STATE OF MISSOURI
Bob Holden, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

SEP 1 5 2004

Mr. Thomas Driscoll
QAPQS/EMAD/EFPAG D243-02
109 T West Alexander Drive
Research Triangle Park, North Carolina 27709

Dear Mr. Driscoll:

The Missouri Department of Natural Resources' Air Pollution Control Program (APCP) is responsible for the implementation of the vapor recovery (VR) programs in St. Louis and Kansas City. As you mentioned in your Stage II VR Issues Paper, the St. Louis area is under Stage II VR program and the Kansas City area is under a Stage I VR program. We would like to submit our comments on the "widespread use" issue as well as on the ancillary issues presented.

Missouri Stage II History

Let me offer some Missouri Stage II VR historic perspective. In the 1989 to 1992 period the APCP became increasingly aware that vapor assist (VA) systems were not performing as well as the balance systems. This is well prior to the non-compatibility issues involved with ORVR coming to light. When we conferred with CARB and CAPCOA on these issues we received conflicting answers. However, evidence of VA performance problems was mounting. This evidence came from our own inspector observations as well as several CAPCOA documents, which all alerted us to the problems associated with VA. We observed excess emissions from the P/V valves, or excess emissions from the nozzle interface. We observed habitual problems with vapor processors, if these systems had processors, and their maintenance. With the mounting evidence of questionable performance of VA systems, we decided to cease permitting any new VA systems until we could implement our own vapor recovery equipment approval process. We intended to provide an objective testing opportunity to the universe of VR systems and components. This approval process was available to all currently CARB certified systems to establish, through MOPETP testing, which systems performed well under Missouri conditions and testing protocols. Since no VA systems applied for approval, this functional ban on VA systems diverted the tendency of our GDFs to convert to VA.

Subsequently, the APCP developed, in November of 1995, the Missouri Performance Evaluation Test Procedures or MOPETP. These testing procedures and approval process allowed us to more closely control which previously CARB certified systems and components would be approved for use in Missouri. The MOPETP was to be used by all VR equipment

manufacturers to request and obtain approval for their previously CARB certified systems and components. We used as our beginning template the proposed (but never enacted) February 1995 CARB testing procedures. We made extensive modifications and enhancements to their proposed document and developed our own testing protocols to more closely address the issues of most concern. Our test procedures would address issues such as wide ranging temperature and humidity in Missouri (compared with the Sacramento area of California) local use and demographic conditions, as well as facilitating our "second tier" evaluation of vapor assist systems for performance issues. Prior to CARB's EVR program, we implemented such (now) cutting edge details as the 180 day testing period, the requirement for all GDF's having either Stage I or Stage II VR to have P/V valves, the testing of the fueling efficiency of a minimum of 200 vehicles for full system approval, and the continuous monitoring protocols for USTs.

The data from these MOPETP tests allowed us to make meaningful contributions to the foundation knowledge of Stage II state regulators. The continuous monitoring data enabled us to provide the pressure data for CARB's decision to limit UST pressures to no greater that + 0.25"WC pressure as a CARB-EVR requirement. We initially tested numerous P/V valves and found several models that do not operate to CARB or Missouri specifications and therefore were not MOPETP approved. The MOPETP became the foreshadowing of the CARB EVR program 2-3 years prior to CARB's announcement of EVR.

We began MOPETP VR system testing on the balance system and found it to be not only reliable, but also simple and more economical to maintain. The first balance system was MOPETP approved in 1998. To date, no VA system has stepped forward to request approval. We have to assume the VA manufacturers understand that in their current design they will not likely be able to pass the MOPETP. We currently have the Husky balance system and the OPW balance system, and about 121 various balance VR components MOPETP approved.

Comments on the Stage II Vapor Recovery Systems Issue Paper.

In concept your suggested definitions of "widespread use" offered in your paper seem to be assuming that the Stage II VR program, in general, is responsible for the incompatibility problems associated with ORVR. However, our experience tells us that this is not the case. As you mention, the balance system only enhances the ORVR and together balance VR and ORVR are capable of achieving well over 98% efficiency. Actually our MOPETP testing indicates more like +99%. Therefore, we strongly believe it is premature to consider ending Stage II VR.

The new CARB EVR protocols are just now beginning to impose the appropriate standards and testing protocols on the VA systems. This will address the VA system's innate problematic tradeoff between A/L required to capture emissions at the nozzle/fillport vs. UST pressurization and subsequent fugitive VOC and HAP emissions as well as the unnecessary hydrocarbon and HAPs emissions from the processor. CARB's early testing and certification protocols were designed to address the characteristic emissions associated with the balance system and did not imagine a vapor assist system with their unique characteristics. Therefore the early CARB

certification tests were not appropriate for adequately measuring a VA system's performance. In our experience the only possible reasonable and cost effective use of VA systems is in automobile assembly plants when producing non-ORVR vehicles, and then only in conjunction with a non-destructive vapor processor. It seems surprising that VA systems have been used at all since they are more expensive to purchase, install and maintain than balance systems and have a lower efficiency than balance systems.

Speaking of auto assembly plants, our Stage II personnel are also responsible for the Stage II testing on these initial fueling facilities. In this testing we have discovered some facts that will impact the "widespread use" issue.

The production in vehicles (many larger SUVs) 6001 to 8500 has increased at an unexpected rate. Therefore, this fleet trend will extend the "widespread use" concept significantly further into the future. Your issues paper specifically mentions, *"ORVR canisters is* (sic) *just beginning in the 2004 model year for new pickup trucks and sport utility vehicles in the 6001 to 8500 pounds gross vehicle weight category and will not be totally phased in until the 2006 model year. The phase-in period for heavy-duty vehicles (8501 to 10,000 pounds gross vehicle weight category) will begin in the 2005 model year (80 percent) and be totally phased in for the 2006 model year." "Heavy-duty vehicles above 10,000 pounds gross vehicle weight rating and incomplete heavy-duty vehicles such as motor home cab/chassis vehicles will <u>not be subject to ORVR requirements</u>." (emphasis added)*

I believe the following tables serve to illustrate the ever-growing trend for vehicles to stay on the road much longer than previously expected. The lower median age for the Light Trucks and All Trucks categories may well represent the fact that more new trucks and SUVs have been purchased in recent years as family and passenger vehicles rather than their historic use as functional vehicles for farm and business use.

Table 1-25: Median Age of Automobiles and Trucks in Operation in the United States

Year	Automobiles	Light trucks [a]	All trucks [b]
1970	4.9	N	5.9
1975	5.4	N	5.8
1980	6.0	N	6.3
1985	6.9	N	7.6
1990	6.5	N	6.5
1991	6.7	N	6.8
1992	7.0	N	7.2
1993	7.3	7.1	7.5
1994	7.5	7.2	7.5
1995	7.7	7.4	7.6
1996	7.9	7.5	7.7
1997	8.1	7.3	7.8
1998	8.3	7.1	7.6
1999	8.3	6.9	7.2
2000	8.3	6.7	6.9
2001	(R) 8.3	6.1	6.8
2002	8.4	6.6	6.8
2003	8.6	6.5	6.7

KEY: R = revised.

The National Household Travel Survey (formerly the Nationwide Personal Transportation Survey), conducted by the U.S. Department of Transportation, estimates the mean age of household vehicles for several years.

	1969	1977	1983	1990	1995	2001
Automobile	5.1	5.5	7.2	7.6	8.2	8.5
Van	N	6.4	8.5	5.9	6.7	7.0
Sport utility	N	N	N	N	6.6	6.1
Pickup	N	7.3	8.5	8.4	9.7	9.4
Other truck	N	11.6	12.4	14.5	14.9	16.8
RV/motor home	N	4.5	10.7	10.4	13.2	12.5

The 1969, 1977, 1983, and 1990 surveys do not include a separate category for sports utility vehicles (SUV), while the 1995 and 2001 surveys do. In the 1990, most SUVs were classified as automobiles.
SOURCE: U.S. Department of Transportation, Federal Highway Administration, *1995 Nationwide Personal Transportation Survey: Summary of Travel Trends* (Washington, DC: 1999); U.S. Department of Transportation, Federal Highway Administration, Bureau of Transportation Statistics, 2001 National Household Travel Survey (NHTS) data, available at Internet site http://nhts.ornl.gov/2001/index.shtml as of Aug. 21, 2003.

[a] Gross vehicle weight 1-3.
[b] Gross vehicle weight 1-8.

KEY: N = data does not exist.

NOTE
Data are as of July 1 of each year.

SOURCE
The R.L. Polk Co., Internet site http://www.polk.com as of Feb. 9, 2004.

With the median age of automobiles increasing (i.e. in 2003 the median vehicles were MY 1994) and the numbers of large trucks and SUVs being purchased, the number of vehicles not having ORVR will continue to be a significant percentage of the fleet for a number of years. The registration data of the St. Louis non-attainment area for July 2004 indicate that only 29% of the gasoline-powered vehicles (automobiles and light duty trucks) have ORVR. So given these facts, in the foreseeable future there will be a significant and growing percentage of the overall US vehicle fleet, which was pre-1998, or which will not yet have, or **will never have** ORVR. These vehicles **will always need balance Stage II VR**.

The facts listed in your Issues Paper document, along with our long history of Stage II VR experience, cause us to come to slightly different conclusions with respect to "widespread use". We suggest another definition of "widespread use" that is not included as an option in your paper.

We also suggest that the USEPA take a very close look at Missouri's information related to VA systems, since they appear to be the culprits in this incompatibility emissions issue, not balance VR systems.

When we implemented the requirement for all Missouri systems to be MOPETP approved (i.e. balance systems) we found that the conversion for the VA systems to balance systems was not difficult. The majority of VA systems can be converted to balance systems rather easily and at reasonable expense. With the "incompatibility excess emissions" issue resolved, the best and

most reasonable definition of "widespread use" is derived from your own graphs (see Figure 6). We would like to suggest that "widespread use" be defined as the point where ORVR only (red line on graph) crosses or joins the now balance Stage II 90% only (green line on graph). This would be predicted, by your graph, to happen sometime after 2030. We also feel that the estimated efficiency of ORVR as 98% may be too high, especially for the older ORVR vehicles. We have seen very high ORVR efficiency (99%) for newly built vehicles (2001 through 2004) but with some significant variability among makes and models (less than 97%). We also feel that the very low efficiencies assigned to Stage II VR of 56% to 84% do not represent the capabilities of well maintained balance systems using approved equipment; these well maintained systems should attain a minimum of 90% efficiency. Lowering the ORVR efficiency and raising the balance Stage II efficiency should extend the date even further.

Some relevant VOC facts:

1. Balance Stage II VR has been shown to be one of the most effective VOC/ozone control strategies in the St. Louis and other non-attainment areas.
2. ORVR canisters are being installed on all new cars and eventually (2006) on all new pick-up trucks and SUVs (up to 10,000 gvw).
3. ORVR will **never be installed** on pre-1998 cars, heavy-duty vehicles above 10,000 gvw, and on all incomplete heavy-duty cab/chassis vehicles. These are used for vans, RVs and utility vehicles, and are a growing percentage of the US fleet. (see table)
4. Carbon canisters, like the ones used in ORVR systems, eventually break down. We do not at this time have sufficient data to know with any confidence the length of time the ORVR vehicles will maintain their initial efficiency. It is likely that older ORVR vehicles will eventually need Stage II VR to control fueling emissions.
5. Balance VR systems are certified to be at least 95% efficient. When used in conjunction with ORVR equipped vehicles the efficiency is **improved to as much as +99%** as determined by our efficiency tests in 1998. (In use efficiency may vary)
6. Balance systems are effective in the control of VOC, HAP, and MTBE emissions with ORVR and non-ORVR vehicle fueling.
7. Vapor Assist systems are (in there present form) incompatible with ORVR. VA systems will actually increase emissions (VOC, HAP, and MTBE) when fueling ORVR equipped vehicles. These additional emissions are referred to as "incompatibility excess emissions." If you eliminate VA you eliminate "incompatibility excess emissions."
8. Vapor Assist systems that use combustion processors (incinerators) increase emissions of PAHs as well as green house gasses (methane, CO and CO2) and nitrogen oxides that would not otherwise be emitted in vehicle fueling.
9. New Hampshire is experiencing MTBE ground water contamination apparently caused by vapor assist system fugitive emissions. They are presently involved in the discovery of vapor assist system innate pressurization of the UST causing these fugitive emissions. See attached news article, New Hampshire – Union Leader, MTBE Vapors Contaminating Groundwater, Dale Vincent, August 24, 2004.
10. In the future, VA systems passing CARB EVR, if in fact they do pass, will be significantly more complex and much more expensive to install and more expensive to operate. CARB will require extensive monitoring (ISD) of these systems.

11. Balance systems are much simpler and economical to install, maintain, and operate. There are no "incompatibility excess emissions" with balance VR systems.
12. Balance systems, though the most effective VOC control measure, could improve their in use efficiency by improved maintenance by the GDFs,.
13. Many states have "no stricter than federal" requirements in their statutes, which will impede the ability of the regulatory agency to choose to continue Stage II VR after the USEPA determination of "widespread use" triggers a waiver of 182(b)(3) CCA.

In conclusion
We would like to propose that the USEPA look very closely at requiring the conversion of VA to balance systems. We believe this could be accomplished at minimal cost and would address the issues of ORVR incompatibility as well as the "unknown" of how long any particular ORVR system will maintain its efficiency.

In other words it is premature to end Stage II VR in favor of an as yet unproven and not completely utilized ORVR, especially when there is another option to address the "incompatibility excess emission" issue .

When the "incompatibility excess emissions" no longer is an issue to consider, it becomes logical and judicious for the USEPA to define "widespread use" as the point where ORVR only line crosses Stage II balance VR only (without incompatibility excess emissions) line. By your graph this point seems to be sometime near 2030.

As a side note the USEPA should also consider requiring permitted Stage I VR with the use of PV valves nationwide. This VR control measure installed on each and every GDF in the US would capture approximately one half of the expected overall emissions at those GDFs since Stage I VR has been shown to be greater than 98% effective. Stage I is inexpensive to install and maintain. Stage I would significantly reduce the VOC, HAPS, HC, and MTBE issues.

We thank you for giving us this opportunity to comment on this very important decision process. We hope to be sending Bud Pratt to the September 20, 2004, stakeholders meeting in Research Triangle Park, North Carolina. If you have any questions please contact Bud Pratt of this office at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Leanne Tippett Mosby

Leanne Tippett Mosby
Director

LTM:bpd

Attachment

Attachment

News - August 25, 2004

MtBE vapors contaminating groundwater

By DALE VINCENT
Union Leader Staff Writer

Upgraded underground fuel storage systems were supposed to prevent the gasoline additive MtBE, cited as a cancer threat, from leaking into groundwater in New Hampshire.

Gary Lynn, chief of petroleum remediation for the New Hampshire Department of Environmental Services, said the new double-walled, double-piped tanks were "a liquid release success story (but) there was an unrecognized problem . . . vapor releases" of methyl tertiary butyl ether.

The vapor release problem was a topic of concern at a groundwater contamination conference last week in Baltimore. Cliff Rothenstein, director of the Environmental Protection Agency's Office of Underground Storage Tanks, said: "We need to find out the source of the problem and . . . make sure systems are both liquid- and vapor-tight."

Lynn said New Hampshire is already working on the problem. He said DES got a heads up on the problem from California in 2002, when extremely sensitive testing there showed there were still leaks at gas stations; this time vapors were the problem.

Lynn said that solved a seeming mystery here. Despite groundwater cleanup projects and installation of upgraded fuel storage systems, the MtBE problem wasn't going away. In fact, he said: "Here we are cleaning up the site and the MtBE (level) is going in the opposite direction."

Lynn said the vapor leaks are small enough that they aren't detected by normal testing, so the state had to hire the same vendor who could do the extremely sensitive "tracer" testing used in California.

The special testing confirmed the loss of MtBE vapor from tanks at a Windham location, which is being used as a test site for vapor containment solutions.

Lynn praised the cooperation of Kevin Waterhouse, the owner of the Waterhouse Country Store in Windham, saying: "The owner has been a champ."

He said there is no simple solution to the vapor leak problem. Not only do tanks systems have lots of connections, each a possible source of leakage, but there are also underground, plastic lined sumps that may only contain liquids, and above and in-ground vents that can get stuck open.

Complicating the problem is that MtBE vapors are "very, very water-soluble," he said.

That's evident because there is MtBE found at nearly 100 of the more than 400 gas stations where the DES does groundwater monitoring.

At the Waterhouse Country Store in Windham, Lynn said the problem resulted from tanks that were pressurized slightly by recycled gas vapors.

"We've reduced the pressure, to see if we can reduce the release," he said.

"We're one of the early states," he said, in identifying and tackling the vapor release problem. The state is now testing a variety of potential solutions, including membranes, and has invited the University of New Hampshire to join in trying to develop and test alternatives.

Lynn said new tank standards and the use of Stage 2 systems, utilizing what Lynn called the "hoods" and "flying saucer" on the gas dispensing nozzle to collect vapors and prevent their escape can help with the vapor problem.

New Hampshire's ban on MtBE in gasoline, which goes into effect in 2007, won't eliminate the MtBE problem, but he said: "The vapor release problem will be a much smaller problem."

The Associated Press contributed to this report