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## **Clean Diesel Platinum Plus(R) Combined with Specially Catalyzed After-treatment Devices Slashes Cost of Diesel Emission Control**

### **Teams with Coca-Cola Enterprises for Engine and Field Trials**

STAMFORD, CT (March 28, 2003) . . . Clean Diesel Technologies, Inc. (CDT) (EBB:CDTI & AIM:CDT/CDTS) announced today that new tests demonstrate that combining Platinum Plus(R), the Company's patented and EPA-registered fuel borne catalyst (FBC), with specially catalyzed aftertreatment devices produces dramatic reductions in diesel emissions on a 1990, 7.6 liter International DT 466 engine, the type commonly used in school buses and local delivery trucks. The testing was conducted at Southwest Research Institute of San Antonio, TX on an engine supplied by the San Antonio division of Coca-Cola Enterprises, Inc. (CCE), which uses the engine in a large portion of its fleet and took part in the testing.

Commenting on the program, Dave Leasure, Corporate Director Fleet Procurement for CCE stated, "The combination of the Platinum Plus FBC and emission control devices is one of several low emission diesel technologies being evaluated by CCE. We especially like its ability to reduce cost and emissions at the same time. As a charter member of the EPA's recently announced SmartWay Program we are looking for proven technologies that reduce emissions and improve fuel economy. That's good for the environment and for the Company." SmartWay Transport is a new national initiative in which partners from leading multi-national corporations agree to work with the EPA to develop performance measures or goals to improve air quality, reduce greenhouse gas emissions, save fuel and protect public health.

Commercial field demonstration programs are underway on refuse trucks in California and beverage delivery trucks operated by Coca-Cola Enterprises in Texas to help generate 1,000-hour field durability data required by the California Air Resources Board and EPA for retrofit verification of emissions reduction.

"The results of these tests should be attractive to corporate fleets, municipalities and marketers of low sulfur and ultra-low sulfur diesel (ULSD) fuel," said James M. Valentine, President of CDT. "To date, the higher cost of heavily catalyzed systems, which require ULSD to operate, has prohibited many fleets from moving forward. At only 50-70 percent of the capital cost of traditional heavily catalyzed systems this new family of specially catalyzed devices designed for use with the FBC could encourage more fleets to be proactive in retrofitting existing equipment. These systems, while performing the best on ULSD, can operate on current sulfur fuels as ULSD makes its way into the market. In addition, the average fuel economy improvement of 7 percent from the FBC helps offset the cost of fuel treatment and the emissions control device."

CDT is planning to offer blending licenses to selected refiners and fuel marketers interested in marketing treated fuel under CDT's Cleaner Burning Diesel™ brand name and is expecting that interest from major corporate fleet customers like CCE will help jump start action with fuel suppliers. The Platinum Plus FBC is easily added at any point in the fuel distribution chain from rack blending to fuel delivery truck mounted dosing systems and even fuel pump dosing. CDT is also looking at several low cost on-board truck dosing systems.

Comparing emissions from normal No. 2 diesel fuel containing 350ppm sulfur to an ultra-low sulfur fuel (ECD-1) produced by BP/ARCO, showed only modest particulate emissions reductions versus the baseline No. 2 diesel fuel. However, the combination of Platinum Plus and No. 2 diesel fuel reduced particulates (PM) by 15 percent; and when combined with a low cost specially designed oxidation catalyst PM was reduced by 30 percent along with significant CO and HC reductions. Used with a novel flow-through-filter (DOC/FTF) PM reductions increased to 47 percent with 57 percent CO and 66 percent HC reduction. Several of these devices are in commercial service with Platinum Plus treated diesel fuel on CCE vehicles in Texas and also on several refuse trucks in California using ultra low sulfur diesel.

Changes in fuel consumption were not material over the 50-hour test but commercial fleet trials run with CCE and other delivery fleets on similar engines have shown reductions in fuel consumption of 7-10 percent after 200-400 hours of run time on FBC treated fuel. The FBC introduces minute amounts of catalyst into the engine with each gallon of fuel and it takes time for the FBC to catalyze engine surfaces to improve fuel economy while emissions reductions in the engine and exhaust take place more rapidly according to CDT.

Nitrogen dioxide (NO<sub>2</sub>) emissions, which are a strong lung irritant, were reduced by up to 70 percent using FBC treated fuel and the DOC/FTF device. According to CDT, NO<sub>2</sub> is actually decomposed in the presence of the FBC and soot collected in the DOC/FTF device. Traditional heavily catalyzed devices, in addition to being more expensive, tend to dramatically increase NO<sub>2</sub>

emissions and sulfate particulates and are often unable to operate on older, dirtier engines under normal operating conditions. They are especially sensitive to fuel sulfur level and can be poisoned by contaminants in the fuel and lubricating oils. Because fresh active catalyst is always being introduced with the fuel treated with the FBC even lightly catalyzed devices remain active and do not increase sulfate particulates or NO<sub>2</sub> emissions.

Additional comparative testing evaluated the performance of Platinum Plus FBC treated ECD-1 fuel and a treated ultra low sulfur fuel produced in Texas by Valero Energy in combination with the low cost DOC and DOC/FTF devices. "While we knew the performance in No. 2 fuel was good we wanted to compare performance of several commercial ultra low sulfur diesel fuels with the Platinum Plus FBC and the specially catalyzed devices," Valentine said. "We especially like the NO<sub>x</sub> (12-13 percent) and PM (33-48 percent) reductions found with the Valero fuel and this should be of great interest in Texas and other regions where there is a focus on NO<sub>x</sub> reduction."

CDT is also running several specially catalyzed diesel particulate wall-flow filters made with Corning's Corderite material on newer model year refuse trucks, off road equipment, underground mining equipment and stationary engines where there is a desire for 85 percent+ particulate reduction. In these applications the FBC is critical to the regeneration of the filter and it promotes self cleaning and oxidation of the soot collected in the filter at normal engine operating conditions. This combination was recently listed by the Mining Safety Health Administration as acceptable for use in underground mines.

#### Test Result Tables

Table 1: Percent Change Relative to Baseline No. 2D Emissions\* (Replicate FTP Tests)

Test	HC	CO	NO <sub>x</sub>	PM
Base + FBC	NC	-7%	-2%	-15%
Base + FBC + DOC	-33%	-50%	-2%	-30%
Base + FBC + DOC/FTF	-66%	-57%	-2%	-47%

Table 2: Percent Change Relative to Baseline No. 2D Emissions\* (Replicate FTP Tests)

Test/Fuel	HC	CO	NO <sub>x</sub>	PM
ECD-1 ULSD (15ppm S)	NC	-21%	-8%	-4%
ECD-1 + FBC	-33%	-29%	-8%	-18%
ECD-1 + FBC/DOC	-67%	-57%	-8%	-29%
ECD-1 + FBC/DOC/FTF	-67%	-71%	-8%	-51%
Valero ULSD + FBC/DOC	-33%	-63%	-13%	-33%
Valero ULSD + FBC/DOC/FTF	-67%	-71%	-12%	-48%

#### About Clean Diesel Technologies, Inc.

Clean Diesel Technologies, Inc. is a specialty chemical company with patented products that reduce emissions from diesel engines while simultaneously improving fuel economy and power. Products include Platinum Plus(R) fuel catalysts, the Platinum Plus Purifier System, and the ARIS(R) 2000 urea injection systems for selective catalytic reduction of NO<sub>x</sub>. Platinum Plus and ARIS are registered trademarks of Clean Diesel Technologies, Inc. For more information, visit CDT at [www.cdti.com](http://www.cdti.com) or contact the Company directly.

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