

Testimony of the South Coast Air Quality Management District on the ARB Proposed State Strategy for the California State Implementation Plan (SIP) for the Federal 8-Hour Ozone and PM2.5 Standards

"The Need for Ultra-Low Sulfur (10 ppm) Gasoline"

*Presented at ARB Board Hearing
June 22, 2007, Los Angeles, CA*

Good morning Chairman Sawyer and members of the Board. I am Paul Wuebben, Clean Fuels Officer for the South Coast Air Quality Management District. Thank you for this opportunity to address you this morning. I have been asked to focus my comments on the need for a 10 ppm sulfur cap on gasoline.

Under the section entitled "Ideas Requiring Further Exploration" in your draft statewide SIP¹, your staff noted that "ARB will continue to evaluate the opportunities on mobile source SIP control options."

Just last week, this Board adopted a 20 ppm sulfur cap limit for gasoline as part of the modifications to Phase 3 Gasoline regulations. I am here this morning to respectfully suggest that even as the ink is still drying on this regulation you should continue looking at the sulfur content of gasoline. It has relevance to the SIP action today, as well as the early action measures discussed yesterday relative to reducing greenhouse gases.

There are essentially 3 reservations raised by your staff at last weeks hearing which we would like to respond to more fully.

- 1) The lack of incremental benefits
- 2) The need for refiner flexibility
- 3) The supply and cost risk of a lower sulfur standard

¹ Page 47, Draft SIP, April 26, 2007, <http://arb.ca.gov/planning/sip/2007sip/apr07draft/sipback.pdf>

Let me take each of these in order.

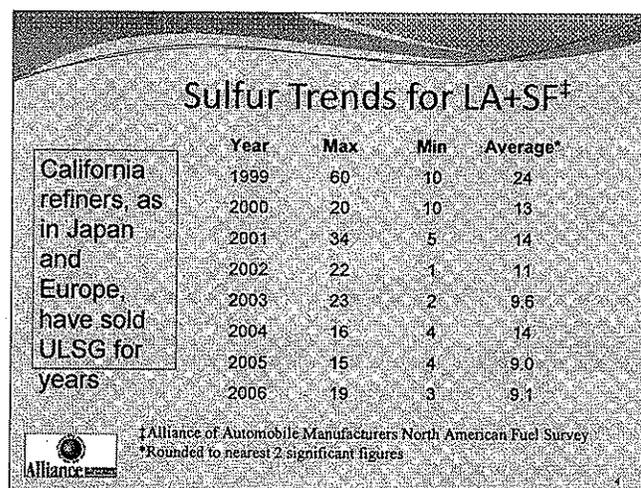
Your staff suggests that there are no emission reduction benefits whatsoever from changing the sulfur cap, yet they base this finding on their belief that the AVERAGE sulfur level in gasoline is EXPECTED to decline to 5 ppm. The operative words in this regard are average and expected. An average does not mean that every batch is below 10 ppm. And expecting an outcome is far different from having the certainty of a requirement.

We agree that the large majority of the gasoline pool will likely have very low sulfur content. But what about the full distribution of the entire gasoline pool? We want to make sure that every batch and every gallon is as clean as possible. This is especially necessary for areas challenged by environmental justice concerns. California did not ask that the AVERAGE lead content or AVERAGE MTBE content meet state requirements; they applied to every single gallon. Sulfur should be viewed similarly. All catalysts respond directly to fuel sulfur effects, even at low levels. Based on our experience in permitting over 60% of the state's refinery capacity in the state, we know that refiners have several options for lowering sulfur. That means they do not necessarily exercise the full combination of available options to minimize sulfur levels of EVERY batch to below 10 ppm. Under the ARB's current 20 ppm limit, some batches may indeed exceed 10 ppm. Your staff can't have it both ways: it is logically inconsistent to claim that no additional sulfur reduction is possible and at the same time assert that if a tighter sulfur cap is established that it limits refiner flexibility. Clearly, the current sulfur cap is leaving some marginal sulfur control on the table. We acknowledge that it is relatively small. But it is there. We know that sulfur content in gasoline contributes to PM2.5 as SOx emissions are readily

converted to PM2.5. In some portions of the basin, such as downtown Los Angeles, secondary sulfate has been found to contribute 23% of the total PM2.5 concentration. There are direct NOx emission benefits of up to 5 tons per day from ensuring that every batch is below 10 ppm. And such gasoline is also an essential enabler of high efficiency / low GHG emission technology such as low NOx absorbers. Given the severe health effects associated with sulfur and PM2.5 exposure, we would hope that ARB would pursue every last opportunity to control sulfur emissions, especially when it is so cheap on an incremental basis.

Our position is simple and straight forward: there are indeed benefits that result from a small sacrifice in flexibility under the Predictive Model. We believe that tradeoff is well justified for several reasons. Simply stated, in this case ARB needs to use its best pitch – we need your 98 mph fast ball!

Regarding the need to retain flexibility, the Auto Alliance survey on fuel quality underscores the consistent and comprehensive capabilities of refiners to meet a more stringent standard, as shown in the following slide:



Since 2003, every tested batch was found to be below the sulfur standard just adopted last week. Your action in reality did not strengthen sulfur

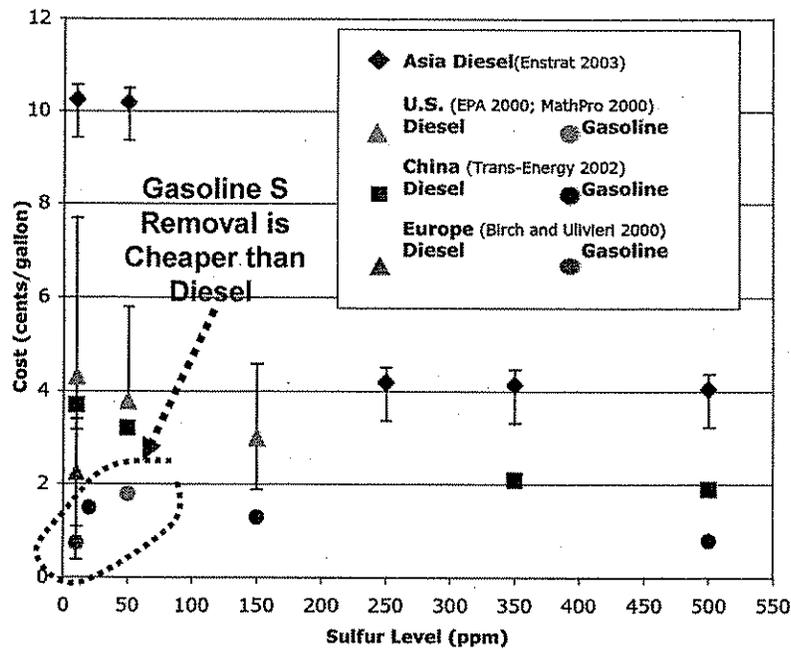
controls, it simply caught up with pre-existing market trends. We need ARB to assert its leadership rather than simply watch events unfold.

The CEC draft analysis on gasoline supply and cost issues, available just days before your hearing last week, does not support a serious reservation about the effect of additional sulfur control on gasoline producibility and supplies. To the contrary, it indicates that the flexibility provided refiners by the Predictive Model allows a wide range of refinery modification options. And this Board provided added flexibility at the last minute to extend the timing on the full compliance with your requirements. The AERP mechanism you approved last week is an important element of this flexibility which should not be underestimated. As we noted in our formal comment letter, we would much prefer that every gallon fully offset the permeation emission obligation as envisioned under SB 989 (Sher). In the interest of flexibility we agree that this mechanism is ultimately constructive. Taking sulfur OUT of gasoline, however, is not an issue of flexibility as much as it is an issue of cost. Several refiners already have excess sulfur reduction plant capacity already in place, ranging from 10% to nearly 40%. On an aggregate basis for all refiners in our air basin, our permit records indicate that there is nearly 3,000 long tons per day of Sulfur Reduction Plant (SRP) capacity. Such capacity, along with the refinery modifications expected following the adoption of the Predictive Model update, are expected to provide more than ample capacity to meet a lower sulfur limit of 10 ppm.

Supply and cost issues seem to be the most pervasive concerns underlying the staff's reluctance to embrace our proposal. It is true that California's dependency on imported finished or near-finished gasoline is growing. That is occurring due to a host of supply and demand reasons completely

unrelated to the level of sulfur control. Internationally, an ultra-low 10 ppm sulfur limit on gasoline is becoming more the norm than the exception. California should embrace this trend to leverage its full air quality benefits. Compared to the global and regional factors affecting CA gasoline supplies and prices, the price impact of a more stringent sulfur limit is virtually undetectable. Even if there is a small price premium for the non-routine shipments of ultra-low sulfur gasoline, it is likely that any price margin would be dwarfed in comparison to weekly spot market price volatility. In this instance, you have nothing to fear but fear itself.

The low and affordable cost of meeting ultra-low sulfur gasoline standards has been convincingly documented by MacArthur Fellow and renowned air pollution expert Michael Walsh and his colleagues at the International Council for Clean Transportation. As you know, this esteemed organization is now headed by your former Chairman, Dr. Alan Lloyd. Mr. Walsh's report on low sulfur fuels indicates that achieving the last full measure of sulfur control can be achieved at a fraction of the cost of desulfurizing diesel fuel, for example. This is shown dramatically in the following slide, which shows how less expensive gasoline sulfur control is compared to diesel fuel desulphurization in the U.S. as well as in Europe and in Asia.



This data is relevant to California for two reasons. First, we have the most sophisticated refineries in the nation, and probably in the world, and thus we have more options for minimizing the cost of added sulfur reduction. Second, California has already set a tight limit on diesel fuel of 15 ppm sulfur, with absolutely no impact on available diesel supplies. Why should gasoline sulfur levels be allowed to be higher than diesel? The answer is that they shouldn't be.

At the end of the day, your staff's commitment to the 20 ppm standard relies on the ASSUMPTION that 10 ppm will be achieved all the time. To be fair, ARB should acknowledge that this is fundamentally a conjecture. The Predictive Model is complex. Refiners will of course seek the least costly path to compliance. Unless required, they will not seek to minimize sulfur content of their own volition. While perfectly rational and understandable, there are other values which need to put in play. The evidence you heard yesterday on the effects of ozone on children's asthma should reinforce in

the strongest way the importance of taking EVERY opportunity to control emissions in a cost effective manner. This is such an opportunity.

Leaving the last portion of sulfur reduction to the discretion of the refiner - and therefore to the marketplace - is essentially telling children that they can wait a little longer. While last week's package was an important step forward, there is still room for improvement. In light of all of these factors, we urge the Board, as a matter of policy, to amend your action of last week, as a part of the 15 day change period allowed under state law, to revise the sulfur cap limit to 10 ppm.

Your job, in other words, is only 90% complete. You've gotten a B+ but we need an A+. We need your best fastball.²

Thank you very much for this opportunity.

² There was one other objection to lowering sulfur noted by your staff in the ARB's Draft Statewide Air Quality Management Plan (April 26, 2007). While it involves a more complex set of interdependent issues, it is still very relevant to question of sulfur reduction. Your staff assert that *"the only practical path to offset the HC increase [associated with permeation from the use of 5.7% ethanol in Phase 3 gasoline] is to use more ethanol, going from 5.7% to 10%."* Essentially, to mitigate the NOx increase resulting from such 10% ethanol blends, the Predictive Model requires that sulfur levels be further reduced. Clearly, the cascade of fuel property dependencies is EXACERBATED by the presence of low level ethanol as a blending stock. The staff never seriously considered a zero ethanol blend which would have fully mitigated the permeation emissions and thereby provided an additional NOx increment of benefit from reducing sulfur. In other words, the impact of reducing sulfur would have credited as an additional benefit rather than an offset benefit. The producibility of zero percent ethanol blends has recently been found by the CEC to be feasible although at somewhat higher cost due to the need for increased alkylation capacity at refineries. By locking the state into E10, the ARB is then left with the need to use sulfur to offset the NOx increase, rather than achieve ADDITIONAL NOx benefits from sulfur reduction in 0% ethanol gasoline. We appreciate that turning back the clock on ethanol blends is highly unlikely; at the same time, it is important to keep the accounting straight. Any way you look at gasoline, you are leaving NOx and sulfur reduction benefits "on the table".