



Technology and Marketing

Wolf H. Koch, Ph.D.

ORVR/Stage II: Certification and Safety Issues

ORVR Cars Are Safe and Efficient

During mid-January 1998, the California Air Resources Board (CARB) and the Society of Automotive Engineers (SAE) hosted a series of three meetings on issues concerning problems between Onboard Refueling Vapor Recovery (ORVR) and Stage II vapor recovery. This column will review the current issues and provide some planning input for vapor recovery equipment installations. The information presented is based on CARB documents and presentations given at the three meetings.

ORVR/Stage II interactions

CARB will require one of two control strategies for avoiding fugitive emissions due to saturating returned air in the underground tanks when using assist vapor recovery systems. Station operators will either need to install a vent processor, or control the vapor pump operation during the refueling of ORVR systems. The agency is proposing a new certification test procedure, TP-201.2D, which will measure the amount of air returned by assisted systems. Systems returning more than 50 percent air relative to the dispensed liquid will fail unless they incorporate a vent processor.

The new testing procedures will probably become effective during the first quarter of 1999. CARB will conduct an engineering review of certified systems and determine recertification requirements under the new procedures. Six months after adoption of the new rules, systems determined to be not in compliance will be decertified. Under California statutes, decertified equipment may continue to be used for four years. However, no major maintenance or parts replacements will be allowed, unless they are certified. Certifications currently under review will be put on hold if CARB's staff deter-

mines that the new requirements will not be met.

CARB awarded a research contract for a study of fugitive emissions projected to result from ORVR/Stage II interactions to AeroVironment in 1996. AeroVironment has completed work on balance systems, will complete testing of assist systems during the first quarter, and will issue a draft report soon thereafter. CARB will utilize the results of this study to guide its engineering evaluation of certified systems.

ORVR safety issues

Extensive testing has been completed to ensure that ORVR cars being fueled by vapor recovery systems are safe.

CARB has recently released a draft report documenting fill pipe hydrocarbon concentrations for nine ORVR systems being filled with five vapor recovery systems and ten nozzle combinations at varying fill rates. During the tests, 80 percent of all dispensing events resulted in hydrocarbon concentrations in the flammable range.

A group comprised of automakers, PEI members, EPA and the California Fire Marshal conducted a system safety review and actual testing of flame propagation at the South West Research Institute (SWRI). A report of the testing will be issued shortly, and will conclude that while flammable range concentrations occur, flame propagation through the nozzle does not occur. While the safety analysis did not result in any credible scenario for spark generation in the fill pipe, testing with a spark plug produced an occasional flame of very short duration which did not propagate past the fill pipe.

A summary by the California Fire Marshal concluded that there are no safety problems with ORVR and Stage II and that there is no need for flame arresters in dispensers.

SAE standards

During the mid-January CARB meetings, the SAE ORVR Task Force met to discuss problems common to the fill pipe interface and Stage II systems. The group worked on a draft for an SAE Recommended Design Practice covering the vehicle-service station interface. The task force membership includes automakers, PEI members and API.

Open issues

While CARB and industry are making progress in resolving most ORVR related issues, one area deserves additional attention. In its new test procedures, CARB appears to be favoring balance over assist vapor recovery systems. While the impact of this fact is minimal in California, the rest of the country installed mostly assist systems in major metropolitan non-attainment areas. CARB has stated that the balance system will not cause additional fugitive emissions when used with ORVR cars. That statement, however, is true only if two additional conditions are met: (1) balance systems are required to comply with periodic tightness tests, and (2) balance systems are required to utilize a pressure/vacuum (P/V) vent valve. Current balance system certifications do not require periodic station tightness testing, while the use of P/V valves is a local option in California. The absence of either requirement will make potential fugitive emissions from balance systems equal those of assist systems. CARB's own tests in 1995 showed balance system stations to be out of compliance with tightness testing at a rate greater than 90 percent. While new certification test procedures are still under development, it is high time to treat the various equipment options equally.

Koch, continued on page 54

The reason that power quality is so badly misunderstood is that different types of building equipment require different types of power protection to address different types of power problems. However, some manufacturers sell (and some people buy) a quick fix magic bullet that doesn't address the proper application of protection at the right place.

There are several classifications of power quality equipment with a broad diversity of products available within each category. This includes surge protection, power conditioning, power filtering and uninterruptible power supplies (UPS).

Electrical protection is a controversial subject that is worthy of its own detailed debate in a future issue of *PE&T*. The subject is relevant to the concept of prefabricated electrical panels because some categories of power quality equipment can and should be designed and preinstalled into the cabinets.

Prefab history

The use of prefabricated electrical panels in convenience stores started in the early 1990s, when a single major oil company and a few large regional operators built larger C-stores in multiple locations. Several major oil companies moved toward this concept in the mid '90s.

With the successful application of this concept and the availability of documented performance and specifications,

this concept has become a viable option in the dealer/jobber C-store market.

As with all new technologies, there was and still is resistance to this conception, primarily from electrical contractors—some of whom view prefabricated electrical panels as a competitive threat. However, after installing these systems, most electrical contractors realize that they also benefit from this concept through simplified construction and reduced startup problems.

Now, some of the most ardent supporters of this concept are electrical contractors; some of whom have even promoted it at other projects on which they work.

The "catch"

Prefabricated electrical panels offer many strong benefits and solutions to several problems. However, without a corporate commitment to provide the necessary design and construction documentation, both the installation and operational benefits will be diminished. This concept is not for everyone.

Without proper design conversion from conventional electrical methods, problems can occur such as:

- ▶ misalignment and improper length of electrical conduit stub ups;
- ▶ inadequate door clearances; and
- ▶ incorrect field wiring to remote peripheral equipment (i.e., tank monitors, dispensers, light sensors and emergency shutdown switches).

Proper documentation is also critical so that the bidding contractors

fully understand what is included with the prefabricated electrical package and what is required for field wiring so that the duplication of labor and material is avoided in preparing their bid. This, by far, is the biggest challenge in the cost justification of this concept.

The cost

In fact, the emergence of this concept has created the need for engineering firms that provide technical services to convert existing prototype drawings to include the prefabricated electrical panels into the building's electrical and mechanical design.

Because the prefabricated electrical panel, by design, is a lump sum cost for a broad spectrum of material, labor and support, the panel sometimes becomes a target for construction managers, accountants and purchasing agents who must reduce costs.

There will always be a temptation to return to the old "Back Room" ways, where these same costs are buried in the overall building contract and deflected to future operating and maintenance costs.

However, for companies that look at true long-term ownership costs in both construction and operations, returning to the conventional "Back Room" will never again be an option. ☐

Bart Mercer is the National Account Manager for W.A. Brown & Son Electrical Controls, which is located in Salisbury, NC.

Circle Reader Inquiry 59

Retrospective

Looking back on over a decade of working with CARB and other regulatory agencies, sometimes in an adversary relationship, I am amazed at the changes that have occurred in the last two years. Together, we have solved many of the pressing issues on ORVR safety and compatibility. I am confident that we can overcome the last hurdles and develop a certification process which treats all equipment equally.

Wolf Koch is president and founder of Technology Resources International, Inc. in Batavia, Illinois. He provides services in technology planning, product development and testing and litigation support. He is an expert in retail service station technology, product distribution and natural gas vehicles and associated fueling systems.

Circle Reader Inquiry 27

Joint ICC/NFPA National Fire Code Effort Ends

QUINCY, MA, FEBRUARY 20, 1998—The National Fire Protection Association (NFPA) ended its efforts with the International Code Council (ICC) to develop a single national fire code on February 19.

"We're sorry that this project was not successful," says NFPA President, George D. Miller. "Both NFPA and ICC knew from the beginning that it would be difficult to develop a fire code together because of the differences in our systems and our philosophies. After more than two years of hard work, NFPA has concluded that the process we were attempting with the ICC would not allow sufficient participation by interested parties, including

the fire service, and so would not result in the kind of fire code the public deserves."

NFPA began working with ICC in 1996 to try to develop and implement a joint process that would produce a true consensus fire code while also supporting and respecting the interests of the fire service as the principal enforcers of that code. In 1997, NFPA established regional fire code development committees across the U.S. to help the fire service organize its ideas and views on key codes and to participate more effectively in the system.

NFPA's system is recognized by the American National Standards Institute
ICC/NFPA, continued on page 60