NEW IEEE STANDARD ON ELECTROLYTE SPILL CONTROL

Hal Taylor
Lead Engineer
Southern Company Services
Bin10170
Atlanta, GA 30308

Stephen W. McCluer
Mgr, External Codes & Standards
APC/MGE
Critical Power & Cooling Services
Dallas, TX 75248

ABSTRACT

A new document, **IEEE Std 1578 -** ***IEEE Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management,*** is expected to be published in 2007. The standard was created to meet the industry's need for common or standard practices in the design of battery spill containment systems and the proper handling of unintentionally-released electrolyte. The document addresses various types of battery electrolytes and their associated hazards. Some new terms are introduced. A distinction is made between electrolyte spill "control" and spill "management." Guidelines are provided for when a spill containment system is or is not appropriate. Several tables detail various spill mechanisms and their appropriate response, such as accidents in transportation & storage, installation & removal, maintenance, and general operation. Guidelines are provided with the pros and cons of various spill containment and spill management techniques. The document is intended as an authoritative guide for people who write and enforce Fire and Building Codes. This paper will give some background on the need for such a standard and its evolution from concept to standard.

BACKGROUND

The document was created out of a need in the industry for definitive guidance on when, where, and how to use the tools of electrolyte spill management. In the absence of such a consensus document, a lot of misinformation or misapplied information found its way into building codes. Failure to understand the nuances of battery technology led to further misapplications by the authorities having jurisdiction (AHJ). As a result, expensive spill containment systems were often mandated where they were not needed, or the user was forced to install a containment method that was inappropriate for his situation.

An IEEE task force started looking at the need for a standard as early as 1999. A PAR was submitted in 2000 and was approved in 2001. A technical committee was formed from a wide variety of interested parties, including users, installers, battery manufacturers, spill control manufacturers, and others. Since then the committee has met twice a year to draft a document on which consensus could be reached. The document has been balloted and recirculated. Approval by the Standards Board and publication of the standard is expected in 2007. For those who can't wait for the publication, an "approved draft" should be available on the IEEE web site.

SCOPE AND PURPOSE

This recommended practice discusses factors relating to electrolyte spill containment and management for vented lead-acid (VLA), valve-regulated lead-acid (VRLA), vented nickel-cadmium (Ni-Cd), and valve regulated nickel-cadmium stationary batteries. Suggestions are made for drafting model codes.

This recommended practice is intended to assist code-writing organizations. It seeks to develop a full understanding of and describe some electrolyte spill containment and management issues related to stationary battery systems, and the ways in which battery chemistry and construction can influence requirements for spill containment and neutralization.

CONTENTS

The main document sections cover the following:

Definitions: Several new definitions, including terms such as: electrolyte release; electrolyte spill; active neutralization; passive neutralization; spill management; zone containment. Note that "Spill containment" is just one element of "spill management," which also includes training, absorption, neutralization, disposal, and reporting.

Safety: This section covers: hazards of electrolyte; appropriate personnel protective equipment and tools; electrolyte absorption and neutralization; hazards of heavy metals; and hazards of toxic vapor

Battery descriptions: This section describes the types of batteries most commonly associated with electrolyte hazards, including: vented lead-acid; valve-regulated lead-acid; vented nickel-cadmium; and partially recombinant nickel-cadmium

Electrolyte spill mechanisms: Several tables describe conditions and activities that might result in a spill. Each table addresses various activities; probability of a spill; spill mechanism; spill severity; and recommended mitigating conditions.

Tables are provided for: transportation and storage; battery installation and removal; maintenance activities; and operational issues.

Spill containment and management: This section goes into detail on the safety issues associated with the activities identified in the previously-mentioned tables.

Several different methods of spill containment are described, with a summary of the advantages and disadvantages of each. Containment methods include: individual rack containment; rack integrated containment; whole room or zone containment; and remote containment.

Discussion is also included on floor sealants; safety issues of electrolyte absorption and neutralization, including considerations for active versus passive neutralization.

Firefighting considerations: This sections discusses what issues might be raised with electrolyte management in the course of fire fighting. Included are: water and sprinkler systems; fire fighter exposure to electrolyte; fire extinguishers; and limiting combustible material

Informative annexes: Two informative annexes are included. Informative annexes are for information only and are not an official part of the standard itself. These are:

- **Hazardous material calculations**: how to calculate the amount of sulfuric acid in the electrolyte of a lead-acid or nickel-cadmium battery when the volume and specific gravity of the electrolyte are known
- **Glossary**

Normative annex: Normative annexes are official parts of the standard that are placed after the body of the standard for reasons of convenience or to create a hierarchical distinction. One normative annex is included:

- **Model code:** A model code is proposed to summarize the best safety practices from existing IEEE battery standards, government regulations, and existing codes for electrolyte spill management. It is intended as a guideline for use by Code and Regulatory authorities. The authority having jurisdiction makes the final decisions regarding applicable requirements, in accordance with applicable national and local Codes and Standards.

SUMMARY

IEEE Std 1578 - *IEEE Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management* has been in development for eight years. It was developed in response to a need for guidance from the scientific and technical community for those who write and implement safety codes. In the absence of such guidance, many inappropriate requirements have evolved. This document should be a valuable reference guide for battery installation engineers, battery owners and technicians, code writers, and authorities having jurisdiction.