Alliance of Automobile Manufacturers[1]

Response to EPA Questions for Consideration by the

Governors Task Force on Boutique Fuels

May 16, 2006

1. EPA's 2001 study analyzed four different scenarios for reducing the number of boutique fuels. Do you agree with these options? Are there other options that should be addressed?

- For lowest emissions, greatest fungibility and smallest risk of supply shortages, a 49-state or 50-state fuel provides the best approach. Providing a single clean fuel for emission control purposes also would help improve fungibility, reduce shortages and maintain low emissions.
  - In the past, the Alliance has supported the use of boutique fuels as a way for states to reduce emissions in advance of action by EPA, but the Alliance has always preferred the adoption of national clean gasoline and diesel fuel. If the fuel quality is good enough nationwide, there would be no need for states to use boutique fuels to reduce emissions locally.
- EPA should modify its concept of a federal Cleaner Burning Gasoline (CBG) to better match the fuel to Tier 2 vehicle technology and any new emission standards that emerge from the MSAT2 rulemaking.
- Any slight impact that a 49- or 50-state gasoline might have on refining capacity, as EPA suggested in its 2001 study, can be offset through the increased use of ethanol as well as by the improved distribution logistics of a national fuel system.

2. Given the current state of fuel requirements, are the 2001 study findings regarding the cost, fungibility, air quality and supply of the four options still accurate?

- In times of equilibrium, boutique fuels can be a low cost way for localities to reduce air pollution, but in times of instability, these fuels can prove difficult to supply, which naturally increases their cost. EPA's 2001 analysis and conclusions are consistent with this understanding of the market.
- The fuel market and state and national policies have changed in several important ways since the 2001 study, and these changes may very well affect the study's conclusions regarding cost, fungibility, emissions and fuel supply for each of the options studied:
  - MtBE bans in many states;
  - Increased use of ethanol and biodiesel;

[1] The Alliance of Automobile Manufacturers is a trade association of nine car and light truck manufacturers including the BMW Group, DaimlerChrysler, Ford Motor Company, General Motors, Mazda, Mitsubishi Motors, Porsche, Toyota and Volkswagen.

- Congress has adopted the Renewable Fuel Standard and eliminated the oxygenate mandate for federal RFG;
- The introduction of low sulfur gasoline;
- The imminent introduction of ultra-low sulfur diesel fuel (ULSD);
- Planned additional fuel quality control under a new MSAT rulemaking;
- Tightened National Ambient Air Quality Standards;
- New data on the impact of fuel quality on newer vehicles; and
- The introduction of advanced Tier 2 vehicle technologies, which are dramatically reducing vehicle emissions. While these vehicles are known to be more sensitive to changes in fuel properties, their performance on various types of fuels remains to be fully investigated.

3. What data would be needed to complete additional analysis on these four factors for boutique fuel options?

- Under the Energy Policy Act of 2005, EPA is required to update the complex model. This effort will be critical to ensure the emissions performance of any new federal gasoline. Vehicle performance also must be considered.
- EPA could study alternative phase-in schemes for a national clean gasoline, using accepted refinery cost modeling methods.
- EPA should review the environmental and economic impacts of past fuel quality regulations at both the state and federal levels, comparing predicted costs with, to the extent possible, the actual costs and their influence on final fuel prices. Air quality impacts also should be examined to the extent possible.
- EPA would need to know the extent to which refineries are already capable of providing cleaner fuels.
- EPA should review economic and air quality impact studies that may have been conducted since 2001.
- Fuel cost is strongly influenced by world crude and finished fuel production and demand, which have changed considerably since 2001. A closer look at imports also is advisable.

4. What impact do state boutique fuels have on your station operations?

N/A

5. What impact do state boutique fuels have on vehicle and engines operation?

- Historically, it was possible to change some fuel properties locally without otherwise affecting fuel quality and vehicle emissions/performance. Increasingly, however, this is no longer true, given the increased sensitivity of vehicles to changes in fuel properties and to the stringency of current vehicle emission standards. Consumers take their vehicles across the country, and automakers design and calibrate them to use gasoline found in any region, cold or hot, high or low altitude, boutique fuel or not, while continuing to meet stringent emission standards and consumer expectations

for superior vehicle performance. Given the wide variation in fuel quality found in the marketplace, this presents a big challenge.

- RVP control has been used to reduce evaporative emissions, and it has been effective for that purpose. But as vehicle evaporative controls have become tighter over the years, the benefit of further reducing RVP has declined.
- Today, RVP limits are approaching and exceeding 7 psi, and as they do, other gasoline properties are likely to change in such a way as to increase vehicle emissions. When required to reduce RVP, refiners make up the lost volume by increasing the proportion of heavier fuel components. This shift in components increases the fuel's Distillation Index (DI) (which is the Driveability Index plus a correction factor for oxygen content). If DI increases too much, vehicle cold start tailpipe emissions increase, which undermines the air pollution benefit of lower RVP. Also, as DI levels range above 1200, automakers are forced to compromise their engine calibrations to enable acceptable vehicle performance. This compromise results in increased tailpipe emissions both locally and nationwide.
- U.S. gasoline DI continues to vary quite widely, compared to Japan and Europe, and seasonal volatility changes also continue to be problematic, with summer fuel often marketed before the warmer weather and with some refiners marketing gasoline with below-acceptable T50 in the shoulder season. Historically, automakers have been able to accommodate some variation in volatility, but the new Tier 2 emission standards and forthcoming MSAT2 standards reduce or may eliminate this capability. A plan to narrow the distillation range of fuels and better manage spring volatility across the US would be very beneficial in achieving lower emissions while maintaining performance.
- Sulfur is another fuel property that is best controlled at the national level. If the fuel sulfur level is too high, the fuel can irreversibly poison vehicle emission control systems. EPA's regulation of gasoline sulfur to today's 30 ppm average level goes a long way to enabling Tier 2 gasoline technologies, and its regulation of diesel fuel sulfur to ultra-low levels will enable the introduction of advanced Tier 2 diesel technologies. The gasoline sulfur reduction does not go far enough to enable fuel-efficient lean-burn gasoline engines, however; ultra-low sulfur levels on a national basis would be needed to enable that technology.

- We disagree with EPA's statement in the 2001 analysis that "little can be done to improve NOx emission performance beyond the Tier 2 sulfur standards".[2] Lower sulfur will always reduce emissions and increase the durability of the emission control systems, which is becoming more important as the vehicles last longer. As long as states continue to look for ways to reduce emissions, further reducing gasoline sulfur should be an option. Advanced Tier 2 technologies may produce smaller emission reduction increments with lower sulfur on an absolute basis compared to previous technologies, but they are much more sensitive to sulfur on a percent basis. The Alliance believes gasoline sulfur should be capped nationally at 10 ppm to

[2] EPA 2001 White Paper, page 19.

improve emission system durability as well as to enable fuel efficient lean-burn gasoline technology, which also has inherently low HC and CO emissions. The cost of doing so should be greatly reduced since 2001, given new refining technologies and upgrading of refineries since then.

- The addition of ethanol to gasoline has a complex effect on emissions, depending on the finished fuel blend and on vehicle technology. Some effects are positive; to the extent they are not, they can be avoided or mitigated by properly balancing the final gasoline-ethanol blend and by waiting for the fleet to turn over to newer vehicle technologies. Additional national control of the base gasoline would be an effective way to enable greater ethanol use without compromising emissions.
    - Evaporative emissions, which tend to be greater in older vehicle technology, are mitigated by fleet turnover to newer technologies that tightly control evaporative emissions.
    - Permeation emissions—which result from the permeation of fuel molecules through hoses and other fuel system components—can be quite significant in older vehicles.[3] Again, newer vehicles use more robust fuel system materials that are much less permeable to ethanol and other fuel molecules, so fleet turnover will mitigate these emissions.
    - Ethanol can both reduce and increase tailpipe emissions. It can reduce emissions from older vehicles by making the air/fuel mixture leaner. It also has reduced emissions by diluting gasoline's previously high sulfur levels, although this effect has diminished in recent years due to the introduction of lower sulfur gasoline. Ethanol can increase emissions in newer vehicles, however, because these vehicles are designed for very lean air/fuel mixtures to minimize emissions. This effect can be mitigated if the gasoline-ethanol mixture is carefully blended to maintain the proper distillation profile and other volatility properties.[4]
- EPA did not fully evaluate the impacts of fuel quality on vehicle emissions in its 2001 White Paper. As one example, EPA admitted not fully evaluating the relationship between RVP control and DI impacts and invited additional comment on the relationship between DI and exhaust emissions.[5]

[3] See CRC E-65, Fuel Permeation From Automotive Systems, 2004. This study has been extended to include newer technologies and additional ethanol blends.
[4] See, e.g., CRC E-67, Effects of Ethanol and Volatility Parameters on Exhaust Emissions, 2006.
[5] EPA 2001 White Paper, page 50.