



## What Contractors Should Know

**Contractors who provide vapor recovery equipment and services must become familiar with the new CARB requirements and how they affect their customers. The recent UST upgrade regulations made it obvious that customers expect contractors to know everything about the rules for their industry. Bill Greer explains the new, more complex EVR rules.**

New CARB requirements



**This system will have a vapor recovery processor on top of the canopy. Below: The new CARB EVR rules will require uni-hose dispensers, such as the one shown here.**

On March 23 and 24, 2000, CARB held a public hearing and passed several amendments to the regulations for certification and testing of vapor recovery systems installed at gasoline dispensing facilities. These new Enhanced Vapor Recovery (EVR) rules are extensive and complicated. The board meeting minutes on the subject of EVR alone take up 124 pages. Contractors who provide vapor recovery equipment/services must become familiar with the new requirements and how they affect their customers. This article will help petroleum equipment contractors toward that goal.

The recent UST upgrade regulations made it obvious that customers expect contractors to know everything about the rules for their industry. We had to learn several different release detection technologies and be aware of several phase-in dates for different requirements. The EVR rules are even more complex, with six different modules and as many or more effective/operative dates.

The first step is to find out what your state is going to do with the new CARB rules. We have heard that several states are considering not adopting the new rules in their entirety. Some states are going to make the plea to EPA that their state is not as bad as California and does not need the 98 percent efficiency rate that CARB has had to enact in response to environmental lawsuits. Other states will argue that, by increasing the frequency of compliance testing (to twice a year), they can reach acceptable levels of efficiency. To find out what your state is going to do, contact the agency responsible for enforcing vapor recovery rules. A list of many of these state agencies and their contacts can be found on PE&T's web site at [www.pe-t.com](http://www.pe-t.com).

If you have determined that your state is going to adopt the new CARB rules in their entirety, then you need to take a look at the new requirements, module by module.

### **Module 1 (Stage I vapor recovery)**

The new rules increase the vapor recovery efficiency requirement from 95 percent to 98 percent and require 360-degree rotatable Stage I vapor and fill adapters. This swivel design will allow rotation of the hoses and help prevent leaks. Alternatively, this may be accomplished with designs that otherwise prevent the fittings from being over-tightened or loosened. The vapor adapter must be poppeted and leak tight.

A new specification is proposed to reduce leaks in drop tubes with overfill protection devices installed. Present drop tubes have moving parts and fasteners that connect the flapper valve to the drop tube. These are thought to be a source of holes that can lead to air ingestion during the bulk drop. All new drop tubes with overfill protection will be required to meet a certain pressure vs. flow specification.

Pressure/vacuum relief valves on vent risers will be required for all systems and there will be a more stringent certification leak-rate criteria for these valves.

CARB initially proposed that the spill containment boxes for both the product and vapor connectors be designed without drain valves and be kept free of gasoline by other means. They will now have new specifications for drain valves in product containment manholes but will still prohibit drain valves in containment manholes used for vapor connectors.

Certification testing performed by CARB will require connectors and fittings to be leak free as determined either by leak detection solution or by bagging the fittings and observing inflation of the bag. Stage I components must demonstrate compatibility with fuel blends approved for use and commonly used in California.

**The new CARB EVR rules will require uni-hose dispensers, such as the one shown here.**



### **Module 2 (Stage II vapor recovery)**

Fugitive vapor leaks from tanks are a concern with existing systems. CARB has set pressure profiles that would limit tank pressures and assess leaks in the vapor space. Increased use of processors is expected to maintain desired underground storage tank pressures. The new concern is the toxics that will be released in the exhaust of combustion processors. Therefore, new limits for selected hazardous air pollutants are established.

### **Emission limit testing**

Systems will have to meet emission limit testing rather than an efficiency requirement. The original CARB proposal was to replace the 95 percent efficiency requirement with an emission limit of 0.38 lbs/1,000 gallons, which is an equivalent standard for the summer uncontrolled emission factor of 7.6 lbs/1,000 gallons. However, the 0.38 emission limit is a more stringent requirement when testing higher volatility winter fuels. CARB will require certification testing using summer fuel to meet both the 0.38 and 95 percent requirements, but will allow either the 0.38 or the 95 percent to be met when testing with winter fuel. It is not CARB's intent to certify systems to both summer and winter fuel, but it will allow testing year-round without penalty.

### **Compatibility with Stage I**

Stage II systems must be compatible with the Stage I system. Most Stage I systems have been certified with open vent pipes, which means the tank operated at atmospheric pressure. Stage I and Stage II systems, historically, have been certified separately. If the Stage II system places a positive pressure on the tank, hooking the vapor hose to the Stage I adapter, but before the other end of the hose is attached to the truck, causes the pressure to be released to the atmosphere along with gasoline vapor. The new standard requires that Stage II systems shall not cause excess emissions from Stage I systems.

### **Pressure-related fugitive emissions**

Underground storage tank pressure profiles must be met by all Stage II systems in order to limit pressure-related fugitive emissions and allow regular checks of tank pressure integrity by in-station diagnostics. Current vapor recovery systems can cause a positive pressure in the underground storage tank. This positive pressure causes gasoline vapor to be emitted through leaks in fittings and valves. These are referred to as pressure-related fugitive emissions.

### **Nozzle/dispenser compatibility**

The new standard for nozzle/dispenser compatibility requires verification that the vapor check valve and hold-open latch are closed when the nozzle is properly hung on the dispenser.

### **One-hose per fueling point**

Many gasoline dispensers have three hoses per fueling point, one for each grade of gasoline. The new standard requires that all new systems have unihose dispensers to reduce the potential number of leak sources. Based on concerns regarding costs of retrofitting existing dispensers to a unihose, CARB has modified its original proposal to make the unihose a requirement for new systems only, or when dispensers are replaced at existing systems.

### **Pipe sizes and slope**

The Stage II riser and the connection between the Stage II riser shall have a minimum 1-inch internal diameter. All new vapor recovery piping shall have a minimum 3-inch ID from the point of the first manifold to the storage tank. The recommended minimum slope of the vapor return piping from the dispensers to the tank shall be 1/4 inch per foot. A minimum slope of 1/8 inch per foot is allowed only if the 1/4 inch per foot is not feasible. A liquid condensate trap would be allowed only if the 1/8 inch slope cannot otherwise be achieved.



**This technician is checking for proper slope of the vapor return line**

### **Drop-out tanks**

Liquid condensate traps (drop-out tanks) must be certified by CARB. The design must ensure that the traps can be maintained vapor tight, accessible for inspection upon request, capable of automatic evacuation of liquid and equipped with an alarm system to indicate evacuation system failure.

### **Connectors and fittings**

CARB certification testing will require that connectors and fittings be leak-free as determined by

either a leak detection solution or by bagging the fittings and observing inflation or deflation of the bag when the underground storage tank vapor space is under pressure or vacuum.

### **Balance nozzles**

Balance nozzles must have check valves to reduce vapor emissions. Such emissions occur in existing nozzles where the check valve is located between the nozzle and the underground storage tank. The vapor check valve limits also are lowered. There also will be a new specification to determine balance nozzle bellows insertion force.

Balance system dynamic backpressure standards are determined by measuring the backpressure at varying flows of nitrogen (to simulate vapor) at the nozzle. New standards have been set for individual balance system components to ensure the overall dynamic backpressure requirements are met.

### **Assist nozzles**

All “bootless” assist nozzles shall be equipped with a vapor guard. Each assist nozzle must have a vapor check valve. There is also a new specification for assist nozzle pressure drop.

There is a new limit on air-to-liquid ratio for assist systems. Theoretically, the ideal A/L ratio should be 1.00 in order to return the same volume of vapor as liquid dispensed. Limiting the A/L will minimize the excess emissions in the event of a processor failure. CARB will limit the maximum A/L to 1.00 for a system without a processor and 1.30 for a system with a processor.

New specifications have been set for assist systems utilizing a common collection device. These are the systems that utilize one vacuum source for the entire station, rather than a separate vacuum pump in each dispenser. Another specification sets the maximum number of fueling points that can be supported by the vacuum device.

Assist systems with destructive processors have raised concern regarding toxic products of combustion. Performance specifications have been set for these systems.

Specifications have also been set for processors that do not rely on combustion to control emissions. Examples include: refrigeration units, carbon bed units and hydrocarbon membranes.

### **Module 3 (ORVR compatibility)**

CARB wants to make sure that Stage II systems will work with vehicles equipped with ORVR. Assist systems that have an active pump to pull in vapors during fueling will draw air into the underground tank. Gasoline will evaporate into the air, leading to vapor volumes exceeding the capacity of the storage tank. This will result in excess emissions through the vent. To be considered ORVR-compatible, the Stage II system must demonstrate that no excess emissions are generated while fueling ORVR vehicles. No excess emissions due to ORVR fueling will be allowed.

### **Module 4 (liquid retention and nozzle spitting)**

Liquid retention includes those emissions that occur when liquid gasoline contained in the hanging

hardware (nozzles and hoses) on the dispenser is allowed to evaporate into the atmosphere between vehicle fuelings while the nozzle is hung on the dispenser. It may also be spilled into the fillpipe well, the dispenser housing or otherwise find its way to atmosphere without being counted as spillage.

CARB expects that redesign of the nozzles will be necessary to reduce these emissions and has established a phase-in of liquid retention limits with the first limit achievable by some currently available nozzles.

Another new standard has been set for “nozzle spitting.” This is defined as the release of liquid when the nozzle trigger is depressed before activating the dispenser. CARB requires that such spitting be limited to 1.0 ml/nozzle. This standard will minimize accidental liquid gasoline releases which can occur while moving the nozzle from the dispenser to the vehicle before fueling.

### **Module 5 (spillage and dripless nozzles)**

Nozzle spillage limits have been reduced from a current limit of 0.42 lbs/1,000 gallons to 0.24lbs/1,000 gallons. The number of drops per fueling event will be limited to one drop. Ideally, CARB would like zero emissions due to spillage. But because the customer can directly cause spillage through improper fueling procedures, such as topping off, CARB does not think that they can completely eliminate fueling spillage.

**This technician is replacing a vapor recovery nozzle. The new CARB EVR rules will have more stringent criteria for liquid retention and a one drop per fueling leak allowance for nozzles**



### **Module 6 (in-station diagnostics)**

In-station diagnostics (ISD) will be required to provide continuous monitoring of important emission-related vapor recovery system parameters and to alert the station operator when a failure mode is detected so that corrective action can be taken. Additional requirements for in-station diagnostics will vary depending on the type of vapor recovery system (i.e., balance, assist or assist with processor).

Many service stations already have a leak detection system for underground storage tanks. CARB, in meeting with monitoring system vendors, encouraged integration of vapor recovery diagnostics with existing liquid leak detection systems where possible.

All ISD systems are required to have pressure monitors to verify pressure integrity (no leaks) and to ensure the storage tank pressure limits are met. Balance systems, which depend on a clear vapor path from the nozzle to the UST for proper operation, will need a monitor to detect any blockage in the vapor line. Assist system pumps must be continuously monitored, and where the vapor pump is not operating, fueling must be shut down at that dispenser. Assist systems with processors, which already are subject to some monitoring requirements, will need to monitor processor operation and prohibit dispensing if critical components fail.

CARB has amended its initial proposal to provide more time for implementation of ISD. The amended schedule provides staggered effective dates for ISD requirements based on annual gasoline

throughput. The smallest throughput stations would be exempt from ISD requirements. New facilities with high gasoline throughput would be subject to ISD in 2003, a year earlier than originally proposed. Mid-throughput stations will have until 2008 to comply with ISD requirements.

### **Warranty changes**

Required warranty provisions will change. In June 1999, CARB approved changes to require a tag for vapor recovery equipment with warranty information. CARB now proposes adding two more items to the tag, a statement that the equipment was factory tested and a list of all applicable performance standards and specifications for which testing occurred. These performance standards are expected to be able to be met throughout the warranty period. Because of the new requirement for ongoing compliance with performance standards and specifications throughout the warranty period, CARB has also provided that system manufacturers may specify that their warranty is contingent upon the use of trained installers.



**Stage I requirements of the new CARB rules dictate that fill adapters have swivel capability or other means to prevent loosening of the riser pipe during transport hose connections**

### **Certification procedure changes**

CARB proposes more stringent certification requirements to address reliability and durability issues. Much more information will be required in the certification application, including complete installation, operation and maintenance manuals and test data indicating that the system will meet certification standards. The applicant must also submit a plan for training contractors in the proper installation of their system.

Once the application is acceptable, the system may be installed in an operating service station for evaluation. The operational test has been increased from 90 days to a minimum of 180 days and the vehicle test matrix has been doubled from 100 to 200 cars.

Currently, certifications for existing systems have no expiration date. Thus, there are outdated designs certified over 20 years ago which may still be purchased and installed, even if no longer supported by the manufacturer. CARB is establishing a four year limit on future certifications. After the four years, the certification can be automatically renewed if there are no documented deficiencies with the system or any component of the system.

Changes to the testing that is performed for CARB certification include five new test procedures to support the new standards for Stage I and Stage II systems. CARB also has revised nine existing test procedures and has repealed one existing test procedure.

### **Replacement parts**

Component parts meeting the current performance standards or specifications may be certified for use with a no-longer certified system for the remainder of the allowable in-use period of the system. This assures that existing systems will not have to be replaced prematurely because of equipment unavailability. However, when replacement parts certified to meet the new standards are

commercially available, only those replacement parts shall be installed.

### **“Effective” Vs “operative” dates**

This aspect of the new CARB rules is confusing. The effective date is the date that the new standard becomes law and starts the four-year clock for existing installations in California. The operative date concept is used to allow time to develop and certify equipment to meet technology-forcing standards, yet not delay the four year clock. For example, if CARB used an effective date, rather than an operative date for the 100 ml limit in April 2004, this would start another four year clock, which would give existing stations until April 2008 to meet the standard. It is CARB’s opinion that because of normal nozzle turnover, it is reasonable to allow one year between the 100 ml operative date of 2004 and the final compliance date of 2005. CARB expects that most nozzle manufacturers will certify to the 100 ml standard early, rather than do the two-step certification for liquid retention.

### **Are the new CARB rules final?**

Because CARB made some changes to the original staff proposal that was issued on February 4, they have to make the changes available for a 15-day comment period. This comment period was scheduled to begin sometime in June 2000. Any additional changes will be posted on CARB’s web page: [www.arb.ca.gov/vapor/evr/evr.htm](http://www.arb.ca.gov/vapor/evr/evr.htm). The effective and operative dates are not expected to change.

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