Exceptional service from pole to pole

Sandia researchers tackle urgent problems at the extreme ends of the earth

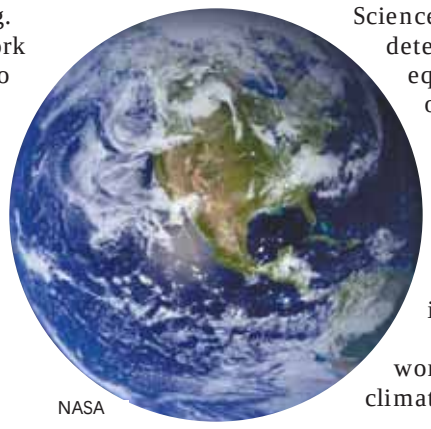
Much has been asked of Sandians from the very beginning. Since its founding in 1949, the Labs' extraordinary mission work has required researchers to travel to the far ends of the world to test nuclear weapon components in every conceivable environment. Over the years, that has meant weeks — and even months — away from home, living in tents in remote locales ranging from jungles to deserts to frozen steppes to tropical isles.

While exotic travel related to weapons work doesn't occur with the intensity or frequency of years past, Sandia's mission still requires expertise across a wide range of disciplines; because of that expertise, the nation continues to turn to Sandia and much is still asked of Labs researchers.

Case in point: In recent months, Sandia teams have found themselves doing vital, unrelated work in both the arctic and antarctic regions of the globe.

Four Sandia researchers recently went to the icy southern continent to test a Sandia-modified miniaturized synthetic aperture radar (MiniSAR) sensor to demonstrate that it could detect buried or bridged crevasses, a real danger to aircraft making deliveries to remote outposts across the vast southern landmass.

The antarctic team flew MiniSAR experiments on a National Science Foundation-sponsored Twin Otter. The device was able to detect virtually invisible crevasses hidden beneath the snow. The equipment will eventually be flown on LC-130s, the workhorses of the south.



NASA

Meanwhile, Sandia has had a long-term presence in Point Barrow, Ala., working with researchers from many national labs, federal agencies, and universities to better understand high-latitude atmospheric phenomena and how those phenomena may impact or indicate trends in global climate change. The DOE Office of Science-sponsored work is generating data that are helping refine existing global climate models.

Lab News writer Michael Padilla's story about the MiniSAR work begins on **page 8**; Darrick Hurst writes about high-latitude climate research on **pages 10-11**.

Sandia LabNews

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Sandia National Laboratories

Budget cut, participation increase put pressure on Tuition Assistance Program

By Julie Hall

Rumors of the demise of Sandia's Tuition Assistance Program have been greatly exaggerated. However, the program's financial issues have not yet been completely resolved.

An email sent earlier this year to Sandians enrolled in the Tuition Assistance Program (TAP) touched off a flurry of rumors about the program. The email asked students graduating in 2007 to provide information on the number of classes and tuition needed to graduate, and estimated graduation date.

A budget cut accompanied by a significant increase in participation prompted the email as staff in Corporate Learning & Professional Development (CL&PD) studied the potential impact of funding shortfalls. While they

(Continued on page 4)

Energy, water closely linked, DOE report to Congress says

Chris Cameron, Mike Hightower key in preparing report

By Chris Burroughs

The US should begin looking at energy and water needs as one issue so that each resource can be sustained in the future.

That is the crux of findings of a report recently submitted to Congress by DOE. A team from Sandia, Los Alamos National Laboratory, the National Energy Technology Laboratory, and the Electric Power Research Institute led the information collection and report development efforts, with Sandia taking charge of writing it.

Mike Hightower will talk about the relationship between water and energy at a Technology Symposium at the TTC on March 26. Details on **page 5.**

"Basically the report notes that energy and water are closely linked," says key report author Chris Cameron (6335). "The production of energy requires large volumes of water

(Continued on page 5)

Ice created in nanoseconds by Sandia's Z machine

Not expected at your local 7-Eleven anytime soon

PUTTING THE SQUEEZE ON ICE — Daniel Dolan (1646) has used Sandia's Z machine to compress water into ice at extreme temperatures and pressures. (Photo by Bill Doty)

By Neal Singer

Sandia's huge Z machine has turned water to ice in nanoseconds.

However, don't expect anything commercial just yet: Z's ice is hotter than the boiling point of water.

"The three phases of water as we know them — cold ice, room temperature liquid, and hot vapor — are actually only a small part of water's repertory of states," says Sandia researcher Daniel Dolan (1646). "Compressing water customarily heats it. But under extreme compression, it is easier for dense water to enter its solid phase [ice] than maintain the more energetic liquid phase [water]."

The ice created in the Z machine is hotter than the boiling point of water.

In the Z experiment, the volume of water shrunk abruptly and discontinuously, consistent with the formation of almost every known form of ice. (One might wonder — given the common experience of frozen water expanding to wreck garden hoses left out over winter — why this ice shrank instead of expanding. The answer is that only "ordinary" ice expands when water freezes. There are at least 11 other known forms of ice occurring at a variety of temperatures and pressures.)

"This work," says Daniel, "is a basic science study that helps us under-

(Continued on page 4)

RRW

NNSA chooses LLNL/Sandia design for RRW

NNSA has announced that the design team from Lawrence Livermore National Laboratory and Sandia has been selected to develop the Reliable Replacement Warhead (RRW). See the story on **page 3.**

Also inside . . .

What's what

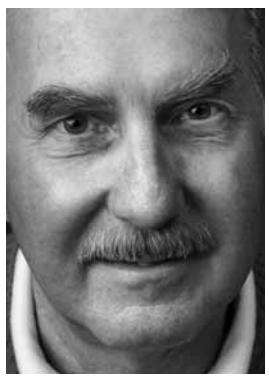
They may not be funny from the point of view of the would-be sellers, but sometimes the offerings in the *Lab News* classifieds make you wonder.

In the March 2 issue, for example, a baseball bat "used once" was available. Why? Used once and it didn't work? Used once and the batter discovered baseball wasn't his (or her) sport? Why would someone buy a baseball bat, use it once and then sell it? Odd.

And in the same issue, someone was selling a "Battle of the Sexes" board game that was used only once. That's maybe a little more understandable.

* * *

And while I'm wondering about stuff, why is there such a concerted effort to label Sandians "Members of the Workforce," or MOWs? What's the problem with calling us what we've been since the beginning: Sandians?



HOWARD KERCHEVAL

The consensus seems to be that, regardless of whether you're an actual lab employee or someone working at the lab under contract, you're a Sandian in the general sense. We're all engaged in the same mission: national security.

Also, Member of the Workforce or MOW is such a utilitarian title, so "gray," compared with "Sandian." Like labeling a building "Concrete General-Purpose Structure" instead of Strathcona Hall or Memorial Coliseum or The Pit.

There are members of millions of workforces around the world, but only one collection of Sandians. Granted, not everyone everywhere knows about Sandia, but in the universe of our peers, everyone does. Say somebody is a Sandian and everybody in that universe knows who and what you're talking about.

But MOW? Member of the Workforce? What's up with that?

* * *

During an around-the-coffeepot conversation recently, the talk turned to parking spaces. (It was a really slow day.) There was the usual discussion about king-cab, long-bed trucks leaving little room to squeeze by; the nearly ground-level front fairings on new cars, whose drivers sometimes stop three or four feet from the bumpers to keep from damaging those fragile structures; and special designations like second-shift and carpool, where there are almost always vacant spaces.

When the talk turned to the frustration of weaving back and forth through a parking lot looking for a space, someone brought up the analogy to stadium seating. A stadium can be "sold out," but still have sold tickets to more people than it has seats because at any given time, some people are up walking around, going to a restroom, buying food, etc. As that's going on, "their" seats are open to be grabbed by the "seatless" people, effecting an ongoing turnover.

Maybe the people who plan parking for Sandia are operating on the same principle.

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

Sandia LabNews

Sandia National Laboratories

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Kimberly Adams leaves to take Lockheed Martin headquarters job

Lockheed Martin has announced that Kimberly Adams, Sandia's VP of Human Resources and Communications, has been selected VP of Human Resources-Enterprise Operations at Lockheed Martin Headquarters in Bethesda, Md. She assumes her new position on March 26. She will be responsible for Corporate Headquarters, Corporate Shared Services, and Enterprise Systems.

KIMBERLY ADAMS

At Sandia, Kimberly was responsible for the Laboratories' human resources, health benefits and employee services, and Laboratory communications.

During her time at Sandia, she became a community champion. With co-champion Executive VP Al Romig she has seen Sandia's generosity to the United Way of Central New Mexico reach $3 million for the first time. She helped ensure Sandia's continued engagement in the community.

Kimberly came to Sandia in November 2004. She joined Lockheed Martin in 1998 and held a number of positions within the corporation.

Prior to joining Sandia, Kimberly served as VP of Human Resources Operations for the Lockheed Martin Integrated Systems and Solutions (IS&S) business area, which employed more than 15,000 in the US.

"Please join me in congratulating Kim on her new role," said John Stichman in his email to employees. "We are of course very pleased for Kim and for Lockheed Martin, but we will surely miss her here. We wish her well and thank her for her leadership and hard work while here at Sandia."

Pat Smith, director of California Site Operations Center 8500, will assume the role of acting VP of HR.

— Iris Aboytes

Labs Accomplishments now available

THE 2007 EDITION of *Labs Accomplishments* has been distributed to all employees and retirees. The publication highlights the Labs' very best work over the past year, as selected by the VPs' offices. *Labs Accomplishments* is also online, in both PDF and HTML formats, at www.sandia.gov/LabNews/labs-accomplish. To receive extra copies contact Mike Lanigan at 844-2297 or mjlanig@sandia.gov.

Sympathy

Sympathy to **Jim Klarkowski** (5335) on the death of his mother, Rosemary Teresa Klarkowski, who passed away peacefully on Feb. 17.

* * *

Sympathy to **Mary Jane Hicks** (2712) on the death of her mother, Rosemary Bingham, age 95, Feb. 1 in Albuquerque.

Lawrence Livermore/Sandia design gets RRW nod

Sandia/California will play key systems integration role, tapping into full resources of the Labs

Note: The following is adapted from an official NNSA news release. More detail about Sandia's role in the RRW program will be published in an upcoming issue of the Lab News.

NNSA has announced that the design team from Lawrence Livermore National Laboratory and Sandia has been selected to develop the Reliable Replacement Warhead (RRW). The announcement says the Lawrence Livermore/Sandia design can be certified without requiring underground nuclear testing, a major factor in its selection.

Sandia/California will play a lead systems integration role utilizing the full capabilities of the Labs. Both Sandia/New Mexico and Sandia/California will lead the design and development of significant components.

The decision clears the way for a joint NNSA and US Navy program to provide a replacement warhead for a portion of the nation's sea-based nuclear weapons that will provide means to ensure long-term confidence in a more secure, smaller, and safer nuclear weapons stockpile.

NNSA and the Navy will develop a detailed RRW project plan and cost estimate for developing and producing the system. This work will support a future decision to seek congressional authorization and funding in order to proceed into system development and subsequent production.

As part of the program, the Navy will lead the overall project team. An integrated team of designers and engineers led by Lawrence Livermore will work with the production plants to develop the nuclear explosive component of the weapon. Sandia will develop the non-nuclear components and ensure compatibility with the DoD's Trident submarine-launched ballistic missile.

"The RRW design concept utilizes modern technology that was not available during the Cold War when our nuclear weapons were designed and built," said Thomas D'Agostino, NNSA's acting administrator. "This will permit significant upgrades in safety and security features in the replacement warhead that will keep the same explosive yields and other military characteristics as the current ones. RRW will take advantage of today's science to ensure the long-term confidence in the future stockpile. RRW builds on the successful scientific accomplishments of our Stockpile Stewardship Program, which helps to maintain our nuclear weapons without underground testing."

The Nuclear Weapons Council (NWC) — a group of senior officials from the DoD and NNSA established by law to oversee nuclear weapons programs — made the final design selection. The NWC evaluated two proposals, one submitted by a Lawrence Livermore/Sandia team and another submitted by a Los Alamos/Sandia team, and determined that although both designs fully met all RRW requirements, higher confidence in the ability to certify the Livermore design without underground nuclear testing was the primary reason for its selection.

D'Agostino said several features of the Los Alamos design are highly innovative and will be developed in parallel with the Livermore effort. Features of the Los Alamos design may be introduced into the RRW design as it progresses.

For the first time, NNSA's production facilities fully participated in the design process to ensure that components and materials used in RRW will be safer and that parts will be easier to maintain and manufacture, moving NNSA toward a more efficient and smaller nuclear weapons complex.

A joint statement released by the three lab directors said all three laboratories and the production complex will work together on RRW as an integrated NNSA project team. "Today's announcement is an important first step in the RRW program that will enable a sustainable nuclear deterrent for our nation. . . . We support this acquisition strategy and stand ready to participate in the transformation of the weapons complex," the joint statement said.

Sandia/University of Texas Medical Branch postdoctoral fellowship program underscores growing partnership

By Mike Janes

Sandia California News

Sandia's ongoing strategic institutional partnership with the University of Texas Medical Branch at Galveston (UTMB) reached a high point in November when the two entities established a jointly funded postdoctoral fellowship program.

The program will enable the alliance between the two organizations to grow even further, says Tony Martino, manager of Biomolecular Analysis and Imaging Dept. 8332, a group that has worked with UTMB. The fellowship program was highlighted during a joint Workshop on Collaborative Research in Bioengineering for Biodefense and Emerging Infectious Disease.

Tony says the workshop represented "an important step in fostering individual partnerships with UTMB researchers and multidisciplinary research teams."

UTMB'S GALVESTON NATIONAL LABORATORY will be a state-of-the-art biocontainment research facility providing much-needed laboratory space for infectious disease researchers from around the country. (Photo courtesy of UTMB at Galveston)

The workshop was conducted in Galveston, Texas, the site of UTMB's Galveston National Laboratory, one of two national biocontainment laboratories to be constructed under grants awarded by the National Institute of Allergy and Infectious Diseases/National Institutes of Health.

The workshop featured several breakout sessions, including technical presentations on the Microscale Immune Studies Laboratory (MISL) Grand Challenge, microfluidics, bioMEMS, hyperspectral confocal fluorescence imaging of live cells, and others.

Besides Tony, other members of Sandia's management team taking part in the workshops were Division 1000 VP and Chief Technology Officer Rick Stulen; Glenn Kubiak, senior manager of Biological and Microfluidic Science Dept. 8320, and Wendy Cieslak, Science, Technology, & Engineering SMU deputy. The UTMB side of the workshop and new fellowship program was organized by Dr. David Gorenstein, associate dean for research, School of Medicine, UTMB.

The key workshop objective, says Tony, was to establish the postdoctoral program, which will be jointly funded by the two organizations.

Current areas of research being explored through the Sandia-UTMB alliance include host/pathogen interactions, new bioresearch techniques in microfluidics and other microengineered platforms, advanced imaging, and computational biology. According to Glenn Kubiak, four inaugural postdoctoral fellowships were awarded on a competitive basis on Feb. 20 to collaborative Sandia-UTMB teams, with work expected to commence in the next one to three months.

"The new fellowship program represents a significant commitment on the part of UTMB, one which pleases us enormously," says Rick.

UTMB's Gorenstein also acknowledges the importance of this joint fellowship program "to stimulate unique, world-class science between Sandia and UTMB — bringing together two of the national laboratories."

Sandia and the University of Texas joined forces in early 2005 when the UT System Board of Regents unanimously approved a memorandum of understanding (MOU) between the system and Sandia. The MOU had three objectives, including one that specifically called for increased interactions and collaborations between individual staff, faculty, and students at Sandia and UT System academic and health institutions.

As recently as last October, Labs Director Tom Hunter and Rick led a Sandia delegation to the UT System offices in Austin to meet with UT Chancellor Mark Yudof and members of his team to talk about issues related to the relationship, with an underlying goal of identifying ways to jointly create a national agenda (see *Lab News*, Oct. 13, 2006).

Glenn says Sandia and UTMB continue to offer complementary capabilities that will make both organizations stronger, particularly in the area of biodefense.

"Sandia's rich history in science and engineering, as well as our commercialization savvy and our capabilities in high-performance computing, are very attractive to UTMB," he says. "Conversely, UTMB enjoys incredible depth in its study of emerging diseases and the biomedical aspects of that line of research. We value that expertise tremendously."

Glenn also points to the $167 million Galveston National Laboratory (GSL) — largely funded by the National Institutes of Health and managed by UTMB under the direction of Dr. Stan Lemon — as an indication of the university's commitment to advanced medical research.

At GSL, research will will focus on therapies, vaccines, and diagnostic tests for naturally occurring emerging diseases such as SARS and West Nile encephalitis, as well as for viral and bacterial agents that might be employed by terrorists.

Glenn notes that UTMB has been named by the National Institute of Allergy and Infectious Diseases as one of 10 Regional Centers of Excellence for Biodefense and Emerging Infectious Diseases to support research focused on countering threats from bioterror agents and emerging infectious diseases.

No ordinary ice

(Continued from page 1)

stand materials at extreme conditions."

But it has potential practical value. The work, which was published online March 11 in *Nature Physics*, was undertaken partly because phase diagrams that predict water's state at different temperatures and pressures are not always correct — a fact worrisome to experimentalists working at extreme conditions, as well as those having to work at distances where direct measurement is impractical. For example, work reported some months ago at Z demonstrated that astronomers' ideas about the state of water on the planet Neptune were probably incorrect. Closer at hand, water in a glass can be cooled below freezing and remain water, in what is called a supercooled state.

Accurate knowledge of water's behavior is potentially important for Z because the electrical pulses it sends through water compress that liquid. Ordinarily, the water acts as an insulator and as a switch. But because the machine has been newly refurbished with more modern and thus more powerful equipment, questions about water's behavior at extreme conditions are of increasing interest to help avoid equipment failure for the machine or its more powerful successors, should those be built.

"Apparently it's virtually impossible to keep water from freezing at pressures beyond 70,000 atmospheres."

— Daniel Dolan

One unforeseen result of Daniel's test was that the water froze so rapidly. The freezing process as it is customarily observed requires many seconds at the very least.

The answer, says Daniel, seems to be that very fast compression causes very fast freezing. At both Z in Area 4 and also at Sandia's nearby STAR (Shock Thermodynamic Applied Research) gas gun facility in Area 5, thin water samples were compressed to pressures of 50,000-120,000 atmospheres in less than 100 nanoseconds. Under such pressures, water appears to transform to ice VII, a phase of water first discovered by Nobel laureate Percy Bridgman in the 1930s. The compressed water appeared to solidify into ice within a few nanoseconds.

Nucleating agents, of course, are often used to hasten sluggish chemical processes, such as when clouds are "seeded" with silver iodide to induce rain. Daniel already had demonstrated, as a graduate physics student at Washington State University, that water can freeze on nanosecond time scales in the presence of a nucleating agent.

However, the behavior of pure water under high pressure remained a mystery.

Sandia instruments observed the unnucleated water becoming rapidly opaque — a sign of ice formation in which water and ice coexist — as pressure increased. At the 70,000 atmosphere mark and thereafter, the water became clear, a sign that the container now held entirely ice.

"Apparently it's virtually impossible to keep water from freezing at pressures beyond 70,000 atmospheres," Daniel says.

For these tests, Z created the proper conditions by magnetic compression. Twenty million amperes of electricity passed through a small aluminum chamber, creating a magnetic field that isentropically compressed aluminum plates roughly 5.5 by 2 inches in cross-section. This created a shockless but rapidly increasing compression across a 25-micron-deep packet of water.

The multipurpose Z machine, whose main use is to produce data to improve the safety and reliability of the US nuclear deterrent, has compressed spherical capsules of hydrogen isotopes to release neutrons — the prerequisite for controlled nuclear fusion and essentially unlimited energy for humanity.

This work is sponsored by the National Nuclear Security Administration. Other authors on the paper are Chris Deeney (now at NNSA), Mark Knudson (1646), and Clint Hall (1646).

Tuition program

(Continued from page 1)

have made up for part of the shortfall by reallocating some of their budget, efforts are still underway to locate additional funding sources to provide for long-term continuous support.

"We have funding to handle the balance of this fiscal year," says Charline Wells, CL&PD senior manager. "There's a strong feeling on the part of Sandia's executive management that we need to do whatever it takes to make this work and honor our commitment to employees participating in this program."

Charline says that she and her staff are also looking into other funding mechanisms and ways to avoid situations like this in the future.

More Sandians pursuing more education

In FY06, the number of Sandians participating in the Tuition Assistance Program (TAP) unexpectedly increased from 420 the previous year to 640 — a more than 50 percent increase, says financial analyst Donna Robertson (3012). By cutting back in other areas and reallocating its budget, CL&PD was able to keep up with increased demand in FY06. Tuition costs for TAP were roughly $945,000 in FY05 and $1,452,000 in FY06. However, the upward trend in TAP participation is continuing while CL&PD's budget was cut about 10 percent at the beginning of the fiscal year — as were other Integrated Enabling Systems organizations — further straining the budget, she says.

In FY06, the number of Sandians participating in the Tuition Assistance Program (TAP) unexpectedly increased from 420 the previous year to 640 — a more than 50 percent increase.

The participation levels for SDP programs such as the Doctoral Studies Program, the Special Master's Program, and the University Part-Time Program essentially were unchanged. Those programs involve an application and selection process that TAP does not.

Program administrators aren't exactly sure as to the reasons behind the increase but believe that Sandians are responding to Sandia's emphasis on continuous learning and are trying to enhance their skills and become more flexible and marketable as Laboratory budgets become increasingly tight.

Changes in the works

Prompted by the increased demand, CL&PD is making some changes in its approach to educational assistance. After benchmarking Sandia's programs against those of some other corporations, CL&PD is planning to align its university assistance programs with the corporate university partnerships strategy being developed by the Science, Technology & Engineering Strategic Management Unit in collaboration with Human Resources. The strategy involves establishing enduring partnerships with a focused set of universities to nurture talent, collaborative research, and national advocacy. Corporate investments in research, recruiting, and education will be aligned with these same universities. Criteria used to identify this set of universities include academic quality, the universities' research expertise, the number of hires Sandia has made in key disciplines, and diversity.

CL&PD is placing more emphasis on regional accreditation of schools as well as program accreditations such as the Association to Advance Collegiate Schools of Business (AACSB) for business and accounting programs and the Accreditation Board for Engineering and Technology (ABET), which accredits engineering and technology programs.

"We took a hard look at the list with the goal of focusing on university programs in key areas and target schools of importance to Sandia and its missions," Charline says. "We want to ensure we're being efficient and effective with our budget and at the same time provide a high quality of education for Sandians."

CL&PD intends to support the TAP participants who are already on an established educational path, she adds.

Watch for coverage of further developments in future issues of *Lab News* and the *Sandia Daily News.*

Feedback

What's the rule on full-time employees working from home

Q: *Under what conditions can full-time salaried employees or postdocs work from home for an extended time (9 months or more)? Is there an approval process?*

A: Under CPR300.6.30, regular (full-time and part-time) employees, and temporary employees (such as recurrent staff, postdocs, faculty sabbatical appointees, limited-term employees, and student interns at the undergraduate and graduate level) may apply for telecommuting with their immediate manager. The ability of the company to allow telecommuting is based on many factors and considerations with the primary factor being the needs of the business. In many cases, the work to be completed may not be done off-site and telecommuting is simply not an option. In other cases, partial telecommuting may be allowed contingent on the availability of resources to complete the work and other factors. Telecommuting is a program that balances the needs of an employee with the requirements of the company, with company requirements and needs taking precedence.

The approval process consists of requesting a telecommuting arrangement from the manager and discussing what work will be completed, how progress will be measured, how contact will be maintained similar to working on site, how often and when the employee will telecommute (e.g., each Monday), etc. If the request is approved by the manager, a Telecommuter's Authorization form is completed and submitted before any telecommuting arrangement can begin. If the off-site work location is outside of New Mexico or California the employee will need both the manager's and director's approval.

For telecommuting arrangements that are not regularly scheduled work hours (core hours must be in accordance with CPR300.4.1, "Hours of Work"), you would need to follow the exception process and go through HR vice presidential signature approval. For further information on our telecommuting policy, go to: www-irn.sandia.gov/hr/policies/Benefits/Time/telcomut.htm.

It is management's and the telecommuter's responsibility to terminate the agreement when he/she no longer telecommutes by terminating the agreement and sending it to the telecommuting coordinator. Failure to complete this important step may create negative tax complications for the employee as well as financial risk for the company.

— BJ Jones, Director (3500)

Water study

(Continued from page 1)

"Those of us from the West already know how real the threat of limited water availability is. But the rest of the country should also be concerned because water is increasingly relied on in every aspect of energy production."

— US Sen. Pete Domenici

while the treatment and distribution of water is equally dependent upon readily available, low-cost energy."

The report, *Energy Demands on Water Resources: Report to Congress on the Interdependency of Energy and Water*, was prepared in response to a letter from the chairmen and ranking members of the House and Senate Subcommittees on Energy and Water Development Appropriations dated Dec. 9, 2004. It was approved by DOE on Jan. 12, sent to Congress Jan. 17, and publicly released on Feb. 8.

Mike Hightower (6332) coauthored the report.

"As population has increased, demand for energy and water has grown," the report says. "Competing demands for water supply are affecting the value and availability of the resource. The operation of some energy facilities has been curtailed due to water concerns, and siting [building] and operation of new energy facilities must take into account the value of water resources."

Chris says that in preparing the report, it became obvious the availability of adequate water supplies has an impact on the availability of energy, and energy production and generation activities affect the availability and quality of water. This becomes particularly alarming as populations grow in water-scarce regions of the country like the South and Southwest where demand for power is increasing.

Technology symposium

Talk on energy and water issues

The next Technology Symposium will feature Mike Hightower (6332) talking about emerging trends in water resource availability and utilization. He'll also discuss the recent Energy and Water Research and Development Roadmap effort coordinated by Sandia with support from all the national laboratories. The roadmap is designed to help the nation improve natural resources planning and address long-term energy and water security and reliability. Mike's talk, "At the Crossroads: Water Resource Impacts on Future Energy Reliability," will be presented at an Unclassified Unlimited Release level in the Steve Schiff Auditorium March 26, noon-1 p.m.

MIKE HIGHTOWER

Water used throughout energy sector

Water is used throughout the energy sector, including resource extraction, refining and processing, electric power generation, storage, and transport. Large energy-related facilities, such as power plants, mines, and refineries can have a significant impact on local water supplies and water quality.

"More importantly, while not much water is currently consumed in producing transportation fuels, future transportation production fuels may be obtained from the production of biofuels, hydrogen, and coal liquefaction, all of which require more water than is used now in refining petroleum."

— Chris Cameron

US Sen. Pete Domenici (R-N.M.), ranking member of the Senate Energy and Natural Resources Committee, says the report should "serve as a wake-up call to those working to diversify our nation's energy supply."

"Those of us from the West already know how real the threat of limited water availability is," he says. "But the rest of the country should also be concerned because water is increasingly relied on in every aspect of energy production."

The report notes that thermoelectric power generation accounts for 39 percent of all freshwater withdrawals and 20 percent of all nonagricultural water consumption in the US. If new power plants continue to be built with evaporative cooling, consumption of water for electrical energy production could more than double from 3.3 billion gallons a day used in 1995 to about 7.3 billion gallons a day by 2030. This would be equal to the entire country's domestic water consumption in 1995.

Alternatives: Solar, wind

On a positive note, there are a number of alternatives to producing electricity that do not use much water, including wind and solar energy — although they do not necessarily produce the electricity when it is most needed.

"More importantly, while not much water is currently consumed in producing transportation fuels, future transportation production fuels may be obtained from the production of biofuels, hydrogen, and coal liquefaction, all of which require more water than is used now in refining petroleum," Chris says. "And there are no easy solutions."

Mike says that in their research for the report, they discovered that "water managers and energy managers don't necessarily talk to each other. They don't take a cooperative system-level approach to energy and water management."

"If the energy companies and water companies don't work together to resolve joint issues, we see big problems over the next 25 years," Mike says. "They are going to have to look at their water and energy needs in unison, rather than following the current US path of managing water and energy separately."

ENERGY PRODUCTION AND WATER USE are inextricably linked. A report to Congress by DOE, written with key input from Sandia researchers, calls attention to the often overlooked relationship and its implications for national energy and water policy. (Photo courtesy of Perstorp)

Examples of energy-water conflicts

• Arizona rejected a permit for a proposed power plant because of potential impact on a local aquifer.

• Idaho opposed two proposed power plants because of impact on aquifers.

• As a result of a 1999 drought, water-dependent industries along the Susquehanna River reported difficulty getting sufficient water supplies to meet operational needs.

• Low water on the Missouri River leads to high pumping energy, blocked screens, lower efficiency, load reduction, or shutdown at power plants.

• Southern States Energy Board members cited water availability as a key factor in the permitting process for new merchant power plants.

Sandia makes considerable strides in assessment of diversity maturity

Labs jumps from score of 2.2 to 3.3 in annual Lockheed Martin Diversity Maturity Model assessment

By Chris Burroughs

Jumping from a score of 2.2 in 2005 to 3.3 in 2006 on a scale of 5.0 in the Lockheed Martin Diversity Maturity Model (DMM) assessment, Sandia has made considerable strides in assessing the Labs' diversity progress.

That is according to Margaret Harvey, manager of Diversity, EEO & AA Services Dept. 3512.

"We did significantly better this year as a result of commitment on the part of Sandia leadership to diversity, as well as an improved process for responding to the assessment," she says. "In addition, we were much better at documenting our processes relevant to our diversity efforts, better at communicating process effectiveness and impact to the peer reviewers."

This is the third year Sandia and other Lockheed Martin companies have participated in the Diversity Maturity Model, an assessment process to measure an organization's progress and maturity in creating an inclusive environment. In 2006, all the participating business units showed improvements in their ratings.

According to Lockheed Martin Chairman and President Bob Stevens upon announcing the 3.2 achieved by the corporation as a whole, a "three on the Diversity Maturity Model scale means an organization has reached a level where diversity and inclusiveness are embraced."

Rochelle Lari (3512), diversity program lead for the Labs, says that Sandia's 2006 assessment efforts involved "a lot more rigor" than in the previous two years, engaging a broader set of subject matter experts, as well as adding pink and red team reviewers, and involved leadership from senior management.

"It took us a full year to prepare for and participate in the assessment," she says. "We had monthly subject-matter meetings attended by a variety of people ranging from representatives of the student intern program to supplier diversity, recruiting, mentoring, EEO, diversity, and corporate quality processes, and external customer satisfaction."

The Diversity Maturity Model takes a three-pronged approach:

• **Diversity self-assessment.** The assessment of processes and their effectiveness is determined by responses to more than 70 questions in the areas of leadership commitment, organization climate and culture, workforce strategy and development, and customer experience management. Sandia's responses to the questions included some 315 pieces of evidence. The self-assessment was reviewed and validated by a Lockheed Martin peer review team, which conducted on-site visits to 14 business areas/units during the fall of 2006.

• **Employee survey.** The survey measures employee perspectives regarding leadership commitment, organization climate and culture, workforce strategies and development, and customer experience management with questions related to manager accountability, reward and recognition for good work, respect for employee ideas, and creating a work environment for company loyalty, for example. It was sent to 50 percent of the regular workforce, randomly selected, between Aug. 30 and Sept. 20, and at Sandia had a 38 percent response rate.

• **Objective data adder** (score adjusted up to 0.5 points, plus or minus). This looked at data concerning the hiring and retention of minorities, women, and short-service employees. Sandia's score included a 0.15 adder based on performance against pre-established standards.

New in 2006 were two internal reviews, done before the Lockheed Martin peer review team visited for the formal review. The internal reviews involved a "pink" team that did a preliminary review and a "red" team that did a final review prior to submission of the self-assessment.

Rochelle says that last year, the second year of the assessment, 80 percent of participating business units failed to meet their targets, with many scores falling from the first year's assessment. That prompted Rochelle and others from across the enterprise to participate in a process improvement review. Several improvements were adapted, including:

• On-site peer reviews with reviewers representing the various Lockheed Martin business areas.

• Leadership at each of the visited sites could meet with the peer reviewers and had the opportunity to provide an overview of the business and discuss their commitments to diversity. At Sandia, Labs President Tom Hunter and Human Resources VP Kimberly Adams met with the peer reviewers to discuss the nature of the work at Sandia and to share their views of diversity.

"Lockheed Martin listened and implemented these suggestions," Rochelle says.

All the Lockheed companies are now on track for the fourth DMM assessment in 2007. At Sandia the associated action plan will include studying comments provided by members of the workforce on last year's survey. This involves some 905 comments about what at Sandia contributes to an inclusive work environment, and 808 comments about what needs to be improved.

"While our Diversity Model score improved greatly between 2005 and 2006, we still have much work to do in these dynamic times to ensure continued progress toward a more inclusive work environment that supports high performance," Margaret says.

Take Our Daughters and Sons to Work Day is April 26

By Iris Aboytes

Take Our Daughters and Sons to Work Day will be held April 26 at both Sandia/New Mexico and Sandia/California.

Sandia employees and contractors can invite children to visit their workplace and learn more about their parents' work and Sandia's mission. This can be an avenue to encourage students to pursue science, technology, engineering, and math careers.

Children in grades six through 12 are invited to attend and guests can include children, relatives, or friends. (For California details, see box below right.)

The decision to combine events was made based on several factors, among them easing impact on local schools, hosting employees, and line organizations. The combined event also provides an equal opportunity for both sons and daughters to attend on the same day.

This year, eligibility is based on school grade and not on age. In past years, 800 to 900 children ages 9-15 attended the separate events. Because it would be difficult to accommodate 1,800 children on one day, restrictions on grades were made, organizers say. The final decision was made based on employee input. Management approval is required for all guests.

Foreign national guests will need an approved Foreign National Request (FNR) and Security Plan (SP) for access to all locations visited. The FNR and SP should be submitted five to 20 days (depending on criteria) prior to the event to allow time for processing and approval. Contact the Foreign Interactions office helpline at 844-8263 for further information.

Registration will take place in the Bldg. 825 (TTC) lobby and Bldg. 10600 (IPB, Research Park) from 6:30-9:30 a.m.

In addition to presentations around the Labs, activities will be held at Hardin Field 10:30 a.m.-1:30 p.m.

Lunch will be served at Hardin Field, Area 4, and Thunderbird Cafe from 11:30 a.m.-1 p.m.

All information and registration forms will be available on the web teaser scheduled to go up the first of April. The website will also include a published schedule of activities and a Kids Zone where guests can find out more about the day's events.

If you are interested in hosting an activity or a booth, contact your division representative.

Planning Committee
Amy Tapia, Coordinator
Robin Jessen
Machelle Karler
Lori Carroll
Ernest Sanchez

Division Representatives

Debra Chavez	1000
Rachel Wilson	2000
Shannon Delgado	2000
Lupita Serna	3000
Elissa Thompson	4000
Kathryn Crowder	5000
Carmen Good	6000
Stephanie Cotinola	10000
Debbie Chavez	10000
Richie Spangler	10000
Katherine Rivera	10000
Tiffany Aragon	12000

Sandia/California Take Our Daughters and Sons to Work Day

This year's activities will be targeted at 8- to 12-year-olds. Children ages 13-17 are welcome; however, the primary function for this age group will be job shadowing.

If you would like your child to attend, fill out a registration form and send it to Theresa Price at the Badge Office, MS 9113. All registration forms are due at the Badge Office no later than close of business April 5. Registration forms for foreign national children are needed by March 19.

For questions or a registration form, contact Kristi Miller at 294-6205 or Shannon Yeoman at 294-6840.

Changes make way into Sandia's ethics culture

Director Carol Yarnall wants to make center more proactive in advancing ethics considerations

By Chris Burroughs

Since Carol Yarnall (12400) became director of the new Ethics and Business Conduct Center, changes are making their way into Sandia's ethics culture.

The changes are showing up in more contacts with the Ethics Office and people in general being more aware of what is ethical business behavior, Carol says.

"Sandians are beginning to realize that not only is the quality of our technical results important, but how we behave to achieve those results is equally, or perhaps even more, important," she says. "Our center is trying to be more proactive in getting the word out that Sandia takes ethics and the way it conducts its business seriously.

"Sandians are beginning to realize that not only is the quality of our technical results important, but how we behave or achieve those results is equally, or perhaps even more, important. . . . We encourage people to call us with any questions they might have — no matter how trivial they may seem."

— Carol Yarnall, director, Ethics and Business Conduct

We encourage people to call us with any questions they might have — no matter how trivial they may seem."

The Ethics and Business Conduct Center was formed in early fiscal year 2006 when the Ethics Office was separated from the Audit Center. The intent was to make ethics more visible; to provide independence for fraud, waste, and abuse investigations; to be the focus for all Sandia personnel-related investigations; to ensure consistent processes; to collect and analyze investigative data; and to provide administrative support for the Sandia Ombuds office.

Among the changes and activities that have taken place with Carol at the helm of the new center are:

• Talking to leaders around the Labs about the impact of ethics and business conduct on Labs' business.

• Revamping ethics and business conduct training for new hires and new managers.

• Activating an Executive Business Conduct Advisory Council to review data never compiled before and provide guidance and oversight for the center and investigative functions at Sandia.

• Initiating an award program to recognize individuals doing the "right thing."

Carol says that so often the Ethics Office is viewed as looking for the negative, and "we wanted to change that image." To achieve that goal the office recently established a new program to promote positive ethical behavior. If an employee knows of or observes someone demonstrating an act of positive ethical behavior, he or she should let the Ethics Office know. This could include an action such as accidentally denting a neighboring car and leaving a note with your name and phone number. After receiving the report, the Ethics Office will recognize the individual's positive behavior with a letter of appreciation from executive management.

A place at the table

Carol, who became center director after serving as executive staff director for several years, remains a member of the Labs Leadership Team, which she says is very appropriate because "ethics should have a place at the table." She sees her role as serving as Sandia's conscience, helping to ensure that ethics and corporate values are part of executive decisions.

Sandia's ethics program is modeled after Lockheed Martin's, which has been recognized as one of the best in the country by the Society of Human Resources Management.

"We have a close working relationship with Lockheed Martin's ethics program and communicate with them daily," Carol says. "They oversee our ethics program, provide a critical review of our investigations and guidance requests, and set goals for us around case closure time and the investigative process."

Additionally, Corporate Investigations has a close relationship with the Sandia Site Office, ensuring they are aware of Sandia's cases. Corporate Investigations also maintains frequent communication with the office of the DOE Inspector General (IG) regarding fraud, waste, and abuse cases. Criminal cases are automatically referred to the IG to determine the proper investigative office.

Two senior managers lead the day-to-day functions of the center. They are Doug Nordquist of the Ethics Office (12410) and Chris Padilla of Corporate Investigations (12420).

Doug says the Ethics Office provides training, advice, and guidance and also investigates allegations of ethical misconduct. People can anonymously or openly call the Ethics Office.

"Our office wants to foster a free and open atmosphere that allows and encourages employees to make inquiries, express work-related concerns regarding ethics issues, or report business ethics violations or violations of law, regulations, policies, or procedures without fear of retribution or retaliation," Doug says.

327 requests for guidance

In FY06 the Ethics Office answered 327 requests for guidance and investigated 35 cases. Hiring or job placement, interpersonal skills, and charging practices were the top three allegations. Of the 35 ethics cases officially investigated, eight resulted in discipline actions, including one suspension and seven oral reprimands.

The Investigations Office, headed by Chris, investigated 13 cases, conducted 40 preliminary inquiries, and forwarded 165 security concerns to the DOE Personnel Security Department. As a result of these investigations, nine persons were terminated, one retired, one received a letter of reprimand, and one was suspended for a day. The 13th case resulted in three contractor personnel being terminated by their companies.

In FY06, approximately $329,000 in lost, missing, or stolen Sandia or US government property was reported to Corporate Investigations by members of the workforce. Electronic equipment was the largest category of items reported with 28 computers and nine Blackberries/personal digital assistants (PDAs) lost or stolen.

A number of these losses occurred during travel and in the course of residential and auto burglaries. Because of the valuable information stored on these items, Chris encourages employees to take extra security precautions with these devices.

Carol says the Ethics and Business Conduct Center is positioned to help navigate issues involving conflict, legal or policy violations, or unethical behavior.

"We want to ensure that Sandia's customers can be confident that Sandia is a high-integrity laboratory, and when issues do arise they can trust that Sandia will deal with them in a timely, objective, and fair manner," she says.

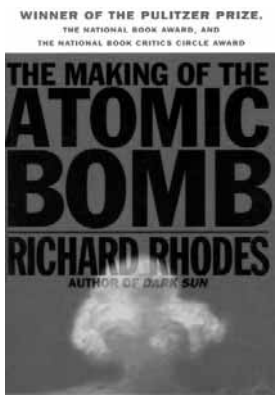
Contacting Sandia's Ethics and Business Conduct Office

- Sandia Ethics Helpline — 505-844-1744
- Sandia Corporate Investigations Hotline — 505-845-9900
- Lockheed Martin Ethics Helpline — 800-563-8442
- DOE/NNSA Employee Concerns Program Hotline — 800-688-5713
- DOE Office of Inspector General — 800-541-1625

www-irn.sandia.gov/ethics

Author of 'Making of the Atomic Bomb' to speak at National Atomic Museum March 17

Pulitzer Prize-winning author Richard Rhodes will lecture and sign books at the National Atomic Museum March 17, 11 a.m.-1:30 p.m. Rhodes is the author of 21 books, including *The Making of the Atomic Bomb*, which won the 1988 Pulitzer Prize for nonfiction, the 1987 National Book Award and the National Book Critics Circle Award.



Rhodes also wrote *Dark Sun: The Making of the Hydrogen Bomb* and recently finished a third volume of nuclear history, *Arsenals of Folly: Nuclear Weapons in the Cold War*, which examines the international politics of nuclear weapons in the last years of the Cold War.

Admission for the lecture is $5 for adults and $4 for seniors and youth. Copies of Rhodes' books can be purchased at the museum gift store. For more information, contact Becky Kenny (3656) at 245-2137, extension 102, or rekenny@sandia.gov.

Five Sandians recognized for ethical behavior

Five Sandians were recently recognized by the Laboratory Leadership Team by nomination for The Chairman's Award honoring "extraordinary actions or behavior" that exemplify the Lockheed Martin commitment to "Setting the Standard" for ethical business conduct and integrity.

John (Jack) Loye (10320) was selected as the Sandia submission to Lockheed Martin Information & Technology Services (I&TS) for ensuring that ES&H decisions are carefully thought through, researched, and most importantly adhere to the principle of "doing the right thing."

The other nominees were **William Moffatt** (12337), **Karon Ely** (9241), **Annette Sobel** (303), and **Tracy Garcia** (8528). They were recognized for not settling for the status quo, being honest in times of disagreement, exhibiting a principle-based approach in maintaining and fostering program development contacts, and identifying and resolving areas of concern.

Mission: Antarctica

Sandia team tests new modified MiniSAR sensor that could detect buried or bridged crevasses

Story by Michael Padilla
Photos by the Antarctic team

In one of the coldest parts of the world, four Sandia researchers recently took advantage of what is considered to be one of the warmest time of the year in Antarctica late last year.

At peak temperatures of 35 degrees outside with the sun shining continuously, the researchers worked diligently on a highly planned project. There was no room for error or equipment failures because there is no overnight express to Antarctica.

The goal of the mission was to test a Sandia-modified miniaturized synthetic aperture radar (MiniSAR) prototype sensor that could detect buried or bridged crevasses for the New York Air National Guard (NYANG). Flying for the National Science Foundation, the Air Guard must land planes safely in this remote area of Antarctica. The use of the Sandia sensor would augment or replace the present method of manually finding the crevasses.

"We were highly successful in demonstrating our ability to detect snow-covered crevasses in Antarctica using Sandia's MiniSAR crevasse detection radar," says Tim Mirabal (5341), project manager.

The Antarctica team, led by Grant Sander (5342), included Jeff Bradley (5338), Doug Bickel (5354), and Jeffrey Bach (5345). The team left on Thanksgiving Day 2006 and stayed there for nearly three weeks.

Technical homework

Sandia began working on the crevasse detection radar (CDR) in March 2006 when funding was received from New York Air National Guard to create a system using Sandia's existing MiniSAR technology.

The first step was to change the normal KU-band frequency to X-band. KU-band frequency is 12 to 18 GHz and X-band frequency is 8 to 12 GHz. A lower frequency was needed to penetrate the snow. The snow in Antarctica is unique in the world as it is very dry; whether the radar would perform as well in other climates would need to be investigated, says Tim.

The team built an external X-band converter and changed the front-end components as well. New engineering had to be done in order to accommodate the X-band frequency.

A gimbal arm and electronics were redesigned to allow free movement and antenna balance. The design had to allow for easy assembly and disassembly, says Grant.

"We were able to grow the gimbal assembly and make it perform better," says Tim. "This included rerouting the wiring."

In addition, the team developed specifications for data formats, mechanical and electrical components for installation on the plane, and software tools to review the data.

The technical design team, consisting of more than 30 Sandians, worked for 10 months to meet the objectives of the project. The team built two systems, with one serving as a backup.

"Being that far away, it was good to have a complete spare in your back pocket," says Grant.

Jeffrey Bach, who served as hardware specialist on the trip, says there also was a potential interference problem from the radar system, but the solution didn't arrive in time to apply it before shipping the radar.

"Luckily, my skills weren't needed, as the hardware performed well," says Jeffrey. "I made myself useful in other ways, such as helping to retrieve radar targets from the field at midnight, with the sun still shining brightly."

Road to Antarctica

The hidden crevasse problem was first brought to Sandia's attention in 1999 when the Guard needed assistance in locating deep cracks in the ice. The crevasses made it difficult and dangerous to land airplanes. Historically, millions of dollars have been lost due to crevasse-related incidents. Not until Sandia developed the MiniSAR could the Guard afford to demonstrate CDR technology.

The NYANG uses the LC-130 aircraft, which has special landing gear, to operate off the snow and ice at McMurdo Station, Antarctica's largest community. McMurdo is built on the bare volcanic rock of Hut Point Peninsula on Ross Island, the farthest south solid ground accessible by ship. McMurdo, established in 1956, has grown from an outpost of a few buildings to more than 100 structures including a harbor, an outlying airport with landing strips on sea ice and shelf ice, and a helicopter pad. There are above-ground water, sewer, telephone, and power lines linking buildings. During the winter about 200 to 400 people work at McMurdo, swelling to some 1,500 people in the summer.

The team flew commercial airlines from Los Angeles to Auckland, New Zealand, then on to Christchurch, New Zealand. From Christchurch they took an eight-hour military LC-130 flight to McMurdo.

Before arriving at McMurdo the researchers underwent numerous and extensive physical and dental exams. Each team member had a backup who also went through the rigorous exams as if they were going. They included Marty Thompson (5348), Mike Pedroncelli (5338), Tim Bielek (5342), Steve Reber (5342), Phil Kahle (5334), and Mike Taylor (5342).

At Christchurch they were fitted for extreme cold-weather gear and upon arrival at McMurdo they participated in a two-day "Snow Craft 1" boot camp — also known as "happy camper school." The camp prepared the team on what to expect and taught them various safety and survival techniques.

The hunt for crevasses

"Most people don't realize how large Antarctica is because of it being at the bottom of the globe," says Grant. "This is the area that the Guard is dealing with when it comes to the remote sites that they need to supply."

The crew collected data in several locations including McMurdo Station, Pegasus Wreck, Shear Zone (Mina Bluff Area), Shear Zone Traverse, and Taylor Dome.

"First we mapped McMurdo, Scott Base, and the nearby pressure ridge. Then we flew the Pegasus Wreck site, where our corner reflector array and junk pile were located, says Jeff, who served as test planner, motion measurement operator while flying on the aircraft, morale officer, and snow shovel operator.

Data was sent from the detection radar to an office at McMurdo where Doug served as on-ground support analyst.

Doug pieced the data together to create coherent maps of the surveyed areas. "Piecing the data together using software was a difficult task," Doug says. "But the software was able to receive high volumes of data."

On one day, the researchers were able to conduct two flights while mapping two 5- by 5-nautical mile areas. The 5- by 5-mile area was a goal set by the Guard to find a suitable spot to land in the vicinity of a remote camp.

"We saw crevasses from the first patch of radar data onward," Jeff says. "The first area was at the Shear Zone, an area where multiple glaciers come together and flow in parallel. There is a road bladed into it, an attempt to build a road to the South Pole. It has not been maintained this year, but we think we saw it anyway in the radar data. This couldn't be seen by the naked eye."

The "Tres Hermanas" crevasses, selected by Guard customers Maj. Mark Armstrong and Maj. Walter Hallman, were studied closely. The three crevasses are difficult to visualize from the air and are located in a fairly flat area that represents a possible location to land LC-130 aircraft. The Tres Hermanas are relatively narrow — around four meters wide — and are covered with a snow bridge. Loose snow blows across and camouflages the crevasse, making it look like all the other terrain, especially from the air. The bridge in these crevasses is very loose snow and only a couple meters deep.

"Maj. Armstrong, who is also an LC-130 pilot, was thrilled that we could detect these crevasses using the CDR, especially because of their size and the difficulty in seeing them from the air," says Tim.

CDR outcomes

"The Antarctica MiniSAR CDR can identify hidden threats, clearly show hazards, and effectively covers large areas," says Tim.

"The efficacy of the sensor for this application has now been proven," Jeff says. "I hope the project has the opportunity to carry forward to a fully fieldable system that the Guard can use to make its job of supplying the remote camps and conducting emergency operations safer and more efficient."

Another successful part of the trip was gathering radar imagery of Antarctica, says Jeff.

"We experienced excellent weather, infinite visibility, and fantastic scenery," Jeff says. "And of course cool SAR imagery."

CDR outlook

Since Sandia has successfully demonstrated the ability to see buried crevasses, the team continues to work to sell the capability and secure funding to begin the integration of the CDR on the LC-130 aircraft.

Funding has been set aside to begin analyzing the data obtained in Antarctica and start addressing the integration activity.

"Integration will be a challenge as a lot of work is still necessary to make the CDR ruggedized and user friendly, but we're up for the task," says Tim. "The MiniSAR CDR has other applications, such as day or night search and rescue, a capability the Guard needs. And we will continue to assist them."

TRES HERMANAS — The image below left shows an X-band synthetic aperture view of Tres Hermanas (three sisters). The three crevasses are located in a fairly flat area that would superficially appear to be a possible location to land LC-130 aircraft. From the air and with the unaided eye, however, the crevasses are hard pick out (especially in unfavorable lighting conditions) making landings in unfamiliar areas a bit uncertain. The MiniSAR imagery gives a new level of confidence to pilots. The image below right gives a ground-level view of one of the Tres Hermanas crevasses.

Arctic dreams

Growing our understanding of climate change

Alaskan North Slope site offers new insights to climate researchers

INSTRUMENT CLUSTERS near Barrow, Alaska, gather data useful in refining global climate models. (Photo by Mark Ivey)

By Darrick Hurst

On the cold tundra near the Arctic Ocean in northern Alaska, researchers from around the world are transforming scientists' understanding of what the future may hold for the Earth's climate.

Located just east of Barrow along the coast of the Chukchi Sea, the North Slope of Alaska (NSA) site's unique location provides researchers with a rare, ground-based window into the cloud and radiative processes that take place in the earth's atmosphere at high latitudes. The research performed here has resulted in NSA arguably being today's most successful atmospheric research program.

Rune Storvold, Geophysical Institute, University of Alaska-Fairbanks

"What makes the North Slope site important is that climate processes differ depending on where on Earth they occur," says Bernie Zak (6338), science liaison for the North Slope site. "At the North Slope and in other cold regions, different processes are important because water there is mostly in solid, rather than liquid, form."

Sponsored by DOE's Office of Science and managed by its Office of Biological and Environmental Research, NSA is one of three global locales operated by the Atmospheric Radiation Measurement (ARM) Program's national user facility for interdisciplinary studies of earth systems, the ARM Climate Research Facility (ACRF). Along with sites in the US southern Great Plains and the tropical western Pacific, these primary, fixed locations are equipped with an extensive array of instruments for obtaining atmospheric data. In 2005, the ACRF added a mobile facility to its suite of research capabilities.

"Using a closely integrated team of national laboratory partners, the ACRF provides the complex physical infrastructure and data systems needed for national and international research efforts related to global climate change," says Mark Ivey (6338), NSA site manager for the ACRF. "We provide the facilities, support, and atmospheric measurement data for an international group of scientists. At the NSA, we've also been incredibly fortunate in receiving the support of native Inuit — what we call Eskimo — communities in the vicinity of the site."

> *"What makes the North Slope site important is that climate processes differ depending on where on Earth they occur. At the North Slope and in other cold regions, different processes are important because water there is mostly in solid, rather than liquid, form."*
>
> **— Bernie Zak**

MARK IVEY at the North Slope site. (Photo by Eli Mlawer)

Researchers on ice

Extending south to the vicinity of Atqasuk, west to Wainwright, and east toward Oliktok, the extended NSA locale has become a modern-day center for atmospheric and ecological research activity. These high latitudes are receiving increased attention by climate researchers as they work to better understand the interactions of the atmosphere-land-ocean system. The Arctic, specifically, is predicted to undergo more intense warming than any other region on earth because water undergoes a specific seasonal phase change there. Scientific evidence indicates, in fact, that this warming is already happening.

(Continued on next page)

Born at Sandia, raised in the Arctic

Mark Ivey's first job with the Atmospheric Radiation Measurement program was to manage the team that integrated and tested the first Atmospheric, Radiation, and Cloud Station (ARCS) mobile instrumentation unit.

"The first ARCS ended up in the tropical western Pacific," says Mark. "We had a great team that worked on the ARCS unit at a site near the Eubank gate at 20th and H streets."

The extended ARCS team included colleagues from Los Alamos, Argonne, Pacific Northwest, Brookhaven, Oak Ridge, and the National Renewable Energy Laboratory.

Work at the ARCS integration and testing site came to an end in late 2000 or early 2001 after the ARCS was deployed to other locations around the globe.

"We integrated and tested the Polar ARCS (or PARCS) at the North Slope of Alaska site with help from our colleagues at the Pacific Northwest National Lab," says Mark. "The PARCS was a polar version of the ARCS that was used on the icebreaker for the Surface Heat Budget of the Arctic Ocean (SHEBA) experiment, where an icebreaker was driven into the pack ice and left there for a year. An international team, including researchers sponsored by ARM, investigated the arctic atmosphere and ocean from onboard that ship. That PARCS' instrumentation was placed at the NSA in Atqasuk after the SHEBA experiment concluded."

Climate study

(Continued from preceding page)

(Photo by Rune Storvold, Geophysical Institute, University of Alaska-Fairbanks)

"The arid cold during winter at the North Slope provides a 'window' into space," says Bernie. "Under these conditions, infrared radiant energy can escape more easily through the atmosphere — it's something that's part of the earth's natural energy balance. This is one of the ways that high latitudes are quite different from temperate or tropical regions, and reinforces the importance of our research here."

The value of these different regional factors is that the researchers have the chance to study how longwave energy gets trapped to varying degrees inside the atmosphere by different conditions from chemical constituents that include water vapor, carbon dioxide, methane, nitrous oxide, chlorofluorocarbons, and liquid water droplets that absorb the energy emitted by the surface of the Earth.

"Essentially, our work at these facilities enables us to contribute to improvements in climate models that simulate global climate change," Bernie says.

Such global climate models are tools for calculating atmospheric, land, and oceanic conditions all over the earth. By providing cloud and radiative transfer information to climate modelers, say Bernie and Mark, the site's data will help to improve the performance of general-circulation and related models of the atmosphere as tools for predicting future global and regional climate changes.

"Because the North Slope site is fairly cold year-round, we often observe clouds that are composed of ice or ice and water in mixed phases," says Mark. "In 2004, the ACRF sponsored a field experiment to specifically study mixed-phase clouds in the arctic. The results of the Mixed-Phase Arctic Cloud Experiment — or MPACE — have changed our understanding of arctic clouds and how they should be represented in climate models."

"Our high-latitude NSA location also allows researchers the opportunity to study surface optical properties with and without snow and/or ice cover as a function of temperature history," says Bernie. "Snow and ice surfaces are more reflective to visible light than soil or vegetation, and that plays an important role in high latitude and global climate."

A strong indicator of the value of the site's work is the number of researchers who make use of the data obtained there. Academic, foreign, domestic, and other researchers from many different areas of research use data collected from the NSA. Many also come to the site for field campaigns to temporarily add their own unique measurement capabilities to the existing instrumentation suite and study specific phenomena.

"People are still publishing peer-reviewed articles based on the 2004 MPACE data," says Bernie. "We found far fewer ice nuclei than had been expected — that is, far fewer aerosol particles capable of nucleating ice crystals. This means that water was staying liquid even at very low temperatures. That has direct implications, not only for climate, but for the Federal Aviation Administration as well, because when this liquid water comes into contact with planes, it instantly converts to ice. These icing conditions can bring down aircraft."

"Our work isn't just limited to climate research," says Mark. "The Army has done research on the atmospheric phenomena that cause the twinkling of the night sky, and how distant objects can be seen more easily through the atmosphere at certain times of the day, under certain meteorological conditions. Our location and instruments at the North Slope provide data sets that are useful to a wide range of research interests. That is one of the reasons the NSA locale was chosen as part of the ACRF."

At the end of a hard day of work, Bernie and Mark say the thing they're most grateful for is the caliber of the team members they work with.

"The NSA is a cold place with a lot of equipment and little in the way of creature comforts — without guys like Jeff Zirzow (6338), and our local native technicians, Walter Brower and Jimy Ivanoff, I don't know how we'd get anything done," says Mark.

International Polar Year and International Geophysical Year

2007 marks the International Polar Year (IPY), when scientists the world over will focus research on the Arctic and the Antarctic.

This year is also the 50th anniversary of the International Geophysical Year (IGY), a similar international scientific effort that occurred from 1957 to 1958.

Organized through the International Council for Science Unions (ICSU) and the World Meteorological Organization, this is actually the fourth polar year, following those in 1882-1883, 1932-1933, and 1957-1958.

In order to have full and equal coverage of both the Arctic and the Antarctic, IPY 2007-2008 covers two full annual cycles, from March 2007 to March 2009, and will involve more than 200 projects, with thousands of scientists from more than 60 nations examining a wide range of physical, biological, and social research topics.

Similarly, the IGY was proposed by the ICSU in 1952 and initiated a comprehensive series of global geophysical activities to span the period July 1957-December 1958. The IGY was modeled on the International Polar Years of 1882-1883 and 1932-1933, and was intended to allow scientists from around the world to take part in a series of coordinated observations of various geophysical phenomena. Although representatives of 46 countries originally agreed to participate in the IGY, by the close of the activity, 67 countries had become involved.

The seeds of current concerns about global climate change were planted during the IGY. Prior to IGY, it was not known that the burning of fossil fuels was progressively changing the composition of the global atmosphere.

ICEBERG in the Beaufort Sea off the northern coast of Alaska during the Arctic summer.
(Photo courtesy of NOAA)

50 years ago . . . Van de Graff Accelerator to Be Installed at Sandia — High Voltage Generator for Nuclear Research — A Van de Graff accelerator for use in radiation physics and chemistry research by Sandia Corporation scientists in the testing of various materials will be installed in the corporation Technical Area I within the next year. Plans call for the $120,000 instrument to be located in a building west of Building 808. Weapons Research Division II (5133) under Dr. Richard S. Claassen is planning the program for the new facility. Research scientists in this division will work with personnel of the Stanford Research Institute in Menlo Park, Calif., at a similar installation during the next year to become familiar with the instrument and to initiate Sandia's research studies.

40 years ago . . . Sandia to Provide Arming & Firing and Earth Motion Studies for 'Gasbuggy' — Two Sandia Field Test Divisions will

A SANDIA-LED TEAM prepares a site east of Farmington, N.M., for the Gasbuggy project test. Gasbuggy was intended to determine if nuclear explosions could improve the yield of natural gas fields.

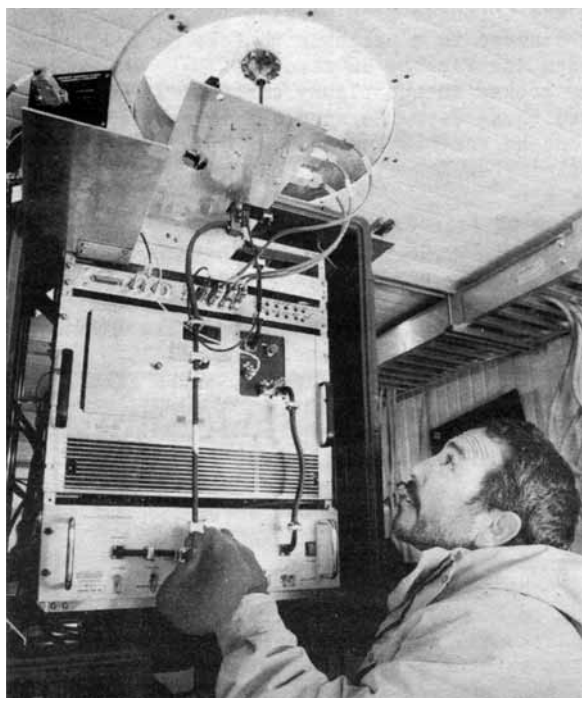
participate in Project Gasbuggy — the nation's first experiment using a nuclear explosion in an effort to stimulate natural gas production. Tentatively scheduled for September, the project will be conducted at a site 55 air miles east of Farmington. A 20-kiloton nuclear device will be placed about 4,200 feet underground in a low permeability ("tight") gas producing formation. It is expected that the nuclear explosion will fracture the sandstone gas reservoir sufficiently to release about seven times the amount of gas now recoverable at the site. **Rocket Launched into Aurora Borealis** — A team of Sandians launched a Nike-Tomahawk rocket into an aurora borealis (northern lights) display Feb. 28 from Fort Churchill, Canada. The rocket carried three Los Alamos Scientific Laboratory instruments to probe the physics of the auroral system. The purpose of the LASL instruments was "to study the unexplored ultraviolet emission of natural aurorae in relationship to the visible output, and to gain, indirectly, information of the magnitude and energies of the primary particle fluxes."

30 years ago . . . Labs Has New Role in Oil Recovery — DOE recently authorized Sandia Laboratories to manage part of the nation's enhanced oil recovery program, a segment called "Deep Steam." The Sandia project is funded at $23 million over the next five years. Advanced Development Division 5731 under Dick Traeger has done development work on the project, and the newly formed Thermal Processes Division 5737 will assume responsibility for the work in the future. "We have a number of objectives," Dick says, "including the development of a deep downhole steam generator for use in oil wells where economic oil production has stopped. Heat from the steam reduces the oil viscosity, and steam pressure drives the oil to the producing well." **Electronic Seal Developed for International Agency** — An electronic seal, which readily reveals tampering has been designed and built at Sandia Laboratories. A series of laboratory tests on working models is now underway before 10 of the seals are sent this spring to the International Atomic Energy Agency (IAEA) for field test. The seal is the size of a padlock and opens and closes like one. It employs a 900-strand fiber optic loop as its shackle; both ends connect to a complex electronics package, which includes a loop integrity sensor, display generator, tamper-responding container, and batteries. Each seal is programmed to display unique sequences made up of different letters and numbers. For each seal, digit changes will occur at selectable intervals — once every 1, 2, 4, 8, 16, or 32 hours. When these tests are completed, 10 units, along with a programmer and verifier package, will be sent to the IAEA, which will install the seals at selected locations.

20 years ago . . . Sandia Now in Superconductivity Race — "Overnight success" is usually a figurative phrase, but this time it's literally true. On March 2, Sandia was not a contender in the ongoing race for a really practical superconductive material. By the morning of March 3, Sandia was moving up fast. The key to the sudden breakthrough is a new combination of materials. The January-February progress came from a mixture of lanthanum, barium, and copper oxide. On Tuesday of last week the Sandia scientists had the key parts of the published report read to them over the telephone from early recipients of *Physical Review Letters* on the East Coast and learned that yttrium had replaced lanthanum in the compound and, after suitable annealings, that night demonstrated it was superconductive between 93 and 94 K. A potential application exciting to Sandia would be linking the zero resistance at 77 K with the high-speed strained-layer semiconductor for even faster and more efficient devices.

IN A DESKTOP DEMONSTRATION, a small sample of a new superconductor material, connected to a battery and voltmeter, was dipped into liquid nitrogen in 1987.

10 years ago . . . Arctic Cloud Station: Ambitious Program Puts Atmospheric Radiation Measurement Study on Ice . . . Instrument Package Assembled at Sandia Heads for Arctic Ocean — North to Alaska! That's the rallying cry of an intrepid band of Sandians and fellow researchers from DOE, other national labs, universities, and a wide range of government agencies as they mount a major campaign to study the



MARK AGUILAR makes adjustments to a cloud radar instrument in the Portable Arctic Atmospheric Radiation and Cloud Station (PAARCS) during predeployment testing and integration in this 1997 photo.

arctic climate. The Sandians are one element of a multi-agency, multipronged, international initiative to scrutinize, with an unprecedented degree of detail, how high-latitude climate works, bringing to the effort the most sophisticated and advanced instruments available. Some of those instruments, configured into an integrated package at Sandia, are bound for an icebreaker in the Arctic Ocean more than 400 miles north of Barrow in the Beaufort Sea. The instruments, to be housed in and around a specially designed shelter, will ride out a full arctic year aboard the icebreaker. The instruments will gather data as DOE's contribution to SHEBA, the Surface Heat Budget of the Arctic project, sponsored by the National Science Foundation and the Office of Naval Research to investigate predicted changes in the earth's climate. Sandia is involved in the project through its participation in DOE's Atmospheric Radiation Measurement (ARM) program. — *Janet Carpenter*

Sandia takes lead in Armed Services blood donation program

GIVING THEIR ALL — Sandia has won the Armed Services Blood Program (ASBP) traveling trophy two times in a row. Sandians provided the most pints of blood for the ASBP in November and January. These blood donations go directly to military personnel serving overseas. Colonel James Ice, 377th Medical Group deputy commander, presented the ASBP trophy to Sandia's Kelly Rogers (4329). The trophy is awarded bimonthly to the KAFB tenant group with the highest participation in the ASBP blood drive. The ASBP has its own appointment site with tons of useful donation information. Click on the blood drop at the bottom center of the home page (www.militaryblood.dod.mil); on the resulting page, type "Kirtland" in the sponsor code field to locate blood donation centers.
(Photo by Bill Doty)

Employee death

Jeneane Taylor was a multifaceted person with a heart of gold

Mother hen to 1300 Center Office died Feb. 28; fought for causes she believed in

"Jeneane was a kind and loving person who thought of her co-workers as part of her big, extended family," says coworker, Marlene Keller. "She was dedicated and diligent in her work and direct in her speech as she managed her assignments. She treated everyone with kindness and consideration."

JENEANE TAYLOR

Jeneane Taylor, senior management assistant to Jim Lee, died Feb. 28. "Jeneane was a tireless advocate for employees who faced special challenges," says Jim. "She served this community as chair of Sandia's Disability Awareness Committee."

"She was mother hen to those of us in the center office," says colleague Elizabeth Scott-Patterson. "As a strong believer in environmental protection, she set up a recycle station on the second floor and convinced others to do the same. She would remind us to shut off our lights and lock down our computers every time we left our offices. She was a strong advocate of the Americans with Disabilities Act because she herself had become disabled after a lifetime of battling Type 1 diabetes.

"Jeneane and I shared a wicked sense of humor. She had a strong sense of self and was always ready to fight for causes she believed in."

"Jeneane and I shared a wicked sense of humor. She had a strong sense of self, and was always ready to fight for causes she believed in. Those of us who knew her well knew she had a heart of gold and always put the needs of other before her own," Elizabeth says.

Says her friend Karen Klar, "Jeneane was a multifaceted person possessing talents, kindness, unselfishness, and extending graciousness to all she encountered. She not only believed in compassion, she *was* compassion. She showed this by the way she lived her life, either by mentoring a new secretary or by offering her home to someone in need. I am a better person because Jeneane came into my life."

"She was a true professional," says Dick Steele. "She would take on a project and make sure everyone looked good. She enjoyed funny stories and always had a twinkle in her eye. She was very proud of her family and grandchildren."

"Jeneane remembered everyone's birthdays," says her friend Ruth Smith. "She was a can-do, get-it-done person."

Jeneane is survived by son Troy and his wife Sandy, son Eric and wife Amy, brother Steve Johnson and his wife Rita, five grandchildren, one great-grandchild, and several nieces and nephews.

— Iris Aboytes

Back to the Future?

Tech Library study takes a clean-slate look at new services

Where do you go today as your first stop for information — Google or Sandia's Technical Library? When was the last time you called Recorded Information Management to help organize and retain your critical Sandia information? Don Guy, manager of Technical Library Operations Dept. 4536, wants to know.

The Technical Library and Recorded Information Management (RIM) organizations have launched a study to determine how best to support viable information life cycle management at Sandia — cradle to grave, research to publication, creation to disposition.

"If we had to start today, how would we build Technical Library and Recorded Information Management functions to best support Sandia users' needs?"

— Objective of Tech Library survey

The Library and RIM are partnering with Outsell to conduct the study. Outsell is a leading research and advisory firm focused exclusively on the information industry. The objective of the study, Don says, is to answer the question, "If we had to start today, how would we build Technical Library and Recorded Information Management functions to best support Sandia users' needs?"

Part of the study will be a survey in which all Sandians at all sites can comment about their information needs. A link to the survey will be sent in April to all members of the Sandia community. The survey will ask where you go today to find information and will solicit input on your needs and preferences throughout the information life-cycle process. In addition to the survey, Outsell will conduct focus groups designed to explore information habits and needs.

"This study," Don says, "is a watershed moment in the history of the Technical Library and RIM — a 'clean-slate' take at forming or recreating services to meet the information needs of all Sandians."

For more information regarding the study, contact Donald Guy at dwguy@sandia.gov or 284-2859.

Former Sandian Shawn Lin hopes to realize dream he shared with Jim Fleming

The March 2 issue of the *Lab News* featured an obituary of Sandian Jim Fleming. Jim's longtime scientific collaborator, former Sandian Shawn Lin, heard about Jim's death after the *Lab News* deadline and was unable to offer his personal remarks. Because of their close and important working relationship — Jim and Shawn's 1998 *Nature* paper on 3-D photonic crystals is one of the top 10 cited Sandia materials papers over the past decade — the *Lab News* offered Shawn the chance to extend his condolences in this issue. Here are Shawn's remarks:

"I am writing to remember a dear friend, Dr. Jim Fleming. Jim and I worked closely in advanced photonics for nearly eight years till 2004, when I left Sandia for an academic position. We had productive times together, winning several prestigious awards and co-inventing 14 patents. Jim was a material scientist by training. But he was more than a scientist. He was the most skillful person that I have ever known in a modern silicon microfabrication laboratory. Jim had an extraordinary 3-D vision of microstructures. Coupled with his extensive material and fabrication expertise, we realized many of the world's firsts that include the first 3-D infrared and optical photonic crystal and the first 3-D metallic photonic crystal. These seminal works laid the foundation for a large-scale photonic integrated circuit with high speed and low loss, a dream of the modern photonic revolution. I am continuing to work on this exciting subject and hope to realize in the near future the dream that Jim and I had together."

Feedback

Isn't there a better way to get emergency info to Sandians during nonwork hours?

Q: *In light of the recent bad weather, I've noticed that many emergency updates and weather closures are sent to our work email addresses but outside of work hours. Access to work email may be inconvenient or technically impossible for many people. I find it ironic that work email is used for the communication of safety and emergency information after work hours to an audience with limited or inconvenient email access while away from work. This isn't in the best interest of the employees, particularly in light of the importance of these messages.*

Would it be possible to set up a list (voluntarily subscribed to) that would allow these notices to be sent to home email addresses? This would be a more effective way to convey this critically important information to employees during nonwork hours. In this way, we would be "pushed" this information, when otherwise we wouldn't know to check our company email accounts, and wouldn't have to repeatedly check the Sandia Line phone system for messages.

Along these lines, a TXT system whereby these messages could be sent to our cell phones (company owned or private) would be excellent, too.

SOME SANDIANS say they had trouble getting timely information about weather-related changes in work hours.

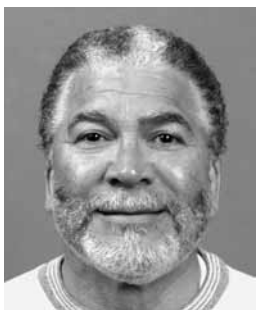
Given Sandia's emphasis on employee safety and health, and our innovative and creative approaches to problem solving, it seems that such an email/text messaging system would be a welcome solution, and well worth the cost/effort of implementation.

A: Thank you for your thoughts and suggestions. As you stated, notices and emergency messages are typically sent to all employees via work emails. In addition, they are often sent to each person's work phone, read on the Sandia radio station (AM 1640), and available on the Sandia Information Line at 505-845-6789. This way, it is easy for any employee to check on messages from any location including home or while on travel. Given the number of options, it is felt that using home emails and cell phones are unnecessary.

— Phil Newman, Director (10300)

Mileposts

New Mexico photos by Michelle Fleming



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Alice Ann Vandevender
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Mark Weber
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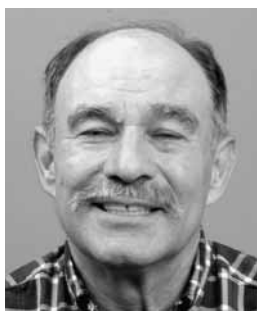

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Anthony Medina
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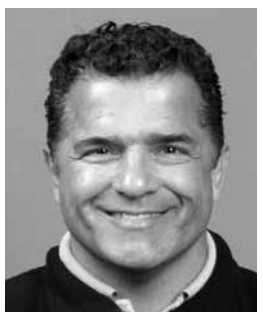
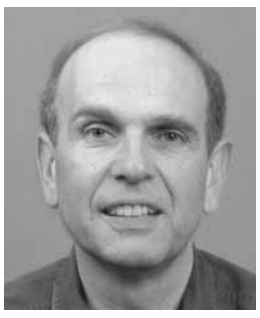


Steven Rivera
25 4211



Victor Romanelli
25 5623

Boris Starr
25 4512

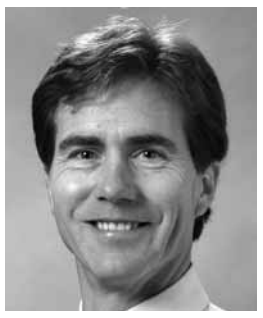
Sharon Walsh
25 4312

David Bodette
20 5531

Donald Bridgers
20 10312

Terry Garino
20 1816

Tommy Goolsby
20 6752



Gene Kallenbach
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Douglas Lawson
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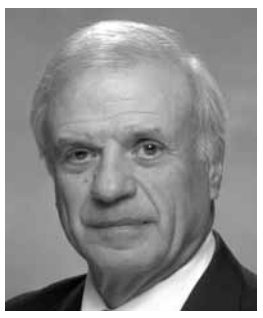
Lewis Reif
20 5336

Christine Roth
20 1825



Jim Tegnelia
20 12190

Melissa Wilson
20 2124

Richard Fate
15 6433

Maxine Gallegos
15 6038

Richard Garcia
15 5050

Joan Harris
15 12305

Lisa Hooper
15 10327

G. Kelly Rogers
15 4329

Lars Wells
15 5354

Recent Retirees

Richard Anderson
32 1726

Mary Gallegos
30 3655

Dixie Harvey
25 6765

Jim Hickman
23 5731

Rodema Ashby
21 6428

Sandia teams, individuals make mark on Mt. Taylor

Sandia teams and individuals did themselves proud in the annual Mt. Taylor Winter Quadrathlon near Grants, N.M., the legendary competition that combines running, biking, crosscountry skiing, and snowshoeing. The team

WINNING ATTITUDE — The Sandia team Lab Ratitude took the top prize in the team race at the annual Mt. Taylor Quadrathlon. They are, from left, Ed Heller, Jason Strauch, Doug Deming, and Darrell Armstrong.

Lab Ratitude won the overall team competition and posted the third fastest time of the day, less than 1 percent slower than two individual Colorado pros in their twenties. The team posted the fastest overall uphill ski time and downhill bike time and were consistent in the other events. Jason Strauch (biker in 1723), Darrell Armstrong (runner in 1128), Doug Deming (skier in 2125), and Ed Heller (snowshoer in 1723) raced their way up the 21-mile, 4,700-foot ascent of Mt. Taylor and then back down again in 3:45:58, competing in the male teams 40-49 age division.

Larry Walker (2110) and his teammate were the second fastest male pair as Pokey Okies, and Pam Walker (2555) helped out at the run-to-ski transition.

Doug Vangoethem (1534) was the 21st overall male and 3rd in his age division. Jason, the Lab Ratitude biker who has competed at Grants seven times, including solo, says: "This is just a great event and a great excuse to go up in the mountains and get some exercise. The people who do it solo are so strong and motivated. I just love working at a place where the people are exceptional in both intellectual and athletic pursuits, and us putting this team of working professionals together and doing that well is a thrill for all of us."

Laptop stays behind as Ron Detry retires after 37 years

By Iris Aboytes

As an explorer scout at the Philmont Scout Ranch, VP Ron Detry (4000) thought to himself, "I could live here." About 10 years later, he was back, but this time he returned as a Sandian.

Ron was the head resident advisor at Illinois Institute of Technology when Frank Dean, a good friend who worked at Sandia, sent him some literature to hand out to the best graduate students. He kept one for himself. Three months later he came to Sandia for an interview and got the job. He had not completed his dissertation; he had not even started it. That was a problem, but Sandia waited.


FAYE AND RON DETRY

Sandia's appeal came in a basket filled with a variety of work, 24 days of vacation, and highly talented people.

The Eagle has landed

Ron arrived at Sandia on July 21, 1969. It is still fresh in his mind; he and his family went to Sandia Crest the Sunday before he started. "The eagle has landed," they heard. Neil Armstrong and Buzz Aldrin had landed on the moon.

Ron worked in the applied mathematics department within the computing organization and became its manager in 1973. He was familiar with the work; his challenge was to learn about management. In later assignments, he managed areas in which he did not know the technology — that was a bigger challenge. The biggest challenge came when he became manager of *two* centers with *two* bosses. One center was in New Mexico and the other in California.

During this period, Ron was also charged with consolidating the two supercomputer centers into the New Mexico location, a very emotional change for the Sandians in California. He would fly into New Mexico and then back to California every week, working long hours on both ends. He thought he was handling the workload really well until Faye, his wife, told him his son Rich asked her why dad did not laugh anymore.

I have a problem saying 'no'

Ron returned to New Mexico as Executive Staff Director and is currently VP of Security & Information. He says he is a VP because when then-Executive VP Joan Woodard called he answered the phone. "I have a problem saying 'no,' " says Ron.

"When we needed leadership in the lab for security, Ron said yes, showing again his selfless dedication to service and to our nation's security," says Joan. "He is one of my very favorite people. He brings wisdom and a very thoughtful perspective to almost every topic. I will miss him tremendously."


THE DETRY FAMILY

"Ron is without question an example of exceptional service in the national interest at its finest," says President and Labs Director Tom Hunter. "He has been an essential member of the Laboratory Leadership Team for many years. His leadership has been a critical part of our evolution into modern scientific computing, our operations in California, our role in nuclear weapons, and our commitment to security at Sandia. He has been the articulate champion of many efforts that have made us a better place. We will miss him for what he has done and, as importantly, for who he is. He has made us all better. Ron, we thank you."

Maybe he will buy me a rose

In his letter announcing his retirement, Ron says, "I made a commitment to my wife Faye over a year ago that I would retire no later than the end of March 2007, and that time is approaching. She has waited patiently for 42 years; I want to give her a much larger share of my time."

"He has been married to me for 42 years," says Faye. "He has been married to Sandia for 37 years. It will be great going on vacation. It will just be the two of us. For a while it has been the three of us, Ron and me — and his laptop. Ron doesn't turn on his cell phone, so it was on my phone that he would receive his business calls on our vacations. Imagine not having to plan everything 18 months ahead of time to work around his calendar."

"Maybe he will buy me a rose. Maybe he will open a door for me," Faye quotes lyrics from a Kenny Rogers song about a man who worked hard. "These are the little things I need the most in my life." (She adds that he actually *does* open the door for her!) "Ron is a man of integrity who is very, very kind," she says.

Ron's friend Frank attended Illinois Institute of Technology. "There were us mortals," he says, "and then there was Ron. He is good at everything. He is an excellent photographer and skier. Faye was very active in the Garden Club, and he would participate in their skits. He can also artistically carve a mean watermelon. We took him hunting and told him to sit down and wait. Sure enough, a deer ran up to him and he shot it. He thought it was too easy, so he took up bow hunting, but called it bow hiking. "

Ron says he has no great plans, but knows it will include enjoying and learning from his four grandchildren — Natalie, 13; Conor, 11; Anna, 7; and Olivia, 5 — the children of his son Rich and daughter Deb. Anna would like him to take her to Cliff's Amusement Park. Olivia wants him to go snowshoeing with her. He will also spend time with his 94-year-old father in Wisconsin (see *Lab News* Oct.13, 2006). "I will have an opportunity to reacquire patience," he says. "I would like to regain it permanently. Once it all settles, I know I will be helping people."

"That was OK, my dad did"

Deb says she thinks her father will need a long period of adjustment. "He has worked many hours for a long time," says Deb. "As a child my dad came home on time after work. He would help us with our homework and after we were tucked in bed, he would go back to work. In high school, he would show me how to do my math and I would go show all my friends. My math teacher did not explain math in a way I understood. That was OK, my dad did."

"My dad attended all my baseball games and helped me with my homework even when he had something really important going on at work," says Rich. "As a kid, I enjoyed family days, and the guard boxes going into his office made a big impression on me. I thought they were cool and mysterious. When I started working at Sandia in 1993, it was wonderful when I first walked into his office, not just as his son, but also as his peer. People often ask me if we are related. When I tell them I am his son, I see respect in their eyes. Everyone has a story of something helpful, thoughtful, or special my dad has done for them."

Looking back at my career . . .

"In James Autry's book, *Confessions of an Accidental Businessman*, the following could have been written by me," says Ron.

"I worked hard but was surprised every time I was promoted . . . a series of surprising decisions of my bosses followed by a lot of scrambling and self-education . . . Looking back at my career . . . I understand the overall lesson: We frequently underestimate ourselves, we frequently know more than we think we do, and our instincts and judgement are more reliable than we think.

"The commitment to act beyond ego — to recognize when we are in denial, to retain humility, to correct our mistakes, and to learn from others regardless of their so-called status — is the commitment to grow personally and spiritually through the work we have chosen to do."

"These words have made me stop and think more than once," says Ron.

"I will miss the people at Sandia," he says. "It is hard to imagine a better set of people — the caliber, nature, and philosophy.

Ron and Faye enjoy country and western dancing and like to follow Syd Masters and South by Southwest, two local country bands, so he says he will keep doing that. Deb says her parents are groupies.

On March 30, Ron will leave his office, count the 31 traffic lights back to his home and do what a Syd Masters song says — find the ones he loves.

PERSONAL MISSION STATEMENT

As husband and parent, I will provide for the material, emotional, and spiritual needs of my family. I will try to avoid domination and will encourage the personal growth and independence of my wife, daughter, and son.

As a grandparent, I will spend time with the children of my children, helping them experience life and develop in their unique ways while drawing wonder and enjoyment from them.

As a child, I will return the love my father has given me by helping make his remaining years comfortable and fulfilling.

As a boss, I will improve my organization by investing my time and energy in the technical and personal development of its members.

As an employee, I will use all my knowledge, skill, experience, and energy for the benefit of my employer. I will support the goals of my boss unless such action would conflict with my values, in which case I will openly discuss my reservations and reasons for them.

As a neighbor and friend, I will accept others as they are in their wondrous diversity, and will strive to know the feelings of their lives as well as the facts.

As a child of God, I will live my life as though I am the only Gospel my neighbors will ever read.

To accomplish all this and because I am also a person of intrinsic worth, I will invest in myself as well. I will care for my physical health, and each year will learn something new and visit somewhere new so as to become someone new.

And, in the spring of each year, I will rewrite my Mission Statement so it may bloom again and draw attention to the many colors of my life.

Ron Detry, April 28, 1992

Last revisited Feb. 20, 2007


RON ON THE SLOPES at Taos Ski Valley.