

Stage II Vapor Recovery Systems (VRS) and Underground Storage Tanks

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Air Rules' Background

- Criteria Air Pollutants
 - NAAQS, VOCs
 - Nonattainment areas
- Hazardous Air Pollutants
 - NESHAPs, MTBE, Benzene

What are “Stage II” Vapor Recovery Systems (VRS)?

- Devices that control the volatile organic compound (VOC) emissions from the refueling of vehicles. USTs are considered Stage I.
- Stage II VRS are required by section 182(b)(3) of the Clean Air Act (CAA) for moderate or worse ozone national ambient air quality standards (NAAQS) nonattainment areas.
- VOC emissions from vehicle refueling, nationwide, were estimated to be 470,000 tons from the 167 billion gallons pumped in 1999.

What is a Stage II VRS?

- VRS control VOC emissions by drawing VOC vapors back into the UST.
- There are generally two types of Stage II VRS:
 - Balance systems that passively draw vapors back into the UST.
 - Vacuum assist systems that use a vacuum pump to draw vapors back into the UST; they keep the UST pressurized.
- Vapor (Air)/Liquid Ratio
- Most of the VRS are vacuum assist VRS.

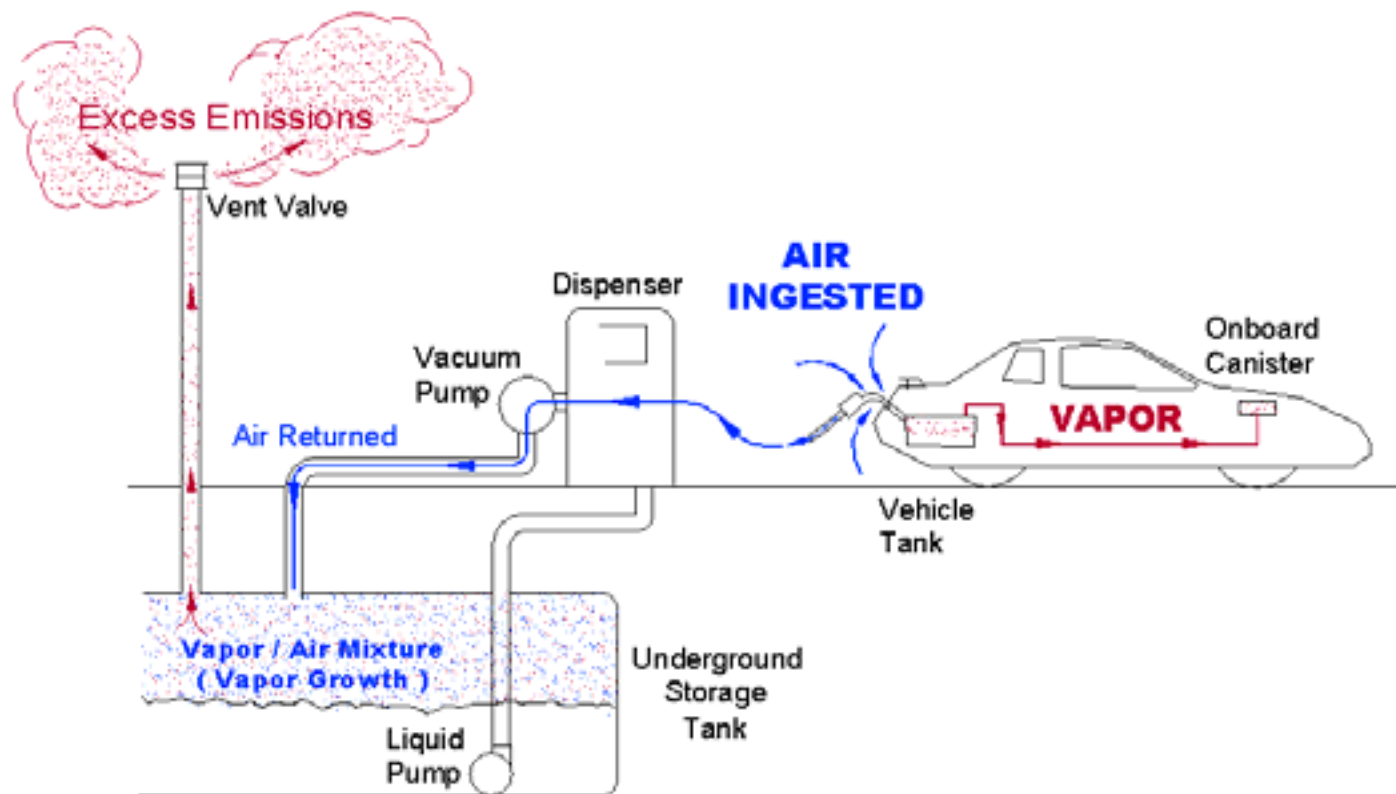
What is On-board Refueling Vapor Recovery (ORVR)?

- ORVR is a charcoal canister that adsorbs VOC emissions during refueling.
- Section 202(a)(6) of the CAA required EPA to develop standards for ORVR on light-duty (autos and truck < 10,000 lbs.) vehicles.
- ORVR will be installed in all light-duty vehicles by the 2006 model year.
- ORVR is not required for motorcycles, vehicles > 10,000 lbs., motor homes, tractors, etc.

What is the Significance of ORVR?

- ORVR to supplant Stage II VRS.
- When ORVR was promulgated, moderate NA areas were then exempted from Stage II VRS requirements.
- When widespread use of ORVR is achieved, Stage II VRS can be removed (section 182(b)(2)).
- At least two states, CA and MO, plan to retain Stage II VRS.

Stage II VRS – ORVR Diagram



What are the emission issues with Stage II VRS?

- Fill pipe emissions
 - Incompatibility of vacuum assist VRS and ORVR
 - Spillage, spit-back
- UST emissions (Stage I)
 - Vent pipes, faulty P/V valves
 - Filling losses
 - Breathing losses
 - Leaks in the tank
- Fugitive leaks in the system

Next Steps

- Conduct VOC emissions monitoring studies with Hertz and Gilbarco/Veeder Root to better characterize the Stage II (and UST) VOC emissions.
- Work with stakeholders to develop policy/rule for widespread use and control of Stage II emissions.
- Work closely with OUST and stakeholders to control emissions from UST.