

# HOMESTAKE DUSEL AND SANFORD LABORATORY NEWSLETTER

## Dear Homestake Collaboration,

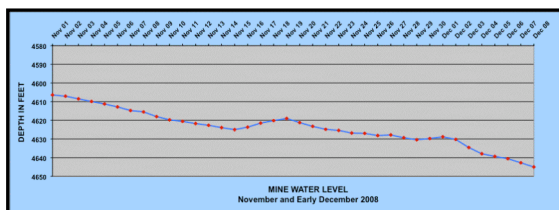
Welcome to the short December edition of our monthly newsletter for Homestake DUSEL and South Dakota's Sanford Laboratory. We always welcome your input on news, links to news articles, upcoming workshops, conference notices, scientific updates, information concerning the Collaboration, and other highlights relevant to our shared mission.



## SANFORD UNDERGROUND LABORATORY AT HOMESTAKE

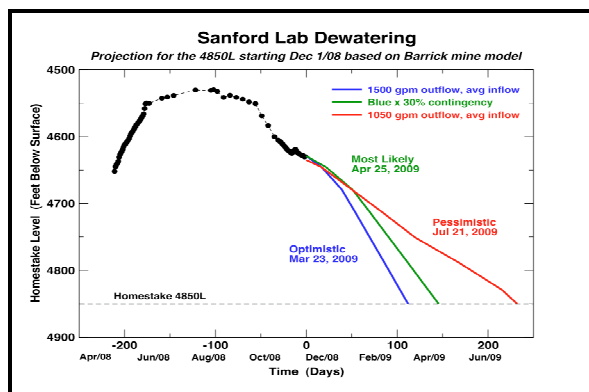
### Water level marks progress at Sanford Underground Lab

Dewatering the former Homestake gold mine remains the top priority of the South Dakota Science and Technology Authority. SDSTA crews continue to improve the dewatering system, adding a high-volume submersible pump in November and successfully testing new sand-filters to remove iron from the water.



As of December 7, the water level was 4645, 115 feet below the high-water mark, which was reached in August.

The current "reverse cascade" pumping system uses submersible pumps to lift water from the deep pool, below the 4550 Level, to chain of larger, 700-horsepower pumps at the 3650, 2450 and 1250 levels. The SDSTA plans to install a second set of large pumps at those levels by February 1. This will add capacity and reduce slowdowns due to single-point failures. In addition, another high-volume submersible pump will be added to #6 Winze, a shaft that connects the 4550 Level to the bottom of the mine at 8,000 feet.



*Above: Projections lowering water to the 4850 Level at Homestake*

## 1100 Level Mine Dewatering System

Almost all of the water at Homestake comes from surface runoff, and most of that comes from the giant Open Cut. Homestake Mining Co. was able to capture a significant amount of this water at the 1100 Level of the mine, preventing it from reaching deeper levels. The SDSTA exploring options to create a new water-capture system at the 1100 Level. Bid letting for the selected option is scheduled for March.

## The Yates Shaft re-entry

RCS Construction of Rapid City hired a number of shaft technicians with Homestake experience to help re-open the Yates Shaft to the 4850 Level. RCS hoist operators trained in November with SDSTA operations staff, and SDSTA staff completed hoist, cage, and skip certifications and rope cuts for all four Yates Shaft conveyances. "Cages" are mine elevator cars used for personnel and equipment. "Skips" are elevator cars for rock. "Rope cuts" are made to remove wear points on the 5,000-foot, 2-inch steel cables in the Yates and Ross shafts. Yates reentry officially began on night shift on December 8.

## IMPORTANT DATES

**DUSEL Annual Review: January 28-30, 2009**  
- Berkeley, California. Committee will be chaired by Ed Temple.

**S-4 Solicitation deadline: January 9, 2009.**  
<http://www.nsf.gov/pubs/2009/nsf09500/nsf09500.htm>

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## Early science support

The SDSTA is reopening Homestake to the 4850 Level for experiments in advance of DUSEL. To that end, engineering design work continued on the infrastructure to support the LUX dark matter experiment in the Davis Cavern at the 4850 Level. The LUX Design Team, lead by CNA Consulting Engineers, was in Lead Dec 3-5 for a design review.

CNA also is evaluating the 800 Level Powder Magazine area for possible conversion to the Majorana copper e-forming laboratory. Geologic mapping of the space was completed in November.

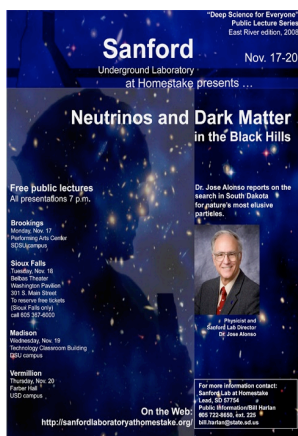


*Above: Ross shaft at Homestake, after a fresh snow on December 8*

## Information technology management

Golden West Telecommunications installed fiber optic cabling from the floor of Kirk Canyon into the Yates Administration Building for the Sanford Lab's connection to the ultra-high speed REED Network. Golden West is in the final stages of finalizing the fiber optic cable installation that runs from Interstate 90 to the Yates Administration Building at the Sanford Lab. South Dakota Bureau of Information Technology (BIT) staff will be on-site in January to install data routing equipment to complete the 10 Gbps Internet2 REED connection. The connection is capable of expansion to 50Gbps.

## "Deep Science" outreach goes East River



*Left: A poster announcing the "Deep Science" lecture series.*

The Sanford Underground Laboratory emphasized East River outreach in November, with a four-day tour of the "Deep Science for Everyone" lecture series (November 17-20). Dr. Jose Alonso presented "Neutrinos and Dark Matter in the Black Hills to audiences in Brookings, Sioux Falls, Madison

and Vermillion. Nearly 800 people attended the lectures. Dr. Alonso talked about the LUX and Majorana experiments, and he also provided an update on progress reopening Homestake as the Sanford Underground Laboratory.

In addition, the week before Dr. Alonso's lecture tour, Dr. Kevin Lesko flew to Sioux Falls for a long day of public outreach. Dr. Lesko was a keynote speaker to an audience of 250 at the South Dakota Technology (sic) Summit, and he spoke to science students at Lincoln and Washington high schools in Sioux Falls. Cheryl O'Brien arranged for Dr. Lesko to meet with science teachers after school. These meetings will lead to follow-up discussions about regular events with Sioux Falls high school students.

Extensive media coverage surrounded the "Deep Science for Everyone" lecture series. (About 2,000 people have attended nine lectures since April.) In addition, South Dakota Public Broadcasting videotaped Dr. Alonso's lecture in Sioux Falls, then produced an hour-long DVD for use by the Sanford Lab.

Dr. Alonso and Dr. Lesko also promoted the South Dakota Department of Education's new Davis-Bahcall Scholarships, a summer program that will allow high school seniors and college freshmen to study at the Sanford Lab, at Gran Sasso Laboratory in Italy and at Princeton University.

## The best kind of outreach

Dr. Alonso answered questions for at least a half hour after each lecture. He then stayed to answer individual questions.



*Above: Dr. Jose Alonso shares a light-hearted physics moment with Natasha Powell.*

Natasha Powell, 12, also stayed late. She had persuaded her mother to drive her from St. Paul, Minn., to Sioux Falls for the "Deep Science" lecture. (That's a four-hour drive each way.) Natasha waited patiently for more than 45 minutes to ask Dr. Alonso if he could suggest a science fair project. Jose told her she should choose a subject herself -- something that really interested her. They continued to talk for about 15 minutes. Then Natasha asked, "Could I have a sample of your

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yucky water?" Natasha thought it might be interesting to test Sanford Lab's pre-treatment discharge water. Look for a Sanford Lab research project at a science fair soon.

### TRANSPARENT EARTH SYSTEM

Steve Glaser of UC Berkeley and Bill Roggenthen of South Dakota School of Mines and Technology continue to develop the Homestake Transparent Earth Observatory. A second seismometer site was added on the 2000 Level in October. Power and network connectivity were provided during November. Both 2000 Level sites are fully operational. In the New Year, Roggenthen and Glaser will expand their current instrument array to include sites on the 800 Level, the 4100 Level and eventually the 4850 Level.

**EDUCATION AND OUTREACH: BHSU hired deputy director of education and outreach for Sanford Lab, DUSEL**  
(From *Black Hills Pioneer*, Wendy Pitlick)

**LEAD** – Education and outreach for the Sanford Underground Lab and the DUSEL keeps growing, and on Thursday, Dr. Ben Sayler, director of education and outreach activities at the lab announced that his staff is growing.

Peggy Norris, who has a PhD in chemical physics from Columbia University, has been hired as the new deputy director for education and outreach, Sayler said. In that capacity, Sayler told the board that Norris will work out of the Sanford Underground Lab administrative offices and act as a liaison between Black Hills State University and the lab, relating to education activities. Norris will be a BHSU employee through the Center for the Advancement of Math and Science Education. She will work very closely with lab officials, Sayler said.

During the S.D. Science and Technology Authority June board meeting, Sayler talked about the possibility of hiring a deputy director for education and outreach who will assist in coordinating early education and outreach activities, as well as assist in developing a long term education plan for federal consideration which will be included in the DUSEL proposal to the NSF.

The original job posting states, "CAMSE (Center for the Advancement of Math and Science Education) seeks a visionary leader in science education to help direct this work and maximize learning opportunities

for K-12 students and teachers, university students and faculty, and the general public."

Sanford University Underground Laboratory Director Dr. Jose Alonso said he has worked with Norris on a number of past projects, and through the years the two have become good friends.

"I am delighted that the selection process came out this way because she will be a wonderful person for this job," Alonso said.

Norris is currently the chairman of the Lawrence Berkeley National Lab Diversity Council, and Alonso reported that she is very prominent nationally in physics education.

Although her official start-date is not until January 5, Sayler said Norris is already helping with education and outreach efforts. From her current station at Lawrence Berkeley National Lab she has been helping members of the Homestake Collaboration prepare for their annual review with the National Science Foundation, and she is preparing for a national conference about creating science and technology outreach efforts.

"We're gaining momentum, it feels like, by the day," Sayler said. "Strengthening the tie between education and outreach and the Sanford Lab to help improve communication is going to be really valuable."

Upon completing her work in Berkeley, Sayler said Norris plans to move to Lead.

### UPDATE FROM THE DUSEL EXPERIMENT DEVELOPMENT COMMITTEE (DEDC)

As the S4 proposal submission deadline of January 9, 2009 rapidly approaches, the DEDC are focusing their efforts to help the various collaborations and proponent groups from across the spectrum of activities which will comprise the DUSEL laboratory.

A common suite of resources is posted now at:  
<http://www.ems.psu.edu/~elsworth/projects/dusel/s4/resources.htm>

These resources are common to all proponent groups. As an aid to proponents, the package includes (1) a description of the evolving Homestake Facility and what it will ultimately offer; (2) a listing of all known physics and non-physics collaborations; (3) a NSF proposal checklist; (4) examples of prior

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MREFC proposals as a target; (5) E&O resources; (6) a sample WBS; and (7) a mechanism to check that facility resources and experiment needs are compatible. In addition, perhaps most importantly, a mechanism to codify this compatibility between experiment and facility with a consultation letter that may be an important part of a proposal.

Although these resources are common to all disciplines, the physics and biology-geoscience-engineering groups have taken different approaches in aiding the component collaborations to readiness.

The physics community has relied on close personal contact with collaboration groups, the supply of the resources noted above, collaboration workshops at professional meetings and contact through conference calls.

The biology-geoscience-engineering community has organized a network of science and responsiveness reviews for draft submissions completed by December 1. These activities will feed into an informational and review-feedback meeting planned 9-5 pm for the Hotel Nikko during the American Geophysical Union meeting in San Francisco on December 18<sup>th</sup>.

A series of conference calls have refined the form of individual experiments which will be submitted for the initial suite of experiments for S4. Since no specific resources in the S4 opportunity have been allocated for Biology, Geosciences, Engineering and other cross-cutting areas, the proposals will have to compete within the existing grant submission structure of NSF. Consequently, working groups have been busy determining the most appropriate programs within NSF as receptors for their proposals. The coordination activities will culminate with sessions on Geoneutrinos and Underground Science at the Fall meeting of the American Geophysical Union (San Francisco, December 2008).

Hopefully, these two different approaches in coordinating and in aiding the activities of the community will contribute positively to the maturing science plan for DUSEL-Homestake.

### JOBS IN PHYSICS

*Assistant, Associate or Professor Physics in Department of South Dakota School of Mines and Technology.* Anticipated tenure-track faculty position in experimental nuclear/particle or atomic physics related to the ongoing development of the Deep Underground Science and Engineering Laboratory (DUSEL) in Lead, South Dakota. Primarily seeking candidates at Assistant Professor level,

but exceptional candidates at a more senior level will be considered. Required: Ph.D. in experimental nuclear/particle or atomic physics/related field. Start date: August 22, 2009. Applicants must apply on-line at <http://sdmines.sdsmt.edu/sdsmt/employment>. Review of applications will begin February 2, 2009. SDSMT is an EEO/AA/ADA employer & provider. For more information: <https://yourfuture.sdbor.edu/applicants/jsp/shared/frameset/frameset.jsp?time=1229535238765>.

### FOCUS ON SAFETY

Fast & EZ way to become familiar with Integrated Safety Management, the foundation for the EH&S program being developed for Sanford Lab/DUSEL: <http://engineering.lbl.gov/training/ehs10/>

### Holiday Safety Tips

- \* Monitor electric lights, outlets and wires.
- \* Avoid burning candles near trees, children, or pets.
- \* Keep your live tree fresh and watered. Secure tree from tipping over. Nearly 25% of tree fires result from tree proximity to heat source.
- \* Avoid Holiday Drinking and Driving.



Happy

Holidays!

This newsletter is edited by Melissa Barclay. Special thanks for input from Kevin Lesko, Bill Harlan, Derek Elsworth, Ben Sayler and George Campbell.

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Happy

— New Year