

QUALITY FIRST

ORIGINAL

UNIT 2

SONGS MAINTENANCE ORDER NO: 07020581000

CATEGORY: 70 - Work In Progress

REPETITIVE MAINT. NO. - 30972016000

INTERVAL - 01

FREQUENCY - A

RESPONSIBLE ORG: ELECTRICAL UNIT 2

MAINTENANCE TYPE: SV

EQUIPMENT ID: S21806EB008

RC:

CONST. CODE: N/A

PRIORITY: DD

SU SYSTEM: PKA ACCOUNTING DISTRIBUTION: 0121 7221 098 020

QC WITNESS/HOLD REQD: N

FUNC DESC: 125VDC STATION BATTERY 2D2

LOCATION. AREA: CB ROOM: 306B ELEVATION: 050 COLUMN: 18.5L1

QUAL CLASS: 2

**** NOTE: WORKLIST ATTACHED ****

DESCRIPTION:

Annual Battery Performance Test after reaching 85% Service Life in October 2006. (Should include spare cells). Perform Thermography. Ref. Tech Spec SR 3.8.4.8 and AR #051000856.

If both service and performance tests to be conducted on 2B008 battery during a refueling outage, then per Tech Spec Bases SR 3.8.4.7 statement, the service test (RMO 30972016000) should be completed first.

RCM-CRITICAL/TS/AR031000166-3/AR030801255-10/AR051000856-01

2-27-08

REMARKS:

Planner to generate SM for Test Tech to perform thermography. Reference Fire Impairment 07020013.

REQUESTOR DATA:

CREW CODE: EW2

DCP:

ENVIRN QUAL: N

PROJECT CODE:

SEIS: 1

REQUESTING DEPT: EL2

REQUESTOR NAME: (b)(6)

PAX:

REQUIREMENTS:

WORK AUTH REQD?

FIRE PROT. ADMIN. REQD? Y

WORK AUTH TYPE? I

SECURITY REQD? N

ASME CODE WORK? N NO. N/A

SSR REQD?

NO TO DISP NCR? N NO. N/A

ENGINEERING REQD? N

TEMPORARY MOD.? N NO. N/A

FME REQUIREMENTS? N

FCN REQD? N NO. N/A

R.E.P. EVAL. REQD? N

ECP REQD? N NO. N/A

CREACUS BREACH? N

SCHEDULING:

R.M. DUE DATE 1/31/2008 11:15

RITTS: DUE DATE

VIOLATION DATE

SCHEDULED START DATE 2/19/2008 00:00

SCHEDULED COMP DATE 2/22/2008 00:00

MO OBJECTIVE:

CONDUCT A BATTERY PERFORMANCE TEST, INCLUDING SPARE CELLS.

Att. 86

3/17/08

(b)(6)

POOR QUALITY DOCUMENT
BEST AVAILABLE COPY
(b)(6)
SIGNER: [Signature] DATE: [Date]

Page 1

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200060319

Originator File Copy

07020581000

QC REQUIREMENTS:

FIRE PROTECTION/SECURITY REQUIREMENTS:

Adhere to the requirements of SO23-XV-4.500 (Control of U2/3 Barriers) and the requirements specified in the applicable Hazard Barrier Evaluation.

Contact the Fire Protection Coordinator at 86641 to activate the impairment.

Performed by: (b)(6) Date: 2/15/08

When work is complete, contact the FPC to terminate the impairment.

Performed by: (b)(6) Date: 2/24/08

Note: If the FPC is not available, contact the Fire Department at 86655.

PRECAUTIONS:

WORK IAW THE SCE ACCIDENT PREVENTION MANUAL
AS LISTED IN SECTION 4.0 OF PROCEDURE SO123-I-2.6

SPECIAL TOOLS:

FACE SHIELD, GLOVES, RUBBER APRON

WORK PLAN GENERAL INSTRUCTIONS:

Support MO(s): 07020584000, 07020586000, 07020589000, 07121387000, 08010717000
08011002000, 08011261000, 08011292000

RELIABILITY CLASS:

1. CRITICAL STEPS ARE IDENTIFIED IN SO123-I-2.6.
2. HUMAN PERFORMANCE APPLICATIONS IAW SO123-I-1.43.
3. THE SPARE CELLS SHOULD BE INCLUDED IN THE PERFORMANCE TEST. THEY MUST BE ON FLOAT CHARGE FOR AT LEAST 72 HOURS PRIOR TO STARTING THE TEST.
4. THE SPARE CELLS WILL BE "RECHARGED" WITH THE MAIN BANK USING THE

(WORK PLAN GENERAL INSTRUCTIONS CONTINUED)

AVAILABLE SPARE BATTERY CHARGER.

5. PERFORM TEMPORARY SYSTEM ALTERATION/RESTORATION IAW SO123-II-15.3.
6. REFER TO THE FOLLOWING M.O.'S FOR TEST TECH & ELECTRICAL SUPPORT ACTIVITIES.

- A. 07020582000 - PRE-WEEKLY/QUARTERLY
- B. 07020583000 - SPARE CHARGER CONNECTION
- C. 07020584000 - PHYSICAL INSPECTION
- ~~D. 07020585000~~ - 31 DAY WEEKLY/QUARTERLY
- E. 07020586000 - INSTALL CROSS-TIE FROM B00X
- F. 07020587000 - TEST CROSS-TIE SWITCH FOR 2D200
- G. 07020589000 - TT LABVIEW INSTALLATION
- H. 07020588000 - TT THERMOGRAPHY IMAGING

08030095000
(b)(6) 3/3/08

HEALTH PHYSICS DOSE ESTIMATES:

EST DOSE	ACT DOSE	PERCENT OF ESTIMATE
0	0	0%

POSITIVE COMPONENT VERIFICATION:**REQUIRED OBSERVABLE BEHAVIOR STEPS**

As requested in the craft surveys, in order to increase compliance and effectiveness in conducting positive component verifications (PCV's), the below required observable behavior steps have been included in the MO/CWO as an aide. These steps should be performed PRIOR to performing work on equipment, components, or terminations. See SO123-I-1.43 "Maintenance Human Performance Application" for complete PCV program requirements and labeling exceptions.

A. PRIOR TO LOCATING EQUIPMENT IN FIELD (TYPICALLY DONE DURING PRE-JOB BRIEF):

Step 1: 'IDENTIFY TARGET ID' - Write down the "Target ID" on the PCV Tracking Record (Attachment 8 of SO123-I-1.43) or MO/CWO.

Step 2: 'VERIFY CORRECT ID' - Compare written "Target ID" with the "MO/CWO Equipment ID" to validate that the "Target ID" was written correctly.

B. AT JOB SITE:

Step 3: 'LOCATE EQUIPMENT' - With the MO/CWO in hand, compare the "Target ID" to the component-identifying label using verbalization (point-shout-shoot).

Step 4: 'WRITE EQUIPMENT ID' - Write down the component-identifying label "Equipment ID" near previously written "Target ID".

Step 5: 'INITIAL & DATE' - Compare the written down component-identifying label "Equipment ID" with the "Target ID" and initial and date if the ID's match exactly (See SO123-I-1.43 for approved labeling exceptions). If the ID's do not match exactly, STOP and contact the work supervisor to resolve in accordance with Procedure SO123-I-1.43.

C. SECOND COGNIZANT EMPLOYEE:

Step 6: 'SECOND-PERSON SELF-CHECK' - A second person should repeat Step 3 and initial signifying agreement that the intended component has been positively identified. (Note: The responsible supervisor may waive the second-person self-check based on a SAFER evaluation.)

The correct equipment/component must be positively identified prior to performing any work.

*** THIS M.O. IS ON EQUIPMENT WHICH REQUIRES RECORDING OF M&TE USE AS ***
*** DESCRIBED IN SO123-XV-1 'CALIBRATION AND CONTROL OF MEASURE AND ***
*** TEST EQUIPMENT'. ***

EQ REFS: None

POSITIVE COMPONENT VERIFICATION

- When conducted by different worker,
- After an extended break from work,
- When the level of distraction is high,
- When working in Skill-Base or Rule-Base performance modes,
- Or as directed by the work supervisor.

[illegible]

(WORK PLAN DETAIL CONTINUED)

1. Verify SO123-I-2.2 & SO123-I-2.3 were completed on the battery bank, (including spare cells), less than 24hrs prior to the Performance Test.

NOTE: ENGINEERING IS TO EVALUATE THE INDIVIDUAL CELL RESULTS TO DETERMINE IF CELLS SHOULD BE JUMPED OUT PRIOR TO RECHARGE. A 58 CELL CONFIGURATION IS REQUIRED TO RETURN THE BATTERY BANK TO SERVICE.

2. Conduct a Battery Performance Test & Rapid Recharge IAW the latest REV & TCN of SO123-I-2.6.

- a. As required, and prior to recharge, jumper out individual cells determined by Engineering to be failing. Torque and ductor affected connection IAW appropriate steps of SO123-I-2.4. (No more than two (2) cells may be failing to meet the 58 cell requirement.

3. After declaring the battery bank operable, IAW SO123-I-2.6, continue with float charging for 48hrs prior to the next step.

- a. Perform SO123-I-2.3, for engineering data gathering.
- b. As required, perform a "triple dip" while obtaining specific gravity readings, to compensate for stratification of electrolyte.
- c. If SO123-I-2.3 is Sat, continue with float charging.
- d. If SO123-I-2.3 is Unsat, place the Bank on equalize charge IAW SO123-I-4.53.
- e. If an equalize charge was conducted, perform SO123-I-2.2 and SO123-I-2.3 after a 72 hour float charge.

PLANNING APPROVALS:

	BY	DATE	TIME
FIRE PROTECTION REVIEW	(b)(6)	02/06/07	08:28:38
WORK PLANNED		02/05/07	22:02:35
WORK PLANNED REVIEW		02/08/07	16:35:11
EQUIPMENT CONTROL REVIEW		01/18/08	08:17:28
WORK SCHEDULED		02/05/08	12:58:05

PROCEDURE LIST:

PROCEDURE ID	REV	TCN
1 - SO123-I-2.2	007	002
Desc: 125 VDC PILOT CELL BATTERY INSPECTION		
2 - SO123-I-2.3	007	001
Desc: 125 VDC BATTERY INSPECTION		
3 - SO123-I-2.6	008	005
Desc: BATTERY PERFORMANCE TEST AND RAPID RECHARGE		
4 - SO123-I-4.53	005	001
Desc: BATTERY EQUALIZE CHARGE		
5 - SO123-II-15.3	010	000
Desc: TEMPORARY SYSTEM ALTERATION AND RESTORATION FORM		
6 - SO23-V-2.14	007	001
Desc: THERMAL INSPECTION OF PLANT COMPONENTS		

CRAFT INFORMATION:

CRAFT CODE	CRAFT DESCRIPTION	QTY	ESTIMATED HOURS	ACTUAL HOURS
1 - EL	ELECTRICIAN	2.0	80.0	2.5
2 - SP	FIRST LINE SUPERVISOR	1.0	12.0	

WORK DONE:

Work Started: Date - 2, 15, 08 Time - 07:00

- ACTIVATED IMPAIRMENT

- SET UP FOR PERFORMANCE TEST

2 PL 8 HRS

(b)(6)

16

2/16/08 GRAVES

CONTINUED WITH SET-UP

2 PL 3 HRS

(b)(6)

6

02-19-08 SWINGS.

#(1) SO123-I-2.2 COMPLETED, ALSO 2.3 ON M.O. #
08011261000 @ 06:00 OF 2/19/08.

#(2) COMPLETED SET UP FOR PERFORMANCE TEST.
TURNED OVER TO GRAVES. 3 PL 8 HRS.

(b)(6)

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(WORK DONE CONTINUED)

2/20/08

GRAVES — performed raw SO123-1-2.6, from 1.0 to step 6.2.20.
 Test never started due to communication issue between laptop &
 BCT. Put battery bank back to float due to test delay per engineer
 OMT.

3el x 4.5 hrs

1el x 4 hrs

1el x 7 hrs

15.5

(b)(6)

2-20-08- STARTED TEST @ 07:02, TEST COMPLETE @
 11:02 / SAT

STARTED RAPID RECHARGE @ 14:38

1EL 12 HRS

1EL 9 HRS

(b)(6)

21

2-20-08-Snowes - TURNED OVER FROM DATES, CONTINUED WITH RAPID

RECHARGE RAW SO123-E-2.6.

3EL x 8 HRS

(b)(6)

24

2/21/08- GRAVES - TURNED OVER FROM SNOWES, CONTINUED RECHARGE
 RAW SO123-I-2.6. Completed through equalize stabilize
 test (4 hourly readings with no more than 5 amp variance).
 TEST IS SAT.

2EL x 4 hrs

1EL x 3.5 hrs

1EL x 2 hrs

18.5

(b)(6)

Work Done Continuation Sheet

MO# 0702 0581 000

Page #

2/21/08 days

(2) COMPLETED RAPID RECHARGE. (S0123-I-2.6 STEP 6.4)
RESTORED BATTERY TO SB CPU CONFIGURATION +
PUT ON FLOAT CHARGE @ 131.46Vdc. PLACED SPARE
CELLS ON FLOAT CHARGE ON 2ND CHARGER IAW 15.3
S0123-I-2.6 COMPLETE UP TO STEP 6.5.5.4.
BATTERY IS READY TO BE RESTORED TO NORMAL
CHARGER

2EL 8hrs

(b)(6)

16

2/21/08 Swings

(2) Restored 2B008 to normal charger IAW S0123-I-2.6
Step 6.5.1 to 6.5.10, using MO# 07120476000 work
Plan Steps 4 ~~thru~~ 10 to ~~guide thru~~ the 2nd 2HR Action
Statement. ~~Entered~~ Action Statement @ 20:35 completed
@ 20:45 and declared 2B008 Operable.

3EL 8HR (b)(6)

24

2/22/08

- COMPLETED STEP 6.5.11 ALL READINGS WERE
SAT

→ NEEDED TO PERFORM QUARTERLY BETWEEN
0830 ON 2/24/08 + 0932 ON 2/27/08

2EL 25 hrs

(b)(6)

5

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Work Done Continuation Sheet

MO# 0702 0581 000

Page # _____

2/27/08

(3) PERFORMED QUARTERLY INSPECTION - WITHIN
7 days of discharging to < 110 Vdc, step
C.S. 12 + WITHIN 7 days of being operable
step C.S. 13. ON 2n Quarterly performed
on 2/25/08 under MO# 0501 1292 000
QUARTERLY → (b)(6) (b)(6)

FINAL APPROVALS:

Ensure all tooling, equipment and unused material is removed from work area and work area is left in an acceptable housekeeping condition IAW SO123-XV-23.1.

VERIFIED BY:

(b)(6)

2,27,08 14:00

PRINT NAME:

STEM ENTRY REVIEWED BY:

(b)(6)

2,27,08 14:00

COMPLETED BY:

2,27,08 14:00

PRINT NAME:

1ST LINE SUPV:

3,3,08 13:55

PRINT NAME:

2ND LINE SUPV:

MAR 11 2008 11:41

PRINT NAME:

PLANNER REVIEW:

3,11,08 18:00

PRINT NAME:

EQUIPMENT WORK LIST:

MAJOR EQUIPMENT ID	RC	SYSTEM	Q-CLASS	EQ	AREA	ROOM	ELEV	COLUMN	INITIAL	DATE
S21806EB008 125VDC STATION BATTERY 2D2		PKA	2	N	CB	306B	050	18.5L1	(b)(6)	<u>2,27,08</u>
NO. EQUIPMENT ID										
1 - S21806EB017 BATTERY CHARGER 2B017		NKA	3	N	CB		050			<u>2,27,08</u>
2 - S31806EB017 SPARE 1E BATTERY CHARGER		NKA	3	N	CB		050			<u>2,27,08</u>

3.0 PREREQUISITES

NOTE: If performing the BCT-2000 / Load Bank Verification Test, then go to Attachment 17 and continue.

- 3.1 Before starting work, the user **SHALL** verify this procedure is current by referring to NDMS or one of the other methods listed in SO123-I-1.3.

- 3.2 Enter the following data:

MO#: 0702 0581 000 Unit: 2 Equip ID: 521806 E4006

- 3.3 Before making a second attempt to meet the 80% capacity requirement of this test, perform a Physical Inspection, SO123-I-2.4, and Equalize Charge, SO123-I-4.53.

- 3.4 Procedure SO123-I-2.2 and SO123-I-2.3 has been performed on the 125VDC Battery Banks **NO** more than 24 hours before this test. Record MO# below.

Performed on MO#: 08011261000

- 3.5 Procedure SO23-I-9.48 has been performed on the 250VDC Battery Banks **NO** more than 24 hours before this test. Record MO# below.

Performed on MO#: MA

- 3.6 If performed on a new battery bank, an equalizing charge has been performed according to SO123-I-4.53 more than 3 days and less than 7 days before conducting a Performance Test.

- 3.7 If the spare battery cell(s) are included in this test, verify the following:

3.7.1 Verify Spare Cells connected to the spare cell charger have been on float charge for more than 72 hours, or

3.7.2 For Spare Cells **NOT** connected to a spare cell charger, or the spare cells are connected to a charger that has been de-energized, perform an equalize charge according to SO123-I-9.301.

Performed on MO#: 08011261000

- 3.8 A Performance Test **SHALL** be performed **AS-FOUND**. **NO** pretest enhancements of the Battery Terminal / Inter-Cell Connectors and battery are allowed. (**NO** Cleaning, Tightening, or other activities that could improve the performance of the Battery Bank before the Performance Test). Technical Specification Bases 3.8.4.7 allows connecting the Spare Cells to the battery for testing.

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3.9 The Planner **SHOULD** enter the following data:

NOTE: Notify the Supervisor if the battery capacity is approaching 85% of Service Life.

3.9.1 Date which constitutes 85% of expected Service Life for the Battery Bank.

10-30-06

3.9.2 The battery capacity obtained from the previous Performance Test on the installed battery bank.

102.08

3.10 For Non-Safety Related Battery Banks **ONLY**, prepare non-safety related cables for jumping cells falling below 1.0 VDC if directed by the Supervisor.

3.11 The battery bank is on open circuit with the battery circuit breaker **OPEN** and tagged out. The Battery Bank **SHOULD NOT** be left **OPEN** circuited for more than 4 hours prior to the start of the Performance Test. ✓

3.12 The battery room ventilation system is in operation. ✓

3.13 An operable OSHA approved eye wash facility is available near the battery bank. ✓

NOTE: The use of the Labview is optional and **NOT** required for determining the success or failure of the Battery Bank Performance Test.

3.14 Notify the Test Technician Supervisor 24 hours prior to the start of the Battery Performance Test to allow support for the following activities:

3.14.1 Connecting the Labview Computer and applicable Voltage and Current Sensors, and

3.14.2 Battery Bank Terminal Connection Thermography.

3.15 The Battery Bank Rapid Recharge outlined in Section 6.4, **MAY** be performed on the 1E Battery Banks if:

3.15.1 The Spare Battery Charger 2(3)B017, or one of the Swing Battery Chargers 2/3B021 or 2/3B022 is connected to the Battery Bank to be charged, and

3.15.2 The Battery Bank to be charged has been isolated from the DC Bus

(b)(6)

3.16 The above Prerequisites have been verified.

VERIFIED BY

Date

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- 6.1.4 If directed by MO to perform a verification test on the BCT-2000 / Load Bank, Then go to Attachment 17 for testing information.
- 6.1.5 As necessary, refer to the information below when using the listed test equipment:
- .1 Battery Performance Test – BCT-2000 Program Parameters, Attachment 6,
 - .2 BCT-2000 Quick Reference, Attachment 7,
 - .3 BCT-2000 Computer Load Bank Weight Settings, Attachment 8,
 - .4 DC Clamp-on Ammeter, Attachment 9.
- 6.1.6 ~~Craft who initial a step in this procedure~~ **SHOULD** print their name and initial below

(b)(6)

<i>print name</i>	<i>initial</i>	<i>print name</i>	<i>initial</i>

END OF SECTION

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6.2 Battery Test Setup

NOTE: Battery Bank 2/3B00X is a 60 Cell connected battery bank. Cells #13 and #14 are designated Spare Cells.

6.2.1 If including the spare battery cells in this test, perform the following:

- .1 Record the spare battery cells included in this test.

Cell ID	Cell ID	Cell ID	Cell ID
15	16		

- .2 Measure the resistance of each connection point that will be disturbed to allow the addition of the Spare Battery Cells to the Battery Bank. Record the readings in Attachment 12, Modified Cell Connection Data Form.
- .3 Turn OFF Rail Charger.
- .4 Remove both fuses at the Rail Charger and record on SO123-II-15.3.
- .5 Disconnect the Rail Charger from the spare cells. As necessary, record in SO123-II-15.3.
- .6 Connect the spare cells to the battery bank (refer to Attachment 11) and Torque all new connections including the Spare Cell inter connections according to Attachment 5.
- .7 Measure the resistance of the new connections. Record readings in Attachment 12, Modified Cell Connection Data Form.
- .8 Connection resistance of the new terminations verified to meet the Acceptance Criteria in Attachment 12, Modified Cell Connection Data Form.

(b)(6)

☒ CHK CPL

☒ CHK CPL

☒ CHK CPL

☒ CHK CPL

☒ CHK CPL

☒ CHK CPL

(b)(6)

NOTE: If necessary to lift one or more leads to facilitate connecting the load bank for testing, perform the following step. Otherwise, N/A Section 6.2.2 and go to Section 6.2.3

- 6.2.2 Measure the resistance of each connection point that will be disturbed at Cell #60 to allow connection of the Load Bank. Record the resistance readings in Attachment 12, Modified Cell Connection Data Form.

(b)(6)

SECTION CONTINUES ON NEXT PAGE

- NOTES:** 1. The battery cell internal resistance will be used for trending by the Engineer.
2. Measurement is taken between the *Positive* (+) and *Negative* (-) Cell Posts. Exclude the Inter-Cell, Intertier, and Inter-Rack connections.

6.2.3 Use an E-BITE Tester, including the Loop for Current Sensor, to measure the *As-Found* internal resistance of each connected battery cell. Record resistance readings on Attachment 15, E-BITE - Battery Cell Internal Resistance Form.

- .1 The internal resistance measurement of each connected battery cell has been completed.

☒ OK CPL

(b)(6)

INT:

SECTION CONTINUES ON NEXT PAGE

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- NOTES:**
1. When taking Battery Cell Voltage, use a **Fluke 187** (*equivalent or better*) set on the **5V** range. *If necessary, reference Design Calc E4C-017.*
 2. When taking Battery Bank Terminal Voltage, use a **Fluke 187** (*equivalent or better*) set on the **500V** range. *If necessary, reference Design Calc E4C-017.*
 3. When taking millivolt readings across the Load Bank Shunt Output Terminals connect a **Fluke 187** (*equivalent or better*) set on the **500 mV** range. *If necessary, reference Design Calc E4C-017.*
 4. It **MAY** be necessary to remove a cable from the Negative Terminal of Cell #60 to allow termination of the Load Bank Cable.

6.2.4 Battery Bank Test Equipment Setup.

- | | |
|---|--------------|
| ✓ Connect a Fluke 187 Multimeter (500 millivolt range) Across the Load Bank Shunt Output Terminals. | Check
Cpl |
| ✓ Connect a Fluke 187 Multimeter (500 Volt range) Across the Terminals of the Battery Bank. | ✓ |
| ✓ Install a DC Clamp-on-Ammeter at or near the Load Bank (<i>refer to Attachment 9</i>). | ✓ |
| ✓ Connect the Sense Wires to the Battery Cells (<i>refer to Attachment 11</i>). | ✓ |
| ✓ Verify Continuity of the Test Cable Limiter Fuses. Replace as Necessary. | ✓ |
| ✓ Connect an Isolation Switch, with Interrupt capabilities, between the Load Bank and the Battery Bank according to Attachment 11, page 4 of 4. Isolation Switch SHOULD be readily accessible and close to the Load Bank. | ✓ |
| ✓ Connect Test Cables to the Battery Bank (<i>Limiter fuses connected to the battery bank</i>). Ensure Cables Are Tightened According to Attachment 5. Continuity of the Test Cable and Fuse connections SHOULD be less than 145 microhms. | ✓ |
| ✓ Connect Control Cable Between the BCT-2000 and the Load Bank with the Active Shunt. | ✓ |
| ✓ Verify Continuity of All Fuses Inside the Load Bank Control Cabinets, Located Front and Back. | ✓ |
| ✓ Use a Battery Back-Up UPS (≥ 2000 VA rating) to Provide Control Power to the BCT-2000 and Load Bank. | ✓ |
| ✓ Ensure Load Bank Rear Terminal Cover Is Secured Properly | ✓ |
| ✓ If the Labview Computer will be used, have the Test Technicians Have Installed Labview Computer and Necessary Current and Voltage Sensors. | ✓ |

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SECTION CONTINUES ON NEXT PAGE

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CAUTION

Failure to Configure the Jumper Cable for the Applicable Discharge Test Will Result in Possible Equipment Damage and MAY Cause a Fire. (refer to AR# 070800209)

CAUTION

- 6.2.4.1 Check the correct Jumper Cable configuration for the appropriate Load Bank is correct for the test to be performed. As necessary, refer to Attachment 11 for Jumper Cable location at J10 and J13.

125 VDC Discharge Test

Jumper **INSTALLED**



250 VDC Discharge Test

Jumper **REMOVED**



- .1.1 Have a second person verify the correct Jumper Cable configuration.

- 6.2.5 Turn on the Data Logger.

- 6.2.6 Initiate power to the Load Bank Fans.

- 1 Verify ALL LEDs inside the front Control Panel of the Load Bank are "OFF" or NOT lit.

- 6.2.7 Turn on the Lap Top Computer and allow time to boot to the BCT-2000 main menu.

- 6.2.8 Select [Setup].

- 6.2.8 CLOSE or verify Closed the Isolation Switch.

- .1 Have a second person verify the Switch is Closed.

NOTE: The program information MAY be entered in any order as long as all of the required information is entered prior to the start of testing.

- 6.2.10 As necessary, refer to Attachment 7, for BCT-2000 Setup Information. (NOT required if Manual control is used)

- 6.2.11 Adjust the BCT-2000 Program clock to the real time.

2-14-08
(b)(6)

N/A

(b)(6)

N/A

INT:

N/A

2nd Person INT:

CHK CPL

CHK CPL

(b)(6)

INT:

CHK CPL

CHK CPL

(b)(6)

INT:

2nd Person INT:

CHK CPL

CHK CPL

SECTION CONTINUES ON NEXT PAGE

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6.2.12 Identify the Load Bank Model being used and refer to Attachment 8 to verify the correct Load Bank Weight Settings.

1. Load Bank Weight Settings for the model and configuration are verified correct.

2. Have a second person verify the Load Bank Weight Setting and configuration are correct for the model being used.

3. If the Weight Settings are incorrect, contact the Supervisor for concurrence and the password to make the necessary corrections.

6.2.13 From Attachment 6 enter the Cell Warning setpoint.

6.2.14 Enter "0" in the Cell Shut Down Field. When the value is set to "0" the Cell Shut Down is disabled.

(b)(6)
INT:
2nd Person INT:
N/A
INT:
CHK CPL

CHK CPL

NOTE: Overall Battery (OV) Shut Down and Warning Voltage MAY have to be rounded up to the next decimal when entered into the BCT-2000 program

6.2.15 Calculate the Overall Battery (OV) Shut Down Voltage below. Enter this value into the BCT-2000 program.

(No. of Cells to be Tested)

60

(Minimum Cell Voltage)

X

1.75

VDC

105

(Test Equipment Tolerances)

+

0.17

VDC

(OV Shut Down Voltage)

105.17

VDC

(b)(6)
INT:
2nd Person INT:
N/A
INT:
CHK CPL

6.2.16 Calculate the Overall Battery (OV) Voltage Warning Level below. Enter this value into the BCT-2000.

(Shutdown Voltage from step 6.2.15)

105.17

VDC

+

1.0

VDC

(OV Warning Voltage)

106.17

VDC

(b)(6)
INT:
2nd Person INT:
N/A
INT:
CHK CPL

1. Results in Steps 6.2.15 and 6.2.16 verified by a second person before start of test.

SECTION CONTINUES ON NEXT PAGE

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6.2.17 In the Intertier (IT) Shut Down and Warning Fields enter "0" to disable.

☒ CHK CPL

6.2.18 Record the average cell electrolyte temperature from Procedure SO123-I-2.3 or SO23-I-9.48.

INFORMATION ONLY

Used to Determine Correction Factor (K) in Step 6.2.19

Average Cell Temperature 71 °F

INT: (b)(6)

6.2.19 Use the formula below and calculate the test load amperage.

(Note: 08011261000)

L_{au} = Rated Load Amperage Uncorrected for Temperature, According to Attachment 8.

L_{ac} = Rated Load Amperage Corrected for Temperature.

K = Discharge Current Correction Factor According to Attachment 10.

2 AMP = Additional Amperage Compensates for Test Equipment Tolerances

$$(K) [1.034] \left[\frac{239.84}{248} \right]$$

(Result of L_{au} / K)

239.84

(Test Equipment Tolerances) + 2 AMP

(L_{ac}) 241.84 AMPS

INT: (b)(6)

.1 Results verified by a second person before start of test.

2nd Person INT:

(b)(6)

NOTE: If the L_{ac} Value has a decimal value, round the L_{ac} value to the next higher whole number.

6.2.20* Enter the amperage value determined in the step above into the BCT-2000 Program Step(s).

INT: (b)(6)

END OF SECTION

20

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T/S REQUIREMENT

6.3 Battery Performance Test

CAUTION

If the Computer Locks up or Fails in Any Other Manner,
Turn-Off the Load Bank Power Before Attempting to
Reboot the BCT-2000. Failure to Do this May Damage the
Battery Bank.

CAUTION

- 6.3.1 If testing is interrupted and the test will be restarted, record the interruption time in the MO.

NOTE: The use of the Labview Computer is optional.

TT

- 6.3.2 Have the Test Technicians start the Labview Computer.

✓ **CHK CPL**

- 6.3.3 Initiate the test (refer to Attachment 7, BCT-2000 Quick Reference). Verify BCT-2000 is in the "AUTO" Mode.

NOTE: When taking Battery Bank Terminal Voltage, use a Fluke 187 (equivalent or better) set on the 500V range. If necessary, reference Design Calc E4C-017.

- .1 Record the Performance Test starting Time, Date, and Battery Terminal Voltage below.

Starting Time:

07:02

Date

02/20/08

(b)(6)

Terminal Voltage:

129.55

VDC

INT:

SECTION CONTINUES ON NEXT PAGE

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6.3.6 Monitor the load bank current. Use the multimeter installed across the Shunt Output Terminals. Discharge current **SHOULD** be within 2 amps (0.17 mV) of the value calculated in Step 6.2.19.

		TIME	VOLTAGES	MILLIVOLTS	AMPS	INITIAL
TEST START		07:02	129.55	20.409	241	(b)(6)
end of 15 minutes	1	07:07	119.58	20.388	244	
	2	07:32	117.49	20.345	244	
	3	07:47	116.96	20.26	243	
	4	08:02	116.48	20.25	243	
	5	08:17	116.09	20.24	243	
	6	08:32	115.80	20.27	243	
	7	08:47	115.27	20.21	243	
	8	09:02	114.86	20.27	243	
	9	09:17	114.36	20.23	243	
	10	09:32	113.74	20.25	243	
	11	9:47	113.16	20.26	243	
	12	10:02	112.47	20.27	243	
	13	10:17	111.64	20.24	243	
	14	10:32	110.60	20.27	243	
	15	10:47	109.59	20.27	243	
4 hrs	16	11:02	107.06	20.23	243	
	17					
	18					
	19					
	20					
	21					
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					
	30					

SECTION CONTINUES ON NEXT PAGE →

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	TIME	VOLTAGES	MILLIVOLTS	AMPS	INITIAL
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
END OF TEST					

6.3.7 Monitor Battery Performance Test for the following termination criteria:

- 1 Battery Overall (OV) Shut Down Voltage is reached.
- 2 Any battery cell(s) temperature exceeding 110 °F.
- 3 Any battery Intercell Connector(s) shows evidence of excessive heating.
- 4 If the Overall Battery (OV) or Cell Voltage drops below the *Warning Alarm* setpoint, perform the following:
 - 4.1 Silence the Warning Alarm by clicking OK in the Warning Message Box, and continue testing.

6.3.8 During the last half of the Battery Performance Test, the Test Techs **SHOULD** perform *Thermography* on all Battery Terminations. Generate an AR if a "Hot Termination" is found.

(b)(6)

INT

SECTION CONTINUES ON NEXT PAGE →

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6.3.9 Just before test termination perform the following:

NOTE: When taking Battery Bank Terminal Voltage, use a Fluke 187 (*equivalent or better*) set on the **500V** range. *If necessary, reference Design Calc E4C-017.*

- .1 Measure the battery terminal voltage while the battery bank is still under load. Record the voltage reading below.

ADMINISTRATIVE LIMITS

Battery Terminal Voltage Is Greater than or Equal to the Value Calculated Below.

(No. of Cells Tested)

60

(Minimum Cell Voltage)

X

1.75

VDC

(Test Equipment Tolerances)

+

0.17

VDC

(Shutdown Voltage)

105.17

VDC

Battery Terminal Voltage:

107.06

VDC

SAT

☒

UNSAT

☐

(b)(6)

INT:

- .2 Results verified by a second person before recharging the battery.

2nd Person INT:

NOTES: 1. Amp-hours removed value will be used during the Rapid Recharge. The Value recorded is for information only and **NOT** for determining Operability or for satisfying Technical Specification Surveillance requirements.

2. If a Labview is **NOT** used or fails during use, N/A the following step and go to Step 6.3.10.

- .3 From the Labview Computer, record the total Amp-hours (Ah) removed from the Battery Bank during the Performance Test below.

INFORMATION ONLY

939 Ah from LABVIEW + 20.25 MISSING 1ST 5 min

Actual Amp-hours Removed:

N/A

Ah

959.25 TOTAL

Expected Amp-Hours, from Attachment 6:

998

Ah

INT:

(b)(6)

SECTION CONTINUES ON NEXT PAGE

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6.3.10 Record the following Performance Test termination data:

- .1 Time and Date Performance Test completed,

Completion Time:

11:02

Date

02/20/08

(b)(6)

INT:

- .2 Calculate the total elapsed test time.

(Completion Time from step 6.3.10.1)

11:02

(Starting Time from step 6.3.3)

07:02

(Total Elapsed Time)

240

minutes

(b)(6)

INT:

- .3 Results verified by a second person before recharging the battery.

2nd Person INT:

6.3.11 After the load bank cools off, turn the load bank fans OFF.

☒ CHK CPL

6.3.12 Disconnect the load bank cables, sense leads, and test equipment (including the Labview Computer and Sensors) from the battery bank.

(b)(6)

INT:

6.3.13 Perform the following if cable(s) were removed from Cell #60:

- .1 Make-up and Torque Cell #60 (=) connections according to Attachment 5, Battery Terminal Torque Specification.
- .2 Measure the As-Left resistance of the new connections. Record reading(s) in Attachment 12, Modified Cell Connection Data Form.

INT:

INT:

6.3.14 **Non-Safety Related Battery Banks Only.** If any individual cells were jumpered out during the test, contact the Engineer for an evaluation before reconnecting to the battery bank, and generate an AR.

☒ CHK CPL

6.3.15 Review the Battery Terminal Voltage stored in the BCT-2000 Program and identify any occurrence of the Battery Bank Terminal Voltage dropping < 110 VDC for a 58 Cell Battery Bank configuration. Record the Time and Date below.

(b)(6)

INT:

Time:

09:32

Date

2/20/08

(b)(6)

INT:

2/21/08

SECTION CONTINUES ON NEXT PAGE

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- 6.3.16 Calculate the Battery Bank Capacity. Verify results meet the minimum requirements below. Have a second person verify results.

ACCEPTANCE CRITERIA

All Batteries: $\geq 80\%$ of Rated Capacity

All New Batteries: $\geq 90\%$ of Rated Capacity

Ta = Actual Duration of Test, in Minutes, to Minimum Terminal Voltage (from step 6.3.10.2)

Tr = Rated Time to Final Voltage (from Attachment 6)

$$\frac{T_a}{T_r} \times 100\% = \text{Capacity Corrected to } 25^\circ\text{C (77}^\circ\text{F)}$$

[] [] []

(Tr) [240] (Ta) [240]

(Result of Ta/Tr)

x

100

(Battery Capacity)

100

%

SAT	<input checked="" type="checkbox"/>	Go to Step 6.3.17	UNSAT	<input type="checkbox"/>	Perform corrective actions as follows
-----	-------------------------------------	-------------------	-------	--------------------------	---------------------------------------

2nd Person INT:

- 1 Immediately notify your Supervisor of any UNSAT condition. This Supervisor SHALL report a failed Surveillance according to SO123-I-1.3
- 2 Notify the Engineer, and generate an AR.

- 6.3.17 Verify the value calculated in step 6.3.16 meets the Acceptance Criteria below.

ACCEPTANCE CRITERIA

$\geq 90\%$ of Manufacturer's Rating.

Battery Capacity (from step 6.3.16):

100

SAT	<input checked="" type="checkbox"/>	Go to Step 6.3.18	UNSAT	<input type="checkbox"/>	Perform corrective actions as follows
-----	-------------------------------------	-------------------	-------	--------------------------	---------------------------------------

- 1 Immediately notify your Supervisor of any UNSAT condition. This Supervisor SHALL report a failed Surveillance according to SO123-I-1.3
- 2 Notify the Engineer, and generate an AR.

SECTION CONTINUES ON NEXT PAGE

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NOTE: A negative value calculated below, indicates an increase in capacity.

- 6.3.18 Calculate the difference in battery capacity between this test and the average from previous testing. Have a second person verify the results.

ACCEPTANCE CRITERIA

Battery Capacity Has **DECREASED** less than 10% of Rated Capacity from the last Performance Test

(Last Capacity Test, Step 3.9.2) 102.08 %

(Battery Capacity this test, step 6.3.16) = 100 %

(Circle one) 2.08 %

SAT	<input checked="" type="checkbox"/>	Go to Step 6.3.19.	UNSAT	<input type="checkbox"/>	Perform corrective actions as follows
-----	-------------------------------------	--------------------	-------	--------------------------	---------------------------------------

2nd Person INT:

- .1 Immediately notify your Supervisor of any **UNSAT** condition. This Supervisor **SHALL** report a failed Surveillance according to SO123-I-1.3.
- .2 Notify the Engineer, and generate an AR.
- .3 Go to Step 6.3.20.

(b)(6)
INT: *[Signature]* CHK CPL
[Signature] CHK CPL

- 6.3.19 Use the Battery Capacity degradation calculated in Step 6.3.18 and verify that the capacity has decreased less than the value below.

ACCEPTANCE CRITERIA

Battery Capacity Has **DECREASED** less than 9% of Capacity from the last Performance Test

SAT	<input checked="" type="checkbox"/>	Go to Step 6.3.20.	UNSAT	<input type="checkbox"/>	Contact Supervisor for Direction
-----	-------------------------------------	--------------------	-------	--------------------------	----------------------------------

(b)(6)
INT: *[Signature]*

- .1 Generate an AR for Engineering evaluation.
- .2 Go to the next step.

SECTION CONTINUES ON NEXT PAGE →

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6.3.20 Section 6.3, Battery Performance Test, completed satisfactorily.

(b)(6)

CAUTION

To Prevent Internal Shorts Between the Cell Plates, Do
NOT Keep the Battery Bank Open - Circuited for More than
4 HOURS after Completion of the Performance Test.

CAUTION

6.3.21 Go to Section 6.4, Rapid Recharge, and recharge the Battery Bank.

END OF SECTION

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- NOTES:**
1. A Rapid Recharge **MAY** be performed on a Battery Bank, if the Charger and Battery Bank are isolated from the associated DC Bus.
 2. If unable to perform a Rapid Recharge, go to Section 6.6 to complete this procedure.
 3. For the Battery Banks on the 50' Control Building use the Spare Battery Charger 2(3)B017 or one of the Swing Battery Chargers 2/3B021 or 2/3B022.

6.4 Rapid Recharge

- 6.4.1 Record the Equipment ID of the Charger being used to perform the Rapid Recharge.

Charger Equipment ID: 2B022

- 6.4.2 Verify the Battery Bank is connected to Spare Battery Charger 2(3)B017 or on of the Swing Battery Chargers 2/3B021 or 2/3B022.
- 6.4.3 Install appropriate Cable Limiter Fuses at the Battery Terminals.
- 6.4.4 Ductor all Cable and Fuse connections. Continuity **SHOULD** be less than 145 microhms.
- 6.4.5 Verify the High Voltage Shutdown has been disabled as follows.
N/A option NOT used:

- .1 For the 2(3)B017 Charger; verify that the Test Technicians have installed a jumper across the High Voltage Shutdown Relay Contact.

Unit Check one		Charger	Jumper Installed
2	<input type="checkbox"/>	3	<input type="checkbox"/>
		B017	<input type="checkbox"/>

OR

NOTE: Removal of Timer K303 will defeat tripping of the associated breakers. Refer to drawings SO23-301-3A-D-12, D13, D17 & D18.

- .2 For the 2/3B021 & 2/3B022 Charger; verify that the Test Technicians have removed Timer K303 from the Swing Charger to be used.

Unit Check one		Charger	Timer K303 Removed
2	<input type="checkbox"/>	3	<input type="checkbox"/>
		B021	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	3	<input type="checkbox"/>
		B022	<input checked="" type="checkbox"/>

SECTION CONTINUES ON NEXT PAGE

NOTE: The use of the Labview Computer is optional. If a Labview Computer is **NOT** available or will **NOT** be used, N/A Step 6.4.6 and go to the next step.

6.4.6 Verify the Test Technicians have installed a Labview Computer and the necessary Voltage and Current Sensors.

INT: (b)(6)

6.4.7 Connect the following:

- o Fluke 187 Multimeter (500 Volt range) across the Charger output Voltmeter,
- o Fluke 187 Multimeter (500 millivolt range) across the Charger Shunt Output Terminals,
- o Fluke 187 Multimeter (500 Volt range) across the Battery Bank Terminals.

Check
Cpl

☒

☒

☒

NOTES: 1. After determining the applicable Battery Bank configuration, the craft **MAY** line out the unused choice.
2. Battery Bank B00X is normally 60 Cell connected battery bank, *spare cells are connected*. If cell(s) have been jumpered out use the appropriate value for Charging.

6.4.8 Select the battery bank configuration below to determine appropriate *Rapid Recharge* Voltage value.

Battery Bank Configuration	Rapid Recharge - Voltage Value (as measured at the battery terminals)	(✓) ONE
58 Cell Battery Bank Configuration	149.0 (148.5 to 149.5) VDC	<input type="checkbox"/>
59 Cell Battery Bank Configuration	151.5 (151.0 to 152.0) VDC	<input type="checkbox"/>
60 Cell Battery Bank Configuration	154.0 (153.5 to 154.5) VDC	<input checked="" type="checkbox"/>

1. Record the voltage value selected and the number of cells in Step 6.4.13.1 and Attachment 14.

☒ CHK CPL

2. Supervisor verifies correct Rapid Recharge Voltage value is selected.

Supervisor INT:

(b)(6)

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NOTES: 1. Do **NOT** attempt to adjust the *Equalize Voltage* while the charger is in Current Limit. The Battery Banks and Current Limit durations below are approximate and are for reference only.

Following a PERFORMANCE Test

Battery Bank	2(3)B017 Current Limit Duration	2(3)B021 & 2(3)B022 Current Limit Duration
D1 & D2	165 minutes	116 minutes
D5	395 minutes	280 minutes
D3, D4 & B00X	299 minutes	211 minutes

2. When the Charger comes off Current Limit it is very important that the charger output voltage be monitored very closely to optimize charging time.
3. The multimeter across connected Charger Output Voltmeter **MAY** be used to assist in maintaining charging voltage. The Battery Terminal Voltage will be less than the charger output voltage due to the voltage drop across the cable. This difference **MAY** be as much as 8 volts while the connected Charger is on Current Limit.
4. When the charger is cold, the Current Limit **MAY** operate at a lower value. Also, the charger Equalize Potentiometer **MAY** be set at a lower value depending on the last use. The charger **MAY** need constant monitoring until coming off Current Limit and charging voltage range is set.

6.4.13 As the Charger comes off Current Limit, **SLOWLY** adjust the Equalize potentiometer to push Charger back on Current Limit, if possible.

NOTE: When taking Battery Bank Terminal Voltage, use a Fluke 187 (equivalent or better) set on the 500V range. If necessary, reference Design Calc E4C-017.

1. Battery Terminal voltage **SHOULD NOT** exceed the voltage recorded below (value determined in Section 6.4.8).

Battery Bank Configuration	Rapid Recharge - Voltage Range (as measured at the battery terminals)
Number of Cells: 60	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;"> 153.5 <small>minimum</small> </div> <div style="margin: 0 5px;">to</div> <div style="border: 1px solid black; padding: 2px; margin-left: 5px;"> 154.5 <small>Maximum</small> </div> <div style="margin-left: 10px;">VDC</div> </div>

(b)(6)

SECTION CONTINUES ON NEXT PAGE →

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NOTE: To optimize the Rapid Recharge Time, maintain the Voltage level as close as possible to the value recorded in Step 6.4.13.1. If voltage slips below desired value recharge time will increase.

6.4.14 As necessary, make adjustments to maintain the Voltage level as close as possible to the voltage range recorded in Step 6.4.13.1. Frequent adjustment may be necessary.

.1 **MAY** be necessary to reduce voltage to prevent Cell Temperature exceeding 110 °F and Electrolyte Levels from overflowing.

NOTES: 1. Engineering established the 110% Amp Hour return requirement as an alternate means of evaluating when the battery is fully charged. This requirement is informational only and does **NOT** determine Operability or validate Technical Specification Surveillance requirements.

2. If a Labview Computer is **NOT** used or fails during use, N/A the following step and go to Step 6.4.16.

6.4.15 Reference Step 6.3.9.3 and record the Amp-hours removed below. Calculate the **110%** Amp-hour return value. Have a second person verify calculation.

Amp-hours Removed. Recorded in Step 6.3.9.3:

	959.25	Amp-hours
x	110	%
	1055.175	Amp-hours

(b)(6)

INT

2nd Person INT

SECTION CONTINUES ON NEXT PAGE

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- NOTES:**
1. Amp-hours removed value **MAY** be used during the Rapid Recharge. The Value recorded is for information only and **NOT** for determining Operability or for satisfying Technical Specification Surveillance requirements.
 2. If a Labview is **NOT** used or fails during use, continue the Rapid Recharge for about 6 hours or as directed by the Supervisor or Engineer. *Time is tracked on Attachment 14.* Then go to Step 6.4.17.

- 6.4.16 Continue charging at this voltage rate until the Labview Computer shows 110% of the Amp-hours removed has been returned to the battery bank.

INFORMATION ONLY

110% Amp-hours Calculated in Step 6.4.15 **1055.175**

Amp-hours Returned (Recorded by Labview) **1055.158**

- .1 If unable to return 110% of the Amp-hours removed within the desired time period, contact Supervisor and Engineer and continue as directed.

(b)(6)
INT
☐ CHK *NA*

- NOTES:**
1. After determining the applicable Battery Bank configuration, the craft **MAY** line out the unused choice.
 2. Battery Bank B00X is normally 60 Cell connected battery bank, spare cells are connected. If cell(s) have been jumpered out use the appropriate value for Charging.

- 6.4.17 Select the battery bank configuration below to determine the appropriate *Equalize Charge* Voltage value.

Battery Bank Configuration	Equalize Charge - Voltage Value (as measured at the battery terminals)	(✓) ONE
58 Cell Battery Bank Configuration	139.0 (138.5 to 139.5) VDC	<input type="checkbox"/>
59 Cell Battery Bank Configuration	141.5 (141.0 to 142.0) VDC	<input type="checkbox"/>
60 Cell Battery Bank Configuration	144.0 (143.5 to 144.5) VDC	<input checked="" type="checkbox"/>

- .1 Supervisor verifies correct Equalize Charge Voltage value is selected.

Supervisor INT

(b)(6)

SECTION CONTINUES ON NEXT PAGE →

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NOTE: Reducing the Charging Voltage from a "Rapid Recharge" to a Normal "Equalize Charge" the Charging Current MAY fall to less than 5 amps. When the charging current is less than 5 amps, wait about 1 minute before making any further adjustments. This pause allows the Labview Low Current Transducer to "LOCK-IN." After the transducer "Lock-in" continue to adjust the current slowly.

- 6.4.18 Reduce the Charger output to the *Equalize Charge* Voltage selected above. Measure voltage at the Battery Terminals.

CHK CPL

NOTE: Refer to Attachment 9 for the DC Clamp-on Ammeter set up information.

- 6.4.19 Allow the Charging Current to stabilize at the new voltage setting. Stable condition is verified by 4 consecutive hourly readings *WITHIN* 5 amps of each other.
- 6.4.20 Request that the Test Technicians restore the High Voltage Shutdown feature of the Charger as follows. *N/A option NOT used:*

CHK CPL

NOTE: The High Voltage Shut Down Relay SHOULD be reset before the jumper is removed.

- .1 For the 2(3)B017 Charger; verify the Test Technicians have removed the jumper installed across the connected Charger High Voltage Shutdown Relay.

Unit Check one		Charger	Jumper Removed
2	<input type="checkbox"/>	3	<input type="checkbox"/>
		B017	<input type="checkbox"/>

INT: N/A

OR

NOTE: As necessary, refer to drawings SO23-301-3A-D-12, D13, D17 & D18 for the K303 Timer.

- .2 For the 2/3B021 or 2/3B022 Charger; verify that the Test Technicians have reinstalled Timer K303 in the Swing Charger being used.

Unit Check one		Charger	Timer K303 Installed
2	<input type="checkbox"/>	3	<input type="checkbox"/>
		B021	<input type="checkbox"/>
2	<input checked="" type="checkbox"/>	3	<input checked="" type="checkbox"/>
		B022	<input checked="" type="checkbox"/>

INT: (b)(6)

SECTION CONTINUES ON NEXT PAGE

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- 6.4.21 After a stable condition is verified, continue to the next step and place the Battery Bank on a Float Charge.

☒ CHK CPL

- NOTES:** 1. After determining the applicable Battery Bank configuration, the craft **MAY** line out the unused choice.
2. Battery Bank B00X is normally 60 Cell connected battery bank, *spare cells are connected*. If cell(s) have been jumpered out use the appropriate value for Charging.

- 6.4.22 Select the Battery Bank configuration below. Put the Charger in a **FLOAT** mode of operation. As necessary, adjust the Charger output to the *Float Voltage* selected below.

Battery Bank Configuration	Float Charge – Voltage Value (as measured at the battery terminals)	(✓) ONE
58 Cell Battery Bank Configuration	131.5 (131.0 to 132.0) VDC	<input type="checkbox"/>
59 Cell Battery Bank Configuration	133.5 (133.0 to 134.0) VDC	<input type="checkbox"/>
60 Cell Battery Bank Configuration	135.0 (134.5 to 135.5) VDC	<input checked="" type="checkbox"/>

- .1 Supervisor verifies correct Float Voltage value is selected.

Supervisor INT: (b)(6)

SECTION CONTINUES ON NEXT PAGE ➡

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- NOTES:**
1. Before taking any readings with the EXTECH Model 380942, press the "Zero / Relative" Button to zero the meter. As necessary, refer to manual 1814-AT912-M0004 and Attachment 9.
 2. Meter Range **SHOULD** be mA DC (0 - 4A).
 3. If other M&TE is used, engineering evaluation required to verify adequate consideration for the measurement uncertainties of M&TE.

6.4.23 When the Float Charging Current has stabilized, perform the following steps to verify that the battery bank is **FULLY** Charged.

- .1 Measure Float Charging Current and record below.

ADMINISTRATIVE LIMIT	
Ambient Temperature is within:	65 to 82 °F
Current as read on the EXTECH Model 380942 is	< 1.91 Amps
Ambient Temperature:	70 °F
EXTECH Model 380942 Current Reading:	N/A Amps
If Available, record Labview Current Reading:	0.6 Amps
SAT <input checked="" type="checkbox"/> UNSAT <input type="checkbox"/>	Notify Supervisor & Engineer and Continue as follows.
0830	2/21/08
Time	Date

(b)(6)

INT.

NOTE: When taking Battery Cell Voltage, use a Fluke 187 (equivalent or better) set on the 5V range. If necessary, reference Design Calc E4C-017.

- .2 Measure the Pilot Cell Voltage and record results below.

ACCEPTANCE CRITERIA					
Pilot Cell Voltage:		> 2.0717 VDC			
CELL ID	SAT	UNSAT	CELL ID	SAT	UNSAT
37	/		57	/	

(b)(6)

INT.

SECTION CONTINUES ON NEXT PAGE →

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NOTE: When taking Battery Cell Voltage, use a Fluke 187 (*equivalent or better*) set on the 5V range. If necessary, reference Design Calc E4C-017.

- 6.4.24 Verify the cell voltage and electrolyte level of each connected cell and record below.

ADMINISTRATIVE LIMITS

Cell Voltage: > 2.0717 VDC

Cell Level: **NOT** Overflowing, and Above the Low Level Mark

Cell No.	Cell Volts	Level		Cell No.	Cell Volts	Level		Cell No.	Cell Volts	Level		Cell No.	Cell Volts	Level	
		SAT	UNSAT			SAT	UNSAT			SAT	UNSAT			SAT	UNSAT
1	2.23	/		16	2.18	/		31	2.26	/		46	2.25	/	
2	2.26	/		17	2.21	/		32	2.27	/		47	2.29	/	
3	2.26	/		18	2.25	/		33	2.25	/		48	2.26	/	
4	2.24	/		19	2.23	/		34	2.25	/		49	2.26	/	
5	2.19	/		20	2.24	/		35	2.21	/		50	2.29	/	
6	2.19	/		21	2.21	/		36	2.21	/		51	2.27	/	
7	2.24	/		22	2.23	/		37	2.26	/		52	2.26	/	
8	2.21	/		23	2.22	/		38	2.29	/		53	2.20	/	
9	2.25	/		24	2.24	/		39	2.26	/		54	2.25	/	
10	2.29	/		25	2.21	/		40	2.29	/		55	2.25	/	
11	2.26	/		26	2.23	/		41	2.21	/		56	2.23	/	
12	2.28	/		27	2.28	/		42	2.27	/		57	2.24	/	
13	2.19	/		28	2.26	/		43	2.27	/		58	2.25	/	
14	2.20	/		29	2.27	/		44	2.26	/		59	2.25	/	
15	2.20	/		30	2.30	/		45	2.24	/		60	2.27	/	

- 1 The connected Cells meet the criteria above, and the Supervisor / Engineer have been notified of any UNSAT condition.

(b)(6)

INT

SECTION CONTINUES ON NEXT PAGE →

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NOTE: Satisfactory completion of Section 6.4.23 indicates that the battery is Fully Charged.

- 6.4.25 If Steps 6.4.23.1 and 6.4.23.2 are SAT, the Battery Bank MAY be considered **Fully CHARGED** and ready to restore to OPERABILITY.
- .1 If the above conditions are UNSAT, notify Supervisor and Engineer. Continue as directed. Section 6.5 determines Battery Bank OPERABILITY.
- 6.4.26 Review Attachment 14, Rapid Recharge Data Form. IF any recorded Battery Terminal Voltage readings are > 150 VDC for a 58 Cell configuration, THEN record the Date and Time of the Overvoltage reading in Step 6.5.12.2.
- 6.4.27 Section 6.4, Rapid Recharge, completed satisfactorily.

INT: *MIA*

(b)(6)

INT:

END OF SECTION

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6.5 Restoring Battery Bank to Operability

NOTE: Leaving the Battery Bank *Open-Circuited* for more than 4 hours will extend the amount of time necessary for the Charging Current to stabilize.

6.5.1 Identify the connected Battery Charger below.

Charger Equipment ID:

2B022

(b)(6)

INT:

INT:

1 De-energize the connected Battery Charger.

NOTE: The battery cell internal resistance will be used for trending by the Engineer.

6.5.2 Using the E-BITE Tester, measure *As-Left* internal resistance of each connected battery cell. Record readings on Attachment 15, E-BITE – Battery Cell Internal Resistance Form.

INT:

NOTE: The following step is performed with the spare charger de-energized and the main battery breaker Open.

6.5.3 Measure the DC Voltage to ground at both positive and negative battery terminals.

ACCEPTANCE CRITERIA

Battery Bank Terminal to Ground Voltage is: ≤ 3.25 VDC

As-Left
Positive Terminal: 0.35 VDC

As-Left
Negative Terminal: 0.41 VDC

SAT	<input checked="" type="checkbox"/>	Go to Step 8.5.4.	UNSAT	<input type="checkbox"/>	Perform Corrective Actions as Follows.
-----	-------------------------------------	-------------------	-------	--------------------------	--

(b)(6)

INT:

- 1 Notify Supervisor, and
- 2 Disconnect the Battery Cables leading to the Battery Breaker and the connected Swing Charger Output Cables from the Battery Bank Terminals.
- 3 As directed, isolate and locate ground. If cables or inter-cell connectors are removed, record alteration and restoration on SO123-II-15.3.

SECTION CONTINUES ON NEXT PAGE

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- 6.5.3.4 As necessary, wipe clean all accessible areas of the battery jar. *NIA*
- .5 Verify the Battery Bank, positive and negative terminals, voltage to ground is less than or equal to 3.25 VDC (less than or equal to 800 millivolts for a battery row). *INT: NIA*
- .6 Retermine the cables removed and Torque tighten all connections. As necessary, reference Attachment 5. *INT: NIA*

NOTE: Battery Bank B00X will be maintained by 2B017 as a 60 Cell Battery Bank. Steps 6.5.4 through 6.5.7 do **NOT** apply to B00X. Go to Step 8.5.8.

- 6.5.4 Restore the spare cells to their pretest configuration according to SO123-II-15.3. Returns the 1E Battery Banks to a 58 Cell configuration. *(b)(6)*
- .1 As necessary, torque the Battery Terminal Cable connections according to Attachment 5, Battery Terminal Torque Specification. *INT:*
- .2 Measure the As-Left resistance of the new connections. Record reading in Attachment 12, Modified Cell Connection Data Form. *INT:*
- 6.5.5 At the Supervisor's discretion, the following options MAY be performed: *INT:*

- .1 De-energize the Swing Charger being used to maintain the Battery Bank on Float Charge
- OR
- .2 Open the Breaker, and remove the field cable between the Spare Charger and the Battery Bank. Then go to Step 6.5.6,
- OR

NOTE: When taking Battery Bank Terminal Voltage, use a Fluke 187 (equivalent or better) set on the 500V range. If necessary, reference Design Calc E4C-017.

- .3 Re-energize the connected Charger and adjust the **FLOAT** Voltage to the value below as measured at the Battery Bank Terminals.

ACCEPTANCE CRITERIA

Float Voltage: **131.5 (131.0 to 132.0) VDC**

As-Left Float Voltage: **131.46**

SAT	<input checked="" type="checkbox"/>	Go to next Step.	UNSAT	<input type="checkbox"/>	Contact Supervisor for direction if unable to adjust.
-----	-------------------------------------	------------------	-------	--------------------------	---

INT:

SECTION CONTINUES ON NEXT PAGE

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NOTE: When ready to restore the Battery Bank to the *Normal* Charger, continue as follows.

6.5.5.4 De-energize the connected Battery Charger.

.5 As necessary, remove the temporary field cables installed for recharging.

(b)(6)

INT:

INT:

NOTE: If B00X is supporting an 1E DC bus, then Step 6.5.6 does **NOT** apply.

~~6.5.6~~ With Operations assistance, verify the 125 VAC Vital Bus is on the *Alternate* Source and the Inverter is de-energized.

6.5.7 As necessary, **CLOSE** the *Normal* Battery Breaker:

INT:

INT:

NOTES: 1. Float Charging Voltage is set minimum allowed to help reduce the charging current.
2. When taking Battery Bank Terminal Voltage, use a Fluke 187 (equivalent or better) set on the 500V range. If necessary, reference Design Calc E4C-017.

6.5.8 Verify the Normal Charger is set for *Float Charge* and energize the Charger.

.1 As necessary, adjust the *Float* Voltage to the value shown below. Voltage is verified at the Battery Terminals.

ACCEPTANCE CRITERIA

Float Voltage: 131.5 (131.0 to 132.0) VDC

B00X: 135.0 (134.5 to 135.5) VDC

As-Left Float Voltage: 131.75

SAT

☐

Go to next Step.

UNSAT

☐

Contact Supervisor for direction if unable to adjust.

(b)(6)

SECTION CONTINUES ON NEXT PAGE

- NOTES:**
1. Battery Bank Float Charging Current **MAY** take about 1 hour to stabilize.
 2. The Float Charging Current of **< 1.91** amps with the Battery Bank fully charged was verified in Section 6.4.23. (Refer to Attachment 9 for the DC Clamp-on Ammeter set up information).
 3. When taking Battery Cell Voltage, use a Fluke 187 (equivalent or better) set on the 5V range. If necessary, reference Design Calc E4C-017.

6.5.9 When the Float Charging Current has stabilized, perform the following steps. When the criteria is met the battery bank **MAY** be considered **OPERABLE**.

1. Measure the Pilot Cell Voltage and record results below.

ACCEPTANCE CRITERIA

Pilot Cell Voltage: **> 2.0717** VDC

CELL ID	SAT	UNSAT	CELL ID	SAT	UNSAT
37	✓		57	✓	
2.27			2.26		

(b)(6)

INT:

2. Verify the Electrolyte Level of each connected cell.

ACCEPTANCE CRITERIA

Electrolyte Level Above Top of Plates and **NOT** Overflowing.

SAT	UNSAT	CONTACT SUPERVISOR & ENGINEER FOR DIRECTION.
✓		

(b)(6)

INT:

6.5.10 With the Battery connected to its *Normal* Charger, and satisfactory completion of Section 6.5.9, the Battery Bank **MAY** be considered **OPERABLE**

1. Record the Time and Date Operations was notified below.

Time: **20:44** Date: **02/21/08**

(b)(6)

(b)(6)

INT:

Supervisor INT:

SECTION CONTINUES ON NEXT PAGE

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NOTE: The following section **MAY** be performed in conjunction with Section 6.5.10.

- 6.5.11 Within 24 hours of the Battery Bank being declared *OPERABLE* in Step 6.5.10.1, verify the following information. Satisfactory completion allows the Battery Bank to remain *Operable*.
- .1 This section verifies the battery bank meets the Category "C" *ALLOWABLE* values for each connected cell - LCO Table 3.8.6-1.

Parameter	Category C: Allowable Value For Each Connected Cell
Electrolyte Level:	Above Top of Plates, and <i>NOT</i> Overflowing.
Float Voltage:	> 2.0717 V
Float Charging Current:	< 1.91 amps, and Current Stabilized. (Float Charging Current was verified in Section 6.4.23 using the EXTECH Model 380942).

1.1 amps

(b)(6)

SECTION CONTINUES ON NEXT PAGE →

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NOTE: When taking Battery Cell Voltage, use a Fluke 187 (equivalent or better) set on the 5V range. If necessary, reference Design Calc E4C-017.

6.5.11.2 Verify the cell voltage and electrolyte level of each connected cell and record below.

ADMINISTRATIVE LIMITS

Cell Voltage: **> 2.0717** VDC

Cell Level: Above Top of Plates, and **NOT** Overflowing.

Cell No.	Cell Volts	Level		Cell No.	Cell Volts	Level		Cell No.	Cell Volts	Level		Cell No.	Cell Volts	Level	
		SAT	UNSAT			SAT	UNSAT			SAT	UNSAT			SAT	UNSAT
1	2.23	✓		16	2.25	✓		31	2.31	✓		46	2.26	✓	
2	2.27	✓		17	2.25	✓		32	2.29	✓		47	2.28	✓	
3	2.27	✓		18	2.26	✓		33	2.28	✓		48	2.26	✓	
4	2.26	✓		19	2.27	✓		34	2.27	✓		49	2.29	✓	
5	2.24	✓		20	2.26	✓		35	2.25	✓		50	2.29	✓	
6	2.25	✓		21	2.23	✓		36	2.22	✓		51	2.28	✓	
7	2.26	✓		22	2.24	✓		37	2.28	✓		52	2.30	✓	
8	2.24	✓		23	2.27	✓		38	2.25	✓		53	2.26	✓	
9	2.27	✓		24	2.27	✓		39	2.25	✓		54	2.28	✓	
10	2.30	✓		25	2.27	✓		40	2.27	✓		55	2.29	✓	
11	2.28	✓		26	2.26	✓		41	2.29	✓		56	2.25	✓	
12	2.28	✓		27	2.29	✓		42	2.26	✓		57	2.26	✓	
13	2.21	✓		28	2.28	✓		43	2.28	✓		58	2.27	✓	
14	2.21	✓		29	2.30	✓		44	2.25	✓		59	2.26	✓	
15	2.26	✓		30	2.29	✓		45	2.27	✓		60	2.26	✓	

- 3 The connected Cells meet the criteria above, and the Supervisor / Engineer have been notified of any **UNSAT** condition. If the requirements are **NOT** met, the Battery Bank **SHALL** be declared inoperable.

INT: (b)(6)

SECTION CONTINUES ON NEXT PAGE →

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- NOTES:** 1. If the 1E 58 Cell Battery Bank was *Discharged* to < 110 volts, or *Overcharged* at > 150 volts, LCO SR 3.8.6.2 requires verifying Battery Cell parameters meet the Table 3.8.6-1 Category B Limits within 7 days.
2. N/A Steps 6.5.12.1 or 6.5.12.2 if conditions do **NOT** apply.

6.5.12 Within 7 days of the Battery Bank being discharged to < 110 VDC or overcharged at > 150 VDC.

- .1 Battery Bank was discharged to less than 110 VDC, SO123-I-2.3 completed satisfactorily within 7 days of the date and time recorded below. Check Step 6.3.15 and transfer the Time and Date the Battery Bank was discharged to less than 110 VDC below.

Time:

09 : 32

Date

21 20 108

INT:

(b)(6)

Supervisor INT:

OR

NOTE: Information **MAY** be found in Attachment 14, Rapid Recharge Data Form. **IF** any recorded Battery Terminal Voltage readings are > 150 VDC for a 1E 58 Cell Configuration, **THEN** record the Time and Date below. Make sure the Spare Cell Voltages are **NOT** included in the total Battery Terminal Voltage.

- .2 Battery Bank was overcharged greater than 150 VDC, SO123-I-2.3 completed satisfactorily within 7 day of the date and time recorded below.

Time:

:

Date

/ /

INT:

Supervisor INT:

SECTION CONTINUED ON NEXT PAGE →

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- NOTES:** 1. Section 6.5.13 is **NOT** required if the *Category B Limits, LCO Table 3.8.6-1* were verified in Section 6.5.12.
2. Section 6.5.14, verification of the LCO Table 3.8.6-1 *Category B* within 31 days of declaring the Battery Bank *Operable* is still required.

6.5.13 Within 7 days of the Battery Bank being declared *Operable* in Step 6.5.10.1, verify the following information.

- .1 SO123-I-2.3 completed. All connected Cells verified to meet the *Allowable Values (meeting the Allowable Values satisfies verifying the Category C Allowable Values, LCO Table 3.8.6-1)*. Attachment 16 **MAY** be referenced for information **ONLY**. Actual requirements are contained in SO123-I-2.3.

(b)(6)

INT:

6.5.14 Within 31 days of the Battery Bank being declared *Operable* in Step 6.5.10.1, verify the following information.

- .1 SO123-I-2.2 completed satisfactorily. *Verifies the battery bank meets the Category A Limits, LCO Table 3.8.6-1*. If a separate MO is used to verify this requirement, record the MO number below.

(b)(6)

INT:

MO Number:

~~0702 0585 002~~

08030098000

(b)(6)

3/3/08

- .2 SO123-I-2.3 completed satisfactorily. *Verifies the battery bank meets the Category B Limits, LCO Table 3.8.6-1*. If a separate MO is used to verify this requirement, record the MO number below.

(b)(6)

INT:

MO Number:

~~0702 0585 002~~

08030098000

(b)(6)

3/3/08

END OF SECTION

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MODIFIED CELL CONNECTION DATA FORM

- 1.0 *Reference Step 6.2.1.2:* Record the *As-Found* resistance readings below. Only applicable to the normal connection(s) that will be disturbed to include Spare Cell(s) in the Battery Bank for this Performance Test.

INFORMATION ONLY			
Cell ID	Resistance (microhms)		Initial
	+	-	
17	97.9 μ R		(b)(6)

- 2.0 *Reference Step 6.2.1.7:* Record the Test Connection resistance readings below. Only applicable to the test connections made for including the Spare Cell(s) in the Performance Test. As necessary, disassembly, clean, and reassembly the connection to meet the criteria.

ACCEPTANCE CRITERIA

Highest Microhm Reading from Step 1.0 on this page

97.9

microhms

x

1.20

Resistance Readings of the Spare Cell Terminations to the Battery Bank are Less Than or Equal to this value and ≤ 145 microhms.

117.48

microhms

Cell ID	Resistance (microhms)		Initial
	+	-	
17	9.3 μ R		(b)(6)
16		4.2 μ R	
15	5.0 μ R		

- 3.0 *Reference Step 6.2.2:* Record the *As-Found* resistance readings below of each connection point that will be disturbed at Cell #60 to allow connecting the Load Bank.

INFORMATION ONLY		
Cell ID	Resistance (microhms)	Initial
	-	
#60	20.8 μ R	(b)(6)

MODIFIED CELL CONNECTION DATA FORM

- 4.0 *Reference Step 6.3.13.2:* Measure the *As-Left* resistance of the Cell #60 connections following the removal of the Load Bank. As necessary, disassembly, clean, and reassembly the connection to meet the criteria. There **MAY** be three or more connection points.

ADMINISTRATIVE LIMIT				
≤ 20 microhms				
Cell ID	Resistance (microhms)	SAT	UNSAT	Initial
60	6.5	/		(b)(6)

- 5.0 *Reference Step 6.5.4.2:* Measure the *As-Left* resistance of the Battery Bank connections restored after removing the Spare Battery Cell(s). As necessary, disassembly, clean, and reassembly the connection to meet the criteria.

ADMINISTRATIVE LIMIT				
≤ 20 microhms				
Cell ID	Resistance (microhms)	SAT	UNSAT	Initial
17+	6.7	/		(b)(6)

NUCLEAR ORGANIZATION
UNITS 1, 2 AND 3

MAINTENANCE PROCEDURE
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RAPID RECHARGE DATA FORM

Date 2 / 20 / 08 154 Time Started: 14 : 38
Cells Tested: 60 Battery Voltage Range: 153.5 - 154.5 Ambient Temp. 72

58 Cell Battery Bank is

≤ 150 Volts

If the 58 Cell Battery Bank exceeds 150 Volts, notify the Supervisor, Tech. Spec. LCO 3.8.6.2 requires performance of a Quarterly (SO123-I-2.3) within 7 Days.

Date Time	60 or 58 Cell Battery Bank		Spare Cell		58 Cell Bank Voltage	Pilot Cell					Initial
	Current	Voltage	Cell #	Voltage		Cell #	Voltage	Temp.	Specific Gravity	Level SAT UNSAT	
2/20/08 14:38	463	132.89	15	2.21	126.48	37	2.20	75	1.114	✓	(b)(6)
			16	2.20		57	2.20	75	1.104	✓	
2/20/08 15:38	463	136.04	15	2.27	136.5 (b)(6)	37	2.28	80	1.157	✓	
			16	2.26	131.51	57	2.27	80	1.169	✓	
2/20/08 16:38	325	149.78	15	2.42	144.95	37 (b)(6)	2.51	90	1.237 (b)(6)	✓	
			16	2.41		57	2.48	89	1.206	✓	
2/20/08 17:38	21	153.35	15	2.46	148.93	37	2.55	90	1.227	✓	
			16	2.46		57	2.55	90	1.225	✓	
2-20-08 18:38	14	153.60	15	2.46	148.68	37	2.56	90	1.225	✓	
			16	2.46		57	2.55	91	1.224	✓	
2/20/08 19:38	12	153.65	15	2.45	148.73	37	2.56	90	1.227	✓	
			16	2.45		57	2.55	91	1.220	✓	
2-20-08 20:38	8.3	153.91	15	2.45	149.00	37	2.56	89	1.228	✓	
			16	2.44		57	2.56	90	1.218	✓	
2-20-08 21:38	6.8	153.91	15	2.44	149.02	37	2.56	88	1.230	✓	
			16	2.43		57	2.56	90	1.216	✓	

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ATTACHMENT 14

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NUCLEAR ORGANIZATION
UNITS 1, 2 AND 3

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RAPID RECHARGE DATA FORM

58 Cell Battery Bank is ≤ 150 Volts

If the 58 Cell Battery Bank exceeds 150 Volts, notify the Supervisor. Tech. Spec. LCO 3.8.6.2 requires performance of a Quarterly (SO123-I-2.3) within 7 Days.

Stabilization
TEST START

Date Time	60 or 69 Cell Battery Bank		Spare Cell		58 Cell Bank Voltage	Pilot Cell						Initial
	Current	Voltage	Cell #	Voltage		Cell #	Voltage	Temp.	Specific Gravity	Level		
										SAT	UNSAT	
2/20/08 22:30	6.0	153.93	15	2.43	149.08	37	2.57	88	1.228	✓		(b)
			16	2.42		57	2.56	89	1.212	✓		(6)
2/20/08 23:30	5.3	153.94	15	2.42	149.09	37	2.57	86	1.229	✓		
			16	2.43		57	2.56	87	1.209	✓		
2/21/08 00:30	5.8	153.94	15	2.43	149.09	37	2.57	87	1.227	✓		
			16	2.42		57	2.56	85	1.205	✓		
2/21/08 01:30	4.5	153.8	15	2.43	149.12	37	2.57	85	1.226	✓		
			16	2.41		57	2.56	86	1.209	✓		
2/21/08 02:30	4.0	153.97	15	2.43	149.13	37	2.57	84	1.226	✓		
			16	2.41		57	2.56	85	1.210	✓		
2/21/08 03:05	0.6	144.03	15	2.28	140.48	37	2.42	81	1.226	✓		
			16	2.27		57	2.40	84	1.209	✓		
2/21/08 04:05	0.7	144.03	15	2.30	139.44	37	2.41	83	1.204	✓		
			16	2.29		57	2.40	83	1.211	✓		
2/21/08 05:05	0.6	144.03	15	2.31	139.42	37	2.42	82	1.228	✓		
			16	2.30		57	2.40	83	1.212	✓		
2/21/08 06:05	0.7	144.04	15	2.31	139.43	37	2.41	81	1.228	✓		
			16	2.30		57	2.39	82	1.213	✓		

(b)(6)

PAGE ____ OF ____

E-BITE - BATTERY CELL INTERNAL RESISTANCE FORM

- NOTES:**
1. The following information is recorded at the Engineer's request for trending purposes.
 2. When taking Battery Cell Voltage, use a Fluke 187 (*equivalent or better*) set on the 5V range. *If necessary, reference Design Calc E4C-017.*
 3. When taking Battery Bank Terminal Voltage, use a Fluke 187 (*equivalent or better*) set on the 500V range. *If necessary, reference Design Calc E4C-017.*
 4. When taking connection resistance readings, use a Biddle 24700 series Digital Low Resistance Ohmmeter (*equivalent or better*) set on the 6 milliohm range (10A current source). *If necessary, reference Design Calc E4C-017.*

Step 6.2.3, As-Found Internal Resistance of Each Connected Cell, readings are in milli-Ohms (mΩ):

Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)
1	0.138	16	0.142	31	0.154	46	0.140
2	0.140	17	0.134	32	0.142	47	0.149
3	0.140	18	0.144	33	0.152	48	0.141
4	0.140	19	0.139	34	0.142	49	0.149
5	0.130	20	0.142	35	0.138	50	0.145
6	0.132	21	0.127	36	0.129	51	0.150
7	0.140	22	0.135	37	0.145	52	0.146
8	0.140	23	0.137	38	0.133	53	0.132
9	0.145	24	0.140	39	0.142	54	0.137
10	0.153	25	0.140	40	0.126	55	0.147
11	0.134	26	0.140	41	0.135	56	0.142
12	0.138	27	0.149	42	0.143	57	0.136
13	0.137	28	0.140	43	0.142	58	0.135
14	0.140	29	0.148	44	0.131	59	0.139
15	0.141	30	0.148	45	0.134	60	0.138

E-BITE - BATTERY CELL INTERNAL RESISTANCE FORM

- NOTES:**
1. The following information is recorded at the Engineer's request for trending purposes.
 2. When taking Battery Cell Voltage, use a Fluke 187 (equivalent or better) set on the 5V range. If necessary, reference Design Calc E4C-017.
 3. When taking Battery Bank Terminal Voltage, use a Fluke 187 (equivalent or better) set on the 500V range. If necessary, reference Design Calc E4C-017.
 4. When taking connection resistance readings, use a Biddle 24700 series Digital Low Resistance Ohmmeter (equivalent or better) set on the 6 milliohm range (10A current source). If necessary, reference Design Calc E4C-017.

Step 6.2.3, As-Found Internal Resistance of Each Connected Cell, readings are in milli-Ohms (mΩ):

Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)
1	0.138	16	0.142	31	0.154	46	0.140
2	0.140	17	0.134	32	0.142	47	0.149
3	0.140	18	0.144	33	0.152	48	0.141
4	0.140	19	0.139	34	0.142	49	0.149
5	0.130	20	0.142	35	0.138	50	0.155
6	0.132	21	0.127	36	0.129	51	0.150
7	0.140	22	0.135	37	0.145	52	0.146
8	0.140	23	0.137	38	0.133	53	0.132
9	0.145	24	0.140	39	0.142	54	0.137
10	0.153	25	0.140	40	0.126	55	0.147
11	0.134	26	0.140	41	0.135	56	0.142
12	0.138	27	0.149	42	0.143	57	0.136
13	0.137	28	0.140	43	0.142	58	0.135
14	0.140	29	0.148	44	0.131	59	0.139
15	0.141	30	0.148	45	0.134	60	0.138

E-BITE - BATTERY CELL INTERNAL RESISTANCE FORM

NOTE: The following information is recorded at the Engineer's request for trending purposes.

Step 6.5.2, As-Left Internal Resistance of Each Connected Cell, readings are in milli-Ohms (mΩ):

Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)	Cell No.	Resistance (mΩ)
1	0. 152	16	0. 146	31	0. 151	46	0. 152
2	0. 145	17	0. 142	32	0. 155	47	0. 152
3	0. 144	18	0. 146	33	0. 144	48	0. 151
4	0. 153	19	0. 142	34	0. 152	49	0. 151
5	0. 133	20	0. 144	35	0. 148	50	0. 156
6	0. 152	21	0. 139	36	0. 138	51	0. 154
7	0. 137	22	0. 138	37	0. 148	52	0. 154
8	0. 157	23	0. 142	38	0. 141	53	0. 141
9	0. 144	24	0. 143	39	0. 147	54	0. 150
10	0. 142 (b)(6)	25	0. 143	40	0. 141	55	0. 156
11	0. 138	26	0. 143	41	0. 148	56	0. 152
12	0. 146	27	0. 147	42	0. 141	57	0. 147
13	0. 143	28	0. 148	43	0. 152	58	0. 144
14	0. 156	29	0. 147	44	0. 143	59	0. 144
15	0. 142	30	0. 157	45	0. 148	60	0. 151

BCT-2000 Battery Load Test Report

Test Site Information

Site Name: SONGS

Address:

2/21/2008

Battery: 2b008

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Test Type: Performance

Tested: 02/20/08

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07020581000

Battery Information

Name: 2b008

Manufacturer: EXIDE

Model: 2GN-15

ID: 2b008

Installed: 10/01/89

Next Test: 02/20/08

Number of strings: 1

Number of cell/string: 60

String Names:

1) String 1

Test Setup

Date of Test: 02/20/08

Start Time of Test: 07:02:31 am

Ending Time of Test: 11:02:31 am

Test Type: Performance

Load Type: Constant Current

Rated Time: 04:00:00

Cell Voltage Warning: 1.100

Battery Voltage Warning: 106.2

Cell Voltage Shutdown: 0.000

Battery Voltage Shutdown: 105.2

Temperature at Time of Test: 77° F

Total Programmed Test Time: 05:00:00

Actual Discharge Time: 04:00:00

Number of Test Steps: 1

Step 1 duration = 05:00:00 @ 242 Amps

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2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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OV/Load

Test Time	Battery Voltage	Battery Load
00:00:02	126.6	242.9
00:15:00	117.4	244.3
00:30:00	117.0	243.8
00:45:00	116.5	242.9
01:00:00	116.1	242.6
01:15:00	115.7	242.5
01:30:00	115.3	242.3
01:45:00	114.7	242.3
02:00:00	114.4	242.8
02:15:00	113.9	242.8
02:30:00	113.3	242.5
02:45:00	112.7	242.6
03:00:00	112.0	242.6
03:15:00	111.3	242.6
03:30:00	110.3	242.9
03:45:00	109.2	242.5
04:00:00	106.3	242.3

2/21/2008 Battery: 2b008

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Test Type: Performance

Tested: 02/20/08

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Test Results

The Following cells dropped below the low threshold level of 0.000 Vs

None

Battery string results:

Battery Capacity = 100.0 %

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2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Test Activity

Step	Step Time	Test Time	Activity
1	04:00:00	04:00:00	TEST ABORTED BY USER

2/21/2008 Battery: 2b008

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Intertiers

Intertier # 1

Step	Step Time	Test Time	Voltage
1	00:00:02	00:00:02	0.028
Intertier End Voltage:			0.029

Intertier # 2

Step	Step Time	Test Time	Voltage
1	00:00:02	00:00:02	0.030
Intertier End Voltage:			0.030

Intertier # 3

Step	Step Time	Test Time	Voltage
1	00:00:00	00:00:00	0.018
1	00:00:03	00:00:03	0.031
Intertier End Voltage:			0.032

Cell Summary

Cell	Float V	Start V	V @ 30 Sec	End V
String: String 1				
1	2.168	2.101	1.995	1.800
2	2.160	2.036	1.994	1.784
3	2.159	2.083	1.992	1.803
4	2.159	2.083	1.993	1.811
5	2.167	2.095	2.005	1.806
6	2.160	2.068	1.992	1.792
7	2.165	2.131	2.001	1.823
8	2.163	2.127	1.992	1.790
9	2.166	2.125	1.996	1.822
10	2.169	2.125	2.021	1.812
11	2.166	2.087	1.999	1.816
12	2.164	2.102	1.993	1.813
13	2.165	2.102	1.987	1.620
14	2.165	2.002	1.989	0.975
15	2.164	2.101	1.985	1.625
16	2.159	2.096	1.981	1.699
17	2.166	2.100	1.995	1.818
18	2.163	2.096	1.990	1.808
19	2.166	2.098	1.995	1.825
20	2.163	2.095	1.991	1.819
21	2.167	2.107	2.003	1.835
22	2.164	2.099	1.992	1.814
23	2.163	2.095	1.991	1.826
24	2.160	2.090	1.986	1.823
25	2.162	2.091	1.987	1.790
26	2.162	2.041	1.999	1.803
27	2.167	2.096	1.990	1.785
28	2.163	2.086	1.981	1.794
29	2.175	2.098	1.996	1.810
30	2.169	2.011	1.985	1.756
31	2.172	2.092	1.996	1.826
32	2.166	2.089	1.990	1.818
33	2.162	2.085	1.984	1.813
34	2.162	2.037	1.994	1.812
35	2.164	2.094	2.005	1.828
36	2.169	2.099	2.010	1.819
37	2.171	2.095	2.008	1.818
38	2.168	2.074	2.002	1.822
39	2.171	2.139	2.005	1.819
40	2.167	2.132	2.004	1.825
41	2.166	2.131	2.001	1.812
42	2.170	2.132	2.032	1.820
43	2.167	2.088	1.996	1.799
44	2.166	2.107	1.994	1.798
45	2.167	2.107	1.996	1.804
46	2.171	1.996	1.996	1.784
47	2.172	2.104	2.000	1.815
48	2.163	2.094	1.988	1.808
49	2.171	2.102	1.995	1.810

2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Cell Summary

Cell	Float V	Start V	V @ 30 Sec	End V
String: String 1				
50	2.172	2.101	1.994	1.810
51	2.157	2.082	1.974	1.795
52	2.173	2.099	1.993	1.798
53	2.159	2.093	1.986	1.798
54	2.161	2.090	1.984	1.811
55	2.162	2.089	1.982	1.816
56	2.154	2.083	1.978	1.820
57	2.167	2.097	1.993	1.806
58	2.166	2.045	2.002	1.799
59	2.160	2.087	1.983	1.804
60	2.161	2.090	1.989	1.796

2/21/2008 Battery: 2b008

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Test Type: Performance

Tested: 02/20/08

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Cell General

Starting Float Voltages (No Load)

Test Time: 00:00:00		Battery Voltage: 129.0		Amps: 0.0		Kw: 0.0	
String: String 1							
1 = 2.168	2 = 2.160	3 = 2.159	4 = 2.159	5 = 2.167	6 = 2.160		
7 = 2.165	8 = 2.163	9 = 2.166	10 = 2.169	11 = 2.166	12 = 2.164		
13 = 2.165	14 = 2.165	15 = 2.164	16 = 2.159	17 = 2.166	18 = 2.163		
19 = 2.166	20 = 2.163	21 = 2.167	22 = 2.164	23 = 2.163	24 = 2.160		
25 = 2.162	26 = 2.162	27 = 2.167	28 = 2.163	29 = 2.175	30 = 2.169		
31 = 2.172	32 = 2.166	33 = 2.162	34 = 2.162	35 = 2.164	36 = 2.169		
37 = 2.171	38 = 2.168	39 = 2.171	40 = 2.167	41 = 2.166	42 = 2.170		
43 = 2.167	44 = 2.166	45 = 2.167	46 = 2.171	47 = 2.172	48 = 2.163		
49 = 2.171	50 = 2.172	51 = 2.157	52 = 2.173	53 = 2.159	54 = 2.161		
55 = 2.162	56 = 2.154	57 = 2.167	58 = 2.166	59 = 2.160	60 = 2.161		

Starting Voltage (Load)

Test Time: 00:00:02		Battery Voltage: 126.6		Amps: 242.9		Kw: 30.8	
String:String 1							
1 = 2.101	2 = 2.036	3 = 2.083	4 = 2.083	5 = 2.095	6 = 2.068		
7 = 2.131	8 = 2.127	9 = 2.125	10 = 2.125	11 = 2.087	12 = 2.102		
13 = 2.102	14 = 2.002	15 = 2.101	16 = 2.096	17 = 2.100	18 = 2.096		
19 = 2.098	20 = 2.095	21 = 2.107	22 = 2.099	23 = 2.095	24 = 2.090		
25 = 2.091	26 = 2.041	27 = 2.096	28 = 2.086	29 = 2.098	30 = 2.011		
31 = 2.092	32 = 2.089	33 = 2.085	34 = 2.037	35 = 2.094	36 = 2.099		
37 = 2.095	38 = 2.074	39 = 2.139	40 = 2.132	41 = 2.131	42 = 2.132		
43 = 2.088	44 = 2.107	45 = 2.107	46 = 1.996	47 = 2.104	48 = 2.094		
49 = 2.102	50 = 2.101	51 = 2.082	52 = 2.099	53 = 2.093	54 = 2.090		
55 = 2.089	56 = 2.083	57 = 2.097	58 = 2.045	59 = 2.087	60 = 2.090		

Test Time: 00:15:00		Battery Voltage: 117.4		Amps: 244.3		Kw: 28.7	
String:String 1							
1 = 1.971	2 = 1.967	3 = 1.966	4 = 1.966	5 = 1.969	6 = 1.969		
7 = 1.976	8 = 1.965	9 = 1.967	10 = 1.970	11 = 1.973	12 = 1.968		
13 = 1.961	14 = 1.966	15 = 1.965	16 = 1.957	17 = 1.971	18 = 1.967		
19 = 1.973	20 = 1.968	21 = 1.977	22 = 1.968	23 = 1.969	24 = 1.971		
25 = 1.969	26 = 1.973	27 = 1.968	28 = 1.967	29 = 1.970	30 = 1.967		
31 = 1.971	32 = 1.972	33 = 1.967	34 = 1.969	35 = 1.973	36 = 1.979		
37 = 1.979	38 = 1.976	39 = 1.979	40 = 1.980	41 = 1.974	42 = 1.978		
43 = 1.966	44 = 1.966	45 = 1.967	46 = 1.967	47 = 1.968	48 = 1.968		
49 = 1.968	50 = 1.967	51 = 1.967	52 = 1.971	53 = 1.970	54 = 1.964		
55 = 1.964	56 = 1.967	57 = 1.968	58 = 1.967	59 = 1.963	60 = 1.966		

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Cell General

Test Time: 00:30:00		Battery Voltage: 117.0		Amps: 243.8		Kw: 28.5	
String: String 1							
1 = 1.966	2 = 1.967	3 = 1.961	4 = 1.966	5 = 1.969	6 = 1.964		
7 = 1.971	8 = 1.959	9 = 1.967	10 = 1.965	11 = 1.967	12 = 1.968		
13 = 1.956	14 = 1.960	15 = 1.960	16 = 1.957	17 = 1.966	18 = 1.962		
19 = 1.967	20 = 1.968	21 = 1.972	22 = 1.968	23 = 1.969	24 = 1.965		
25 = 1.969	26 = 1.968	27 = 1.962	28 = 1.962	29 = 1.965	30 = 1.961		
31 = 1.971	32 = 1.966	33 = 1.967	34 = 1.963	35 = 1.973	36 = 1.973		
37 = 1.973	38 = 1.970	39 = 1.973	40 = 1.974	41 = 1.969	42 = 1.972		
43 = 1.966	44 = 1.961	45 = 1.962	46 = 1.962	47 = 1.968	48 = 1.962		
49 = 1.968	50 = 1.967	51 = 1.961	52 = 1.966	53 = 1.964	54 = 1.964		
55 = 1.964	56 = 1.961	57 = 1.968	58 = 1.962	59 = 1.963	60 = 1.966		

Test Time: 00:45:00		Battery Voltage: 116.5		Amps: 242.9		Kw: 28.3	
String:String 1							
1 = 1.961	2 = 1.956	3 = 1.955	4 = 1.955	5 = 1.959	6 = 1.958		
7 = 1.965	8 = 1.954	9 = 1.962	10 = 1.959	11 = 1.962	12 = 1.957		
13 = 1.951	14 = 1.949	15 = 1.954	16 = 1.952	17 = 1.961	18 = 1.956		
19 = 1.962	20 = 1.957	21 = 1.966	22 = 1.956	23 = 1.959	24 = 1.960		
25 = 1.957	26 = 1.963	27 = 1.956	28 = 1.956	29 = 1.960	30 = 1.950		
31 = 1.965	32 = 1.961	33 = 1.961	34 = 1.958	35 = 1.962	36 = 1.962		
37 = 1.968	38 = 1.964	39 = 1.962	40 = 1.963	41 = 1.958	42 = 1.961		
43 = 1.954	44 = 1.956	45 = 1.957	46 = 1.951	47 = 1.962	48 = 1.957		
49 = 1.957	50 = 1.956	51 = 1.956	52 = 1.960	53 = 1.959	54 = 1.958		
55 = 1.959	56 = 1.956	57 = 1.957	58 = 1.957	59 = 1.952	60 = 1.954		

Test Time: 01:00:00		Battery Voltage: 116.1		Amps: 242.6		Kw: 28.2	
String:String 1							
1 = 1.955	2 = 1.951	3 = 1.950	4 = 1.950	5 = 1.953	6 = 1.947		
7 = 1.954	8 = 1.948	9 = 1.951	10 = 1.948	11 = 1.956	12 = 1.952		
13 = 1.940	14 = 1.944	15 = 1.943	16 = 1.941	17 = 1.955	18 = 1.951		
19 = 1.956	20 = 1.952	21 = 1.961	22 = 1.951	23 = 1.953	24 = 1.954		
25 = 1.952	26 = 1.952	27 = 1.951	28 = 1.951	29 = 1.954	30 = 1.944		
31 = 1.954	32 = 1.950	33 = 1.950	34 = 1.952	35 = 1.957	36 = 1.957		
37 = 1.957	38 = 1.953	39 = 1.957	40 = 1.958	41 = 1.952	42 = 1.956		
43 = 1.949	44 = 1.950	45 = 1.951	46 = 1.945	47 = 1.951	48 = 1.951		
49 = 1.951	50 = 1.950	51 = 1.950	52 = 1.949	53 = 1.953	54 = 1.947		
55 = 1.948	56 = 1.950	57 = 1.951	58 = 1.951	59 = 1.947	60 = 1.949		

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2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Cell General

Test Time: 01:15:00 Battery Voltage: 115.7 Amps: 242.5 Kw: 28.1

String: String 1

1 = 1.944	2 = 1.940	3 = 1.938	4 = 1.944	5 = 1.947	6 = 1.942
7 = 1.948	8 = 1.937	9 = 1.945	10 = 1.943	11 = 1.945	12 = 1.946
13 = 1.934	14 = 1.932	15 = 1.937	16 = 1.935	17 = 1.950	18 = 1.945
19 = 1.945	20 = 1.946	21 = 1.955	22 = 1.945	23 = 1.947	24 = 1.948
25 = 1.946	26 = 1.946	27 = 1.940	28 = 1.940	29 = 1.943	30 = 1.939
31 = 1.948	32 = 1.944	33 = 1.944	34 = 1.947	35 = 1.951	36 = 1.951
37 = 1.951	38 = 1.948	39 = 1.951	40 = 1.952	41 = 1.947	42 = 1.950
43 = 1.943	44 = 1.939	45 = 1.946	46 = 1.939	47 = 1.946	48 = 1.946
49 = 1.946	50 = 1.944	51 = 1.939	52 = 1.943	53 = 1.948	54 = 1.941
55 = 1.942	56 = 1.944	57 = 1.946	58 = 1.940	59 = 1.941	60 = 1.943

Test Time: 01:30:00 Battery Voltage: 115.3 Amps: 242.3 Kw: 27.9

String: String 1

1 = 1.938	2 = 1.934	3 = 1.933	4 = 1.938	5 = 1.936	6 = 1.936
7 = 1.943	8 = 1.932	9 = 1.940	10 = 1.937	11 = 1.940	12 = 1.941
13 = 1.923	14 = 1.927	15 = 1.932	16 = 1.930	17 = 1.938	18 = 1.934
19 = 1.940	20 = 1.941	21 = 1.944	22 = 1.940	23 = 1.942	24 = 1.937
25 = 1.935	26 = 1.941	27 = 1.934	28 = 1.934	29 = 1.937	30 = 1.928
31 = 1.943	32 = 1.938	33 = 1.939	34 = 1.936	35 = 1.946	36 = 1.940
37 = 1.946	38 = 1.942	39 = 1.940	40 = 1.947	41 = 1.941	42 = 1.944
43 = 1.932	44 = 1.933	45 = 1.934	46 = 1.928	47 = 1.940	48 = 1.934
49 = 1.940	50 = 1.939	51 = 1.933	52 = 1.938	53 = 1.937	54 = 1.936
55 = 1.937	56 = 1.939	57 = 1.940	58 = 1.934	59 = 1.936	60 = 1.932

Test Time: 01:45:00 Battery Voltage: 114.7 Amps: 242.3 Kw: 27.8

String: String 1

1 = 1.933	2 = 1.928	3 = 1.927	4 = 1.927	5 = 1.931	6 = 1.925
7 = 1.937	8 = 1.926	9 = 1.934	10 = 1.932	11 = 1.934	12 = 1.930
13 = 1.917	14 = 1.916	15 = 1.921	16 = 1.924	17 = 1.933	18 = 1.928
19 = 1.934	20 = 1.930	21 = 1.938	22 = 1.928	23 = 1.936	24 = 1.932
25 = 1.930	26 = 1.930	27 = 1.928	28 = 1.923	29 = 1.932	30 = 1.922
31 = 1.937	32 = 1.933	33 = 1.933	34 = 1.930	35 = 1.934	36 = 1.934
37 = 1.934	38 = 1.937	39 = 1.934	40 = 1.936	41 = 1.930	42 = 1.933
43 = 1.927	44 = 1.928	45 = 1.929	46 = 1.923	47 = 1.934	48 = 1.929
49 = 1.929	50 = 1.928	51 = 1.928	52 = 1.927	53 = 1.931	54 = 1.930
55 = 1.931	56 = 1.928	57 = 1.929	58 = 1.929	59 = 1.924	60 = 1.927

2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Cell General

Test Time: 02:00:00		Battery Voltage: 114.4		Amps: 242.8		Kw: 27.8	
String:String 1							
1 = 1.922	2 = 1.917	3 = 1.916	4 = 1.922	5 = 1.919	6 = 1.919		
7 = 1.926	8 = 1.915	9 = 1.923	10 = 1.921	11 = 1.923	12 = 1.924		
13 = 1.906	14 = 1.910	15 = 1.915	16 = 1.913	17 = 1.927	18 = 1.923		
19 = 1.928	20 = 1.924	21 = 1.933	22 = 1.923	23 = 1.925	24 = 1.926		
25 = 1.918	26 = 1.924	27 = 1.917	28 = 1.917	29 = 1.921	30 = 1.911		
31 = 1.926	32 = 1.922	33 = 1.922	34 = 1.924	35 = 1.929	36 = 1.929		
37 = 1.929	38 = 1.926	39 = 1.929	40 = 1.930	41 = 1.924	42 = 1.928		
43 = 1.921	44 = 1.917	45 = 1.923	46 = 1.917	47 = 1.923	48 = 1.923		
49 = 1.923	50 = 1.922	51 = 1.917	52 = 1.921	53 = 1.920	54 = 1.919		
55 = 1.920	56 = 1.922	57 = 1.923	58 = 1.923	59 = 1.919	60 = 1.921		

Test Time: 02:15:00		Battery Voltage: 113.9		Amps: 242.8		Kw: 27.7	
String:String 1				58 CELL 110.094			
1 = 1.916	2 = 1.912	3 = 1.911	4 = 1.916	5 = 1.914	6 = 1.908		
7 = 1.921	8 = 1.909	9 = 1.917	10 = 1.915	11 = 1.917	12 = 1.913		
13 = 1.895	14 = 1.899	15 = 1.904	16 = 1.902	17 = 1.916	18 = 1.912		
19 = 1.917	20 = 1.918	21 = 1.927	22 = 1.917	23 = 1.919	24 = 1.915		
25 = 1.913	26 = 1.913	27 = 1.906	28 = 1.906	29 = 1.915	30 = 1.905		
31 = 1.921	32 = 1.916	33 = 1.917	34 = 1.913	35 = 1.923	36 = 1.918		
37 = 1.918	38 = 1.920	39 = 1.918	40 = 1.924	41 = 1.913	42 = 1.917		
43 = 1.910	44 = 1.911	45 = 1.912	46 = 1.906	47 = 1.918	48 = 1.912		
49 = 1.918	50 = 1.917	51 = 1.911	52 = 1.910	53 = 1.914	54 = 1.913		
55 = 1.914	56 = 1.917	57 = 1.918	58 = 1.912	59 = 1.913	60 = 1.910		

Test Time: 02:30:00		Battery Voltage: 113.3		Amps: 242.5		Kw: 27.5	
String:String 1				58 CELL 109.517			
1 = 1.905	2 = 1.900	3 = 1.899	4 = 1.905	5 = 1.903	6 = 1.897		
7 = 1.909	8 = 1.898	9 = 1.906	10 = 1.904	11 = 1.906	12 = 1.907		
13 = 1.884	14 = 1.888	15 = 1.893	16 = 1.890	17 = 1.905	18 = 1.900		
19 = 1.912	20 = 1.907	21 = 1.916	22 = 1.906	23 = 1.908	24 = 1.909		
25 = 1.902	26 = 1.902	27 = 1.900	28 = 1.900	29 = 1.904	30 = 1.894		
31 = 1.909	32 = 1.905	33 = 1.905	34 = 1.902	35 = 1.912	36 = 1.907		
37 = 1.912	38 = 1.909	39 = 1.907	40 = 1.913	41 = 1.908	42 = 1.911		
43 = 1.899	44 = 1.900	45 = 1.901	46 = 1.895	47 = 1.907	48 = 1.901		
49 = 1.907	50 = 1.905	51 = 1.900	52 = 1.904	53 = 1.903	54 = 1.902		
55 = 1.903	56 = 1.905	57 = 1.907	58 = 1.901	59 = 1.902	60 = 1.899		

2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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07020581000

Cell General

Test Time: 02:45:00		Battery Voltage: 112.7		Amps: 242.6		Kw: 27.3	
String:String 1							
1 = 1.894	2 = 1.889	3 = 1.894	4 = 1.894	5 = 1.892	6 = 1.892		
7 = 1.898	8 = 1.887	9 = 1.900	10 = 1.893	11 = 1.900	12 = 1.896		
13 = 1.873	14 = 1.877	15 = 1.881	16 = 1.879	17 = 1.899	18 = 1.895		
19 = 1.900	20 = 1.896	21 = 1.905	22 = 1.895	23 = 1.897	24 = 1.898		
25 = 1.890	26 = 1.890	27 = 1.889	28 = 1.889	29 = 1.898	30 = 1.883		
31 = 1.898	32 = 1.899	33 = 1.894	34 = 1.897	35 = 1.901	36 = 1.901		
37 = 1.901	38 = 1.903	39 = 1.901	40 = 1.902	41 = 1.897	42 = 1.900		
43 = 1.893	44 = 1.889	45 = 1.895	46 = 1.890	47 = 1.895	48 = 1.895		
49 = 1.895	50 = 1.894	51 = 1.889	52 = 1.893	53 = 1.892	54 = 1.897		
55 = 1.898	56 = 1.894	57 = 1.895	58 = 1.895	59 = 1.891	60 = 1.893		

Test Time: 03:00:00		Battery Voltage: 112.0		Amps: 242.6		Kw: 27.2	
String:String 1							
1 = 1.883	2 = 1.878	3 = 1.877	4 = 1.883	5 = 1.880	6 = 1.880		
7 = 1.893	8 = 1.876	9 = 1.889	10 = 1.881	11 = 1.889	12 = 1.885		
13 = 1.861	14 = 1.860	15 = 1.865	16 = 1.868	17 = 1.888	18 = 1.884		
19 = 1.889	20 = 1.885	21 = 1.894	22 = 1.884	23 = 1.892	24 = 1.887		
25 = 1.879	26 = 1.879	27 = 1.873	28 = 1.878	29 = 1.887	30 = 1.872		
31 = 1.887	32 = 1.888	33 = 1.883	34 = 1.885	35 = 1.890	36 = 1.890		
37 = 1.890	38 = 1.892	39 = 1.890	40 = 1.891	41 = 1.885	42 = 1.889		
43 = 1.882	44 = 1.878	45 = 1.884	46 = 1.873	47 = 1.884	48 = 1.884		
49 = 1.884	50 = 1.883	51 = 1.878	52 = 1.882	53 = 1.881	54 = 1.885		
55 = 1.887	56 = 1.883	57 = 1.884	58 = 1.879	59 = 1.880	60 = 1.882		

Test Time: 03:15:00		Battery Voltage: 111.3		Amps: 242.6		Kw: 27.0	
String:String 1							
1 = 1.871	2 = 1.861	3 = 1.866	4 = 1.871	5 = 1.869	6 = 1.864		
7 = 1.876	8 = 1.865	9 = 1.878	10 = 1.870	11 = 1.873	12 = 1.874		
13 = 1.845	14 = 1.843	15 = 1.848	16 = 1.851	17 = 1.877	18 = 1.867		
19 = 1.878	20 = 1.874	21 = 1.883	22 = 1.873	23 = 1.880	24 = 1.876		
25 = 1.863	26 = 1.868	27 = 1.861	28 = 1.861	29 = 1.870	30 = 1.855		
31 = 1.876	32 = 1.871	33 = 1.872	34 = 1.869	35 = 1.879	36 = 1.879		
37 = 1.879	38 = 1.881	39 = 1.879	40 = 1.880	41 = 1.874	42 = 1.878		
43 = 1.865	44 = 1.867	45 = 1.868	46 = 1.862	47 = 1.873	48 = 1.873		
49 = 1.873	50 = 1.872	51 = 1.867	52 = 1.865	53 = 1.870	54 = 1.869		
55 = 1.875	56 = 1.872	57 = 1.873	58 = 1.868	59 = 1.869	60 = 1.865		

2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Cell General

Test Time: 03:30:00		Battery Voltage: 110.3		Amps: 242.9		Kw: 26.8	
String: String 1							
1 = 1.855	2 = 1.845	3 = 1.849	4 = 1.855	5 = 1.852	6 = 1.847		
7 = 1.865	8 = 1.848	9 = 1.861	10 = 1.854	11 = 1.861	12 = 1.857		
13 = 1.817	14 = 1.815	15 = 1.826	16 = 1.829	17 = 1.860	18 = 1.856		
19 = 1.861	20 = 1.857	21 = 1.871	22 = 1.856	23 = 1.864	24 = 1.865		
25 = 1.846	26 = 1.851	27 = 1.845	28 = 1.845	29 = 1.859	30 = 1.838		
31 = 1.865	32 = 1.860	33 = 1.861	34 = 1.858	35 = 1.868	36 = 1.862		
37 = 1.862	38 = 1.864	39 = 1.862	40 = 1.863	41 = 1.858	42 = 1.861		
43 = 1.849	44 = 1.850	45 = 1.857	46 = 1.845	47 = 1.862	48 = 1.857		
49 = 1.857	50 = 1.855	51 = 1.850	52 = 1.849	53 = 1.853	54 = 1.858		
55 = 1.859	56 = 1.861	57 = 1.857	58 = 1.851	59 = 1.852	60 = 1.849		

Test Time: 03:45:00		Battery Voltage: 109.2		Amps: 242.5		Kw: 26.5	
String: String 1							
1 = 1.832	2 = 1.822	3 = 1.832	4 = 1.838	5 = 1.836	6 = 1.825		
7 = 1.848	8 = 1.826	9 = 1.845	10 = 1.837	11 = 1.845	12 = 1.840		
13 = 1.783	14 = 1.777	15 = 1.792	16 = 1.796	17 = 1.844	18 = 1.833		
19 = 1.845	20 = 1.840	21 = 1.855	22 = 1.839	23 = 1.847	24 = 1.848		
25 = 1.823	26 = 1.829	27 = 1.822	28 = 1.828	29 = 1.837	30 = 1.810		
31 = 1.848	32 = 1.844	33 = 1.839	34 = 1.841	35 = 1.851	36 = 1.845		
37 = 1.845	38 = 1.848	39 = 1.845	40 = 1.852	41 = 1.841	42 = 1.844		
43 = 1.832	44 = 1.828	45 = 1.834	46 = 1.823	47 = 1.840	48 = 1.834		
49 = 1.840	50 = 1.839	51 = 1.828	52 = 1.832	53 = 1.831	54 = 1.835		
55 = 1.842	56 = 1.844	57 = 1.834	58 = 1.834	59 = 1.835	60 = 1.832		

Test End Voltages

Test Time: 04:00:00		Battery Voltage: 106.3		Amps: 242.3		Kw: 25.8	
String:String 1							
1 = 1.800	2 = 1.784	3 = 1.803	4 = 1.811	5 = 1.806	6 = 1.792		
7 = 1.823	8 = 1.790	9 = 1.822	10 = 1.812	11 = 1.816	12 = 1.813		
13 = 1.620	14 = 0.975	15 = 1.625	16 = 1.699	17 = 1.818	18 = 1.808		
19 = 1.825	20 = 1.819	21 = 1.835	22 = 1.814	23 = 1.826	24 = 1.823		
25 = 1.790	26 = 1.803	27 = 1.785	28 = 1.794	29 = 1.810	30 = 1.756		
31 = 1.826	32 = 1.818	33 = 1.813	34 = 1.812	35 = 1.828	36 = 1.819		
37 = 1.818	38 = 1.822	39 = 1.819	40 = 1.825	41 = 1.812	42 = 1.820		
43 = 1.799	44 = 1.798	45 = 1.804	46 = 1.784	47 = 1.815	48 = 1.808		
49 = 1.810	50 = 1.810	51 = 1.795	52 = 1.798	53 = 1.798	54 = 1.811		
55 = 1.816	56 = 1.820	57 = 1.806	58 = 1.799	59 = 1.804	60 = 1.796		

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2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Cell Detail

No Cell Selected

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2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Cell Tabular

Load (amps):	0.0	242.9	244.3	243.8	242.9	242.6	242.5	242.3	242.3	242.8	242.8	242.5
Battery Voltage:	129.0	126.6	117.4	117.0	116.5	116.1	115.7	115.3	114.7	114.4	113.9	113.3
Cell	Float	00:00:02	00:15:00	00:30:00	00:45:00	01:00:00	01:15:00	01:30:00	01:45:00	02:00:00	02:15:00	02:30:00

String: String 1

1	2.168	2.101	1.971	1.966	1.961	1.955	1.944	1.938	1.933	1.922	1.916	1.905
2	2.160	2.036	1.967	1.967	1.956	1.951	1.940	1.934	1.928	1.917	1.912	1.900
3	2.159	2.083	1.966	1.961	1.955	1.950	1.938	1.933	1.927	1.916	1.911	1.899
4	2.159	2.083	1.966	1.966	1.955	1.950	1.944	1.938	1.927	1.922	1.916	1.905
5	2.167	2.095	1.969	1.969	1.959	1.953	1.947	1.936	1.931	1.919	1.914	1.903
6	2.160	2.068	1.969	1.964	1.958	1.947	1.942	1.936	1.925	1.919	1.908	1.897
7	2.165	2.131	1.976	1.971	1.965	1.954	1.948	1.943	1.937	1.926	1.921	1.909
8	2.163	2.127	1.965	1.959	1.954	1.948	1.937	1.932	1.926	1.915	1.909	1.898
9	2.166	2.125	1.967	1.967	1.962	1.951	1.945	1.940	1.934	1.923	1.917	1.906
10	2.169	2.125	1.970	1.965	1.959	1.948	1.943	1.937	1.932	1.921	1.915	1.904
11	2.166	2.087	1.973	1.967	1.962	1.956	1.945	1.940	1.934	1.923	1.917	1.906
12	2.164	2.102	1.968	1.968	1.957	1.952	1.946	1.941	1.930	1.924	1.913	1.907
13	2.165	2.102	1.961	1.956	1.951	1.940	1.934	1.923	1.917	1.906	1.895	1.884
14	2.165	2.002	1.966	1.960	1.949	1.944	1.932	1.927	1.916	1.910	1.899	1.888
15	2.164	2.101	1.965	1.960	1.954	1.943	1.937	1.932	1.921	1.915	1.904	1.893
16	2.159	2.096	1.957	1.957	1.952	1.941	1.935	1.930	1.924	1.913	1.902	1.890
17	2.166	2.100	1.971	1.966	1.961	1.955	1.950	1.938	1.933	1.927	1.916	1.905
18	2.163	2.096	1.967	1.962	1.956	1.951	1.945	1.934	1.928	1.923	1.912	1.900
19	2.166	2.098	1.973	1.967	1.962	1.956	1.945	1.940	1.934	1.928	1.917	1.912
20	2.163	2.095	1.968	1.968	1.957	1.952	1.946	1.941	1.930	1.924	1.918	1.907
21	2.167	2.107	1.977	1.972	1.966	1.961	1.955	1.944	1.938	1.933	1.927	1.916
22	2.164	2.099	1.968	1.968	1.956	1.951	1.945	1.940	1.928	1.923	1.917	1.906
23	2.163	2.095	1.969	1.969	1.959	1.953	1.947	1.942	1.936	1.925	1.919	1.908
24	2.160	2.090	1.971	1.965	1.960	1.954	1.948	1.937	1.932	1.926	1.915	1.909
25	2.162	2.091	1.969	1.969	1.957	1.952	1.946	1.935	1.930	1.918	1.913	1.902
26	2.162	2.041	1.973	1.968	1.963	1.952	1.946	1.941	1.930	1.924	1.913	1.902
27	2.167	2.096	1.968	1.962	1.956	1.951	1.940	1.934	1.928	1.917	1.906	1.900
28	2.163	2.086	1.967	1.962	1.956	1.951	1.940	1.934	1.923	1.917	1.906	1.900
29	2.175	2.098	1.970	1.965	1.960	1.954	1.943	1.937	1.932	1.921	1.915	1.904
30	2.169	2.011	1.967	1.961	1.950	1.944	1.939	1.928	1.922	1.911	1.905	1.894
31	2.172	2.092	1.971	1.971	1.965	1.954	1.948	1.943	1.937	1.926	1.921	1.909
32	2.166	2.089	1.972	1.966	1.961	1.950	1.944	1.938	1.933	1.922	1.916	1.905

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Cell Tabular

Load (amps):	0.0	242.9	244.3	243.8	242.9	242.6	242.5	242.3	242.3	242.8	242.8	242.5
Battery Voltage:	129.0	126.6	117.4	117.0	116.5	116.1	115.7	115.3	114.7	114.4	113.9	113.3
Cell	Float	00:00:02	00:15:00	00:30:00	00:45:00	01:00:00	01:15:00	01:30:00	01:45:00	02:00:00	02:15:00	02:30:00

String: String 1

33	2.162	2.085	1.967	1.967	1.961	1.950	1.944	1.939	1.933	1.922	1.917	1.905
34	2.162	2.037	1.969	1.963	1.958	1.952	1.947	1.936	1.930	1.924	1.913	1.902
35	2.164	2.094	1.973	1.973	1.962	1.957	1.951	1.946	1.934	1.929	1.923	1.912
36	2.169	2.099	1.979	1.973	1.962	1.957	1.951	1.940	1.934	1.929	1.918	1.907
37	2.171	2.095	1.979	1.973	1.968	1.957	1.951	1.946	1.934	1.929	1.918	1.912
38	2.168	2.074	1.976	1.970	1.964	1.953	1.948	1.942	1.937	1.926	1.920	1.909
39	2.171	2.139	1.979	1.973	1.962	1.957	1.951	1.940	1.934	1.929	1.918	1.907
40	2.167	2.132	1.980	1.974	1.963	1.958	1.952	1.947	1.936	1.930	1.924	1.913
41	2.166	2.131	1.974	1.969	1.958	1.952	1.947	1.941	1.930	1.924	1.913	1.908
42	2.170	2.132	1.978	1.972	1.961	1.956	1.950	1.944	1.933	1.928	1.917	1.911
43	2.167	2.088	1.966	1.966	1.954	1.949	1.943	1.932	1.927	1.921	1.910	1.899
44	2.166	2.107	1.966	1.961	1.956	1.950	1.939	1.933	1.928	1.917	1.911	1.900
45	2.167	2.107	1.967	1.962	1.957	1.951	1.946	1.934	1.929	1.923	1.912	1.901
46	2.171	1.996	1.967	1.962	1.951	1.945	1.939	1.928	1.923	1.917	1.906	1.895
47	2.172	2.104	1.968	1.968	1.962	1.951	1.946	1.940	1.934	1.923	1.918	1.907
48	2.163	2.094	1.968	1.962	1.957	1.951	1.946	1.934	1.929	1.923	1.912	1.901
49	2.171	2.102	1.968	1.968	1.957	1.951	1.946	1.940	1.929	1.923	1.918	1.907
50	2.172	2.101	1.967	1.967	1.956	1.950	1.944	1.939	1.928	1.922	1.917	1.905
51	2.157	2.082	1.967	1.961	1.956	1.950	1.939	1.933	1.928	1.917	1.911	1.900
52	2.173	2.099	1.971	1.966	1.960	1.949	1.943	1.938	1.927	1.921	1.910	1.904
53	2.159	2.093	1.970	1.964	1.959	1.953	1.948	1.937	1.931	1.920	1.914	1.903
54	2.161	2.090	1.964	1.964	1.958	1.947	1.941	1.936	1.930	1.919	1.913	1.902
55	2.162	2.089	1.964	1.964	1.959	1.948	1.942	1.937	1.931	1.920	1.914	1.903
56	2.154	2.083	1.967	1.961	1.956	1.950	1.944	1.939	1.928	1.922	1.917	1.905
57	2.167	2.097	1.968	1.968	1.957	1.951	1.946	1.940	1.929	1.923	1.918	1.907
58	2.166	2.045	1.967	1.962	1.957	1.951	1.940	1.934	1.929	1.923	1.912	1.901
59	2.160	2.087	1.963	1.963	1.952	1.947	1.941	1.936	1.924	1.919	1.913	1.902
60	2.161	2.090	1.966	1.966	1.954	1.949	1.943	1.932	1.927	1.921	1.910	1.899

Cell Tabular

Load (amps):	242.6	242.6	242.6	242.9	242.5	242.3
Battery Voltage:	112.7	112.0	111.3	110.3	109.2	106.3
Cell	02:45:00	03:00:00	03:15:00	03:30:00	03:45:00	04:00:00

String: String 1

1	1.894	1.883	1.871	1.855	1.832	1.800						
2	1.889	1.878	1.861	1.845	1.822	1.784						
3	1.894	1.877	1.866	1.849	1.832	1.803						
4	1.894	1.883	1.871	1.855	1.838	1.811						
5	1.892	1.880	1.869	1.852	1.836	1.806						
6	1.892	1.880	1.864	1.847	1.825	1.792						
7	1.898	1.893	1.876	1.865	1.848	1.823						
8	1.887	1.876	1.865	1.848	1.826	1.790						
9	1.900	1.889	1.878	1.861	1.845	1.822						
10	1.893	1.881	1.870	1.854	1.837	1.812						
11	1.900	1.889	1.873	1.861	1.845	1.816						
12	1.896	1.885	1.874	1.857	1.840	1.813						
13	1.873	1.861	1.845	1.817	1.783	1.620						
14	1.877	1.860	1.843	1.815	1.777	0.975						
15	1.881	1.865	1.848	1.826	1.792	1.625						
16	1.879	1.868	1.851	1.829	1.796	1.699						
17	1.899	1.888	1.877	1.860	1.844	1.818						
18	1.895	1.884	1.867	1.856	1.833	1.808						
19	1.900	1.889	1.878	1.861	1.845	1.825						
20	1.896	1.885	1.874	1.857	1.840	1.819						
21	1.905	1.894	1.883	1.871	1.855	1.835						
22	1.895	1.884	1.873	1.856	1.839	1.814						
23	1.897	1.892	1.880	1.864	1.847	1.826						
24	1.898	1.887	1.876	1.865	1.848	1.823						
25	1.890	1.879	1.863	1.846	1.823	1.790						
26	1.890	1.879	1.868	1.851	1.829	1.803						
27	1.889	1.873	1.861	1.845	1.822	1.785						
28	1.889	1.878	1.861	1.845	1.828	1.794						
29	1.898	1.887	1.870	1.859	1.837	1.810						
30	1.883	1.872	1.855	1.838	1.810	1.756						
31	1.898	1.887	1.876	1.865	1.848	1.826						
32	1.899	1.888	1.871	1.860	1.844	1.818						

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Cell Tabular

Load (amps): 242.6 242.6 242.6 242.9 242.5 242.3
 Battery Voltage: 112.7 112.0 111.3 110.3 109.2 106.3
 Cell 02:45:00 03:00:00 03:15:00 03:30:00 03:45:00 04:00:00

String: String 1

33	1.894	1.883	1.872	1.861	1.839	1.813						
34	1.897	1.885	1.869	1.858	1.841	1.812						
35	1.901	1.890	1.879	1.868	1.851	1.828						
36	1.901	1.890	1.879	1.862	1.845	1.819						
37	1.901	1.890	1.879	1.862	1.845	1.818						
38	1.903	1.892	1.881	1.864	1.848	1.822						
39	1.901	1.890	1.879	1.862	1.845	1.819						
40	1.902	1.891	1.880	1.863	1.852	1.825						
41	1.897	1.885	1.874	1.858	1.841	1.812						
42	1.900	1.889	1.878	1.861	1.844	1.820						
43	1.893	1.882	1.865	1.849	1.832	1.799						
44	1.889	1.878	1.867	1.850	1.828	1.798						
45	1.895	1.884	1.868	1.857	1.834	1.804						
46	1.890	1.873	1.862	1.845	1.823	1.784						
47	1.895	1.884	1.873	1.862	1.840	1.815						
48	1.895	1.884	1.873	1.857	1.834	1.808						
49	1.895	1.884	1.873	1.857	1.840	1.810						
50	1.894	1.883	1.872	1.855	1.839	1.810						
51	1.889	1.878	1.867	1.850	1.828	1.795						
52	1.893	1.882	1.865	1.849	1.832	1.798						
53	1.892	1.881	1.870	1.853	1.831	1.798						
54	1.897	1.885	1.869	1.858	1.835	1.811						
55	1.898	1.887	1.875	1.859	1.842	1.816						
56	1.894	1.883	1.872	1.861	1.844	1.820						
57	1.895	1.884	1.873	1.857	1.834	1.806						
58	1.895	1.879	1.868	1.851	1.834	1.799						
59	1.891	1.880	1.869	1.852	1.835	1.804						
60	1.893	1.882	1.865	1.849	1.832	1.796						

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Cell Detail Graph

No Cells Selected

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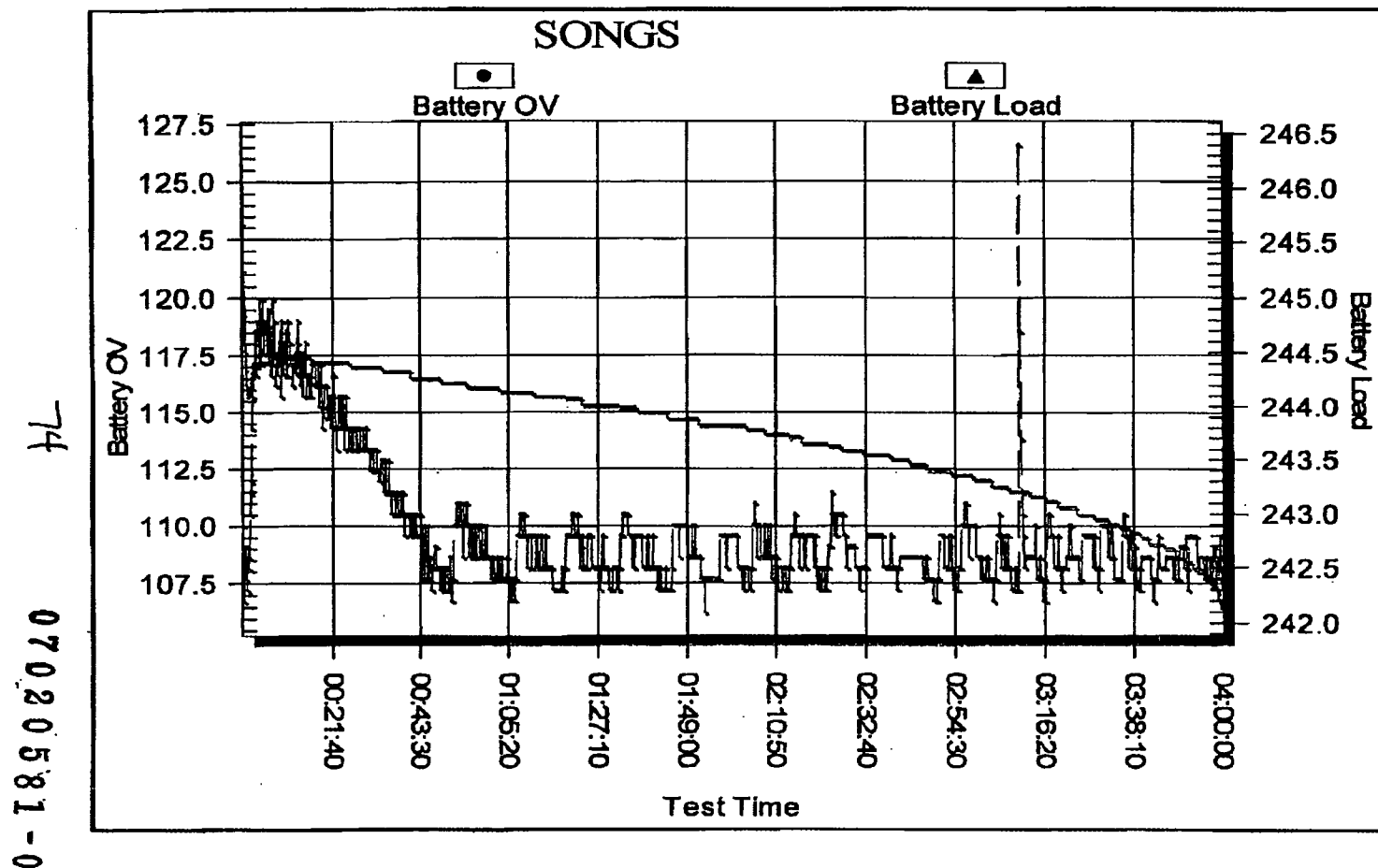
07020581-0

2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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Battery OV & Load Graph



Test Notes

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2/21/2008 Battery: 2b008

Test Type: Performance Tested: 02/20/08

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NUCLEAR ORGANIZATION
UNITS 1, 2 AND 3

INSTRUMENTATION PROCEDURE S0123-II-15.3
REVISION 10 PAGE 5 OF 5
ATTACHMENT 1

TEMPORARY SYSTEM ALTERATION AND RESTORATION

MO NO: 67020581000 (1)

Page 1 of 1

Device Altered (2)	Location (3)	Description of Modification (4)	Alteration			Restoration		
			Date (5)	Perf. By (5)	Verif. By (6)	Date (7)	Perf. By (7)	Verif. By (8)
1. 2B002S	50' 02 (202/0000h)	TURNOFF RAIL CHARGER	2/19/08	(b)(6)		2/21	(b)(6)	
2.		REMOVED 2 FUSES FROM RAIL CHARGER	2/19/08			2/21		
3.		Lifted Black Lead (charger) From Negative Post Cell 16	2/19/08			2/21/08		
4.		Lifted Red Lead (From charger) From Positive Post Cell 15	2/19/08			2/21/08		
5.		Lifted Jumper Plate (From cell 14-) From Positive cell 17	2/19/08			2/21/08		
6.		Installed Jumper Plate (from cell 14-) ON Positive cell 15	2/19/08			2/21/08		
7.		Installed Jumper plate (Buss link) ON 17 Positive and 16 Negative	2/19/08			2/21		
8.		Lifted 2BD202P2 CABLE (-) From (-) cell 60	2/20/08			2/21/08		
9.		Installed sensor leads to batteries 2B008	2/20/08			2/21/08		
10.								

Remarks: (9)

NOTE: This attachment supersedes Form SO(123)335

ATTACHMENT 1

PAGE 1 OF 1

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**PHOTOS, GRAPHS, CHARTS
OR
POOR QUALITY
DOCUMENT PAGE**

NOT IMAGED

SEE CDM FOR ORIGINAL

RPA # 96-0012

DOCUMENT DATE 2/27/08

DOCUMENT # 07020581000

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10/04/06

07020581000

07020581000

Mo Procedure STARTS WITH 07020581000

MM Code	Mte	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org	Verified M&TE	Verified Cal Due
7101	M3-3847	07020581000	02/21/2008	(b)(6)	4/15/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: VOLTAGE, CELL								
Minimum Range: 0 VDC Maximum Range: 20 VDC								
Nominal Accuracy: $\pm(0.1 \text{ PCT IV} + 0.01 \text{ VDC})$								
Temp Corr Accuracy: $\pm(0.05 \text{ PCT IV PER DEGREE F})$								
Comments:								
7101	M3-3847	07020581000	02/21/2008	(b)(6)	04/15/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: VOLTAGE, BATTERY								
Minimum Range: 0 VDC Maximum Range: 600 VDC								
Nominal Accuracy: $\pm(0.1 \text{ PCT IV} + 0.2 \text{ VDC})$								
Temp Corr Accuracy: $\pm(0.05 \text{ PCT IV PER DEGREE F})$								
Comments:								
7101	M3-3847	07020581000	02/21/2008	(b)(6)	04/15/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: VOLTAGE, INTERTIER								
Minimum Range: 0 VDC Maximum Range: 3 VDC								
Nominal Accuracy: $\pm(0.1 \text{ PCT IV} + 0.01 \text{ VDC})$								
Temp Corr Accuracy: $\pm(0.05 \text{ PCT IV PER DEGREE F})$								
Comments:								
7101	M3-3847	07020581000	02/21/2008	(b)(6)	4/15/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: CURRENT								
Minimum Range: 0 ADC Maximum Range: 3000 ADC								
Nominal Accuracy: $\pm(0.1 \text{ PCT IV} + 1.0 \text{ ADC})$								
Temp Corr Accuracy: $\pm(0.05 \text{ PCT IV PER DEGREE F})$								
Comments:								

Verified M&TE Verified Cal Due

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

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Mo Procedure STARTS WITH 07020581000

MM Code	Mts	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org	Verified M&TE	Verified Cal Due
7405	M3-5574	07020581000	02/21/2008	(b)(6)	07/24/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: CURRENT, DC								
Minimum Range: 0 A Maximum Range: 400 A								
Nominal Accuracy: $\pm(1.3 \text{ PCT IV} + 0.3 \text{ A})$								
Temp Corr Accuracy:								
Comments:								
7405	M3-5574	07020581000	02/21/2008	(b)(6)	/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: CURRENT, DC								
Minimum Range: 0 A Maximum Range: 1000 A								
Nominal Accuracy: $\pm(1.3 \text{ PCT IV} + 3 \text{ A})$								
Temp Corr Accuracy:								
Comments:								
7422	M3-6093	07020581000	02/21/2008	(b)(6)	/28/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: DENSITY, LIQUID								
Minimum Range: 0 GRAMS/CC Maximum Range: 1.999 GRAMS/CC								
Nominal Accuracy: $\pm(0.001 \text{ GRAMS/CC})$								
Temp Corr Accuracy:								
Comments:								
7674	M3-6124	07020581000	02/21/2008	(b)(6)	15/2009	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: VOLTAGE								
Minimum Range: 25 VDC Maximum Range: 250 VDC								
Nominal Accuracy: $\pm(3.0 \text{ PCT IV} + 0.1)$								
Temp Corr Accuracy:								
Comments:								

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

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Mo Procedure STARTS WITH 07020581000

MM Code	Mte	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org	Verified M&TE	Verified Cal Due
7675	M3-6124A	07020581000	02/21/2008	(b)(6)	01/15/2009	EL		

Worker Entered Range/Function:

STEM SONGS Range/Function: IMPEDANCE, AC

Minimum Range: 10 MILLIOHM

Maximum Range: 100 MILLIOHM

Nominal Accuracy: $\pm(5.0 \text{ PCT IV} + 0.1)$

Temp Corr Accuracy:

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

7675	M3-6124B	07020581000	02/21/2008	(b)(6)	01/15/2009	EL
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Worker Entered Range/Function:

STEM SONGS Range/Function: IMPEDANCE, AC

Minimum Range: 10 MILLIOHM

Maximum Range: 100 MILLIOHM

Nominal Accuracy: $\pm(5.0 \text{ PCT IV} + 0.1)$

Temp Corr Accuracy:

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

8043	M3-6124E	07020581000	02/21/2008	(b)(6)	01/15/2009	EL
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Worker Entered Range/Function:

STEM SONGS Range/Function: CURRENT, AC AT 60 HZ

Minimum Range: 0 AAC

Maximum Range: 14 AAC

Nominal Accuracy: $\pm(1 \text{ PCT IV} + 0.2 \text{ AAC})$

Temp Corr Accuracy:

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

8043	M3-6124F	07020581000	02/21/2008	(b)(6)	01/15/2009	EL
------	----------	-------------	------------	--------	------------	----

Worker Entered Range/Function:

STEM SONGS Range/Function: CURRENT, AC AT 60 HZ

Minimum Range: 0 AAC

Maximum Range: 14 AAC

Nominal Accuracy: $\pm(1 \text{ PCT IV} + 0.2 \text{ AAC})$

Temp Corr Accuracy:

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

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Mo Procedure STARTS WITH 07020581000

MM Code	Mte	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org	Verified M&TE	Verified Cal Due
8032	M3-6704	07020581000	02/21/2008	(b)(6)	7/10/2008	EL		

Worker Entered Range/Function:

STEM SONGS Range/Function: TEMPERATURE, INFRARED

Minumum Range: 23 DEGREES F

Maximum Range: 212 DEGREES F

Nominal Accuracy: +/- (1.5 DEGREES F)

Temp Corr Accuracy: +/- (THE GREATER OF: [0.05 DEGREE F PER DEGREE F] OR [0.028 PCT OF RDG PER DEGREE F])

Comments: 6.18.73

Recorded Date: 02/21/2008

Userid: (b)(6)

7957	M3-6742	07020581000	02/21/2008	(b)(6)	02/05/2009	EL
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Worker Entered Range/Function:

STEM SONGS Range/Function: VOLTAGE, DC

Minumum Range: -500 MILLIVOLTS

Maximum Range: 500 MILLIVOLTS

Nominal Accuracy: +/- (0.03 PCT IV + 0.02 MILLIVOLTS)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

7957	M3-6742	07020581000	02/21/2008	(b)(6)	02/05/2009	EL
------	---------	-------------	------------	--------	------------	----

Worker Entered Range/Function:

STEM SONGS Range/Function: VOLTAGE, DC

Minumum Range: -5 V

Maximum Range: 5 V

Nominal Accuracy: +/- (0.025 PCT IV + 0.001 V)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

7957	M3-6742	07020581000	02/21/2008	(b)(6)	02/05/2009	EL
------	---------	-------------	------------	--------	------------	----

Worker Entered Range/Function:

STEM SONGS Range/Function: VOLTAGE, DC

Minumum Range: -500 V

Maximum Range: 500 V

Nominal Accuracy: +/- (0.1 PCT IV + 0.02 V)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

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Mo Procedure STARTS WITH 07020581000

MM Code	Mte	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org	Verified M&TE	Verified Cal Due
7957	M3-7177	07020581000	02/21/2008	(b)(6)	02/05/2009	EL		
Worker Entered Range/Function:							Recorded Date:	02/21/2008
STEM SONGS Range/Function: VOLTAGE, DC							Userid:	(b)(6)
Minumum Range: -50 MILLIVOLTS							Maximum Range:	50 MILLIVOLTS
Nominal Accuracy: +/- (0.1 PCT IV + 0.02 MILLIVOLTS)								
Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL								
Comments:								
7957	M3-7177	07020581000	02/21/2008	(b)(6)	02/05/2009	EL		
Worker Entered Range/Function:							Recorded Date:	02/21/2008
STEM SONGS Range/Function: VOLTAGE, DC							Userid:	(b)(6)
Minumum Range: -5 V							Maximum Range:	5 V
Nominal Accuracy: +/- (0.025 PCT IV + 0.001 V)								
Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL								
Comments:								
7957	M3-7177	07020581000	02/21/2008	(b)(6)	02/05/2009	EL		
Worker Entered Range/Function:							Recorded Date:	02/21/2008
STEM SONGS Range/Function: VOLTAGE, DC							Userid:	(b)(6)
Minumum Range: -500 V							Maximum Range:	500 V
Nominal Accuracy: +/- (0.1 PCT IV + 0.02 V)								
Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL								
Comments:								
7957	M3-7180	07020581000	02/21/2008	(b)(6)	02/05/2009	EL		
Worker Entered Range/Function:							Recorded Date:	02/21/2008
STEM SONGS Range/Function: VOLTAGE, DC							Userid:	(b)(6)
Minumum Range: -50 MILLIVOLTS							Maximum Range:	50 MILLIVOLTS
Nominal Accuracy: +/- (0.1 PCT IV + 0.02 MILLIVOLTS)								
Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL								
Comments:								

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Mo Procedure STARTS WITH 07020581000

MM Code	Mte	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org
7957	M3-7180	07020581000	02/21/2008	(b)(6)	02/05/2009	EL

Verified M&TE Verified Cal Due

Worker Entered Range/Function:

STEM SONGS Range/Function: VOLTAGE, DC

Minumum Range: -5 V

Maximum Range: 5 V

Nominal Accuracy: +/- (0.025 PCT IV + 0.001 V)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

7957	M3-7180	07020581000	02/21/2008	(b)(6)	02/05/2009	EL
------	---------	-------------	------------	--------	------------	----

Worker Entered Range/Function:

STEM SONGS Range/Function: VOLTAGE, DC

Minumum Range: -500 V

Maximum Range: 500 V

Nominal Accuracy: +/- (0.1 PCT IV + 0.02 V)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

7957	M3-7261	07020581000	02/21/2008	(b)(6)	05/23/2008	EL
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Worker Entered Range/Function:

STEM SONGS Range/Function: -VOLTAGE, DC

Minumum Range: -50 MILLIVOLTS

Maximum Range: 50 MILLIVOLTS

Nominal Accuracy: +/- (0.1 PCT IV + 0.02 MILLIVOLTS)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

7957	M3-7261	07020581000	02/21/2008	(b)(6)	/23/2008	EL
------	---------	-------------	------------	--------	----------	----

Worker Entered Range/Function:

STEM SONGS Range/Function: VOLTAGE, DC

Minumum Range: -5 V

Maximum Range: 5 V

Nominal Accuracy: +/- (0.025 PCT IV + 0.001 V)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

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Mo Procedure STARTS WITH 07020581000

MM Code	Mte	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org
7957	M3-7261	07020581000	02/21/2008	(b)(6)	2/23/2008	EL

Verified M&TE Verified Cal Due

Worker Entered Range/Function:

STEM SONGS Range/Function: VOLTAGE, DC

Minimum Range: -500 V

Maximum Range: 500 V

Nominal Accuracy: +/- (0.1 PCT IV + 0.02 V)

Temp Corr Accuracy: ADD (0.0278 PER DEGREE F) TIMES THE NOMINAL

Comments:

8268	M3-7422	07020581000	02/21/2008	(b)(6)	2/08/2008	EL
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Worker Entered Range/Function:

STEM SONGS Range/Function: RESISTANCE, RANGE = 1.9999 MILLI-OHM FULL SCALE

Minimum Range: 0.0001 MILLIOHM

Maximum Range: 1.999 MILLIOHM

Nominal Accuracy: +/- (0.2% INDICATED VALUE + 0.2 MICRO-OHM)

Temp Corr Accuracy: <0.006% PER °F FROM 41°F TO 104°F

Comments:

7849	M3-7775	07020581000	02/21/2008	(b)(6)	12/27/2008	EL
------	---------	-------------	------------	--------	------------	----

Worker Entered Range/Function:

STEM SONGS Range/Function: TORQUE, CLOCKWISE

Minimum Range: 30 INCH LBS

Maximum Range: 150 INCH LBS

Nominal Accuracy: +/- (4 PCT FS) (+/- 6 INCH LBS)

Temp Corr Accuracy:

Comments:

7849	M3-7776	07020581000	02/21/2008	(b)(6)	12/27/2008	EL
------	---------	-------------	------------	--------	------------	----

Worker Entered Range/Function:

STEM SONGS Range/Function: TORQUE, CLOCKWISE

Minimum Range: 30 INCH LBS

Maximum Range: 150 INCH LBS

Nominal Accuracy: +/- (4 PCT FS) (+/- 6 INCH LBS)

Temp Corr Accuracy:

Comments:

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

Recorded Date: 02/21/2008

Userid: (b)(6)

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Mo Procedure STARTS WITH 07020581000

MM Code	Mte	Mo Procedure	M&TE	Used By	Cal Due Date	Resp Org	Verified M&TE	Verified Cal Due
7875	M3-7777	07020581000	02/21/2008	(b)(6)	12/28/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: TORQUE, CLOCKWISE								
Minumum Range: 15			FOOT LBS		Maximum Range: 75		FOOT LBS	
Nominal Accuracy: +/- (4 PCT FS)								
Temp Corr Accuracy:								
Comments:								
7875	M3-7778	07020581000	02/21/2008	(b)(6)	12/28/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: TORQUE, CLOCKWISE								
Minumum Range: 15			FOOT LBS		Maximum Range: 75		FOOT LBS	
Nominal Accuracy: +/- (4 PCT FS)								
Temp Corr Accuracy:								
Comments:								
673	M3-2777	07020581000	02/21/2008	(b)(6)	05/21/2008	EL		
Worker Entered Range/Function:								
STEM SONGS Range/Function: CURRENT ADC								
Minumum Range: 0			A		Maximum Range: 1200		ADC	
Nominal Accuracy: +/- 0.25 PCT I.V.								
Temp Corr Accuracy:								
Comments:								

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