



An ORNL State Partnerships Program Success Story

Analyzing the Mischief Caused by Idle Trucks

Pass a truck stop or rest stop and you'll see hundreds of 18-wheelers sitting and smoking. Long-haul trucks idle for hours to operate lights and climate control systems for the cabs while their drivers rest. There are few data regarding how millions of trucks idling daily impact air pollution or fuel consumption.

ORNL's National Transportation Research Center (NTRC), the U.S. Environmental Protection Agency, and the state of New Jersey are cooperating to measure and characterize emissions and fuel use during idling. They also are studying the effects of using auxiliary power units (APUs) and diesel-fired heaters in parked trucks. The APU uses a small, efficient diesel engine to drive an alternator that charges the batteries and powers a heating or cooling system for the cab. The diesel heater keeps the cab and engine warm in cold weather.

For the tests, five Class 8 tractors from different manufacturers were operated in an environmental chamber at the Aberdeen Test Center in Maryland that simulates a range of summer and winter weather conditions. The trucks represented model years ranging from 1992 to 2001; all had turbochargers, direct injection, and electronic controls. Emissions were measured at ambient temperatures of 0, 65, and 90°F and at idle speeds of 600 and 1200 rpm while the cabs were maintained at a constant temperature.

Researchers from the Fuels, Engines, and Emissions Research Center at NTRC provided technical expertise and instruments to measure particulate matter and other emissions. In most cases, fuel use and emissions were substantially higher at a 1200-rpm idle than at 600 rpm. Both the APU and the heater cut fuel use and exhaust emissions compared with engine idling. However, at current fuel prices, it would take two years or more for the fuel savings to offset the cost of the units.

The data gathered will be used to develop models of emissions and fuel use for state energy and air quality planning and to support technologies to mitigate emissions and reduce fuel waste.

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Instrumented tractor rig in the environmental chamber at the Aberdeen Test Center.