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Update on Caterpillar Consent Decree Projects

The following projects were undertaken pursuant to an agreement with the United States in connection with settlement of disputed claims in an enforcement action under the Clean Air Act.

Environmental Project E-1: Emission Reduction of Non-Road CI Engines

The primary focus of this project is to reduce NOx emissions from non-road CI engines operating in urban non-attainment areas. Through the early implementation of Tier II emission standards and repower of existing machines and off road vehicles, an estimated NOx emissions reduction of 14,060 tons has been achieved. The project in its entirety is expected to produce a NOx reduction of 26,900 tons.

Environmental Project E-2: Hybrid Engine System Development

The primary focus of this project is to evaluate, develop, and demonstrate hybrid regenerative drivetrain technology for on-highway heavy-duty vehicles. This project offered an opportunity to provide both emissions and fuel economy benefits. Two different hybrid engine technology concepts were evaluated: (1) series mechanical-hydraulic drivetrain, and (2) homogenous charge compression ignition (HCCI), hydraulic, free piston engine. The findings indicated that the time and costs needed for development outweighed the potential benefits. As a result, other promising technologies are being considered for development as part of this project.

Environmental Project E-3: Dual Fuel Engine Program (California)

The purpose of this project was to promote acceptance of dual fuel engines in heavy-duty on-highway applications within non-attainment areas. Dual Fuel engines are primarily natural gas fueled engines where natural gas is ignited by a small pilot quantity of diesel fuel. This technology provides a power source that is similar to diesel in fuel economy and performance while reducing NOx emissions. There are currently over 600 Caterpillar dual fuel engines operating within the United States (most within urban areas of California) providing an estimated NOx reduction of over 1700 tons. The 2005 forecasted population for dual fuel engines would yield an estimated cumulative NOx reduction of over 10,000 tons over the useful life of the engines.

Environmental Project 4: On-Highway CI Engine Emissions Reduction

This purpose of this project is to evaluate, select, develop and demonstrate advanced combustion and aftertreatment technologies for on-highway Heavy-Duty Diesel Engines (HDDE) that would reduce emissions levels of NOx and PM substantially below the requirements of October 2002 regulations. The scope includes the effects on fuel consumption as well as durability and reliability issues. Project work has been divided by technology (also includes a demonstration by combining technologies):

1. SCR Technology Development
2. NOx Adsorber Technology Development
3. DPF Performance and Durability Demonstration
4. Combustion Technology Development
5. Combined Low NOx/Low Particulate Technology Demonstration

A final summary report for the SCR technology is being prepared and will be submitted to the EPA during the 3rd quarter. Development work on the remaining technologies has shown significant progress as well.