Natural Gas School Bus Emissions Exceed Low-Emitting Diesel Buses, Says Southwest Research Institute Report Presented At Society of Automotive Engineers Conference

Detroit, MI (November 18, 2002) — Exhaust emissions from natural gas school buses contain higher levels of air pollutants and toxic air contaminants than those in school buses powered by advanced-technology, low-emitting diesel engines.

That is the chief finding by an independent research laboratory under contract to International Truck and Engine Corporation, presented today to the Society of Automotive Engineers conference. The research compares emissions from a popular model natural gas bus with emissions from diesel school buses.

"We now have a reliable basis for comparing the current relative toxicity of natural gas and diesel engine exhaust," said Dr. Charles A. Lapin, a toxicologist and co-author of a forthcoming SAE paper on the research. "The study shows that low-emitting diesel technology clearly has clean-air advantages over natural gas when it comes to school buses."

International Truck and Engine Corporation, which has begun selling a low-emitting diesel engine certified to U.S. Environmental Protection Agency (EPA) and California Air Resources Board (ARB) 2007 particulate and hydrocarbon emission standards, sponsored the research along with ConocoPhillips, a producer of the ultra-low-sulfur fuel that enables the use of the new diesel technology.

The study raises questions about the basis for diesel exhaust regulation in California, the nation's leading state air pollution regulator, said Lapin.

Of the 41 toxic air contaminants (TACs) listed as present in diesel exhaust by the California ARB, tests did not find 21 of them in the exhaust of any of three tested power system configurations - conventional diesel, low-emitting diesel or natural gas.

"Special sampling provisions were used specifically to detect low levels of these contaminants," Lapin said. "The fact that the contaminants were missing casts doubt on previous statements about diesel toxicity."

The natural gas bus exhaust had higher levels of six of California's listed TACs than the exhaust from the low-emitting diesel bus.

In the three tested bus configurations, the natural gas bus had the highest emissions of nitrogen oxides (NOx), nitrogen oxide (NO), total hydrocarbons, non-methane hydrocarbons, methane and carbon monoxide (CO), according to Lapin.

The low-emitting diesel bus was found to be higher than both natural gas and conventional diesel in two other emissions — nitrogen dioxide and carbon dioxide — but the low-emitting diesel had the lowest emissions of the four engine exhaust "criteria pollutants" regulated by EPA and the ARB: NOx, CO, particulate matter, and hydrocarbons.

The natural gas bus had lower emissions of carbon dioxide than the two diesel bus configurations, and lower emissions of nitrogen dioxide than the low-emitting diesel bus.

"The findings provide a serious challenge to assertions that natural gas buses are inherently cleaner than diesel," said Dr. William Bunn, chief medical officer and vice president of International.

"Low-emitting diesel technology has the lowest emissions of most criteria pollutants and toxic air contaminants — both in California and nationally, under EPA's listing. Diesel is clearly part of the clean-air future in transportation, and we are glad to have this research available to decision makers and customers who rely on diesel power for performance as well as environmental compliance," Dr. Bunn said.

Ahead of other manufacturers in the heavy-duty, low-emitting diesel market, International has supplied more than 100 Green Diesel Technology® school buses to California schools in the last year.

Using ultra-low-sulfur fuel, International's low-emitting diesel bus engine, with a low-NOx engine calibration and a catalyzed particulate filter, was certified by the U. S. Environmental Protection Agency as well as the California ARB as reducing particulates and hydrocarbons to the 2007 levels. In California, this engine and reduced sulfur fuel enabled Green Diesel Technology® school buses to qualify for state funds made available for the purchase of "lower emission" school buses.

The research is the first to provide comparable detail in testing the emissions profile of low-emitting diesel school bus technology alongside those of conventional diesel engines and natural gas engines used in school buses.
The same diesel bus, an American Transportation Corporation rear-engine school bus powered by a 2001 model year International® DT530 engine, was tested in both the conventional and the Green Diesel Technology® configurations. The use of the same bus minimized the effects of vehicle-to-vehicle variation.

The low-emitting Green Diesel Technology® bus used a catalyzed particulate filter and a low-NOx engine calibration, and was fueled with less than 15 parts per million sulfur content diesel fuel provided by ConocoPhillips.

An 8.1-Liter John Deere natural gas engine powered the second bus, a 2000 model year Blue Bird All-American, typical of natural gas school buses sold prior to 2002 and now in service. More recent-model natural gas buses may be purchased with an oxidation catalyst; testing of natural gas transit buses with oxidation catalysts is being conducted by the California ARB.

Both the diesel and the natural gas buses were in the same size category with approximately the same engine power rating, and were well within their warranted service lives.

The research team ran three consecutive runs of a chassis dynamometer driving cycle representing school bus operation. Each test run covered about 21 miles and took about 85 minutes. An "emission value" was calculated using the average of the three test runs.

International Truck and Engine Corporation is the operating company of Navistar International Corporation (NYSE: NAV). International Truck and Engine is a leading producer of mid-range diesel engines, medium trucks, heavy trucks, severe service vehicles, bus chassis and a provider of parts and service sold under the International® brand. The company also is a private label designer and manufacturer of diesel engines for the pickup truck, van and SUV markets. Additionally, through a joint venture with Ford Motor Company, the company will build medium commercial trucks and currently sells truck and diesel engine service parts. A subsidiary, IC Corporation, produces integrated school buses. International Truck and Engine has the broadest distribution network in the industry. Financing for customers and dealers is provided through a wholly owned subsidiary of Navistar. Additional information can be found on the company’s web site at http://www.internationaldelivers.com/