



**"A more scientifically accurate prediction of the effect of herbicides and pesticides on humans,** the pharmacokinetic models we are developing with agrochemical clients present a more realistic evaluation of human health risks than is currently available."

—**Charles Timchalk**, scientist, Pacific Northwest National Laboratory. Chuck's work has had profound impact in agrochemical modeling. One of five recipients of the 2000 STAR (Science to Achieve Results) Award from the DOE, he also won the "Best Technical Paper" award at the annual meeting of the Society of Toxicology for his work.

United States—Battelle is successfully pioneering a strategy of coinvesting—or risk/value sharing—with major agrochemical companies worldwide. Our AgriFood teams are playing an important role in new product development, label extension, and European reregistration for the most successful players in the global agrochemical industry.

## Automotive Technology

Sophisticated emission control technologies will clean the exhaust from next-generation diesel engines to meet future restrictions on oxides of nitrogen and particulate matter. Battelle is integrating a world-class team that includes three national laboratories to develop and commercialize emission control products for both transportation

**"The science to effectively remove all pollutants** from diesel exhaust is now being refined in laboratories. Our task is to combine this science into commercially viable systems that use the outstanding fuel efficiency of advanced diesel engines—without risk to our environment or health."

—**Jim Patten**, Battelle VP for Vehicle and Emissions Systems, is integrating a top management team from three national laboratories to help next-generation high-efficiency engines meet emissions requirements. Pictured (from left) are Ron Graves (ORNL), George Sverdrup (NREL), Jim Patten and Jud Virden (PNNL).



and stationary applications. In working with Pacific Northwest National Laboratory, Ford Motor Co., Delphi Automotive Systems, Caterpillar, DaimlerChrysler, and General Motors in the Northwest Alliance for Transportation Technologies, we've achieved more than 30 percent reduction in particulate matter and a 55 percent reduction in NOx emissions. Our product development strategy will enable industry to meet off-road emissions requirements and make significant progress toward meeting 2007 on-highway targets.

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*Battelle is developing commercial emission control products that clean diesel exhaust to meet current and anticipated NOx emission regulations, removing a primary roadblock to more widespread use of diesel engines.*

## Energy Products

From commercializing fuel cells to disposing of CO<sub>2</sub> from power plant flue gas, Battelle is a powerhouse of commercial solutions for energy providers. Collaborative relationships with venture capital firms are bringing Battelle's energy technologies to the broader investment

*Using a unique method of varying electrode voltage in polymer electrolyte membrane (PEM) fuel cells, (from left) Brad Glenn, Jim Saunders and Barry Hindin of Battelle Columbus are developing a dynamic electrode to make fuel cells more tolerant of carbon monoxide and other contaminants—improving performance, reducing costs, and pushing toward commercialization.*

