

Sandia LabNews

Managed by Lockheed Martin for the National Nuclear Security Administration



Managing by intent: Tom Hunter and John Stichman on the State of the Labs during a time of transformation



LABS PRESIDENT AND DIRECTOR Tom Hunter, right, emphasizes a point during the annual Lab News State of the Labs interview. Joining him in his office is Executive VP John Stichman. (Photos by Randy Montoya)

Note: Each year, the Lab News talks to Sandia's senior leaders about the important issues on employees' minds and the issues that will shape the future of the Labs. This year, that conversation took place in Labs President and Director Tom Hunter's office, where Tom was joined by Executive VP John Stichman to talk with Lab News editor Bill Murphy, Media Relations and Communications Manager Chris Miller, and Sandia publications editor John German.

Lab News: Let's start with something that's been the subject of a lot of discussion lately: How important is the RRW [reliable replacement war-head] program to the nuclear weapons complex in general, and to Sandia in particular?

Tom Hunter: RRW is, rightfully, a matter of national discussion and debate — it's essential to have that national discussion about the appropriate policy, and then it seems essential that RRW should at a minimum be evaluated to find out what it can do for the transformation in both the stockpile and the complex.

For us, I think, RRW represents a unique opportunity to start to transform the stockpile for the future, and it represents a way we can

(Continued on page 4)

Sandia research indicates that lightning was the likely cause of Sago Mine explosion Labs' research makes way into official report

By Chris Burroughs

Findings of a Sandia research team were a key source of a recently released report by the US Mine Safety and Health Administration (MSHA) indicating that lightning was the likely cause of the explosion in the Sago Mine on Jan. 2, 2006. The disaster killed 12 miners.

As part of its official investigation, MSHA contracted with Sandia to study if energy from a lightning strike could travel underground to potentially ignite an explosive mixture of methane gas trapped in a sealed section of the Sago Mine. Three lightning strikes were recorded by national detection networks, along with eye-witness accounts of other strikes nearby the mine, just prior to the explosion. The bolts struck nearly

simultaneously with the explosion that was registered by seismographs and carbon monoxide monitors at the mine.

Operations at the mine were officially idled in late March by mine owner International Coal Group, Inc. A small crew remains employed at Sago to maintain the mine infrastructure.

In early November a Sandia team took its test monitoring equipment across the country to the Sago Mine, located near Buckhannon, W.Va. They spent 10 days analyzing the likelihood that electric current

produced by a lightning strike could transmit effects deep into the coal mine.

Their findings became part of the final MSHA accident investigation report delivered to Con-

(Continued on page 8)



SANDIAN DAWNA CHARLEY, left, and a Sago miner work with a vehicle, called a "mantrip," before it enters the mine as part of experiments Sandia researchers conducted at the site last November.

Status report:

Brokering stage of Labs' Managed Workforce Transition process ends

Matching work to people and people to work continues

Brokering — the stage of Sandia's Managed Workforce Transition (MWT) process during which senior managers actively sought to match job openings and people across the Labs — has concluded.

MWT is a systematic Labs-wide staffing process, begun in November, designed to align Sandia's workforce with the work that needs to be done (Lab News, Dec. 8, 2006; Feb. 16, 2007; and April 13, 2007).

Brokering, one of the final steps in the process, began in early April.

(See the answer on page 6 of the interview with Tom Hunter and John Stichman, which starts above, for an assessment of progress made as a result of the MWT.)

Although the formal MWT steps have concluded, Pat Smith, acting VP for Human Resources Div. 3000, encourages managers, directors, and VPs to continue to place available people in open, funded positions through directed transfers and post and bid. Divisions that are below their FTE targets should seek qualified candidates internally if possible, she says.

"If an internal candidate is qualified or can be suitably retrained, please consider such a candidate first," she says.

There will be situations in which matches cannot be made, says Pat. In those situations, organizations should evaluate whether they can retain a person for several months in anticipation of future work or until attrition resolves the discrepancy. Another option, when an employee's skills do not match current or anticipated work, is placing the

(Continued on page 7)



Inside . . .

- California site wins prestigious DOE P2 award for its environmental management system Page 3
- Scores of Sandia volunteers take on key roles in Intel International Science and Engineering Fair 2007 . . . Page 9
- Sandia and Boeing to work on hydrogen-based fuel cells for standby power in aircraft Page 10
- Sandia Safety Fair speaker's firsthand story jolts audience to take safety procedures seriously Page 11
- Thunderbird Award winners overcome obstacles. Page 13
- Brian Griego is a walking, running miracle man. Page 16

What's what

It's no surprise, I guess, that numbers – like those pointed out in a two-line blurb in *Sandia Daily News* three weeks ago – really catch the attention of folks at an engineering R&D lab. It noted that at three minutes and four seconds after 2 a.m. on May 6 the time/date sequence would be 02:03:04 05/06/07, and that that wouldn't happen again for 100 years.

A couple of people wrote right away, in time to make the May 11 *Lab News*, pointing out variations and other factoids of sequential numbers. But other numerophiles chimed in, too.

Mark Boslough (1433) wrote that that same sequence also “will happen next month in most countries, where they write June 5, 2007, as 05-06-07.”

Gerard Kerbleski (3331) added: “Yes, but at 12:34 a.m. and p.m., it was 12:34 5/6/7.”

And Keith Miller (1523) noted that his granddaughter will be 07 years old on 07/07/07.

Surely someone could crunch all these number combinations and come up with a lottery or roulette winner. If so, I hope he or she will remember where the suggestion came from and share generously; my boat needs lots of stuff.

* * *

We made a little style change in *Sandia Daily News* last week. Publications use “style” for consistency – abbreviating some things and spelling out others, for example, referring to people by title (honorific or otherwise), etc. Because my first job in journalism was with The Associated Press, I've kept to that style, partly by habit but also because it's used by thousands of publications in the US and other places around the world.

In AP style for days/dates referenced in a story, Monday, Tuesday, etc., are used for days of the week within seven days before or after the current (publication/broadcast) date; the month and a figure (June 8, July 1, etc.) are used for dates beyond that range. Afternoon publications (like *SDN*) also use “today,” “tonight,” “this morning,” and “this afternoon.” That style seems to be based on verb tense common sense and conversational usage: “I'm going to do so-and-so Monday” indicates the next Monday after the announcement, or “I saw that Monday” indicates the last Monday prior to the announcement. A Monday further out or back would have to be specified by date. Simple.

But occasionally, an *SDN* reader would email “Which Monday do you mean?” or “To me, ‘today’ is the day I read *SDN*, and I don't always read it the day it comes out,” or something similar. I would explain and that would be that. Questions about “which Monday” were rare. But there have been a few.

So, clarity being the foremost requirement of communication, the style is now to state the complete, unambiguous date, as in “Friday, May 25, 2007.”

Hopefully, there'll be no need for further clarification, such as BC, BCE, AD, or CE. Surely we can figure that out.

* * *

Oh, and by the way, where's Suavé Superfly these days?

— Howard Kercheval (844-7842, MS 0165, hckerch@sandia.gov)



Bob Stevens calls for support of Military Appreciation Month

Note: Lockheed Martin President, Chairman, and CEO Bob Stevens recently sent a memo to all employees around the corporation, encouraging them to participate in the Lockheed Martin Employees Care program, which provides care packages to military personnel. Here's the text of his memo:

* * *

In an effort to honor the personal sacrifices of the men and women of the armed forces and their families, Congress has designated May as National Military Appreciation Month.

As a Lockheed Martin family, we have especially close ties to those who serve. Many of us have military experience, and we have 266 employees currently called to active duty in the National Guard and Reserves. Beyond that, as a corporation we have a mission to support our service men and women with the systems, products, and services on which their lives — and our freedom — ultimately depend.

One way to show your appreciation of our men and women in uniform is through the Lockheed Martin Employees Care program, accessible at www.lockheedmartinemployeescare.com.

Through this program, you can make a tax-deductible donation to purchase care packages for \$25 per package. These packages contain many items our service men and women have requested, such as prepaid phone cards, books, and personal items. Since the Lockheed Martin Employees Care USO Care Package program began in 2004, the corporation and employees have donated close to \$1 million.

Now more than ever — with tours of duty being extended for many deployed personnel — is the time to consider sending a care package. They are a warm reminder of home for our military who are stationed far away from their families and friends. Thanks in advance for your continued generous support of this program — and for letting our service men and women know we care.

Sandia will field a Race for the Cure team

On Sunday, June 10, a Sandia team will join in the fight against breast cancer by participating in the 2007 Central New Mexico Komen Race for the Cure® Run/Walk. The run/walk features a 5K run, a 5K walk, and a mile walk.



Up to 75 percent of the net proceeds from the race will stay in central New Mexico to fund screening, treatment, and follow-up care for underserved women; education on breast health and early detection; and outreach programs specifically targeted to breast cancer.

Sandians working to put together the Labs team include Jodi Case, Jackie Von Loh, Chris Slater, Ian Cheng, Kristen Steen, and Robin Mitchell.

Jodi says the goal is to enlist at least 250 Sandians to participate in the event. “Help us exceed this goal and, more importantly, help make a difference in the fight against breast cancer,” Jodi says. The Sandia team is open to employees, contractors, friends, and family members.

For more information or to get a team registration form, contact Jodi at jcase@sandia.gov or 844-8559.

Register by May 28 and receive \$5 off of the entry fee of \$25.

Take Note

Retiring and not seen in *Lab News* pictures: Larry Clevenger (3300), 28 years; Joanne Hertz (6421), 12 years.

Sandia LabNews

Sandia National Laboratories

<http://www.sandia.gov/LabNews>

Albuquerque, New Mexico 87185-0165
Livermore, California 94550-0969
Tonopah, Nevada • Nevada Test Site • Amarillo, Texas •
Carlsbad, New Mexico • Washington, D.C.

Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin company, for the US Department of Energy's National Nuclear Security Administration.

Bill Murphy, Editor 505/845-0845
Chris Burroughs, Writer 505/844-0948
Randy Montoya, Photographer 505/844-5605
Mike Janes, California site contact 925/294-2447
Michael Lanigan, Production 505/844-2297

Contributors: Janet Carpenter (844-7841), John German (844-5199), Neal Singer (845-7078), Stephanie Holinka (284-9227), Howard Kercheval (columnist, 844-7842), Iris Aboytes (844-2282), Michael Padilla (284-5325), Julie Hall (284-7761), Patti Koning (925-294-4911), Rod Geer (844-6601), and Michelle Fleming (Ads, Milepost photos, 844-4902), Darrick Hurst (intern, 844-8009). Dept. 3651 Manager: Chris Miller (844-0587).

Lab News fax 505/844-0645
Classified ads 505/844-4902

Published on alternate Fridays by Media Relations and Employee Communications Dept. 3651, MS 0165



Recent Patents

Note: Patents listed here include the names of active Sandians only; non-Sandia inventors are not included. Following the listing for each patent is a patent number, which is searchable at the US Patent and Trademarks Office website (www.uspto.gov).

* * *

Bruce Mosier, Bob Crocker (both 8125), and Kamlesh Patel (8324): Sample Preparation System for Microfluidic Preparations (Patent No. 7,213,473)

Stephen Eisenbies (8237) and Steven Haney (8229): Adaptive Ophthalmologic System (7,195,354)

Chris Cornelius, Cy Fujimoto, and Michael Hickner (all 6338): Sulfonated Polyphenylene Polymer (7,186,790)

Clifford Ho (6313): Circular Chemiresistors for Microchemical Sensors (7,189,360)

Kurt Berger (8231): Reticule State Based Linear Dosimeter (7,196,771)



Lab News Reader Service

Retirees (only):

To notify of changes in address, contact Benefits Dept. 3332, Customer Service, at 505-844-4237, or Mail Stop 1021, Sandia National Laboratories, Albuquerque, NM 87185-1021.

California Site wins major environmental management award from DOE

By Patti Koning

Sandia/California recently was awarded a prestigious DOE Pollution Prevention (P2) Star Award for the implementation of the site's Environmental Management System (EMS).

"This is the highest pollution prevention award given out by DOE," says Janet Harris (8516). "More importantly, this award recognizes the hard work of our entire site in implementing the EMS quickly and effectively."

Titled "Unique Approaches and Techniques Resulting in Rapid and Effective EMS Implementation at SNL/CA," the project first received an NNSA Environmental Stewardship Award last December. Those winners were then advanced to the DOE P2 Star Awards competition, which includes the entire DOE complex.

The team behind this effort received a Gold President's Quality Award (PQA) for their work in 2006.

Sandia/New Mexico also received a DOE P2 Star Award for "HERMES III Waste Minimization Practices."

Sandia/California implemented its EMS program in just 14 months, a process that took most other DOE facilities several years to complete. In 2003 DOE set a requirement for all of its facilities to have an environmental management system in place by December 2005.

Initially, Sandia/New Mexico led the EMS effort for all Labs sites. During the process it became clear the California site needed a separate EMS program because of the different environmental aspects of the two sites, especially in geography, local environmental laws, and the nature of the work conducted. Radioactive waste and heavy noise, for example, have a much lower risk ranking for California than for New Mexico.

In ranking the risk of environmental aspects, Sandia/California examined conditions under normal and off-normal operations to account for existing controls and compliance programs. Consideration for off-normal events allowed the inclusion of emergency aspects such as earthquake and fire as environmental aspects in the program.

A 2003 study by the US Geological Society



THE EMS CORE TEAM of Gary Shamber, Janet Harris, Laurie Farren, Mark Brynildson, Leslee Gardizi, Robert Holland, and Barbara Larsen. (Deanna Dicker is not shown.) (Photo by Randy Wong)

concluded there is a 62 percent probability of at least one magnitude 6.7 or greater quake striking the San Francisco Bay Area region before 2032.

In October 2004, the site established a core team consisting of Mark Brynildson, Deanna Dicker, Laurie Farren, Leslee Gardizi, Janet Harris, Robert Holland, Barbara Larsen, and Gary Shamber, all of Environmental Management Dept. 8516. The initial goal was to exceed the DOE requirements and establish an EMS that could achieve ISO 14001:2004 certification by the end of FY2007.

The core team started with a strong project management approach. They performed a



ENVIRONMENTAL MONITORING staff John Chavarria and Robert Holland (both 8516) conduct groundwater monitoring at the Navy Landfill site, located at the southern end of Sandia/California.

Sandia California News

detailed gap analysis against both DOE and ISO requirements. The gap analysis looked at which aspects of the DOE order the site was already meeting, and what was necessary to meet the remaining aspects.

'We weren't missing much'

"The results of the gap analysis were very encouraging," says Barbara Larsen (8516), Environmental Planning & Ecology Program lead. "We found we weren't missing much. The big pieces, such as targeted environmental programs and implementation of compliance requirements, were already in place. We needed to work on the supplemental activities such as documentation, communication, and training."

In July 2005, the California site plan was audited by ES&H, Quality, and Safeguards & Security Dept. 12870. The auditors completed only a desk audit and interviewed core team members to verify that the elements of the EMS program met DOE requirements.

The EMS program has 19 aspects, each with its own broad objective to minimize environmental impact. Specific targets, including chemical inventory reduction, large-scale recycling, minimizing refueling on Spare the Air days, and green purchasing, support achievement in meeting the objectives.

"Our environmental aspects impact everyone in some way. Everyone made small changes for a big net effect," says Janet. "In shipping and receiving, wood pallets are now recycled. Maintenance changes routine equipment fueling on Spare the Air days. OMAs seek out green purchasing whenever possible."

The EMS has resulted in substantial progress in many environmental program areas. The hazardous material inventory was decreased by 15 percent in FY05 and an additional 12 percent in FY06, exceeding the goals set for both years.

Electrical energy use has declined significantly, from 38,483 megawatt hours (MWHs) in FY04 to 35,974 MWHs in FY06, a reduction of

nearly 10 percent. By the end of FY2006, the site was recycling 3,836 pounds of toner cartridges, 1,367 pounds of aluminum beverage containers, 882 pounds of glass beverage containers, and 661 pounds of plastic beverage containers.

Barbara says a key ingredient to the success of the EMS was the commitment from site management, notably then-Div. 8000 VP Mim John.

"Having Mim's firm commitment really helped in rolling out the EMS," she says. "And Paul Himmert continues to provide a high level of support, leading the site in embracing this process. Everyone here has really put their arms around the EMS and taken ownership."

Another key factor was the Interdisciplinary Team (IDT), which won a President's Quality Award in 1999. The IDT consists of representatives from each environmental, safety and health (ES&H) subject area, facilities, and security. The IDT reviews all new or modified site activities and projects for their potential environmental impacts, and provides for incorporation of all environmental requirements.

The auditors approved Sandia/California's EMS program with noteworthy recognition for going above and beyond the requirements. Division 8000 was the first in all of Sandia to self-declare that it had met the DOE requirement.

With the EMS plan in place, the core team pushed forward and achieved ISO 14001:2004 certification in September 2006, a year ahead of schedule. Division 8000 is the first organization at Sandia to receive this certification and is being viewed as a pilot for Sandia/New Mexico, which is aiming to receive certification by the end of FY08.



For more California news, see "Sandia builds ties to California's clean energy initiatives" on page 11.

State of the Labs

(Continued from page 1)

transform the production complex and turn it into something that is more effective, more robust, and more agile.

John Stichman: RRW represents an opportunity for us to support national policy. Also, it is fully in line with one of the major strategies of the Laboratory, which is to support through our leadership the transformation of the nuclear weapons stockpile and the complex that supports the stockpile.

How much work does RRW represent?

LN: If RRW does go forward, will it be a fairly significant portion of our work?

TH: Within the weapons program nationally, the volume of work will not change enormously with RRW. It will become a piece of the weapons program at the national level. At Sandia the same thing is largely true. We still have to maintain the stockpile. We'll still have to do the assessments of the stockpile. We'll still have to provide support for the entire stockpile. RRW will be an important and transformational program, but it will not result in large growth in the work in the weapons program at Sandia or nationally.

It's also important to note that our role in national security has many dimensions. The principal one for us has been and will continue to be nuclear weapons. But we do provide a balanced portfolio of capabilities for the nation in many areas of national security.



“The nuclear weapons budget is under stress nationally. . . . There will be key areas where we'll feel like we don't have the resources to do what we need to do, but our experience has been, if we work very hard and we work very closely with the customer, we'll find a way to get the work done.”

LN: Besides RRW, what's the most significant weapons work Sandia's going to be involved in over the next few years?

TH: Key technology elements that will enable the broader transformation will include our work in microsystems, our work in computing, our work in system design, and our work in making sure we know how to impact production within the complex.

JS: I'd also emphasize stockpile evaluation. Sandia always has been a leader in developing new ways to do the surveillance and overall evaluation of the stockpile, and that continues to be a major element of our activity.

TH: One of the significant examples of technology transformation that we're involved in today resulted from the elimination of our ability to use certain reactors to do radiation hardening testing. The science basis for making that change at Sandia, the QASPR [Qualification Alternatives to the Sandia Pulsed Reactor] program, is an example of one of those key and very impacting programs that we're going to have to master and do over the next several years. Joan Woodard has taken a leadership role in all of this work.

Will the weapons budget be adequate for the mission?

LN: Do you think the budget over the next few years will be adequate for the Labs to fully execute its weapons mission?

TH: The nuclear weapons budget is under



STATE OF THE LABS — *Lab News* team members, from left, Bill Murphy, Chris Miller, and John German (all 3651) interview Tom Hunter, right, and John Stichman in Tom's office.

(Photos by Randy Montoya)

stress nationally. There will be a lot of work to do in the incorporation of RRW, if that moves forward. But beyond that, the transformation of the complex is going to require a lot of resources. Sandia will be bearing some of the same stress locally that the complex will feel

nationally. There will be key areas where we'll feel like we don't have the resources to do what we need to do, but our experience has been, if we work very hard and we work very closely with the customer, we'll find a way to get the work done. That doesn't mean it will be easy; it will mean a lot of hard work because there's going to be budget stress all through the system.

LN: What potentially could be the effect of the Complex 2030 plan on Sandia? [Note: Complex 2030 is the name NNSA has attached to the process of transforming the weapons complex and stockpile to meet 21st-century demands.]

TH: The complex will have to go through a transition. It appears to me that the role that Sandia has in nuclear weapons is essential no matter which way the complex goes.

I think we'll be relied on to play that role. The magnitude of the transition and the way it works out at all the facilities is yet to be determined, but there will be changes.

For example, we're already eliminating special nuclear material at Sandia to make the complex easier to operate and make security less costly. There'll be a number of those kinds of changes over time at Sandia and around the complex.

JS: In our 2007 strategic plan, we set in place an intent to be leaders in helping the government achieve Complex 2030. And, in fact, we're playing an active leadership role in that process.

TH: We should note that some of our capabilities like the MESA complex and the environmental testing complex and some of the other simulation areas we have are likely to be crucial features in the complex as we move forward.

Perceptions of nuclear energy

LN: What's the status of the GNEP [Global Nuclear Energy Partnership] program? Is the political support there?

TH: I'm personally convinced that the country has a different attitude about nuclear energy today than it did a few years ago. It stems from the fact that we have to deal with the question of climate change and the question of energy production; we have to deal with the question of nonproliferation and we have to deal with the question of our global leadership.

The administration has said that if there's to be a broad nuclear future in this country, there has to be a way to provide for a more effective fuel cycle and do recycling of spent fuel. Otherwise you just accumulate too much spent fuel.

To date Congress has not supported the administration directly in this concept, particularly in FY07. We'll see how it comes out in FY08. So far, [GNEP] hasn't grown as quickly as the broad initiative the administration had proposed.

LN: Do you think there'll be a point where the public will demand some sort of concrete progress in nuclear energy?

TH: The American public is a little hard to predict in this regard but I think they're going to declare in some way that our engagement of the environment and our energy use have to be modified. Many will come to the conclusion that nuclear energy is clearly the way to provide more usable energy and have less impact on the

(Continued on next page)

“I think the American public has a sense of what their rightful stewardship of the planet should be. There will be people who argue that nuclear energy is not the way to go, but as Tom said, I think the country is more receptive to nuclear power than it has been in years.”



State of the Labs

(Continued from preceding page)



“... one that exemplifies in large part who we are and how we serve the nation is our new role in Yucca Mountain. We’ve been asked to take the leadership of the scientific program for Yucca Mountain on a very compressed time frame and out of that, DOE will put a license application before the Nuclear Regulatory Commission next year.”

environment.

JS: I think the American public has a sense of what their rightful stewardship of the planet should be. There will be people who argue that nuclear energy is not the way to go, but as Tom said, I think the country is more receptive to nuclear power than it has been in years.

Yucca Mountain, satellites, imagery

LN: *What are the some of the notable projects Sandia is involved in right now?*

TH: I think without question, the RRW as a nuclear weapons program has to be considered a very exciting opportunity, an historic opportunity, for us to truly make a difference in the future of nuclear weapons. There are many others, but one that exemplifies in large part who we are and how we serve the nation is our new role in Yucca Mountain. We’ve been asked to take the leadership of the scientific program for Yucca Mountain on a very compressed time frame and out of that, DOE will put a license

“What we envision now is something we call the Innovation Corridor, where we’re integrating microsystems that we can develop at MESA, our work in high-performance computing and modeling and simulation, and our fundamental work at CINT in understanding the behavior of atoms.”



application before the Nuclear Regulatory Commission next year.

JS: There’s also our work on satellite systems, which continues to be a major area of focus for the Laboratory and one where we’ve met a significant number of challenges. That work is exciting technically and it’s exciting programmatically.

We’ve also made absolutely seminal contributions to real-time imaging radars, SAR [synthetic aperture radar], and our work for the Missile Defense Agency and its predecessor agencies has been a long-standing program for us. We continue to make major contributions there.

TH: I would also add the work that we’re doing with the reconfigured Z machine. It’s a nuclear weapons program — no question about that — but the science work we’re doing around the ability to produce X-rays and do materials testing is just unprecedented.

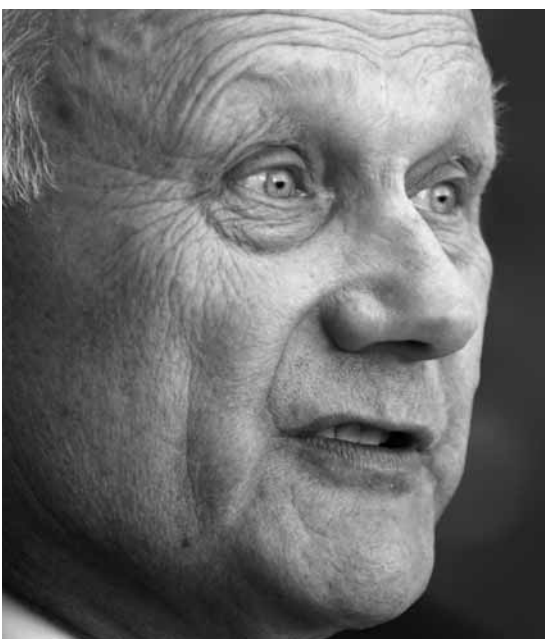
JS: And think about the basic contributions we have made in doing large-scale modeling and simulation. Now again, that [work] is supported by the nuclear weapons program, but it is something that has actually added a new national capability. The other thing that comes to mind in a totally different area is our work in infrastructure simulation. The National Infrastructure Simulation and Analysis Center [NISAC] is a whole new capability, so when disaster strikes somewhere you can see the effect on the infrastructure of the nation.

LN: *That’s an incredible range of things that we just really excel in.*

JS: The joy we take in it is that there are so many things that are so exciting and so impacting; the regret we [Tom and I] have is we can’t actually go out and get actively engaged in the projects.

A new vision: MESA, CINT, and the Innovation Corridor

LN: *Tom, you mentioned the role MESA is likely*



“We’ve also made absolutely seminal contributions to real-time imaging radars, SAR [synthetic aperture radar], and our work for the Missile Defense Agency and its predecessor agencies has been a long-standing program for us. We continue to make major contributions there.”

to play in a transformed complex. How important are the MESA and CINT [Center for Integrated Nanotechnologies] facilities to Sandia?

TH: We’re thinking more broadly now about some of our major investments, MESA being the largest and CINT — in which we’re working with Los Alamos — being a very important investment the Office of Science has made here. What we envision now is something we call the Innovation Corridor, where we’re integrating microsystems that we can develop at MESA, our work in high-performance computing and modeling and simulation, and our fundamental work at CINT in understanding the behavior of atoms.

Each of those — computing, microsystems, and nanotechnology — are vital capabilities for us in themselves, but their integration creates an unprecedented opportunity.

Security technology, a differentiating approach to engineering, education

LN: *Are there some things not widely known about Sandia that we’re good at?*

JS: There are things we just can’t talk about; that’s just the nature of it. But I will say we have made great contributions beyond the things that we talk about openly.

TH: We lead the nation in understanding security technology and how one applies that to all kind of critical features. It’s an important capability, but it doesn’t generate a lot of headlines.

JS: We’re also trying to establish a differentiating approach to engineering in this nation, including engineering education, including preparation of people even at the K-12 level so that they will be more inclined to go into the physical sciences and engineering.

NNSA’s Performance Evaluation Report: Improvements and challenges

LN: *The most recent NNSA report card said we’d made some significant strides in the operational side of the house. What do you think has been our biggest area of improvement?*

JS: We’ve put in place an Integrated Laboratory Management System [ILMS] that encompasses the entire Laboratory. It’s a way for us to state how we intend to run the Laboratory and then to do a report card from time to time on how we did.

Within ILMS, we’ve had goal-directed performance associated with our approaches to safety and security and that has resulted in better performance in both of those areas. Emergency Management has also seen real improvement and that reflects a lot of work we’ve done there. I look at the annual performance evaluation by NNSA as a recognition that we did what we said we would do. We registered intent and then drove toward that intent, and we’re performing better because of it.

LN: *Is there any one area where we still really need to improve?*

JS: We need to recognize that operations are not separate from fulfilling the mission. They

(Continued on next page)

State of the Labs

(Continued from preceding page)

are part and parcel of how we assure mission success. If we are unsafe we jeopardize our ability to achieve mission success. If we're not secure, we jeopardize our ability to achieve mission success.

We really have to work on line ownership of issues like safety; it's important that we all recognize that safety is something that's owned by every single Sandian. We've made progress, but by our own measurements we're not there yet.

TH: To add to that, we found that we had significant agreement with our site office and also with DOE Headquarters on some important fundamental principles. One was that we need to state our intention for how we want to see the Laboratory operated, and we need to be clear and deliberate and work closely with them so that their oversight becomes one of systemic evaluation and not event-by-event critique.

Another principle was that you can't be excellent and have pieces of your enterprise that you ignore and are not excellent. The third was that we had to make operational excellence a leadership challenge for everybody and get the entire Lab engaged.

Regarding the performance evaluation — I

"We are not yet where we want to be. What we saw this last year was that we've made an excellent beginning and DOE acknowledged that in the performance appraisal, but there are still many areas for improvement. In fact, that journey of improvement will never end."

Labs Director Tom Hunter

don't know if I'd call it a report card — there's a very important point I want to make: We are not yet where we want to be. What we saw this last year was that we've made an excellent beginning and DOE acknowledged that in the performance appraisal, but there are still many areas for improvement. In fact, that journey of improvement will never end.

Infrastructure investment

LN: As nuclear weapons funding from DOE decreases — at least in real dollars — are there potential customers out there who will provide the kind of fundamental infrastructure level of support for the Labs that DOE has historically provided?

JS: One of the strategic areas for the Laboratory is to investigate how we can assure the adequacy of both our physical infrastructure and our science and technology base of the Laboratory in the presence of programmatic needs from other customers. So we're working on methods by which that would be done. We continue to work with the Department of Defense and the Department of Homeland Security on ways they can help assure the continuation of these capabilities. It's not a solved problem yet, but it is one that we continue to work.

TH: There's no one we see today who has the intent or the strategic role of providing the same kind of investment at the Laboratory that the nuclear weapons program has historically had. It's unrealistic to think that the scale of infrastructure investments that characterized the nuclear weapons program could be replaced by anybody else in the short term.

Reducing costs over five years

LN: With health care and other costs rising and contributions to the pension fund looming on the horizon while funding stays essentially flat, we understand that FTEs in indirect are potentially being reduced over the next five years by upwards of



TOM HUNTER (foreground) and John Stichman discuss the state of the Labs.

20 or 25 percent. Do you think that Sandia will weather this period OK?

TH: There's no doubt that we're facing a cost question and it applies both to direct and indirect. We have to do more and do it more effectively and efficiently in all of our programs. But you mention indirect specifically; indirect is truly a cost and easy to characterize as a cost.

Our plan, generally speaking, is over five years to have our costs at the Laboratory down by about 15 percent — we haven't decided on anything larger at this point — and that'll be done at about 3 percent per year regardless of whether funding for the Laboratory goes up or goes down.

We've deployed that to the IES [Integrated Enabling Services] and we do that both in dollars and in people. What it means is that the Laboratory will have to really deal with effectiveness and efficiency, clarity of process, and clarity of result. We need to look everywhere we can for ways to make things much simpler and much less costly to operate and function. It'll require the support of everybody. It will require a big commitment to thinking through what we do and why we do it. We'll be deploying such things as Lean Six Sigma practices to all of our operations to see how we can make them more effective and efficient.

JS: We want, to the extent possible, to perform the maximum amount of work directly for the customer. If we didn't do something to manage costs, with flat budgets we would actually decrease the amount that we could provide directly to the customer, and that's not what we want for the future of the Laboratory. Our intention is to maintain the level of direct support to the customer that we currently provide, and ideally, to increase it.

Benchmarking indicates that we are extraordinarily effective at providing indirect support. The benchmark also shows that, compared to other companies, we provide it at an extraordi-

narily high cost. So that says there's an opportunity for us to decrease the costs associated with providing those services.

The first thing that we're talking about is not reducing services, but how we use the best practices that we find when we benchmark ourselves against others. Of course, we always look at services with an eye to whether they are necessary or redundant. But this really is about listening to and learning from the benchmarking so that we can provide services more efficiently and effectively.

TH: The Integrated Laboratory Management System provides the framework to sort out and improve over time our functions and services. That's the framework in which it'll all be developed and deployed.

Managed Workforce Transition

LN: We've been talking a lot about Managed Workforce Transition over the last several months. Is that finished? Did it achieve its goal? What are the lessons we've learned? And where does it go from here?

JS: Managed Workforce Transition is the process where, by intent, we move people to work and work to people. In the immediate situation, what that meant was moving people from nuclear weapons work and indirect to other national security mission work in Integrated Technologies and Systems [ITS]. We had excellent movement from nuclear weapons into the ITS area; in fact we probably overachieved, which gives us an opportunity to do some hiring in that area. We need to continue the movement from indirect to direct programs. We won't quite reach our target in indirect this year, but we need to keep moving toward the target that we set by intent when the process began.

The current process, which involved a sequence of specific events, is nearing its completion. But the drive to make efficiency gains, the effort whenever possible to deploy people in indirect to a direct function — those efforts need to continue, not only for the rest of this year, but in the upcoming years.

TH: It's important to recognize that this isn't an event. It's a process that'll continue over the next several years. The movement of people from nuclear weapons to ITS was very

"We want, to the extent possible, to perform the maximum amount of work directly for the customer. If we didn't do something to manage costs, with flat budgets we would actually decrease the amount that we could provide directly to the customer, and that's not what we want for the future of the Laboratory."

Executive VP John Stichman

good; as John said, there's a chance it maybe overshoot a bit. The process hasn't been as effective in the indirect to direct. We still have jobs that need to be done and we still have people who can do them. We have to work harder to make the match work.

Outsourcing, maybe; layoffs, no

LN: Regarding services, is outsourcing on the table as a way to manage costs?

JS: Yes, but there's always a caveat with

(Continued on next page)

State of the Labs

(Continued from preceding page)

that. Responsible business management requires us to look at what things can best be provided internally by our own employees and what things would best be provided externally through contracts. We continue to evaluate it, we'll always do it. It's just a sound business practice.



“Yes, but there’s always a caveat with that [the decision to out-source]. Responsible business management requires us to look at what things can best be provided internally by our own employees and what things would best be provided externally through contracts. . . . It’s just a sound business practice.”

LN: Anything like a VSIP [voluntary separation incentive package] or even layoffs on the table?

TH: No.

JS: No.

Mood of the Labs

LN: How would you characterize the general mood around the Labs?

TH: I think that depends on where you go and with whom you talk. There are different stresses at different places. Overall there is a sense that there's a lot happening in this area that we broadly call transformation. We're catching up to where we need to be, and that's causing stress on employees. I sense an enormous desire for something that we consider a key attribute of transformation, and that is simplicity. Whenever we are dealing with a topic, we don't need to make it more complicated than it needs to be. We don't make it in any way so onerous that it becomes exceptionally hard to do. I pick that up a lot.

I draw much of my sense from new employees. I spend time with new employees — on the order of 30 or so a month — where we get

together for breakfast. They are really glad to be at Sandia, glad we care about them, and searching for meaningful ways in which they can work into the ranks of the Laboratory and feel successful and fulfilled. I sense a quest for that all over.

The Shawn Carpenter case

LN: Regarding the outcome of the Shawn Carpenter case, are there any lessons learned, particularly from a management standpoint?

TH: Of course it remains a legal matter. We consider the actions Sandia took regarding Shawn Carpenter to be both essential and proper for the situation, and if we live by and believe in our values, we had no other alternatives to take. There has been no payment of any penalty, and we don't know where it will end up. We just know as we move forward we cannot abandon our values. We cannot make decisions based on the expediencies of a situation. They must be based on our ser-

vice to the nation and our values, which we expect from all managers and all employees and from ourselves.

As for lessons learned, we learned some broad things from situations like the Carpenter case. There is a significant expectation of behavior on the part of our employees and the engagement of our management. We want to ensure that managers and employees have a consistent set of values and behaviors and seek the support and resources they might need.

JS: Even before the Carpenter case we were doing a lot of reflection on the role of management at Sandia. That includes how we prepare people for management. We must be sure managers understand the critical role they have for their staffs and the Laboratory and for the nation as a whole.

I wouldn't infer any general management shortcomings from any particular case. It just reminded us how important managers' responsibilities are. One of our values is “each other.” That's something we all must believe in and follow.

LN: Some of the trial testimony by Sandia managers was alarming. To somebody who wasn't there and read some of those things in the newspaper, they just didn't seem to show a respect for the individual.

TH: As you know, it is sometimes difficult for news coverage to get the full context of a situation. We believe that some of the reports did not fully reflect the events that occurred and that were presented in the trial. That said, we do hold managers as well as all Sandians responsible for their actions. I agree with John's earlier comments that we must show respect for the individual, for all individuals whether we agree with them or not.

JS: Legal issues regarding privacy really keep us from talking about some of the aftermath.

However, let us be clear that this isn't about saying management made errors. Managers shouldn't draw inferences from a particular case and how it's reported in the press and say, “I guess I have to do things differently or I have to ignore something that otherwise I would deal with.” What we really need to be sure of is

that managers know there is a right course of action, that they have responsibilities to exercise, and that they have resources available to them so they can do the right thing.

How decisions are made

LN: We've seen an increase in questions through the Feedback Program about how decisions are made at Sandia, with employees wondering why they're being left out of the decision-making process in things like the tobacco-free workplace decision and so forth.

TH: Sandia's communications system depends heavily on the foundation of a close link in the line organization chain from vice presidents to the staff. When we make executive decisions, we rely on the significant engagement of the vice presidents and sometimes the directors on these issues, with the assumption there's opportunity for staff-level input throughout the line organization chain. That's the essential premise. If we're having a lack of engagement and a lack of input across the Laboratory, it's a very important issue and something we should deal with.

Taking nothing for granted in a rapidly changing world

LN: Before we wrap this up, is there anything more you'd like to add?

JS: I want to emphasize how proud I am of the accomplishments of the people here, how proud I am when I look at our programmatic accomplishments over the past almost six years since the attacks of 9/11. And I'm proud of how our people have responded as we've begun the process of transforming how we do our work. We're really making tremendous strides in terms of fulfilling our mission.

TH: It's important for all of us to understand the vital role this Laboratory plays in the course the nation takes on national security and how that's recognized in so many tangible ways.

We have visits of senior people who come here; we've had the opportunity to talk to everybody from the president down throughout the executive structure. We've talked to chairmen of committees in Congress. We've had a lot of opportunity to determine whether these visitors value our contributions to the nation's security future, and it's clear to us that they do.

It's important, too, to understand how dynamic that [policy-making] arena is for the nation and how significantly things can and will change. We should never assume that there will be a stable environment in which most of the major enterprises in this country operate. It will always be one of continual dynamic change. People will change, approaches will change, policies will change, and they will change rapidly.

Third, I think that we should not take for granted this country's position relative to other countries about such things as the vibrancy of the economy or its leadership in science and technology.

This country's position is not assured and is only assured if all of us who play a role in making the country more safe and secure really take that to heart and deal with it.

So we're making important contributions but we're in an arena that changes and we shouldn't take anything for granted or make any assumptions about staying in the same place.

Workforce

(Continued from page 1)

employee into Sandia's realignment process.

Sandia's workforce realignment process is designed to facilitate the expedient movement of employees whose jobs are at risk due to changing business needs (more information at www-irn.sandia.gov/hr/policies/Staffing/staff3.htm).

Realignment of employees will be handled on a case-by-case basis in accordance with Sandia's policies and where a strong business case supports the decision, says Pat. She says there are likely to be few such decisions across the Labs.

“Sandia remains strongly committed to its people,” Pat says. “It's just as important that our people are flexible and willing to take on different assignments. With that combination, Sandia can adjust as mission needs change and provide employees growth and development opportunities.”

Employees who have questions should talk to their managers, Sandia's Ombuds, or the division Human Resources Consultants. Managers should direct questions to Chuck Maheras, cjmaher@sandia.gov, or 284-5025. — *John German*

“We should never assume that there will be a stable environment in which most of the major enterprises in this country operate. It will always be one of continual dynamic change. People will change, approaches will change, policies will change, and they will change rapidly.”



Sago Mine

(Continued from page 1)

gress on May 9.

“We never expected to discover a smoking gun,” says Larry Schneider, senior manager of Sandia’s Pulsed Power Technology Dept. 1650. “However, we pursued and characterized a coupling mechanism that the team of accident investigators hadn’t previously considered — that current from a surface lightning strike can generate electromagnetic fields that can readily propagate through the earth, as opposed to current being driven into conductors entering the mine such as metal rails or power lines. Our findings had profound implications.”

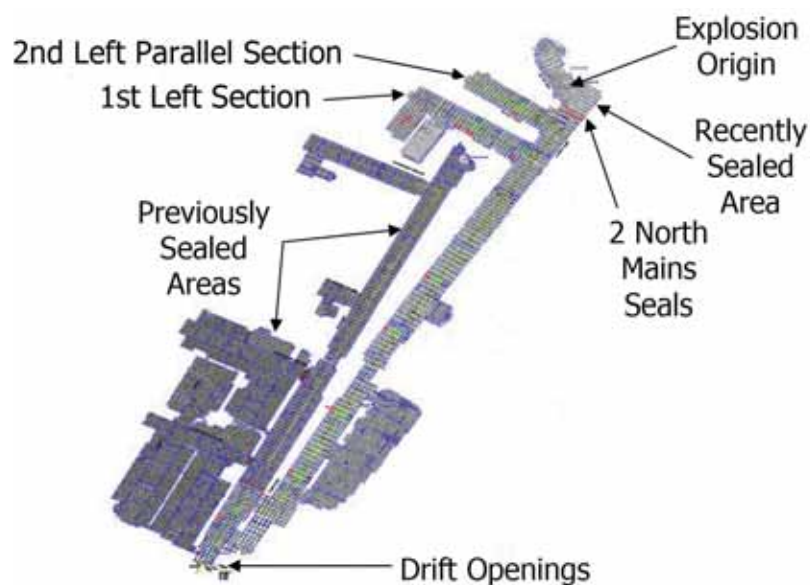
The Sandians, including project lead Matt Higgins, Dawna Charley, and Leonard Martinez (all 1653) with support from Marv Morris, a contracted consultant and former Sandian, conducted the experiments at the mine. Matt, Dawna, and Leonard worked at the site for 10 days last November.

MSHA knew of Sandia’s lightning work

The Mine Safety and Health Administration — aware of Sandia’s decades of work studying lightning, particularly how it might impact critical nuclear weapons facilities at the DOE Pantex Plant located outside Amarillo and underground facilities at the Nevada Test Site — asked the team to conduct the experiments and analysis.

“Accident investigators had been suspicious all along that lightning was the cause of the explosion, but there had been no definite proof one way or the other,” says Michele Caldwell, manager of Electromagnetic Qualification and Engineering Dept. 1653.

Twenty-nine miners were underground at



A MAP of the Sago Mine, as published in the MSHA report issued on May 9, shows where the explosion occurred in relation to the entrances, or drifts.

Sago when the explosion occurred. Thirteen were in close proximity to the blast. As was later learned, the force of the explosion killed one miner outright, and 12 others retreated behind a curtain at the working face of the mine in an attempt to barricade themselves against the smoke and carbon monoxide. They awaited rescue there, which would come too late for all but one of them.

With lightning as a potential cause for the Sago Mine explosion, the Sandia team investigated two modes of transmitting lightning energy deep into the coal mine, Michele says.

The first mode was direct attachment onto metallic penetrations — such as conveyers used to extract the coal, rails used for transporting people and equipment — and power and communication lines from the entrance to deep inside the mine. The second mode investigated energy propagating through the earth’s surface from the point of a surface lightning strike or overhead arc channel.

“We needed to be able to make measurements without waiting for or triggering a true lightning strike in the vicinity, so we provided our own drive signal,” Michele says. “To prevent interference with mine operations or introduc-



SAGO MINE operations were idled in late March. Research by a Sandia team showed that lightning was the likely cause of the Jan. 2, 2006, explosion at the mine that killed 12 miners.

tion of a safety hazard, we injected a small, continuous signal over a range of frequencies present in a lightning strike as a drive source.”

For the metallic penetrations, the drive signal was applied at the entrance to the mine and signals were measured with current and voltage probes at various points in the mine, as far as two miles in. The drive signal was transmitted by fiber optics to the entrance of the mine as the instrumentation was carried inside the mine to make measurements. The goal was to see how much the signals decreased as a function of the distance from the entrance of the mine.

For measuring propagation of lightning energy from the surface of the earth to the mine cavern 300 feet below, the drive signal was applied to a long wire stretched on the surface. Directly below, inside the mine, an antenna was set up to pick up the transmitted signals. Multiple antenna measurements were made, covering a cross pattern in the mine of about 80 meters by 80 meters. The measurements were compared to analytical models simulating lightning field

propagation through the earth.

The data were used to develop transfer functions, a way of understanding how much energy penetrated into the mine based on a surface lightning event. These results were combined with a theoretical lightning strike waveform to determine if voltages get high enough inside the mine to be of concern.

The study concluded that it was highly unlikely that lightning initiated the explosion by traveling along conductors through the mine and into the sealed area. However, electromagnetic energy from a

significant lightning event close to the sealed area could travel through the ground at Sago to create high voltage in the sealed area, subsequently creating a spark, a known ignition source of flammable methane mixtures.

A brief, but powerful look

“The results of field measurements and analytical modeling were clear; lightning can propagate significant electrical energy into mine systems under the right conditions,” says Larry. “The team’s work at Sago was only a brief, but powerful look into this effect. We need to better understand this phenomenon in the variety of scenarios seen in the US mining system. I can readily envision this leading to additional, reasonable preventative measures to reduce the probability of such a catastrophic event in the future. This is an important message.”

Larry says he is grateful for Sandia’s relationship with MSHA.

“I need to compliment MSHA for their engagement of Sandia. The techniques we used in our work for them were not generally understood outside the nuclear weapons community. It took technical insight and courage on their part to embrace this work. We’re very pleased that Sandia played an important role in this investigation.”

MSHA’s investigation report of the Sago Mine accident is online at www.msha.gov.



SANDIA RESEARCHER MATT HIGGINS conducts an experiment at the Sago Mine during the 10 days he spent at the mine last November trying to determine the cause of the explosion.



SASHA SIY, a 15-year-old high school sophomore from Anchorage, Alaska, describes the mechanics of his Artificial Life Form for Robotic Evolutionary Development

(ALFRED) project to Sandia volunteer Gayle Thayer (5711) at the Intel International Science and Engineering Fair.

Scenes from the Intel International Science & Engineering Fair

More than 1,500 precollege students representing 47 countries, regions, and territories, all winners in their regional competitions, were in Albuquerque last week to participate in the Intel International Science & Engineering Fair (ISEF) 2007.

They received a warm welcome. Neon green-shirted volunteers met participants at the Albuquerque Sunport and escorted them to area hotels. Tour buses shuttled the students to and from ISEF venues. Numerous social and ceremonial events during the week kept the participants busy.

"Students from all over the world began pouring into the Convention Center on Saturday afternoon," wrote Jeanette Miller, Intel ISEF Marketing & Communications director, in a dispatch from the event. "Everywhere we turn, we see oceans of smiling faces and busy people heading off to the various events."

Len Duda (5715) served on the ISEF host committee as judging co-chair.

"The exhibit floor was filled with judges holding intense conversations with the finalists," wrote Len from the event. "You could see the finalists pointing out some graph or piece of information on their display as they answered questions from the judges. Many of the judges, especially the Sandians, thanked me for this opportunity because they were simply amazed at the intelligence and enthusiasm of these students."

More than 125 Sandia volunteers reviewed and scored science fair projects. Other Labs contributions include monetary support, pre-event planning, and a scholarship (*Lab News*, May 11). Sandia will offer some ISEF participants an all-expenses-paid two-week internship at the Labs this summer. Watch the *Lab News* for more.

Story by John German

Photos by Randy Montoya



SIYABULELA XUZA, an 18-year-old high school senior from Johannesburg, South Africa, takes a moment to pose for a photo with a group of fellow science fair participants. Xuza's presentation was titled "African Space: Fueling Africa's Quest to Space," and featured a full-size, functioning homemade rocket.



THE INTERNATIONAL SCIENCE AND ENGINEERING FAIR featured presentations by more than 1,500 students from 47 countries. Grand awards, valued at nearly \$1 million in scholarships, tuition grants, and scientific field trips, were awarded. Sandia has offered some ISEF participants two-week internships at the Labs this summer.

Boeing project targets little-known aircraft safety feature

Hydrogen storage, fuel cells explored as part of Sandia-Boeing CRADA

By Julie Hall

Sandia and Boeing researchers are collaborating to determine if a hydrogen-powered fuel cell could be used to provide backup power in aircraft. The work is a new task under an umbrella cooperative research and development agreement signed in 2002.

The project came about as a result of project manager Lennie Klebanoff's (8755) interest in hydrogen as an aircraft fuel. Lennie, who participated with other Sandians in California Gov. Arnold Schwarzenegger's Hydrogen Highway Network project, wondered why the general discussion of fossil fuel depletion and greenhouse gas emissions rarely mentioned aviation. It turned out that Boeing was already investigating fuel cell power on aircraft. The two organizations linked up through a chance meeting at a Boeing tech expo between Duane Landa of Sandia's Partnerships Development Dept. 9116

and a Boeing representative. After more than a year of discussions, the team decided to focus on exploring hydrogen for backup power.

"Fuel cell technology represents a straightforward and innovative approach to gaining experience with alternative energy sources for airplane electrical power," says Joe Breit, project manager and an associate technical fellow at the Boeing Systems Concept Center. "A significant part of our focus at Boeing Commercial Airplanes is looking at environmentally progressive technologies that can further reduce dependencies on oil-driven power sources. Our collaborative work with Sandia on this application is a step forward in that regard."

The project taps Sandia's 60 years of experience in hydrogen storage for weapons applications and more recent R&D in materials science and hydrogen storage engineering through its DOE-sponsored Metal Hydride Center of Excellence, says Lennie. The CRADA focuses on the

use of a polymer electrolyte membrane (PEM) fuel cell for emergency power. Sandia PEM researcher Chris Cornelius will evaluate fuel cell requirements, implementation, and efficiency; Lennie will provide analysis of hydrogen storage options and issues.

Hydrogen as an aviation fuel poses significant aircraft design challenges. Although hydrogen releases about three times more energy per fuel mass than conventional jet fuel, it would require much larger tank volume than the equivalent tanks for jet fuel, due to its low density. These and other issues such as fuel availability, safety, and technology reliability need to be solved. Both gas-phase and liquid hydrogen storage will be explored.

For now, the team will focus on backup power. "This is an area where there's a good match," Lennie says. "We're hoping this is a start of even more work with Boeing in the future."

Supply chain affects every Sandia employee whether they know it or not

Sourcing, procurement, accounts payable, mail services, and more are all part of supply chain

By Chris Burroughs

What do sourcing, procurement, contract audit, accounts payable, tours, fleet services, mail services, packaging, and shipping have in common?

A lot, says Billie Weatherly, senior manager of Supply Chain Integration Group 10220. They are all part of the Sandia supply chain that affects every employee whether they know it or not.

"Everyone is somehow served by the supply chain," Billie says. "When you receive or send mail, ship out a package, drive your department vehicle, or buy something, you are tied into the supply chain. Just about every aspect of Sandia's day-to-day operations is linked to the chain."

More than half of Sandia's funding is processed through the supply chain. Last year supply chain expenditures amounted to \$1.029 billion in contract-related payments. Of that, some \$467 million was paid to small businesses, including some \$244 million paid to New Mexico small businesses. Sandia exceeded its small business goal for the FY06 Performance Evaluation Plan and received an outstanding rating for Performance Incentive 3 for small business utilization.

In simple terms, Billie says, supply chain management is "getting the right thing, to the right place, at the right cost, at the right time, and in the right manner to enable mission success while balancing considerations such as safety, security, process, efficiency, best value, regulatory compliance, corporate citizenship, impact on the New Mexico economy, and relationships with peers, stakeholders, customers, and suppliers."

While not all elements of the supply chain system are operated by Supply Chain Management Center 10200, the center is the primary and integrating organization for all supply chain activities.

"The Supply Chain Management Center knows our business, and we are committed to excellence," Billie says. This can be demonstrated, she says, by attaining ISO 9001 certification for Procurement and employing Lean Six Sigma tools for process improvement. Sandia's Logistics Group is also currently seeking ISO 9001 certification.

"The supply chain involves quite an array of services and activities."

Supply chain management stretches across four chains — physical, financial, informational, and relational. It also moves beyond the walls of an organization and includes the entire supply network into Sandia-specific initiatives like the Supply Chain and Material Management Council (SCMMC) and the Fleet Transportation and Property Management Concepts Studies.

Billie says the 10 directors who make up the SCMMC recently received an analysis of their use of the supply chain. The analysis involved discussions and reciprocal recommendations for areas for improvement in supply chain utilization to better enable mission success. Also, Fleet and Property Management recently negotiated supply chain improvements with NNSA that will have significant impact on the Labs.

"The supply chain involves quite an array of services and activities," Billie says. "If we didn't do this, the Labs would stop functioning."

Number of activities part of Supply Chain Management Center

Until recently supply chain activities were operated through the Procurement and Logistics Center. In 2005, when Bonnie Apodaca was named center director, she renamed the center Supply Chain Management Center 10200 in an effort to affect more "end-to-end business processes."

The services provided by the center include: sourcing and small business programs, self-service and buyer-assisted procurement, property management and reapplication, receiving, material movement, tours, fleet services, mail services, packaging and shipping, and corporate storage.

Teachers recognized for this year's PI awards



PI AWARD WINNERS — PI awards were introduced this year by Sandia and Lockheed Martin to recognize outstanding math teachers in the Albuquerque area. It will rotate with the ESTE Awards (Excelling in Science Teaching). The six teachers recognized were: Carolyn Chadwell, Governor Bent Elementary; Beth Parker, Cleveland Middle School; Megan Lebleu, Ernie Pyle Middle School; Paula Maxmin, Jefferson Middle School; Debbie Perich, Cibola High School; and Jo Ann Alvarado, Rio Grande High School.

Sandia builds ties to California's clean energy initiatives

By Patti Koning

California is leading the nation when it comes to energy and environmental policy. Last year Gov. Arnold Schwarzenegger put California on the world stage when he committed the state to reducing global warming emissions back to 1990 levels by 2020.

In an effort to stay abreast of developments in the rapidly advancing field of clean energy and related government policy, Sandia's Energy, Resources, and Nonproliferation Strategic Management Unit California Energy Liaison Office and its Div. 8000 Business Development Office hosted a visit by Dan Adler of the California Clean Energy Fund (CalCEF). Adler is the director of Technology and Policy Development at CalCEF.

According to Carrie Burchard (8529), Sandia's work in "cleantech" is generally much closer to commercialization than some of the other areas of research at the Labs. Engaging with CalCEF enables the Business Development Office to look at alternative funding possibilities and aligning research with what is happening in the state, Carrie says.

"We often look 10 to 20 years out, but in this arena we need to be looking ahead five years," she says. "Biofuel, including cellulosic ethanol and biodiesel from algae, is just one area where we're applying the capabilities we developed in our homeland security work to energy issues."

CalCEF is a \$30 million nonprofit investment fund created to spur investment in California's clean energy economy. The fund was formed in 2004 from the PG&E bankruptcy settlement negotiated by the California Public Utilities Commission.

Interests intersect

This is where the interests of CalCEF and Sandia intersect. The companies funded by CalCEF could be potential business partners with Sandia. Burchard says it is also an opportunity for Sandia to strengthen its relationships with California's state government.

Adler thinks there are great opportunities for CalCEF and Sandia to develop a common platform for technology commercialization, a regular forum for interaction with the venture capital community, and a means of mutually reinforcing state policy efforts via insights into emerging

energy research.

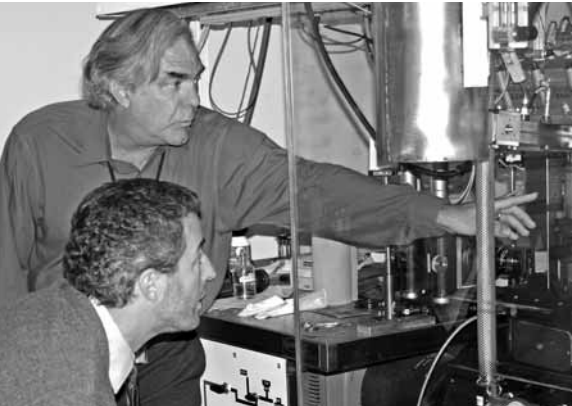
The Global Warming Solutions Act that took effect on Jan. 1 will have a big impact on any company doing business in California.

These companies will be actively looking for solutions to reduce their greenhouse gas footprint.

Ron Stoltz (8302), head of the California Energy Liaison Office, envisions the relationship between Sandia and CalCEF as a two-way information exchange. Sandia can advise CalCEF on promising technologies, while CalCEF can provide insight

into trends in venture capital investing in clean energy. Ron and Adler already have meetings planned to further this partnership.

"The overall intent is for us both to be ahead of the crowd in the future of clean technology innovation and investing," Ron says. "I



Dan Adler (foreground) of CalCEF gets a lesson on hydrogen engine combustion from Hydrogen Research and Development Manager Jay Keller.

don't expect CalCEF to directly fund Sandia, but they can make us aware of promising companies through which we can commercialize our inventions.

A \$1 million grant

Adler noted that he was "impressed by the breadth of clean energy work undertaken by scientists at Sandia, and by the entrepreneurial spirit and outward-orientation of the members of the management team I had a chance to meet."

CalCEF recently gave a \$1 million grant toward the establishment of an Energy Efficiency Center (EEC) at the University of California, Davis. The goal of the EEC is to accelerate energy efficiency innovation and to stimulate the transfer of the technology into the marketplace.

CalCEF operates independently of both PG&E and the state of California. The fund is a limited partner in three venture capital funds.

During Adler's visit, Ron led a spirited panel discussion in which he played the role of Vinod Khosla, a Silicon Valley venture capital investor. Khosla, who cofounded Sun Microsystems, recently has been pursuing investment in bio refineries, synthetic biology for alternative fuels, and solar cells.

On the panel were Blake Simmons (8755), representing energy systems; Lennie Klebanoff, (8755), representing hydrogen; Art Pontau (8750), representing materials and energy sciences; Margie Tatro (6200), representing fuel, water, and alternative energy; and Masood Hadi (8321),

representing biosystems research. The panel debated and discussed concentrated solar versus photovoltaics, the merits of electricity peak shaving and load shifting, hydrogen, nuclear power, and how the rising popularity of plug-in hybrid vehicles could impact the energy market.

Lennie, director of the DOE Metal Hydride Center of Excellence, was quick to defend the merits of hydrogen after Vinod (aka Ron) suggested that "hydrogen makes no sense to me."

"You can't sequester the mobile source of carbon emissions — exhaust from your car's tailpipe," Lennie says. "That's why it is essential we look at hydrogen. Hydrogen is a storage medium, not a fuel."

The purpose of the discussion was to look at alternative points of view about energy and to challenge assumptions. While the panel participants all work directly in clean energy technology, Ron says the focus was "less on what we are doing and more on what we are thinking."

Development of next-gen biofuels

After the panel discussion, Adler toured the hydrogen storage and hydrogen engine combustion labs and learned about the applications of fiber lasers to energy problems from Dahv Kliner.

"Sandia's expertise in combustion research should be of great use in the development of next-generation biofuels, which is a major emphasis in the policy and financial arenas," Adler comments.

Adler's visit, and especially the panel, accomplished another goal of Burchard's.

"We need to spend more time talking about difficult, hot issues," she says. "It gets the intellectual juice flowing."



EWA RONNEBRO describes her work on discovering and developing new materials for hydrogen storage for the DOE Metal Hydride Center of Excellence to Dan Adler (far right) of the California Clean Energy Fund.

(Photo by Ken Ball)

Safety fair speaker's 'shortcut' almost cuts short his life

Sandia Safety Fair is June 7, 10 a.m. to 4 p.m.; speaker in Steve Schiff Auditorium at 11:30 a.m.

Randy Fellhoelter had been around high power lines long enough — 20-something years — to be supremely confident that he knew how to do his job, that he knew what he could get away with and what he couldn't.

He found out the hard way — the hardest way (look at the photo at right) — that taking shortcuts around standard safety procedures is a potentially deadly idea.

Fellhoelter is the Public Service Company of New Mexico's senior safety consultant. Previously, he had been a lineman, crew leader, and foreman with PNM until an avoidable accident jolted his career into a new and unexpected direction.

Here's how Fellhoelter describes the circumstances that changed — and almost took — his life:

"The safety rule in working on high-voltage cables is always to test and ground before working on them. However, I had not brought grounding equipment, and my 20 years of high voltage line experience gave me the confidence to take a short cut as I knew the line was dead.

I was dead wrong."

Fellhoelter made a careless safety mistake and paid dearly for it. At the annual Sandia Safety Fair June 7, 11:30 a.m. in the Steve Schiff Auditorium,

he will share his experience and what he's learned from it.

In addition to Fellhoelter's remarks, the safety fair will feature more than 40 exhibitors from Sandia and around the community. They'll share information about how to be safer in the workplace, at home, and at play.

The safety fair will take place in and around the Steve Schiff Auditorium June 7, 10 a.m. to 4 p.m. For more information, go to www.safetyfair.sandia.gov.



RANDY FELLHOELTER

Manager promotions

New Mexico

Mark Herrmann from PMTS, ICF Target Design Dept. 1674, to manager of that same department.



MARK HERRMANN

Mark joined Sandia in August 2005 and has served as a theoretical/computational physicist working in the area of inertial confinement fusion and high energy density physics target design.

Mark received his BS in physics, a BS in applied science, and his MS in systems science and mathematics in 1991 from Washington University. He received his PhD in astrophysical sciences, with a concentration in plasma physics, from Princeton University in 1998.

Rita Gonzales from team leader, ASIC Design and Development Dept. 1735, to manager of that same department.

Rita joined Sandia in 1991. She has been a project leader for the past few years. She has been involved with the design of complex application specific integrated circuits (ASICs) for systems on chip applications. Rita has supported several customers throughout the Labs but most notably in centers 5600 and 2600.

Rita received her BS in electrical engineering from New Mexico State University and her MS in electrical engineering from Stanford University.



RITA GONZALES

Kendall Key from SMTS, Navigation, Pointing & Control Dept. 5338, to manager of Mission Assurance Dept. 5402.

Kendall joined Sandia in January 2005 after working for six years with a small startup company, MicroDexterity Systems, developing medical robotic equipment. Prior to his time with MicroDexterity Systems, he spent eight years with Johnson & Johnson's Ethicon Endo-Surgery performing process engineering, new product development, corporate acquisitions and production line supervision.

During his two years at Sandia, Kendall has performed quality assurance for Sandia's satellite programs.

Kendall received his BS in electrical engineering from New Mexico State in 1989, and his MS in electrical engineering and MS in management from MIT in 1991.

Dave Minster from PMTS, Transnational Technical Threat Dept. 5926, to manager, Energetic Threats and Training Dept. 5915.

Dave came to Sandia in August 2005 after retiring as an Air Force officer with 25 years of experience managing intelligence programs and activities at 12 locations.

Since joining Sandia, Dave has been performing counterproliferation analysis with organizations 5925 and 5926.



KENDALL KEY



DAVE MINSTER

Dave received his BS from Montana State University in earth science, his MS from Ohio State University in geodetic science, and his MA from the Naval War College in national security and strategic studies.

Jim Pacheco from PMTS, Active Response & Denial Dept. 6422, to manager, Primary Physical Standards Dept. 2541.

Jim joined Sandia in 1987, and for the past five years has led several security projects including designing a network-centric security system for a DoD customer, developing an advanced, nonlethal, active-denial technology, and the integration of an enhanced access delay system. He has also worked on the characterization of explosive breaching charges and fuel-air explosive devices, and risk assessments on four large water utilities in the US.

Prior to working in security, Jim developed solar thermal technologies in the Concentrating Solar Power department, where he led the tests and evaluations of the 10 MW Solar Two project and served on the technical advisory committee, conducted R&D in power tower technologies, developed thermal storage for parabolic troughs, and developed a solar photocatalytic oxidation process.

Jim has been active in the American Society of Mechanical Engineers' solar energy division, where he served as the chair, vice chair, secretary/treasurer, as well as a past chair of the executive committee.

Jim received his BS in mechanical engineering from New Mexico State University, and his MS in mechanical engineering from the University of California, Berkeley.



JIM PACHECO

Feedback

Hiring criteria clarified: Sandia recruits from across the country

Urban legend dispelled: Hiring not limited to graduates of just 25 select universities

Q: Exactly what are the criteria for hiring a new MTS or MLS? I overheard my management talk about new-hires having to come from the top 25 colleges in the country, having recently graduated, and having at least a 3.7 GPA. If this is true, I can't believe they hired me 26 years ago. On the other hand is this criteria a corporate goal? And is it for both MLS and MTS slots?

Someday, I'd like my son or daughter to get hired by Sandia. However, I now wonder if I should advise them to look elsewhere.

A: The criteria for hiring a new MTS or MLS begin with the external job posting that defines both required and preferred selection criteria. The job posting content is reviewed by the Sandia staffing consultant who supports the line organization prior to placing the job announcement on Sandia's external employment website.

The current corporate GPA guidelines are that a candidate's cumulative undergraduate GPA should be 3.2 or higher on a 4.0 scale. The GPA guideline for graduate degrees is 3.5 or higher on a 4.0 scale. Equivalent GPAs are calculated for institutions that use something other than a 4.0 scale to measure students' academic performance. Grades are one measure of the strength of a candidate's intellectual tool kit. Exception requests to the corporate GPA guidelines can be made when a hire package is submitted for senior management review and approval. In some cases, for example, a low undergraduate GPA may be outweighed by a stellar graduate academic record, a track record of research accomplishments in mission-specific areas, or an experience base that brings critical skills to the hiring organization.

Sandia hires new MTS and MLS employees from colleges and universities across the country and around the world. Hiring managers are not restricted to hiring only new MTS and MLS employees from the top 25 institutions. Because Sandia is asked to solve complex national security technical problems, we look to institutions whose academic programs and research thrusts hold promise for developing our talent base. In order to develop ongoing relationships with schools whose programs and research are a strong match for our needs, we have currently identified 13 key (national) and 10 regional (local and surrounding states) institutions. By sponsoring research at these institutions we hope to develop talent pipelines for staffing the Labs. Through regular campus visits by our volunteer tech staff and lab staff recruiting teams we maintain ongoing campus presence and develop brand identity and interest in Sandia as an employer of choice.

When advising a daughter or son on where to enroll in college, there are many factors to weigh. The cost of attending the institution is a major factor. The strength of the institution's academic programs, national rankings, and the individual student's career interest are all very important. The level of student service support through scholarships and financial aid, student retention programs, and graduation and job placement rates are also important factors that contribute to a student's success at a college or university.

When making this important family decision, the best choice is for the student to attend the academic institution that offers the best

opportunities for them to achieve their aspirations.

— BJ Jones (3500)

Q: I feel the renaming of the secretarial Wednesday Newsletter is inappropriate. It excludes the OMAs, SMAs and EAs from the administrative assistant group. We are not part of the represented hiring group. I don't think I am the only one who feels this way; hopefully more have responded to the new name.

A: Thank you for reading our newsletter. The name of the newsletter itself has not changed — it remains the *Wednesday Newsletter*. Represented Hiring and Employment Testing is the new (since July 2006) name of the department that brings you the *Wednesday Newsletter*. We were previously called Secretarial Services, but changed the name to reflect the complete customer base that we now serve. We are proud that the *Wednesday Newsletter* has a subscription base of more than 1,000; so, while it remains geared toward the assistant groups, it has a readership that extends beyond that.

— BJ Jones (3500)

Q: In view of Sandia's current emphasis on slips and falls, it would be a good idea to have street sweepers clean up the motorcycle parking areas in the parking lots. The motorcycle parking areas are usually tucked away in corners where the wind and lack of heavier vehicle traffic cause accumulations of sand, dust, and gravel. As a result, footing while parking a motorcycle is insecure and constitutes an unnecessary hazard. Can cleaning these spaces be considered?

A: We will put in a maintenance service request to have the motorcycle parking areas cleaned on a quarterly basis.

— Stan Harrison (10850)

Thunderbird Award winners persevere in spite of obstacles



THUNDERBIRD AWARD WINNERS for 2007, seen here, were honored by Lockheed Martin and Sandia for overcoming obstacles to succeed in their high school careers. (Photo by Bill Doty)

By Iris Aboytes

Imagine being a senior in high school, having a job, and living on your own. What if your world changed and you needed to have open-heart surgery? Those are some of the circumstances that challenged Kayla and Iris, two of this year's Thunderbird Award winners.

Thunderbird Awards are given yearly to graduating seniors from 11 Albuquerque public high schools, five alternative schools, and five outlying schools (Bernalillo, Rio Rancho, Los Lunas, Belen, and Moriarty). The awards were created in 1994 by

Sandia and Lockheed Martin to recognize students who have demonstrated a desire to make a difference in their lives despite difficult circumstances. The award carries with it a \$1,500 cash prize.

Iris's story: During Iris' junior year, she started feeling ill, tired, depressed, and began losing weight. In October 2006, she was told she had an enlarged heart and needed open-heart surgery. She was out of school for more than a month, but her grades did not suffer. Iris will be going to India on a mission this summer. She plans on being a journalist or civil engineer and to continue her missionary work.

Kayla's story: Kayla had not seen her mother in eight years, until her father died and she came to the funeral. Kayla works 20 hours a week to support herself. She is the No. 1 tennis player at Highland High School and has made district and all state choirs.

"Kayla is well known in the student body; other students look to her as a role model," says her school counselor Krista Vasquez. "She not only welcomes being treated as a role model, but embraces it and makes choices worthy of a role model for younger students. She freely gives of her athletic and singing talents and truly enhances the lives of those around her by being both unassuming and fantastic with her abilities."

Kayla has a full scholarship to Adams State College in Alamosa, Colo. Her ultimate goal is to be a pediatrician or physician's assistant.

"Sandia and Lockheed Martin are pleased to recognize such outstanding young people," say Community Involvement Manager Bruce McClure. "Their persistence and determination are an inspiration to us all."

Thunderbird Award Winners

Yolanda Holguin, Albuquerque High School • Amy Williams, Belen High School • Dezeree Jennings-Albalos, Bernalillo High School • Richard Estrada, Cibola High School • Karie Morgan, Del Norte High School • Thomas Barr, Eldorado High School • Charmaine Sanchez, Albuquerque Evening School • Ashley McFarlane, Freedom High School • Kayla O'Leary, Highland High School • Brandy Rodke, La Cueva High School • Tracie Anzara, Los Lunas High School • Alonzo Williams, Manzano High School • Lantz Renn Bailey, Moriarty High School • Lucia Rodriguez, New Futures School • Jazmin Lowery, Rio Grande High School • Sierra Brown, Rio Rancho High School • Anna Lam, Sandia High School • Denise Sandoval, School on Wheels • Lizette Montez, Sierra Alternative High School • Bernadette Romero, Valley High School • Iris Coriz, West Mesa High School

Three Sandians nominated for Girl Scouts of Chaparral Council Hall of Fame

By Iris Aboytes

Chris Morgan (4318), Bobbie Williams (2400), and Leslie Phinney (1513) were recently nominated to the Girl Scouts of Chaparral Council 2007 Hall of Fame: Women in Science, Technology, and Engineering.

Bobbie and Chris were named as winners and were inducted into the Hall of Fame.

Girl Scouts of Chaparral Council serves more than 4,100 girls and 1,800 adults in nine counties in New Mexico and five counties in southwestern

Colorado. The Council's mission is to help girls, ages 5-17, develop leadership skills they need to lead positive and successful lives.

Chris codeveloped the Chaparral Girl Scouts Council's Science Spectacular and Math Magic programs. These programs have annually offered hundreds of girls hands-on activities in math, science, technology, and engineering concepts. As a member of Sandia Women's Action Network, Chris was instrumental in designing the Explore Engineering program, a series of presentations intended to keep students interested in engineering and science.

Leslie does volunteer work with the Society of Women Engineers, the Junior League of Albuquerque, and the Albuquerque Rose Society. At Sandia she has contributed to the understanding of laser interactions with microsystems, thermal conductivity measurement, thermomechanical effects in MEMS, thermal metrology and imaging techniques for small systems, adhesion phenomena in MEMS, and thermal microactuators.

As a founder of the Strategic Action Forum, an organization that aims to influence public policy, Bobbie established an organization that supports and engages families and youth toward betterment of their communities. At the request of the US Department of Labor, Bobbie also created the Horizon Award with a team of women from various organizations. She performs volunteer service at various youth-serving organizations.

The Hall of Fame event recognizes women for achievements and accomplishments within their profession and community. During the last two years, the event has raised more than \$20,000 to provide programs for girls throughout the council's jurisdiction.

Stargazing in the Manzanos

The Albuquerque Astronomical Society (TAAS) and Sandia Ranger District will co-host an evening of free public stargazing in the Manzanos Saturday, May 26, at Oak Flat Picnic Area.

Observing begins at sunset, weather permitting, and is suitable for all ages. Picnic facilities are available for those who would like to come early, and adjacent parking is available. Alcoholic beverages and pets are not allowed in the telescope viewing area.

To get to Oak Flat, take NM 337 nine miles south of the I-40 Tijeras exit and follow the signs to Oak Flat and Juniper Loop.

For information and a map, go to the TAAS website (www.taas.org) or call 254-TAAS.

At the website, click on "Archives" then "TAAS at Oak Flat Picnic Grounds June 2003" then "Click here for a schedule of TAAS Oak Flat events for 2004."

City's water plans, lifelong learning are topics of June 11 Thunderbirds meeting



Speakers from the Albuquerque/Bernalillo County Water Authority at the June 11 meeting of the Sandia Thunderbirds (Sandia's retiree organization) will discuss the city's ambitious future water use and conservation plans.

Among those plans is the massive San Juan-Chama Drinking Water Project, which is expected to go online in 2008 and will meet up to 70 percent of the metro area's drinking water needs. Other water plans include the aquifer recharge project and several water reuse projects.

Lifelong Learning Institute briefing

The water presentation begins at 2 p.m. (or come early for lunch) at the Mountain View Club on Kirtland Air Force Base. Prior to the presentation at 1:15 p.m. there will be a 15-minute discussion by Maya Sutton on the Osher Lifelong Learning Institute at UNM. The Institute offers classes for individuals 50 and above.

The T-Birds' monthly business meeting will follow Sutton's remarks.

There is no charge for the programs (lunch is extra). The meeting is open to all with access to KAFB. For information, contact Genelia Boenig at 836-6977.



Mileposts

New Mexico photos by Michelle Fleming



Allen Stanley
40 4242



Alfred Watts
40 5400

Recent Retirees



Craig Olson
36 1640



Ralph French
30 4312



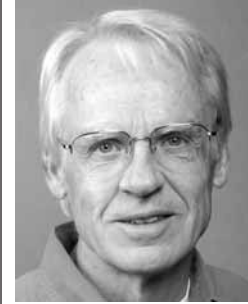
Kathleen McCaughey
30 2700



Mary Ann Seiler
30 5997



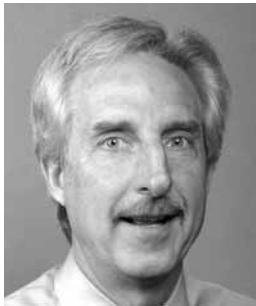
Regina Simpson
30 1822



Roger Assink
34 1821



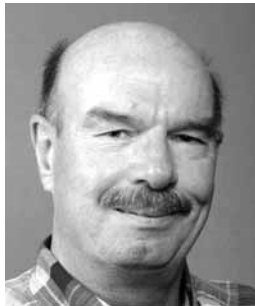
Diana Stavros
23 10267



George Wagner
30 6461



Marion Wilde
30 5932



Charles Fink
25 10333



Donald Funkhouser
25 5764



Will Keener
19 3651



Jeffery Green
25 5719



Wahid Hermina
25 1710



Elizabeth Huffman
25 1824



Terry MacDonald
25 6765



Roberto Mata
25 5711



Steven Ulibarri
25 10761



Anthony Aragon
20 4242



Stephen Becker
20 5348



Anthony Bentley
20 5622



Paul Claassen
20 5335



Jamieson Deuel
20 6472



Susan Mcree
20 4328



John Porter
20 1670



Joseph Sandoval
20 4243



John Schroeder
20 1821



James Stromberg
20 4317



Steven Yrene
20 5057



Katherine Gaither
15 9113



Frank Lujan
15 10242



Ricardo Ortiz
15 10826



Christine Saavedra
15 10541



Paiboon Tangyonyong
15 1726



Larry Varoz
15 12334



Thomas Vigil
15 10864

RUNNING MAN



(Photo by Randy Montoya)

After freak accident, Brian Griego finds healing through faith, friends, family

By Iris Aboytes

Walk into any gym and the treadmills are in full use. It's a common scene that most of us take for granted — but not Brian Griego (4211). For Brian, walking and running are miracles.

In November 2005 Brian was at his property in Los Chavez. He was trying to pull out an old fence post. It had rooted itself to the ground so he tied a chain to the post and tried to pull it out with his tractor. The tractor, straining against the pole, flipped over. Brian was pinned under it from the waist down with the tractor still running.

He managed to turn the tractor off and lay there for a while. He was in a secluded part of his property that people don't routinely frequent, so he knew he had to do something. With considerable effort, he was able to dig his cell phone out of his pocket and dial 911.

First attempt to free him failed

The commotion of the paramedics and fire department attracted his neighbors, who found him. The first attempt to free Brian failed, and the tractor fell back on him. The second attempt was successful, and within an hour of the accident, Brian was airlifted to the hospital.

Melissa (Brian's wife) and Brian were both shaking when they first saw each other. "He was going into shock," says Melissa. "The only way I could handle it was by putting him in God's hands. What happened to him was so tragic and yet he was so calm."

Brian's diagnosis was bleak. He had a crushed pelvis ("It was like a puzzle," says Melissa), a fractured femur, a compound fracture in his tibia, and muscle and nerve damage. There was some good news — his internal organs were intact. "That was the first miracle," says Brian.

During that first week after the accident, Brian had four operations. A rod and numerous screws were inserted to repair the damage. A halo-like apparatus with bars was drilled into his pelvis to stabilize and bind it together. Some of the muscle was so infected, it had to be removed.

Brian met every challenge given to him at the hospital and was able to go home for Christmas. His friends and people from his church got his house disability-accessible in two days. Hospital personnel were happy to see him go home, but were sad he would not be there cheering them on.

"When we brought Brian home after a month, there were many details to handle," says Melissa. "Brian was nowhere to be found. He had managed to

ride his wheelchair down a little hill to go see the horses. Getting him back up the hill was quite a chore."

"Brian had many visitors during his ordeal," she says, "but instead of them cheering him up, it was Brian who cheered *them* up. Brian found peace and strength in the pages of his Bible. His visitors always left stronger, as he shared his faith. Brian always puts everyone's needs before his own. He is a special soul."

"Melissa, my sons Joshua [now 13], and Luke [8], and my daughter Hannah [5] were especially happy," says Brian. "My healing is a testimony to them. We became closer and stronger. We hardly watched TV. We played games and we read a lot."

"Hannah was my little nurse. She helped me as I cleaned and put ointment on my wounds. She was my little angel as she cried with me. She is truly a blessing, a special gift from God. My boys picked up the slack. I am so proud of them. Melissa and I made sure there was very little change in their routine."

Because of the nerve and muscle damage, pain pills often didn't work and Brian was in constant pain for about six months. "My family would pray with me until I could handle the pain," says Brian. "One day I needed to do something to keep me going. I managed to get into the car and drive. Hannah ran to my wife and called, 'Mommy, Mommy, look! Daddy is driving!' As you can imagine, Melissa was not too pleased."

Brian had been a state champion wrestler and was coaching Joshua's team. About two months after his accident, Joshua faced a tough match. Brian persuaded Melissa to take him and he arrived in his wheelchair. "I was able to coach the team," says Brian. "And Joshua? He won in overtime!"

Brian attended Luke's soccer games in the wheelchair. "One day I surprised him by showing up on crutches," says Brian. "He was excited."

Brian and Hannah continued their adventure. "Once the pelvic bars were removed, we walked a mile every day, first on the walker, next on crutches, then with a cane," says Brian. "It was one day and one step at a time. Running — forget it. I was concerned about my livelihood. The doctor told me I would never walk again without the aid of a prosthetic and cane. I heard the words, but deep down I knew that I would be walking, riding my horses, and roping again."

Incredible progress

Brian's progress was incredible; he calls it miraculous. He was able to return to work on a limited schedule last July and is now back full time. "I'm very grateful to Sandia for the patience given me," says Brian. "In the beginning, I was in physical therapy at Sandia for about four hours a day. Sandia stuck with me and gave me freedom to get better. It's such a privilege to come to work."

"Being one of the first to arrive at the scene of the accident, it was inconceivable that anyone could have survived," says his lifetime best friend Norman

Baca (4211). "It is not surprising that Brian's life was spared. His first words to me were, 'Norman, pray for me.' Although the scene was chaotic and his physical body was badly wounded, there was a sense of peace as we worked to get Brian extracted."

"This accident could have been tragic for him, not only setting him back physically but emotionally and spiritually. His perseverance has proven that he has only gotten stronger."

'I was never alone'

Brian had been competitive in roping competitions before his accident. He placed fourth in the first competition he entered after his accident. He coached his son's wrestling team to an undefeated season. But best of all, Brian is running on his own.

"The hard days," says Brian, "they were bearable because, in addition to my family, the support of my coworkers and friends was unbelievable. I was never alone. I can only hope to be the friend to them that they have been to me."

"I'm told I am a light for a lot of people," he says. "It's not me; it's Jesus Christ in me. I'm just going through the motions."

"And hero? My wife Melissa is the hero," says Brian. "She kept everything together so our children wouldn't feel the impact. She and my children are the heroes. I feel so blessed."



BRIAN GRIEGO



A SPECIAL FAMILY — Brian Griego sits with his family, Josh, Hannah, Luke, and Melissa.