

APPENDIX H

PROCEDURE TO MEASURE ACTUAL PEAK POWER

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Purpose:

The purpose of this test is to measure the actual capability of a battery to deliver sustained power for 30 second intervals at one or more depths-of-discharge (DODs). It should be noted that this test will load the battery with discharge currents that will depress its voltage to 2/3 or less of the open circuit value. Depending on the battery design, this may require extremely high currents and may be damaging to the battery. A more detailed procedure for the conduct of this test can be obtained on request from the Idaho National Engineering Laboratory.

Abstract:

Charge the battery, allow it to stand for one hour at open circuit, and discharge it to the intended DOD at a constant current of $C_3/3$ amperes. Interrupt the $C_3/3$ discharge and determine the open circuit voltage (OCV) at this DOD. Sweep the discharge current (in approximately 5 seconds or less) to a value that reduces the battery terminal voltage to less than 2/3 of its open circuit value at this DOD; then immediately return the discharge current to zero at the same sweep rate. From a graph of the voltage vs current during the (increasing) sweep, determine the current corresponding to 2/3 OCV at the given DOD; this current will be used as the test current for the subsequent peak power test. The $C_3/3$ discharge can be continued and additional sweeps made at other DODs to determine the appropriate test currents for these DODs.

Recharge the battery, wait one hour at open circuit, and discharge the battery to the intended DOD at $C_3/3$. Then discharge the battery at the previously determined test current for 30 seconds while recording voltage as a function of time. The peak power available from the battery is defined as the product of the 30 second sustained current and the time-averaged voltage over the 30 second discharge step. This $C_3/3$ discharge can also be continued to other DODs and additional 30 second discharges can be done using the test current previously determined for each DOD.

This test should normally be repeated at least once, i.e. performed a total of two or more times.

Data Acquisition and Reporting Requirements:

Data to be acquired includes battery ampere-hours to each DOD at which testing is conducted, battery temperature at each DOD, voltage as a function of current at each of the initial sweeps, and voltage as a function of time during each of the 30 second discharge steps. Additional summary information to be reported should include a plot of peak power vs depth of discharge.