HOMESTAKE DUSEL AND SANFORD LABORATORY NEWSLETTER

Dear Homestake Collaboration,

Welcome to the June monthly newsletter for Homestake DUSEL and South Dakota's Sanford Laboratory. We would like to receive 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 goal.

IMPORTANT DATES

July 6-10: LCAB Meeting Sanford Lab

July 10: EH&S Meeting, Sanford Lab

August 31 – September 2
Internal Review meeting, South Dakota

DUSEL IN THE NEWS

(Bill Harlan, Sanford Laboratory at Homestake)

The Sanford Lab's underground dedication ceremony on June 22 made headlines around the world this month. CNN picked up a story by Associated Press writer Dirk Lammers. So did ABC News. The Washington Post ran the story, as well as AP's online slide show. By June 23 the Sanford Lab dedication was the "most viewed" science story on Yahoo News and the third "most popular" of all Yahoo News stories.

Figure 1: Gov. Mike Rounds and T. Denny Sanford arrive at 4,850 feet underground in the former Homestake gold mine to dedicate the Sanford Underground Science and Engineering Laboratory

South Dakota Gov. Mike Rounds and Mr. T. Denny Sanford were the keynote speakers during an event at the 4,850-foot level. "This is a great moment in the history of South Dakota and in the history of underground science," the Governor told scientists and other dignitaries invited to the underground dedication. "The water has been lowered and we are starting to build a campus of experiments that can help our scientists solve some of the greatest mysteries of our world."

Figure 2: Sanford Lab Infrastructure Technician Bill Heisinger drills a hole for the plaque dedicating the Sanford Lab at Homestake. Left to right behind him: Dr. Kevin Lesko, Dr. Rick Gaitskell, Infrastructure Tech Alvin Burns, Gov. Mike Rounds, Mr. T. Denny Sanford, and Dr. Ken Lande.

The ceremony was in the "Vent Drift" -- a large tunnel, 14 feet wide by 14 feet tall, that connects the Ross and Yates shafts on the 4,850-foot level of Homestake. Guests wore hardhats and mine lamps, but the tunnel (a "drift" in mine parlance) was lit, the temperature was 70 degrees and there was a steady breeze thanks to a large exhaust fan on the surface.

The "ribbon cutting" was done in the style of hard-rock mining. Former Homestake gold miners Bill Heisinger and Alvin Burns used a traditional "jackleg" drill to punch holes into the wall of a tunnel. Governor Rounds and Mr. Sanford then lifted into place a plaque dedicating the Sanford Underground Laboratory at Homestake.

The Governor and Mr. Sanford and about 30 other guests -- including reporters -- descended Ross Shaft to the 4,850-foot level -- a trip that would have been impossible six weeks ago. Until May 13, the 4,850-foot level was under water.

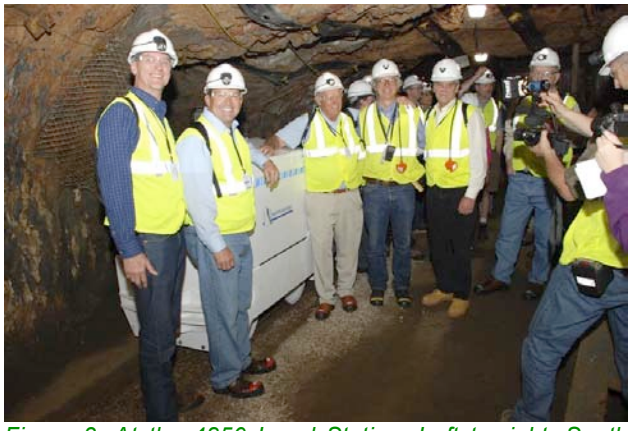

Figure 3: At the 4850 Level Station: Left to right: South Dakota Lt. Gov. Dennis Daugaard, South Dakota Gov. Mike Rounds, Mr. T. Denny Sanford, Dr. Kevin Lesko, and SDSTA Executive Director Ron Wheeler

DUSEL Principal Investigator Dr. Kevin Lesko of University of California at Berkeley and Lawrence Berkeley National Laboratory was among the guests. "The establishment of the Sanford Lab today is an important step in achieving the Deep Underground Laboratory many of us have sought in the past decade," Dr. Lesko said. "It re-establishes significant physics experiments in Homestake along with earth science experiments while we develop the proposal for the national facility." ◆

To read more about this story:

http://news.yahoo.com/s/ap/20090623/ap_on_sc/us_sci_underground_science

http://www.scientificamerican.com/blog/60-second-science/post.cfm?id=search-for-dark-matter-goes-deep-wi-2009-06-25

http://abcnews.go.com/Technology/wireStory?id=7902066

http://www.rapidcityjournal.com/articles/2009/06/23/news/local/doc4a3fe6717d39b312971727.txt

http://www.washingtonpost.com/wp-dyn/content/article/2009/06/22/AR2009062202183.html

Figure 4: UC Berkeley physicist Roger Falcone explains X-ray microscopy experiments underway at Berkeley Lab's Advanced Light Source (ALS). Falcone, associate laboratory director for photon science and director of the ALS, is accompanied by Zahid Hussain, division deputy for scientific support. (Roy Kaltschmidt/Lawrence Berkeley National Lab)

BERKELEY STAKES SCIENCE CLAIM AT HOMESTAKE GOLD MINE

By Robert Sanders, Media Relations | 17 June 2009 (Source: UC Berkeley News)

BERKELEY — South Dakota Gov. Mike Rounds paid a visit to UC Berkeley and Berkeley Lab last Friday (June 12) to get a feel for the type of research operation the campus and the lab plan to build at his state's famed Homestake gold mine.

Rounds has strongly supported efforts to turn the mine, founded in 1877 by mining magnate and California Senator George Hearst and taken out of operation in 2002, into the world's premier underground research laboratory, and the only one capable of answering critical questions about the nature of the elusive neutrino, a nearly massless sub-atomic particle that rarely interacts with matter. The DUSEL facility will host experiments in a range of fields, including physics, earth sciences, biology and engineering, as well as a major education and outreach program.

"We felt it was important to come out and see what the University of California has already completed and coordinated in terms of science facilities, in particular the labs like Berkeley Lab, and to develop long term, lasting relationships with people who are actively involved in the science community," Rounds said. "We in South Dakota are in the primary stage of welcoming research into our state and providing the necessary resources to make it successful. To come here and see how it's done gives us a chance to understand what the science community's expectations are."

Figure 5: South Dakota Gov. Mike Rounds, DUSEL principal investigator Kevin Lesko and South Dakota School of Mines and Technology geologist and co-Principal Investigator William Roggenthen touring the Hearst Mining Building, which was dedicated to the memory of California Senator George Hearst, founder of the Homestake Gold Mine in Lead, S.D. (Robert Sanders/UC Berkeley photo)

"We are excited by the tremendous progress being made at Homestake and by the DUSEL science team," said UC Berkeley Chancellor Robert Birgeneau, who breakfasted with Rounds. "DUSEL is a very important project, not only for the campus, the lab and South Dakota, but also for science, addressing some of the deepest questions about the very nature of the universe."

UC Berkeley physicist and Berkeley Lab researcher Kevin Lesko escorted Rounds and a small entourage on a tour of the Hearst Mining Building and Stanley Hall, as well as Berkeley Lab's Advanced Light Source and National Center for Electron Microscopy. Lesko is spearheading the collaboration with the National Science Foundation (NSF) to create at the Homestake mine the Deep Underground Science and Engineering Laboratory (DUSEL), which, at an existing depth of 8,000 feet, would be the deepest experimental lab in the world.

"The Homestake mine is the crown jewel for our research opportunities," said Rounds, who anticipates a major economic and academic stimulus from a high-profile national laboratory in South Dakota.

So far, the South Dakota legislature has ponied up more than $35 million and applied an additional federal grant to prepare the former mine for science, while South Dakota banker and philanthropist T. Denny Sanford plunked down another $70 million to turn an underground cavern at a depth of 4,850 feet into an experimental chamber to be called the Sanford Underground Science and Engineering Laboratory, or Sanford Lab. These funds are being used to reopen the shafts and install pumping equipment to remove water from the lower levels, which flooded when the mine was decommissioned and the pumps turned off. The water level dipped below 4,850 feet on May 13.

The underground lab will be dedicated June 22, kicking off parallel efforts to prepare underground space to host initial scientific programs while plans for NSF's DUSEL are prepared.

The first experiment to go into the Sanford Lab will be the Large Underground Xenon (LUX) experiment, which will look for dark matter, a so far unidentified 25 percent of the universe that has been inferred from observations of distant galaxies. Some astrophysicists think dark matter could be comprised of "weakly interacting massive particles," or WIMPS, that would betray their identity by interacting with supercold xenon atoms. The LUX experiment, an international collaboration led by Brown University and Case Western Reserve faculty, will take up residence this summer in newly renovated above-ground buildings while the underground space is readied.

Another experiment destined soon for the mine is Majorana, which will attempt to determine the mass of the neutrino via an hypothesized but rare event, neutrinoless double-beta decay the spontaneous conversion of two neutrons into two protons and two electrons (beta particles) without the emission of a neutrino.

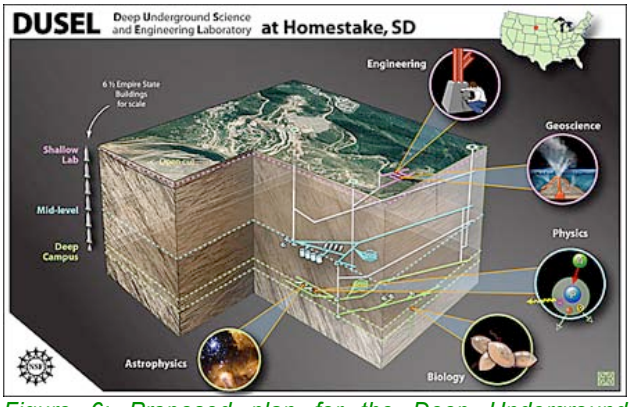

Figure 6: Proposed plan for the Deep Underground Science and Engineering Laboratory (DUSEL) in the Homestake Gold Mine, Lead, S.D. (Zina Deretsky, National Science Foundation)

For both experiments, an underground site is critical to block cosmic ray particles from space that could mimic the rare events the researchers are trying to discover.

The biggest project proposed for the underground lab is the very long baseline neutrino oscillation experiment, for which a neutrino detector at a 4,850-foot depth would be the target of a neutrino beam aimed from the FermiLab accelerator 1290 km away in central Illinois. Neutrinos rarely interact with matter, which means the neutrino beam could pass underground unperturbed, though scientists hope some of them will interact in the detector and reveal their "flavor." The results will tell researchers which of the three flavors of neutrino is the heaviest and which the lightest, complementing the results of Majorana, as well as refine the determination of the mixing between the three neutrino flavors. The experiment also probes a major symmetry in nature, charge-parity (CP) violation, that might ultimately explain the universe's matter-antimatter asymmetry.

"Other sites don't go deep enough for some next-generation physics experiments," Lesko said. A majority of DUSEL's experiments will be housed in cavities excavated off existing drifts – horizontal tunnels with experiments clustered into campuses at the 4,850- and 7,400-foot levels.

One member of Rounds' group was DUSEL project co-principal investigator William Roggenthen, professor of geology and geological engineering at the South Dakota School of Mines and Technology, who is intrigued by the opportunity to drill even deeper into the Earth from the bottom of Homestake. Future plans to drill to 16,000 feet could tell about the movement of fluids in underground cracks and the unique biology of underground microbes, which live at temperatures above the boiling point of water.

As executive project director and principal investigator, Lesko hopes to leverage these state investments to obtain National Science Foundation funds for a more expansive lab to accommodate a variety of experiments. In 2007, when NSF chose Homestake as its preferred location for a deep underground science lab, it awarded UC Berkeley and Lesko $15 million to plan the facility and the experiments. An NSF review in January 2009 resulted in a go-ahead to turn in a proposal for approximately $30 million to complete a preliminary design for the laboratory. That proposal was submitted in May.

"The 25-person review team gave DUSEL a very strong endorsement," Lesko said. "With this good sign, it is the right time for the governor to visit the campus to meet with those, like Graham Fleming and Chancellor Birgeneau, who have shepherded this project along."

Until his appointment as UC Berkeley vice chancellor for research, Fleming served as a member of the Board of Directors of the South Dakota Science and Technology Authority, which oversees the state's Homestake conversion project.

As construction begins for the Sanford Lab, Lesko is working with many collaborations to develop the scientific programs that will be supported as part of the DUSEL construction project and to integrate into the DUSEL facility design the necessary infrastructure and support services.

"The DUSEL team is seeking ways to exploit synergisms between the different experiments and disciplines and use these very different experiments to create a world-class education and outreach center," Lesko said.

During his tour of Berkeley Lab, Rounds was energized by a discussion about K-12 outreach with educators from the Lawrence Hall of Science and Berkeley Lab's Center for Science and Engineering Education. Rounds said that boosting education efforts in his state was one of his top priorities, and interaction with DUSEL would be key to that effort.

"The biggest problem we have in South Dakota is keeping young people within our state; if we don't provide them with opportunities, they have to go someplace else and we lose their talents," Rounds said. "We want to develop a program that … convinces the scientists that here's a place where they can get teachers and students interested in their story; and convinces teachers that they have an opportunity for them and their kids to participate even teachers who aren't science teachers."

Rounds noted that the mine was the site of an underground experiment in the 1960s that first measured neutrinos from the sun, earning Raymond Davis Jr. the 2002 Nobel Prize in Physics. In fact, Davis's old lab will be enlarged and renovated to house LUX. Rounds hopes that, whereas Homestake was once known for mining gold, in the future it will be known for mining science.

"There has been one Nobel Prize that has been found there already; we are convinced there will be others in the future," Rounds said. ◆

EXPERIMENTAL FACILITY EXPERIMENTAL DESIGN

DUSEL Preliminary Design

The DUSEL Engineering group is modifying the preliminary design of the 4850 level to reflect changes in scope as well as the increased size of the large cavity to become a 100kt water Cherenkov detector. Figure 7 shows the current plan view of the 4850 level at the first phase of construction.

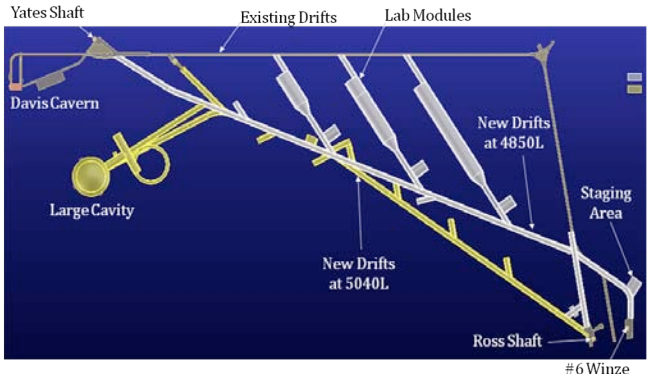

Figure 7: 4850L – Plan View

Three lab modules are shown in Figures 7-9. Two are expected to be standard lab modules, 20 x 20 meters of varying lengths and the third module will likely be somewhat smaller as it will be designed to accommodate a particle accelerator for nuclear astrophysics experiments. The large cavity has been enlarged to house a 100kt fiducial volume. The diameter remained the same as previous layouts but the height has changed. The enlarged excavation near the Davis Cavern will be completed for the Early Implementation Program to house the LUX and Majorana experiments at the Sanford Lab.

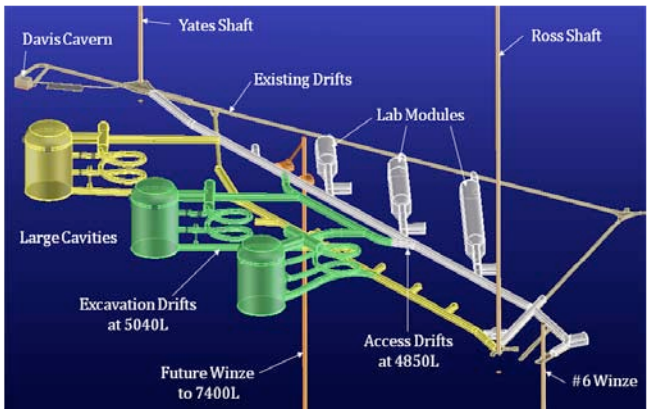

Figure 8: Preliminary Design - 4850 level with the addition of two more large cavities that could be added later or with additional funding and a winze to the 7400L

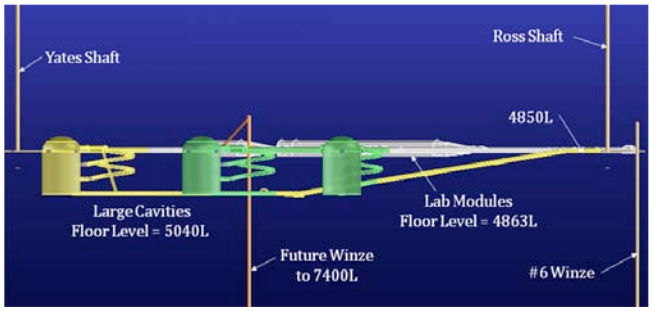

Figure 9: Elevation of the 4850L. The increased depth of the large cavity has lowered the excavation drifts to an elevation of 5040 feet below the Yates shaft collar. Previous layouts had the lower elevation at 5000 feet.

The Project team prepared its proposal to complete the preliminary design and integrate the DUSEL suite of experiments into that design with plans for the construction project. This proposal benefited from the thorough annual review in January 2009 and subsequent recommendations from the review panel. The Proposal requests ~$30M to complete the preliminary design of the facility and would support the project through December of 2010. The costs are shared between a significant increase of project staff to oversee the preparation of the proposal and outsourced design contracts. The Proposal was submitted on May 15 and maintains the aggressive timetable of preparing the Preliminary Design by the end of 2010 and preparing for a presentation to the National Science Board in the Spring of 2011.

DUSEL CO_2 - A Deep Underground Laboratory for Geologic CO_2 Sequestration Studies

Two members of the DUSEL CO2 team, Dr. Patrick Dobson and Dr. Rohit Salve of LBNL, visited Homestake on June 9-11 to introduce the DUSEL CO2 concept to the Sanford Lab community and to initiate fieldwork on this project. Dr. Dobson gave a presentation describing GCS and discussed how proposed DUSEL CO2 research on this topic could answer key science questions and accelerate GCS implementation.

The DUSEL CO2 research team, comprised of scientists from LBNL and Princeton University, proposes the construction of an underground laboratory facility at Homestake for geologic carbon sequestration (GCS) studies. GCS, a process by which CO_2 is captured from power plants and other large point source emitters and injected into deep

saline formations or depleted oil and gas reservoirs where it will be sequestered, is a promising approach for mitigating CO_2 emissions.

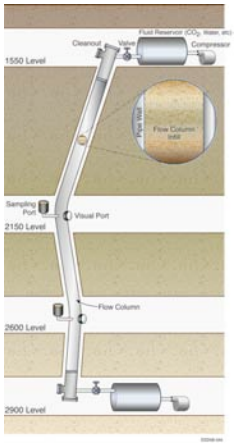

Figure 10: Conceptual model for the DUSEL CO2 facility

A challenge in implementing GCS is ensuring long-term entrapment of the injected CO_2, minimizing environmental impacts, and quantifying the risk of CO_2 leakage. The proposed DUSEL CO2 experimental facility would utilize the large vertical extent (over 400 m) of existing borings at Homestake as well as the natural geothermal gradient. Pipes installed within the existing borings would serve as long flow columns (FCs) that will contain the CO_2 and allow control of pressure and flow rate. The FCs can be filled with selected porous media such as alternating layers of sand and clay, as well as with cements to mimic plugged wells. Three main areas of focus are planned for the proposed suite of experiments: 1) study the vertical migration of CO_2 in a simulated leak in which CO_2 changes from a supercritical fluid to a subcritical gas; 2) quantify the interactions of CO_2 with cap rocks and well cements; and 3) investigate the effects of anaerobic, thermophilic microbial communities on CO_2 conversion to CH_4 and carbonate.

Figure 11: Existing sand line on the 1700 level at Homestake

During this visit, Dr. Salve oversaw the installation of monitoring stations on the 800, 2000, and 4850 levels to record ambient temperature, barometric pressure, and relative humidity for site characterization. In addition, potential sites (drain holes and sand lines) for this proposed experimental facility were examined. This effort was supported by Tom Trancynger, Jason Rosdahl, Jaret Heise, Kathy Hart, and Tom Regan of the Sanford Lab and Professor Larry Stetler and Jason van Beek of the South Dakota School of Mines and Technology.

Figure 12: Dr. Rohit Salve setting up an environmental monitoring station on the 4850 Level

UPDATES

Surface Infrastructure Alterations and Upgrades

The HDR CUH2A Architecture of San Francisco, CA contract to assess the surface infrastructure was signed on May 28 and was immediately followed with extensive surface inspections by the HDR team. With an initial funding allocation, HDR will focus their assessment activities on the buildings and campus infrastructure that are planned for reuse in the DUSEL architectural program. They will identify the existing surface site conditions and assess the existing surface conditions related to safety concerns and environmental hazards. HDR will

provide an initial assessment report with preliminary cost estimates by August 2009.

Infrastructure for Underground Operations and Research Space

Existing RESPEC and ARUP contracts have both been amended to increase and accelerate gathering of critical information about existing infrastructure status, geotechnical information from the underground, and prepare an updated cost-estimate for the refined project scope. These contract amendments as well as original contracts are being handled by the project satellite project office at the South Dakota School of Mines under the direction of Dr. Bill Roggenthen and Mike Headley.

Research Instrumentation and Equipment and Experimental Requirements

Dr. Larry Stetler (SDSMT) took advantage of the reopening of the 4850 Level to deploy a pressure transducer down the #6 Winze to the 5,190-foot level. The transducer allows minute-to-minute monitoring of the water level. The project is part of an NSF-sponsored experiment to study pre-Cambrian aquifers.

Jaret Heise (Sanford Lab) collected water samples from the Davis Cavern as part of a study by Dr. Cynthia Anderson's (BHSU) NASA grant to study biota on the 4850 Level.

The Research Advisory Committee (RAC) is a group formed under the auspices of the SD Board of Regents. It consists of the Vice Presidents for Research from the regental institutions and the Technology Transfer Officers. Late in 2008, the DUSEL project was asked to furnish a person to join this group, and W. Roggenthen attended the most recent meeting in Pierre.

A news release has indicated that NASA EPSCoR has announced the recipients of seven research initiation grants (typically in the range of $20,000 - $40,000). Of the seven grants, three involve projects associated with the underground laboratory. The three seed grants, which deal with the laboratory and the PI's include:

Atomic Interferometry based Subterranean Gravimetry at DUSEL - Andre Petukhov

Metagenomic Analysis and Bioprospecting of the Microbial Communities in Homestake DUSEL following Mine Dewatering - Sookie S. Bang

Development of Multi-functional Multiband Antennas for Cryospheric Applications and for Signal Propagation Measurements in Tunnels at the Deep Underground Science and Engineering Laboratory - Dimitris Anagnostou

Site Preparation, Re-entry and Rehabilitation

The 4850L was declared "dry" on May 13. Subsequently the water has been pumped below the 4920 level. Figure 13 shows the Davis Cavity at this level, the birthplace of modern neutrino astrophysics. The cavity is being adapted for the LUX dark matter experiment as part of Sanford Lab's early implementation program. To facilitate the installation of this experiment, the SDSTA recently approved a significant modification of a surface facility to provide the LUX experiment with assembly, commissioning, and testing space. The LUX collaboration is making plans for occupying the surface "warehouse" this summer and preparing for moving underground later this year.

Figure 13: Davis Cavity on Homestake's 4850 Level.

This cavity housed Ray Davis' Homestake experiment using Chlorine to first detect solar neutrinos. These measurements coupled with John Bahcall's solar model work resulted in the Solar Neutrino Problem. The problem of too few solar neutrinos being detected spawned efforts in Japan with Kamiokande and SuperKamiokande, in Europe at the SAGE and GALLEX experiments and was ultimately resolved by Sudbury Neutrino Observatory, which detected flavor oscillations between neutral current and charged current measurements and deduced that neutrinos were massive. SNO's determination of the "Large Mixing Angle" MSW solution was then confirmed and refined by KamLAND using reactor neutrinos.

Environmental Impact Statement

The Environmental Impact Statement kick off meeting was held at the Homestake Site on May 19-22. The ANL team led by Margaret McDowell was hosted by Sanford Lab staff with interactions facilitated by the DUSEL Project Team members including Kevin Lesko, Bill Roggenthen, Kem Robinson, Dick DiGennaro, Mike Headley, and George Campbell. Steve Meador led the NSF delegation for the meeting, accompanied by Jon Kotcher and Patty McNamara.

EDUCATION AND OUTREACH

Dr. Kevin Lesko gave presentations on DUSEL at the LBNL Director's review of the Nuclear Science Division on May 12, the DOE review of LBNL's Physics Division on May 28, to the US House of Representative's Science and Technology Committee Visit to Berkeley May 28, and an invited presentation to the Conference on the Intersections of Particle and Nuclear Physics (CIPANP) May 29.

Cultural Outreach

On May 18, Bill Harlan and George Campbell traveled to Kyle, SD to meet with Birgil Kills Straight. Birgil is Executive Director of the Oglala Lakota Nation Parks and Recreation Authority and he is a recognized authority on Lakota Cosmology.

On May 15, Al Schwalm and Deig Sandoval professors at Oglala Lakota College and four of their students (Beau White, Michael DuBray, David Harman & Richard White Jr.) came to Sanford Lab to demonstrate the use of their robot and portable x-ray fluorescence system. At Homestake's 2000 L, the students conducted a successful demonstration of the robot's capability to transverse over obstacles and changes in elevations. They also completed successful measurements with the XRF unit and demonstrated its elemental analysis abilities, which may be useful for waste rock characterization.

Environment, Health & Safety

Integrated Safety Management

Sanford Laboratory has initiated OSHA on-line training as a requirement for all their employees. SDSTA employees and DUSEL Project members will also be required to complete 10-hour or 30-hour OSHA courses depending upon their work assignments.

On June 30, EH&S Director interviews will be held at the South Dakota School of Mines and Technology in Rapid City. Those who cannot be in South Dakota will participate by videoconference.

Summer Safety

While you are catching those rays at the lake or beach, use sunscreen with UVA and UVB protection and SPF of 15 or higher, especially at midday. Apply at least 15 minutes before you go out. Reapply every two hours, or every hour if you are in the water. Drink plenty of fluids so you don't get dehydrated.

NEW STAFF

Kurt Deshayes has recently joined the DUSEL Project team as Manager of Project Systems and Support. In this role, he will lead Project Controls, Business Systems, Project Administration, and Human Resources for the DUSEL Project. Fifty to sixty percent of his time will support the DUSEL project. Kurt is a Senior Project Manager in the LBNL Project Management Office (PMO) and has worked in this capacity at LBNL since April 2006. In this position, he provides Project Management Support to Senior Lab Management, Project Directors and Project Managers on various projects and programs including operational support projects. His experience includes DOE and DOD EVMS methodology, project management system development and implementation, strategic planning, resource and integration scheduling, budget preparation and management, project management training, performance analysis, change control, proposal development and quality assurance. Project management methodologies are in accordance with DOE Order 413.3A and the Project Management Body of Knowledge (PMBOK). Kurt also holds the title of Earned Value Management System Surveillance Officer for LBNL.

Kurt brings over 34 years experience in project management, project controls, design engineering, and quality assurance "hands-on" expertise at many DOE Facilities. Twenty-three of those years are specific to project management expertise at various DOE facilities including Lawrence Berkeley National Laboratory (LBNL), Los Alamos National Laboratory (LANL), Idaho National Engineering and

Environmental Laboratory (INEEL), and the Hanford Site in Richland, Washington. For 15 years, he provided project management support at Research & Development Facilities with over three years as a Senior Project Manager at LBNL supporting the Project Management Office and 13 years experience at LANL supporting large research and development, high-dollar and high-technical projects/programs, such as the Special Nuclear Materials Laboratory (SNML), Accelerator Production of Tritium (APT), Hydrotest Program and Nuclear Weapons Experimental Programs.

Kurt received his Bachelor of Science degree from the University of Phoenix with an Associate of Science in Mechanical Engineering.

Newsletter Editor: Melissa Barclay
Contributors: Kevin Lesko, Bill Harlan, Robert Sanders, David Plate, Dr. Patrick Dobson, & Kurt Deshayes.

Figures 1-3 Photo Credits: Jack Stratton, Sanford Laboratory at Homestake. Permission to use UC Berkeley News article and Figures 4-6 granted by Robert Sanders and Roy Kaltschmidt. Figures 7-9 provided by David Plate; Figure 10 drafted by Diana Swantek; Figures 11 & 12 courtesy of Dr. Patrick Dobson.

HOMESTAKE DUSEL CONTACT INFORMATION

Lawrence Berkeley National Laboratory
Richard DiGennaro: 510-486-5516
RSDigennaro@lbl.gov
Project Office: Dianna Jacobs
510- 486-7191
DJacobs@lbl.gov
South Dakota Science and Technology Authority
Ron Wheeler, Executive Director
Laurie Gehner, Executive Assistant
605-722-8650
South Dakota School of Mines and Technology
William Roggenthen: 605-394-2460
William.Roggenthen@sdsmt.edu
University of California at Berkeley
Kevin T. Lesko: 510-486-7731
KTLesko@berkeley.edu
Melissa Barclay: 510-486-5237
mwbarclay@lbl.gov