California RFG 3 Workshop

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Phase 3 RFG Goals

- "Provide flexibility while preserving real-world benefits"
- "Obtain additional reductions that are technically and economically feasible"

RFG3 To Do List

- Further sulfur reduction to "sulfur-free"
- Sunset of relaxed T50, T90, aromatics specifications
- Quantify emission inventory impacts of ethanol useage
  - Permeation of fuel system components
  - Co-mingling of ethanol/non-ethanol fuels

"Sulfur-Free" Gasoline

- Additional emission reductions possible
  - Alliance test program
- WWFC 5-10 ppm maximum
- Supports new lean-burn technology, lean NOx catalysts
- Support for reformer fuel cell vehicles

Sunset Relaxed Specifications

- Restore air quality benefits achieved with RFG2
- GM data on LEV vehicles shows 20-25% reduction in HC emissions with 50 deg F reduction in DI

MTBE Policy Considerations

- Ethanol is the preferred oxygenate replacement
- Properly blended, can be environmentally acceptable.
- Need to recognize and address evaporative emission issues.
- Permeation of fuel system components
- Co-mingling of E10/non-ethanol fuels
- Need to evaluate air inventory impacts

Effect of E10 Fuel Exposure on Evaporative Emissions

- Data suggests increased VOC emissions that will require offset mitigation strategies
- Existing literature on evap emissions and permeation
- Newer “enhanced evap” vehicles

Evap Emissions Test Data

Fuel	Odometer	Test Date	Diurnal	Hot Soak	Total
E10	3976	5-1	0.719	0.147	0.866
Gasoline	5019	5-11	0.645	0.137	0.782
E10	8655	5-2	0.619	0.140	0.759
Gasoline	8534	5-16	0.582	0.112	0.694
E10	2561	5-9	0.724	0.109	0.833
Gasoline	2216	5-15	0.672	0.126	0.798
E10	6797	7-21	0.576	0.093	0.669
Gasoline	6951	7-21	0.440	0.091	0.531
E10	8740	7-27	0.441	0.097	0.538
Gasoline	9557	8-21	0.396	0.053	0.449
Mean E10			0.616	0.117	0.733
Mean Gas			0.547	0.104	0.651
% Diff			+12.6%	+12.5%	+12.6%

2005 Statewide Emission Reductions (Increases) in T/d

Program	NOx	HC	NOx + HC
	Without co-mingling		
Alliance	38.6	9.9	48.5
ARB	18.7	0.5	19.2
	With co-mingling		
Alliance	38.6	(13.2)	25.4
ARB	18.7	(22.6)	(3.9)

Recommendations

- Offset mitigation strategies need to be developed
- Tests needed to determine and verify evaporative emission impacts on air inventory related to increased use of ethanol
- RFG3 “To Do” list could result in 25 T/d net benefit