

WSPA Comments on the Mexican Dataset Proposed for Inclusion in the 2006 CARB Predictive Model Update

Most of the concerns [outlined below](#) are based on the publication¹ “A Predictive Model to Correlate Fuel Specifications with On-Road Vehicles Emissions in Mexico”, by I. Schifter, L. Diaz and E. Lopez-Salinas of the Instituto Mexicano del Petroleo.

- The test fuels in this program were formulated from currently available blending stocks from Mexican refinery streams that are different from US streams. One major difference was the high sulfur levels of the test fuels; 12 of the 15 fuels had sulfur levels at 380 ppm and higher. The reference fuels (“individual average fuel”) had very high 724 p.p.m. sulfur levels. This fuel set represented the currently available fuels in Mexico. As quoted from the paper: “Two types of regular unleaded grade gasoline and one premium grade are available throughout Mexico, all manufactured by the state-owned oil company. In ozone nonattainment areas (i.e. MAMC, Guadalajara, and Monterrey), from 1998 regular oxygenated gasoline (1.2 wt % oxygen as methyl-tert-butyl ether, MTBE) of about 350 S is available, while in the rest of the country regular gasoline averages 750 ppm S and with an oxygen content of about 0.4 wt % MTBE”
- The 32 test vehicles in this program were recruited from the MAMC (Metropolitan area of Mexico City). The model years were from 1989 to 2002. There were 4 vehicles (1989 and 1990 models) that were not equipped with catalysts. These vehicles are definitely different from US passenger cars that have all been equipped with catalysts since 1975. The emission standards of the 1993 -1998 vehicles are equivalent to the US Tier 0 and the 1999 to 2002 vehicles were equivalent to US Tier 1. However, the paper also states the Mexican fleet was not equipped with on-board diagnostic systems and no emission durability certificates were issued.
- An inspection of the data themselves reveals the following:
 - Emissions from individual vehicles with fuel 1 show that many were quite clean, even with fuel containing 411 ppm sulfur, which is encouraging.
 - Comparing fleet emissions on fuels 11 and 12 gave the following results for a sulfur reduction from 817 ppm to 209 ppm (all other fuel properties being reasonably constant): NMHC = -11.0%; CO = - 8.7%; NOx = -18.2%. This, too, is encouraging, but several individual vehicles had non-intuitive responses to the sulfur change - emissions increased at lower sulfur. We suspect this signals that these vehicles changed during the course of the program, not unexpected in such a large study but troublesome if not identified and dealt with.
 - Fleet emissions on fuels 1 and 2 (non-oxy to 1.0 wt% oxygen) also seemed to follow expectations, at least directionally: NMHC = -1.1%; CO = -4.9%; NOx = +3.1%. These results suggest the Mexican fleet may have behaved properly, at least in the few cases shown above. .

¹ Environmental Science & Technology, Volume 40, No. 4, 2006, page 1270 -1279

- Given the high sulfur levels of fuels in Mexico, we are concerned that the after-treatment systems of the test vehicles might not respond in the same way as California vehicles. For the Tier 0 and Tier 1 vehicles in this program, even at relatively low mileage, about half of the vehicles had average emissions exceeding the emission standards. This could have been caused by running the vehicles on high sulfur fuel, but we don't really know why the emissions exceeded the standards. Possibilities include poor maintenance, non-functioning emission control systems or the high altitude in Mexico City, which is not representative of most areas of California.
- We have no information on the quality assurance and quality control of the laboratory that conducted this program.
- We will also need to know the appropriate emissions category (or tech group) for the Mexican vehicles.

Because of the above concerns, we feel that more information about the Mexican study is required before we consider including it in the ARB database. It is crucial that ARB engage the auto industry relative to how well their Mexican products would represent the emissions performance of vehicles they sell in California, before this dataset is accepted for any purpose.