

In addition, Rolls-Royce had to modify its passenger cars to accommodate a number of safety standards and environmental regulations which resulted in an increase in vehicle weight. A front passenger air bag was introduced to comply with the requirements of FMVSS No. 208 for passive restraints. The air conditioning system was substantially revised to enable the use of HC 134a refrigerant in place of the previously used CFC 12.

Rolls-Royce, being a small manufacturer of prestigious automobiles, cannot afford to change the design of its cars by downsizing since its customers desire traditional size cars.

#### *Engine Improvements*

The current petition from Rolls-Royce restates past efforts to improve fuel economy in addressing engine improvements. Past developmental activities include test and evaluation of various technologies applied to the Rolls-Royce engine. These included the Texaco Controlled Combustion system, the Honda Compound Vortex Controlled Combustion system, diesel engines, cylinder disablement, increased engine displacement (to reduce NO emissions and permit timing for improved fuel economy), the May "Fireball" combustion chamber, and overall downsizing of the engine and car incorporating all new features including bodysell, engine, transmission, and suspension. Each of these approaches was discarded in turn as failing to provide a feasible option for simultaneously meeting fuel economy and emission requirements, and exacting customer expectations.

For MY 1994, Rolls-Royce introduced a package of engine and emission system improvements. The principal feature was a revised induction system incorporating a multi-point sequentially pulsed fuel injection system, and an advanced ignition system with an individual coil for each cylinder. Both systems are controlled by a central engine management microprocessor. The fuel injection system improves control and precision of fuel metering for improved emission control and fuel economy during warm-up. The ignition system improvements anticipate regulatory requirements for emission control diagnostics.

#### *Transmission and Drive Train Improvements*

Rolls-Royce uses the General Motors 4L80-E four-speed automatic transmission with torque converter lockup clutch on all models beginning in MY 1992. Use of the fourth gear as

an overdrive ratio has shown the capability of improving fuel economy by approximately 14 percent under highway driving conditions. The rear axle ratio was reduced on the Bentley Turbo R and Bentley Continental R, thereby improving the top gear engine-to-vehicle speed ratio from 28.5 rpm/mph to 24.9 rpm/mph. This improved the highway fuel economy of this model by about 5 percent.

#### *Effect of Other Motor Vehicle Standards*

The Rolls-Royce petition cites exhaust emission standards as having the greatest effect on fuel economy, and for this reason the company considers the fuel economy program to be an integral part of its emission control program. It states that, historically, emission standards have placed a severe strain on its limited technical resources; and only with the introduction of new emission control techniques such as oxidation and three way catalysts has the trend to higher fuel consumption been reversed.

As a small volume manufacturer, Rolls-Royce was not subject to the recently agreed upon stringent California emission standards until the 1995 model year. The more stringent Federal Clean Air Act Amendment standards will not apply until the 1996 model year.

Of the Federal regulations having an adverse effect on fuel economy, Rolls-Royce considers the most significant ones to be 49 CFR Part 581 (energy absorbing bumpers), FMVSS 214 (side intrusion beam in doors), and FMVSS 208 (passive restraints). The passive restraint systems (air bags) forced some models to move into the 6,000 lbs and 6,500 lbs inertia weight classes. The effect of these regulations increased vehicle weight despite efforts to reduce weight. Rolls-Royce is a small company and engineering resources are limited and priority must be given to meeting mandatory standards in order to remain in the marketplace. Conflict often exists between the priority of meeting standards and the need to remain competitive.

#### *The Need of the Nation To Conserve Energy*

The agency recognizes there is a need to conserve energy, to promote energy security, and to improve balance of payments. However, as stated above, NHTSA has tentatively determined that it is not technologically feasible or economically practicable for Rolls-Royce to achieve an average fuel economy in MY 1997 above 15.1 mpg. Granting an exemption to Rolls-Royce and setting an alternative standard at that level would result in only a

negligible increase in fuel consumption and would not affect the need of the Nation to conserve energy. In fact, there would not be any increase since Rolls-Royce cannot attain those generally applicable standards. Nevertheless, for illustrative purposes the agency estimates that the additional fuel consumed by operating the MY 1997 fleet of Rolls-Royce vehicles at the company's projected CAFE of 15.1 mpg (compared to an hypothetical 27.5 mpg fleet) over 106,952 miles is 36,378 bbls. of fuel. This averages about 8.30 bbls. of fuel per day over the 12-year period that these cars will be an active part of the fleet. Obviously, this is insignificant compared to the daily fuel used by the entire motor vehicle fleet which amounts to some 4.90 million bbls. per day for passenger cars in the U.S. in 1993.

#### *Maximum Feasible Average Fuel Economy for Rolls-Royce*

This agency has tentatively concluded that it would not be technologically feasible and economically practicable for Rolls-Royce to improve the fuel economy of its MY 1997 automobiles above an average of 15.1 mpg, that compliance with other Federal automobile standards would not adversely affect achievable fuel economy beyond the amount already factored into Rolls-Royce's projections, and that the national effort to conserve energy would not be affected by granting the requested exemption and establishing an alternative standard. Consequently, the agency tentatively concludes that the maximum feasible average fuel economy for Rolls-Royce in MY 1997 is 15.1 mpg.

#### **Proposed Level and Type of Alternative Standard**

The agency proposes to exempt Rolls-Royce from the generally applicable standard of 27.5 mpg and to establish an alternative standard for Rolls-Royce for MY 1997 at its maximum feasible average fuel economy of 15.1 mpg. NHTSA tentatively concludes that it would be appropriate to establish a separate standard for Rolls-Royce for the following reasons. The agency has already received a petition and published a proposal (60 FR 31937, June 19, 1995) for an alternate standard for MedNet, Inc. for MY's 1996, 1997, and 1998 seeking an alternate standard for that company of 17.0 mpg. Therefore, the agency cannot use the second (class standards) or third (single standard for all exempted manufacturers) approaches for MY 1997.