The 2012 Lab News/Daily News readership survey is still open and awaiting your contributions if you haven't already provided them. This year's survey will remain open to readers of these core communications tools through at least the end of September. It can be completed online—in as little as five minutes—at http://www.surveymonkey.com/s/XYT5B9J.

A Lab News readership survey targeted to retirees also is under way. Its web link is http://www.surveymonkey.com/s/NWLC5BV.

Questions about the survey should be emailed to labnewsurvey@sandia.gov.

THE STATE OF THE LABS is strong, Paul Hommert told an audience of Sandians during a recent all-hands meeting that was videolinked to Sandia/California. (Photo by Randy Montoya)

Labs director says Sandia strong, playing vital role in nation’s security

By Sue Major Holmes

President and Laboratory Director Paul Hommert says Sandia is very strong and will weather the current budget uncertainties and continue to grow. Paul addressed a full house of members of the workforce who came to hear his 2012 State of the Labs speech in person at the Steve Schiff Auditorium in Albuquerque and via videostream at Sandia/California.

Backed by slides showing the breadth of work at the Labs and achievements by some of the 9,000 Sandians and 12,000 total members of the workforce, Paul said he had “great confidence in our tomorrow” because of the talent, commitment to national security, and exceptional achievements of the staff despite the many challenges the Laboratories faces.

In addition, leaders throughout the Labs “have an obligation to inform the debate in Washington, to bring honest, independent, scientifically based information to the policy decisions” made in the nation’s capital, he said. That largely comes through testimony to Congress and interactions with the secretary of energy, the head of the NNSA, and other national leaders, he said.

While Sandia has the unique responsibility for the nation’s nuclear weapons, it also has a responsibility to a broader suite of national security issues, Paul said.

“The mission of this laboratory is national security,” he said.

There’s a natural interplay between Sandia’s nuclear weapons mission and the broader national security mission that includes defense, nonproliferation, counterterrorism, energy security, and homeland security. “It’s a tremendous synergy,” Paul said.

How Sandia is able to respond to its national security work “rests on the strength of our people, the strength of our science, technology, and engineering environment, and the unique facilities that we bring to it,” he said.

Paul said it’s easy to forget the breadth of the Labs’ work, but “as you look around the world, there are Sandians pretty much everywhere,” working on everything from homeland security in the international arena and partnerships in nuclear weapons to securing against bioterrorist materials.

He ran down a list of recent Sandia accomplishments:

• Meeting a requirement to produce a concrete cost estimate for the B61 life extension program.

(Continued on page 4)

Sandia’s Explosives Technology Group discovers key detonation behavior in common explosive

By Sue Major Holmes

The explosive PETN (pentaerythritol tetranitrate) has been around for a century and is used by everyone from miners to the military, but it took new research by Sandia to begin to discover key mechanisms behind what causes it to fail at very small scales.

“Despite the fact explosives are in widespread use, there’s still a lot to learn about how detonation begins, and what properties of the explosive define the key detonation process,” says Alex Tappan (2554), who has been with Sandia for 14 years, all of it in the Explosives Technology Group.

Explosives are typically studied by pressing powders into pellets, tests are then done to determine bulk properties. To create precise samples to characterize PETN at the mesoscale, the researchers developed a novel technique based on physical vapor deposition to create samples with varying thicknesses. That allowed them to study detonation behavior at the sub-millimeter scale and to determine that PETN detonation fails at a thickness roughly the width of a human hair. This provided a clue into what physical processes at the sub-millimeter scale actually play a role in PETN’s behavior.

(Continued on page 9)
That’s that

I guess it was inevitable, although that doesn’t make it any easier to accept. We’ve all watched over the years as various professional functions — engineering, accounting, administrative work — have been outsourced. Why? Because businesses have discovered they can get these services cheaper through more sophisticated use of expert systems or by outsourcing the functions to professional developers.

Even as I cluck-clucked at these trends, with maybe just a touch — I am not proud to admit this, but we’re all human — of Schadenfreude. I always figured that my personal number of work — writing — was sort of bulletproof. My skill, my unique, my special, my highly refined art and craft made me as job-secure as a plumber. When you need one, nothing else will do. When you need the words to flow, call a wordsmith.

It turns out I may have been grinning in smug self-satisfaction a bit too soon. It so happens that there’s at least one company out there (and there may be more to follow) that is employing computer-generated stories that are — by all accounts, every bit as readable as the stories produced by us trained professionals. The company, Narrative Sciences, has developed a set of algorithms that can take a collection of data — corporate earnings reports, sports scores, election poll numbers — and generate a credible, journalistically sound news story.

And the algorithms aren’t limited to writing dry, lifeless prose. Narrative Sciences can turn up the heat at will; you can have a punchy style too! That says, the company. Want sedate or stately? Or just-the-facts, ma’am? Done and done.

Upon first reading about Narrative Sciences, I had a sinking feeling (of course), yielding to a selfish thought: I’m glad I’m nearer the end of my career than the beginning. While we liberal arts majors — my degree is in journalism — parted our way through college, the computer science students were touting away quietly, learning to master the skills that define the 21st century. Now, they’re the ones who are partying, while we’re looking for new lines of work. As the implication of the Narrative Sciences breakthrough sank in, I began practicing in front of the mirror: “Would you like some fries with that?”

But then it struck me: There is a way to keep my job security for a bit longer. Since Narrative Sciences’ approach is based on converting facts into fables, I ought to be safe so long as I stay clear of facts altogether. The new paradigm for me! No hard data, please. As long as I can crank out sincere, heartfelt, serialized stories (like this column), I should be safe.

But that will only get me so far; eventually reality — and Narrative Science 2.0 — will catch up with me. What they say in politics is probably equally true for newspaper columnists: Sincerity is everything. Once you can fake that, anything’s possible. I realize, of course, that Schadenfreude is a psychological barrier that prevents people from recognizing that things will change. But then it struck me: There is a way to keep my job security for a bit longer. Since Narrative Sciences’ approach is based on converting facts into fables, I ought to be safe so long as I stay clear of facts altogether. The new paradigm for me! No hard data, please. As long as I can crank out sincere, heartfelt, serialized stories (like this column), I should be safe.

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In early August, our building was part of a multi-facility test to allow the temperature in offices and public spaces to climb up to a maximum of 82 degrees over the course of four hours. This so-called “demand response test” required employees to turn off lights and reduce electric power use in response to requests from grid operators at times of high wholesale market prices or when electric system reliability is jeopardized. A similar test conducted in the summer of 2011 resulted in a 7.1 percent reduction in kilowatt-hour demand from the electric system. The 82-degree work environment is something that’s been considered by building designers.
Sandia and OurEnergyPolicy.org release ‘Goals of Energy Policy’ poll results

By Mike Janes

US energy policy should simultaneously pursue security of its energy supply, economic stability, and reduced environmental impacts, says a national poll of energy professional jointed prepared by Sandia and OurEnergyPolicy.org. The findings of the national poll, “The Goals of Energy Policy,” show that the vast majority — more than 85 percent — of the 884 energy professionals surveyed prefer policymaking that pursues all three goals.

The poll asked the experts to allocate 100 points, representing a 100 percent policymaking effort, across three commonly accepted energy policy goals: the environment, economics, and energy supply security. Participating respondents included representatives of public utilities, oil and gas organizations, engineering groups, and other professional energy associations. Participating organizations were made up primarily of energy professionals who had no overt political or policy agendas related to the three policy goals.

“Creating and implementing energy policy can be difficult and many professionals are concerned with many fronts. We hope these results can serve as a useful starting point for those interested in building consensus for an effective energy policy,” says Dawn Manley (8350), deputy director of chemical sciences.

Matthew Jordan, program director of OurEnergyPolicy.org, says, “Many surveys tend to simplify, rather than clarify, public opinion on energy policy by asking either-or questions. Thinking about energy policy this way is just not leading to results. It may be that the way we talk about energy policy is limiting our ability to develop viable policy options. Our country can and should pursue multiple energy-related goals simultaneously.”

Dawn adds, “There is a growing recognition of the requirement to balance our nation’s need for plentiful, low-cost energy with an inherent responsibility to steward the natural environment and to help grow our economy.”

“OurEnergyPolicy.org plan to continue their work on the goals of energy policy with follow-up surveys and studies on related topics.”

Duane Lindner (8120), at left in photo above, discusses Sandia’s work in chemical and biological security with Rep. Dan Lungren, center. On Lungren’s right is Peter Davies, director of Homeland Security and Defense Systems Center 8100. In top and bottom right photos, Robert Hutchinsion (8960), program manager for cyber infrastructure security, explains how cyber researchers create virtual environments to study malicious computer networks in the Internet Environment Test Facility. (Photos by Dino Vournas)

Congressman Dan Lungren visits Sandia/California

By Patti Koning


First, Lungren learned about several of Sandia’s cyber programs. Casey Deccio (8966) explained his visualization tool DNViz, which helps networking administrators in the federal government and global IT community better understand and troubleshoot Domain Name System Security (DNSSEC). Robert Hutchinsion (8960), program manager for cyber infrastructure security, explained how cyber researchers create virtual environments to study malicious computer networks in the Internet Environment Test Facility. Cathy Branda (8623) gives an overview of Sandia’s biodefense work. Lungren also saw prototypes of the Rapid Threat Organism Recognition (RATOR) tool and the Applied Biosciences Laboratory’s lab-on-a-disk platform with potential applications in radiation biodosimetry and toxic diagnostics.

Lungren represents the Sacramento area, chairs the Committee on House Administration, and sits on the House Committee on Homeland Security and the House Committee on the Judiciary. He has served in the US House of Representatives for 18 years, first representing a Southern California District from 1979-1989 and then being elected to represent California’s 3rd District, the seat he now holds, in 2004. He served as California Attorney General from 1991 to 1999.
Halon cylinder mishap offers opportunities for safety process improvements

By Jim Daneskiold

Sandia has a lot of equipment and materials spread across its five technical areas. More often than you'd expect, storage areas fill up, organizations that need elbow room move, and materials may be moved repeatedly.

On June 20, workers were cleaning up the storage yard in Tech Area 2. In this process, several high-pressure fire-suppression cylinders were moved and staged horizontally in direct sunlight. Later that day, a worker in a nearby storage building heard a hissing noise.

One of about a dozen cylinders that had been laid out on a pallet in the sun that morning heated up, and the pressure of the gas inside increased until it leaked across the seat of the cylinder's solenoid valve. The resulting pressure imbalance led the gas to discharge, propelling the 30-by-10-inch, 94-pound cylinder 15 feet “where it caused minor damage to asphalt, land-scaping, and an unattended vehicle,” according to an official incident report.

Workers had seen at the time as one fairly typical equipment move potentially could have injured a member of Sandia's workforce, and there’s a lot to learn from this incident, says Mike Schaller, Senior Manager for Security.

Immediately following the event, Mike Hazen, VP of Laboratory Operations, commissioned a team to conduct a voluntary, timely, and comprehensive review to determine the direct and contributing causes in an effort to ensure the event isn’t repeated and to develop lessons learned.

Recommendations in several areas

Mike was assigned to oversee cross-divisional technical and investigative aspects of the review, which included representation from the Sandia Site Office. The investigative arm of the review team, headed by Michael Gutierrez (4021), completed a comprehensive analysis of what is termed the Halon 1301 fire-suppression system cylinders.

“We think about moving materials and finding somewhere to store them as completely routine but control, and self-assessment. There’s a great deal to be learned: for work planning, and to develop lessons learned.”

“There’s a great deal to be learned: for work plan-

extension program, “a seminal point in helping stabi-

lize the future of the laboratory”;

• Synthetic aperture radar, which commissioned a team to conduct a voluntary, timely, and compre-

hensive review to determine the direct and contrib-

uting causes in an effort to ensure the event isn’t repeated and to develop lessons learned.

“The origins of this event wind back 23 years, and include a major international treaty, the penchant of some Sandians for hoard-

ing equipment that might be needed later, and a series of small failures that gradually built up, like pressurized Halon gas on a summer day.”

State of the Labs is strong, says Paul Hommert

(Continued from page 1)

nens, pressure safety engi-

neers, facilities managers, supply chain and inventory personnel, fire protection engineers, and others across the Labs,” Mike says.

The origins of this event wind back 23 years, and include a major international treaty, the penchant of some Sandians for hoarding equipment that might be needed later, and a series of small failures that gradually built up, like pressurized Halon gas on a summer day.

Root causes and contributing factors

Sandia documents show that the cylinder was installed in 1987 at the Centrifuge Facility (Bldg. 6526). The following year, the US Senate ratified the Montreal Protocol on Substances that Deplete the Ozone Layer and in 1990, DOE released the Centrifuge Facility to phase out Halon and other chlorofluorocarbons and store the Halon on site in the original cylinders. Then, in April of this year, a Sandia subcontractor moved the fire suppression cylinder from the Centrifuge Facility to the Facilities Laydown Yard, near Sandia’s recycling center in Tech Area 2.

After the pallet on which the cylinders rested was moved outdoors on the morning of June 20, pressure built up in the cylinder as the day grew hotter (it was 98 F at 2:15 p.m.). At around 2 p.m., the cylinder vented, made contact with a shelving unit, became airborne, and landed 15 feet away in the parking lot east of M0308, the Safeguards and Security Building. There it came to rest after bouncing off of the pavement and striking the rear of an unoccupied vehicle, denting it and the asphalt.

“Take-away lessons”

The voluntary investigation, which included active participation with the NNSA Sandia Site Office, subject matter experts, Emergency Management, Facilities, Fire Protection, and executive management, resulted in the development of root cause/corrective actions that will help move Sandia’s safety forward in an effort to enhance mission support, Mike says.

Lesson that each member of the workforce can take away from this event, he says, is the value in routinely looking at work spaces with a critical eye. If you see equipment or materials in your area that don’t seem to be in use, Mike says, discuss this with your manager and be sure it’s stored safely and securely. If the items are no longer needed, he adds, your center and division ES&H coordinators, property coordinators, and envi- ronmental compliance coordinators can help. For more disposal options, refer to the Sandia Get Rid of It web- site at http://info.sandia.gov/getridofit/.

Sandia has identified additional cylinders and expects to complete disposal of the excess material by November. Fire protection engineering personnel also are developing requirements for storing, handling, and decommissioning pressurized fire suppression systems. In addition, work scope and controls are under exami-

nation, with a goal of making sure work orders are pre-

scriptive and all hazards are identified. Pre-job walk-

downs for even some low-digor jobs are now the rule, he adds.

Sandia subcontractor moved the fire suppression cylinder from the Centrifuge Facility to the Facilities Laydown Yard, near Sandia’s recycling center in Tech Area 2.

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Brilliant! — Greg Nielson, just named to create a concentrated photovoltaic unit. (Photo by Randy Montoya) Greg Nielson (1719) has been selected by Popular Science magazine for one of its 2012 “brilliant 10” awards — “a paradigm-shifting success?” Wrote Stephen J. Fonash, Kunkle Chair Professor of Engineering Sciences at Pennsylvania State University, “I have seen many photovoltaic technologies. Sandia’s microscale photovoltaics are one with the most innovative approach and the best chance for a paradigm-shifting success.”

Indications that Greg was a high achiever came early. At the age of 7, he had read all the children’s books in the Bountiful, Utah, public library. His mother, a strong supporter of education, talked the librarian into granting Greg an adult card so he could get more information on the insects and birds he saw around him.

“He taught for the fun of it,” Greg says. “Sandia’s MEMS facilities seemed a fine site to work out the technology.”

At Utah State, a telecommuting Sandian suggested Greg apply to Sandia for a summer internship. He worked for two summers under Rob Leland in the CUBIT group, doing software for mesh generation. It didn’t hurt his application that he was already — though still an undergraduate — working at as a Utah State teaching assistant and also as a research assistant, testing rockets that combined solid fuel with liquid/gas oxidizers. The hybrid system enabled rocket propulsion mechanisms to be turned on and off, adding fuel without pause to the end of their solid-fuel lives.

“I had ideas about optical switching for MEMS devices I was excited about,” he says. “Sandia’s MEMS facilities seemed a fine site to work out the technology.”

But an unexpected conversation with Vijin Gupta (6124) changed Greg’s direction. Vijin had called Greg by mistake, looking for another Truman Fellow. “Vipin is willing to listen to people with crazy ideas,” Greg said. “It was extraordinary luck that we crossed paths.”

The college didn’t have a lot of graduates, so they took advantage of undergraduates,” Greg says modestly. He traveled to the Massachusetts Institute of Technology for his master’s and doctoral degrees. The degrees were in mechanical engineering, but because he was working under a thesis advisor interested in volume holography (creating a holographic lens to provide more information than could a physical lens under certain circumstances), he took courses in physics, mechanical and electrical engineering, and materials science, and ended by doing a thesis on optical micro- and nanostructures combined with MEMS (microelectromechanical systems). After completing a PhD, Greg was selected in the first crop of Sandia Truman Fellows.

Greg at the time had envisioned a nonphotovoltaic way of converting sunlight into electricity through use of the piezoelectric effect. (When a piezoelectric material changes size, it creates a voltage.) Though he still thinks the premise could work, after many conversations with Vijin and others he settled on the more immediately practical idea that current solar photovoltaic generators “were using a lot of silicon they didn’t need to. With my background in microsystems, I saw they could save by a factor of 10 in materials cost.”

He credits his volunteer experience leading youth groups, Boy Scouts, and a church congregation for his ability to provide “steady pressure,” as he puts it, to move his projects forward.

“I’m not that interested in discovering new scientific facts,” he says. “It’s when I hear of a problem that needs an engineering solution that my mind goes crazy. I love coming up with a solution.”

By Neal Singer Greg Nielson, just named to Popular Science’s annual Brilliant 10 list, holds a solar cell test prototype with a microscale lens array fastened above it. Together, the cell and lens help create a concentrated photovoltaic unit. (Photo by Randy Montoya)
NNSA Defense Programs Awards

Four individuals and 10 teams were selected to receive NNSA Defense Programs Awards of Excellence at ceremonies this year in New Mexico and video-linked to Sandia/California. The special guest speaker was NNSA Deputy Administrator for Defense Programs Don Cook. The Defense Programs Awards of Excellence were created in the early 1980s to give special recognition to those at the laboratories and plants directly associated with the stockpile modernization program. Today, the awards honor exceptional contributions to the stewardship and management of the stockpile.

**RENE BIERBAUM**

Rene Bierbaum for her excellent technical and interpersonal team leadership, resulting in the development of surveillance metrics and sampling strategies. Rene has been a leader and contributor to the technical bases of nuclear weapons, providing exceptional guidance, leadership, and extensive knowledge of weapon system performance, surveillance data, and analytical capabilities.

She has worked with others across the nuclear weapons community to develop a General Engineering Document defining the structure of the Sandia surveillance program which provides ongoing data and analysis for annual assessment. She also wrote a white paper about component base-lining, which is a methodology essential to supporting the development of predictive capability for stockpile components. Rene led the development of metrics for evaluating the impact of surveillance accomplishments and gaps on stockpile confidence.

**DAVID CAMPBELL**

David Campbell for his role in delivering a new W88 Pathlength Module design, or PLM, for the W88 ALT370. This design will replace the Force Balanced Integrating Accelerometer of the current W88 Mod 0. As the lead electrical designer, he led the team that delivered this extremely high-risk component. This effort is viewed as one of the most challenging design tasks for the W88 ALT. David’s technical excellence and ability to capture the implications of design trades with respect to both component and system impacts made him an integral part of the W88 ALT team.

David also consulted and mentored system and component engineers as the “go to guy” for both historical context and leading-edge technology. His coaching and mentorship are producing the nation’s future weapon designers.

**JUSTINE JOHANNES**

Justine Johannes for outstanding program management as the deputy program manager for the Advanced Simulation and Computing Program. Justine’s leadership was key to the program’s ability to meet mission requirements for high-performance computing capabilities. Her work led to a technical basis for the Annual Stockpile Assessment that surpassed work done in previous years and that addressed several important questions about the viability and margins of particular designs.

Justine worked with Headquarters and the other NNSA laboratories to develop a high-performance computing platform strategy for the nuclear weapons program that is the foundation for Carlo and the upcoming deployments of Sequoia, Trinity, and exascale-class platforms. Justine also worked to support the advanced computing needs of other customers, which allowed the Red Storm computer to be maintained and supported while several units of the second generation Tri- lab Computing Cluster were being procured.

**BARBARA RESER**

Barbara Reser for exceptional administrative service for 14 years in support of Sandia’s Weapons Intern Program, commonly known as WIP. The WIP curriculum continuously evolves to better address the future challenges of maintaining the nation’s nuclear deterrent and Bar- bara is responsible for maintaining that curriculum.

Barbara is the engine to the vehicle called WIP. Each year she arranges for hundreds of nuclear weapons subject matter experts to visit Sandia and share their historical perspectives; she also coordinates more than 30 tours to significant locations for the WIP class. Barbara’s contributions and unflagging devotion to her position significantly enable the WIP mission to shape the future stewards of the nuclear weapons stockpile.

**B61 Joint Test Assembly Modernization Firmware Verification Team**

“Joint Test Assembly” is also known as JTA. This team is being recognized for executing the first complete functional verification of a JTA telemetry system’s digital hardware using state-of-the-art techniques employed by industry and academia. Significant accomplishments include evaluation of electronic design automation tools, the verification of subsystem components resulting in an improved firmware development process, and the use of high performance computing resources to identify low-probability critical errors using hardware fault finding. The team’s improvements and standardization efforts allowed for easier firmware updating and development by multiple designers. This effort substantially improved the quality and reliability of the B61 JTA Modernization telemetry system. The team’s expertise collaborating on, reviewing, and improving the quality of subsequent firmware will be valuable to Sandia and the Nuclear Weapons program long into the future.

Team members: Valeriu Perianu (8136), team rep), Daniel Keen Anderson (8136), Brett Chaves (8135), Brian Joseph Geinster (8136), Grace Soh (8133), Craig D. Utter (8953)

**B61 JTA Modernization Team**

This team developed and implemented the first JTA to incorporate Micro Modular Telemetry, or MMT, technology aimed specifically at reducing development time and costs across multiple programs and weapon systems. The mechanical architecture was designed for robustness. The team advanced the MMT technology to include MMT Cards, allowing for a more efficient, centralized design. The team was able to reduce the development cycle from seven to five years, and the MMT Cards are designed for reuse and adaptability to minimize the costs associated with current development, future design upgrades, and new system developments. Additional time and cost savings are realized by using a common tester design. Tester software development at Sandia is being shared with two production agencies, the Kansas City Plant and Pantex.

Team Members: Kiet Tieu (8133, team rep), Gary Boccoleri (8233-1), Brett Chaves (8135), Mark Czaja (8235-1), Matthew C. Johnson (8136), Gary W. Kirchner (8135), Myls Young Lum (8136), Brian Layton (8132), Paul Loise (8132), Peter J. Royal (8131), Grace Soh (8133), Douglas L. Stark (8135), Marlene Elizabeth Under (2111)

**Rene Joint Test Assembly Modernization Ground Test Unit Team**

Recognized for its systems engineering excellence in the design and fabrication of the Joint Test Assembly, or JTA, Ground Test Unit. As part of the JTA project, aided with developing options for future systems, the BST Ground Test Unit team developed a systems architecture utilizing a new server-nest system design that is adaptable to three different aeroshells. The team designed, built, and tested a ground test unit. They performed detailed system engineering and integration, and demonstrated the performance of every hardware never before deployed in a telemetry system. The full-scale test unit was assembled and environmental testing was completed.

Team members: Robert D. Monson (8244, team rep), Kurt W. Berger (8242), Edison B. Bochenek (8244), Glenn

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not guaranteed, and parts are available now are often not available in the future. The sheer number of components is the limiting factor to overall fusing reliability, and most important for our customers, the experience seven-year full-life development period of the W70-2 J is not feasible for future programs. This team has demonstrated new design approaches for future fusing reliability solutions. The electronics can be integrated onto an RFCF, in order to greatly reduce part count, simplify the qualification process, increase reliability, reduce physical size, and allow the fuser to have additional capabilities as desired. This approach allows Sandia to deal with the fewer but more-troublesome inputs that have basic commercial interests in maintaining the stability and uniformity of their Integrated Circuit manufacturing processes. What’s more, the RFCF approach allows us to create a radar technology infrastructure that is a generic, chipped that can be transported among multiple future Life Extension Programs.

Team members: Christopher C. Redderick (5352, team rep), Keith Burton Albers (5353), Keith Richard Barkley (1731), Thomas G. Brown (5353), Emily R. Crenz (7515), Gilbert Del Galiano (3544), Michael Matthew Elsbury (4128), Ian Zachary Wilcox (5337), Sharon Lynn Wiltry (8135), Jason Wilson (5344), June C. Wood (8135), Robert W. Yost (4128), Randy Wong (5352), John T. Ford (1381), Emily J. Fuller (4128), Boyd R. Gilbert (1383), Samuel J. Hedgpeth (5344), Sherry K. King (1383), Christopher D. Lott (1342), Elaine T. Marshall (4128), Matthew J. Burger (1381), Rafe Campbell (1381), Nancy Collins (1387), James J. Dahl (1383), Kraig Paul Deike (5344), Leslie Rubottom (KCP), Ronald Schroeder (KCP), Frank Smith (KCP), J. Ambrose Wolf (KCP), Barbara Young (KCP)
**Loveland Health System and the Sandia Health Partner Network (HPN) Offer Exceptional Care for Women**

Women's health providers specialize in meeting the needs and concerns of women of all ages, from adolescent care to obstetrics, from gynecology through menopausal issues related to aging. Services such as family planning, prenatal care, and birthing centers are critical areas in this field. Regardless of your place in life, the Sandia Health Partner Network (HPN) has gynecologists to meet your needs.

Sandians and their covered dependents enrolled in Sandia Total Health Blue Cross Blue Shield of New Mexico (BCBSNM) have access to the entire BCBSNM network of in-network care. However, when you visit providers in the HPN (a smaller subset of the BCBSNM in-network providing a smaller subset of covered services in New Mexico), you'll save money through reduced deductibles, coinsurance, and out-of-pocket maximums. The table below explains the cost savings you can see from visiting HPN providers:

<table>
<thead>
<tr>
<th>Sandia Total Health BCBSNM</th>
<th>Employee Only</th>
<th>Employee + Spouse or Children</th>
<th>Employee + Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-Network:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Deductible</td>
<td>$500</td>
<td>$750</td>
<td>$1,500</td>
</tr>
<tr>
<td>Co-insurance</td>
<td>20%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Out-of-Pocket Maximum</td>
<td>$1,500</td>
<td>$2,250</td>
<td>$4,500</td>
</tr>
</tbody>
</table>

Note: HPN and in-network deductible and out-of-pocket maximum will cross-apply.

For more information about the Sandia Health Partner Network, please visit hbe.sandia.gov.

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**Loveland Health Systems**

Earlier this year, Loveland Women’s Hospital won the 2011 Zia Award for Performance Excellence “Best in Class” designation from the New Mexico Quality Awards program. This award is modeled after the Malcolm Baldrige National Quality Award. Loveland Women’s Hospital earned this honor by demonstrating through its practices and achievements the highest level of performance excellence.

Loveland Women’s Hospital is New Mexico’s first and only hospital dedicated to women’s health and features a 53-bed Level III Neonatal Intensive Care Unit, 24/7 emergency department, 16 labor and delivery rooms, 41-bed Mother-Baby unit, a Maternal-Fetal Medicine program for high-risk pregnancies, and a Pediatric Observation Unit supervised 24/7 by pediatricians. The hospital is also home to a Natural Birthing Center, where women who wish to have a more natural delivery or water birth can deliver in a safe environment.

**Additional HPN Facilities**

A quick Provider Lookup search of Sandia Health Partner Network providers at www.sandiahpn.com shows that there are 66 Obstetrics and Gynecology providers in the Sandia Health Partner Network. Those 66 providers work in the following facilities:

- Women’s Specialties of New Mexico — www.wsnm.org
- Albuquerque Women’s Health — www.abqwomenhealth.com
- Southwest Medical Associates — www.southwestmedicalassociates.com
- ABQ Health Partners — http://abqhealthpartners.com

Most of these providers offer the following women’s health services, but please call the facility to verify that it meets your needs:

- Annual exams
- Birth control
- Breast and pelvic exams
- Family / prenatal planning
- Hormone replacement therapy
- Osteoporosis screening, prevention, diagnosis, and treatment

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This month in the past

60 years ago . . . Movie actress Penny Singleton to help open Sandia Corporation’s Community Chest Drive. In Los Angeles on official business, T.E. Shea, our vice president and general manager, assisted Community Chest Campaign chairman H.J. Wails in arranging for Penny Singleton’s visit to Sandia Oct. 6 to speak in our Red Feather rally. Penny Singleton was the youngest dancer ever to be featured on Broadway. After training in singing and dancing schools and also attending Columbia University, she became a singing-dancing star in Broadway hits such as “Good News,” “Sweet Heart Time,” “Follow Through,” and “Hey Nanny, Nanny.” More recently she has been active as “blonde in the movies” and also in the Penny Singleton radio show.

40 years ago . . . A Sandia scientist has resolved the controversy over the electronic state of the hydrogen atom when metals take up hydrogen to become hydrides. This work, performed by Al Switendick, Supervisor of Solid State Theory Division 5133, will help to better predict a better understanding of all metal hydrides — including those purposely manufactured for their high hydrogen content and those inadvertently created during metals processing and in nuclear environments. In the past, theoretical predictions of how given metals will be converted to hydrides have been governed by two principal models, the proton and anion models, in which the hydrogen atom either loses its electron or gains an additional electron to form a bond with the host metal atoms. Al’s energy band calculations of the electronic energy levels of metal hydrides give fundamental insight into the structural stability and electronic properties of hydrides and replace the proton and anion models with a unifying new model. A Sandia-developed technique for improving the bondability of cured RTV (room temperature vulcanizing) silicone rubbers was announced and is drawing interest in both scientific and medical fields. RTV rubbers are often used to give printed circuits and electronic components a protective resilient coating before they’re permanently potted or encapsulated. Adhesives — epoxies and the like — don’t stick well to the rubber coating. The theory that a liquid (such as an adhesive or encapsulant) can wet a solid (such as RTV rubber) only when the surface energy of the solid is greater than that of the liquid has been around for quite a while. The team exposed the rubber to an activated gas plasma (argon and helium work best) that causes thermalized gas particles. This process appears to cause dissociation of the polymer molecules which, on being quenched with air, results in oxidation of the surface and succeeds in improving rubber’s wettability.
level might dominate the performance of PETN. Years of work went into the process, says Alex. The idea was to understand the fundamental physical behavior of an explosive and the detonation process, researchers will be able to improve predictive models of how explosives will behave under a variety of conditions.

Getting a handle on the variables

Right now, “if we want to model the performance of an explosive, it requires parameters determined from experiments,” Rob says. The potential for this work is huge. If you change any of the conditions, those models we have for predictions don’t hold up any more,” says Rob Knepper (2554).

Physical vapor deposition works like this: Researchers put PETN (pentaerythritol tetranitrate) films in a crucible inside a vacuum chamber, Knepper (2554). You change any of the conditions, those models we have for predictions don’t hold up any more,” says Rob Knepper (2554).

Physical vapor deposition works like this: Researchers put PETN powder into a crucible inside a vacuum chamber, and a protective enclosure, Alex says. And ear protection can stand next to the experiment in the foreground is what’s called a microboom box, where the group does its experiments on PETN explosive films.

PETN Work began as an LDRD project

New information for a very old explosive.

What we brought to the table is a new experiment that allowed samples to be made that are small enough to measure this critical thickness property,” Alex says. “Other research has been done on PETN in a different form or when it had a binder added to it. This is the first time these data have been done on the critical detonation geometry for pure, high-density PETN.” In the past, diameter information was obtained through experiments using high-aspect-ratio cylinders of pressed pellets of differing diameters. But it’s difficult to press pellets with diameters smaller than 1 cm with precision.

The work began under a three-year Laboratory Directed Research and Development project that ended in 2001. It’s now funded largely through a combination of internal and external programs.

The research falls under the umbrella of Sandia’s Microenergetics Program, which Alex says uses novel techniques to produce small-scale explosive samples to study ignition, combustion, and detonation phenomena. It began as a collaboration among researchers in Sandia’s Microenergetics Program, which Alex says uses novel techniques to produce small-scale explosive samples to study ignition, combustion, and detonation phenomena. It began as a collaboration among researchers in Sandia’s Explosives Technology Group 2514.

Manufacturing Process Science and Technology Group 1830, Engineer- ing Sciences Center 1500, and Microsystems Science and Technology and Components Center 1700.

Petri dish to the table, “Critical Thickness Measurements in Vapor-Deposited Pentaerythritol Tetranitrate Films,” that the work represented the first highly resolved measurements of detonation failure in high-density PETN.

Work began as an LDRD project

The tests use less explosive than what’s inside a .22-caliber bullet, and researchers wearing safety glasses and ear protection can stand next to the experiment in a protective enclosure, Alex says. “A typical experiment weighs about a tenth of an ounce, he says. If that tablet is 2.25 milligrams, we’re shooting about 32.5 milligrams. These are not huge.

The team did multiple shots to determine at what point detonation fails. “As size [thickness] decreases further and further, at some point the detonation will slow down and eventually fail,” Alex says.

His interest in the subject goes back to when he and his brother as kids fostered each other’s interest in fireworks and explosives. Alex, a chemist, became involved in Sandia’s projects through an interest in collaboration and because of a mentor, Ania Renlund, a senior scientist with the Explosives Technology Group who retired in 2008. Rob, whose background is in materials science, began working for Sandia in 2009 as a postdoctoral appointee working with Alex. Rob later moved to the Labs’ regular staff, continuing on many of the same projects.

Alex, Rob, and co-authors Ryan R. Wixom, Jill C. Miller, Michael F. Marquez, and J. Patrick Ball presented a paper at the 14th International Detonation Symposium in Coeur d’Alene, Idaho, in 2010. They wrote in the paper, “Critical Thickness Measurements in Vapor-Deposited Pentaerythritol Tetranitrate Films,” that the work represented the first highly resolved measurements of detonation failure in high-density PETN.

Work began as an LDRD project

The团队发现了一个新的方法来改进其性能。

“这几年的工作表明，我们正在努力研究这些条件的特点。例如，聚乙烯醇是一种独特的材料，它由大约3.5毫米组成。这些不是很大。”

团队做了多轮射击来确定在什么条件下爆炸物不会爆炸。他说，“随着尺寸减小到一定程度，爆炸物的性能会迅速下降并在一定程度上失效。”

“他的兴趣源于孩子时期，他和兄弟对彼此的兴趣始于烟花和爆炸的兴趣。Alex，分子科学博士，成为了协作的一部分，因为通过一个导师，Ania Renlund，一位高级科学家，与Explosives Technology Group的退休专家。Rob，他的背景是材料科学，2009年底开始在Sandia工作。Alex, Rob, and co-authors Ryan R. Wixom, Jill C. Miller, Michael F. Marquez, and J. Patrick Ball presented a paper at the 14th International Detonation Symposium in Coeur d’Alene, Idaho, in 2010. They wrote in the paper, “Critical Thickness Measurements in Vapor-Deposited Pentaerythritol Tetranitrate Films,” that the work represented the first highly resolved measurements of detonation failure in high-density PETN.

工作开始于一个LDRD项目

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Manufacturing Process Science and Technology Group 1830, Engineer- ing Sciences Center 1500, and Microsystems Science and Technology and Components Center 1700.

Sandia Tech/Sci Park fuels economy with jobs, tax revenue, spending

By Nancy Salem

The $4.18 billion in economic activity generated by the Sandia Science & Technology Park (SS&TP) since it was established in 1998 has produced more than $73 million in tax revenue for the state of New Mexico and $10.4 million for the city of Albuquerque, according to a new report by the Mid-Region Council of Governments.

And direct and indirect jobs associated with the research park, which houses private companies and Sandia sites, have resulted in $3.06 billion in wages, generating a new economic base, the report said.

Albuquerque Mayor Richard J. Berry and Bernalillo County Commissioner Maggie Hart Stebbins announced the report’s findings Aug. 28 at Ted Hobbs Park in Albuquerque, adding an executive director of the Mid-Region Council of Governments.

“Other research has been done on PETN in a different form or when it had a binder added to it. This is the first time these data have been done on the critical detonation geometry for pure, high-density PETN.” In the past, diameter information was obtained through experiments using high-aspect-ratio cylinders of pressed pellets of differing diameters. But it’s difficult to press pellets with diameters smaller than 1 cm with precision.

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Manufacturing Process Science and Technology Group 1830, Engineer- ing Sciences Center 1500, and Microsystems Science and Technology and Components Center 1700.

Sandia also began a partnership with the establishment of the Cyber Engineering Research Laboratory and the addition of staff to the Innovation Parkway Office Center. Other Sandia Labs facilities in the park include the Center for Integrated Nanotechnologies, the International Programs Building, and the Computer Science Research Institute.

Public investment since the park was established has been nearly $87 million, including DOE’s contribution for the Master Development Plan, land from Albuquerque Public Schools and the New Mexico State Land Office, and land fill in Bernalillo County, the report said. Other federal, state, and local government entities also helped the park by providing grants or matching funds, the report said.

For example, the US Economic Development Administration provided significant grants for small business incubator and technology support infrastructure. The city of Albuquerque also contributed to infrastructure improvements in the park.

As of December 2011, investment in the park has been more than $350 million, with 75 percent coming from private sources,” said Jackie Marquez Moore, the park’s executive director and manager of Sandia’s Technology & Economic Development Dept.

“Fifteen years ago, this area was nothing but dirt and tumbleweeds, but since then the jobs and investments have led people to invest not just in the park, but in the surrounding area,” she said. “The park has been a catalyst for economic revitalization in southeast Albuquerque.”

The SS&TP is located next to Sandia and Kirtland Air Force Base, giving park companies access to scientists and engineers from Sandia and AFRL. Many park companies supply Sandia and AFRL with goods and services or technologies products or have licensed and commercialized technologies that originated at the federal laboratories.

The park received the 2012 State and Local Economic Development Award from the Federal Laboratory Consortium.

The park is a partnership of Sandia, DOE, Lockheed Martin Corp., Technology Ventures Corp., the city of Albuquerque, Albuquerque Public Schools, Bernalillo County, the Technology and Innovation Council of Governments, BUILD New Mexico/Union Development Corp., the New Mexico State Land Office, the state of New Mexico, Public Service Company of New Mexico, and the US Economic Development Administration.
Sandia Emergency Response Team overcomes host of hazards, takes second at HAZMAT Challenge

By Chris Mullaney and Stephanie Hobby

Sandia's Emergency Response Team (ERT) proved once again that they are the guys you want on hand when calamity comes crashing in. Seven Sandians returned with honors after the week-long HAZMAT Challenge at Los Alamos National Laboratory. Team members demonstrated their outstanding skills when facing a variety of significant response challenges including a cramped mechanical room full of toxic and explosive vapors, dangerous chemicals leaking from a vandalized railroad car, a booby-trapped meth lab, and explosive vapors, dangerous chemicals leaking from a vandalized railroad car, a booby-trapped meth lab, and a hijacked city bus packed with frantic passengers, contaminated by a terrorist armed with chemical warfare agents.

THIS YEAR'S SANDIA HAZMAT CHALLENGE TEAM was (front row, kneeling, left to right) Rich Lovato, William Liebhard, Victor Marquez, John Ledet, (back row, standing, left to right) Chris Mullaney, Dale Larez, and Steve Saddoris.

By Chris Mullaney and Dale Larez, and Steve Saddoris.

Although the emergencies were all simulated, they represented very real possibilities in what emergency responders might face in the course of their work. The days were long, tense, and grueling. Every emergency was complex, physically demanding, and required team members to keep a level head through it all.

The annual challenge is hosted by LANL to enable emergency response teams from around the country to practice technical skills, and learn new HAZMAT techniques in a safe, yet realistic, environment.

“Sandia's Emergency Response Team has again proven their remarkable talents and skills against some of the best this country has to offer. Sandians should be proud of their efforts and rest assured in knowing that such an outstanding team is working on their behalf,” says VP of Infrastructure Operations Div. 4000 Mike Hazen.

This was the 16th annual HAZMAT Challenge and 12 teams from New Mexico, Oklahoma, and Missouri participated during the second week of August. LANL’s Tech Area 49 was the setting, and the competition was intense. Teams are scored on a 500-point scale. The Sandia/New Mexico Emergency Response Team brought home the Second Place Overall HAZMAT Challenge Trophy after missing the first place by only two points.

The Sandia/New Mexico Emergency Response Team is already working with emergency managers bringing the first-place trophy home next year. The Sandia team is committed to refining its skills and training available points and the fastest time of all teams on that event.”

Despite demonstrating a high degree of capabilities, the Sandia team is committed to refining its skills and training available points and the fastest time of all teams on that event.”

“Even though we practiced, there were lots of curves they gave us in that challenge event that were unexpected. But even when we were running out of air, and things weren’t going just right, the Sandia team worked together as one, did not get excited, and just dealt with the situation. The Sandia team got all the available points and the fastest time of all teams on that event.”

“We did very well, and I’m really proud of our team,” says Chris Mullaney (4263-1) of Sandia’s Emergency Operations Department. “Most of the people we were competing against were the best of the best, selected from sometimes hundreds of people in their agency. Sandia’s team is small, so for us to take second — and miss the first place trophy by only two points — was very rewarding. Sandians should be proud and know that they have a first-rate emergency response team.”

One focus of this year’s HAZMAT Challenge was mutual aid and a joint, unified command; that is, two agencies coming together and working in coordination and smartly during a crisis. “Comparatively, we have a lot of experience with unified command since we routinely team up with the Kirtland Air Force Base Fire Department. During the challenge, we had two incident commanders from other teams come up to us and thank us for helping them succeed in their own events. That’s what it’s all about. That meant a lot,” says John Ledet (4236-1).

That experience came in handy more than once. “During the railroad car scenario, everything went wrong. Everything went south,” says Dale Larez (4236-1). “Even though we practiced, there were lots of curves they gave us in that challenge event that were unexpected. But even when we were running out of air, and things weren’t going just right, the Sandia team worked together as one, did not get excited, and just dealt with the situation. The Sandia team got all the available points and the fastest time of all teams on that event.”

Despite demonstrating a high degree of capabilities, the Sandia team is committed to refining its skills and training available points and the fastest time of all teams on that event.”
DIVERSITY AWARENESS EVENT

“HISPANIC HERITAGE MONTH”

Time: 11:00 AM—1:00 PM
Date: Thursday
October 4, 2012
Location: Hardin Field, KAFB

2nd Place
Katherine Ortega

3rd Place
Jose Calsadillas

Honorable Mention
Raquel Madrigal

Salsa/Chile/Cultural Dessert Tasting Contest
Cultural Music provided by The Abel Lucero Band
Youth Art Displayed

Food Provided By: Garcia’s Kitchen - $8.00 per plate
Menu: Red Cheese & Green Chile Chicken Enchilada, Taco Bar, Refried Beans, Spanish Rice, Biscochitos, Tortillas and Passion Fruit Tea.

Advance Food Purchase Only
Contact SNL: Erika Sartzeto 505.844.4803, esartzeto@sandia.gov
SOC: Jose Munoz, 505.844.9210, jose.munoz@nnsa.doe.gov
KAFB: Jose Del Val, 505.883.8300, jose.delval@kirtland.af.mil
NNSA: Pablo Garibay, 505.846.8185, Pablo.garibay@nnsa.doe.gov

Our People, Our Legacy
Nuestra Gente, Nuestra Herencia

The Original Garcia’s Kitchen tickets may be purchased from the SLFCU/Kirtland Branch by Friday, Sept. 28, for $8.
Steve Castillo named HENAAC’s 2012 Engineer of the Year

Sandia manager touched thousands of students’ lives during long career in academia

I t wasn’t inevitable that Steve Castillo would become an engineer. But it wasn’t surprising, either. It was upbringing. It’s not surprising, either, given his upbringing, that he has moved to the very top of his chosen profession. Steve has been named the HENAAC’s Engineer of the Year two years in a row, 2011 and 2012. (Photo by Randy Montoya)

Steve credits his parents with being the biggest positive influence in his life, but there were other influential and inspirational adults in his life, too. “In addition to my parents,” Steve says, “there were a few teachers that inspired me — my 5th grade school teacher, Lorna Brown, a 7th grade science teacher, Steven Preece, and my high school college algebra teachers, Mr. Zamora and Mr. Zuniga.”

In his later career, Steve would remember and say — how important those positive role models were at a formative age.

After graduating from Belen High School in 1977 as a National Merit Scholar finalist and a member of the National Honor Society, Steve was accepted to several good engineering schools, but it was a personal letter from a college close to home that sealed the deal for him. The dean of the engineering school at New Mexico State University in Las Cruces, John Hernandez, heard about Steve and recruited him the way big time sport schools recruit top athletes.

Steve’s decision to go to Las Cruces right out of high school was the beginning of a lifelong relationship with NMSU. After earning his Bachelor of Science degree in electrical engineering at the school, he spent a year and a half at the AT&T Bell Lab facility in Denver. He subsequently moved on to earn a Master of Science degree and doctorate in electrical engineering at the University of Illinois at Urbana.

A consequential phone call

With his PhD in hand, Steve had a wide-open field of options. He interviewed for research positions at several government and private sector laboratories, but again, it was a personal intervention — a phone call this time — from Las Cruces that settled the issue for him. Steve’s NMSU undergraduate mentor, professor Gerry Rachs, suggested that he consider a teaching position at the university. It was something that had never really occurred to Steve, but he became intrigued by the idea and took a tenure-track position that set the direction of his career for the remainder of his professional life.

First as a professor, then as an administrator, Steve became a major influence at NMSU’s engineering school. He taught more than 5,000 students, and graduated eight PhD and 22 MS electrical engineers, all while remaining deeply involved in research. He was lead author or co-author on 27 technical papers, focusing on the areas of his technical interests, which include electromagnetic theory, electromagnetic interference problems, numerical solutions of electromagnetic problems, high performance computing, and computational linear algebra.

After years in the classroom as professor and department head, Steve became dean of the NMSU College of Engineering in 2004. He ran into many successful in helping shape the school’s program direction and in raising more than $120 million in cash and in-kind gifts. Those resources have established several endowed faculty positions and increased scholarship opportunities.

Steve is the recipient of many honors and awards for his professional accomplishments and community service. In 2011 he says, is the opportunity he has had to work with and be a positive influence for his students. “I am very proud of the many young people touched throughout my career that have gone on to become outstanding professionals and citizens.”

Although he has left the classroom, Steve has not left behind his desire to be a positive role model and mentor. When he meets with young people today through community service, he encourages them to consider careers in STEM — science, technology, engineering, and mathematics. Steve says, “When I tell any young person that a career in STEM will give them the opportunity to be involved in the creation of wealth and a better standard of living for our society or even provide for the security of our country, and at the same time, pay them well enough to enjoy a comfortable lifestyle.

“A STEM career has the potential for making their daily work lives enjoyable because of the many ‘gee-whiz’ moments that occur on the job in engineering and science professions. I would also tell them that the keys to a successful career in STEM are the mathematics, science, and communication skills they must obtain before they go on to college.”

Steve will be presented HENAAC’s Engineer of the Year award at the organization’s annual conference in Orlando Oct. 11-13.

How HENAAC chooses the Engineer of the Year

From the HENAAC website: The Engineer of the Year and the Scientist of the Year Award is presented for outstanding contributions of Hispanic American science, engineering, technology, and math profession- als. Over the past 23 years, the conference has evolved to encompass many additional activities including honoring students; providing opportunities for student leadership development; and creating a career fair where both students and professionals can look for employment; and a forum where top leaders of representing corporations, government agencies, academic institutions, the military, and the business community-at-large can discuss and implement change for the betterment of our country and the Hispanic community’s involvement in STEM.

About HENAAC

From the HENAAC website: The first HENAAC conference was held in 1989 as a means of identifying, honoring, and documenting the contributions of outstanding Hispanic American science, engineering, technology, and math professionals. Over the past 23 years, the conference has evolved to encompass many additional activities including honoring students; providing opportunities for student leadership development; and creating a career fair where both students and professionals can look for employment; and a forum where top leaders of representing corporations, government agencies, academic institutions, the military, and the business community-at-large can discuss and implement change for the betterment of our country and the Hispanic community’s involvement in STEM.