

Is CARB playing favorites?

Unbalanced Treatment of Assist Vapor Recovery Systems



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SINCE THE LATE 1980S WHEN I OBTAINED A CERTIFICATION of the first bootless assist vapor recovery system, the California Air Resources Board (CARB) has systematically imposed more and stricter requirements on assist systems than it has for balance systems. Such treatment has not been justified, nor could it be justifiable, by the facts on the relative effectiveness and efficiency of the two types of systems. In the absence of such facts, it seems to me that, for whatever its reasons might be, CARB is showing an unwarranted bias toward balance systems.

Where are the facts?

The recent round of CARB workshops on Enhanced Vapor Recovery (EVR) and In-Station Diagnostics (ISD), together with local

district actions as documented in the minutes of quarterly meetings of the California Air Pollution Control Officers Association (CAPCOA), have increased the disparity with which CARB has treated assist systems compared to balance systems:

- CARB staff has continued for a decade to overlook considerable problems with balance systems, resulting in significant additional emissions from those systems, as we will discuss below.
- At the same time, CARB and CAPCOA have concentrated on regulating assist systems out of existence by imposing ever more stringent testing and control requirements, as discussed in previous articles (see below).

During the last year or so, I have attended many CARB workshops and several quarterly CAPCOA meetings, some of which I reported on in *PE&T* (“CARB Proposes Major Changes to Its Certification Process,” January, page 90; and “CARB Needs to Modify Plan for Improving Vapor Recovery Program,” August, page 28). At these meetings, I have repeatedly requested that CARB produce and share the data to support its obvious contentions that balance systems perform in a stellar fashion, while assist systems require major improvements. No such data has been produced in response to my pleadings—obviously, I think, because such data does not exist.

CARB contentions unfounded

As a matter of fact, there is ample information to dispute, rather than support, some key CARB contentions about balance and assist systems. Three CARB contentions have been repeatedly made by CARB staff when questioned about their treatment of assist vs. balance systems. They are presented below, with each one followed by my analysis using proven facts.

CARB staff contention: Balance and assist systems are designed to “differing principles” and require different standards.

■ **Facts:** Assist systems are balance systems with a vapor pump added to the dispenser and without seals at the nozzle/vehicle interface. Dispenser and station piping are the same. Some assist systems utilize inverted hoses with larger pressure drop across the vapor side. While the operational principles differ (i.e., assist systems pull vapors while balance systems push them), the same fundamental principles of compressible flow apply.

CARB staff contention: Balance systems operate at slightly negative pressure (in the underground tanks) most of the time and require no periodic pressure tightness or other testing.

■ **Facts:** CARB released a study in November 1996, reporting on balance system tightness. A random sampling of almost 50 stations resulted in failure rates above 90 percent. Half of the tested systems leaked to such an extent that CARB staff was unable to establish the required two-inch W.C. pressure at a nitrogen flow rate of five scfm.

For several years, CAPCOA has requested that CARB add periodic tightness testing to balance system requirements; but balance system performance testing done during September of this year specifically excluded system tightness testing.

Preliminary results of testing 650 balance nozzles were presented at a recent CAPCOA meeting by three local Air Quality Management Districts (AQMDs). Significant failures were observed: nozzle vapor valves failed, causing systems to be open to the atmosphere and vapors to be pushed out of adjacent nozzles in a dispenser, rather than into the UST (about 80 percent in two districts and 30 percent in the third); liquid condensate removal in vapor hoses was inadequate, causing vapor hose blockage (about 20 percent); and liquid blockage in vapor piping that prevented vapors from returning to the UST (about 30 percent).

In addition, most pressure/vacuum (P/V) valves at the vents were found to be leaking, providing an open conduit to the atmosphere. The field inspections found most stations to be at atmospheric rather than negative pressures, something to be expected with the high degree of nozzle vapor valve and P/V valve failures.

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CARB staff contention: Balance systems are certified at 95 percent and operate at 90 percent overall efficiency when Stage I and Stage II processes are combined.

■ **Facts:** Balance systems now in use were certified under the old Method 2-1, a statistical procedure. Since the development of the current mass balance based TP201.2 in 1991, balance systems have not been retested. A major procedural change such as TP201.2 should have resulted in a decertification of older systems and a retesting requirement under the four-year grandfathering provisions. In late 1992, the Oregon DNR tested balance nozzles using TP201.2 in its draft version. The tests were conducted by VOC, California's primary test laboratory at the time, and supervised by CARB's Monitoring Division. Resulting efficiencies were below 90 percent for most nozzles (one reached 95 percent).

Recent certification testing of balance systems in Missouri has resulted in two nozzle certifications at 95 percent using procedure derived from TP201.2.

A recent analysis by the San Diego AQMD of actual emissions from Stage I and Stage II processes estimates overall efficiency to be about 75 percent. While the data is preliminary and will be refined in the future, it shows a sig-

nificant discrepancy between assumed performance levels and field observations.

It's time for change

CARB's arguments regarding performance advantages of balance over assist systems are clearly not substantiated by facts. Moreover, for years CAPCOA has requested the assistance of CARB in solving significant operational problems with balance systems, including low vapor recoveries and system tightness problems. The recent test results have prompted at least one AQMD to require annual balance system testing beginning in January 2000.

It is high time for CARB staff to recognize its responsibility to address all potential emissions problems, and not concentrate solely on assist vapor recovery systems. ☐

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