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DOE Pulse

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Telehealth demonstrated on reservations

Pregnant women living on South Dakota Indian reservations where infant mortality rates are more than twice the national average are receiving specialty care under the first commercial test of a telehealth system called MUSTPAC-3. The device, which was created by researchers at DOE's Pacific Northwest National Laboratory, was recently deployed at two reservation clinics for data acquisition. A station also was installed at a Sioux Falls, S.D., medical center, hundreds of miles away, for diagnosis. Healthcare providers at these clinics will use MUSTPAC-3 to monitor 100 women who are in their first trimester of pregnancy. Information obtained through these studies will be used in the FDA approval process for MUSTPAC-3.

[Staci Maloof, 509/372-6313, staci.maloof@pnl.gov]

Device increases electrical margin of safety

In an effort to create the safest possible work environment at DOE's Thomas Jefferson National Accelerator Facility, Rick Gonzales, Accelerator Electronics Support, invented a lockout device that prevents the powering up of electronic equipment with removable power input cords. When correctly attached to any electronic device that has a removable power cord, it prevents anyone from running an electric current through the component. He worked with the JLab Technology Transfer team to patent the device. Recently, on his own time, he signed a licensing agreement with the Lab to commercially produce the LOCKOUT 320.

[Debbie Magaldi, 757/269-5102. magaldi@jlab.org]

Reusable explosive device draws police attention

A cheaper, less dangerous way to stun kidnappers or terrorists holding hostages has been developed by Sandia National Laboratories researcher Mark Grubelich. The nonlethal device—about the size of a small soda can—creates a blinding, deafening, yet ultimately harmless explosion when lobbed into a room. Unlike earlier versions that ignite from concentrated materials, the explosive source in this device fans out as an airborne powder before it ignites, making it less dangerous to hostages. The stun grenade is also reusable, making it feasible as a training tool. The device has drawn the interest of police departments and law enforcement officials from a variety of federal agencies.

[Howard Kercheval, 505/844-7842, hckerch@sandia.gov]

Soldier of the future armed with technology

The soldier of the future, who will have 20 times the fighting capability of today's warrior, will wear bullet-resistant uniforms that will stay cool and even help treat a wound until aid arrives. The Objective Force Warrior envisioned by the Army, which is working with DOE's Oak Ridge National Laboratory, will draw on DOE-developed technologies. Innovations would allow a soldier to engage and destroy the enemy at longer ranges with greater precision and with devastating results. The Army calls its effort to seek technologies to create an overmatch with any potential enemy and minimize risk to its soldiers "the art of the possible."

[Ron Walli, 865/576-0226, wallira@ornl.gov]

DOE Pulse highlights work being done at the Department of Energy's national laboratories. DOE's laboratories house world-class facilities where more than 30,000 scientists and engineers perform cutting-edge research spanning DOE's science, energy, national security and environmental quality missions. ***DOE Pulse*** (www.ornl.gov/news/pulse/) is distributed every two weeks. For more information, please contact Jeff Sherwood (jeff.sherwood@hq.doe.gov, 202-586-5806).

A real HANDSS on experience

DOE's Idaho National Engineering and Environmental Laboratory (INEEL) is demonstrating a new technology that automates radioactive and hazardous waste sorting and integrates other waste handling functions. This new technology uses state-of-the-art imaging to digitally identify and locate suspicious items, then communicates with a robot to remotely retrieve them.

This INEEL-developed waste sorting module is one of several modules being developed to make up the "Handling and Segregating System for 55-gallon drums" or HANDSS-55. The HANDSS-55 imaging system, that is part of the sorting module, develops a picture or contour map of the dimensions of items to be removed each time a new drum is opened. Then it adjusts its remote gripper to accommodate the item being removed. This system is unlike other robotic systems that are pre-programmed to perform routine functions in structured environments.

Miles Walton demonstrates HANDSS-55's capability to remove waste items using the automated and remote sorting equipment developed at the INEEL.

The HANDSS-55 system consists of four modules-sorting, volume reduction, repackaging and system integration and control. The INEEL-developed sorting module automatically opens 55-gallon drums and removes non-compliant items. The volume reduction module shreds the original drum and places it into a 55-gallon canister. Another module repackages acceptable wastes and places them into polyethylene canisters using a bagless transfer method. And, the system integration and control module allows all three modules to function as one seamless system. All these modules will be tested and demonstrated together before being deployed and used at the Savannah River Site in May of 2005.

DOE's TRU and Mixed Waste Focus Area directs the design and development of these modules. The INEEL coordinates the effort and is supported by the Savannah River Technologies Center. HANDSS-55 is funded through DOE's Office of Science and Technology.

Submitted by DOE's Idaho National Engineering and Environmental Laboratory

PNNL RESEARCHER TAPS FUNGI'S POTENTIAL

Dr. Linda Lasure

At a time in science when most research on fungal strains is focused on eliminating organisms—the culprits of several complex, often deadly diseases—Dr. Linda Lasure, staff scientist at DOE's Pacific Northwest National Laboratory, is conducting research that manipulates and fosters growth of certain fungal species.

Only a handful of research institutions around the world are working in fungal biotechnology, and none of those are working to develop new biomass-to-chemicals processes, making PNNL's research unique.

"The filamentous fungi are everywhere, especially where there are woody plants," Lasure said. "We also have many sources of renewable biomass. By subjecting biomass to hungry, specialized fungi and applying new processing techniques, we can both convert biomass into intermediates important in manufacturing chemicals and consumer products, and reduce our reliance on foreign oil. The work is exciting and very rewarding," she said.

Lasure, a recognized national and international leader in the field of fungal genetics, directs the biotechnology component of PNNL's Bio-Based Products Initiative and is focused on extending bioprocessing capabilities while continuing her work in microbial genomics.

"I was drawn to PNNL because there is a firm commitment for biologists and chemists to work together to address issues, develop new knowledge and apply that information to convert renewable biomass into useful things," said Lasure. "We're creating a leading-edge capability in filamentous fungi, a largely untapped resource essential to recycling biomass in nature," she said. The research effort includes pursuing techniques for controlling fungal growth, identifying and exploiting novel fungi, and creating new processes via systems biology and proteomics.

Lasure joined PNNL in November 2000, and has more than 30 years of experience in fundamental biological research.

Submitted by DOE's Pacific Northwest National Laboratory