

**LAWRENCE LIVERMORE**

# **REPORT**

**A weekly collection of scientific and technological achievements from Lawrence Livermore National Laboratory: Dec. 8-Dec. 14, 2008.**

## **ELITE stars in 'CSI: Miami'**



### **ELITE, as shown on 'CSI Miami.'**

An explosives detector developed by LLNL Forensic Science Center researchers hit the big time last week when it appeared on the CBS network television series, "CSI Miami."

ELITE is used in the show to check whether a car had explosive materials on it. ELITE is highly sensitive to more than 40 different explosives, making it one of the most effective trace explosive detection systems available.

With an ELITE detector, about the size of a playing card, border patrol agents, security agents, airport screeners, first responders and military personnel can secure real-time results within about 90 seconds as to whether explosives are present.

To see the television clip, go to

[https://publicaffairs.llnl.gov/news/llnl\\_reports/CSI\\_Miami\\_ELITE.mov](https://publicaffairs.llnl.gov/news/llnl_reports/CSI_Miami_ELITE.mov)

**Lab's antineutrino research hits *Nuclear Engineering International***



Work by Lawrence Livermore and Sandia national laboratories researchers on development of antineutrino detectors to help safeguard fissile materials within nuclear reactors recently was featured in *Nuclear Engineering International*.

The new tool could help international inspectors to peer inside a working nuclear reactor.

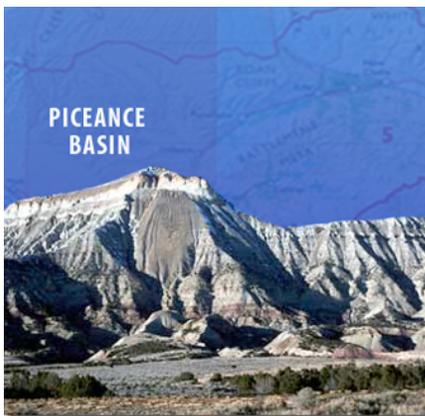
Antineutrinos are elusive neutral particles produced in nuclear decay. They interact with other matter only through gravitational and weak forces, which makes them very difficult to detect. However, the number of antineutrinos emitted by nuclear reactors is so large that a cubic-meter scale detector suffices to record them by the hundreds or thousands per day. As the team has demonstrated, this new detector makes practical monitoring devices for nonproliferation applications possible.

The antineutrino detector could be used to determine the operational amount of plutonium or uranium necessary to run the reactor and place a direct constraint on the amount of fissile material the reactor creates throughout its lifecycle.

To read the article, go to:

[https://newsline.llnl.gov/\\_rev02/articles/2008/dec/nei.pdf](https://newsline.llnl.gov/_rev02/articles/2008/dec/nei.pdf)

## **Pushing carbon underground**



## **Colorado's oil-shale rich Piceance Basin**

LLNL and American Shale Oil, LLC (AMSO), a subsidiary of IDT Corporation, have entered into a technical cooperation agreement to develop carbon sequestration technologies for in ground shale oil production processes.

Specifically, LLNL will partner with AMSO to study how to use depleted underground oil shale retorts to permanently store carbon dioxide generated during the oil shale extraction process. AMSO will provide technical expertise and oil shale core samples from its federal lease site. A retort, in this case, is a refractory chamber, generally cylindrically shaped, within which oil shale is heated as part of a smelting or manufacturing process.

The Lab's Susan Carroll is the principal investigator for the project.

Oil shale can be converted to oil by subjecting it to high temperatures and high pressures -- by speeding up the geologic clock so to speak. In early demonstration projects, LLNL researchers used explosives to fracture the vast oil-shale reserves in the Western United States so that the oil could be processed in place, thus providing an important alternative to imported oil. That effort evolved in the early 1980s into a surface oil-shale retorting process that used hot oil-shale particles as the heat carrier. The research also produced a model of how oil is formed in nature. Today, this model aids the exploration efforts of every major oil company in the world.

For more information, see

[https://newsline.llnl.gov/\\_rev02/articles/2008/dec/12.12.08-shale.php](https://newsline.llnl.gov/_rev02/articles/2008/dec/12.12.08-shale.php)

## **LLNL's research in personal decontamination system in *IECR***



Researchers from the Laboratory and two other institutions have described a major step toward creating a universal personal decontamination system for almost any toxic or hazardous chemical.

The scientists have reported on the development of a layered wipe that can be used to rapidly decontaminate people and equipment exposed to a wide range of military and industrial chemicals, including the blister agent sulfur mustard. These wipes could assist in saving the lives of soldiers and civilians.

Their research results are described in an article in the Dec. 3 issue of *Industrial & Engineering Chemistry Research*, a bi-weekly publication of the American Chemical Society.

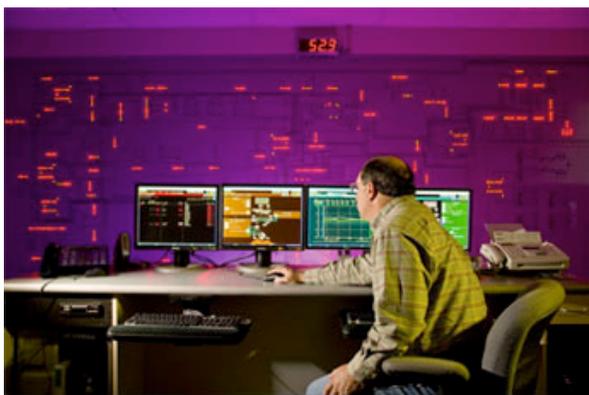
To read more, go to <http://pubs.acs.org/doi/full/10.1021/ie801223b>

### Latest edition of weekly *Newsline* available



*Newsline* provides the latest Lab research and operations news. See the most recent issue at <https://newsline.llnl.gov/rev02/index.php>

### Photo of the week



**Light bright:** Mark Cardoza checks the status of SCADA, the Supervisory Control and Data Acquisition system that monitors and controls the Lab's electrical distribution across the entire Laboratory site.

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LLNL is managed by Lawrence Livermore National Security, LLC, for the U.S. Department of Energy's National Nuclear Security Administration.

LLNL applies and advances science and technology to help ensure national security and global stability. Through multi-disciplinary research and development, with particular expertise in high-energy-density physics, laser science, high-performance computing and science/engineering at the nanometer/subpicosecond scale, LLNL innovations improve security, meet energy and environmental needs and strengthen U.S. economic competitiveness. The Laboratory also partners with other research institutions, universities and industry to bring the full weight of the nation's science and technology community to bear on solving problems of national importance.

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