Predictions from corrosion rates of positive grids measured in these cells by weight loss have shown that the ultimate positive plate grid in the load-leveling cell will corrode about 15 to 20 percent during 4000 deep cycles with 10 percent overcharge per cycle, but will not limit life. Twenty-four out of sixty 200-A h cell designs have reached more than 13 500 shallow cycles on a routine of 36 cycles per day at room ambient designed to accelerate positive material shedding. Eleven out of sixty 1800-A h cell designs subjected to accelerated testing at two cycles per day at 70 + 2 °C have reached the equivalent of 5610 cycles at 25 °C (1110 actual cycles) at 80 percent depth of discharge. Eight full-sized preprototype cells (3500-A h) have completed 500 cycles in ongoing testing. Cost analyses have yielded cell costs of $85/kW h (1982 dollars). Twelve full-sized preprototype cells were delivered to the National Battery Test Laboratory for verificational testing.

All Phase I R & D activities were completed at the end of 1982. Testing of eight full-sized cells will be continued and a statistical analysis of accelerated test methods and data will be conducted in 1983.

Recent publications

1 A. M. Chreitzberg, T. M. Noveske and W. P. Sholette, Accelerated deep cycling test for lead–acid load-leveling cells, *Electrochemical Soc. Meeting, October 11 - 16, 1981, Denver, CO.*

2 T. M. Noveske and A. M. Chreitzberg, Continuous overcharge accelerated positive grid corrosion test on lead antimony pasted flat plate cells, *Electrochemical Soc. Meeting, October 11 - 16, 1981, Denver, CO.*

3 J. C. Sklarchuk and A. M. Chreitzberg, Accelerated positive material shedding test for pasted flat plate lead–acid cells, *Electrochemical Soc. Meeting, October 11 - 16, 1981, Denver, CO.*

4 E. A. Wagner and W. P. Sholette, Correlation of accelerated test results to in-service cycle life, *Electrochemical Soc. Meeting, October 11 - 16, 1981, Denver, CO.*

NICKEL/HYDROGEN BATTERY DESIGN

The objective is to design a sealed 100-A h nickel/hydrogen battery for deep discharge, terrestrial applications that will be cost competitive with lead–acid batteries in a system designed for a 20-yr life. One such application is a solar energy system employing photovoltaic collectors. Technically, the nickel/hydrogen battery meets virtually all of the requirements for solar applications, but the cost of the aerospace quality cell is too high. The main thrust of this contract will be to reduce the cost without unduly compromising the desirable features such as long cycle life at high depth of discharge, high rate of charge and discharge, long calendar life, sealed design with no maintenance, capability to stand at a partial state of charge without degradation, and tolerance to cell reversal and overcharge.

A contract for this project is being negotiated.