



Sunday, September 19, 2004
1:00 PM – 5:00 PM

(4) VALVE REGULATED LEAD ACID BATTERY UTILIZATION GUIDELINES

Tutorial Description

VRLA batteries are very useful in providing back-up power for telecommunications systems in a wide range of conditions but many problems have been encountered after deploying these batteries. Some significant problems will be addressed and some simple solutions provided. Battery sizing is an important issue and the stress will be on safety and reliability and not simply on maximizing capacity. Close packing of the batteries **MUST** be avoided so that thermal runaway is minimized or eliminated.

Battery life is very dependent on temperature and a very detailed treatment will be provided. The effect of climate and cabinet design will be fully discussed and simplified design rules given.

A complete discussion of failure modes of VRLA batteries will be provided concentrating on early detection of problems that might lead to thermal runaway. Some of the fundamentals of battery electrochemistry will be covered to pull the entire presentation together.

The guidelines presented for reserve time will be based on the population density of the *county* where the batteries are to be used. Data indicate that utility power failures are more frequent in counties with lower populations.

The structure of the positive and negative plates will be analyzed along with the electrolyte and separators. The role of oxygen recombination will be stressed along with the continual evolution of hydrogen and the possible evolution

of explosive amounts of hydrogen under certain conditions.

Tutorial Level and Benefits

This course is for those individuals who have little experience with batteries and for those who have used batteries for years and have become familiar with the field problems and are looking for comprehensive reasons for these failures and procedures that will reduce their effects.

About the Presenter

Dr. Thomas O'Sullivan has a Ph.D. in Physical Chemistry in addition to nine Patents and numerous publications. He has been a major contributor to the development of flooded and valve-regulated lead acid, nickel-cadmium, and secondary lithium battery technologies.

He prepared many of the Generic Requirements documents for batteries that are the basis for the continuing effort to improve these battery technologies, (TR-766, TR-1200 and GR-3020). His patents have been utilized to produce Nickel batteries that have provided power on spacecraft for both commercial telecommunications and military activities.

Dr. O'Sullivan also characterized the original "Round Cell" at Bell Laboratories and contributed to the impregnation technology for sealed Ni-Cd. He also made contributions toward VRLA development, the batteries used in the Telstar 3 satellite, and rechargeable Lithium technology.