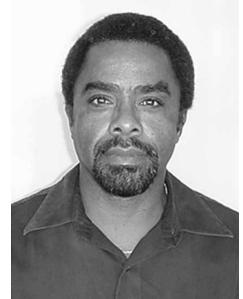


## Toward In-use Testing

**Gregory A. Green**

Director,  
Certification and Compliance Div.,  
U.S. Environmental Protection Agency



As with private firms, the Environmental Protection Agency is continually searching for new ways to maximize our product while using a minimal amount of resources. Since our ultimate responsibility is the protection of the nation's environmental assets, we realize that any task we take on must have environmental benefit.

In that regard, over the last couple of years we have shifted our focus from the certification of prototype engines to actually testing the engines during their actual use, both light-duty and heavy-duty vehicles. We realized it didn't make sense to put a lot of effort into verifying that a particular engine family was engineered to meet air quality standards when it was highly possible the same engines may be violating standards while on the road.

Unfortunately this new approach poses a number of problems. Perhaps the most significant of these is the lack of a reliable commercial tool that we could use to actually measure the emissions of vehicles while in-use. Most of the testing that had been done on post-production vehicles in the past was performed in a laboratory on dynamometers driving well-defined patterns that for the most part didn't reflect actual driving conditions. Also compliance with our current regulations is only dependent upon complying with our standards while driving this laboratory pattern so when exceedances of the standard may occur during in-use testing, our response to those exceedances would be limited.

We took steps to solve the problem of measuring emissions from the vehicle by inventing a prototype unit we call the Real-time On-road Vehicle Emissions Reporter (ROVER). ROVER allows us to measure NOx, CO, and various other pollutants from a vehicle while in-use. Notably this device does not measure PM at this time. While ROVER can be somewhat time-consuming to work with, the advantage it has is that it attaches directly to a vehicle's emission's system and allows us to take real-time readings of the pollutants from this vehicle during everyday use. It can be used on both on- and off-road vehicles, both gasoline and diesel powered.

We followed the invention of ROVER with the development of a second-generation device called the Portable Emissions Measurement Strategy (PEMS) unit. This unit added a remote capability to measuring emissions from a vehicle that allows us to attach it to a vehicle anywhere in the United States and obtain real-time measurements from the vehicle regardless of it's location. This tremendous improvement will allow us to better understand how vehicles are operating under a variety of different geographical and meteorological conditions. We can observe how the emissions of heavy-duty engine differ when driving through the deserts of California as compared to the mountains of Colorado. Does this same engine exceed standards when operating under sub-zero conditions in North Dakota during the middle of winter? How do on-road engines compare with non-road engines?

---

These devices will provide a wealth of information. In addition to the obvious regulatory purposes such as determining compliance with emissions standards, the Agency can use the emissions data to develop new models that help us better understand the actual pollution contributions of motor vehicles. These models are invaluable in determining whether a region's implementation plans for meeting air quality standards are realistic, not only to the EPA but also to state and local air quality agencies. Industry will use these units to collect data that allows them to build cleaner, more durable engines. We can even envision environmental and watchdog organizations using portable emissions units to insure vehicle compliance with environmental regulations.

The final step to complete our focus on in-use testing will be realized in early 2002 when commercial mobile testing units become available. Over the next several years, we intend to collect hundreds of thousands of data points that will tremendously increase our understanding of vehicle emissions and their contribution to air quality in our country. The ultimate result will be an improvement in air quality for our country and significant health benefits for our citizens.