OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE DEPARTMENT OF ENERGY
FACT SHEET

Watt Road Environmental Laboratory Initiative

A World-Class Field Laboratory Focused on Heavy-Duty Trucks

Our goal is to establish a world-class field laboratory in the Knoxville, Tennessee, area devoted to the study of in-use, real-world emissions of heavy trucks. This will be the only facility of its kind that will gather data on emissions from trucks in use on highways, using instrumentation developed specifically for remote sensing and characterization of emissions. These unique data will be combined with information on weather conditions and ambient air quality to yield a complete, one-of-a-kind data set for study of the interactions between on-road heavy vehicle emissions and local environmental conditions. The field laboratory would extend 2.5 miles along I-40, along a valley from the Watt Road/I-40 interchange (where truck service facilities are concentrated and truck traffic is dense), eastward to a weigh station at the top of a ridge. From this facility, models of the interactions between improved emission control technologies, real-world emissions, and ambient air quality can be developed and validated. The data will be available to all interested parties and will include long-term trends of in-use, real-world emissions and well-characterized airshed and watershed conditions. Multiple sponsors are envisioned who would fund different respective interests of the field laboratory, or resources could be pooled to accomplish common objectives. Under multiple sponsors and after initial capitalization, we anticipate this could represent a program of $5 to $10 million per year.

Needs and Opportunities Exist

Heavy trucks have a big impact on ambient emissions inventories. Over 40% of NOx emissions and over 60% of particulate matter emissions from mobile sources in the United States are from diesel engines, mainly heavy-duty trucks. However, little is known about "real-world" emissions of heavy trucks. Results from certification tests of truck engines are insufficient to predict emissions under actual driving conditions.

An aerial view of the Watt Road/I-40 interchange west of Knoxville, Tenn.

The Watt Road/I-40 interchange represents a microcosm of the heavy truck world that is perhaps unique in the United States. The location has a tremendous amount of truck traffic – 25,000 to 27,000 trucks per day, many of which spend the night. The location includes an existing weigh station, a steep grade, a bowl-shaped intersection and a short level section of interstate. All of these features provide essential ingredients for long-term research into truck operating behavior.

Major participants in vehicle emissions research already in the area include ORNL's Fuels, Engines, and Emissions Research Center at the NTRC, a DOE National User Facility; and the University of Tennessee-Knoxville.

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