

Phase 2 Reformulated Gasoline  
Performance Subcommittee

Final  
Meeting Summary  
September 19, 1995

California Air Resources Board

I. Introduction

The performance subcommittee discussed the following key issues regarding the Phase 2 Reformulated Gasoline performance and compatibility testing program:

- ARB On-Road Vehicle Test Program
- Auto Manufacturer Test Programs
- In-Use Fuel Economy Analysis
- Baseline Repair Rates for Fuel Pumps
- Off-Road Vehicle and Equipment Test Program
- ARB Fuel Sample Analysis Results

The minutes from the previous meeting, held on July 18, 1995, were approved. However minor changes were made to clarify that the Texaco test program results were preliminary. Copies of presentations or materials given at this meeting are enclosed with this summary.

II. ARB On-Road Vehicle Test Program

The test program ended on September 1, 1995. The remaining test fuel will be supplied to what was previously the GTE control fleet to further investigate potential fuel pump incidents. For the incidents reported during the test program, the Technical Review Panel (TRP) has coded each incident in accordance with a mutually agreed upon coding scheme. The coding scheme signifies whether or not the incident was fuel related. The report also notes if action was taken to make a repair, and if the event was unusual for the age, mileage and history of the vehicle.

A separate task group comprised of representatives from the domestic auto manufacturers was created to review seeps. Loren Beard of Chrysler Corporation is the head of the Seep Task Group.

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### III. Auto Manufacturer Test Programs

Nissan Motor Company (Nissan) conducted a CaRFG test to study the effect of CaRFG on intake valves and engine deposits. In this test program two vehicles were road tested over 30,000 miles. One vehicle was operated with conventional gasoline and the other was fueled with CaRFG. In addition to the road test, Nissan also performed a 100 hour bench test on a 1.6 liter engine. Preliminary analysis indicates that there were apparently less intake valve deposits and no change in combustion chamber deposits. There were no material compatibility issues raised during the test program. [Nissan presented photographs of the valves and the combustion chambers of the vehicles tested. Color copies of these pictures were provided to subcommittee members. Additional copies can be obtained by contacting Brasil, Performance Subcommittee Secretary at (916) 323-8967.

The GM bench test program is nearly complete. Polymer testing is 95% complete and elastomer testing is about 25% complete. Results so far indicate there are no expected problems with CaRFG in the field.

Ford lubricity testing also shows no apparent CaRFG effect on lubricity. The Ford testing compares CaRFG to other pre-existing fuels. Complete results will be available soon.

### IV. In-Use Fuel Economy Analysis

For fleet fuel economy we will compare historical data (1994) with test data (1995) for the months of March through August for each vehicle. Only fleets that had individual fueling data, they were the City of Sacramento, County of Sacramento, Bank of America, and CSU, Fresno. Monthly aggregate data will not be used due to an insufficient number of data points and limited data quality for obtaining valid results. For the City of Sacramento the fuel economy for test fuel is 2.3 percent lower than conventional fuel.

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### V. Baseline Repair Rates for Fuel Pumps

Baseline repair data represents over 20,000 records for approximately 7 vehicles for 1993 and 1994. The repair data includes information from Caltrans, City of Sacramento, County of Sacramento, Pacific Bell (North and South), and CSU, Fresno. The overall fuel pump repair rate is 7.2 percent and 6.8 percent for 1993 and 1994, respectively. The attached presentation also calculates the fuel pump repair rate by vehicle class, mileage accumulation, and model year groups.

### VI. Off-Road Vehicle and Equipment Test Program

The ARB portion of the off-road test program is complete and preliminary results show that no fuel related incidents were found in the industrial equipment, snowmobiles, motorcycles and personal watercraft. There were several seeps observed on the personal watercraft but are considered normal. For boats tested the only incidents reported were broken piston rings on both test and control boats; the parts were analyzed by the manufacturer Mercury Marine, and were found to be unrelated to fuel effects. A Mercury Marine representative stated that there are no foreseeable problems with CARFG for 1975 to present boat engines.

The Portable Power Equipment Manufacturers Association has several test programs at various stages throughout the world, most are still in progress. Some of the portable equipment provided to CSU, Fresno for the in-use testing have been returned to the manufacturer for tear down and further analysis.

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#### VII. ARB Fuel Sample Results

Fuel sample analysis is nearly complete. In all, 404 samples have been received by the ARB lab, and all of the fuel samples analyzed to date meet ASTM specifications for oxidation stability. The overall results for the fuel analyzed to date are attached.

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Attachments

[CBG Program Advisory and Subcommittee Activities](#)