



Appendix D ORVR WIDESPREAD USE ANALYSIS

Widespread Use Dates – Definition (c) Versus Definition (c2)

The U.S. EPA’s Draft Stage II Vapor Recovery Options Paper (February 7, 2006) (hereinafter “Options Paper”) outlines a number of possible options for defining when Onboard Refueling Vapor Recovery (ORVR) systems are in widespread use and therefore when states may terminate their Stage II Vapor Recovery Programs. In its Options Paper, EPA has indicated it is likely to settle either on Definition (c) or Definition (c2) for widespread use determinations, and of the two, the Definition (c2) approach is EPA’s preferred alternative.

The following provides a short summary of each of these definitions:

Definition (c) – Widespread use of ORVR is achieved in a given state or nonattainment area when VOC emissions (tons per summer day¹) under an ORVR-only scenario equal VOC emissions under a Stage II-only scenario.

Definition (c2) – Widespread use of ORVR is achieved in a given state or nonattainment area when VOC emissions (tons per summer day) under a prospective ORVR-only scenario equal VOC emissions under a real world combination scenario in which (1) Stage II controls are in place, (2) both ORVR and non-ORVR equipped vehicles are fueling at Stage II equipped stations, and (3) fueling of the ORVR equipped vehicles is creating incompatibility excess emissions (IEE) between the two systems.

As explained below, the widespread use date under Definition (c2) typically occurs several years after the date under Definition (c).

Explanation of Difference in Dates for Achieving Widespread Use

The EPA Options Paper included an analysis of widespread use scenarios for three states: Massachusetts, Vermont, and New Hampshire. Appendix C of the Options Paper summarizes the data and presents charts to illustrate the scenarios for the three states. Using the Massachusetts example, widespread use under Definition (c) occurs about the year 2010. In contrast, widespread use under Definition (c2) occurs five years later, about the year 2015. As a first step towards understanding why there is such a difference, we provide the following explanation, focused on the Massachusetts chart given on page 6 of Appendix C of the EPA Options Paper.

¹ Summer day is selected for two reasons. First, it represents the worst case emissions scenario where, due to warmer weather, gasoline vaporization is at a maximum. Second, because Stage II Vapor Recovery is an ozone reduction strategy, it is appropriate to examine the effect of removal of an ozone precursor control measure on a day when ozone is more likely to be at a higher concentration.

Green Line (with Triangles) – Emissions with Stage II, ORVR, and IEE

The green line marked with triangles represents the present day real world combination scenario outlined in Definition (c2). At the point Stage II is removed, the green line ceases to exist and the new real world scenario is the blue line marked with diamonds.

Blue Line (with Diamonds) – Emissions with Only ORVR Requirements in Place

Until Stage II is removed, the blue line (diamonds) is not a real world scenario. The present-day value of the blue line is that it illustrates how an ORVR program by itself becomes increasingly effective at reducing emissions over time as ORVR-equipped vehicles replace non-ORVR vehicles in the fleet. As stated above, the blue line (diamonds) replaces the green line (triangles) as the real world scenario once Stage II is removed.

Violet Line (with Squares) – Emissions with Only Stage II Controls in Place

The violet line marked with squares ceased to represent real world conditions back in the 1990s when the first ORVR-equipped vehicles entered the fleet. In the Massachusetts chart, which shows a time span from 2001 out to about 2030, this line never reflects real world conditions. The continual upward slope of the violet line over time illustrates that because gasoline consumption (therefore gasoline throughput from service stations) is continually increasing, emissions from the collective Stage II systems is also continually increasing.

Intersection of the Blue and the Violet Lines (Definition (c))

This is an intersection of two non-real world scenarios. In one scenario (blue line with diamonds), Stage II controls never existed but instead ORVR was implemented. In the opposite scenario (violet line with squares), Stage II controls were implemented but ORVR never existed.

Emissions Implications of Definition (c)

According to this analysis, when widespread use is achieved and Stage II controls are removed, the green line (triangles) ceases to reflect real world conditions, and instead the blue line (diamonds) reflects the real world. In the Massachusetts example, in 2010 (widespread use date under Definition (c)), the blue line emissions (the new real world of ORVR only and no Stage II) are 6.84 tons per summer day. The green line (real world prior to removal of Stage II) emissions in 2010 are 4.08 tons per summer day. Thus, by removing Stage II controls in 2010, there is an emissions increase of 2.76 tons of VOC per day.² These are the excess emissions caused by refueling the remaining non-ORVR equipped vehicles without Stage II controls.³

Emissions Implications of Definition (c2)

Continuing with the Massachusetts example, in 2015 the blue line (diamonds) emissions are 3.65 tons per summer day and the green line (triangles) emissions are 3.86 tons per summer day. By

² Removal of Stage II Vapor Recovery as a control measure in an ozone nonattainment area would require EPA approval of a State Implementation Plan (SIP) revision. According to § 110(l) of the Clean Air Act, the Administrator shall not approve a SIP revision if the revision would interfere with any applicable requirement concerning attainment and reasonable further progress. Therefore, if removal of Stage II Vapor Recovery resulted in a VOC emissions increase on the order of several tons per day during the ozone season, it may not be an approvable SIP revision.

³ The emissions would actually be slightly higher if not for the benefit achieved by eliminating the incompatibility excess emissions associated with refueling ORVR equipped vehicles with vacuum assisted Stage II Vapor Recovery equipment.

removing Stage II in 2015, there is a net emissions benefit of 0.21 tons per day. At this point, there is a great enough penetration of ORVR equipped vehicles into the fleet for ORVR to more than offset the emissions benefit from continuing to utilize Stage II controls for capturing emissions from the relatively small residual population of non-ORVR equipped vehicles.

Conclusion

Definition (c2) is based on real world conditions and has no emissions consequences associated with the termination of Stage II Programs as compared to Definition (c).