

# Overview

## 9th Diesel Engine Emissions Reduction Conference

This was the ninth in a series of workshops that have evolved to conference status addressing Diesel Engine Emissions Reduction (DEER) technology. The initial three workshops were held biannually at the University of California, San Diego. Thereafter, as we alternated yearly between the sites Castine, Maine and Portsmouth, Virginia on the East Coast and San Diego on the West Coast, the workshops grew to conference status. This year we held the 9th DEER Conference, August 24 – 28, 2003, at the Newport Marriott in Newport, Rhode Island, in the Northeast States for Coordinated Air Use Management (NESCAUM) area.

We had two objectives for DEER 2003:

1. To provide a forum to present transportation diesel engine developments and issues for the federal and state organizations involved with diesel engines as users, regulators, or supporters of research and development with the diesel engine manufacturers, their suppliers, the national laboratories, academia, human health effects, and the environmentally concerned public sector.
2. To make available European and U.S. personal-use diesel engine powered vehicles at our "Ride and Drive" for attendees and the press to see for themselves how far diesel engine technology had advanced. European diesel auto sales are rapidly approaching 50% of sales; and in France, 73% of luxury class vehicle buyers chose the diesel option. Banks Engineering and Cummins exhibited the "Sidewinder", a modified pick-up truck with a production in-line 6 cylinder Cummins B engine upgraded from 300 HP to more than 600 HP. This truck was officially clocked at the Bonneville test track at 222.139 mph. As a comparison, the \$800,000 Ferrari Enzo, which is built to Formula 1 racing standards, has a projected top speed of 218 mph with its 12 cylinder gasoline engine. One can only imagine what the Ferrari Enzo could do fitted with a current technology diesel engine!

Some of the highlights at DEER 2003 included the presentations by high-level managers at BMW and

Mercedes Benz on their diesel engine development. Aaqius & Aaqius presented data and an exhibit of the latest PSA Peugeot fuel bound catalyst diesel particulate trap system. Cummins presented data regarding their compliance with EPA's Tier 2, Bin 5 standards on their V-6, which was developed with DOE support. This was the first report of meeting these standards. Their next step is achieving durability. Caterpillar reported single cylinder engine steady-state tests of their HCCI injector that had engine out NO<sub>x</sub> levels under Tier 2, Bin 5. Two new approaches to particulate traps were reported by Accentus using non-thermal plasma and the University of Manchester's electrostatic precipitators. A Health Effects Session focused on U.S. and European testing of emissions from diesel and CNG buses. This session highlighted the need to use oxidation catalysts to reduce formaldehyde from CNG bus exhaust as CARB and Swedish testing indicated. A worthwhile dialogue was held with the Environmentalists Panel, which was organized and moderated by NESCAUM.

The area that will produce the largest improvements in diesel engine efficiency will be the effective use of the roughly 60% of the energy in fuel that ends up as heat loss. Progress on the waste heat recovery using electric turbocompounding and thermoelectrics was reported. Quantum well confinement thermoelectrics investigators are reporting small specimens with a 400% increase in efficiency compared with current art bulk semiconductor thermoelectrics devices! Investigators of the electric turbocompounding concept for both light-truck and heavy-truck applications are sorting out the problems with a commercial motor/alternators installed on the turbocharger shaft for both light- and heavy-duty trucks.

These are but a few of the advances reported at DEER 2003. We were very fortunate to have such an outstanding group of presentations. We are planning to have DEER 2004 in San Diego—Coronado, actually—in August 2004.

Hope to see you there!

John Fairbanks  
Chair, DEER 2003