PUGET SOUND CLEAN AIR AGENCY ANALYSIS OF STAGE II VAPOR RECOVERY CONTROL SYSTEMS

What are Stage II Vapor Recovery Systems (VRS)?

Stage II Vapor Recovery Control Systems (VRS) are designed to control emissions of toxic air pollutants and ozone (smog) precursors released during vehicle refueling.

- Stage II VRS were first installed at gas stations in the early 1990s to reduce ozone precursor emissions in order to meet the National Ambient Air Quality Standard for ozone.
- Beginning in 1998, vehicles were equipped with onboard refueling vapor recovery (ORVR) systems
    - This technology is designed to reduce gas tank emissions during refueling and is somewhat redundant with Stage II technology.
- The PSCAA's regulations include Stage II VRS requirements, and they are also part of the State Implementation Plan (SIP) for ozone.
- On May 9, 2012, the EPA determined that vehicles equipped with ORVR are in widespread use and emission controls from ORVR are essentially equal to and will surpass the reductions achieved by Stage II alone.
- The EPA determination allows states to decide to discontinue Stage II Vapor Recovery programs.

Should PSCAA discontinue Stage II Vapor Recovery Programs?

The EPA determination eliminated the Stage II requirement "in order to ensure that refueling vapor control regulations are beneficial without being unnecessarily burdensome to American business."

- To consider whether the PSCAA should discontinue Stage II vapor recovery programs, PSCAA quantified the emission reductions from Stage II VRS and ORVR for each year between 2014 and 2030.
- This work will be used to assess the region's ability to maintain attainment with new ozone standard, to be proposed in December 2014.
- The analysis quantified fuel tank emissions during refueling, gasoline spillage, and potential emission increases due to incompatibilities between some Stage II VRS and ORVR systems.
- This was done in two ways, using the EPA suggested method and using the PSCAA method.

How did the PSCAA analysis and result differ from the EPA analysis?

The EPA's "Guidance on Removing Stage II Gasoline Vapor Control Programs from State Implementation Plans and Assessing Comparable Measures," provides a series of equations that can be used to assess the increase in ozone precursor emissions if Stage II vapor control programs are removed.

- The EPA analysis compares fuel tank emissions during refueling with ORVR and Stage II VRS, and considers increased emissions due to Stage II VRS and ORVR incompatibility issues.
    - The EPA analysis does not consider gasoline spillage.
- The PSCAA analysis is a gas station emission inventory and includes all aspects of refueling including spillage.
- In general, the PSCAA analysis shows larger emission reductions from Stage II VRS than the EPA analysis.

ORVR - Onboard Refueling Vapor Recovery
Stage II VRS – Stage II Vapor Recovery Systems
(September 25, 2014)

Does removing the Stage II VR program support ozone maintenance?

The ozone precursor emission estimates support an overall conclusion that emissions are lowest with Stage II VRS in place at least until 2023, and possibly beyond 2030.

- Removing Stage II requirements before these dates would result in increased ozone precursor emissions, primarily from increased gasoline spillage.
- At some point the benefits of Stage II VRS may be outweighed by other factors outside the scope of this analysis such as replacement of incompatible Stage II VRS and changes in vehicle throughput.
- The result of this analysis will be used to estimate how changes in ozone precursor emissions would impact ozone maintenance if Stage II VRS were removed.

Will the change in emissions support PSCAA's goal to reduce potential cancer risk in our region by 2020?

While gasoline vapors contain an array of toxic air pollutants, the most significant pollutant for the Puget Sound region is benzene.

- Benzene has the second highest average potential cancer risk in the Puget Sound region, 17 per million. While there are many sources of benzene, gasoline stations release benzene during vehicle refueling, storage tank venting, and gasoline spillage.
- Stage II VRS control gasoline spillage during vehicle refueling. Removing the systems before 2020, or even 2030, will likely increase benzene emissions at gasoline stations.

Will removing Stage II VRS impact socio-economic disparities in the Puget Sound region by 2020?

If Stage II VRS were removed before 2023, benzene exposure would increase for people refueling pre-ORVR vehicles as well as those who work at or live near a gas station. Without further analysis it is difficult to say if this will disproportionally impact citizens with lower socio-economic status however, there is no safe level of benzene exposure.