Pacific Northwest National Laboratory
Operated by Battelle for the U.S. Department of Energy

Sharing the Excitement of Science

Breakthrough Science and Technology for the Northwest

Richland, Washington

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A testimony to the energy grid of the future

When Pacific Northwest National Laboratory's Steve Hauser delivered his testimony to the U.S. Senate Subcommittee on Water and Power on Aug. 14, he gave a glimpse of the interactive energy system that he expects to see in the future.

Hauser's testimony describes the transformation of the energy system to one that connects every business, home, and appliance and has every component providing information on its energy needs—how much, what kind and when. He envisions energy generators, from large hydroelectric dams to wind farms or small fuel cells, communicating to the system about what energy it can provide and at what cost. With this information, the system would then create a network that optimizes the best use of energy, meeting every need in "real time."

"As we begin the 21st century, the 'Information Age' demands a new model, one that leverages information to optimize our use of energy," Hauser said. "This new model promises to carefully manage our use of precious resources and expensive assets while protecting the environment and enhancing the economy." The testimony also included information about the Laboratory's innovative ideas and technologies that could significantly impact the future of the energy system in the Northwest and across the nation.

See **http://energy.senate.gov/hearings/107-1/water&power/bonneville_conservation/hauser.htm**

'Flight simulator' for computer system administrators

Just as flight simulators provide real-world experience to pilots without jeopardizing lives, a new cyber security training capability under development at Pacific Northwest National Laboratory will give computer system administrators experience defending against cyber attacks without compromising their networks.

PNNL scientists have created a prototype Systems Administrator Simulation Trainer to rapidly develop system administrators' cyber security experience in identifying, circumventing and recovering from hacker activity. The network of training tools that simulate the cyber environment are launched through an automated system. When fully developed, trainees with broadband Internet access would use these tools for remote training, reducing costs and allowing continual access.

The prototype was developed for the Department of Defense's Technical Support Working Group at the PNNL-based Critical Infrastructure Protection and Analysis Laboratory, a dedicated research and development laboratory created specifically to counter cyber threats.

Laboratory hosts "Rainmaking in a Capital Drought"

Private equity experts from the Seattle area shared their knowledge about how to raise capital with entrepreneurs and early-stage business owners who attended an all-day workshop at Pacific Northwest National Laboratory on Aug. 30. "Rainmaking in a Capital Drought: Everything You Need to Know About Raising Capital in this Dry Climate," was intended to help new businesses develop their strategies and business plans while positioning their ventures for investment. PNNL's Economic Development Office sponsored the workshop because it aligns with the Laboratory's mission to help create and support new businesses in the Tri-Cities and nearby communities.

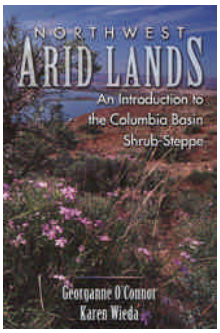
A bird's eye view of Puget Sound pollution

Pacific Northwest 2001, the first sky-based study of the Puget Sound's air quality, will gather air chemistry data in search of answers about regional ozone and other pollutants. During the last two weeks of August, Pacific Northwest National Laboratory conducted flights in a Gulfstream-1 research aircraft between Seattle and Bellingham, tracking the flow of pollutants within the greater Puget Sound basin.

"Despite increased concern about air pollution in our region, no one has captured the atmospheric data needed to understand how pollutants form, travel and interact within the Puget Sound area," said Leonard Barrie, co-coordinator for the study.

PNNL formed and is leading the multi-organization study, which includes collaborators at Washington State University, the University of Washington, the Puget Sound Clean Air Agency, the Washington state Department of Ecology and Environment Canada. The study is being coordinated with the Environmental Protection Agency's Region 10 Office. For more information, see **http://www.pnl.gov/news/2001/01-29.htm** and **http://www.pnl.gov/pnw2001.**

A field guide with feelings



According to Pacific Northwest National Laboratory's Georganne O'Connor and Karen Weida, the Columbia Basin's shrub-steppe lands often go unappreciated and are considered by many as an uninteresting desert. To help build an appreciation for the beauty and significance of the flora and the fauna in the area, O'Connor and Weida wrote *Northwest Arid Lands: An Introduction to the Columbia Basin Shrub-Steppe.*

The book, published by Battelle Press, is designed as a field guide—complete with local history, maps, photos of animals and vegetation and a "places to visit" section. It also presents a human perspective on the desert, including profiles of environmental scientists working in the area.

University of Washington Press has agreed to distribute and promote the book to retail and wholesale booksellers in Washington, Oregon, Idaho and British Columbia. Proceeds that PNNL receives will be donated to the Battelle/PNNL Partnership for Arid Lands Stewardship project that encourages long-term stewardship of arid lands through education and research. To order the book, see **http://www.battelle.org/bclscrpt/bookstore99/northarid.cfm**.

Getting to the bottom of waste problems at dairies

A waste storage lagoon at a dairy in Outlook, Wash., is being converted into a waste treatment facility with the help of a new technology that enhances naturally occurring biological activity. Pacific Northwest National Laboratory brought Battelle's InStreem™ technology to the George De Ruyter Dairy, installing a floating unit at the dairy in January as part of a one-year demonstration test. Battelle operates the Laboratory for the U.S. Department of Energy.

The InStreem™ technology uses a dairy's existing infrastructure, turning waste lagoons into extended aeration systems that promote aerobic and anerobic degradation of wastes including excess nitrogen and other nutrient constituents, such as phosphorous. One cow produces 85 pounds of waste per day, contributing to potential health hazards such as E.coli and fecal coliforms and risks of contaminating surface water and ground water.

"In the first three months, the depth of solids dropped from six feet to six inches, and that was during the coldest part of the year," said John Jaksch, program manager for the project in the Pacific Northwest. The technology also has successfully reduced odors at the dairy operation. Jaksch said that the InStreem™ technology could potentially be a solution for 950 dairies in Washington, Oregon, Idaho and Montana that have waste lagoons—each with about 1,500 cows. For more information, see **http://www.pnl.gov/news/2001/01-31.htm**.

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