Review of ARB's 11/05 Estimates of the Impact of Ethanol on Mobile Source Permeation VOC Inventories

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Air Improvement Resource, Inc.

Caveat

- All work to date is based on E65 Phase 1
- May need to be revisited when Phase 2 available

Permeation Impacts in South Coast Air Basin
Typical Summer Ozone Day in 2005
ARB versus AIR
(Tons per day)

Estimate	On-road	Off-road	Total
ARB: 11/2005	11.5 (3%)	7.4	18.9 (5%)
AIR: 2/2005	7.0	3.3	10.3
AIR: Updated Vehicle Populations	9.4	3.3	12.7
Difference	**2.1**	4.1	6.2

On-Road Ethanol Impacts on Permeation VOC Inventories South Coast Air Basin Average Ozone and SCOS Temperatures (2005 tpd)		
Evaporative Source	**Average Ozone Day (62-83F)**	**SCOS Episode (70-98F)**
Diurnal (includes resting losses)	9.3	23.4
Running Loss	1.2	3.1
Hot Soak	1.0	3.0
Total	11.5	29.5

Concerns with ARB Methodology - On-Road

- ARB assumes that 90% of resting losses are permeation
  - Probably okay for newer vehicles in good condition
  - Fraction is probably lower (70-80%) for older vehicles and newer vehicles which have lost control of breathing losses (i.e., missing gas cap) (~1-4 tpd)
- ARB uses permeation emissions during resting period to estimate diurnal permeation fraction vs temperature
  - Permeation emissions during diurnal should be lower than resting because of lead/lag between ambient and tank temperature (1-5 tpd)-use a lower temp profile for diurnal
- ARB uses only hour-by-hour resting emissions to develop permeation temperature correction factors
  - Should use steady state data from E-65, or full E-65 24 hour data
  - This is what makes the SCOS episode so high relative to average summer ozone day

Concerns with ARB Methodology - Off-Road

- Method used to average percent increases in emissions from PFCs overestimates ethanol effect
  - Determine percent increases from average emissions, instead of using average of percent increases

Next Steps

- Continue to work with ARB to define impacts of ethanol on permeation emissions