

**Statement of
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State and Territorial Air Pollution Program Administrators
and the
Association of Local Air Pollution Control Officials
at the
U.S. House of Representatives'
Subcommittee on Energy and Environment of the Committee on Science
Hearing on
Reducing Sulfur in Gasoline and Diesel Fuel**

July 21, 1999

Introduction

Good afternoon. My name is Bill Becker and I am the Executive Director of STAPPA – the State and Territorial Air Pollution Program Administrators – and ALAPCO – the Association of Local Air Pollution Control Officials – the two national associations of air quality agencies in the 55 states and territories and more than 165 major metropolitan areas across the country. On behalf of STAPPA and ALAPCO, I commend you, Mr. Chairman, for convening this hearing to explore the extremely important and timely issue of controlling sulfur in gasoline and diesel fuel. I am pleased to have this opportunity to provide our associations' views.

As I mentioned, STAPPA and ALAPCO represent the air pollution control agencies in the states and territories, as well as in major metropolitan areas across the country. Our members hold primary responsibility for achieving and maintaining clean, healthful air nationwide and, as such, have a keen understanding of the need to aggressively pursue emission reductions from all sectors that contribute to air quality problems.

In spite of the many air quality improvements that have been achieved to date, we continue to face a variety of serious air pollution problems in this nation. Similarly, while we have taken significant steps in developing cleaner cars and cleaner fuels, we have not gone nearly far enough. Emissions from mobile sources continue to be major contributors to our air quality problems.

The issue of sulfur in gasoline and diesel fuel is a critical one for state and local air agencies. Our interest in and commitment to this issue is evidenced by two resolutions adopted by STAPPA and ALAPCO, calling upon EPA to dramatically cut fuel sulfur levels nationwide. Copies of these resolutions – the *STAPPA/ALAPCO Resolution on a National Gasoline Sulfur Cap* (adopted October 28, 1997, amended April 7, 1999) and the *STAPPA/ALAPCO Resolution on Sulfur in Diesel Fuel* (adopted October 13, 1998, amended May 18, 1999) – are attached.

Air Quality Need

According to the U.S. Environmental Protection Agency (EPA), mobile sources account for almost one-half of the nitrogen oxides (NO_x) inventory, more than 40 percent of the hydrocarbon inventory, 80 percent of the carbon monoxide (CO) inventory and 20 percent of the direct PM₁₀ inventory.

Reducing sulfur in gasoline will decrease emissions of hydrocarbons and NO_x, which, in turn, will lead to reduced levels of ambient ozone. Lower gasoline sulfur levels will also decrease PM and CO emissions, improve visibility, address acid rain problems and reduce greenhouse gases. Further, important reductions in toxic air pollutants will occur, reducing the high risks these pollutants cause in many areas of the country. Similarly, lower diesel fuel sulfur levels will directly decrease emissions of sulfur dioxide, PM₁₀, PM_{2.5}, PM_{2.5} precursors and acid rain precursors and reduce regional haze. In addition, reducing sulfur in diesel fuel can indirectly decrease emissions of other pollutants, including NO_x and toxics, as well as visible emissions from diesel engines, by enabling application of advanced catalyst technologies and reducing the poisoning effect on these catalyst technologies.

However, all of these air quality benefits will be achieved in a meaningful way only if sulfur is cut sharply.

To use the National Ambient Air Quality Standards (NAAQS) as an example: At the end of 1998, over 113 million people lived in areas where at least one of the health-based NAAQS (including the one-hour ozone standard and the CO, PM₁₀, sulfur dioxide and lead standards) was violated. Moreover, EPA projects that, in 2007, 28 areas will violate health-based ozone standards and another 80 areas will be precariously close to nonattainment, affecting about 129 million people. The agency also projects a significant number of violations of particulate matter standards in the latter part of the next decade, affecting tens of millions of people.

Clearly, we continue to face widespread and persistent air quality problems. Very low-sulfur gasoline and diesel fuel offer a tremendous opportunity to achieve vitally important emission reductions that will help us achieve and maintain our clean air goals.

Sulfur in Gasoline

The low-sulfur gasoline program supported by STAPPA and ALAPCO is based upon a national, year-round gasoline sulfur cap of no higher than 80 parts per million (ppm), with an average level in the range of 30 ppm, to take effect in 2004, and the inclusion of flexibilities to minimize the cost to and compliance burden on affected parties. Our associations believe that such a program will achieve important reductions in a variety of polluting emissions and further the objectives of pollution prevention. The result will be cleaner, clearer air in every area of the country. We are especially pleased that the low-sulfur gasoline program proposed by EPA earlier this year directly reflects almost every key recommendation made by STAPPA and ALAPCO over the past two years.

Sulfur in gasoline is a catalyst poison. Its impact undermines the performance of vehicle emission systems. As vehicle technology advances, this poisoning impact becomes more

profound. A sharp reduction in gasoline sulfur is absolutely necessary if we are to comply with the statutory requirements of the Clean Air Act. Moreover, as an emissions control strategy, it is technologically feasible, it is cost effective and it makes sense.

Emissions Impact

Last year, STAPPA and ALAPCO conducted an analysis to assess the emissions impact of reducing sulfur in gasoline. Our intent was to quantify the level of reductions to be achieved by a strong national gasoline sulfur program and to express these reductions in terms to which everyone can relate. The results, which are attached, were astounding.

The bottom line is that a national gasoline sulfur program with an average in the range of 30 ppm will achieve emission reductions that are equivalent to taking almost 54 million Tier 1 vehicles off the road today. Further, to illustrate some of the localized benefits of such a program, we calculated vehicle removal equivalencies for 29 areas across the country. The results of this analysis are attached.

As you review these figures, I remind you that as the composition of our vehicle fleet advances technologically, the impact of sulfur on emission control systems becomes more pronounced. Based on data from a study conducted by the Coordinating Research Council, we have illustrated the difference in emission reductions to occur from Low-Emission Vehicles (LEVs) if sulfur levels were reduced from current average levels of 330 ppm to about 30 ppm, as EPA has proposed, and to 150 ppm and 300 ppm, as the petroleum industry associations have advocated. As the bar chart attached to this statement shows, the difference in LEV emission reductions is dramatic.

Technological Feasibility

Clearly, meeting gasoline sulfur levels of 30 ppm and lower is technologically feasible. California's current Phase 2 reformulated gasoline program sets an annual average sulfur limit of 30 ppm – with no individual gallon exceeding 80 ppm – or a per-gallon flat limit of 40 ppm. This program, which is already three years old, has been a huge success in that state.

Countries around the world are also regulating or proposing to regulate sulfur in fuel to these low levels. The European Parliament has recently adopted fuel quality specifications that will lower the cap on sulfur in gasoline to 30 ppm beginning in 2005. Japan's gasoline has an average sulfur level of 27 ppm, with the average sulfur level of premium gasoline around 7 ppm. And New South Wales, Australia has proposed to reduce its gasoline sulfur levels to 40 ppm.

Cost and Cost Effectiveness of Reducing Sulfur in Gasoline

Achieving average sulfur levels of 30 ppm appears to be affordable. EPA has estimated that such a limit would come at a cost of an additional one to two cents per gallon of gasoline. In almost every opinion poll taken in recent years, the public has reiterated its willingness to pay what is necessary for environmental protection. The agency has cited at least one company –

CDTECH – that has announced its ability to achieve these low levels at a cost of one to two cents per gallon, and has noted that other designers of new sulfur removal technologies have made similar claims. Further, it is critical to recognize that five years, which is the amount of time that will elapse before this program is proposed to take effect, is a technological eternity in pollution control advancement. An examination of the history of EPA and industrial projections of anticipated costs (e.g., acid rain and fuel volatility) and the actual costs once rules were adopted and implemented reveals that in almost every instance actual costs were far less than the projected costs calculated by industry and EPA.

STAPPA and ALAPCO also believe a national program for achieving a 30-ppm sulfur limit is extremely cost effective. Taking into consideration just the NO_x+VOC reductions to be achieved from a uniform national low-sulfur gasoline program with a 30-ppm average and an 80-ppm cap, such as proposed by EPA, the cost-effectiveness would be less than \$2,500 per ton of pollution removed. This compares very favorably with many motor vehicle strategies we are implementing today, such as:

- Basic Motor Vehicle Inspection and Maintenance - \$5,850/ton
- Low-Enhanced Motor Vehicle Inspection and Maintenance - \$4,650/ton
- Phase I Federal Reformulated Gasoline - \$6,450/ton
- Phase II Federal Reformulated Gasoline - \$4,850/ton
- Phase 2 California Reformulated Gasoline - \$9,550/ton
- Clean-Fuel Fleets - \$61,000/ton
- National Low-Emission Vehicle Program without I/M - \$17,400/ton
- National Low-Emission Vehicle Program with LEV-only I/M - \$2,300/ton

[Cost effectiveness figures based on Appendix B of Chapter 5 of the final report of the Ozone Transport Assessment Group: “Mobile Sources Assessment: NO_x and VOC Reduction Technologies for Consideration by the Ozone Transport Assessment Group – April 11, 1996 and Amendment to Mobile Sources Assessment – May 12, 1997.”]

Moreover, when the full range of benefits of EPA’s proposed low-sulfur gasoline program is considered – including reductions in NO_x, nonmethane hydrocarbons, carbon monoxide, toxics, sulfur oxides and greenhouse gases, visibility improvement, protection of emission control devices, enablement of future technology and increased energy efficiency – the cost effectiveness of the program increases further, making it an even more attractive air pollution control option.

National Versus Regional Program

STAPPA and ALAPCO strongly support the establishment of national requirements for low-sulfur gasoline. A national program offers many advantages over a regional or local program.

First, and perhaps foremost, is the issue of irreversibility – the extent to which sulfur makes all or some catalysts less efficient. Many studies of this phenomenon have been undertaken. To date, not one has been able to dismiss this as an issue. Therefore, to forestall the very real and detrimental impact of irreversible catalyst poisoning in vehicles that travel out of their home area with low-sulfur gasoline, into an area with higher-sulfur gasoline and then back

home again, consistently low levels of gasoline sulfur are imperative. Without a uniform national standard, the integrity of the program will be sorely compromised.

The discussion of reversibility also begs the basic question of pollution prevention. If our nation is truly serious about pollution prevention, a national, not regional, program is necessary, aimed at preventing pollution at the source – in this case, removing sulfur from fuel – rather than allowing the pollution to occur and then requiring much more costly and less cost-effective measures to ameliorate it.

Second, a uniform national program provides substantial air quality benefits over a regional program. While much of the debate surrounding low-sulfur gasoline seems to have gravitated toward ozone, it is imperative that we not overlook the many other important air quality benefits of such a program, to be realized by both nonattainment and attainment areas, east *and* west. While this program will, indeed, decrease emissions of hydrocarbons and NO_x, which, in turn, will lead to reduced levels of ambient ozone, it will also provide an array of other important benefits – including decreased particulate and CO emissions and acid rain precursors, improved visibility and reduced toxic air pollution and greenhouse gases, thus benefiting every area of the country, whether or not it has an ozone problem.

A third important advantage of a national program is that it enables automobile manufacturers to meet strict motor vehicle control standards with the use of advanced technologies, such as direct-injection engines and fuel cells. It is widely acknowledged that gasoline sulfur has a detrimental impact on advanced engine technologies, including the gasoline direct-injection engine. These engines, which are currently being sold in Japan, and are expected to be offered in the U.S., offer substantial improvement in fuel economy and reductions in ozone precursors and greenhouse gas emissions. The fuel economy savings alone could likely offset the modest consumer costs of a national low-sulfur gasoline program. STAPPA and ALAPCO continue to urge EPA to establish Tier 2 motor vehicle standards based upon new and emerging technologies. It would be totally inappropriate for the introduction of these technologies to be precluded because of a shortsighted decision on gasoline sulfur.

Fourth, a national sulfur program will not only align the fuels program more closely with a national Tier 2 program, but could also reconcile differences in motor vehicle emissions performance that currently exist as a result of the discrepancy between certification fuel and in-use commercial fuel.

Finally, a national program could be the most effective and easiest to implement from an enforcement perspective. This uniformity could reduce compliance costs for industry and minimize new reporting requirements.

Sulfur in Diesel Fuel

As you are aware, EPA recently issued an Advance Notice of Proposed Rulemaking (ANPRM) announcing its consideration of improvements in diesel fuel quality and seeking

comments on the merits of such action. STAPPA and ALAPCO wholeheartedly agree that reducing sulfur in diesel fuel is of critical importance.

EPA currently caps sulfur in onroad diesel fuel at a very high 500 ppm; sulfur in nonroad diesel fuel (e.g., that used in construction and farm equipment) is not limited by federal regulation. Advanced technologies, such as lean-NO_x catalysts and adsorbers and particulate filters, will likely be needed on new diesel engines in order to meet future NO_x and particulate reduction requirements for heavy-duty vehicles and fuel-neutral emission standards for Tier 2 light-duty vehicles. Sulfur in onroad diesel fuel at the 500-ppm level currently allowed by EPA is an impediment to the introduction and effective operation of these advanced technologies, which, in addition to reducing emissions, also offer the opportunity to improve fuel economy.

The World-Wide Fuel Charter of vehicle and engine manufacturers currently recommends that advanced countries, including the U.S., limit sulfur in diesel fuel to 30 ppm and will soon recommend a further tightening of diesel sulfur levels. In Sweden, sulfur in Class I diesel fuel – which accounts for almost 100 percent of the market – is limited to 10 ppm. The European Union has adopted a 50-ppm cap on the sulfur content of both gasoline and onroad diesel fuel, to take effect in 2005, with incentives for early introduction and up to a two-year limited delay in compliance.

In our associations' resolution on sulfur in diesel fuel we recommend that:

- EPA adopt a national cap on sulfur in nonroad diesel fuel (including that used in locomotives and marine engines) of 500 ppm, to take effect as soon as possible prior to 2004, so that nonroad diesel fuel is subject to the same sulfur standards as currently apply to onroad diesel fuel;
- By 2004, EPA adopt a national cap on sulfur in both onroad and nonroad diesel fuel of no higher than 30 ppm;
- Based on additional study, EPA further lower national standards for sulfur in onroad and nonroad diesel fuel and set appropriate standards for other characteristics affecting diesel fuel quality and/or emissions, to take effect in 2007;
- In reducing sulfur in diesel fuel, EPA ensure that there will be no adverse impacts on emissions or drivability as a result of changes in other fuel parameters and no increase in the sulfur content of other petroleum fuels; and
- In setting sulfur caps, EPA consider regulatory flexibilities, such as early reduction credits and other economic incentives, to minimize the cost to and compliance burden on affected parties, without significantly affecting the overall benefits of the program in any particular area of the country.

STAPPA and ALAPCO have evaluated the air quality impacts of these recommendations and have concluded that by enabling the use of advanced technologies, such as lean-NO_x catalysts and adsorbers and particulate filters, such limits on sulfur in diesel fuel will yield enormous reductions in emissions. In fact, once EPA's forthcoming onroad heavy-duty diesel standards are fully effective, those standards, coupled with the cleaner diesel fuel, will achieve NO_x and PM emission reductions of about 80 percent. This is equivalent to taking four out of five heavy-duty diesels off the road.

Last week, our associations submitted comprehensive comments to EPA on the ANPRM (copy attached). In our comments, we urge EPA to move ahead with proposal and promulgation of a low-sulfur diesel fuel program consistent with our recommendations and in a timeframe that will allow a cap on diesel sulfur of no higher than 30 ppm to take effect in 2004, at the same time the national low-sulfur gasoline program is implemented. We believe such a program is essential for several key reasons:

- Substantial additional control of diesel vehicle emissions is necessary to protect public health and the environment;
- Reducing sulfur in diesel fuel will decrease emissions of SO₂, PM₁₀, PM_{2.5}, PM_{2.5} precursors and acid rain precursors from existing and future diesel vehicles and engines;
- Substantially reducing the sulfur content of diesel fuel can enable the use of currently available advance control technologies and newly emerging advanced technologies, thus facilitating reductions in ozone precursors and toxic air contaminants from new onroad and nonroad diesel vehicles and engines and potentially achieving further reductions in SO₂, PM₁₀, PM_{2.5}, PM_{2.5} precursors and acid rain precursors;
- Substantially reducing sulfur in diesel fuel will facilitate significant opportunities to clean up existing onroad and nonroad diesel vehicles and engines; and
- Clean diesel fuel is spreading to different parts of the world, demonstrating both the environmental benefits and technical feasibility.

Conclusion

In conclusion, STAPPA and ALAPCO strongly support the timely establishment of national programs effecting sharp reductions in levels of sulfur in gasoline and diesel fuel, consistent with our recommendations and timetables. We urge this because of the serious and continuing nature of the air pollution problems facing this country and because such programs are both technologically feasible and cost effective. While a number of sources contribute to air pollution, motor vehicles are the dominant cause. Accordingly, we also support stringent emission standards for passenger cars and light- and heavy-duty trucks, both gasoline fueled and

diesel fueled. Moreover, we can not overstate the fact that the issues of vehicle emission standards and fuel sulfur levels are inextricably linked.

We appreciate this Committee's interest in this most critical and timely issue and, again, thank you for this opportunity to present our views.