



LESTER ARAKAKI (6418) displays a bomb vest like one a terrorist might use in an attack on a rail system. Lester's group, Contraband Detection Dept. 6418, has worked with the Department of Homeland Security to evaluate systems that detect explosives that might be smuggled onto a train. (Photo by Randy Montoya)

Sandia plays role in DHS program to bolster commuter train security

Sandia helps evaluate several technologies that aim to prevent rail bombings

By John German

Several Sandians worked alongside transit officials at a security checkpoint in a New Jersey commuter train station recently as part of a program to improve rail security.

The Department of Homeland Security (DHS) program, funded by Congress shortly after the 2004 commuter train bombings in Madrid, Spain, is intended to identify security approaches that may help prevent attacks on US rail transit systems.

The two-week field demonstration in July, which tested five new detection systems provided by vendors, took place at the Port Authority of New York and New Jersey Exchange Place Station in Jersey City. The trials involved checking rail passengers for explosive objects hidden underneath clothing as they passed through a checkpoint.

Its focus was on large threats such as explosive vests and package bombs, says project leader Jim Phelan of Contraband Detection Dept. 6418. Two other Sandians, Eric Varley (6418) and Andrew Vaughn (8134), served as technology experts during the trials and worked alongside Transportation Security Administration screeners.

"Security systems for passenger rail are challenged by open station design, ease and speed of entry, and low-cost features that make mass transit popular," Jim says.

Five systems tested

The five demonstrated systems employ various standoff imaging techniques — including millimeter wave, infrared thermography, and terahertz imaging technologies — to detect large threat objects as commuters pass walkthrough checkpoints. A few of the systems included automatic threat recognition.

The field demonstrations in Jersey City followed a round of laboratory (Continued on page 4)

National nanotechnology Core Facility formally opens

Sandia, Los Alamos combine skills to keep US in forefront of field of very small things

By Neal Singer

Several stories about Caltech professor Richard Feynman surfaced at a ceremony dedicating the 96,000-square-foot Sandia-Los Alamos Center for Integrated Nanotechnologies (CINT) Core Facility on Aug. 23.



SENATORS Jeff Bingaman, left, and Pete Domenici share a happy moment with Julia Phillips during opening ceremonies for the new CINT facility. (Photo by Randy Montoya)

DOE Deputy Secretary Clay Sell mentioned the talk by Feynman in which he made famous the phrase "plenty of room at the bottom" (referring to technological opportunities in nanometer spaces).

Then the usually straight-faced Sen. Jeff Bingaman described Feynman's presence at a LANL security meeting in which Edward Teller opined that too much was being made out of security issues. Teller felt that he kept his keys satisfactorily locked in his desk. Feynman, one of whose hobbies was picking locks,

walked casually out of the meeting as Teller spoke, entered Teller's office, picked his lock, took his keys, and re-locked the drawer. Returning to the meeting, he mentioned to Teller that he'd be honored to view Teller's security apparatus. (Continued on page 5)

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Tom Hunter addresses all-hands meeting . . .

Labs' new strategic plan aims to move Sandia to a higher plateau

By Bill Murphy

Labs Director Tom Hunter, addressing a standing-room-only all-hands meeting at the Steve Schiff Auditorium last week, laid out the context in which the Labs' new strategic plan has been developed and why the plan is so vital to Sandia's continued success. The new plan is being rolled out across the Labs over the next couple of weeks.

The presentation, video-linked to California, Tonopah, Carlsbad, Pantex, and Washington, opened with a video that highlighted Tom's comments at the 2006 Spring Leadership Forum. In the video, Tom rolled off a series of the surprising twists and turns the world has taken over the past decade. He concluded, "The future is never what you expect it to be, but you know it will be different."



LABS DIRECTOR TOM HUNTER

Nation will expect more

Regardless of the specific course the future takes, Tom said, there will be challenges for the nation that Sandia can help address.

As the nation faces the challenges of the 21st century, Tom said, the American people are going to expect more of all of their institutions, including the national laboratories. The nation, Tom said, is demanding that the national laboratories "rise above where they are today, because business as usual will not be competitive in the future."

That expectation, Tom said, definitely applies to Sandia. "We operate pretty well, but not well enough for the future."

The strategic plan, the result of more than a year's effort by the Labora- (Continued on page 4)

Score one for safety

Sandia's emphasis on safety issues over the past several months appears to be paying dividends. According to ES&H Director Phil Newman, the number of recordable accidents — those requiring more than immediate first aid — is down, with month-by-month accident rates lower than last year. Phil cites "culture change" as a key factor. The full story is on page 5.

Also inside . . .

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- UNM's Mechanical Engineering Building goes solar — again . . . Page 6
- All through the night with the Bldg. 703 concrete pour . . . Page 7
- Benefits Choices 2007: Open Enrollment moves to web . . . Page 10
- Who ya gonna call for computer problems? Try CCHD Page 12

What's what

Something relatively new has crept into our lab lexicon — MOW.

It's a dual-purpose initialism/acronym for member of the workforce and the plural form, member(s) of the workforce. Spelling it's no problem, but the pronunciation is unclear. Is it MOW (like "go") or MOW (like "cow")?

Of course, becoming MOW or MOW (whichever it is, and the plural form in either case) isn't the first change. We now attend all-minds or all-hearts meetings, pursue customers, align strategic goals, hold informational sessions for stakeholders, etc., etc., etc.

(Sigh!) It used to be much simpler, when we were just plain old Sandians and occasionally were invited to all-hands meetings to learn about our latest missions in the interest of national security, and pursuit of funding was left to the congressional constituents of projects we were tasked with.

Yeah, it used to be a lot simpler — but then, the world was a much simpler place, too, when there was one Cold War adversary, three TV networks, Chevys, Fords, and Plymouths, and a radio station that played music that everyone — everyone! — listened to. (Sigh!)

* * *

It's worse than we feared.

Still not quite believing Albuquerque's two Krispy Kreme stores closed last month, we learned that all eight of the donut franchise stores in Arizona shut their doors at the same time. Which moved Larry Rogers (10263) to wonder, "As sources shrink, can a Krispy Kreme black market be far behind?"

Could happen. Remember the 1977 movie *Smokey and the Bandit*? The movie was full of stunts and laughs, but the premise was true — a semi load of semi-cult Coors beer headed east from the Rocky Mountains, because it was unavailable for sale legally much east of the mountains. Go to a NASCAR race or just about any other large gathering anywhere at that time and you'd find at least one van in a parking lot peddling bootleg Coors beer out the back door at prices that made you wonder if it was made with "pure Rocky Mountain spring water" or water imported from another planet (not Pluto, of course).

So don't be surprised if one of these Fridays a block or so outside the base, you slow for the line of gate-check traffic and some guy walks up to your car, looks around nervously, and says, "Pssst. . . Hey, buddy, wanna buy some donuts?"

* * *

In one of those shake-your-head-in-disbelief stories, The Associated Press reported recently that in Santa Cruz, Calif., only about a third of the calls to 911 are really emergencies. So many are so wacky or ridiculous, the dispatchers don't even remember details.

They've had calls from people who are lost, whose drive-thru fast food order was wrong, who can't find their cars in mall parking lots, misplaced their car keys, can't get the baby to stop crying. There was even one about a tumbleweed rolling across a highway.

A lot of us, it seems, are unclear on the concept.

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

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Thunderbirds to hear about sleep disorder issues

Sandia Thunderbirds (and all interested persons) will hear about sleep disorder issues this month from Lisa Teves, a health educator in Sandia's Preventive Health Services group in Health Services Dept. 3331. Lisa has worked with people with sleep disorders for the past five years. The free-of-charge meeting is Monday, Sept. 11, 1:30 p.m. at the Mountain View Club on Kirtland Air Force Base.

Lisa addresses a range of sleep issues: difficulty falling asleep or staying asleep, or feeling tired even after a night's sleep. She will help attendees determine various factors may be affecting sleep quality.

After the presentation there will be an election of Thunderbird officers for 2007, followed by an ice cream social. The program, as always, is preceded by an optional lunch.

The Sandia Thunderbirds is Sandia's retiree club. Call Rod Boenig at 836-6977 for information on how to attend.

Disabilities Awareness Committee holds monthly meeting Sept. 13

The Disabilities Awareness Committee will meet Sept. 13 in Bldg. 823, Conference Room 4255 at 11:30 a.m. The committee meets monthly for interested employees to address disability awareness, education, and solving disability problems throughout the Labs. For information, contact Jeneane Taylor (1300) at 845-9646 (sjtayl@sandia.gov) or Susan Carson (6143) at 845-8713 (sdcarso@sandia.gov).

Ted Sherwin, founder and champion of Labs' ECP program, dies

Also led Labs' original PR group

By Rod Geer

I remember Ted Sherwin well. Ted, who died Aug. 19 at the age of 88, was my first department manager. More importantly, however, he was, in two very concrete ways, one of the Labs' visionaries.

He came to Sandia straight from serving a stint as a spokesperson for Sen. E. V. Roberson, of Wyoming. It was partly because of that background, but also because Ted so clearly saw the exceptional contributions that Sandia could offer to the nation, that he founded and became the leader of Sandia's first public relations organization.

Also in his role as head of PR during the Labs' first decade, he recognized a need for a new and large employer in Albuquerque to be seen as a good neighbor and contributor to the community. So he founded the Labs' Employee Contribution Program.

On the occasion of Sandia's 40th anniversary — in the fall of 1989 — I sat down and talked with him about ECP and its beginnings. That

interview appeared in the anniversary celebration booklet, *Recollections for Tomorrow*, which was distributed to all employees at that time. Here are some excerpts of Ted's words from that 1989 interview:

"ECP — or the program that became ECP — did not happen overnight. It took four or five years to get it started. I began waging a memo-writing campaign in 1953 to get formal approval for some major changes in the way our employees could be solicited by charitable organizations and how they could make their contributions to these groups.

"Other companies around the country were adopting so-called federated giving, which combined annual employee Community Chest contributions and contributions to health agencies. These plans had some of the elements that our Employee Contributions Planning Committee was after, but I knew the specifics of our plan would make it unique . . . in the community.

"Year-round giving by payroll deduction would be the key. That was new in those days. Also, we didn't want to second-guess the community on how to distribute ECP funds. We'd rely on existing community-giving patterns.

"I remain very proud of our work, especially . . . when I read how much Sandians are pledging to their community, both in money and time. Twenty percent of Albuquerque's United Way giving for more than 30 years — that's something Sandians can be proud of."

Also while a Sandian, Ted founded the New Mexico chapter of the Public Relations Society of America and received DOE's Outstanding Achievement Award.

He is survived by Helen, his wife of 65 years, a daughter, a son, several grandchildren, and a great-grandchild.

Sympathy

To Chris Tolendino (10312), on the loss of her father, Sandia retiree George Chapman, and Larry Tolendino (4334), on the loss of his father-in-law. George is survived by his wife, Sandia retiree Virginia Chapman, son Tom Chapman, and daughter Kari Wier.



A CHAMPION — Ted Sherwin (right) started Sandia's hugely effective ECP program and its first PR group.

This demonstration network elevates cell phone cameras to surveillance tools

By Nancy Garcia

Take common cell phone cameras combined with parallel processing algorithms and pattern-recognition capability, add radio frequency links, and get an economical and robust wireless sensor network to scan perimeters, critical infrastructures, emergency scenes, or other potential danger spots.

That's the idea behind DISCERN, the Distributed Camera Recognition Network, a Laboratory Directed Research and Development (LDRD) effort coming to an end this month with an anticipated demonstration of a small set of nodes.

"We're sort of taking the 'cheap, simple, plentiful approach,'" says Dept. 8961 Manager Mitch Sukalski.

Although the project uses simple components in a novel slant on wireless sensor networks, it incorporates high-performance concepts by treating the system as a distributed computer, building on years of research to push the limits on computer visualization and distributed systems. The flexible, low-power system is scalable and can be extended to other sensor systems.

Embedding each node with artificial intelligence to recognize features, collaborate, and relay relevant information has several advantages, says principal investigator Teresa Ko (8961).

"You only send images that tell you something," she says. Not funneling pictures continuously to a central base station conserves power and relieves human operators of monotonous surveillance in which performance can falter.

Each node has an eraser-sized Agilent Cyclops camera atop a compact Crossbow Stargate processor embedded with pattern-recognition programming. The individual nodes recognize visual changes, extract features, and alert neighboring nodes, which collaborate to figure out the exact position and direction of movement. Decisions are made from machine learning derived from statistical probabilities.

Because of limited communication bandwidth, processing information at each node provides finer sensing and resolution faster than beaming raw data to a central base station. The

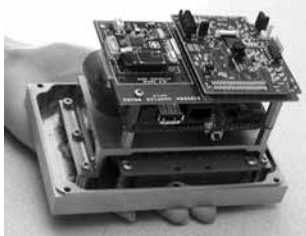


IMAGE CONSCIOUS — Teresa Ko holds a DISCERN node. Several of these can be linked to provide area surveillance.

parallel algorithm that tracks 3-D images takes advantage of naturally distributed data.

The team has spent two years on the development, which included investigating how to meaningfully classify events — based on changing features — in a computationally feasible manner.

They developed a collaborative relationship with the image sensor manufacturer, Agilent, and are patenting the system hardware that combines a Sandia-built adapter bed and battery with the commercial components and embedded programming.

DISCERN has been identified as part of the future of virtual perimeter systems (VPS), which look beyond the outskirts of a setting to see into secluded nearby areas.

Moving perimeter beyond the fence

"The concept is applicable to being able to move your perimeter beyond the fence to detect and assess intrusion," thereby providing more time to react, says Intrusion Detection Technology Dept. 6439 Manager Regan Stinnett.

A VPS prototype was fielded in New Mexico last fall as part of a Grand Challenge LDRD.

Regan said the virtual presence is cheaper, performs better, and keeps people out of harm's way.

Both DOE and the Department of Homeland Security have new surveillance requirements, which such research efforts could support. Besides watching perimeters, potential applica-

tions for DISCERN include locating and tracking smugglers at borders, monitoring critical infrastructures, and providing information for first-responders at the scene of an emergency.

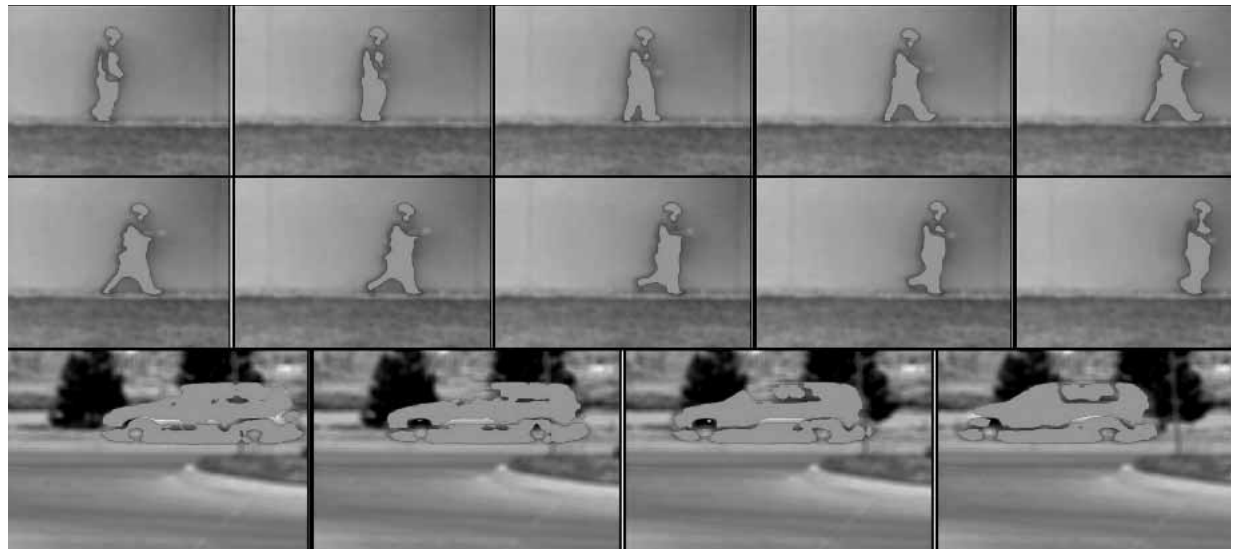
The development is intended to culminate in a small network demonstration in September. The work leverages previous wireless sensing network projects, such as TALON (Target Acquisi-

Sandia California News

tion, Location, Observation, and Neutralization), SDAC (Sense, Decide, Act, Communicate), HERD (Hybrid Emission Radiation Detection), MASS (Modular Architecture Sensor System), and the Facility Monitoring LDRD.

Team members include Teresa, Embedded Research Institute cofounders Nina Berry and Rob Armstrong, and Michael Chen (all 8961), and Jeff Carlson (15211). Additional collaborators include Ron Kyker (8245), Jesse Davis (formerly of 8961), Phillip Kegelmeyer (8141), Doug Stark (8226), Chris Kershaw (8252), and Grace Soh (8235). Intern Marinna Lee worked on the graphical user interface in 2005.

Also Leo Smuzel and Keiichi McGuire are interns working on the demo system. Craig Ulmer (8963) is working on networking issues, and Joe Kenny (8961) is working on power management.



DISTINCTION — Various features help differentiate between objects such as a person or passing vehicle.

(Image by Jeff Carlson)

Feedback

Can I use an exercise ball instead of an office chair? . . . and more

Q: Sometimes I'm sitting in my office and having a hard time staying awake. I was thinking about bringing in one of those exercise balls to sit on not only because of its "active sitting" capabilities but also because it might help me stay more alert. The only problem I saw with that was the possibility that ES&H might call it unsafe. Would I be allowed to use a ball as a part-time replacement for my desk chair?

A: I would not recommend using an exercise ball as a substitute for an office chair. At Sandia we have had incidents of employees sitting on balls and having them rupture and also falling off the balls. There is no assurance that a ball will help you stay awake. It is much easier to fall off a ball than out of a chair if you happen to doze off. I would suggest a stand/sit workstation. Standing periodically and working would certainly be more beneficial to your system and safer.

— Larry Suzuki (3331-2)

Q: Sandia's gardeners and landscapers do a fantastic job keeping Sandia looking nice. We have contractors come in and dig, dig, and dig but they never put things back the way they found it. Plants are uprooted or damaged, the area looks like a bomb hit it, and it just looks awful. Are the contractors responsible for putting back the landscaping they destroy or

remove? If so, and they don't do it, can Sandia withhold payment to them to make the repairs? There is another digging job going on by my building and I shudder to think of what I will have to look at when they are finished. A previous job that was done damaged the chain link fence, and the gates have been lying on the ground for many months.

A: Contractors are responsible for restoring landscaped areas based on what requirements are contained in project contract specifications. In most all cases it is their responsibility to restore areas to original conditions since this requirement is placed in the project scope. There could be circumstances where we would not want the area restored immediately if subsequent work in the area would affect the same landscaping.

Payment to contractors is made on a schedule of values, meaning as work is completed in stages the contractor is paid for what has been completed. Therefore, until the contractor finishes the scope of work in the contract they are not paid in full.

If you identify anything that you believe needs repair, please contact Telecon Plus at 844-4571 and someone from Facilities will investigate.

— Lynnwood Dukes (10860)

Q: Why is it that the ES&H Organization expects everybody to spend time completing an ergonomic self-assessment and taking ergonomics seriously (which my organization does) but the ES&H Organization itself makes many of their employees get their desk chairs from Reapplication? Reapplication is where most of us send old chairs that are no longer in good working condition. Shouldn't the ES&H Organization be setting the standard for the company in ES&H matters and taking care of its own employees?

A: I wish I could contact you directly to explain our aggressive ergo program within the center. All employees are aware that they are entitled to have a comfortable and ergonomically designed work area. Those who have questions, issues, or health concerns are set up for an ergo evaluation, the same as the rest of the Lab. If employees have special needs, such as a special chair, they are encouraged to see if the appropriate furniture is available in Reapplication. If a solution cannot be found in Reapplication, we purchase the necessary furniture or equipment. Employee safety and health is our number one concern. Using cost saving resources is a smart way to do business.

— Phil Newman (10300)

All-hands

(Continued from page 1)

tory Leadership Team, with support from staff across Sandia, maps the course the Labs must follow to meet the new, higher level of expectations.

The underlying premise of the plan — and the key to its success — is that Sandians at all levels need to internalize the Labs' strategic intent (see "Sandia's strategic intent" this page). Tom summarized that intent by noting that in answer to a news reporter's question that very morning, he had described Sandia as "the nexus between national security and science and engineering."

Tom explained that as Sandia moves forward to implement the new plan, it will base its approach on the Integrated Laboratory Management System. ILMS is a business enterprise model that describes how the Labs achieves its mission today and for the future, what it values, how it maintains customer focus, how it assesses and improves itself, and how it assures consistent performance through operational excellence.

Challenges, opportunities

Tom addressed specific accomplishments and challenges in the Nuclear Weapons Strategic Management Group headed by Executive VP Joan Woodard and the Integrated Technologies and Systems (ITS) SMG headed by Senior VP Al Romig.

Regarding the weapons program, Tom noted that the challenges ahead are daunting. Over the next few years, he said, the nation will see changes in the stockpile, changes in the weapons complex, and changes in how everything in the complex is managed. Sandia's new strategic plan, he noted, positions the Labs to help address, and even lead, that transformation.

Challenges also abound for the ITS side of the house. There are many opportunities, but to take advantage of them, the Labs will need to be leaders in areas such as nuclear energy, space systems, nuclear legacy issues (i.e., WIPP and Yucca Mountain), infrastructure protection, base and force protection, support for the warfighter, cutting-edge technology as represented through CINT (the just-opened Center for Integrated Nanotechnologies, operated jointly with Los Alamos National Laboratory), and MESA (Microsystems



LABS DIRECTOR Tom Hunter during an all-hands meeting on new strategic plan stresses the need for transformation of the Labs. (Photo by Randy Montoya)

and Engineering Sciences Applications).

Transformation underpins everything

To be fully positioned to meet the challenges in both nuclear weapons and ITS, Tom talked about a new strategic management group, Laboratory Transformation, headed by Executive VP John Stichman. (VP Lenny Martinez has been tapped to head the new Enterprise Transformation Division 9000.) And it was the theme of transformation — the need for the Labs to adapt to a new geopolitical national security environment — that colored everything Tom said. The Labs future, ultimately, hinges on its ability to transform.

"The plateau of where we must go is much higher than the plateau where we are."

There are several immediate and near-term implications of the new plan. It sees the nuclear weapons program and the combined ITS programs as each representing about 50 percent of the Labs' operating budget within a few years.

Rail security

(Continued from page 1)

evaluations at Sandia of the five systems. For the lab tests Sandians built mock bombs, including explosive vests and belts, to understand system performance against a range of threats. They also tested the systems for false alarm rates, passing through the mock checkpoints with concealed cell phones, PDAs, and other commonly carried objects.

"It's been a whirlwind," says Jim of the activity leading up to the field tests.

The July trials in New Jersey were the third in a series of field exercises that are part of the overall DHS program.

The first, in June at a MARTA station in Atlanta, Ga., evaluated dogs specially trained to sniff out explosive vapors coming off passengers moving through crowds. The dogs were trained via an Auburn University "vapor wake canine" process. Andy Vaughn led the canine field tests



ERIC VARLEY (6418) sets up a passive millimeter-wave weapon detection system at the Port Authority of New York and New Jersey's Exchange Place Station.

and evaluation, with participation from Oak Ridge National Lab and the Atlanta Police Department bomb squad.

The second field exercise, in June at a Maryland Transit Administration station in Baltimore, tested two developmental fare-card vending systems that detect trace explosives residue on passengers' fingers. Four Sandians — Dave Hannum (6418), Mary Mitchell (6418), Akinbayowa Falase (6115), and Jim — planned and performed the field test and served as technical advisors.

Next step: assessment

Sandians will now begin assessing the systems and approaches based on the data gathered during the lab evaluations and field tests.

As part of the DHS program, Oak Ridge National Lab also is using enterprise

modeling to assess the greater impact of new security systems on rail transit in terms of delays, costs, manpower, and other factors.

"This has been a great project in demonstrating where technology can meet some of these needs, and how much further it needs to go," says Jim.

Traditionally, nuclear weapons has accounted for the majority — even a substantial majority — of the operating budget. Within just a year or two, the actual majority of income may be for non-nuclear program work.

There's a particular challenge to that new trend: Historically, DOE has invested hugely in key Labs capabilities and infrastructure. As ITS programs assume a larger role in the Labs' mission space, Tom asked rhetorically, will those customers be willing to make strategic investments in the Labs' capabilities to the extent that DOE has? There are some positive indicators in that regard, but the challenge — and the concern — is still there.

As the Labs moves into the future, the FTE load will change — through a combination of attrition and a slightly slowed down hiring program — from a current level of about 8,500 employees to an FY10 estimated level of about 8,200 employees.

Tom spoke in some detail about benefits costs and the challenge they pose for the Labs. He also addressed the compensation package just approved by DOE for the coming year.

Regarding that package, Tom noted that DOE has accepted the Labs' principle of matching salaries to markets. The new package, to be outlined in detail in mid-September, provides an overall compensation increase of more than five percent.

That's the average Labs-wide; raises vary according to current market valuations for different job classes. Individual raises also are tied to annual performance reviews.

To see Tom's entire presentation in streaming video, including his answers to a number of questions at the end of the session, go to: <http://as54snlnt.srn.sandia.gov/mediasite/viewer/FrontEnd/Front.aspx?&shouldResize=False>.

The **strategic plan website** is <http://www-irn.sandia.gov/es/new2006/strategicplanning>.

Sandia's strategic intent

Sandia's strategic intent is a combination of its core purpose statement, its vision statement, and supporting statements presented here:

Core Purpose: Exceptional service in the national interest

Vision: Sandia National Laboratories is the provider of innovative, science-based, systems-engineering solutions to our nation's most challenging national security problems.

Highest Goal: Sandia's highest goal is to become the laboratory that the US turns to first for innovative, science-based, systems-engineering solutions to the most challenging problems that threaten peace and freedom for our nation and the globe.

Vivid Description: We are widely recognized as a national leader in preventing technological surprise, in anticipating threats, in providing innovative, science-based systems-engineering solutions to our nation's most challenging national security problems, and in managing the Laboratories in a way that inspires customer confidence. The excitement and importance of our work, our exemplary work environment, our partnerships with academia, industry, and other partners, and our record of historic contributions help us to attract exceptional staff. Our employees are recognized by their professional peers for their outstanding contributions.

Mission: Committed to "science with the mission in mind," Sandia creates innovative, science-based, systems-engineering solutions that:

- Sustain, modernize, and protect our nuclear arsenal,
- Prevent the spread of weapons of mass destruction,
- Provide new capabilities for national defense,
- Defend against terrorism,
- Protect our national infrastructures, and ensure stable sources of energy and other critical resources.

Recordable work-related accidents continue downward trend

By Chris Burroughs

Despite a small spike in August, the number of recordable work-related accidents — those requiring treatment beyond basic first aid — is down.

"Month by month the accident rate has been dropping," says Phil Newman, director of Sandia's ES&H and Emergency Management Center 10300. "For example, in January there were 30 OSHA [Occupational Safety and Health Administration] recordable accidents, but by July, there were only eight."

Phil suggests several factors contributed to the decreasing figures.

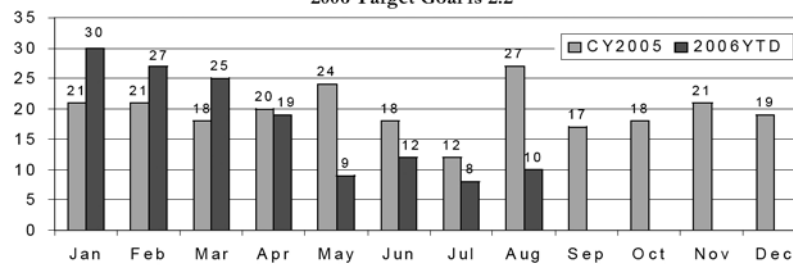
"We are beginning to see a culture change among our employees in the area of safety," he says. "People are thinking about safety more. They are using handrails and being more diligent about where they are walking or how they are lifting objects."

In addition, management is continuing to take safety seriously. All members of the Laboratory Leadership Team (LLT) serve on an ES&H committee. Labs President and Director Tom Hunter makes unannounced ES&H walkthroughs of laboratories across the complex and is not hesitant to close them down if he sees safety problems. All recordable accidents reported to OSHA are also reviewed by Tom.

Several new programs implemented last year are beginning to show results, including the Behavior Based Safety program, which is a systematic

Monthly Recordable Cases, 2005-2006YTD

2006 Total Recordable Case Rate is 2.5
2006 Target Goal is 2.2



way to identify unsafe behaviors that may cause accidents and remind, reinforce, and refocus workers on safe behaviors.

The ergonomics program also is showing results. Last year Sandia conducted an ergonomics survey of the entire workforce. This included checking employee workspaces to make sure they were ergonomically safe. In instances where problems were noted, ergonomic specialists recommended remedies such as new chairs or different computer keyboards.

Formal work controls — procedures that identify safety practices employees must follow — are being implemented in high-risk areas such as the Z machine.

Phil says that while accident rates are falling, they still remain higher than desirable. The current recordable injury rate at Sandia is 2.5 per 200,000 staff-hours. The 2006 "stretch" target is to reduce it to 2.2.

The highest injury rates continue to be in the areas of repetitive trauma/motion, slips/trips/falls,

lifting/carrying/moving, and struck by/against. But each of those areas has seen dramatic reductions.

Efforts to reduce accident rates really took hold last year at Sandia when Labs management launched a new "Best in Class" initiative to drive a change in safety culture and performance (*Lab News*, April 1, 2005). DuPont Safety Resources was hired to help assess Sandia's safety systems, culture, and performance. DuPont was given two tasks: assess the current state of safety and propose a path forward with recommendations for improvement.

Assessment work began in June 2005 with an online employee safety culture survey. More than 4,400 people responded, representing some 55 percent of the potential survey population.

In addition to the survey, DuPont representatives conducted 265 interviews last July and August with Sandia executive leadership, management, technical and laboratory staff, scientists, technologists, ES&H staff, and contractors. They also visited facilities around the Labs, reviewed safety-related documents, and analyzed injury frequencies and worker compensation claim data.

Their biggest finding was that Sandia's present safety culture is in "an early stage and is driven by compliance."

"Over the past year we have moved ahead significantly," Phil says. "People are no longer seeing safety as something that is mandated. Instead they are starting to view it as an integral part of their work life. After all, no one wants to get injured."

CINT opening

(Continued from page 1)

When Teller obliged, only to find his keys missing, he immediately understood what had happened and chastised Feynman.

"I don't know what that story has to do with nanotechnology," said Jeff, "but it's too good a story to pass up."

After praising the openness of the new facility — "you don't have to drive through a checkpoint to reach it" — he went on to say that the \$75.8 million spent on the project (including a Los Alamos Gateway facility) constituted "a statement of the nation's priorities and the importance we attach to remaining preeminent in science and technology."

The building, on the west side of Eubank Boulevard just north of the Eubank Gate, is funded by DOE's Office of Basic Energy Sciences.

Sandia Labs President and Director Tom Hunter spoke in visionary terms about the future of nanotechnology, saying that he saw the new building as "a symbol that science can be transformed." Historically, he said, "science has gone from the top down to get to the bottom of things, an unraveling process. Nano is raveling, putting it together, teaching us a new way to think, learn, and create."

Sen. Pete Domenici held both a carrot and stick, describing his wonder at the building but warning that output from the facility was expected and would be closely monitored by funders.

"What a fantastic thing," he said, gesturing at the CINT building. "Notice that the government did not go out and establish these [five DOE Office of Science nano centers] in hundreds of universities — they are in labs the government has confidence to give big tasks. Maybe we don't deserve it — I personally think they couldn't have chosen better — but remember, you're going to be watched."

Later he said, "I'm so pleased we can fund this [work] for a few years at maximum to see what you can do."

Senior VP and Deputy Laboratories Director for Integrated Technologies and Systems Al Romig, who worked with Terry Michalske and others to launch the idea of a Sandia/LANL nanotechnology center in the first place, pointed out that "almost any organization can build a building, but the possibilities of CINT are embodied in the people who work here."

About the building itself, Patty Wagner from

DOE's Sandia Site Office praised construction of the building for being on-time and on-budget. "We were going to build a DOE building [on the 20 acres] here, but I think this is a better building to have here," she said.

"Dr. Hunter," she said, turning from the podium to face Tom, "this is another example of a line-item project well-managed by Sandia."

Terry Wallace, LANL acting principal associate director, spoke about the appropriateness of "integrating Los Alamos and Sandia around a new type of science." He said that "We cannot underestimate the danger to the country today. These have solutions in science and technology."

The speakers were each introduced by CINT director Julia Phillips, who praised those involved with the project.

CINT is the only research center run jointly by Sandia and Los Alamos national laboratories. The CINT Core Facility is the only permanent Sandia research facility in Albuquerque located off the airbase.

Design evokes Southwest heritage

The building's curved front wall of stacked stone, hundreds of feet long, symbolically links New Mexico's history of innovation by Native Americans at Chaco Canyon, nearly a thousand years ago, with that emerging from today's labs.

The center is expected to help keep the US in a leading position in the expanding field of nanotechnology. Countries around the world are vying to be first in a research area that may have considerable economic, scientific, and military consequences.

Researchers from the University of New Mexico Cancer Research Institute, the University of New Mexico, and New Mexico Tech will participate in nanotechnology projects, as will researchers from around the world.

The CINT Core Facility houses low-vibration laboratories with sensitive microscopes for materials characterization, chemical/biological synthesis labs, and a clean room for device integration. The Scanning Probes Laboratory houses unique and state-of-the-art instruments crucial to the advancement of nanoscience. The work will focus on nanomaterials and nanofabrication.

The Core Facility will be a distribution point



DIGNITARIES, including, from left, Sandia Deputy Labs Director and Senior VP Al Romig, Labs Director Tom Hunter, Sen. Jeff Bingaman, DOE Deputy Secretary Clay Sell, Sen. Pete Domenici, Sandia Site Office Manager Patty Wagner, and LANL Acting Principal Associate Director Terry Wallace help open the new CINT facility in Albuquerque.

(Photo by Randy Montoya)

for researchers best served at "gateways" at LANL and Sandia.

The 36,500-square-foot CINT Gateway to Los Alamos Facility at LANL features roughly 11,000 square feet of laboratory space dedicated to chemical and biological synthesis and characterization, biomaterials fabrication and characterization, optical microscopy and spectroscopy, physical synthesis, thin film fabrication, spatially resolved scanned probe characterization, and advanced computation.

Both facilities will house lab scientists, post-doctoral researchers, technical support staff, and visiting researchers.

A ceremony marking the opening of the LANL Gateway Facility was held in Los Alamos Aug. 21.

The Sandia Gateway is already in place in Bldg. 897.

A new agreement and laboratories milestone, called a pre-competitive users agreement (PUA) and designed specifically for outside researchers, is in place. The agreement with DOE enables relatively quick access for industrial, university, and non-profit researchers because DOE BES agreed to delegate its right to review and approve each agreement to local authorities at Sandia and LANL prior to allowing users access to the CINT Gateway facilities.

The CINT External Agreements Management Plan was prepared by Sandia CINT User Program Manager Neal Shinn (1131), Sandia Strategic Relationship Center (9112; Deborah Payne, and Vic Weiss), and the Small Science Cluster Business Office (1051; Alan Nichelason and Jennifer Lange), in collaboration with counterparts at LANL.

Solar power shines once again at UNM

The time to repair the roof is when the sun is shining

By Darrick Hurst

In a world of ever-increasing energy costs, inflation concerns, and political unrest, it is becoming harder and harder to miss the headlines about diminishing energy resources, or to ignore that steadily increasing figure on your utility bills.

The University of New Mexico is no exception to these economic challenges. However, for the university the solution to reducing those energy costs was hanging overhead all along.

The roof of UNM's Mechanical Engineering Building has been home to a system of energy-saving solar panels for the past 26 years. For most of that time, the system had been all but forgotten. Until, that is, UNM Associate Professor of Engineering and renewable energy researcher Andrea Mammoli stumbled upon the system and saw a golden opportunity to resuscitate the dilapidated solar panels.

"There was a whole system of water storage tanks, pumps, and solar panels that had essentially been forgotten about up here," says Mammoli standing among the panels four stories above the university campus. "The potential waiting to be realized was incredible."

When the Mechanical Engineering Building was completed in 1980, it was designed to be a model of energy efficiency during a time of rising energy costs and diminishing reserves. A system of thick walls, small windows, and solar panels all worked to make the building the most energy efficient on campus.

However, as the costs of traditional energy sources receded in the late '80s, funding for system maintenance was cut. When ethylene glycol from the panels began to damage the roof shortly thereafter, the system was abandoned altogether.

Solar power rides again

Thanks to the work of David Menicucci (6217), Sandia research engineer and manager of the energy surety program, Greg Kolb (6216) of the solar heat program and UNM project design review team, with professors Mammoli and Peter Vorobieff, a project is underway to bring solar power back to the Mechanical Engineering Building.

Mammoli discovered the Clean Energy Grant Program by the New Mexico Energy, Minerals, and Natural Resources Department, which offered funding for clean energy systems. Mammoli approached David with his idea for rebuilding the solar panels, and together they wrote and submitted a proposal to refurbish the system.

When the review board's results were announced, Mammoli and David's proposal was the highest-ranked proposal submitted, and the team was awarded the nearly \$200,000 grant.

The grant's funds will allow the team to replace the system's old, smaller panels with new, more efficient panels.

"The new collectors we bought are much big-



UNM STUDENTS Gehan Kaviratne (left) and Eric Ulrich install the new solar thermal collectors on the roof of UNM's Mechanical Engineering Building.



HERE COMES THE SUN — UNM professors Andrea Mammoli (left) and Peter Vorobieff examine solar thermal collectors on the roof of the Mechanical Engineering Building on the campus of the University of New Mexico. Sandia is helping upgrade the solar system to the latest technologies. (Photos by Randy Montoya)

ger than the old collectors, so the total surface area of the 40 new collectors is approximately equal to that of the 88 old collectors," says Mammoli. "These new collectors reflect 25 years of technology improvement and are much better performers — especially in high-temperature applications such as this one."

A portion of the funds will also provide for renewable energy research and the salaries of students who assist with the refurbishment project.

Although many of the systems that debuted in the 1970s, such as the one on UNM's engineering building, were carefully designed and put together, they often did not work properly. Consequently, solar power systems developed a bad reputation in the '70s and '80s, says Mammoli.

"Our system was not poorly designed; however it was a complex system and thus was prone to failures without careful and continued maintenance," he says. "Also, the old control systems were not as reliable as the modern microprocessor-based ones, which we now have."

In order to avoid the fate of the original system, the refurbished system will make use of multiple redundancies and fail-safes.

"We'll have multiple pumps on uninterrupted power, a valve system to protect the panels from damage, and we'll now be using pure water in the system, rather than the ethylene glycol originally used," says Vorobieff.

System will provide cooling, too

Originally, the system only provided heating for the 70,000-square-foot building. With the help of Vorobieff, Mammoli redesigned the system to include an absorption chiller, making the new system capable of providing both air conditioning and heating.

By Mammoli's conservative estimates, the new and improved system will prevent 100 tons of carbon dioxide emissions a year and a 20 percent reduction in overall utility costs. Of course, the only drawback of a solar energy system is that the sun isn't overhead 24 hours a day.

"An inherent problem with the supply of energy is that it is in highest demand when it is least available," says Vorobieff.

With some innovation, Mammoli and his team have overcome this limitation.

"By employing thermal storage tanks, that renewable energy source is now available to us at anytime," says Mammoli. "A unique benefit of

New Mexico is that weather conditions are fairly easy to predict, which makes it easy to manage the loads on the energy supply."

Looking to the future

The research and development goals for the renovated system will benefit both Sandia and the university, says David. "The grant we've received will allow us to establish a test bed where we will be able to perform research on the solar energy systems. This is particularly exciting because here at Sandia, we have no solar collectors quite like what they have at UNM."

In fact, it is the educational possibilities that most excite David about this project.

"We're going to be studying the configuration and components of these systems, and exploring ways to increase their performance and efficiency as well as operations strategies for the economic aspects of these systems," says David.

"The opportunities that will be created through this project for students to perform research, publish joint papers, and gain real hands-on knowledge and experience in this area of technology are just fantastic."

Students and faculty alike are already involved with the project. Professors Mammoli and Vorobieff are working to create a curriculum on the practical application of sustainable energy systems with focused studies in solar energy and energy management, thereby putting UNM "on the map" in the renewable energy community, says Mammoli, who already is teaching a course in sustainable energy.

Mammoli also hopes to expand the system to the adjacent Nuclear Engineering Building in the near future for a nighttime radiant cooling system, which would release heat into the night sky as a means of cooling.

The team is collaborating with local company Energy Control Inc. on the GridWise program, a DOE initiative aimed at making the electricity grid more efficient, robust, and flexible.

"Bud Wildin, ME Professor Emeritus and original codesigner of the system, deserves a lot of credit for the first design and for all the advice he is providing for the refurbishment," says Mammoli.

"We also really have a lot to thank David Menicucci for with his contributions on this project," says Vorobieff. "David's been an inspiration for us."

While you were sleeping

Critical concrete work at Bldg. 703 done in unprecedented nighttime pour

Story by Bill Murphy • Photos by Mike Pacheco

Late one night this summer, while you were sleeping, Joseph Cordova, Sandia's construction manager for the Bldg. 703 project, was scanning the skies, looking for telltale flashes of lightning, listening for the rumble of thunder.



As Joseph (10826) knew — only too well — a big rainstorm that night could mess up everything.

But Mother Nature showed her gentle side that night. The rains held off and the big pour was on.

The big pour? That night a team of Sandians, vendors, contractors, and officials

from NNSA's Sandia Site Office pulled off one of the biggest single concrete pours in recent Sandia memory.

The pour was what is called in the business a monolithic pour — that is, the nearly 500 yards of concrete that make up the shield walls for Bldg. 703 (a specialized facility for testing neutron gen-

erator components) were poured in one seamless joint-free process. The concrete form for the pour was complex enough to require a special design and engineering effort all its own. The form had to be designed so that the walls, some three feet thick and more than 20 feet high in places and with a maze-like configuration, could be poured nonstop. And the form had to be strong: This wasn't a flat slab, after all, but a complex vertical pour with the concrete trying to bust out of the form walls with the force of a California mudslide.

In fact, because of the way the building will be used, the pour *had* to be done nonstop; each additional truckload of concrete *had* to be added to the form before the preceding load had dried. Otherwise, seams would form where the wet and dry concrete met. And that wouldn't meet the design requirement for this building, which had to provide effective seam-free shielding for neutron generator component testing. No wonder Joseph was watching the skies so closely that night.

No call, no problem

Joseph had a bit of a scare. He had agreed in advance that the FAA control tower at the airport would call him on his cell phone if — and only if — lightning appeared to be moving within the danger perimeter of six miles. Because of safety concerns, lightning was the one, big, no-compromise show-stopper. No call, no problem.

Well, Joseph's phone rang — and his heart sank. He hadn't seen or heard anything, but the FAA tower guys had the instruments, and they were good. Dreading what he was about to hear, Joseph flipped open the phone. It was the FAA tower alright. The guy at the other end of the line said to Joseph, "Just wanted to let you know everything looks good so far."

Right before the trucks began to roll, the construction team — Sandians, federal officials, and vendor/contractors — held a production meeting. They went meticulously through the sequence of operations. Every step of the process was reviewed and safety issues were identified. Then the safety issues were identified again.

Just after 10 p.m. Summit Construction, the main building contractor for the project, began coordinating the concrete delivery. A fleet of more than a dozen concrete trucks shuttled between the LaFarge concrete plant (near the Big I) and the Bldg. 703 site, coming through the contractor gate at a clip of about a truck every six minutes or so.

In all, the trucks made 52 separate deliveries. The whole job was done at night, says Bldg. 703 project manager Brian Behling (10826), to minimize traffic impact, but also so that the LaFarge plant could

donate its whole production capability to the job.

Speaking of that concrete: Two factors were critical to the required shielding performance of the walls: concrete density and water content. The concrete had to meet the specified density and water content within a tolerance of plus or minus 5 percent.

Throughout the entire pour, AMEC, an independent third-party vendor, monitored the concrete characteristics both at the LaFarge plant and the building site to make sure those critical parameters were met.

The pour — big enough to build a patio in the backyard of every home in your neighborhood association — took all night and then some. When the sun came up, seven hours into the pour, the team was still going strong. The work was hard, physically demanding. As the concrete



pumper truck channeled the wet mix into the form, workers used heavy vibrating tools to compact and settle the concrete evenly. And the trucks just kept coming. Such work takes its toll, but the crew members kept their enthusiasm, knowing they were involved in something really special. (Mike

Pacheco, the Sandia architectural inspector who took photos throughout the pour, recalls that even at the very end of a long night of hard labor, workers were calling out to him, "Hey, photographer, get my picture for the newspaper!")

Putting Bldg. 703 to bed

When the last pour was finished, Bldg. 703 was bedded down in thermal blankets designed to minimize temperature differentials that can occur as concrete cures. It's a particular concern in monolithic pours. Because of the chemical reactions involved, concrete gets hot as it sets. (In the huge Hoover Dam project, stainless steel cooling pipes were actually incorporated into the concrete pour. Chilled water from a specially built refrigeration plant was circulated through the dam's concrete walls to speed up and equalize the cooling process. Without that design element, cooling would have taken an estimated 100 years — if the dam had been able to survive the thermal stresses of the normal curing process.)

Two weeks later, the blankets came off, the building was awakened, and construction proceeded. Before long, those walls — the walls that were poured while you were sleeping — will protect future occupant Mike Eatough and his team, enabling them to safely perform the neutron generator testing that had previously been done in the basement of 807.

Project Manager Brian Behling on the Bldg. 703 pour

The July 6 concrete pour for the Bldg. 703 shield walls went as planned and was an unqualified success, says Brian Behling, project manager for the Bldg. 703 pour.

Seventeen Summit Construction employees were onsite from the beginning of the pour. AMEC, the independent third-party quality control inspector of each truck, had a crew of six and Hernandez Concrete Pumping had two trucks with one man each (one standing by in case of failure). LaFarge, the concrete supplier, had two quality assurance staff onsite and 13 drivers. The Sandia Facilities team was led by Joseph Cordova, the construction manager, with Mike Pacheco, the architectural inspector, taking pictures throughout the night. Six Sandia security officers staffed the Eubank contractor gate and a safety officer from 10300 was onsite most of the night, as was Max Lopez from DOE/SSO.

Throughout the process, Brian says, safety was the paramount concern. "According to our records," Brian says, "contractors are much safer doing work at Sandia than anywhere else in New Mexico. When we started planning for this pour, we were determined to do absolutely everything possible to assure that this project would only add to our already excellent safety performance record. I'm very pleased to say that we achieved that goal."



Three lightning detection systems alert outdoor workers that electrical storms are in area

By Chris Burroughs

Everyone knows that working outside when lightning strikes can be dangerous. But at Sandia it's less dangerous than most work places.

The reason? Three lightning detection systems give workers early warning that electrical storms are in the area. Two of those protect people working with explosives, and the third protects everyone.

EOC system

About three years ago Sandia's Emergency Operations Center (EOC) replaced an unreliable system that measured lightning potential with one that provides information on generally where and when lightning strikes occur.

Sandia's sole meteorologist, Gina Deola (10333), worked with the EOC to determine which system to buy and where to put it. At her suggestion, Sandia purchased a system from the Arizona-based company Vaisala that consists of a sensor placed on a five-foot concrete pedestal just north of Tech Area 3 in the middle of the desert.

When lightning strikes anywhere within a 30- and 15-mile radius of Sandia, the information acquired by the sensor is transmitted via a modem to a computer in the EOC, located in the basement of Bldg. 801. Data concerning strikes are instantly displayed.

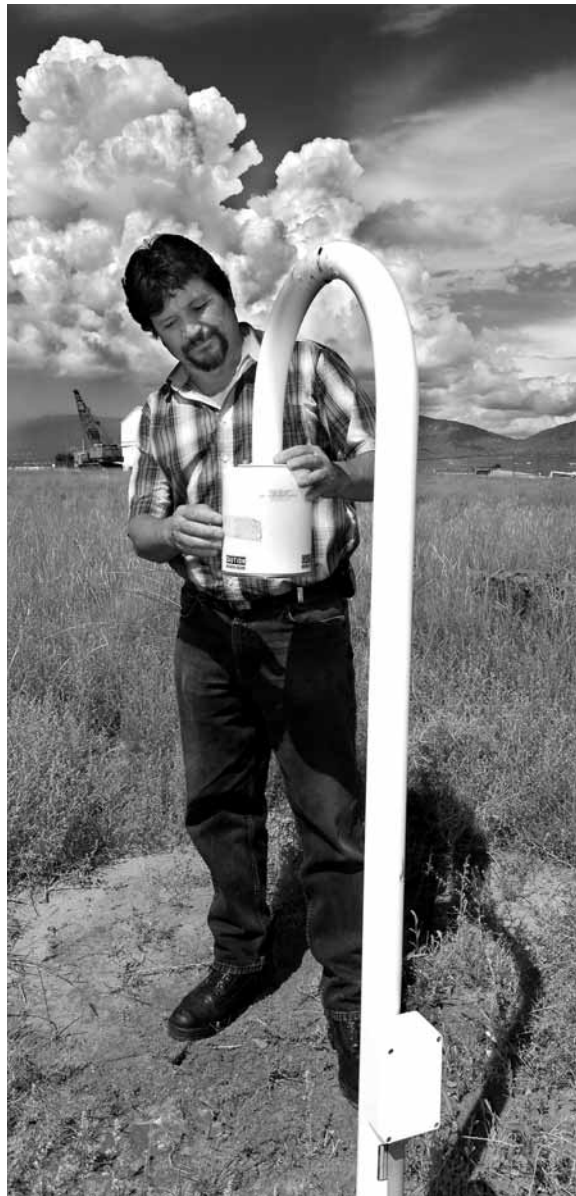
Software called WARN produces on a computer screen in the EOC a pie-shaped chart centered over a map of Sandia that consists of 16 30-mile pie-wedge-shaped sectors and 16 15-mile pie-wedge-shaped sectors. They show the general area where the lightning strikes are occurring. When there are five or more strikes in a sector, the sector turns red. Less than five, it is yellow. Sometimes — like at 7:45 p.m. on Aug. 21 during a riveting lightning storm — the entire pie turns red.

John Sensi (10337), who manages the computer system, says when any quadrant turns red, an alarm alerts EOC communication coordinators. They then send a text page message to about 200 Sandians warning them that lightning is in the area. The people on the page list have all requested to be notified when lightning strikes are in the area. Most work outside as groundskeepers, at the Solar Tower, at Coyote Canyon, or are contractors at construction sites.

"This is our best effort to warn people working outside about lightning strikes," John says. "It doesn't predict where strikes will occur, it just tells them that lightning strikes are happening in the area."

Over the past several weeks, the monitoring system has been busy, John says. There has been hardly an afternoon when some sectors or all have not been red, and workers have not been paged.

People wishing to be added to the pager



TECHNICIAN Amarante Martinez (1535) checks out one of the 14 candy cane-shaped probes located primarily in Area 3 where field testing is routinely done. They transmit data on volts per meter constantly. The information is put on a website for subscribers to check out before and during explosives testing. (Photo by Randy Montoya)

lightning strike advisory list should call the EOC at 844-6511.

Two lightning warning systems protect for explosive workers

Sandians working with explosives have two lightning warning systems.

"Obviously it is really important to keep people working outdoors with explosives informed about possible lightning," says Amarante Martinez (1535), who operates the lightning warning systems for field testing groups. "Even conditions with high electric static conditions that may not produce lightning can be a problem and force operations to shut down. That's why we use these two systems."

One system is a Lightning Early Warning

System (LEWS), a commercial product that, through a satellite, monitors lightning strikes throughout the country. However, Sandia has only purchased rights to monitor strikes within a 120-mile radius of the Labs and closely watches strikes in a 60-mile range. All data are archived.

As an example, Amarante points out that within a 24-hour period Aug. 22-23, there were 323 lightning strikes in a 120-mile radius of Sandia and 39 strikes in a 60-mile range.

The second system, which consists of 14 probe sensors on candy cane-shaped five-foot poles, is homegrown, designed by Sandia engineers.

"This is a system Sandia developed on its own because of need," Amarante says. "It's gone through many renditions with the most recent version put on the web two years ago. It is available to any Sandia group that wants to subscribe."

The 14 probes — located primarily in Area 3 where field testing is routinely done but also in other locations around Sandia including Mt. Washington, the Eubank Gate, and Sandia's munitions storage facility — transmit data constantly. The information is put on a website. The sensors detect volts per meter (V/m). When V/m is at 1,000 or less there is no advisory. An advisory is issued at 1,000 to 2,000 V/m, a yellow code, and at 2,000 V/m and above, a red code. If lightning is in the vicinity, it's not unusual to reach 7,000 V/m. That's definitely time to suspend outdoor work!

Organizations subscribe to the web-based lightning monitoring system. Amarante says explosives testing groups constantly monitor the website while preparing for and staging tests.

"They know they are in danger if the V/m goes into the red zone," he says.

Recently subscribers have been given pagers that provide text page messages whenever V/m at any probe site reaches the yellow zone warning level.

Some organizations have local probes at their locations just in case the web and radio frequency repeater go down. They provide the same type of V/m information in the consoles.

"The warnings provided by both the web and portable sensors have definitely saved lives," Amarante says. "People need to know when and how to get to a safe area or vehicle. And we do follow the 30-30 rule, which is not to resume outdoor activities until 30 minutes after the last audible thunder."

Feedback

What kind of safety shoes do I need and where can I buy them?

Q: My manager has indicated that I need safety shoes on construction sites. Will any safety shoes do or do they have to meet some safety standards? How do I get reimbursed and at what locations locally can I buy safety shoes? I looked online and could not find appropriate documentation for the matter.

A: The ES&H Manual, Section 4L, "Personal Protective Equipment — Protective Footwear," contains language on the applicable standards and the purchase of safety shoes (http://www-irn.sandia.gov/corpdata/esh-manuals/mn471001/s04l.htm#pro_footwear). "Safety shoes shall meet the requirements of ANSI Z41-1991 and be marked with ANSI Z41-1991. They may be purchased from any vendor as long as they meet these criteria. Employees may purchase up to two pairs of safety shoes, if needed and with their manager's approval, at Sandia's expense and may spend up to \$140 per pair per year. For special requirement shoes, managers may approve expenditures for more than \$140. Employees may spend up to two hours of work time to purchase safety shoes. Employees shall submit an expense report to be reimbursed for the cost of the shoes." — Darrell Fong (10833)

Sandia offers meteorological service

In addition to the three lightning monitoring systems, Sandia has a well established meteorology program run by the Labs' sole meteorologist Gina Deola (10333).

For more than a decade Gina has kept track of wind speed, wind direction, temperature, humidity, and other weather data by managing eight tower stations



GINA DEOLA

equipped with instrumentation scattered throughout Sandia and KAFB. The sensors provide information important to emergency management, environmental activities, and researchers doing outdoor tests. It is also used by the Emergency Operations Center (EOC) in modeling plume flow in case of accidental chemical spills.

The information obtained through the network is placed on a website (<http://132.175.200.42>) and is available for anyone at Sandia to view. The monitoring program also provides Labs-wide customer support, upon request, with additional meteorological instrumentation.

Sandia sponsors Southwest Renewable Energy Conference

Sandians share their renewable energy expertise at recent Flagstaff meeting

By Stephanie Holinka

In early August, experts from Sandia spent some time in Flagstaff, sharing their knowledge, experiences, and contacts with other professionals interested in renewable energy projects all over the Southwest at the Southwest Renewable Energy Conference.

SREC brings together experts throughout the Southwest interested both in the policy and technical issues of renewable energy implementation in this part of the country. The conference addressed issues such as the impacts of climate change on renewable energy initiatives and included many opportunities for policy discussions.

Sandra Begay-Campbell (6218) spoke about her technical efforts in Sandia's Tribal Energy Program, assisting tribes with renewable energy development. Her panel included Larry Ahgasteen from the Navajo Tribal Utility Authority, who spoke about wind studies, and Ken Garzia from Laguna Pueblo's new energy utility, who spoke of their first steps for energy planning.

Sandra says conferences such as this allow opportunities for networking and acquiring new information, which is not always easy for participants that come from more rural communities.

Sandra was accompanied to the conference by her three summer interns, Lani Tsinnajinne of the Navajo Nation, Johnathan Bairon, who is Chippewa, and Terry Battiest, a member of the

Choctaw Nation of Oklahoma. Sandra brought the students so they could forge professional relationships of their own before heading back to their academic programs in the fall. As the former executive director of the American Indian Science and Engineering Society (AISES), a non-profit organization whose mission is to increase the number of American Indian scientists and engineers, she recognizes the importance of networking and shared experience to those looking to enter renewable energy fields.

Sandra says that new studies of wind distribution in Arizona indicate that some communities in central Arizona may be able to take advantage of wind power something they may not have previously considered. She also spoke about the Citizen Potowatomi Nation's Geothermal Heat Pump Demonstration Project and the importance of renewable resources being used to offset energy use.

Mike Hightower (6212) also spoke at the conference, discussing the interdependence of energy and water issues, especially in the water-scarce American Southwest.

"The largest water withdrawals by sector in the United States are for energy, especially for electric power," Hightower says. "Not all of that water is consumed, but water must be in streams for use in both hydroelectric generators and for use in cooling of thermoelectric plants. Forty percent of all water withdrawn in the US is used

by thermoelectric plants for cooling."

Mike says the interdependence between energy and water must be addressed to avoid a future scenario where "we don't have enough water to turn on the lights." Mike is working on a technology research roadmap with a team of Sandians and other national laboratories to identify the energy and water research challenges ahead of us.

Rural communities such as those represented at the conference, Mike says, may be able to jump ahead of areas that have already heavily invested in infrastructure. Those communities at the end of transmission lines, he says, may be able to use new ways to improve reliability without using as much water as the older infrastructure requires.

In addition to Sandra and Mike, Dale Berg (6214) and Debbie Tewa (6218) also participated at the conference. The conference website at <http://swrec.org> lists the event participants and will include the conference proceedings once completed.

Sandia has sponsored the event for the past four years. It shares sponsorship along with the Sustainable Energy Solutions Group at the University of Northern Arizona (<http://ses.nau.edu>), NAU's College of Engineering and Natural Sciences (<http://www.cet.nau.edu>), PNM, and many other Southwest groups interested in renewable energy research and implementation.

Feedback

What's the reporting policy for those in search of help for depression, anxiety

Q: *I do not understand the acceptance of DOE's policy requiring reporting to personnel security by those of us in search of help for depression, anxiety, or even sleep disorders. My understanding is that we (Sandia employees) are required to notify DOE within three days if we are given a medical prescription to assist with depression or anxiety. It is also my understanding that, once we report this information, DOE may investigate this matter further to determine whether or not we should be allowed to maintain a clearance (which is a requirement for the work many of us do at Sandia). If investigated, we must either answer all their questions, no matter how personal, or risk losing our clearance, right?*

Why has Sandia agreed to these requirements? I contend that these reporting requirements and investigative practices inhibit some Sandians from seeking medical assistance that they need and should have access to. Why would Sandia be a party to such a practice?

A: I would first like to address the question as to why Sandia would accept DOE's reporting policies. The DOE policies on this matter and related subjects are embedded in our contract to run Sandia National Laboratories. In signing the contract to do the work this laboratory is responsible for, we signed up to abide by DOE's personnel security policies, including those that you discuss in your question.

It is clear that you understand that the requirements you refer to are part of a federal government process to make determinations regarding whether or not to authorize access to sensitive and classified materials, facilities, and information — access that is a requirement for many of the jobs at Sandia. While Sandia is not in a position to directly address concerns regarding DOE's processes and decisions, I will try to provide some background information that may be helpful.

I will note one misconception embedded in your question — your first paragraph describes a requirement to notify DOE within three days if given a medical prescription to assist with depression or anxiety. This is not a current requirement; in prior years, there was a requirement to self-report any such treatment, but that requirement was recently removed (current requirements for self-reporting are found in DOE Manual 470.4-5 Attachment 2 — see excerpt, next column). There

remains a requirement for government contractors to report on any employee's medical treatment that, in their opinion, could affect the employee's judgment or otherwise affect their suitability to hold an access authorization. It appears that this requirement is the closest thing to the requirement that you refer to (reference DOE Manual 470.4-5 Attachment 2 and see excerpt below).

DOE Manual 470.4-5 Attachment 2, 2 (g)

Individuals must

(2) Provide direct notification to the DOE processing personnel security office of the following (verbal notification is required within 2 working days followed by written notification within the next 3 working days) for (g) hospitalization for a mental illness; treatment of drug abuse; or treatment for alcohol abuse.

DOE Manual 470.4-5 Attachment 2 — 7. a. contractors must notify. . . the DOE processing personnel security office of the following conditions affecting the status of an applicant's or employee's access authorization
(3) when an individual under their cognizance who holds an access authorization is hospitalized for mental illness or has received other treatment for a condition that in the supervisor's opinion may cause a significant defect in the individual's judgment or reliability, verbal notification must be made within 8 working hours and written confirmation within the next 10 working days.

As noted above, the specific requirements for cooperation with access authorization processes and for self-reporting are captured in DOE Manual 470.4-5. These DOE policies and requirements are intended to implement federal regulations, and compliance with these is also part of our contract with DOE — specifically, the personnel security requirements you discuss in your question are based in 10 CFR 710. It is useful to look at 10 CFR 710 to gain some insight into the DOE process for

determinations regarding access authorization.

While the DOE Manual (and our own policies) simply indicate that self-reporting is required for "hospitalization for a mental illness, treatment for drug abuse, or treatment for alcohol abuse," the regulation provides more detail. In particular, the regulation indicates that reporting is required for "an illness or mental condition of a nature which, in the opinion of a psychiatrist or licensed clinical psychologist, causes or may cause a significant defect in judgment or reliability." The regulation also clarifies that the intent of the DOE review process is to determine that "granting or continuation of access authorization will not endanger the common defense and security and is clearly consistent with national interest. Any doubt as to an individual's access authorization eligibility shall be resolved in favor of the national security."

The DOE reporting and review process is intended to conservatively provide information of potential significance to DOE and then to provide for a review of that information to determine whether granting or continuation of access authorization is in the national interest. The intent of DOE directives is not to discourage people from seeking treatment, but rather to ensure that there is a fair and informed process for decisions regarding access authorization.

Finally, I note that, by regulation, DOE must make determinations as to whether or not to grant access to sensitive and classified information, materials, and facilities. While we may choose not to provide information to DOE to aid in these decisions, DOE must (by regulation) err on the side of protecting national security when they make these decisions with the information at hand. With this in mind, I encourage your continued efforts to comply with DOE reporting requirements and to continue to seek any and all treatment needed to appropriately manage your health.

I hope that this helps to clarify the matters that you explore in your question, and that this information is helpful to you in your current and future interactions with DOE's access authorization processes. If you have further questions along these lines, please contact me at your convenience (284-8456).

— Corey Cruz (12420)

Buying, selling energy being conducted in safer environment due to Sandia standards assessments

By Chris Burroughs

Companies buying and selling natural gas and electricity are conducting business in a safer environment thanks to three information standards assessments done by Sandia since 2000.

"Buying and selling natural gas used to occur in a system where everyone knew each other. All transactions were handled by phone and fax, and people trusted each other," says David Duggan (5616), who has been involved in three assessments of information standards set by the North American Energy Standards Board (NAESB), formerly the Gas Industries Standards Board (GISB). DOE's Office of Fossil Energy sponsored the assessments.

All that changed with the arrival of the Internet. In today's world, bidding and purchasing of fossil fuels are done electronically with limited or no personal contact — opening the

door for fake transactions or worse.

In 2000 a Sandia team performed assessments of the GISB's Electronic Delivery Mechanism (EDM) standard for wholesale gas distribution.

"At that time the organization didn't understand much about information security and didn't realize how easy it could be for someone to break into the system," David says. "As a result, we found a number of critical security issues in the standards and reported them to GISB along with suggested mitigation strategies."

As is generally expected with security assessments, GISB was not in complete agreement with Sandia's assessments of all the vulnerabilities. However, the GISB made enough direct changes to the standards that when a second Labs assessment team did a follow-up in late 2005 and early 2006, they found that more than half of the original vulnerabilities had been corrected.

"More than half of the residual vulnerabilities were eliminated by the addition of improved technology," David says. "For example, new and better encryption methods were adopted — methods that didn't exist in 2000. It is to GISB's credit that they, as an industry consortium, have addressed a majority of the vulnerabilities and are working on plans to address the remaining vulnerabilities."

A third assessment team recently completed an analysis of proposed public key infrastructure (PKI) standards for the wholesale electric power sector, finding some vulnerabilities and offering

mitigation strategies. Since these are new standards that have not yet been adopted and used by NAESB members, "a proactive opportunity exists for NAESB to address a number of these issues before the standard is ever implemented," David says.

"If these mitigation strategies for PKI are followed, it will enable the standard to be secure for many years to come," David says.

He adds, "Without the leadership and collaborative approach of DOE's Office of Fossil Energy, these assessments would never have been performed on this important component of the US critical infrastructure, and electronic transactions in the energy sector would be considerably more vulnerable."

Assessment teams

Assessment 1 done in 2000 — Tom Cabe (5614), project lead; David Duggan (5616), technical lead; Patricia Tempel (2622), Phillip Lewis (5534), analysts

Assessment 2 done in late 2005 — David Duggan (5616), project lead; Philip Campbell, Annie McIntyre, Aura Morris (all 5616), Charles Morrow (6863), analysts

Assessment 3 done in 2006 — David Duggan (5616), project lead; Tim Draelos, Michael Collins, Lauren McIver (all 5614), analysts

What is NAESB?

The North American Energy Standards Board (NAESB) is an independent and voluntary North American organization that develops and promotes the use of business practices and electronic communications standards for the wholesale and retail natural gas and electricity industries. Its members include more than 300 companies and organizations that participate actively in the retail and wholesale natural gas and electricity markets.

Benefits Choices 2007 coming to Sandia Oct. 20-Nov. 9

Employee Open Enrollment moves to the web

Paper-based process retained for retirees

Sandia employees can expect to surf the web during this fall's Benefits Choices 2007 Open Enrollment period, which will be held Oct. 20-Nov. 9, with coverage effective Jan. 1, 2007.

A new web-based system, part of Sandia's HR Self-Service initiative, will replace the Open Enrollment phone system for all employees. No longer will employees indicate their benefits choices by punching numbers into a phone. Instead, they will be able to select and review their benefits choices online with a few clicks of the mouse.

Health, Benefits, and Employee Services is confident the web-based system will simplify the Open Enrollment process by enabling employees to quickly view current enrollments, add family members, and make changes to health plan coverage and other benefits. The new system will also help employees double-check their benefits choices by providing an easily accessible benefits summary.

The new Peoplesoft-based Open Enrollment system will process more than 10,000 transitions over the three-week period. Implementation of the new system will allow Sandia to more efficiently manage the enrollment processes and systems data exchange, required during the processing of an

open enrollment period.

Since some retirees may not have Internet access, Sandia retirees will continue to receive Open Enrollment books and can make plan or dependent changes through a paper-based enrollment process. Retirees in Albuquerque and Livermore can also attend presentations about Benefits Choices 2007 Open Enrollment.

Stay tuned to the *Lab News* and *Daily News/TNT* for key announcements about Open Enrollment.

Sandia health plans — changes and transitional challenges

In 2006, Sandia made major changes to health plans for both employees and retirees. These changes were made to improve the value of Sandia's health care dollars and to address the needs of employees, retirees, and families.

The intent was to provide enough choice in the health plans so that members could select the plans that best met their needs. At the same time, a conscious effort was made to control costs for both Sandia and our members — a difficult task in light of ever-increasing health care costs.

Changes in 2006

To achieve these goals, Sandia rolled out new health plans in 2006. These new health plans were designed to provide broad, national-net-

work coverage options while maintaining a safety net for members by implementing out-of-pocket plan maximums. We also wanted to promote a healthy population by providing certain preventive care coverage at 100 percent. Finally, we deliberately built health plan consumerism into the plans to encourage members to use their health care dollars wisely.

Sandia also selected new third-party administrators (TPAs) for our health plans through a competitive bid process. As a result, CIGNA remained the TPA for medical plans with Sandia/Lovelace Health Systems in New Mexico, and United Healthcare (UHC) became the new TPA for medical plans affiliated with New Mexico's Presbyterian network.

UHC brought significant advantages to Sandia and our membership: (1) greater provider discounts, which decrease out-of-pocket costs for both members and Sandia, (2) lower administrative fees and robust reporting capabilities, (3) access to specialty programs such as the Cancer Resource Services Program, and "Centers of Excellence" for treatments/diseases, (4) access to Web tools and features, (5) disease and case management programs, and (6) a commitment to create a physician provider Premium Designation Program in New Mexico and the rollout of this program, which measures physician quality and efficiency, is targeted for November 2006 in New Mexico.

Smoothing out the transitions

Health, Benefits, and Employee Services (HBE) recognizes that some members have experienced transitional challenges with the new plans. UHC plan members in both New Mexico and California have encountered stressful network changes, and the CIGNA/Lovelace network is undergoing a hospital change in Albuquerque.

Unfortunately, such transitional challenges are common when changing TPAs or plan designs. These issues typically arise as the new TPA addresses existing claims from the previous TPA, develops effective networks for all beneficiaries, and streamlines new claims administration.

However, HBE is committed to working on these issues and communicating with our members. HBE is optimistic that the transition will smooth out over the remainder of the calendar year.

Note: This information about Benefits Choices 2007 and open enrollment was provided to the Lab News by Benefits Dept. 3332.

Fully insured and self-insured health plans: what's the difference?

There are two types of health care plans: self-insured and fully insured. Both types of plans are contracted with a third-party administrator (TPA). However, the risks and responsibilities that the TPA assumes differ depending on the type of plan.

In fully-insured plans, the employer pays a TPA a fixed monthly premium for each member. The TPA then assumes the risk and responsibility for paying all membership claims. The TPA designs the health plan and provides a network of physicians. Sandia's fully-insured health plans include the Kaiser Health Maintenance Organization, Kaiser Senior Advantage, Lovelace Senior, and Presbyterian MediCare Premier Preferred Provider Organization (PPO) plans.

Self-insured plans are funded by employee and employer contributions. This method of funding is generally used by large employers to minimize administrative fees and allows employers to design their own plans (not buy off-the-shelf insurance products). The employer

assumes the financial risk and responsibility and pays for each medical claim as it is submitted. A TPA is contracted to provide administrative services such as setting up claims processing systems and carrying out claims payment transactions. TPAs also provide negotiated and discounted contracts with a national network of physicians and facilities. Such contract arrangements are essential to control employer and member health care costs.

The United Healthcare (UHC) Senior PPO, UHC Premier PPO, UHC Standard PPO, CIGNA Senior Premier PPO, CIGNA Premier PPO, and CIGNA In-Network plans are self-insured health care plans. Sandia pays UHC and CIGNA to act as TPAs for these plans.

Large employers typically prefer self-insured plans because they provide more flexibility. With self-insured plans, employers can design plans that will best meet the needs of their members. For example, Sandia's self-insured plans cover certain preventive care at 100 percent.



AFTER THE RAINS — The rains of the summer of 2006 will go down in the collective memory of New Mexicans. For years to come, every summer shower will be measured by the yardstick of 2006. *Lab News* photographer Randy Montoya, on his way to a photo shoot in one of the Labs' remote areas, was stunned by the beauty of the

usually arid terrain around Tech Area 3. "As a photographer," he says, "I'd be crazy not to stop and start shooting." The photo here is one he especially liked. Randy, who's been at Sandia for 21 years, says the remote areas are "greener, by far, than I've ever seen them."

Computer problem? Who ya gonna call? Ghostbusters? No, call CCHD, the Corporate Computing Help Desk

By Iris Aboytes

It's Monday morning. You have a deadline and your computer isn't cooperating. You reboot and still nothing. What do you do? Call Ghostbusters? Not exactly. You call the Corporate Computing Help Desk (CCHD).

CCHD has 16 analysts who answer 500-600 calls every day. Three of the analysts are dedicated to helping classified customers. They are in a separate area they call the "bat cave." CCHD supports over 15,000 customers located at Sandia/New Mexico, Sandia/California, and all the remote sites.

A call comes in to CCHD and a service request is recorded in its ticketing tracking system, the Enterprise Service Suite (ESS). If CCHD is unable to resolve a computing issue, a service request is routed to the appropriate service provider (i.e., application developers, networking, e-mail team, corporate server group, corporate database group). CCHD currently partners with 83 service providers.

Real-time statistics from the Avaya Definity Automated Call Distribution (ACD) system are projected on the wall. In addition to live calls, analysts can be working on e-mail, voicemail, contributing to the Knowledgebase (a repository

for technical and general support information), or updating alerts.

The calls are as diverse as the analysts themselves. Before Thanksgiving one year a Sandian called asking how long to cook a turkey. Fortunately for her, it was Rich Stewart who answered her call. Without skipping a beat, he asked her the size of turkey, how it was going to be cooked (in the oven, fried, or outside), and if it was going to be stuffed. Rich just happens to be handy in the kitchen, so he made his recommendations, and the caller was grateful.

Rich has been at Sandia about seven years. He works on computers here, at home, and at his friends' homes. His work is also his hobby. "Our jobs keep us learning," says Rich. "We learn from our customers. Our next caller benefits from the previous call. We are in a constantly changing industry."

Joann Okuzono-Perkins came to Sandia last October. She loves Albuquerque and Sandia. "Sandians are very grateful," says Joanne. "I enjoy the challenge and the immediate personal satisfaction."

Analysts are contract employees from SAIC, LMIT, and Kemtah, who are hired as much for their people skills as for their technical skills.



TEAM LEADER Susie Romero and Chris Gabbert (both 4342) look over work requests. (Photo by Randy Montoya)

For computer help at work, call . . .

845-2243 (845-CCHD)

"Although the analysts work for different contracting companies their teaming and customer service focus unite them," says project leader Steven Sanchez (4342).

"I enjoy talking to the customers," says Joann. "There is something new every day. This is the best job I have ever had. I love it."



Good day
sunshine.

Remember to enjoy
the sun, safely.

One in five Americans develops skin cancer from exposure to the sun's UV rays; a few blistering sunburns increase the risk of developing melanoma. Reduce the risk:

- Use sunscreen with an SPF of 15 or higher; apply a thick layer 30 minutes before going outside.
- Wear a brimmed hat, sunglasses with 99-100% UV protection, and lightweight, light-colored, loose-fitting clothing.
- Plan outdoor activities for the cool part of the day.



www.sunprotection.net

Dept. 4330 earns ISO certification

Another Sandia team has earned ISO 9000 certification. Cyber Infrastructure Development and Deployment Dept. 4330 received ISO 9001:2000 certification.

ISO 9001:2000 is the latest version of the ISO 9000 family of business standard certifications. It is intended to be a framework for management systems to provide assurance that products conform to established standards as well as giving customers avenues for feedback.

Performance Review Institute of Warren-

dale, Pa., is accredited by the ANSI-ASQ National Accreditation Board to perform ISO certifications.

After an audit of Dept. 4330's operations, PRI awarded a certificate of registration for "Telecommunication Delivery and Infrastructure Services" within the group. The registration covers 180 employees working three shifts and is effective from July 26, 2006, through May 13, 2009. Leonard Stanns is the acting senior manager of the department.