UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

Notice of Proposed Rulemaking: Control of Air Pollution from New Motor Vehicles: Proposed Tier 2 Motor Vehicle Emissions Standards and Gasoline Sulfur Control Requirements	Docket No. A-97-10

STATEMENT OF THE
CLEAN FUELS DEVELOPMENT COALITION

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REGARDING EPA'S PROPOSED
TIER 2 MOTOR VEHICLE EMISSIONS STANDARDS AND
GASOLINE SULFUR CONTROL REQUIREMENTS

Introduction

The Clean Fuels Development Coalition (CFDC) hereby submits comments on the EPA's proposed rule to tighten motor vehicle emission standards and to impose control requirements on sulfur in gasoline. The CFDC is a national coalition of organizations and companies that since 1987 has strongly supported the development of quality motor fuels to optimize the emissions performance of motor vehicles, enhance air quality and reduce dependence on foreign petroleum sources. The attachment to these comments lists our members.

We strongly support EPA's initiative to reduce sulfur content in U.S. gasoline. Fuel sulfur has always had deleterious effects on automobiles, and these effects are becoming increasingly pronounced as emission standards tighten and as vehicle technology evolves. Our position is the same as that of the automobile manufacturers, namely, that fuel sulfur should be lowered to negligible levels, commensurate with emissions standards. Thus, we believe EPA should either tighten its proposed schedule for lowering gasoline sulfur to 30 ppm or less, or loosen its proposed schedule for lowering vehicle emission standards.

In fact, all fuel properties are having a much stronger impact on today's vehicles than in the past, and they will continue to do so due to regulatory constraints and the increasing sensitivity of vehicle technology to various fuel parameters. This is why the CFDC also endorses controlling fuel volatility by capping the distillation index (DI), as defined by the automakers in their petition of January 27, 1999. CFDC supports limiting DI to 1200 in 2000 and to 1150 in 2003. We are both puzzled and troubled by EPA's hesitancy to address this most serious fuel quality problem. CFDC also supports limiting aromatics to between 22% and 25% by volume, which will help reduce combustion chamber deposits (CCDs), lower the reactivity of emitted HC, and minimize air toxic emissions.

Reliance on EPA modeling to show the benefits of controlling sulfur, DI and other fuel parameters has been inadequate because such modeling has failed to accurately reflect the many positive effects of fuel quality changes on vehicle emissions. Thus, the Agency's projections of emissions after controlling various fuel parameters and of the air quality impacts of such controls have understated the benefits of these types of controls, to the detriment of states and citizens working to attain ambient air quality standards. Fortunately, we have the real world experience of California to show how fuel quality changes, including lower aromatics, 30 ppm sulfur and DI control (California gasoline averaged 1118 in 1998), can dramatically improve air quality.

EPA Should Lower Gasoline Sulfur to 30 ppm or less

EPA has proposed limiting sulfur in gasoline to a corporate annual average of 30 ppm and an 80 ppm cap. EPA would phase in these limits over time, beginning in 2004, and would apply them to gasoline sold throughout the nation. EPA cites two reasons for this proposal. First, EPA explains that lowering sulfur will yield an important incremental emission benefit from the motor vehicle fleet. Second, the Agency states that lowering sulfur will enable new technologies that are now being considered for use in vehicles over the next decade.

We contend that reducing sulfur in gasoline to 30 ppm or less will enable *existing* vehicle technology to operate properly. Reducing gasoline sulfur will reduce emissions of tailpipe pollutants that contribute to ambient levels of criteria pollutants. Few other control strategies, if any, can yield comparable, broad-ranging benefits. First, lowering sulfur to at least 30 ppm will help reduce ambient ozone levels by reducing NOx and VOC emissions in areas that need these reductions the most. While many debate whether EPA should target NOx or VOC preferentially, a fuel sulfur reduction strategy avoids this dilemma because it reduces both pollutants at the same time. This should help minimize the risk of potential disbenefits from a NOx-only or a VOC-only strategy.

Reducing sulfur to 30 ppm or less also will help reduce particulate emissions from vehicles. Particulate emissions arise from both NOx and sulfates, among other pollutants. Sulfates will decline directly as a result of reducing gasoline sulfur. Particulate derived from NOx also will decline due to the improved functioning of catalytic converters. To the extent that catalytic converters help reduce other particulate-forming species, then reducing sulfur should also help reduce these species.

Many of the tailpipe emissions of concern for toxicity are broadly classified as VOCs or particulate. Since reducing sulfur will reduce these categories of pollutants, it also will reduce toxic emissions. As EPA considers how to address ambient toxics in urban areas, reducing fuel sulfur can play a key role in reducing this type of pollution, to the extent that vehicles are responsible for ambient levels.

These emission benefits will accrue immediately as low sulfur gasoline is sold in the marketplace, in contrast to the years that is takes for newer vehicle technologies to penetrate the fleet. Since many states are looking for help in achieving ambient ozone standards within the next decade, EPA should prefer a fuel-based strategy to a vehicle-based strategy for controlling vehicle emissions in the near term.

Controlling fuel sulfur to 30 ppm is readily achievable and at very reasonable cost. In this country, California has required clean gasoline, with additional fuel quality controls besides sulfur, since 1996. Gasoline sulfur levels in that state now averages about 20 ppm. Even API now says that nationwide sulfur control will cost only about 2 cpg. Japan has had low sulfur gasoline for several years; today, premium gasoline in that country is averaging about 10 ppm sulfur. Sweden and Finland have had low sulfur diesel fuel for several years. Canada will begin phasing down sulfur next year, and Europe will require a flat 50 ppm cap on sulfur in both gasoline and diesel throughout the entire European Union by 2005.

In fact, EPA should take more aggressive steps to reduce fuel sulfur and pollution earlier than 2004. While its proposed policy of offering early sulfur reduction credits and permitting assistance may be helpful, economic incentives would get the job done much faster and in the

most efficient way. A slight price differential at the pump between cleaner and dirtier fuels, for example, can have a remarkable impact. The latest example of this is in the UK where the government offered preferential tax treatment for marketing cleaner diesel fuel. This year, virtually all diesel fuel sold in that country has less 50 ppm sulfur, years ahead of schedule.

New low emission vehicle technology (i.e., LEVs), which will enter the national marketplace next year, needs low sulfur gasoline to perform at its best in terms of emissions. We already know these vehicles will be more sensitive to sulfur than vehicles built to Tier 1 standards. As Tier 2 vehicles begin to enter the market in 2004, the impact will be even more serious. In the NPRM, EPA recognizes the benefit of lowering sulfur to enable new automotive technologies. Virtually all of the new emission control strategies under consideration for the next generation of vehicles, which automakers hope to use to help meet tougher fuel economy goals, will require extremely low sulfur fuel due to their greater sensitivity to sulfur.

EPA must dramatically reduce fuel sulfur levels nationwide. Today's society is too mobile to do otherwise, and the evidence of irreversible harm to vehicle emission control devices is compelling. In addition, society will benefit from providing the infrastructure that newer vehicle technologies will need. It is highly questionable if these newer technologies can be introduced anywhere as long as any state continues to have high sulfur fuel within its borders. For example, companies that are selling vehicles with spark ignition direct injection engines in Japan have been unable to bring these vehicles to this country. Even if California lowers sulfur further, as it may propose this year, these companies still may decline to sell these vehicles in that state out of fear that their emission control devices will be impaired upon leaving the state. Looked at from another perspective, allowing any state to sell dirty fuels would be comparable to allowing less stringent vehicle emission standards in those states. Both of these outcomes would be untenable, however. Thus, EPA must take a uniformly national approach to fuel sulfur control. The Agency should avoid being swayed by political arguments on this issue; too much is at stake for the health and welfare of residents of this country to do otherwise.

The CFDC also endorses the position of the Alliance of Automobile Manufacturers in terms of the timing and extent of lowering gasoline sulfur. That is, EPA should lower fuel sulfur as much as possible and as soon as possible, and should require it nationwide to protect the emissions performance of the nation's automotive fleet. The timing of the sulfur reductions should be coordinated with and in advance of changes in vehicle technology. Thus, we support implementing a sulfur standard of 30 ppm or less for both gasoline and diesel fuels, along with a flat limit of 80 ppm by 2004. Depending on the rate at which automakers must introduce Tier 2 vehicles, EPA should further phase down sulfur to near zero levels as soon as possible.

EPA Should Set Distillation Index Limits at 1200 in 2000 and at 1150 in 2003

In the NPRM, EPA asks for comment on the automakers' 1999 petition to cap the distillation index (DI) at 1200. EPA indicates that it believes controlling DI would reduce vehicle HC emissions but feels it lacks sufficient justification for doing so, from the standpoint of air quality need and economic impact.

It is unclear how the Agency can say it lacks justification for controlling DI when it believes it has enough justification for reducing vehicle HC emissions and for controlling fuel sulfur under Tier 2. We recognize that EPA has adopted a preference for NOx reductions

following the recommendations of the Ozone Transport Assessment Group (OTAG). OTAG's strategy, however, targeted ozone transport; the state did not intend the strategy necessarily to produce attainment in any area. Furthermore, its modeling efforts, while extensive, were inadequate for purposes of predicting local air quality. Reducing HC is still important for helping ozone non-attainment areas throughout the U.S. reach their goal of attaining the ozone standards and that controlling DI is a highly cost-effective way to achieve this outcome. Reducing HC from mobile sources may be even more helpful than a NOx-oriented strategy because it will impact the local environment more immediately and directly than the stationary source NOx reductions that EPA and some states are calling for. It also may help minimize the risk of NOx disbenefits in urban non-attainment areas. Since EPA has proposed to lower HC standards for vehicles by a significant amount, the Agency also must continue to believe HC still has a role in reducing ozone. Recognizing the benefits of gasoline with lower DI, EPA should not phase out the use of MTBE.

As areas seek fuel-based options for reducing HC emissions, they tend to favor low RVP fuels before opting in to federal RFG. This strategy is faulty, however. Reducing RVP is most helpful in reducing evaporative emissions, but newer vehicle technologies are providing highly effective control for evaporative emissions. In addition, since DI tends to increase as refiners reduce RVP, tailpipe emissions will increase. These factors mean that RVP control strategies will be less effective than expected, and perhaps may even increase net emissions. Current models are failing to adequately reflect this impact. No matter how little the cost, if the strategy fails to reduce net emissions to the environment, it will be cost-ineffective.

Limiting DI to 1200 in 2000 and 1150 in 1003 would have the added benefit of making vehicle HC emissions less reactive overall. This occurs because tailpipe HC emissions tend to be more reactive than evaporative emissions, so reducing exhaust emissions will have a larger impact on ozone than will reducing evaporative emissions by a comparable mass amount.

Controlling DI will also help reduce vehicle exhaust HC emissions at the point in the operating cycle when such emissions remain relatively large, namely, during cold start. Catalytic converters work least well during this phase of vehicle operation because they are still cold. A large portion of these excess emissions is preventable, as the automakers' petition shows. Test data using California's "cleaner burning gasoline" (CBG) with a DI of less than 1150 was able to reduce these emissions dramatically, compared to conventional fuels, without any hardware changes.

In addition, controlling DI will reduce emissions from all vehicles all the time because of the calibration effect described in the automakers' petition. Providing a predictable volatility-controlled gasoline throughout the country will enable automakers to optimize the calibrations on their vehicles. This, in turn, will reduce HC (and CO and toxic) emissions. Automakers are now calibrating their vehicles to be able to start on the lowest volatility fuels in the marketplace. In 1998, the maximum DI reached 1308 for premium gasoline and 1274 for regular (uncorrected for ethanol).[1] If automakers could calibrate to optimum levels instead, all vehicles would emit less. In fact, failing to control DI means that high ozone locations like Boston, where the maximum DI reached only 1170 last summer, are being penalized because other areas, like New Orleans, St. Louis, Kansas City and Miami, have high DI gasoline. Even in California, where the DI in

[1] AAMA 1998 Summer Fuel Survey.

1998 averaged 1118, vehicles are emitting more than they otherwise would if DI were limited nationally to 1150.

Finally, with the stringent standards proposed by EPA for Tier 2, automakers will need to provide tight air-fuel ratio control for their vehicles to enable the vehicles to meet the new standards. Allowing high DI fuel to continue in the marketplace will undermine this strategy for reducing emissions.

As for the economic impact of limiting DI to 1200 nationwide, the analysis conducted by MathPro provides ample reason why it will be small. MathPro's review of actual refinery gate and market data shows that most gasoline already meets a 1200 cap, and most of those that don't are exceeding it by only a small amount. In fact, only a handful of refineries will need to take more substantial steps to meet a 1200 DI cap. Even here, these refineries should be closer to meeting the recommended specification since the industry volunteered last year to begin meeting a self-imposed cap of 1250. Last year, the maximum uncorrected DI for regular gasoline, which predominates in the marketplace, was 1274, but the average of that grade was only 1138. Again, California has been requiring DI control since 1996; the maximum DI last summer in that state reached only 1169, found in premium gasoline, and most of that state's fuel is easily meeting an 1150 cap. In other countries, Japan's gasoline also is under 1200, with the majority under 1100. Given this apparent capability in the refining sector, the CFDC has no reason to doubt MathPro's estimated nationwide average cost of only 0.4 cents per gallon and further believes the estimate to be conservative.

We recommend capping DI at 1200 on a national basis immediately. Then, in 2003, we recommend further lowering DI to 1150, to help automakers reach their Tier 2 goals more easily and to optimize the emissions performance of all vehicles.

There is some debate about how low DI should go. We are recommending 1150 as the optimum target because, while emissions increase sharply at a DI of 1200 according to test data, the increase actually begins much closer to 1150. Thus, we believe 1150 is the better target. Given that states need to reduce ozone in the near term and the fact that most refiners can meet this target with little or no change to operations, controlling DI will provide an extremely cost-effective approach to reducing HC emissions from vehicles.

EPA Should Limit Aromatics to 22-25% by volume

Another fuel quality parameter that bears attention is lowering aromatics. This group of gasoline components is heavier than other fuel components, so it tends to reduce fuel volatility (i.e., it increases gasoline DI). Besides impairing driveability and increasing net mass emissions, higher levels of aromatics also tend to increase the reactivity and toxicity of tailpipe emissions. Furthermore, they can increase combustion chamber deposits (CCDs), which have their own adverse impacts on tailpipe emission levels—especially NOx.

Information provided to CFDC by Information Resources, Inc., indicates that refinery emissions also will be lower if aromatics are controlled. Since producing fuel with higher levels of aromatics tends to produce relatively more emissions of VOC, NOx and air toxics at the refinery, capping aromatics will help limit these emissions in the refining sector. Lowering aromatics also can extend gasoline yields from each barrel of crude oil.

Thus, limiting aromatics will have numerous emissions benefits. Doing so will be increasingly important if the federal government moves to reduce the use of MTBE and other ethers in gasoline. CFDC believes that refiners will tend to use heavy aromatics to replace these ether compounds and make up product volume lost during the refining process. This would lead to increased emissions at both refineries and from motor vehicles. For these reasons, CFDC recommends that EPA also control aromatics in gasoline. We recommend limiting aromatics to 22-25% by volume.

Conclusion

The CFDC supports improving fuel parameters at the national level to enhance fuel quality and optimize vehicle emissions performance. Specifically, reducing fuel sulfur to 30 ppm or less, DI to 1150 and aromatics to 22-25% constitutes the best pollution prevention and most cost-effective approach for reducing motor vehicle emissions in the near term. It will improve performance for all vehicles, both big and small, and for both current and future technologies. California's record of real-world ozone reductions, due primarily to these fuel quality changes, is testament to the power of these proven strategies.