuchen, New Jersey 08840
Lockheed Missiles and Space Company (Mr. R. E. Corbett, Dept. 52-23, Bldg. 154), P. O. Box 504, Sunnyvale, California 94088
TRW Systems, Inc. (Dr. W. R. Scott), Redondo Beach, California 90278

EXPLANATION OF DATA

1. An explanation of the symbolic names used on line one of enclosures (2) and (3) follows:

a. TYPE: This stands for the type of cells in the battery pack. The following is a list of the symbols for the various types of cells.

(1) AGCD: Silver-Cadmium Cells.

(2) AGZN: Silver-Zinc Cells

(3) NICD: Nickel-Cadmium Cells.

(4) PBCA: Lead-Calcium Cells.

(5) PBH+: Lead-Acid Cells.

b. AMPHR: This stands for the ampere-hour capacity of the individual cells as rated by the manufacturer. Cells tested in this program have ranged in rated capacity from 1.25 to 50 ampere-hours.

c. PEROD: This is the total time (in hours) for one charge-discharge period during automatic cycling. The various cycle periods are listed below with the corresponding charge and discharge times.

Cycle Period	Charge Time	Discharge Time
1.5 hr.	1.0 hr.	0.5 hr.
3.0 hr.	2.5 hr.	0.5 hr.
8.0 hr.	7.0 hr.	1.0 hr.
24.0 hr.	23.0 hr.	1.0 hr.

d. DEPTH: This is the depth of discharge. The depth of discharge is given as a percentage of the manufacturer's rated ampere-hour capacity to be removed during discharge. The depths of discharge at which cells are presently being cycled are 15, 25 and 40 percent.

e. TEMP: This is the ambient temperature at which the cells undergo automatic cycling. The various ambient temperatures at which cells are currently cycling are -20°, 0°, 25° and 40° C.

f. MANFR: This stands for the manufacturer of the cells. The manufacturer is represented by one of the following symbols:

(1) CD: C&D Batteries.

(2) DL: Delco-Remy.

(3) ESP: The Electric Storage Battery Company.

(4) GE: General Electric.

(5) GO: Gould-National Batteries, Inc.

(6) GU: Gulton Industries, Inc.

(7) NF: NIFE, Jungner of Sweden.

(8) SO: Sonotone Corporation.

(9) YD: Yardney Electric Corporation.

g. SPSYM: This stands for special symbol. These symbols are used to describe special types of cells. They also indicate new charge control methods and devices used during automatic cycling.

(1) AE: Auxiliary electrode cells.

(2) CC: Commercial cells.

(3) CLM: Coulometer in series with cells to effect charge control.

(4) CPSP: Cellophane separator.

(5) C3SP: C3 separator.

(6) FRS: Vulcanized neoprene terminal to folded cover seal.

(7) IM: Improved ceramic seal.

(8) IPD: Internal pressure device.

(9) NB: Nimbus cells.

(10) NBPT: Nimbus cells with pressure transducers.

(11) PLSP: Pellon separator.

(12) PS: Polymerized neoprene terminal to cover seal.

(13) PT: Pressure transducer.

(14) RCPSP: Radiated cellophane separator.

(15) RS: Vulcanized neoprene terminal to cover seal.

(16) ST: Stabistors used for charge control of individual cells.

(17) WNSP: Woven nylon separator.

(18) 2SR: Two-step regulator used for charge control of cells.

(19) 3S: Triple seal between terminals and cover (ceramic between glass).

h. PACK: This stands for battery pack identification number. The numeric part of the number was assigned arbitrarily and is for convenient identification of the pack. The alphabetic character indicates the chronological order in which the battery packs were run. That is, pack 1A completed automatic cycling prior to starting pack 1B.

i. PRCHG: This represents the percent recharge. It is the charge following discharge, and is given as a percentage of the ampere-hours removed on the previous discharge. The percent recharge will range from 100 to 200 percent.

j. CHGCU: This represents the specified charging current in amperes.

k. DISCU: This represents the specified discharging current in amperes.

l. VOLIM: This is the specified per cell on charge voltage limit. Cells on test are connected in electrical series. The average cell voltage must not exceed this value during charging. The value is given in volts. Not all batteries on test have a per cell voltage limit. However, for those that do, the voltage limits will range from 1.45 to 1.60 volts per cell for nickel-cadmium cells to 1.97 to 2.05 volts per cell for silver-zinc cells.

m. NUMCP: This is the total number of cells connected in electrical series initially to form the battery pack.

n. STARTED: This is the date the pack was put on automatic cycling.

o. CYCLES: This is the number of charge-discharge cycles completed as of the end of the month by the active packs listed in enclosure (2). On the inactive packs, enclosure (3), this is the total number of charge-discharge cycles completed at the time the pack was removed from automatic cycling.

p. CELLS: This is the total number of cells still on automatic cycling at the end of the month.

q. FAILURES: This gives the total number of cells failed during the month.

r. COMPLETED: This is the date the pack was removed from automatic cycling.

INFORMATION ACTIVE TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	CYCLES	CELLS	FAILURES
AGCD	11.00	24.0	18	40	YD	AE-GU	033C		.25	2.00	1.51	5	10-17-65	318	5	0
AGCD	11.00	24.0	18	25	YD	AE-GU	069B		.25	2.00	1.51	5	2-14-68	319	4	0
AGCD	11.00	24.0	18	00	YD	AE-GU	057D		.25	2.00	1.51	5	2-14-68	310	10	0
AGCD	8.00	8.0	25	25	ESB	AE	001B	175	.50	2.00	1.51	5	9- 9-66	2416	4	0
AGCD	5.00	24.0	20	00	YD	NONE	113B	NONE	.30	1.00	1.50	5	1-22-67	705	5	0
NICD	20.00	1.5	75	25	SD	IPD	072B		20.00	30.00	1.50	10	9-20-67	610	10	0
NICD	20.00	3.0	40	25	SD	IPD	046A		20.00	16.00	1.50	10	9-20-67	866	8	0
NICD	20.00	1.5	40	25	SD	IPD	034B		20.00	16.00	1.50	10	9-20-67	2765	7	0
NICD	20.00	1.5	25	25	SD	IPD	010A	140	7.00	10.00	1.49	10	9-20-67	2940	10	0
NICD	20.00	1.5	25	25	SD	IPD	022A		20.00	10.00	1.50	10	9-20-67	2421	5	0
NICD	20.00	1.5	15	40	GU	AE	038E		8.00	6.00		5	3-23-68	4544	5	0
NICD	20.00	1.5	15	25	GU	AE	019B		8.00	6.00		5	3-23-68	4456	5	0
NICD	20.00	1.5	15	00	GU	AE	054B		8.00	6.00		5	3-23-68	4462	5	0
NICD	20.00	1.5	15	*	GU	MULTI	012D		10.00	6.00		5	2- 8-68	5172	5	0
NICD	12.00	3.0	25	25	GE	NONE	083A	125	1.50	6.00	1.49	5	1- 4-64	13691	3	0
NICD	12.00	3.0	25	00	GE	NONE	125A	115	1.38	6.00	1.55	5	1- 4-64	13862	5	0
NICD	12.00	3.0	15	00	GE	NONE	111A	115	.83	3.60	1.55	5	1- 4-64	13790	5	0
NICD	12.00	1.5	40	25	GU	AE	011B	NONE	6.00	9.60	NONE	5	10-17-66	11973	0	0
NICD	12.00	1.5	40	00	GU	AE	071B	NONE	6.00	9.60	NONE	5	1- 6-67	10930	5	0
NICD	12.00	1.5	25	00	GU	AE	070A	NONE	6.00	6.00	NONE	5	2-10-67	10665	5	0
NICD	12.00	1.5	25	00	GU	NONE	101B	115	3.45	6.00	1.55	5	12-19-64	22533	4	0
NICD	12.00	1.5	25	00	GE	NONE	124A	115	3.45	6.00	1.55	5	1- 4-64	27285	4	0
NICD	12.00	1.5	15	00	GU	NONE	016B	115	2.07	3.60	1.55	5	2-20-65	21620	5	0
NICD	12.00	1.5	15	00	GE	NONE	110A	115	2.07	3.60	1.55	5	1- 4-64	26710	5	0
NICD	6.00	1.5	25	40	GE	AE	006C		3.00	3.00		5	6- 6-68	3223	10	0
NICD	6.00	1.5	25	40	GE	AE	042C		3.00	3.00		5	5-20-68	3498	5	0

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ACTIVE TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	CYCLES	CELLS	FAILURES
NICD	6.00	3.0	25	40	GU	CLM	029B	NONE	3.00	3.00	NONE	5	11-18-66	5946	5	0
NICD	6.00	1.5	15	40	GE	AE	047C		1.80	1.80		5	7-18-68	2570	10	0
NICD	6.00	1.5	25	25	GE	AE	005B		3.00	3.00		5	5-20-68	2754	5	0
NICD	6.00	1.5	25	25	GE	AE	017B		3.00	3.00		5	5-20-68	3515	5	0
NICD	6.00	3.0	25	25	GU	CLM	018C	NONE	3.00	3.00	NONE	5	11-18-66	5578	5	0
NICD	6.00	1.5	15	25	GE	AE	028C		1.80	1.80		5	7-18-68	2604	10	0
NICD	6.00	3.0	25	-20	GU	CLM	041B	NONE	3.00	3.00	NONE	5	11-18-66	5758	5	0
NICD	6.00	3.0	25	00	GU	CLM	066B	NONE	3.00	3.00	NONE	5	11-18-66	6011	5	0
NICD	6.00	1.5	25	*	GU	AE	024C	NA	3.00	3.00	NONE	5	4-25-67	9717	5	0
NICD	6.00	1.5	25	00	GU	IM	013B	115	1.73	3.00	1.55	5	2-22-65	21754	5	0
NICD	6.00	1.5	25	00	GE	AE	052C		3.00	3.00		5	6- 6-68	3265	5	0
NICD	6.00	1.5	25	00	GE	AE	050B		3.00	3.00		5	5-20-68	3501	5	0
NICD	6.00	1.5	15	00	GE	AE	053B		1.80	1.80		5	7-19-68	2544	10	0
NICD	6.00	1.5	15	*	GU	AE	060B	NA	1.80	1.80	NONE	5	4-25-67	9734	5	0
NICD	6.00	1.5	10	00	GU	NONE	061B	110	.66	1.20	1.55	10	6- 7-67	8795	10	0
NICD	6.00	1.5	25	*	GE	AE	066B		3.00	3.00		5	7- 4-68	2761	5	0
NICD	5.60	1.5	25	-20	GU	FRS	044B	115	1.61	2.80	1.60	5	1- 2-66	16804	5	0
NICD	5.60	1.5	25	-20	GU	RS	032B	115	1.61	2.80	1.60	5	1- 2-66	16698	4	0
NICD	5.60	1.5	25	00	GU	RS	090C	115	1.61	2.80	1.55	5	12-27-65	17056	5	0
NICD	5.60	1.5	25	00	GU	FRS	100B	115	1.61	2.80	1.55	5	12-17-65	16970	5	0
NICD	5.00	1.5	25	00	GE	NBPT	107A	110	1.38	2.50	1.49	5	6- 5-65	20081	5	0
NICD	5.00	1.5	25	00	GU	NBPT	121A	110	1.38	2.50	1.49	5	6- 5-65	19867	3	0
NICD	5.00	1.5	15	25	GE	NB	106A	120	.90	1.50	1.49	5	4-24-65	20695	5	0
NICD	5.00	1.5	15	25	GU	NB	120A	120	.90	1.50	1.49	5	5- 2-65	19321	5	0
NICD	5.00	1.5	15	00	GE	NB	103A	110	.83	1.50	1.49	5	4-24-65	20688	5	0
NICD	5.00	1.5	15	00	GU	NB	117A	110	.83	1.50	1.49	5	5- 8-65	20282	5	0

FOLDOUT FRAME

INFORMATION ACTIVE TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	CYCLES	CELLS	FAILURES
NICD	4.00	1.5	25	25	GU	CC	0048	125	1.25	2.00	1.49	5	8- 4-64	23352	5	0
NICD	4.00	1.5	25	00	GU	CC	1268	115	1.15	2.00	1.56	5	7-25-64	24981	5	0
NICD	4.00	1.5	15	25	GU	CLM	026C	NONE	1.20	1.20	1.44	5	2-18-67	10493	5	0
NICD	4.00	1.5	15	00	GU	CC	1158	115	.69	1.20	1.55	5	7-25-64	24532	5	0
NICD	3.90	1.5	25	25	NIFE	NONE	085C	107	1.07	2.00	1.50	6	9-29-67	6806	5	0
NICD	3.90	1.5	25	00	NIFE	NONE	097C	107	1.07	2.00	1.50	5	9-29-67	7112	5	0
NICD	3.50	1.5	40	25	GU	PS	073C	125	1.75	2.80	1.49	5	12-23-66	10986	3	0
NICD	3.50	1.5	40	-20	GU	PS	075D	110	1.54	2.80	1.56	5	12-24-66	10091	4	0
NICD	3.50	1.5	40	00	GU	PS	099C	115	1.61	2.80	1.55	5	12-24-66	11394	5	0
NICD	3.50	1.5	25	40	GU	PS	112C	160	1.40	1.75	1.45	5	1- 2-67	11090	4	0
NICD	3.50	1.5	25	25	GU	PS	067C	125	1.09	1.75	1.49	5	12-23-66	11410	5	0
NICD	3.50	1.5	25	-20	GU	PS	069C	110	.96	1.75	1.56	5	12-24-66	11313	5	0
NICD	3.50	1.5	25	00	GU	PS	122C	115	1.01	1.75	1.55	5	12-24-66	18393	5	0
NICD	3.50	1.5	10	00	SO	NONE	0168	110	.39	.70	1.55	10	6- 7-67	8863	10	0
NICD	3.00	1.5	25	00	SO	3S	0318	115	.96	1.50	1.55	5	6-24-65	18960	5	0
NICD	3.00	1.5	15	00	SO	3S	043_B	115	.52	.90	1.55	5	6-24-65	19283	5	0
NICD	1.25	1.5	60	-20	GU	NONE	088D	NONE	1.00	.63	NONE	5	3- 3-66	14999	4	0
NICD	1.25	1.5	25	-20	GU	NONE	074B	NONE	1.00	.63	NONE	5	3- 3-66	15610	5	0
NICD	1.25	1.5	25	00	GU	NONE	108B	NONE	1.25	.63	NONE	6	3- 4-66	15913	5	0

FOLDOUT FRAME

FOLDOUT FRAME

FOOTNOTE

* THESE CELLS ARE IN AMBIENT TEMPERATURE, WHICH VARIES SINUSOIDALLY FROM ZERO TO FORTY DEGREES CENTIGRADE WITHIN A PERIOD OF 48 HOURS.

MULTI THESE PACKS CONTAIN TWO CELLS WITH THIRD ELECTRODES, A COULOMETER PRESSURE TRANSDUCERS, AND PRESSURE GAGES

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
AGCD	12.00	24.0	50	40	YD	NONE	033A	NONE	.60	6.00	1.50	10	2-14-64	9-20-64	210
AGCD	12.00	24.0	43	40	YD	AE-GE	009F	NA	.50	5.20	1.51	5	6-16-67	5-28-68	310
AGCD	12.00	24.0	50	00	YD	NONE	057A	NONE	.60	6.00	1.50	10	2-14-64	9- 3-64	168
AGCD	12.00	24.0	43	00	YD	AE-GE	021D	NA	.50	5.20	1.51	5	6-16-67	8-14-67	61
AGCD	12.00	1.5	25	25	YD	NONE	082B	130	3.90	6.00	1.55	5	1-17-66	11-27-66	4569
AGCD	12.00	1.5	25	-20	YD	NONE	085B	130	3.90	6.00	1.60	5	1-19-66	3-25-67	2375
AGCD	12.00	1.5	25	00	YD	NONE	097B	130	3.90	6.00	1.58	5	1-19-66	3-15-67	4481
AGCD	11.00	24.0	40	25	YD	NONE	021B	157	.30	4.40	1.51	10	11- 5-66	1-13-67	69
AGCD	11.00	24.0	40	00	YD	NONE	045B	157	.30	4.40	1.51	10	11- 5-66	3-13-67	121
AGCD	11.00	8.0	27	25	YD	PLSP	021C	117	.50	3.00	1.51	5	3-28-67	4- 9-67	37
AGCD	11.00	8.0	27	25	YD	WNSP	045C	117	.50	3.00	1.51	5	3-28-67	4-22-67	70
AGCD	10.00	8.0	30	25	YD	NONE	045D	117	.50	3.00	1.51	5	5- 3-67	11-21-68	17590
AGCD	5.00	24.0	20	40	YD	C3SP	045A	NONE	.30	1.00	1.50	5	9-27-65	11-16-65	61
AGCD	5.00	24.0	20	40	YD	NONE	128B	NONE	.30	1.00	1.50	5	1-19-67	11- 4-67	269
AGCD	5.00	24.0	20	25	YD	RCPSP	009C	NONE	1.00	10.00	1.97	10	10-27-65	12- 1-65	34
AGCD	5.00	24.0	20	25	YD	C3SP	021A	NONE	.30	1.00	1.50	5	9-17-65	12-25-65	98
AGCD	5.00	24.0	20	25	YD	CPSP	033B	NONE	.30	1.00	1.49	5	10-17-65	11- 4-67	720
AGCD	5.00	24.0	20	25	YD	PLSP	069A	NONE	.30	1.00	1.50	5	10-27-65	7-17-67	610
AGCD	5.00	24.0	20	25	YD	NONE	105B	NONE	.30	1.00	1.50	5	1-12-67	4-19-67	77
AGCD	5.00	24.0	20	25	YD	NONE	077B	NONE	.30	1.00	1.50	5	1-12-67	11-12-68	6610
AGCD	5.00	8.0	20	25	YD	NONE	118C	NONE	.30	1.00	1.50	5	1-17-67	7- 3-68	1505
AGCD	5.00	24.0	20	00	YD	C3SP	057B	NONE	.30	1.00	1.50	5	9-17-65	6-17-66	267
AGCD	5.00	8.0	20	00	YD	NONE	114B	NONE	.30	1.00	1.50	5	1-22-68	6-25-68	14966
AGCD	3.00	1.5	16	25	YD	NONE	002C	260	1.30	1.00	1.52	9	9-16-66	12-12-67	7039
AGZN	40.00	24.0	25	25	DL	NONE	075B	NONE	25.00	10.00	1.97	5	10-28-64	3-15-65	139
AGZN	25.00	24.0	40	25	DL	25R	009D	NONE	1.00	10.00	1.97	10	12-13-65	4-18-66	121

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
AGZN	25.00	24.0	40	25	DL	25R	009E	NONE	1.00	10.00	1.97	10	10- 5-66	1- 4-67	90
AGZN	25.00	24.0	40	25	DL	NONE	075A	NONE	15.00	10.00	1.97	5	8-18-64	9-18-64	32
AGZN	25.00	24.0	40	25	DL	NONE	089A	NONE	15.00	10.00	1.97	5	9-18-64	12- 8-64	80
AGZN	25.00	3.0	40	25	DL	NONE	068B	NONE	15.00	20.00	1.97	5	3- 1-65	3-16-65	120
AGZN	25.00	3.0	40	25	DL	NAOH	068C	NONE	15.00	20.00	1.97	5	3-26-65	5- 6-65	325
AGZN	16.00	24.0	31	25	YD	NONE	057C	230	.50	5.00	2.00	10	12- 2-66	8-30-67	281
AGZN	12.00	24.0	42	25	YD	NONE	009A	NONE	.50	5.00	1.97	10	5- 7-65	7- 7-65	58
NICD	50.00	1.5	25	40	GU	NONE	081A	NONE	14.33	25.00	1.55	5	7- 5-64	7-12-65	4
NICD	50.00	1.5	25	40	GU	NONE	109A	160	14.33	25.00	1.55	5	7-11-64	7-26-64	165
NICD	50.00	1.5	25	00	GU	NONE	095A	115	14.38	25.00	1.55	5	6- 8-64	2- 9-65	3227
NICD	50.00	1.5	15	40	GU	NONE	123A	160	12.00	15.00	1.45	5	6- 8-64	11-11-64	1878
NICD	20.00	3.0	40	25	GD	NONE	119A	125	4.00	16.00	1.49	5	2- 1-64	9-27-64	1793
NICD	20.00	3.0	40	25	GU	NONE	088A	125	4.00	16.00	1.49	5	2- 1-64	3-21-64	359
NICD	20.00	3.0	25	40	GD	NONE	122A	160	3.20	10.00	1.45	5	1-24-64	7- 2-64	983
NICD	20.00	3.0	25	40	GU	NONE	091A	160	3.20	10.00	1.45	5	1-24-64	10-14-65	4480
NICD	20.00	3.0	25	25	GD	NONE	105A	125	2.50	10.00	1.49	5	1-21-64	3-17-66	5690
NICD	20.00	1.5	25	*	GU	MULTI	036C		10.00	10.00		5	2- 8-68	8-14-68	966
NICD	20.00	3.0	25	25	GU	NONE	074A	125	2.50	10.00	1.49	5	1-21-64	9-27-64	1755
NICD	20.00	3.0	25	00	GD	NONE	094A	115	2.30	10.00	1.55	5	1-24-64	2-13-68	11162
NICD	20.00	3.0	25	00	GU	NONE	116A	115	2.30	10.00	1.55	5	2-11-64	2-13-68	10971
NICD	20.00	3.0	15	40	GD	NONE	108A	160	1.92	6.00	1.45	5	1-24-64	8-31-65	4273
NICD	20.00	3.0	15	00	GD	NONE	080A	115	1.38	6.00	1.55	5	1-24-64	2-13-68	11378
NICD	20.00	3.0	15	00	GU	NONE	102A	115	1.38	6.00	1.55	5	1-24-64	2-13-68	11212
NICD	20.00	1.5	40	25	GD	NONE	118A	125	10.00	16.00	1.49	5	2- 1-64	9- 7-64	2937
NICD	20.00	1.5	40	25	GU	NONE	087A	125	10.00	16.00	1.49	5	2- 1-64	4- 7-64	627
NICD	20.00	1.5	40	*	GU	MULTI	058C		10.00	16.00		5	2- 8-68	3- 2-68	131

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
NICD	20.00	1.5	25	40	GD	NONE	126A	160	8.00	10.00	1.45	5	1-16-64	5-23-64	1574
NICD	20.00	1.5	25	40	GU	NONE	090A	160	8.00	10.00	1.45	5	1-18-64	11-12-64	4045
NICD	20.00	1.5	25	25	GU	NONE	073A	125	6.25	10.00	1.49	5	1-16-64	6-30-65	7763
NICD	20.00	1.5	25	25	GD	NONE	104A	125	6.25	10.00	1.49	5	1-16-64	8-20-64	2980
NICD	20.00	1.5	25	00	GD	NONE	098A	115	5.75	10.00	1.55	5	1-21-64	1-14-66	10641
NICD	20.00	1.5	25	00	GU	NONE	115A	115	5.75	10.00	1.55	5	1-16-64	6-24-64	2291
NICD	20.00	1.5	15	40	GU	AE	036B	NONE	5.00	6.00	NONE	5	3-11-67	9- 5-67	2740
NICD	20.00	1.5	15	40	GU	NONE	076A	160	1.92	6.00	1.45	5	1-18-64	10-15-65	9348
NICD	20.00	1.5	15	40	GU	NONE	077A	160	1.92	6.00	1.45	5	1-21-64	4-20-66	6032
NICD	20.00	1.5	15	40	GD	NONE	112A	160	4.80	6.00	1.45	5	1-16-64	2-15-65	5213
NICD	20.00	1.5	15	25	GU	AE	012C	NONE	5.00	6.00	NONE	5	3- 9-67	1-25-68	4934
NICD	20.00	1.5	15	00	GU	AE	058B	NONE	5.00	6.00	NONE	5	4- 8-67	1-25-68	4081
NICD	20.00	1.5	15	00	GD	NONE	064A	115	3.45	6.00	1.55	5	1-16-64	2-13-68	22448
NICD	20.00	1.5	15	00	GU	NONE	101A	115	3.45	6.00	1.55	5	1-16-64	9-20-64	3631
NICD	12.00	24.0	50	25	GE	NONE	093A	115	.52	6.00	1.45	5	3-28-64	4-28-65	349
NICD	12.00	3.0	40	25	GE	NONE	097A	125	2.40	9.60	1.49	5	1- 4-64	11- 8-65	5002
NICD	12.00	3.0	25	40	GE	NONE	100A	160	1.92	6.00	1.45	5	1- 4-64	9-24-65	4424
NICD	12.00	1.5	25	40	GU	AE	047B	NONE	6.00	6.00	NONE	5	1- 5-67	6-15-68	6537
NICD	12.00	3.0	15	40	GE	NONE	086A	160	1.15	3.60	1.45	5	12-29-67	1- 4-64	10661
NICD	12.00	1.5	40	40	GE	AE	034A	NONE	6.00	9.60	NONE	5	1-27-67	2- 3-67	65
NICD	12.00	1.5	40	25	GE	AE	024A	NONE	9.60	9.60	NONE	5	10- 2-65	11-19-65	665
NICD	12.00	1.5	40	25	GE	AE	024B	NONE	6.00	9.60	NONE	5	1- 5-67	2-10-67	38
NICD	12.00	1.5	40	25	GE	NONE	096A	125	6.00	9.60	1.49	5	1- 4-64	10- 2-64	4020
NICD	12.00	1.5	40	25	GU	NONE	095B	125	6.00	9.60	1.49	5	12- 2-64	11- 9-65	5152
NICD	12.00	1.5	40	00	GE	AE	072A	NONE	6.00	6.00	NONE	5	1-20-67	2- 2-67	304
NICD	12.00	1.5	25	40	GE	AE	036A	NONE	6.00	6.00	NONE	5	1-27-67	2- 3-67	75

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
NICD	12.00	1.5	25	40	GE	NONE	099A	160	4.80	6.00	1.45	5	1- 9-64	1- 5-65	4853
NICD	12.00	1.5	25	40	GU	NONE	090B	160	8.00	10.00	1.45	5	12- 5-64	11-10-65	5124
NICD	12.00	1.5	25	25	GE	AE	012A	NONE	6.00	6.00	NONE	5	7-20-65	12- 1-65	1698
NICD	12.00	1.5	25	25	GE	AE	012B	NONE	6.00	6.00	NONE	5	1- 6-67	2-10-67	404
NICD	12.00	1.5	25	25	GU	NONE	027B	125	3.75	6.00	1.49	5	1-28-65	9- 5-67	14250
NICD	12.00	1.5	25	25	GE	NONE	082A	125	3.75	6.00	1.49	5	1- 4-64	12-30-65	10878
NICD	12.00	1.5	25	00	GE	AE	048A	NONE	9.60	9.60	NONE	5	10-12-65	2-10-67	5110
NICD	12.00	1.5	25	00	GE	AE	058A	NONE	6.00	6.00	NONE	5	1-20-67	2-10-67	136
NICD	12.00	1.5	25	00	GE	AE	060A	NONE	6.00	6.00	NONE	5	10- 6-65	10-20-66	5650
NICD	12.00	1.5	15	40	GE	NONE	085A	160	2.88	3.60	1.45	5	1- 9-64	11- 8-65	9710
NICD	12.00	1.5	15	40	GU	NONE	078A	160	2.88	3.60	1.45	5	12-22-64	1- 4-66	11081
NICD	10.00	1.5	25	40	GU	AE	006B	NONE	5.00	6.00	NONE	5	11-27-67	3-14-68	5685
NICD	10.00	1.5	25	25	GU	AE	008B	NONE	5.00	6.00	NONE	5	11-27-67	5- 6-68	2414
NICD	6.00	1.5	40	*	GU	AE	048B	NA	4.80	4.80	NONE	5	4-25-67	7- 9-68	6156
NICD	6.00	24.0	50	25	GU	NONE	079A	115	.20	3.00	1.49	5	3-28-64	10-13-65	545
NICD	6.00	3.0	40	25	GU	NONE	018A	125	1.20	4.80	1.49	10	12-31-63	8-18-64	1550
NICD	6.00	1.5	25	*	GE	AE	062B		3.00	3.00		5	7- 4-68	12- 9-68	23160
NICD	6.00	1.5	25	40	GE	PLSEP	027C	NON	4.80	4.80	NONE	5	11- 7-68	12-16-68	5590
NICD	6.00	1.5	25	40	GE	RDSEP	009G	NONE	4.80	4.80	NONE	5	11- 7-68	11-21-68	5590
NICD	6.00	3.0	25	40	GU	NONE	042A	160	1.20	3.00	1.45	10	12-31-63	8-23-65	4133
NICD	6.00	3.0	25	25	GU	NONE	017A	125	.75	3.00	1.49	10	12-20-63	1-31-65	2885
NICD	6.00	1.5	25	00	GU	AE	059A	NONE	3.00	3.00	NONE	5	4-15-67	2-28-68	14863
NICD	6.00	3.0	25	00	GU	NONE	066A	115	.69	3.00	1.55	10	12-31-63	8-31-65	4414
NICD	6.00	3.0	15	40	GU	NONE	041A	160	.58	1.80	1.45	10	12-31-63	9-14-64	1689
NICD	6.00	3.0	15	00	GU	NONE	065A	115	.41	1.80	1.55	10	12-31-63	2-15-68	11208
NICD	6.00	1.5	40	25	GU	IM	018B	125	3.00	4.80	1.49	5	2-22-65	7-21-66	7577

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PEROD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
NICD	6.00	1.5	40	25	GU	AE	011A	NONE	4.80	4.80	NONE	5	2- 5-65	7- 9-66	7743
NICD	6.00	1.5	40	00	GU	AE	071A	NONE	4.80	4.80	NONE	5	4-15-65	5-18-66	5764
NICD	6.00	1.5	25	40	GU	NONE	038A	160	2.40	3.00	1.45	10	12-30-63	5-22-64	1377
NICD	6.00	1.5	25	40	GU	IM	038B	160	2.40	3.00	1.45	5	2-22-65	3-31-66	5766
NICD	6.00	1.5	25	40	GU	AE	047A	NONE	3.00	3.00	NONE	5	5-16-67	5-11-66	5521
NICD	6.00	1.5	25	40	GU G	CLM	038C	NONE	3.00	3.00	1.45	5	5- 7-66	9-20-66	4059
NICD	6.00	1.5	25	25	GU	NONE	013A	125	1.88	3.00	1.49	10	12-31-63	11-11-64	4021
NICD	6.00	1.5	25	25	GU	NONE	014A	125	3.00	4.80	1.49	10	12-30-63	6-19-64	2086
NICD	6.00	1.5	25	00	GU	NONE	062A	115	1.72	3.00	1.55	10	12-30-63	2-15-68	22779
NICD	6.00	1.5	15	40	GU	AE	035A	NONE	1.80	1.80	1.45	5	6-28-65	11-30-67	12511
NICD	6.00	1.5	15	40	GU	NONE	037A	160	.14	1.80	1.46	10	12-31-63	4-14-65	6064
NICD	6.00	1.5	15	00	GU	NONE	061A	115	1.04	1.80	1.55	10	12-31-63	12-17-65	10146
NICD	5.60	1.5	25	40	GU	RS	030B	160	2.24	2.80	1.45	5	12- 3-65	3- 8-66	1275
NICD	5.60	1.5	25	40	GU	FRS	042B	160	2.24	2.80	1.45	5	12- 3-65	9-10-66	3798
NICD	5.60	1.5	25	25	GU	RS	096C	125	1.75	2.80	1.49	5	12-10-65	9-19-67	9791
NICD	5.00	3.0	40	25	SD	NONE	006A	125	1.00	4.00	1.49	10	1- 2-64	12-13-65	5211
NICD	5.00	3.0	25	40	SD	NONE	030A	160	.80	2.50	1.45	10	12-31-63	6- 7-65	4141
NICD	5.00	3.0	25	25	SD	NONE	005A	125	.62	2.50	1.49	10	12-31-63	2-12-68	11092
NICD	5.00	1.5	25	25	SD	AE	014D	NONE	2.50	1.47	1.50	5	11-37-67	2- 4-68	1179
NICD	5.00	3.0	25	00	SD	NONE	054A	115	.58	2.50	1.55	10	12-31-63	2- 7-68	11331
NICD	5.00	3.0	15	40	SD	NONE	029A	160	.48	1.50	1.45	10	12-31-63	4-17-66	5975
NICD	5.00	3.0	15	00	SD	NONE	053A	115	.35	1.50	1.55	10	12-31-63	2-13-68	11427
NICD	5.00	1.5	40	25	SD	NONE	002A	125	2.50	4.00	1.49	10	12-17-63	4-24-65	6671
NICD	5.00	1.5	40	25	SD	ST	087B	NONE	5.00	4.00	NONE	5	8-12-65	1-27-66	2392
NICD	5.00	1.5	40	-20	SD	ST	089B	NONE	5.00	4.00	NONE	5	10-24-65	2-26-66	1530
NICD	5.00	1.5	40	00	SD	ST	122B	NONE	5.00	4.00	NONE	5	9- 5-65	9-24-66	5190

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
NICD	5.00	1.5	25	40	GE	NBPT	114A	130	1.63	2.50	1.49	5	6-12-65	12-19-66	8273
NICD	5.00	1.5	25	40	GU	NBPT	128A	130	1.63	2.50	1.49	5	6-12-65	8-18-66	6345
NICD	5.00	1.5	25	40	SD	NONE	026A	160	2.00	2.50	1.45	10	12-17-63	10-15-64	3625
NICD	5.00	1.5	25	40	SD	ST	099B	NONE	5.00	2.50	NONE	5	8-23-65	7- 9-66	4388
NICD	5.00	1.5	25	25	SD	NONE	001A	125	1.56	2.50	1.49	10	12-17-63	2-27-66	11745
NICD	5.00	1.5	25	25	GE	NBPT	104B	120	1.50	2.50	1.49	5	6-10-65	11-15-67	13149
NICD	5.00	1.5	25	25	GU	NBPT	119B	120	1.50	2.50	1.49	5	6-10-65	11-22-66	8108
NICD	5.00	1.5	25	25	SD	ST	073B	NONE	5.00	2.50	NONE	5	8-12-65	4-15-66	3742
NICD	5.00	1.5	25	-20	SD	ST	075C	NONE	5.00	2.50	NONE	5	10-24-65	4- 5-66	2145
NICD	5.00	1.5	25	00	SD	NONE	060A	115	1.44	2.50	1.55	10	12-17-63	2-15-68	22525
NICD	5.00	1.5	25	00	SD	ST	092A	NONE	5.00	2.50	NONE	5	9- 5-65	5-24-67	8774
NICD	5.00	1.5	15	40	GE	NB	113A	130	.98	1.50	1.45	5	4-24-65	3-15-66	4998
NICD	5.00	1.5	15	40	GU	NB	127A	130	.98	1.50	1.45	5	4-29-65	5-24-67	10638
NICD	5.00	1.5	15	40	SD	NONE	025A	160	1.20	1.50	1.45	10	12-17-63	10-31-65	9328
NICD	5.00	1.5	15	40	SD	ST	112B	NONE	5.00	1.50	NONE	5	8-23-65	4- 1-66	3294
NICD	5.00	1.5	15	00	SD	NONE	049A	115	.86	1.50	1.55	10	12-31-63	2-15-68	23112
NICD	4.00	1.5	15	40	GU	CC	028B	160	.96	1.20	1.45	5	8- 4-64	7- 6-68	20227
NICD	4.00	1.5	25	00	GU	CLM	052B	NONE	2.00	2.00	1.48	5	3- 3-67	3- 4-68	5671
NICD	4.00	1.5	60	25	GU	CLM	038D	NONE	3.20	3.20	1.44	5	2-18-67	6-27-67	1927
NICD	4.00	1.5	40	25	GU	CC	014B	125	2.00	3.20	1.49	5	8- 4-64	3-19-66	8474
NICD	4.00	1.5	40	25	GU	CLM	037C	NONE	4.80	4.80	1.44	5	3- 4-67	5- 5-67	790
NICD	4.00	1.5	25	40	GU	CLM	039C	NONE	2.00	2.00	1.38	5	3- 3-67	6-20-67	1508
NICD	4.00	1.5	25	40	GU	CC	040B	160	1.60	2.00	1.45	5	8- 4-64	6-22-66	10360
NICD	4.00	1.5	25	25	GU	CLM	014C	NONE	2.00	2.00	1.44	5	3- 3-67	8- 8-67	2428
NICD	4.00	1.5	25	-20	GU	CLM	040C	NONE	2.00	2.00	1.56	5	3- 4-67	3- 4-67	2
NICD	3.60	1.5	40	25	GU	CLM	039B	NONE	3.60	2.88	1.49	10	11-11-65	12- 6-66	5399

FOLDOUT FRAME

FOLDOUT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PERIOD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
NICD	3.50	3.0	40	25	GD	NONE	008A	125	.75	2.80	1.49	10	12-20-63	11-29-64	2494
NICD	3.50	3.0	25	40	GD	NONE	032A	160	.56	1.75	1.45	10	12-20-63	6-10-64	975
NICD	3.50	3.0	25	25	GD	NONE	007A	125	.44	1.75	1.49	10	12-20-63	7-26-65	4173
NICD	3.50	3.0	25	00	GD	NONE	056A	115	.40	1.75	1.55	10	0- 0-30	2-15-68	11897
NICD	3.50	3.0	15	40	GD	NONE	031A	160	.34	1.05	1.45	10	12-20-63	1- 3-65	2517
NICD	3.50	3.0	15	00	GD	NONE	055A	115	.24	1.05	1.55	10	12-20-63	2-15-68	11546
NICD	3.50	1.5	25	00	GD	NONE	052A	115	1.00	1.75	1.55	10	12- 5-63	6-11-66	13730
NICD	3.50	1.5	40	25	GD	NONE	004A	125	1.72	2.80	1.49	10	12- 5-63	7- 9-64	3164
NICD	3.50	1.5	25	40	GD	NONE	028A	160	1.40	1.75	1.45	10	12-12-63	5-29-64	1811
NICD	3.50	1.5	25	25	GD	NONE	003A	125	1.09	1.75	1.49	10	12- 6-63	10-31-64	4751
NICD	3.50	1.5	15	40	GD	NONE	027A	160	.84	1.05	1.45	10	12-12-63	11- 4-64	4485
NICD	3.50	1.5	15	00	GD	NONE	051A	115	.60	1.05	1.55	10	12- 5-63	2-15-68	22364
NICD	3.00	3.0	40	25	GE	NONE	020A	125	.60	2.40	1.49	10	12-20-63	1- 8-66	5410
NICD	3.00	3.0	25	40	GE	NONE	044A	160	.48	1.50	1.45	10	12-20-63	9-14-65	4487
NICD	3.00	3.0	25	25	GE	NONE	019A	125	.38	1.50	1.49	10	12-20-63	2-12-68	10768
NICD	3.00	3.0	25	00	GE	NONE	068A	115	.34	1.50	1.55	10	12-20-63	2-13-68	11740
NICD	3.00	3.0	15	40	GE	NONE	043A	160	.29	.90	1.45	10	12-20-63	12-26-64	2656
NICD	3.00	3.0	15	00	GE	NONE	067A	115	.21	.90	1.55	10	12-20-63	2-15-68	11632
NICD	3.00	1.5	40	25	GE	NONE	016A	125	1.50	2.40	1.49	10	12- 5-63	11-18-64	5014
NICD	3.00	1.5	40	25	SD	3S	002B	125	1.50	2.40	1.49	5	7-10-65	7-26-66	5399
NICD	3.00	1.5	25	40	GE	NONE	040A	160	1.20	1.50	1.45	10	12-12-63	7- 9-64	2511
NICD	3.00	1.5	25	40	SD	3S	037B	160	1.20	1.50	1.45	5	7-10-65	8- 4-66	5625
NICD	5.60	1.5	25	25	GU	FRS	076B	125	1.75	2.80	1.49	5	12-10-65	1- 2-68	11158
NICD	6.00	1.5	25	25	GU	AE	023A	NONE	3.00	3.00	1.49	5	2- 5-66	1-24-68	15713
NICD	3.00	1.5	25	25	GE	NONE	015A	125	.94	1.50	1.49	10	12- 6-63	11- 6-65	10382
NICD	3.00	1.5	25	25	SD	3S	003B	125	.94	1.50	1.49	5	6-25-65	8-23-67	11726

EXCEPT FRAME

INFORMATION ON COMPLETED TESTS

TYPE	AMPHR	PERDD	DEPTH	TEMP	MANFR	SPSYM	PACK	PRCHG	CHGCU	DISCU	VOLIM	NUMCP	STARTED	COMPLETED	CYCLES
NICD	3.00	1.5	25	00	GE	NONE	064A	115	.86	1.50	1.55	10	12- 5-63	2-14-68	23441
NICD	3.00	1.5	15	40	GE	NONE	039A	160	.72	.90	1.45	10	12-12-63	6-19-65	6109
NICD	3.00	1.5	15	40	SD	3S	026B	160	.72	.90	1.45	5	7-10-65	10- 4-66	6285
NICD	3.00	1.5	15	00	GE	NONE	063A	115	.52	.90	1.55	10	12- 6-63	2-15-68	22923
NICD	1.25	1.5	60	00	GU	NONE	098B	NONE	1.25	1.50	NONE	5	3- 4-66	5-28-68	12247
PBCA	5.00	1.5	40	25	CD	NONE	009B	NONE	2.39	2.39	2.25	5	8-23-65	9-21-65	39

FOLD OUT FRAME

FOLD OUT FRAME

FOOTNOTE

* THESE CELLS ARE IN AMBIENT TEMPERATURE, WHICH VARIES SINUSOIDALLY FROM ZERO TO FORTY DEGREES CENTIGRADE WITHIN A PERIOD OF 48 HOURS.

MULTI THESE PACKS CONTAIN TWO CELLS WITH THIRD ELECTRODES, A COULOMETER PRESSURE TRANSDUCERS, AND PRESSURE GAGES