Sandia scientists spend year developing computer model of Iraq surface water and related systems

MARSH ARABS poling a traditional mashoof in the marshes of southern Iraq. The Marsh Arabs, or Ma'dan, dwell in the marshlands of the Tigris-Euphrates system in the south and east of Iraq and along the Iranian border. A Sandia team has been working with Iraqi scientists to develop a model of the nation's surface water systems. (Photo courtesy of US Army Corps of Engineers)

Task done in collaboration with Iraqi engineers and modelers

By Chris Burroughs

In an effort aimed at building technical capacity, resource sustainability, and regional stability, a team of Sandia scientists spent the past year working with engineers and modelers from Iraq to build a computer model of the country's surface water and related systems.

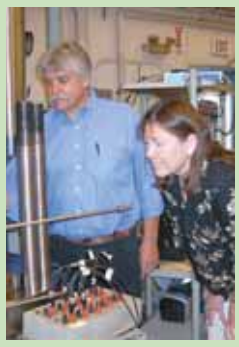
The model, aimed at assisting a longer-term national water and land planning effort by the Iraqi government, includes transboundary flows from Turkey, Syria, and Iran, along with agriculture, municipal and industrial uses, salinity, and restoration of the ecologically sensitive and culturally rich Mesopotamian Marshes in the south.

"The Iraqis recognize very clearly that the long-term stability and security of their country depends on the availability of fresh water for agriculture and for municipal and industrial uses," says Sandia researcher Howard Passell (6313). "We are grateful to have the opportunity to help."

The project, funded by the US Department of State's Iraq Transition Assistance Office, included three five-day workshops over the past year. It culminated in early June with a meeting in Istanbul of all the project participants and a pressure-packed demonstration of the model by the Iraqi engineers to three of their direc-

(Continued on page 5)

Inside . . .



Sandia LabNews

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Sandia National Laboratories

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DOE submits Yucca Mountain license application to NRC

Application marks culmination of 20-plus year effort

By Bill Murphy

After a rigorous science and engineering effort of more than two decades, DOE on June 3 submitted a license application to the US Nuclear Regulatory Commission seeking authorization to establish at Yucca Mountain, Nev., the nation's first repository for spent nuclear fuel and high-level radioactive waste.

The 8,600-page application, backed by more than 200 key supporting documents and some 3.6 million supplemental documents, details DOE's plan to safely isolate spent nuclear fuel and high-level radioactive waste at the remote Yucca Mountain site. The license application submittal was accompanied by a Final Environmental Impact Statement.

Currently the nation's spent fuel and high-level nuclear waste is stored at 121 temporary locations in 39 states — and more waste accumulates every day at the nation's commercial nuclear power plants and other nuclear facilities.

"This material is directed to go to Yucca Mountain by law and even more than that, I believe that we have a responsibility to future generations to deal with this waste problem on a permanent, not temporary basis," DOE Secretary Samuel Bodman said at a news conference on the day of the license application submittal.

Early in his statement, Bodman expressed confidence in the quality of the sci-

(Continued on page 4)

Changes coming to various workforce policies

By Julie Hall

CHANGE @ SANDIA

A number of policy changes are coming down the pike this fall that will affect various groups of Sandia members of the workforce: nonrepresented limited-term employees, staff augmentation contractors who are vested former Sandia employees, and foreign nationals.

The changes are part of a comprehensive review and update of Sandia's workforce management practices as the Labs strives to become more efficient and cost effective. Additionally, these changes are designed to improve the management practices of the Labs' workforce, positioning Sandia for future needs. (Other changes regarding Sandia's strategic sourcing and promotion to exempt staff will

(Continued on page 4)

Research aids understanding of retrovirus transmission between human cells

How to form lipid nanotubes, simply and easily

By Neal Singer

Under the right conditions, nanotubes may form between human cells with surprising ease, Sandia researchers have found.

The tunnel-like structures have been recognized only in the past few years as tiny but important bodily channels for the good, the bad, and the informational.

"Lipid nanotubes provide a vast array of functions

(Continued on page 5)

SANDIA RESEARCHER Carl Hayden in his laboratory. (Photo by Randy Wong)

$4 gasoline makes bus, train commuting options a no-brainer

THE BUS IS COMING — Sandia commuters get off a city bus in front of Bldg. 800. The number of Sandians riding the bus to work has increased dramatically over the past year. Read about Sandia's new commuter culture on **page 7.** (Photo by Michelle Fleming)

That's that

Congratulations are in order — big time — for Sandia's Yucca Mountain team. On June 3, DOE submitted the long-anticipated license application to the Nuclear Regulatory Commission to operate Yucca Mountain as the nation's first permanent repository for spent nuclear fuel. As Lead Laboratory for Repository Systems under DOE's Office of Civilian Radioactive Waste Management, Sandia played a central role in the preparation of the critical post-closure performance assessment aspects of the application. The Sandia effort, led on the ground by Andrew Orrell, was truly epic in scale. We have a story about the license application submittal beginning on page one in this issue. In an upcoming *Lab News*, we'll publish a more detailed account of Sandia's Yucca Mountain work.

* * *

And while we're on the subject of congratulations, how about that new petaflop speed record established by the IBM Roadrunner supercomputer at its Poughkeepsie, N.Y., plant? The computer, bound for Los Alamos National Laboratory, marks the latest in an astonishing string of successes of DOE-funded supercomputers.

In the world of big iron, things sure move fast. It wasn't that long ago — in 1996 — that our very own ASCI Red supercomputer shattered the then unthinkable teraflop barrier. One of our headline writers at the *Lab News* dubbed it "the super-duper computer."

With this latest record, a pretty clear trend seems to be emerging. Twenty-two years ago, Cray introduced the first gigaflop computer — that's a billion calculations a second. Eleven years later, we rolled out ASCI Red with its trillion calculations a second, a thousand-fold increase. Now, another 11 years on, we have Roadrunner, with its thousand trillion calculations, marking yet another thousand-fold increase. Experts are talking confidently now about rolling out an exaflop computer by 2019. It'll run a million trillion calculations per second, and Sandia will play a role in preparing for it.

I doubt any machine will ever match ASCI Red's record of staying at the top of the supercomputer heap for four years. These days, supercomputer bragging rights have a half-life measured in months, or perhaps a year or two (think Lawrence Livermore National Laboratory's BlueGene/L system). I think of that moment in the movie *Patton* where the colorful general (masterfully played by an Oscar-winning George C. Scott) describes for an aide the scene of a Roman triumphal parade: "A slave stood behind the conqueror, holding a golden crown, and whispering in his ear a warning: that all glory is fleeting."

Boy, that's sure true in the supercomputer arena.

* * *

Are you riding the bus to work yet? It's almost getting to the point where there are two kinds of Sandians: those who ride the bus now and those who will ride the bus later. Our page seven story about commuting options paints a pretty evocative picture of what it's like to get to work in something besides your own car. Anyhow, when I read about how a lot of the city buses serving Sandia and Kirtland Air Force Base are now running with standing-room only loads, I thought of that line from *Jaws* (I guess I'm in a movie-quoting mood today): "You're gonna need a bigger boat."

Well, we're gonna need a bigger bus — or, more likely — several bigger buses.

See you next time.

— Bill Murphy (505-845-0845, MS0165, wtmurph@sandia.gov)

Sandia LabNews

Sandia National Laboratories

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2008 Lab Director's Awards recognize efforts to boost Sandia's small business relationships

The 2008 Lab Director's Awards, which recognize project and program managers who excel in the utilization of small regional suppliers, were announced at an award ceremony and reception at the Albuquerque Marriott.

The 2008 award winners were recognized for their efforts in developing a new Pulsed Power Operations contract, creating a new Opportunities website for small business interactions, leading the effort to recompete the Labs' staff augmentation contract relationships, and

RECIPIENTS of the 2008 Lab Director's Awards, which recognize excellence in fostering Sandia's small business activities, pose with Sandia Deputy Labs Director Al Romig (center) and Sandia Site Office Manager Patty Wagner (right of Al). (Photo by Bill Doty)

training Sandia contracting representatives (SCRs) in use of the Opportunities website.

The Supplier Community Advisory Council (SCAC) recommended the establishment of these awards in 2001. The 2008 winners and their categories are:

Diana Baca (10241) was honored in the Regionally Procured Products and/or Services category for her work developing the Pulsed Power Operations contract. A competitive procurement contract was awarded to a small New Mexico business for all pulsed power operations in Tech Area 4 for five years.

In her role as the Sandia contracting representative, Diana wrote the Procurement Action Summary supporting the chosen contractor that was submitted to NNSA for review and approval. She took the lead in defining and defending Sandia's selection to NNSA. The process took more than six months to complete.

Fred Romo (10242) was honored in the Innovation in Small Regional Business Procurement category for his leadership in the Staff Augmentation Recompete contract process. Sandia recently announced the successful bidders on these contracts. All three companies are small businesses and each is either headquartered in Albuquerque or maintains an Albuquerque office. Fred served as the senior Sandia contracting representative for this contract. Several labs in the nuclear weapons complex, as well as several companies in the private sector, are benchmarking Sandia's solicitation approach as a best-in-class model.

Anne Rimbert (10245) was honored in the Sandia Staff Advocate category for excellence in leading Sandia contracting representative training for the newly developed Opportunities website. Anne was one of five SCRs who were part of a larger team to review, analyze, and develop an improved source request process. The delivered end product — the Opportunities website — changed how SCRs conduct their business. Anne volunteered to lead all internal training efforts on the new process and organized and conducted training sessions with every buying organization.

The Source Request Process Team was honored in the Sandia Team Advocates category for developing a website and noteworthy sourcing process that replaced and dramatically streamlined an outdated paper process. As an outcome of a Lean Six Sigma event, an Opportunities website was created to enable small businesses to learn about upcoming Sandia procurement opportunities. The new and revised process can be accessed by any small business 24/7.

Nora Armijo (10222) received the first-ever Career Achievement Award for her demonstrated and sustained support of Sandia's small business programs. Nora has made significant contributions to Sandia's supply chain for more than 25 years and has a long-standing track record as a major contributor to Sandia's small business programs.

Each year, Sandia presents the Community Award to a leader for his or her commitment to and support of small business in the regional economy. This year the award was presented to **Natalie Carter**, who represented the Albuquerque Hispano Chamber of Commerce on the SCAC and now serves as the marketing manager for Enerpulse Inc.

Among those in attendance at the awards ceremony were Labs Deputy Director and Acting Chief Operating Officer Al Romig, NNSA/Sandia Site Office Manager Patty Wagner, Sandia Chief Financial Officer Matt O'Brien, and US Small Business Administration representative John Woosley.

Roderick Whitney honored for volunteer work

By Patti Koning

Recently Roderick Whitney (8948-1) received what he thought was an ordinary manila envelope through interoffice mail. Turns out it was a notification from Lockheed Martin that he'd received the President's Volunteer Service Award — as in president of the United States. A letter from President George W. Bush thanked Roderick for his service, noting that "through service to others you demonstrate the outstanding character of America and help strengthen our country."

While Roderick says the award was a complete surprise, it's less of a shock to those who know him well. Over the past year he volunteered 440 hours, primarily for an organization called DeafHope (www.deaf-hope.org), of which his wife Jane was a founder and now serves as legal counsel.

RODERICK WHITNEY and his wife Jane at "A Glimmer of Hope," a fundraiser for DeafHope.

"Rod is very deserving of this award. He believes strongly in volunteering and has dedicated countless hours of his time to DeafHope and other organizations that are close to his heart," says Jane Ann Lamph (8948), Roderick's manager.

Both Roderick and his wife are hearing-impaired. At around age three, Roderick experienced a high fever that damaged some of his hearing nerves. Hearing loss also runs in his family.

In 1987, Jane's closest friend and the friend's mother were killed by an estranged boyfriend. As Roderick explains, "This prompted her and her colleagues to form DeafHope from the ground up to help unfortunate deaf women and their children into fortunate and better lifestyles. I am there to help Jane's and DeafHope's dreams."

The organization's mission is to end domestic and sexual violence against deaf women and children through empowerment, education, and services. DeafHope's executive director, Julie Rems-Smario, who is also one of the founders, says that in her experience, deaf women do not seem to experience domestic violence at a higher rate than hearing women. "But deaf women definitely experience more barriers, so they are at greater risk," she says.

The core of DeafHope's services is a 24-hour hotline. Individuals in crisis can use email to send a message to the pagers of advocates who typically respond within 20 minutes. The organization also provides advocacy on behalf of victims, support groups, art therapy for children, a parent support group for deaf mothers, outreach to the California School for the Deaf in Fremont and other schools with deaf children, and training and workshops for both the deaf community and service providers.

Last fall DeafHope was featured on *CNN Heroes*, a special report showcasing ordinary people worldwide who have accomplished extraordinary deeds. Rems-Smario was chosen in the "Community Crusaders" category.

Roderick contributes to DeafHope by helping organize events and promotions. In addition to DeafHope, he also volunteers with Clean-up Earth Day, the Middle School Regional Science Bowl at Las Positas College, and the Deaf Community Center in San Leandro.

Roderick has been at Sandia for five years this summer. Using computer-aided design tools, he works as an ECAD/MCAD designer in the Design Definition Group and serves as California site lead librarian for ECAD component parts and MCAD archives.

Capable of doing anything

While being hearing-impaired changes the way he communicates with the outside world, Roderick points out that deaf people are capable of doing anything that hearing people can do, short of hearing sounds. He's taught his coworkers some sign language, and also communicates through pencil and paper, email, and even body language and gestures.

"I have to give credit to Rod. He's never allowed his hearing impairment to be a hindrance to sharing his thoughts and communicating with the team. He's always been very proactive in the area of communication, often using a white board or paper to get his thoughts across," says Ray Ng (8940), Roderick's former manager.

Jane Ann adds that "working with Roderick has made us all more conscious and aware of the importance of our communication styles and how critical it is to be clear and effective in conveying the message we intend — valuable skills to have in any interaction."

The President's Volunteer Service Award was created by the President's Council on Service and Civic Participation as a way to thank and honor Americans who, by their demonstrated commitment and example, inspire others to engage in volunteer service.

Sandia CaliforniaNews

Friends and family share the spotlight at Intellectual Property and Innovation Celebration

By Patti Koning

In April, Div. 8000 recognized inventions and significant accomplishments of the past year at the annual Intellectual Property and Innovation Celebration, formerly known as the Royalty Awards. This year's event went beyond patents, royalties, and licensing by highlighting both the unique accomplishments achieved by Sandians and the support of their families and friends.

ART PONTAU (8750), his wife Donna, and Deborah Robertson-Christman (wife of Randy Christman, 8521) review some of the Div. 8000 work honored at the Intellectual Property and Innovation Celebration.

Bob Oetken (8244) spoke about "Innovation in the California Weapons Program," followed by Anup Singh (8321), who addressed "Defending the Nation in a Changing World." Blake Simmons (8755) shared his insights on "Renewable Energy at Sandia: Past, Present, & Future."

One of the evening's goals was to help the guests better understand the work that goes on at Sandia, something that can be difficult given the secure environment.

"I feel awkward standing outside of the fence talking about the weapons program," said Bob.

Div. 8000 VP Paul Hommert presented three special awards. The first went to Jim Miller (8353), who was honored last year with a Festschrift issue of the *Journal of Physical Chemistry* and the Bernard Lewis Gold Medal from the Combustion Institute. A Festschrift is a book honoring a respected academic, usually to mark an anniversary, retirement, or notable achievement.

In this case, the entire issue was a collection of articles submitted by combustion chemists to honor Jim's long and productive career.

Paul next recognized Dahv Kliner (who recently left Sandia) and Jeff Koplow (8368) for their work on the mode-filtered fiber amplifier. This breakthrough technology received the Editors' Choice Award for Most Enabling Technology at the 2007 R&D 100 Awards ceremony.

Ernest Friedman-Hill (8962) and Craig Smith (8529) were honored for receiving the Federal Laboratory Consortium Award for Excellence in Technology Transfer for Jess®, the rule engine for the Java™ system. Howard Hirano (8960) accepted the award on their behalf.

"I get to talk about Sandia at a lot of places with a lot of people, and the response always is 'Wow! I didn't know you did that,'" said Paul. "You all should be pretty proud. But we also owe thanks to the family and friends who endure a lot of travel and stress. As the nation struggles with the importance of science and technology, your support is invaluable."

DOE Office of Science undersecretary Ray Orbach visits Sandia/California

RAY ORBACH (center), DOE's undersecretary for science, pauses with Sandia staff and management during a visit to Sandia/California on May 29. Orbach received briefings on current science research at the site, including fuel cell studies and the growth of multilayer ice films. In addition, Paul Hommert (8000), Rick Stulen (1000), and Terry Michalske (8300) engaged Orbach on current activities at the Combustion Research Facility and Sandia's ideas on the transformation of the laboratories. In the photo, from left to right, are Paul Hommert, Mark Linne (8353), Andy McIlroy (8350), Orbach, Terry Michalske, Norm Bartelt (8756), and Konrad Thuermer (8756). (Photo by Daniel Strong)

Workforce changes

(Continued from page 1)

be covered in the *Lab News* at a future date.)

Nonrepresented LTE changes

A significant policy change affecting Sandia's approximately 230 nonrepresented limited-term employees will go into effect Oct. 1. The change will limit the length of time that nonrepresented LTEs can be employed at Sandia from a current maximum of up to six years to a maximum of up to two years.

Nonrepresented LTEs who are on roll prior to Oct. 1 may have up to two years of additional service starting from the Feb. 1, 2009, cost-of-living adjustment and renewal date and still subject to the current six-year maximum employment period. Consequently, current LTEs may remain at Sandia — contingent on ongoing business needs — until Feb. 1, 2011. However, if their six-year anniversary date occurs before Feb. 1, 2011, they will be released at the earlier date.

"The LTE job classification was created in the early 1990s to address temporary staffing needs in the line. This change reaffirms the purpose of work performed by LTEs as short-term and temporary in nature," says Chuck Maheras, manager of Staff Planning, Hiring, and Relocation Dept. 3554. "The changes are designed to restore it to its original intended purpose."

The changes are designed to more rigorously align the type of work with the appropriate type of member of the workforce, whether it be a regular employee, LTE, or contractor, he says.

LTEs with questions about how this change affects their vesting status should call the Health, Benefits, and Employee Services hotline at 505-844-HBES (4237).

Hours limitation for vested former employees

Another policy change effective Oct. 1 reduces the maximum number of hours that can be worked by staff aug contractors who are vested former Sandia employees. The current maximum of 800 hours annually will be reduced to 600 hours during a rolling 12-month period. Other changes to this policy include:

• A 90-day break in service will be required between the time an employee leaves Sandia and returns as a staff aug contractor. Under current policy, a break in service is not required, but limitations are placed on the number of hours worked annually depending on the length of break that occurred.

• Vested former employees may work a maximum of two years as staff aug contractors. Current policy does not place a limit on length of service.

• The provision that limits the hours a vested former employee may work applies to all vested former employees, regardless of the length of time separated from Sandia.

CHANGE @ SANDIA

Note that those who met the seven-year separation criteria under the current policy, and therefore have no limitation on hours worked or period of performance, are not impacted by these policy changes.

Sandia employs about 125 staff augmentation contractors who are vested former employees. These changes should facilitate knowledge transfer from retiring Sandians and allow movement of remaining Sandians into these vacancies.

Should the mission require consultation services from Sandians with highly specialized and unique knowledge, other procurement mechanisms are available.

More information on these policy changes will be forthcoming.

New foreign nationals category

Changes have also been made to Sandia's practices for hiring foreign nationals. A new nonregular classification — Foreign National Interim Technical Staff — has been created for those foreign national employees who qualify and are being considered for hire (pursuant to CPR 300.3.8) into a regular position. The new category will allow foreign nationals to remain on roll until hiring prerequisites are met, including a counterintelligence investigation and the completion of two years in an LTE position.

Previously, foreign nationals were required to attain US citizenship to be eligible for regular employment, a process that can extend well beyond the six-year cap for an LTE under the current policy.

A committee led by VPs Paul Hommert, Les Shephard, and Rick Stulen reviewed Sandia's current policy and recommended the changes, which were approved by Labs Director Tom Hunter.

"Our foreign national workforce has made significant and critical contributions to Sandia's technical goals," Div. 3000 VP John Slipke wrote in a memo communicating the changes. "The committee believes that hiring foreign nationals as regular employees significantly enhances our ability to attract truly world-class individuals into our workforce and improves our ability to respond to the nation's needs."

One year along, MESA's lean thinking efforts paying off for Labs, customers

By Laura Guedelhoefer (0225)

In the year since MESA began applying Lean Six Sigma principles to its operations, Microsystems Science, Technology, & Components Center 1700 has made notable strides toward becoming a lean organization.

Its lean journey began when the center's leadership, under Director Gil Herrera, called on the LSS corporate office to help the center's personnel become "lean thinkers," with the additional aim of having the center become a model for other science and technology centers.

First up for MESA in its lean initiative was to develop LSS goals that align with center goals. Working with Sandia's lean experts, a Center 1700 team identified a number of goals: cost savings, training of leaders, certification of Black Belts, training of Green Belts, and becoming self-sufficient.

One year along, the center has made measurable progress toward all of its goals. Three Black Belts have been certified and three more are nearly there. These Black Belts mentor and assist more than 80 Green Belts on improvement projects and certifications.

Additionally, MESA's fabrication facility is pioneering a $400,000 cost-savings initiative, including a reduced MEMS touch time. That's the time fabrication staff spend actually working on a MEMS device. When fully implemented, the initiative will decrease MEMS touch time by approximately half, even though there are no standard MEMS products. In a related area, the time it takes to deliver a fully customized application-specific integrated circuit, or ASIC, has been cut from four years seven months to one year eight months, roughly a third of the original time.

MESA's fabrication facilities are high-impact and high-cost operations. Like many areas at Sandia it has been tasked to reduce costs while maintaining quality and customer satisfaction. To meet the new requirements, it was clear that new efficiencies had to be found, project times reduced, and overall cost lowered.

Those were the conditions on the ground when MESA turned to Sandia's LSS organization. It was a good move, says Gil. Not only is LSS helping MESA increase satisfaction by reducing lead times and cost while maintaining quality, he says, it is also helping the MESA team achieve strategic milestones. For example, lean thinking is making a significant impact in MESA's ISO certification application. By leaning out its processes, MESA has simplified acceptance, avoided rework, and identified gaps, bringing it into ISO compliance in preparation for applying for ISO certification in October.

"I'm very pleased with the progress made thus far toward the LSS transformation of 1700," says Gil. "The MESA fab employees are leading the way by using LSS to transform how we manufacture and prototype devices in our heavy fabrication facilities. We will leverage this experience as we learn to apply lean principles to our research and development activities."

Since beginning to apply LSS principles, Gil says, MESA's fabrication personnel have been able to increase the time spent meeting customer requirements by reducing the time spent on things such as defects, rework, or searching for items.

"There has been great progress made in a short period of time," says Gil.

MESA's progress toward implementing LSS has earned it a 2008 ERA Team Award.

For more about LSS, contact Laura Guedelhoefer, Corporate Black Belt, at 505-284-3469 or laguede@sandia.gov.

Yucca Mountain

(Continued from page 1)

ence underpinning the application.

"This application represents the culmination of over 20 years of work by some of our nation's leading scientists, engineers, and technical experts," Bodman said. "Eight of our world-class national laboratories have been involved in conducting the research and analyses that underpin this application, including Sandia National Laboratories, which coordinated the scientific work."

Bodman also cited key contributions from Bechtel SAIC, as well as numerous federal agencies, including DOE's Office of Civilian Radioactive Waste Management, the US Naval Nuclear Propulsion Program, and the US Geological Survey, which conducted studies of the Yucca Mountain site and surrounding areas over several decades.

Sandia has been involved in Yucca Mountain research since the late 1980s. By January 2006, DOE determined that the decades of preparatory analytical and design work were sufficient to demonstrate compliance with the performance standards in 10CFR63 (NRC's detailed site-specific regulation regarding Yucca Mountain) and decided to move forward with the formal license application as required by law. To advance that process, DOE's Office of Civilian Radioactive Waste Management turned to Sandia to serve as Lead Laboratory for Repository Systems. (The role is similar to the Scientific Advisor role Sandia played in the successful Waste Isolation Pilot Plant application process.)

Defensible before NRC

In its lead lab role at Yucca Mountain, Sandia was responsible for integrating the post-closure performance assessment and scientific/technical basis, and the corresponding sections in the License Application Safety Analysis Report.

"From the outset, our mission goal has been to produce the scientific technical basis that is credible with our peers, defensible before the NRC, and respected for the integrity of the people who created it," says Andrew Orrell (6780), who has headed up Sandia's Yucca Mountain efforts as the Lead Laboratory for Repository Systems.

DOE, says Andrew, "has supported its mission by enabling us to bring the leadership necessary to create a credible and defensible license application, and providing us with sufficient resources to perform the job to the high standards set by the NRC."

In his news conference, Bodman tied Yucca Mountain to the nation's energy security, stressing that approval of the repository will encourage the expansion of nuclear power in the US. Such an expansion, Bodman said, "is absolutely critical to our energy security, to our environmental health, and to our national security.

"If we are to meet growing energy demand and slow the growth of greenhouse gas emissions, nuclear power must be a larger part of our energy mix . . . In order to ensure that such an expansion can occur, the US simply must have a permanent repository for the disposal of spent nuclear fuel and high-level radioactive waste."

An end and a beginning

The license application submittal is both an end and a beginning: It marks the end of the two-plus decades of the basic research into the suitability of the site as a waste repository. It marks the beginning of the process in which DOE makes its case before the NRC that the site is, in fact, compliant with the safety and performance standards set in the law. The NRC will conduct an initial review of the license application to determine that it is complete and correctly filed. That process will take approximately three months. Then, assuming NRC formally accepts the application, it will spend the next three years in a detailed technical review culminating in acceptance or rejection of the application.

"We are confident," Bodman said, "that the NRC's rigorous review process will confirm that the Yucca Mountain repository will provide for the safe disposal of spent nuclear fuel and high-level radioactive waste and will be protective of human health and the environment now and into the future."

In addition to Sandia, other DOE labs that have been involved in the Yucca Mountain work over the decades have included Los Alamos, Lawrence Livermore, Lawrence Berkeley, Oak Ridge, Argonne, Idaho, and Pacific Northwest national labs.

An upcoming *Lab News* article will detail Sandia's role as lead lab in the Yucca Mountain license application process.

Iraqi water

(Continued from page 1)

HOWARD PASSELL gives a presentation at the final water modeling workshop in Istanbul in early June.

tors from the Iraq Ministry of Water Resources (MoWR). The participants included the Sandia team of Howard, Jesse Roach, and Marissa Reno (all 6313), four engineers from the MoWR, a State Department contractor from the US embassy in Baghdad, and a water program manager from UNESCO. Sandia contractor Geoff Klise and Labs researcher Vince Tidwell (both 6313) also helped on the project in Albuquerque.

Jesse says the best part of the project was watching the Iraqi engineers and modelers become engaged in the modeling process, a growing engagement that became apparent as the project unfolded. Jesse was the lead modeler in the project.

"Our approach was to build the computer model in a collaborative fashion with the Iraqis," he says. "We could have built it for them and then handed it over, but we wanted them to have ownership — to understand how the model went together and how it works. At the end of the third workshop, our Iraqi colleagues presented the model to three high-level Iraqi MoWR officials. They presented it entirely in Arabic, explained how it worked, and answered questions about everything from input data to the scenario runs they were demonstrating. It was a powerful moment in a very successful capacity-building project."

The model was built in a commercially available system dynamics (SD) modeling platform called Studio Expert, produced by Powersim Inc. It features short run times, user-friendly interfaces, and real-time graphical output. The 6313 staff have used the SD platform for years in collaborative, multistakeholder settings as a way of helping collaborators understand the complexities of their resource systems, identify data and information gaps, and evaluate competing resource management strategies — often in group settings, Howard says.

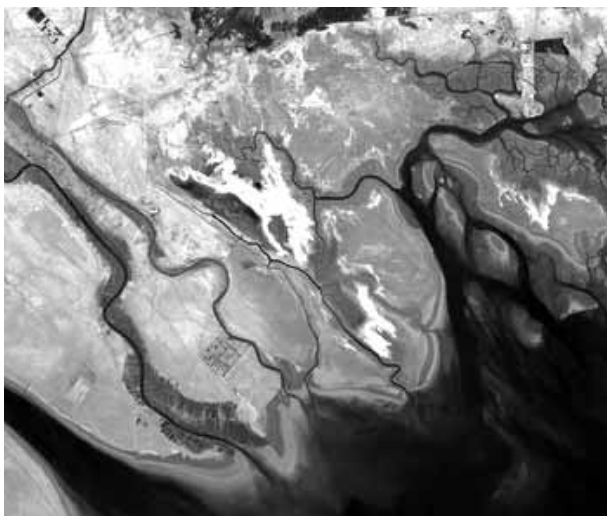
Over the years the 6313 team has blended this technical/social approach — bridging science and policy — to help decision makers with water, energy, and food resource management problems in New Mexico, the US, and internationally. They have used the approach in one form or another and have engaged scientists and engineers from more than a dozen countries, including Turkey, Syria, Iraq, Libya, Jordan, Japan, and four Central Asian republics.

The first two workshops in the Iraq project took place in Amman, Jordan, in November 2007 and February 2008. The initial workshops focused on helping the Iraqis learn to use the software and think about how the different systems associated with their resource issues were interdependent and interconnected.

By the time of the second workshop, the Sandians — with data and other information from the Iraqis — built a first draft of the model. The Iraqis used their growing skills to also build part of that model.

One of the critical drivers in the model is the flow of water from the headwaters of the Euphrates and Tigris rivers in Turkey through Syria to Iraq. The transboundary nature of the water resource adds a critical wrinkle in Iraqi efforts at water management.

"Surface water in Iraq is affected by infrastructure development and water operations in upstream countries," says Marissa, who built the transboundary module in the model. "Historically, Turkey and Syria were not major water users, but now both countries have developed the capacity to store and use more, and that is a major concern to Iraq."



THIS NASA PHOTO shows the delta region of the Tigris-Euphrates river system in Iraq. A team of Sandia researchers worked with Iraqi scientists to develop a computer model of Iraqi water resources.

Just as Iraq is at risk as the downstream user in the Tigris-Euphrates system, so are the Mesopotamian Marshes at risk as the downstream user in Iraq. Labeled by some as the original Eden and populated still by the ancient Marsh Arab culture, the southern marshes once covered about 8,000 square kilometers. They are a crucial freshwater wetland ecosystem in the Arabian Gulf region. Water uses upstream have gradually reduced the area of the marshes. Saddam Hussein partially drained them in the 1990s when his enemies hid there, and they are threatened by increasing upstream water use in the future. Now they cover about 5,000 square kilometers.

"The marshes, which are culturally, historically, and economically rich and diverse, have started to dry out — partly by accident and partly by design," says Geoff, the team member who built the marsh module. "We modeled how they might be restored, looking at flows, reservoir operations, and changes to agriculture, to see how these might affect marshes downstream."

New funding for phase two of the project is expected in July.

TEAM MEMBERS: Howard Passell, Jesse Roach, Marissa Reno, Geoff Klise, Vince Tidwell, Ray Finley (all 6313)

Iraq water facts

The Tigris-Euphrates river basin covers about 766,000 square miles and includes the countries of Turkey, Syria, Iran, and Iraq. It is home to more than 44 million people. Increasing population is expected to place even greater pressure on water resources in the basin.

Nanotubes

(Continued from page 1)

that could greatly impact our approach to treating infection and in understanding how cells respond to pathogens," says Darryl Sasaki (8331) of Sandia's Bioscience and Energy Center.

"Our work is the first to show that the formation of nanotubes is not complicated, but can be a general effect of protein-membrane interactions alone."

Understanding how cellular nanotubes form has become important to medical science over the past few years because of the discovery of what they transport. They seem to serve as routes that protect retroviruses and bacteria as they pass from diseased cells to healthy ones — a fact that may explain why vaccines do poorly against certain invaders. Conversely, the nanotunnels also seem to help trundle bacteria to their doom in the tentacles of microphages. Lastly, the nanotubes may also provide avenues for cells to send and receive information (in the form of chemical molecules) from cell to cell far faster than their random dispersal into the bloodstream would permit.

Given the discovery of this radically different transportation system operating within human tissues, it was natural for researchers to attempt to duplicate the formation of the nanotubes. In their labs, they experimented with giant lipid vesicules that appeared to mimic key aspects of the cellular membrane.

Giant lipid vesicules resemble micron-sized spherical soap bubbles, with the inner side hydrophobic and the outer side hydrophilic.

The object for experimenters was to create conditions in which the spheres would morph into cylinders of nanometer radii.

But researchers had difficulties, says Darryl, perhaps because they used a composite lipid called egg PC that requires unnecessarily high energies to bend into a tubular shape.

RESEARCHER CARL HAYDEN (8353) positions a lipid nanotube sample on the spectrally and lifetime-resolved confocal imaging microscope. (Photo by Randy Wong)

Egg PC is inexpensive, readily available, and offers good, stable membrane properties. It is the usual lipid of choice in forming nanocylinders via mechanical stretching techniques.

But Sandia postdoctoral student Haiqing Lui (8331) instead used POPC — a single pure lipid requiring half the bending energy of egg PC.

She was trying to generate nanotubes by a completely different approach that involved the use of motor proteins to stretch naturally occurring membranes into tubes.

Working with George Bachand (8331), she serendipitously found that interaction of the POPC membrane with a high-affinity protein called streptavidin alone was enough to form the nanotubes.

"Perhaps this information — linking membrane-bending energy with nanotube formation — may provide some clue about the membrane structure and the cell's ability to form such intercellular connections," Darryl says.

The formation was confirmed by Carl Hayden (8353), who characterized the nanotube formation through a confocal imaging microscope. The custom instrument allows pixel-by-pixel examination of the protein interaction with the membranes comprising the nanotubes by detecting the spectrum and lifetimes of fluorescent labels on the proteins.

Nanotube formation had been noticed previously by cell biologists, but they had dismissed the tiny outgrowths as "junk — an aberration of cells growing in culture," says Darryl. "The reason they were only noticed recently as trafficking routes is because of labeling studies that marked organelles and proteins. This allowed a focused look at what these nanostructures might be used for."

It became clear, says Darryl, that the organelles were being transported with "specific directionality" on the backs of motor proteins within the tubes, rather than randomly.

Three-dimensional networks of nanotubes also are found to be created by macrophages — part of the police force of the body — grown in culture, says George. The tubes in appearance and function resemble a kind of spider web, capturing bacteria and transporting them to the macrophages, which eat them.

Other paper authors include postdoc Hahkjoon Kim (8353) and summer intern Elsa Abate (8331).

The lipid work is supported by Sandia's Laboratory Directed Research and Development office. Motor protein work is supported by DOE's Office of Basic Energy Sciences.

Results were published in the American Chemical Society's *Langmuir* journal in mid-March.

Solution to high-energy costs could lie underground

Sandia's Georgianne Peek aids Iowa with compressed air energy storage project

By Chris Burroughs

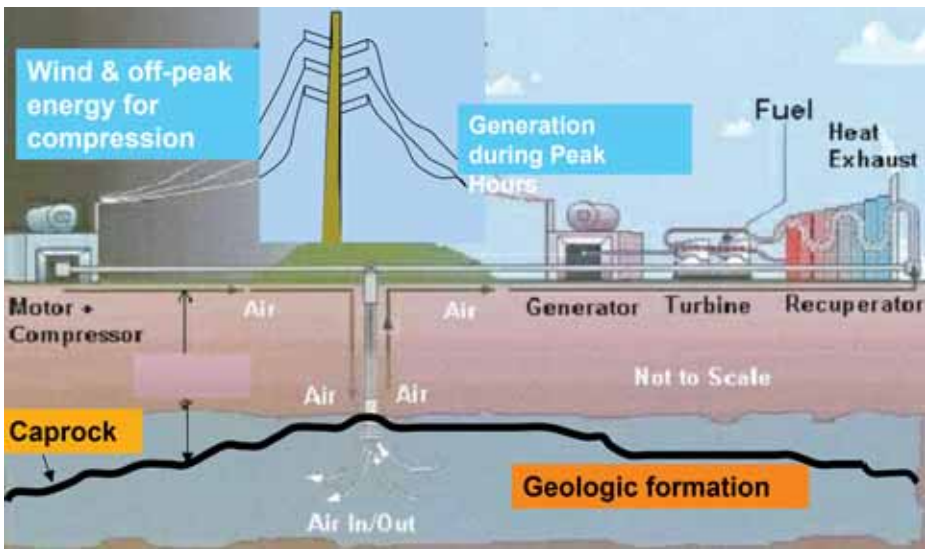
Sandia researcher Georgianne Peek (6336) thinks a possible solution to high energy costs lies underground. And it's not coal or oil.

It's compressed air energy storage (CAES).

"Until recently energy has been relatively inexpensive. But now prices are rising dramatically, and we need solutions," Georgianne says. "CAES and other storage technologies are not the only answer to our energy needs, but they can be an important part of the solution."

CAES facilities function like big batteries. Electric motors drive compressors that compress air into an underground geologic formation during off-peak electric use times like evenings and weekends. Then, when electricity is needed most during high-demand times, the precompressed air is used in modified combustion turbines to generate electricity. Natural gas or other fossil fuels are still required to run the turbines, but the process is more efficient. This method uses up to 50 percent less natural gas than standard electricity production.

While the concept of compressed air energy storage is more than 30 years old, only two such plants exist — a 17-year-old facility in McIntosh, Ala., located about 40 miles north of Mobile, and a 30-year-old plant in Germany, both in caverns in salt domes. A third is being developed near Des Moines, Iowa, in an aquifer. In addition, the Public Service Company of New Mexico (PNM) and several other US utilities are considering CAES to help mitigate potential problems associated with the high proportion of wind generation in their systems.



THIS ARTIST'S RENDERING depicts how energy can be stored during off-peak hours as compressed air in underground geologic formations to be released during peak demand hours.

Iowa project management

Sandia is currently managing DOE money to support the design of the Iowa facility, called the Iowa Stored Energy Park (ISEP). Georgianne is the project manager. Developers include more than 100 municipal utilities in Iowa, Minnesota, and the Dakotas.

ISEP will be a nominal 268 MW/13,400 MWh CAES plant with about 50 hours of storage. It will utilize the abundant wind generation already in Iowa to charge the plant. When ISEP is up and running, it could account for 20 percent of the energy used in a year at a typical municipal Iowa utility and could save cities and their utilities as much as $5 million each year in purchased energy.

Georgianne says the Iowa project is pretty far along and is expected to be operational by 2012.

"One of the most important tasks that has to be done before a CAES facility can be built is to find a geologic formation that will support it," Georgianne says. "ISEP developers are 95 percent sure that they have the right formation, based on the seismic testing at the site, computer modeling, and data from a sister formation."

STEVE BAUER AND GEORGIANNE PEEK look at equipment that will be used to analyze core samples from the potential Iowa aquifer compressed air energy storage site. The data will provide necessary fundamental information used for the design and performance of the underground air storage vessel. (Photo by Chris Burroughs)

Sandia to study core samples

This summer multiple core samples from the potential Iowa aquifer CAES site will be taken and sent to Sandia for analysis by a team led by Steve Bauer (6315). The analysis will include collection and assessment of the geologic, hydrologic, and rock physics data in the geomechanics laboratory. The data will provide necessary fundamental information used for the design and performance of the underground air storage vessel.

In 2000 Steve did similar analysis of rock mechanics of a limestone mine in Norton, Ohio, that was being studied for a potential CAES facility. That project is still under development.

Possible PNM plant

Georgianne says that PNM is also considering building a CAES plant and is exploring possible locations around the state, including locations near existing wind farms that provide service to PNM.

"Wind often blows at night," she says. "As electricity is produced at night from the wind farms, it will be stored and eventually make its way into PNM's transmission lines."

Several Sandia researchers and the Electric Power Research Institute Initiative are helping PNM plan for a CAES facility.

CAES technology development can trace its roots to the early 1960s when evaluation of gas turbine technology for power production began. The technology gained momentum during the next decade due to its promising fuel efficiency and response capabilities to provide load-following and peaking power support.

Now utilities are starting to tie CAES technology to wind power — first with the Iowa plant and soon with a possible facility in New Mexico, Georgianne says.

"The wind blows in some areas when electricity is not needed or where the transmission system can't accept all of the energy," she says. "Storage enables delivery of the off-peak energy that has been saved in storage to be delivered when it is needed most or has the highest value. Thus, more renewable energy can be delivered than might be possible without storage."

'Jumper' image a winner in 2008 MRS 'Science as Art' competition

This image, captured by Geoff Brennecka (1816), won a second place award in the Materials Research Society's popular Science as Art competition at its spring meeting. The image was collected using secondary electrons in a Hitachi S-4700 scanning electron microscope and was colorized in GIMP, an open-source image editing application.

The image resulted when Geoff inserted for study a tantalum oxide crystal in the microscope (when he was a grad student at the University of Illinois). The image, Geoff says, is actually of some contamination (probably monodisperse polystyrene spheres left over from a previous experiment) in the microscope. The polystyrene spheres happened to collect at the corner of the tantalum oxide crystal, resulting in the arresting image that looks like nothing so much as a tiny man about to leap from the edge of a cliff.

Not only was the image featured on the MRS website (www.mrs.org/s_mrs/doc.asp?CID=1803&DID=171434), it was also picked up as a featured item on the popular Wired website.

Says Geoff: "I know a couple of Sandia microscopists cringed when they saw the image, because most of the time dust on your sample (or in this case, leftover gunk from a previous user) is a BAD thing. I ended up submitting it to this year's MRS Science as Art competition on the urging of a few friends, and can't believe how much attention it's been getting (it is essentially just a random collection of dust, after all). I guess it really does prove those old adages about one man's trash being another's treasure and that art is in the eye of the beholder."

Another one takes the bus

Sandians band together to save money and the environment

Photo by Michelle Fleming

Story by Darrick Hurst

It's 5:45 a.m. and while the sun has yet to rise, commuter Jesus Martinez (4225) is about to embark on a marathon of sorts.

"I first walk to the Rail Runner station in Los Lunas, ride the train to the Rio Bravo station in Albuquerque, then take the 222 bus to Sandia," Jesus says. "It's a 41-minute trip, almost the same amount of time it would take me to make the trip in my own car, but with a lot less stress."

As rising fuel costs are putting the squeeze on wallets all across the nation, commuting by alternative transportation is quickly becoming a more popular choice. In the last year alone, commuter assistance coordinators at Sandia have seen increased participation in carpool, vanpool, state transportation programs, and bus pass sales, says Debbie Moore (3332).

"Carpooling increased by 100 new participants this past year. There's new participation in a pilot program for commuting from Moriarty, and SERP and SLFCU bus passes have been selling out," Debbie says.

Seasoned commuters have also noticed the marked increase in new faces on buses and trains.

"There's just been an incredible increase in the number of people commuting to work by bus since March or so," says Kevin Lederer (5996), a Sandian who also commutes by Rail Runner and the 222 bus.

COMMUTERS relax and enjoy the ride aboard the New Mexico Rail Runner Express. (Photo by Randy Montoya)

"When I started taking the Rail Runner and bus in December 2006, we had six passengers on our bus," Jesus says. "Now, we have four full buses on my route. Tuesday morning alone, we had 28 people in standing-room only on my bus [which seats 42 regularly]. Realistically, we're going to need yet another bus."

Increased demand

The increased demand for mass transit options prompted several Sandians to take action and collaborate with local transportation officials to create solutions for commuters who are coming from areas all around the state. The 222 bus route that now serves commuters from the Rio Bravo Rail Runner station to the base, Lovelace, and the VA Medical Center, was the idea of Kevin Lederer and Jesus Martinez, who worked with Lawrence Rael of the Mid-Region Council of Governments to get the route created.

"We used to catch a switchover to a second bus in order to get to Kirtland Base from the Rail Runner," Kevin says. "Jesus and I thought, 'This would be a vastly more popular way to get to work if it we had a more direct connection,' so we approached ABQ Ride and the Mid-Region Council of Governments with a proposed 222 schedule. Two weeks later, the route was up and running."

The city estimates that ridership on the 222 has increased 755 percent since its creation, Rael says.

"We saw that this was a good idea," Jesus says. "We saw that gas is going up in cost, so it was the perfect time to get something established."

The newly created I-40 pilot program that runs from the East Mountains directly onto Kirtland Air Force Base to Sandia was also the result of hard work by a Sandian, Lydia Koch (1542).

When major highway construction was announced for I-40 through Tijeras Canyon, Lydia met with Phil Gallegos of the US Department of Transportation and described that there were at least 187 Sandians who were members of an East Mountains commuting email group she maintains. After insisting that a new bus route that specifically targeted the needs of these people would present an opportunity to ease the strain on traffic flow during this construction period, the commuter program was created.

"I drove around the base and mapped out a route the bus should take," Lydia says. "I met with the DOT and All Aboard America! coach service and presented them with my route idea. They accepted the route and said they would give us two luxury coaches through the duration of the most critical time period of the construction as a pilot program. If ridership is successful, a permanent route will be established."

Promoting the cause of commuting has become a personal passion of those who have opted for the mass transit approach.

"Jesus and I have a personal goal of encouraging 10 percent of Sandia to start taking alternative transportation," Kevin says. "It's a modest goal that has the potential to make a big impact."

Besides being instrumental in creating the 222 route, Jesus and Kevin are now working with the city to get additional buses for routes that are reaching near-capacity. They are also working with the Air Force to consider the creation of an on-base shuttle system, and approached Sandia management about creating a flex spending account for commuting and potentially changing the policy that currently prevents the use of government vehicles in commuting.

"Most of the government vehicles we have on base are either electric or run on alternative fuels," Kevin says. "If we were able to allow employees from outer tech areas to leave a vehicle near the bus stops so they can drive out to where they work, it has the potential to increase environmentally friendly commuting even more."

The cost savings that commuters are seeing from taking alternative transportation are remarkable, says Jesus.

"It costs $50 a month for me to ride the Rail Runner," he says. "Compare that to $47 four times a month filling up a car. I did an analysis with Kevin and estimated that the average savings for a Sandian taking alternative transportation to be about $2,000 annually."

The Rail Runner system has also enabled Sandia commuters to take part in public transportation from communities north of Albuquerque. Approximately 400 Santa Fe commuters currently drive to the station in Bernalillo and ride to work from there, says Kevin.

While such monetary benefits are remarkable, it's not the only factor motivating Sandians to take public transportation, they say.

Environmental concerns

"As commuters, we need to take into account environmental concerns as well," Jesus says. "Considering that public transportation reduces carbon emissions by 600 tons or more for every person who participates, taking the bus quickly becomes one of the best choices we can make for providing our children and grandchildren with a better tomorrow."

"My philosophy is that we're all in this together," Lydia says. "There is some sacrifice involved in taking the bus; it's not your car, after all. Riders have to be at a stop at a particular time and travel according to set routes, but those trade-offs are outweighed by the benefits that we all reap — we're reducing emissions, there's less traffic, and our commute is safer."

"Together, we can have a positive effect on the quality of our commute and make a significant positive impact on the quality of our environment," Kevin says.

Smart Commuters

Kevin Lederer (5996) created the Smart Commuting Options email distribution list to keep commuters using alternative means of transportation — bus, train, bike, walk, etc. — informed about changes, updates, and new services that may affect them.

"The email list works a bit like a blog," Kevin says. "People can submit questions to the list and have their questions answered by people who may already have experienced a particular commuting route, or other times we use the list to get the most up-to-date commuting information out quickly."

Anyone can subscribe or unsubscribe to this list at any time by following the steps below:

Everything in the email must be in lowercase letters.

1. Send an email to majordomo@sandia.gov
2. Leave the Subject line blank.
3. In the body of the message, add the following: subscribe smartcommutingoptions "put your email address here" (do not include the quotation marks)

If done correctly, subscribers will receive a message confirming their addition or removal from the list.

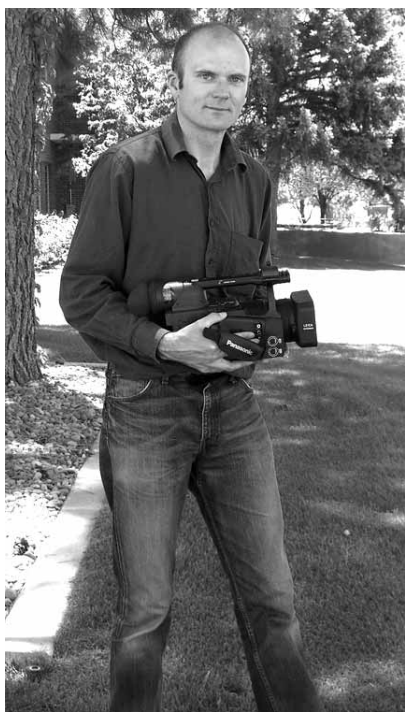
East Mountain commuters maintain an online communication network at https://sharepoint.sandia.gov/sites/East-Mountain Commuters/_layouts/viewlsts.aspx. To join the East Mountain Residents email list, email Lydia Koch at lkkoch@sandia.gov.

French videographer visits Sandia's Z machine

Scientific truth meets artistic truth during production of European Discovery Channel fusion documentary

By Neal Singer

I almost missed the message among the nearly 500 I received the week I was off last November. It was an opening query from one Jacques Bedel [buh-dell'], of whom I had never heard, asking about progress on Sandia's Z machine. Jacques, who is French, wanted to include it in a European Discovery Channel documentary about large machines that might make electrical energy from nuclear fusion. The piece, he later said, stood a good chance of running on the US Discovery Channel as well.



JACQUES BEDEL

Of course Mr. Bedel had my interest. I believe in the eventual utilization of nuclear fusion for energy. All other so-called fusion machines are either still conceptual or still being built. Z was up and running, which meant it would probably receive a pretty fair amount of showtime.

And while Sandia has never been "branded" — the current mot du jour — as a peacetime nuclear fusion laboratory, Z was very close to earning that title.

The X-ray output from its shots is so high that it had compressed a capsule of deuterium several years ago, producing the all-important fusion neutrons that were the first baby steps on the road to useful fusion.

Learning of this and other Z advances, the French press had found in Z a possible competitor to ITER, the world's largest fusion energy test project, located in southern France.

To the amusement of some at Sandia, a highly placed French official had been quoted in a French nuclear magazine to the effect that Z was the American alternative — that the clever Americans never put all their scientific eggs in one basket (the internationally supported ITER) but instead were secretly also backing Z.

Here was a chance, I thought, to have an independent observer show that Z had risen above its already important status in providing key data for nuclear weapons simulations. It could serve as the model for an energy machine that could produce electricity from seawater.

However, there remained many slips, as the saying goes, between cup and lip in getting this hopeful fact demonstrated in a documentary.

After getting some background video material from Al Lujan in Video Services Dept. 3653, I began laying the groundwork for Jacques' several visits to shoot video at Z.

Filling out the complex Foreign Interaction visitor form was not very intuitive, but I had the helpful Melisa Pacheco (4233) on the line to guide me through every step.

And when a wrong computer button somewhere along the security process was pressed after I had completed the form, in error denying Jacques entry to Sandia less than a week before his arrival, Melisa helped correct the problem.

Walking between the raindrops to hit all security requirements, I helped Jacques interview key researchers on the Z project on two trips to Sandia, spaced over several months to meet his schedule.

These included Keith Matzen on the overall direction of Z, John Porter on the dramatic story of Z-Beamlet's removal from Lawrence Livermore National Laboratory and its resurrection (without instruction booklet) at Sandia as one of the world's most powerful lasers, Mike Cuneo's picturesque visualizations of a deuterium target shrinking to achieve fusion, and Mike Mazarakis' rapid-firing LTD (linear transformer driver) devices, imported from Siberia, to make the Z method a contender in producing electrical energy.

Let me not forget Dolores Graham, who weaves the future of Z's fusion shots by hanging hundreds of wires as small as 10 mm in diameter (about 1/7 the thickness of a human hair) that are at the heart of Z's X-ray emissions.

The Sandia researchers, all in all, presented Jacques a vivid picture of Z's potential as a fusion machine.

But talking heads alone do not a fusion video make.

FRENCH VIDEOGRAPHER JACQUES BEDEL strikes a pose after visiting Z.

There remained the question of dramatically presenting the effect of Z's firing to the ordinary viewer.

I was horrified at Jacques' intention to shake the LTD table with a sharp shove to produce a small motion in an oil bath on the table. But at least Mike Mazarakis confirmed that the amount the oil sloshed was approximately what moved when Z actually fired. Given there was no way to predict when an actual shot would happen, at least the sloshing was realistic.

But I drew the line at the idea of a coffee cup falling off a shelf and smashing on the floor. "Are you going to play us for fools?" I said. "This machine has been firing every day or so for years. Who is going to leave a cup teetering on the edge of a table or bookcase close enough for it to tip?"

Also, I pointed out, regulations did not permit food in the device room.

Jacques looked at me and said nothing. Overnight, I saw his point. There was no drama in his video. And his other subjects – ITER, the laser-based LMJ device also in France, and another site in New Jersey – were fusion devices in dream only. Z was the only fully built, functioning machine. We were the only game in videotown. And he wanted to show how powerful the machine was in a simple, vivid way.

"There's a cafeteria housed in a trailer east of Z," I said reluctantly, "with a porch with a fine view your viewers would like. I suppose a coffee cup dropped there could be a legitimate accident."

I hated the idea. But I thought it necessary. And in a form of divine retribution, there was no one around but me to hold the cup, which Jacques, crouching below the porch floor, pulled down from the railing in front of me with a piece of dental floss.

No, it didn't smash. He had insulation on the ground below. He just wanted to film the drop, and we had to do that over and over until it was just right. The smash will happen on a set in France. But at least I learned why movie stars get temperamental. I gave up rigorous insistence on truth for a star's perks. By the fifth "take," I told Jacques, "I'm going into my trailer. Call me when you have it right."

The documentary is expected to air in 2009.

4,000 Sandians attend Safety and Security Fair

2008 theme was 'Safety and Security at Work and at Home'

SANDIA SAFETY AND SECURITY FAIR attendees view exhibitor booths in the Steve Schiff Auditorium lobby. Other exhibits and demonstrations addressing safety and security concerns at home and at work were held outside. (Photos by Bill Doty)

An unusually cool and blustery June day was no disincentive to the 4,000-plus Sandians who turned out for the 2008 Safety and Security Fair in and around the Steve Schiff Auditorium.

The 85 or so vendors, showing off their wares and information at exhibit booths and tables spread throughout two large tents and the Schiff Auditorium lobby, offered an impressive variety of products and services related to the fair's theme: "Safety and Security at Work and at Home."

I NEED A VOLUNTEER — Anita Romero (3651) receives a free acupuncture treatment at the Safety and Security Fair. The treatment is intended to relieve stress.

The codirectors of the fair, Willie Johns and Ernie Sanchez (both 4122), who have worked together on the annual event for four years, have made it a priority to create an event that reaches the whole person, says Willie.

Ernie explains: "When I first got involved in the fair, my idea was to use the Spanish word "seguridad," which literally means both safety and security — they really are one and the same. So, our idea of safety, the message we've been trying to get across, is that safety isn't just about the 'job.' Safety is about work, home, and play. . . . We wanted to bring all these things together and have people look at these things and realize that all of these are issues of safety and security that are critical for them and their families.

"That's been the goal and I think we're beginning to realize it."

Willie adds, "At work when we talk about safety, we often say we want you to be able to go home safely to your family at the end of the day. That's true, but Ernie and I take it a step further: We want you back here tomorrow."

The Safety and Security Fair has come a long way from its origins several years ago when it was held at the Coronado Club. Originally, it was simply the Safety Fair and the exhibits were all Sandia-related. Now, in keeping with its focus on the whole person, the exhibitors come from across the community, offering safety and security information that applies at work and at home.

Willie and Ernie and their team have been working on this year's fair since January. Willie says this year's attendance sets a new record for the fair, something that hasn't gone unnoticed by the vendors. Many exhibitors from the private sector, Willie says, reported that they'd never seen such a receptive and interested crowd at a trade fair.

DIV. 1000 VP RICK STULEN examines power cords at the electrical safety exhibit at the Safety and Security Fair.

With the success of the 2008 Safety and Security Fair to build on, Willie says the challenge for the organizing team is to attract an even larger crowd to the 2009 event.

"It'll be quite a feat to improve on this year's fair," says Willie, "but with our great team, I'm sure we'll be better than ever next year." — *Bill Murphy*

Safety fair team members

Willie Johns, Ernest Sanchez, Sandy Portlock, Sandra Jiron, Whitney Faust, Andy Zeitler, Randy Fellhoelter (all 4122), Fran Armijo, Margret Tibbetts (both 4232), Charles Montoya (4234), Daniel Barela (4021), and Bill Wolf (4136). Additionally, the organizing team was supported by volunteers from Safety, Security, and Facilities.

Mileposts

New Mexico photos by Michelle Fleming

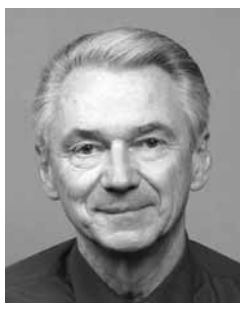
Ronald Glaser
40 6455

Melquiades Salazar
40 2542

K. Wayne Shirley
40 9343

Recent Retirees

David Baldwin
35 5443



Hank Witek
40 2910

Gary Chemistruck
30 3653

Larry Costin
30 6311

Richard Kottenstette
30 1716

Allyn Anderson
25 6452

George Dulleck
32 3932

Estrella Dulleck
34 3654

Kevin Eklund
25 2111

William Filter
25 5713

R. David Foral
25 5415

John Freshour
25 2122

Gregory Mann
25 5338

Keith Almquist
32 241

Jill Miller
25 2554

William Noel
25 5425

Glenn Roubik
25 12343

Edward Russick
25 1821

Dan Schmitt
25 2611

Thomas Zarick
25 1343

Lester Arakaki
20 6418

Billy Black
20 6482

David Denning
20 5715

David Goodnow
20 5625

James Heise
20 5747

Daniel Kettleborough
20 2736

Howard Kimberly
20 5534

Lisa Larkin
20 5761

Lucille Ortiz
20 5343

Jeffrey Rienstra
20 5417

Mark Yee
20 5432

Yvonne Baros
15 2024

Denise Bleakly
15 6453

Sharon Del Prete
15 2021

Huri Fraley
15 5933

Philip Heermann
15 6470

Bill Plummer
15 4225

Rolf Riesen
15 1423

Slow down, Sandia

GOTCHA — Div. 6000 VP Les Shephard mans the speed gun while Willie Johns (4122) brandishes a sign reminding Sandia drivers to slow down in Labs parking lots. With Les and Willie is Sue Collins (6062). The "speed trap" was part of an initiative to encourage safety around the Labs. (Photo by Bill Doty)

From 1940s Mexican prisoner to cameraman, Sandian David Sanchez makes it sound appealing

By Iris Aboytes

In *All the Pretty Horses,* David Sanchez (2541) played a prisoner. In *Around the Bend,* he drove his 1988 Chevy pickup truck back and forth on a country road. In *Suspect Zero,* he was a carnival patron eating a taco that he actually could not eat. By the time he was in *Bordertown,* he was a master. He was both a hotel patron and a restaurant customer. David has been an extra in almost 10 movies.

"I like my day job," says David. "I don't plan on becoming the next Brad Pitt. It's interesting to sit back and take in the very detailed process. The cameras, the lighting, the sequences — it all intrigues me."

David learned that extras were needed for a movie being filmed around Albuquerque and decided it might be a fun thing to do. He and his wife Gerti joined the 500-plus possible extras and waited in line. They completed a questionnaire and a head shot was taken. They were told they would be notified if they were selected.

DOING TIME — David Sanchez played a Mexican prisoner in his first movie, *All the Pretty Horses*.

About a month later David got called. He was selected to be a prisoner in a 1940s Mexican prison. A short time after that he was given all the details. He needed to be at the old Santa Fe prison at 6 a.m. on the given date.

Once there he completed his paperwork and was sent to breakfast. From there he and 199 other prisoners were given striped prison uniforms and sent to makeup. The uniforms given to them were new so they were soiled to make them look authentic. Sunscreen and makeup were applied to make them look prison-worthy.

"Next we were sent to a holding area where we waited," says David. "Some of us read, some of us played cards. You have to be patient."

Once it was time for their scene, the prisoners were told where to stand and what to do. Several shots of the same scene were taken. "The director and assistant director viewed the film to see if everything looked authentic," says David. "One of the retakes had to be done because one of the extras was wearing a cool pair of Oakley sunglasses. Don't think those were around in the 40s."

Gerti got called about two months later. Her shoot was in Las Vegas, N.M. They had caught the bug.

"The days are long, typically 12 hours," says David. "Snacks are always available. Meals are catered. The food has been good at every movie I have been in. *Swing Vote,* the movie with Kevin Costner, was better funded," he says. "We were served filet mignon and Alaskan King crab for dinner. That was easy to handle."

David worked in *Swing Vote* for three days. He played a cameraman who was part of a news team. "Kevin Costner, the lead actor, thanked us every day," says David. "He told us the movie couldn't be made without the extras and background people. He was a nice man." *Swing Vote* will be in theaters Aug. 1.

LABORING ON — David Sanchez was a warehouse worker in the movie *Employee of the Month*.

David uses some of his vacation when he becomes Brad Pitt for a day or two. He says he has met other Sandians at the various shoots.

"The hardest part of being an extra is completing the Sandia Conflict of Interest and Outside Employment forms," says David. "I enjoy it. For a little while, I get to be a different person. Then it is over and I get to be me again. No stress, I just follow orders. I am very detail-oriented and enjoy their precise attention to each detail. What's not to like; it is a no-brainer!"

Man's best friend and others are given a new leash on life with the help of warm-hearted volunteers

By Iris Aboytes

When Janet Philippsen (2916) goes home she is greeted by the meows of furry little kittens. Janet fosters sick, injured, and nursing cats and kittens for the Albuquerque Animal Welfare Department.

"I try to help as many as I can," says Janet. "Fostering animals is a 24/7 job, and it's not for the faint of heart. I had a kitten that died on Christmas night. It was heartbreaking, but other littermates thrived and did very well. I keep them until they are ready to return to the shelter."

She recently had a mama cat and two kittens. This is the third set she has fostered this year.

TEKA (left) AND CODY enjoy the wildflowers on a dog-day afternoon.

The Albuquerque Animal Welfare Department has three sites. The Eastside shelter is located at 8920 Lomas NE. The Westside shelter is at 11800 Sunset Gardens SW, and Lucky Paws is located at Coronado Mall. The centers have 300-350 adoptable pets available at any given time, says Animal Welfare coordinator James Hallinan.

About 100 Sandians volunteer at the shelters. "Volunteers do everything," says Hallinan. "They greet the visitors and answer questions on adoption, groom the dogs, and help at off-site adoption events. Sandia has the largest group of volunteers, but many more are still needed."

Vivian George (5741) volunteers most Sundays for four hours. "Sometimes I don't feel like going," says Vivian, "but they are invariably the most rewarding four hours of my weekend. My 14-year-old niece, Haley, has started going with me. She told her mom how volunteering makes her feel good about herself. She says it is wonderful to make a difference. Sometimes Haley brings a friend.

"It is overwhelming and heartbreaking to see so many dogs at the shelter. On a good day we can get six dogs an hour out of their kennel for 20 minutes. We let them run around and spot-clean and wash them. We also show dogs to prospective human companions and help match human expectations to the dog's personality."

Vivian could not help herself — she adopted Teka, a two-year-old border collie cattle dog mix. "Teka had no manners, she had no training when I adopted her," says Vivian. "She was wild. Today Teka is well-behaved, thanks to training and lots of love. She is so intelligent. She makes me laugh.

"I have another dog, Cody, an Australian shepherd. He has health and behavioral problems. I made the mistake of getting him from a backyard breeder. In my opinion, the best companion dogs come from shelters. Teka and Cody are my family. They travel and go hiking with me."

"Where else can you get a dog that is sterilized, with a microchip, current vaccinations for a year, license, free dog training, and a free first visit to the vet of your choice for $59?" says Hallinan. "Cats can be adopted for only $39. Compare that figure to a 'free' puppy from a neighbor or friend. Sterilization is $100-$300, shots are $60-$80, microchip is $25-$100, and licensing is about $18. The price goes up if you purchase a puppy from a pet shop."

For more information about being a volunteer or about adopting a pet go to www.cabq.gov/pets.

SABRINA and her baby Winnie pose for the camera.