

'Laser Scalpel' May Help Doctors Treat Severe Burn Victims

A man pours gasoline from a coffee can into an open carburetor, not entirely conscious of the lit cigarette in his mouth.

Returning from a vacation, a woman flips on a light switch in a house that has a slow leak in its gas floor furnace. She's been meaning to get it fixed.

Kaboom.

If accidents like these stopped happening, Linda Moore would, happily, have to find a new job. Linda is Nurse Manager at University Hospital's Regional Burn Center (located at the University of New Mexico in Albuquerque). The hospital

The slightest draft feels like steel wool brushing across open wounds. Patients sometimes ask to die.

treats 300 new burn victims each year, many of them children. (See "Some Common Household Burn Hazards" on page four.)

Severe burns are perhaps the most painful injuries a person can receive, she says. If you're lucky enough to survive the accident, your ordeal is just beginning. "It's horrendously bloody," she says. "There's no medication that takes away all the pain."

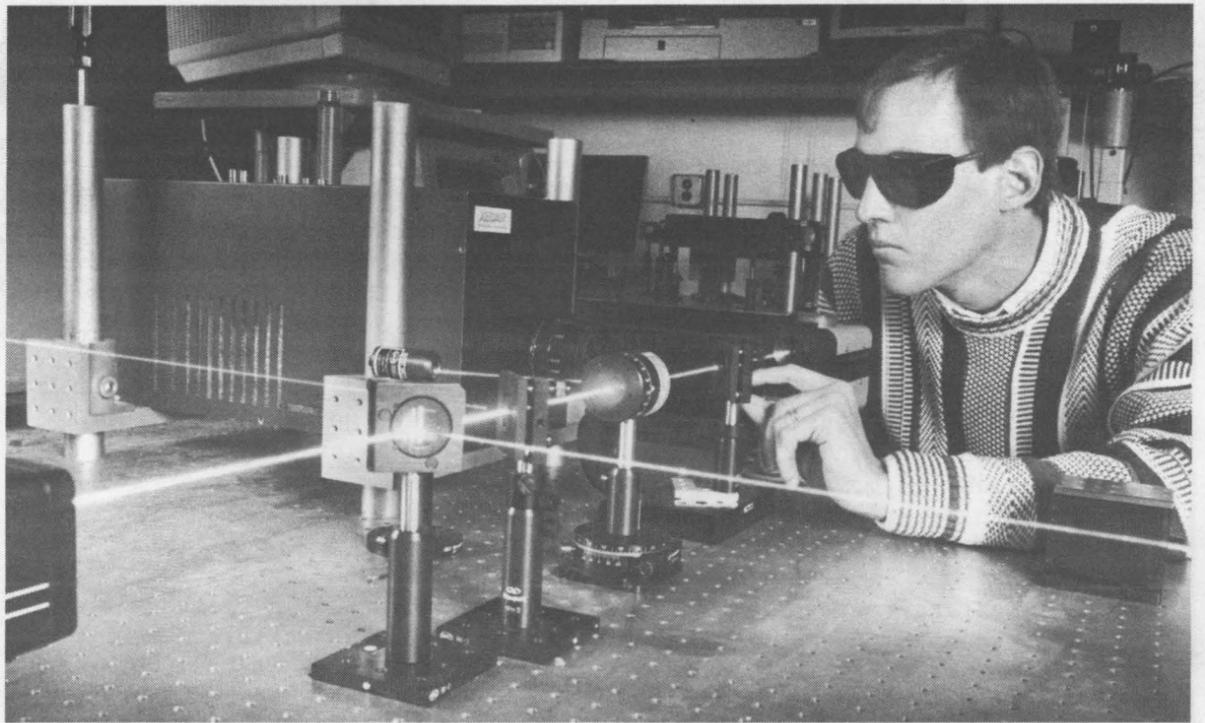
As part of the treatment, dead skin called "eschar" (pronounced "ess-car") must be removed surgically, a procedure Linda likens to carving meat. Using a scalpel, a surgeon shaves away layer

after layer of tissue, cutting deeper until healthy skin is reached. For deep burns, live skin from a skin donor or from another part of the body is transplanted.

Depending on the severity of the burn, a burn

victim may spend weeks to months recovering in intensive care. Every breath stings. The slightest draft feels like steel wool brushing across open wounds. Patients sometimes ask to die, says

(Continued on Page Four)



BOSTON BOUND — Using a low-powered helium-neon gas laser, Scott Holswade (2674) tests an infrared camera that Wellman Laboratories of Photomedicine (Boston) will use to evaluate beam behavior from a high-powered CO₂ laser. Sandia is helping Wellman develop a surgical laser system that will help doctors treat patients with severe burns. (Photo by Randy Montoya)

Help Your Manager Improve

Upward Feedback Is On the Way

Upward Feedback is coming back, so for the third time every Sandia employee will have a chance to rate his or her manager's performance. The Upward Feedback committee, which includes representatives from each division, has evaluated the program and decided what changes are needed for this year.

Employees again will be able to respond anonymously to a set of questions and offer specific comments and suggestions for managers' improvement.

Last year, managers were required only to inform their managers that they had conducted feedback meetings and developed action plans. In this round of Upward Feedback, says project leader Susan Harty of Staff Employment and Personnel Policy Dept. 3531, managers will undergo a bit more scrutiny. "They will be required to give their own manager the results of the feedback," she says. "That includes sharing a copy of the feedback report, including comments, and the action plan that says what he or she will do to respond to the ratings and comments."

Let the Trend-Spotting Begin

Now that Upward Feedback has become an established part of the Labs' practices, Susan

(Continued on Page Nine)

On a Scale of 1 to 5, How Have Sandia Managers Rated?

Category	Average Rating	
	1992	1993
Integrity	3.71	3.94
Respect for the Individual	3.68	3.88
Quality	3.61	3.80
Leadership	3.61	3.80
Teamwork	3.51	3.72



LAB NEWS

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Sandia Facelift More Than Skin Deep

In Facilities, About the Only Thing That's Not Changing Is the Name

Editor's Note: Interviewing for this update on Sandia facilities was finished late last year, before the death during the holiday break of Director James "Jake" Jacobs (see obituary on page eight). Jake was proud of the direction and work of the Facilities organizations, and we regret not having been able to publish this before his death.

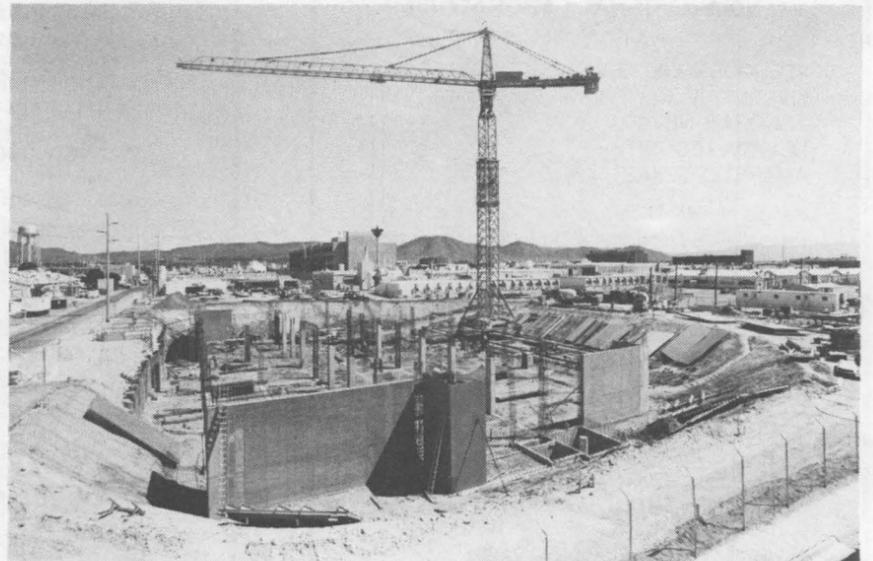
At Sandia, you might say, the only thing you can be sure *won't* change is the near certainty that almost everything *will* change sooner or later. And the people making the most visible changes are the Sandians who are up to their computer-aided drafting software in workforce and mission projections, capital budget requests, and worksite dust.

Visible evidence of changing times in the Facilities organizations includes empty space once occupied by World War II-era buildings, and more and more heavy equipment rumbling around the Labs site. But what you don't see is the fundamental change in the way that work is being

planned and carried out.

"We have pretty well restructured every business process associated with Facilities or we're in the process of doing that," said James "Jake" Jacobs, the late Director of Facilities Program Management Center 7300, "so that in fiscal management we can get to a sound budget, fiscal

(Continued on Page Six)



A CONSTRUCTION CRANE towers over the site where the new Center for National Security and Arms Control is growing out of the ground. Several old structures were demolished to make room for the new building in the middle of Tech Area 1.

This & That

It's Weird Name Time, Senalians - Many moons have passed since we last published a roundup of wrong, but entertaining, names on mail received by Sandians. We've mentioned some of these before, but here's a recent sampling of misspelled variations of Sandia: Sanka, San Dia, San Diea, San Dina, Sandy, Saudia (probably the most common misspelling), Sandra, and Senalia. (The last one was from AT&T - how soon they forget!) Other variations that go beyond simply misspelling Sandia include Sundig Nutrition Lab, Sander Hate Labs (whew!), Sandia Nail Lab, Saudia Wateonal Laboratories, Andia National Airts, and Sandia Nut Lubs.

Do you have others? Send them to the LAB NEWS, Mail Stop 0413, and we'll put them in the file and do this again sometime.

* * *

Supercipherers? - Some folks assume that because we LAB NEWS staffers work mainly with words, we aren't very good with numbers. Well, it depends on how you look at it. Managing Editor Charles Shirley says he was looking into whether he can afford to send one of his kids to a private school, so he started checking over his 1993 expenditures. At last report, he had accounted for 126 percent of his 1993 income. I can account for about 74 percent of mine, so on average we're perfect! In truth, journalists and big numbers don't mix (our salaries prove that). The journalism majors I ran with in college had an alternate name for college math courses: We called 'em "pre-journalism."

* * *

Henry Said It Better - In the last issue, I said I was growing weary of hearing that so many groups plan to become "world-class" and a "source of competitive advantage" for Sandia. Just as that issue went to press, I noticed that former LAB NEWS writer Linda Doran (12610), who now writes the *Sandia Business Brief*, had quoted Henry Ford on the same basic subject. Years ago, Henry said, "You can't build a reputation on what you are going to do."

* * *

Numbers, Please - Many of us need to reply to lots of calls and internal correspondence, and it's less trouble if we don't have to first look up "your numbers." Why not do what many other Sandians have already done? Add your mail stop number, telephone number, and fax number to all memos and faxes that you send, and - when appropriate - provide those same numbers when you leave a phone message. This little courtesy could save busy folks time and trouble.

* * *

Coming Attractions - If all goes as planned, we will publish two special issues soon. President Al Narath and Executive VP Jim Tegnalia visited with the LAB NEWS several days ago, and we plan to publish that "State-of-the-Labs" interview Jan. 21. Soon after that - maybe on Feb. 4 - we'll publish our annual Labs Accomplishments issue, highlighting Sandia's most notable achievements of fiscal year '93.

* * *

A Rare Employee - I often wonder about the people who work here at the LAB NEWS. One employee was placing a bag of popcorn into our microwave oven recently and set the timer for 2 minutes. I was walking by at the time, and said, "Hey, that isn't nearly long enough." "It's OK," he replied. "I like mine rare." Maybe I should lighten his workload. ●LP

feed liback

Q: Landscaping for the new Kirtland AFB building at the Eubank gate includes an earth berm just inside the base perimeter fence. This berm restricts visibility of the gate and of vehicles coming out of the gate northward on Eubank, especially freight trucks headed south to the Sandia Shipping and Receiving (S&R) gate.

Since it appears the city is widening Eubank north of Gibson, and installing a traffic signal, I suggest that consideration be given to moving Sandia's S&R gate to that point. There would seem to be at least a couple of advantages of doing this:

- Incoming freight trucks would not have to cross the northbound lanes of Eubank just where they come out of the base gate, where drivers are beginning to accelerate.

- Outgoing trucks would have traffic light-controlled access to Eubank, and would not be tempted to run the yield sign and force a merge into northbound traffic, especially when someone coming off the base is trying to turn to the Sandia offices in the Research Park.

Once through the Sandia S&R gate, incoming trucks could be routed south through the new intersection just inside the Eubank gate. Outgoing trucks could simply follow the reverse route to exit the base.

A: Sandia worked with the Air Force during construction of its new building, including our input on the traffic light. We also met with the city to discuss the widening of Eubank, a project that will not occur until the mid to late 1990s.

We do not see an opportunity to move the gate, as you suggested. The Air Force controls access to the new intersection and it doesn't allow us to insert our traffic from the north.

We are, however, looking at moving the Eubank entrance to Sandia well to the south using a widened Eubank hooking up to 'O' Street. If that improvement comes to pass, we expect to enhance public access to Sandia, at which time we could include a provision for contractor access.

Charles Thomas (7305)

LEAP Participants Pledge \$161,000

More than 850 employees at Sandia/California responded to the LEAP (Livermore Employees Assistance Plan) campaign in October by pledging \$161,000 to some 37 local-area human service and charitable agencies, as well as to the area United Ways, Tri-Valley Community Fund, and United Health Appeals.

Randy Christman (8523), who chaired this year's campaign, says he's satisfied with the results considering the economic climate (there was a 6-percent decline in gift dollars from the 1992 campaign). "I think folks here are still sensitive to the needs of others and clearly have chosen to make a difference," he says.

A couple of things are worth noting about this year's drive, he adds. First, the campaign was handled by enthusiastic volunteers from each center. Second, the giving spirit of Sandians was gratifying to everyone who worked on the drive.

Co-chair this year was Rene Bierbaum (8116), who will head the LEAP campaign next year.

Take Note

The Central Rio Grande Chapter of the New Mexico Network for Women in Science and Engineering will have a dinner meeting on Wednesday, Jan. 12, 6 p.m. Diane Marshall, Associate Professor of the UNM Biology Department, will speak on "The Mating Behavior of Wild Radish: An Examination of the Possibility of Sexual Selection in Plants." Any interested person is welcome to attend. For more information, including cost and location, contact Carol Skinner (9215) on 844-8901.

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ALBUQUERQUE, NEW MEXICO 87185-0413
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LARRY PERRINE, Editor (505/844-1053)
CHARLES SHIRLEY, Managing Editor (844-6210)
JOHN GERMAN, Writer (844-5199)
HOWARD KERCHEVAL, Writer (844-7842)
RANDY MONTOYA, Head Photographer (844-5605)
MARK POULSEN, Photographer and
Production Coordinator (844-0421)
JANET CARPENTER, Publications Coordinator
(844-7841)
LISA CHAVEZ, Assistant (844-7522)
LAB NEWS FAX (505/844-0645)
BARRY SCHRADER, California Reporter
(510/294-2447)

MARTIN MARIETTA

President's Quarterly Dialogue Sessions Begin Jan. 25

President Al Narath invites all Sandians to attend his upcoming quarterly dialogue sessions. Al will give a "State of the Labs" presentation (which he will also present to community leaders Feb. 1).

New Mexico Sessions

Sessions will be in the Technology Transfer Center (Bldg. 825) at 8:30 a.m. and 10 a.m. on Jan. 25, and at 8:30 and 10 a.m. on Jan. 28. Employees with last names beginning A-M should attend the 8:30 a.m. session, either on Jan. 25 or Jan. 28. Employees with last names N-Z should attend the 10 a.m. session, either on Jan. 25 or Jan. 28.

California Sessions

Sessions will be at 8:30 and 10 a.m. in the Sandia/California auditorium (Bldg. 904) on Feb. 18. Employees with last names beginning A-M should attend the 8:30 session; N-Z the session at 10.

'Greening of the Complex'**Sandians Discuss
'Shades of Green'
At Workshop**

The message was clear at DOE's Office of Defense Programs Fourth Biannual Technology Workshop: "Green" design and manufacturing are "in."

Cosponsored by Sandia and Lawrence Livermore national labs, the "Greening of the Complex" conference included presentations by several Sandia scientists whose work has focused on elimination of toxic products and design for environmentally conscious manufacturing. Meeting participants represented DOE; Sandia, Lawrence Livermore, and Oak Ridge national labs; AlliedSignal, Kansas City; and two universities. The conference was held in Pleasanton, Calif., Oct. 26-28.

"The mission of this three-day workshop was to convey the wide range of research activities currently being conducted to help DOE become more environmentally compliant and achieve pollution prevention goals," says Alice Johnson-Duarte of Environmental Protection Dept. 8642. "Speakers from DOE, regulatory agencies, the private sector, and academia were selected for their expertise and knowledge on a variety of 'green' topics, including recycle initiatives, concurrent engineering, life-cycle analysis, and incorporation of pollution prevention into planning and review processes."

Designing Green Products

"Product Design and the Environmental Life-Cycle Analysis" was the topic of a presentation by Randy Watkins of Environmentally Conscious Life-Cycle Systems Dept. 6625. Supported by the Defense Program's Integrated Manufacturing and Design Initiative, Randy's work has concentrated on developing a computer-based expert system to support a life cycle approach to concurrent engineering.

The new tool gives weapon designers easy access to environmental information that can help determine the best options for product design and manufacturing. "Although DOE initiatives have focused on hazardous waste minimization and a 'less is best' policy, our efforts cannot stop there," Randy says. "We must take a broader view of environmental quality and attempt to understand the effects of resource consumption. Life-cycle analysis represents the only true method of grasping the implications of this larger perspective."

From an environmental standpoint, Randy explains, a product's life-cycle analysis takes into account what raw materials were extracted from the earth, how the materials were processed, how

**IAMAW Decertifies
At Sandia/California**

The International Association of Machinists & Aerospace Workers' (IAMAW) bargaining unit at Sandia/California recently voted 10 to 4 to decertify.

The machinists' bargaining unit, whose latest three-year contract expired Oct. 31, was the only organized labor unit at Sandia/California. It had been organized since 1962.

Pat Smith, Manager of Personnel and Employee Resources Dept. 8522, says, "Sandia has enjoyed a special relationship with the IAMAW. Our goal now is to build on the already high level of communication and trust that exists."

Announcement of the outcome of the October election was delayed until the National Labor Relations Board certified the results.



SURROUNDED BY PACKAGES from the Holiday Spirit '93 campaign are two Sandia/California volunteers, Patty Loosli (8116, left) and Joan Bersie (8101). Sandians donated 580 gifts and 1,740 pounds of groceries to local agencies during the drive. In addition, they made cash donations that enabled the Family Crisis Center in Livermore to purchase another 3,600 pounds of foodstuffs from the Alameda County Food Bank. This holiday drive was the most successful ever in terms of support shown by Sandians, according to chairperson Renee Haynes (8531).

they were used, and how they were disposed of at the end of their lives.

Current design and manufacturing strategies, he adds, fail to consider all these key life-cycle issues. Instead, they focus narrowly on comparing different materials to find out which produce the least hazardous waste during manufacturing.

"Other environmental impacts may exist that are not considered," he says. "One material might produce less waste, but also could be inefficient to mine and might require destroying acres of usable land, while another material is readily available." Looking at a wider range of life-cycle issues can help designers make informed tradeoffs, he says.

In Europe, for example, "take-back" legislation makes companies responsible for their products at the end of their utility. As a result, industries are encouraged to design components for ease of disassembly and to produce them from materials that can be reused or recycled.

"The nuclear weapons complex is in the same take-back position as European industry," he says, "and we can no longer ignore issues associated with what to do with products at the end of their lives. Here, the DOE has a unique opportunity to establish a leadership role in this country in defining and implementing strategies for 'green' engineering."

Defining 'Green'

Jim Costa, Manager of Organic and Composite Materials Dept. 8711, contended in his presentation that all environmental problems start as a materials problem. Achieving an acceptable balance in terms of a material's utility, cost, health effects, and environmental impact is essential to "green design," he says.

"Scientists and engineers may choose a specific material for its physical or mechanical properties, such as its strength or cleaning ability, but, unfortunately, other properties of the material may adversely impact the environment," says Jim. Lead has desirable properties for soldering applications, for example, but it also poses a hazard to people and the environment.

"We must stop thinking in terms of good and bad materials for specific uses, and consider the overall impact on the environment," he adds. "We must be willing to make compromises and tradeoffs for 'different shades of green' when comparing environmental compatibility versus health versus safety versus energy consumption. Absolutes are hard to come by."

Although different shades exist, Jim defines a "green" product as one that causes no significant

adverse impact on the environment or worker/community health during its manufacture, use, or disposal.

Another benefit of green alternatives is that by not creating toxic waste, the public and private sectors save billions of dollars in disposal and clean-up costs. "Product 'greenness' cannot be an afterthought," Jim explains. "It's essential for scientists to regard materials technology as a part of green design that must be considered at each step, includ-



ing early design, product testing, manufacture, in-service, and post-use. As the weapons complex evolves during the next few years, we must implement manufacturing and administrative processes that are more sensitive to green issues."

Jim also addressed green redesign, where new, safer materials are substituted for old, toxic substances. At Sandia, current projects involve replacing MDA (methylene dianiline), a suspected human carcinogen used in epoxies, with a non-toxic component; eliminating cadmium from electroplating materials by substituting different alloys; and developing lead-free polysulfides.

Citrus Cleaner Proves Effective

Another Sandian, Carl Pretzel of Systems Engineering Dept. 5362, discussed Sandia's selection of a non-toxic, citrus-based cleaner to replace ozone-depleting chemical agents and known animal carcinogens commonly used to clean circuit board components.

"We recently needed to change the solder flux removal cleaning processes used on high reliability electronic components," he says. "After performing efficacy studies and extensive long-term compatibility evaluations on dozens of different candidate cleaners, we selected d-limonene, a food grade product made from citrus peel.

"It not only cleans the components, d-limonene also is biodegradable, non-carcinogenic, and non-air toxic," he adds. "In fact, we are currently looking at ways to eliminate non-volatile residues picked up by d-limonene during the cleaning process so we can reuse it."

Perhaps even more important, he adds, "the substitute cleaner allows us to remove hazardous agents from the work environment."

(Continued from Page One)

'Laser Scalpel'

Linda.

The "debridement" (skin removal) procedure hasn't changed much since the days of the Vietnam War, she says.

Laser Surgery of a Different ilk

New technology pioneered by one of Sandia's industrial partners may soon help lessen that pain and help doctors diagnose and treat patients with severe burns.

Recent research by Wellman Laboratories of Photomedicine — the nation's leading research institution in using lasers to treat human tissue — has shown that a pulsed, high-powered CO₂ laser

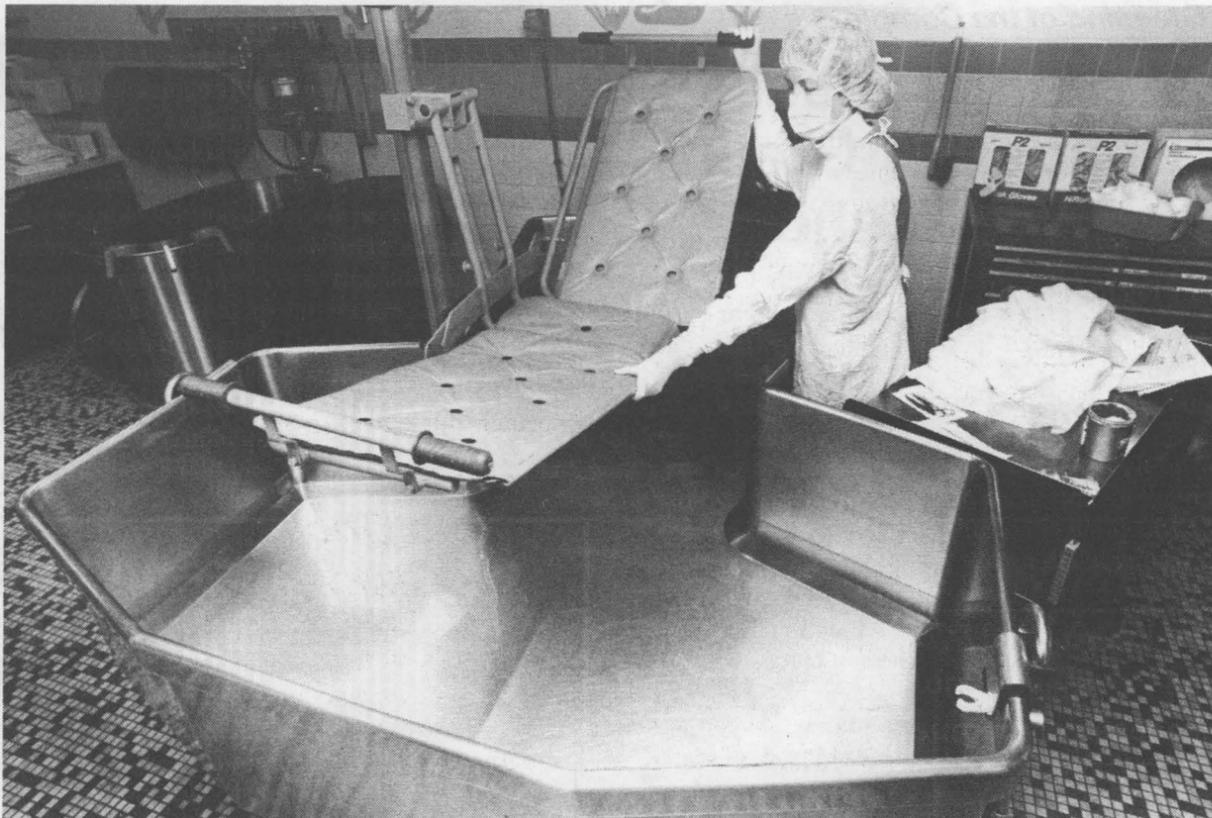
By visual examination alone, the doctors often don't know if or how much surgery is necessary.

can be used to burn away eschar, removing far smaller amounts of underlying healthy tissue and improving skin grafting success. Used in hospital burn wards, it could lead to greater recovery rates, shorter hospital stays, and lower health care costs, says Sandia project leader Ned Godshall (2665).

As part of a four-year, \$16 million cooperative research and development agreement (CRADA), Sandia is helping Wellman (located at Massachusetts General Hospital in Boston) turn the laser technology into a surgical tool that will help doctors more precisely remove burned skin and determine the depth and severity of burns. The CRADA is Sandia's first in the biomedical engineering arena (see "Biomed by Sandia — An Update" on page five).

A major part of Sandia's work with Wellman will be to help doctors distinguish between burned and healthy skin, says Ned. Most of us imagine burned skin as black, charred tissue easy to distinguish from live skin. That's not always so, he says.

Suppose a little girl pulls a pot of scalding water off of a stove and burns her face and arms. She is rushed to an emergency room where doctors examine her. By visual examination alone, the doctors often don't know if or how much surgery is necessary. Moreover, it's difficult during surgery to know when to stop cutting. A serious drawback of the slice-and-peel method is that some underlying healthy tissue is sacrificed, says Ned.



DRAWING A BATH — Linda Moore, Surgical Services Nurse Manager at University Hospital's Regional Burn Center, readies the "tub room" for a burn patient. The tub is used to clean patients' wounds with soap and water before surgery to prevent infection. The Regional Burn Center, located at the University of New Mexico in Albuquerque, handles hundreds of burn victims every year. (Photo by Randy Montoya)

The main difference between burned and healthy skin is blood. That's because severe burns singe the tiny blood vessels that route blood to the skin's surface. During surgery, the surgeon typically knows when to stop cutting when the tissue starts bleeding.

Unfortunately, bloody skin is not the ideal foundation for skin grafts. "It's a kind of Catch 22," says Ned. "The surgeon needs to see blood to know when to stop cutting, but bloody skin is not the best bed for a skin graft."

Stopping Blood, Not Capillary Growth

The heart of Wellman's prototype system is a 150-watt CO₂ laser that, under the guidance of a surgeon, rasters (scans) back and forth across burned skin one line at a time. (The technology is based on emerging laser technology for nuclear weapons.) The surgeon can control the depth of skin removed very precisely (within 40 microns), he says.

Ironically, as dead skin is burned away, the laser kills an additional layer of healthy skin only about 150 microns thick (much thinner than an

onion skin). This remaining "dead zone" is thick enough to limit bleeding yet thin enough to allow capillaries eventually to grow back into the skin graft.

Because pig skin approximates human skin, Wellman's group, headed by Dr. Norm Nishioka, tested the laser technique on pigs, demonstrating that a skin graft has the best chance of "taking" (attaching to the wound) if such a layer of dead skin remains. By circumventing the scalpel, the technique should also avoid the pain induced when nerve endings in underlying live tissue are exposed.

As part of the system, Wellman researchers have also proposed a method for more accurately determining the depth of burned skin before and during surgery.

Prior to surgery, a fluorescent green dye is injected into the patient's bloodstream. Because blood won't flow through burned skin, the fluorescent intensity of the wound under ultraviolet or infrared light indicates eschar thickness and can help a surgeon determine the severity of the burn. During surgery, the dye's intensity increases as the laser approaches live skin, letting the surgeon know when to stop cutting.

Taking Aim at a National Issue

Wellman already has begun developing the two subsystems — the laser system for burning away dead skin and the fluorescent dye viewing

"We'll let the computer do the optimization studies so Wellman doesn't have to do 1,000 experiments on pigs."

technique. Sandia's job is to help Wellman integrate the system's diagnostic and therapeutic components into a single, working system and optimize its performance, says Ned.

The prototype debridement system Sandia is proposing will include a laser, sensors, cameras, robotics, and peripherals all contained on a cart-like vehicle that can be wheeled from room to room. Once perfected, such a system could result in rapid, virtually bloodless surgery, minimizing blood transfusions and limiting the chances of post-surgical infection, a complication of severe burn treatment that often leads to death.

"We still have a long way to go in terms of treating burns," says Dr. Joe Boyce (7030), med-
(Continued on Next Page)

Some Common Household Burn Hazards

Linda Moore, Nurse Manager at University Hospital's Regional Burn Center, would rather spend her time preventing people from getting burned than treating them.

About 40 percent of all burn patients are children, most of them around age two. "That's when they get fast and curious," she says.

Toddler-aged burn patients are often victims of hot liquids. Children tend to grab containers just taken out of the microwave, not realizing that while the container is room temperature, the liquid inside may be scalding. Pot handles hanging over the front of a stove are also attractive to youngsters, she says.

Where adults see an electrical outlet, children see a face. "They know things go in mouths," says Linda. "It's no wonder they stick things in there." Plastic covers on outlets can help prevent some very serious burns, she says.

She suggests parents crawl around their home on their hands and knees — at a child's level — keeping an eye out for dangers. Children like to pull things, so watch for cords or tablecloths that might have a hot iron, crockpot, or serving dish at the other end.

Hot bath water comfortable to an adult can give sensitive young skin potentially fatal burns in seconds, less time than it takes for a baby to react. Baby bath water is best at body temperature, tested on an adult's wrist or neck where the skin is most sensitive.

Woodburning stoves are a particular hazard in the Southwest, says Linda. They can ignite surrounding materials or burn a hand or elbow in fractions of a second.

For adults, severe burns are often the result of carelessness — unattended woodburning stoves or fireplaces, people falling asleep with lit cigarettes, and open flames or sparks where there are gasoline fumes.

If you witness someone being severely burned, says Linda, cool the wound with clean, cold water and call 911. Remember to wrap the victim in a blanket — burn victims often get hypothermia because when skin is burned, the body loses its ability to control temperature.

Even if a burn doesn't seem severe, it may be, says Linda. Call the burn unit at 843-2715 around the clock for information.

(Continued from Preceding Page)

ical advisor to the Sandia development team. "I think this system will help a lot of people by lowering the incidence of infection, improving graft take, and speeding recovery time."

By limiting hospital days and cases of infection, the system should also reduce health care costs, says Ned. Conservative estimates show the average cost of treatment for each burn patient is about \$20,000. With 100,000 third-degree burn victims spending a million days in US hospitals each year, the total annual health care cost is about \$2 billion.

Still, a variety of technical "complications" must be overcome first.

Research Has a Distinct Flavor

"Sandia is applying its engineering experience to help refine a system that will help doctors do their jobs," says Ned, "but this was Wellman's

Biomed by Sandia — An Update

Although Sandians haven't heard much lately about Sandia's forays into the frontiers of high-tech medicine, the Labs' Biomedical Engineering Initiative journey is begun, says Wayne Johnson, Manager of Biomedical Engineering Development Dept. 9902.

FY94 funding for Labs biomedical engineering research exceeds \$9 million. At least 10 technical projects are now under way, he says, funded through the Labs' cooperative research and development agreement (CRADA), Laboratory Directed Research and Development (LDRD), and Technology Transfer programs, as well as the federal government's Technology Reinvestment Project.

Several new projects received first funding Oct. 1. Among those is a device that applies microassembly techniques to robotic microsurgery, allowing finer-scale surgical procedures and minimizing the shake of a surgeon's hand. Another project applies a former ballistic missile imaging system to the problem of early diagnosis of tissue disease, allowing doctors to image deep tissue using short pulses of laser light.

Other projects include a laser diode system for in-situ analysis of arterial walls, a biosensor that makes measurements at the cellular level, and a human factors approach to biomedical decision making that adopts analysis techniques from the intelligence community. Sandia's recent work on the blood glucose monitor (LAB NEWS, June 26, 1992) and blood gas chemistry monitor (LAB NEWS, Oct. 29, 1993) has received attention from both the health care industry and the media.

Biomedical and Defense Programs (DP) technologies are strikingly similar, and adapting to the new kind of research has been relatively easy, says Wayne. "Many of these technologies grew up in DP organizations," he says. He notes, however, that the move has required the Labs to find industrial partners already familiar with the territory.

Wayne emphasizes that because the two areas are so similar technically, performing biomedical work helps keep Sandia's core competencies vital, allowing the Labs to maintain preparedness for its main duty — minimizing nuclear risk to the nation for DOE.

"That's why we're here," he says.

idea." The project involves more than 20 Sandians from at least nine Labs centers. (See "From Doctors to Robot Researchers, a Variety of Sandians Enlist in 'Laser Scalpel' Project.")

Much of Sandia's work will focus on optimizing the high-powered laser for use on people. "We don't know what the beam looks like at the patient level," says Scott Holswade (2674), a laser engineer on the project. "There currently are hot spots, but for use on burns you want a more even beam profile."

Safety of the system is also a big concern — the 150-watt prototype laser could burn through one-inch-thick steel in about 30 seconds, says

Scott. More powerful lasers, in the range of 200 to 500 watts, are also being considered for the final Sandia system.

"This isn't a laser you'd use in eye surgery or to remove a tattoo," says Ned. "Suppose it stops rastering for some reason. Within a few seconds, it's bored through a patient's skin and is damaging internal organs." Labs weapon reliability expertise will help make sure that doesn't happen, he says.

Scott says the Wellman project has a flavor distinct from other research work done at Sandia. "A lot of Defense Programs work is for use way in the future," he says. "This stuff is for use on people the minute it's ready." ●JG

From Doctors to Robot Researchers, a Variety of Sandians Enlist in 'Laser Scalpel' Project

Biomedical engineering is unusual territory for Sandia, and the 'laser scalpel' development project for Wellman Laboratories of Photomedicine is drawing on a diverse assortment of Sandians, says project leader Ned Godshall (2665).

Laser/optics — Adapting the high-powered CO₂ laser for use on humans will require studying beam characteristics and behaviors. (Info: Kent Meeks, 5166; Fred Dickey, 9136; Scott Holswade, 2674; and Dave Sandison, 2665)

Computer modeling — Optimizing the Wellman system requires the Labs to study a variety of parameters, such as the distribution rate of fluorescent dye in the bloodstream and the rate and characteristics of beam rastering. "We'll let the computer do the optimization studies so Wellman doesn't have to do 1,000 experiments on pigs," says Ned. (Bruce Bainbridge and Vince Romero, both 1513)

Robotics — Sandia's prototype system will require highly precise robotic mirror movement, rastering, and beam rotation, as well as autonomous cameras that follow the beam. (Dave Foral and Dave Kozlowski, both 2171)

Microsensors/sensors — Sandia is examining alternatives to the Wellman method of diagnosing the depth of burned skin using fluorescent dye in the patient's bloodstream. Possibilities include a needle-laden microsensor patch that determines the depth of blood flow based on an electrical signal, among others. (Jim Novak, 1315; and Ed Patterson, 1275)

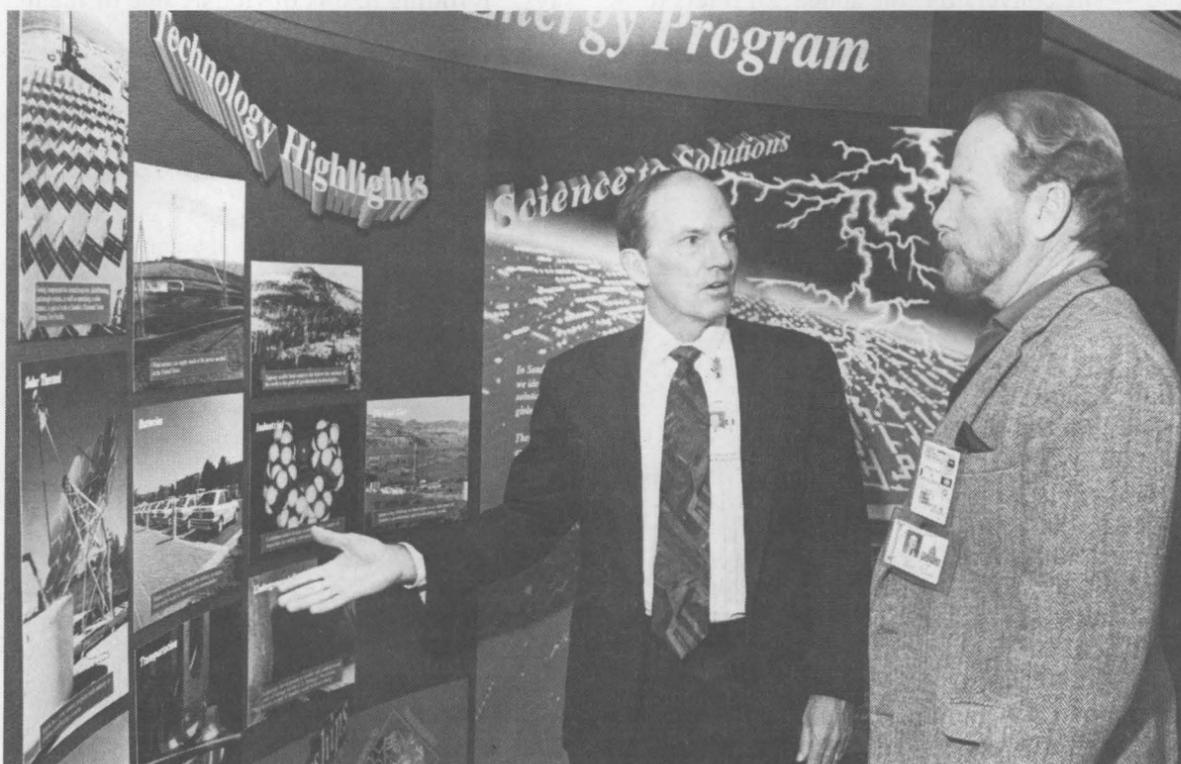
Imaging — Sandia is studying ways to convey sensor and camera information to the surgeon. (Mark Yee, 9136)

Systems integration — Labs systems researchers will ensure that all the pieces of the Sandia prototype system work together. (Mike Partridge and Tim Vargo, 2665)

Safety, reliability — Sandia system safety and reliability experts must make sure the high-powered laser system won't hurt the patient. (Eric Tomlin, 6613)

Aerodynamics/fluid flow — Labs parachute researchers, experts in aerodynamics, are studying ways to whisk the smoke and spatter that results from laser surgery away from the patient. In addition to interfering with the laser and optical equipment, it could be a hygienic concern for surgeons and nurses. (Don McBride, 1552)

Medical advisor — Dr. Joe Boyce (7030) is providing an interface between Labs engineers and Wellman doctors. "They often don't speak the same language," he says. "My job is to help them understand each other."



SANDIA SOLUTIONS — VP for Energy and Environment Dan Hartley (6000, left) summarizes Sandia's energy programs for US Rep. Robert Dornan. Dornan, a member of the House Armed Services Committee, visited Sandia/New Mexico Dec. 16. His visit included seeing a variety of exhibits ranging from agile manufacturing to parachutes, as well as an on-line welding demonstration in which Sandians welded a piece of titanium in Livermore from Albuquerque workstations. Dornan was also briefed on the National Competitiveness Technology Partnership Act, expected to streamline the processes by which the DOE labs enter into partnerships with industry. The House is due to consider that legislation during the next few months.

(Continued from Page One)

Facilities Changes

tracking, and fiscal control of projects.”

That reflects a fundamental shift away from the Labs' earlier history when a government locked in the Cold War was less likely to quibble over funding for a new lab or renovation of existing space for new mission-oriented research.

The result, said Jake, was a proliferation of quonset huts, single-story shingled wood structures, “temporary” buildings remodeled time and again for changing roles, and an associated clutter of fencing, parking lots, utility substations, and other required support structures.

Demolition a ‘Landmark Event’

“The truth is that for the last 40 years, we took down very few — if any — buildings,” he said. “When we took down Building 815 [the old auditorium, in 1992], it was a landmark event, both for Sandia and the base [Kirtland AFB]. The base commander called it a minor miracle — that Sandia and the base finally took a building down.”

Since then, several older structures were demolished to clear a site in the middle of Tech Area 1 for construction of the now-rising Center for National Security and Arms Control (CNSAC), and Building 814 — last used for classes and as the offices for Employee Communications Dept. 12660 — fell to the wreckers the last week in September.

Facilities' “hit list” for FY94 includes Buildings 824, 829, 838, and 839. Building 824, the old mail-handling facility, was demolished during the holiday break after undergoing asbestos abatement and being stripped.

But as the old buildings vanish, new ones are rising, a process Jake said will go on for about five years. And how will that change the Labs' appearance? There'll be less of what he called with a chuckle “early penal architecture.”

“You're going to see a lot more buildings outside the secure area, more groupings of like-kinds of activities,” he said. “You're going to see more of a campus or research park atmosphere than you've seen in the past.”

Needs Require Site Conversion

“At both the New Mexico and California sites, you see a lot of construction. Over the next four or five years, you're going to hear a term more and more — site conversion,” he added. “It refers to

Facilities Facts & Figures

Sandia facilities locations range from the desert to the tropics; from generally stable temperatures to wide daily fluctuations; from remote outback to metropolitan locales. Following are some characteristics of primary sites that are driving current and future Facilities planning.

Sandia/New Mexico

There are 574 major structures — a significant percentage of which are overcrowded, substandard, or of “temporary” construction type — incorporating more than 5 million square feet of space. Approximately 300,000 square feet of usable space is in temporary or substandard buildings. In addition, by a Government Services Administration (GSA) standard that prescribes a specific amount of space per person, the New Mexico site is short 368,500 net square feet (NSF) of space.

The site uses 2,842 acres of land owned by DOE, and an additional 14,946 acres through land-use permits from Kirtland AFB, the US Forest Service, the State of New Mexico, and Isleta Pueblo.

Sandia/California

There are 55 buildings incorporating 710,135 gross square feet of space. Most origi-

nal permanent buildings and temporary structures lack internal flexibility, energy efficiency, and architectural aesthetics. However, newer facilities are modern and well-designed for current activities. By GSA standards, the California site is short 27,503 NSF of space.

The site is located on 413 acres.

Tonopah Test Range

There are 96 buildings — a significant number of which are temporary — incorporating 159,976 square feet of space. The site is on the northern portion of Nellis AFB, Nev., 160 air miles northwest of Las Vegas.

The range comprises nearly 525 square miles. Sandia maintains approximately 40 miles of the paved roadway system.

Kauai Test Facility

There are 24 buildings incorporating 31,302 gross square feet. The site is located within the US Navy's Pacific Missile Range Facility (PMRF), 135 miles northwest of Honolulu. The Navy considers the entire PMRF a “major ancient burial ground.”

The Main Complex site occupies approximately 180 acres, and the Kokole Point Launch Complex site occupies two acres.

how we change our site to meet our new business needs.”

A major component of site conversion, says Jeff Everett, Manager of Facilities Planning Dept. 7308, is “district planning” — breaking the Labs into subsets incorporating activities of similar missions, located in specific geographic areas.

“For example, we're evaluating what we call the ‘Gateway District Plan,’ which contemplates transforming the east side of Tech Area 1 into an unclassified, almost business-outreach kind of area,” says Jeff. “It would include a mixture of related activities, such as economic development, advanced manufacturing, and energy and environment work.”

Similarly, he says, planners are discussing establishing what they call a “defense-related classified area” in Tech Area 1. “We believe there are certain core buildings that would be included,” he says. “Building 836 is obviously one of them;

CNSAC would be one; and there are several labs in 808 and 809, which would be tightly tied into that district.”

Again, said Jake, it is the Labs' changing mission that is driving these kinds of changes in physical layout. “A lot of our industrial partners are not
(Continued on Next Page)

Money: Building Blocks and Fuel

At Sandia — like everywhere else — money keeps the doors open, the lights on, and the staff working. But in addition to doing those things at one of the world's pre-eminent research and development laboratories, the Facilities group also is grappling with the problems of modernizing to meet new challenges.

And considering the exotic, cutting-edge work done at the Labs, it requires a significant allocation of resources.

Facilities' revenue for FY94 totals \$215,291,000. Well over one-third of that — more than \$80 million — is allocated for utilities, operations, and maintenance. More than one-fourth — \$67.3 million — goes to capital line item expenses, which include construction projects for facilities and infrastructure.

Although not major parts of the budget, it is significant that \$1 million is set aside for demolition, and \$6 million for asbestos management.

As probably would be assumed, expenditures *authorized* by DOE (although, obviously, not yet by Congress, since Congress deals with spending bills yearly) are greater in the next few years than further out on the calendar, and spending proposed by the Labs is greater further in the future than in the next few years.

Spending already *authorized* by DOE for new construction for FY94 through FY97, for example, is, respectively, \$67.3 million, \$66.3 million, \$28.8 million, and \$4.1 million. *Proposed* spending, meanwhile, for FY95 through FY2000, totals, respectively, \$3.7 million, \$32.2 million, \$30.9 million, \$48.8 million, \$63 million, and \$95.5 million.



JAKE JACOBS (right), the late Director of Facilities Program Management Center 7300, was briefed by John Romanek of Dominion Services on asbestos removal from Bldg. 824. The former mail-handling building was one of several old structures demolished as part of the Labs' long-term site development plan.

(Continued from Preceding Page)

used to the security atmosphere we have," he said, "and although we have to maintain security requirements, we're searching for ways to make them more transparent to our industrial colleagues and the kinds of work we're going to be doing more of in the future."

Concept Includes Direct-Access Gate

Jeff says Labs President Al Narath would like Sandia to have a visitor center or business outreach facility, and that his concept for that fits neatly into the Gateway District Plan.

"We've looked at situating that 'subdivision' in a corner bounded by Eubank and 'O' streets, with Eubank extended south to 'O' Street as a four-lane boulevard including bike lanes," says Jeff. "The plan also includes establishing a Sandia-controlled gate opening directly into our unclassified areas, so visitors wouldn't have to come through Air Force security to get to us."

He says Kirtland officials have been receptive to initial discussions of the concept.

A governing concept for the Gateway District Plan, as for others, he says, is to develop it "the way a property developer downtown would do it — plan the roads, parking, and utility corridors, and size the utilities so you only have to put them in the ground once."

Current planning for all facilities includes aesthetics and practicality. Jeff says planned parking puts smaller lots adjacent to the buildings they serve, rather than having "acres of asphalt half a mile from anybody's desk." Plans also call for pedestrian walkways and landscaping to make work areas more appealing.

Other changes either planned or under consideration for the future, says Jeff, include moving Buildings 805, 806, and 807 out of the tech area and changing them from labs to administrative offices. "They'll be great office space buildings after we renovate them," he says, "and technology has changed to the extent that it would probably be difficult and more expensive to upgrade and continue using them as laboratories."

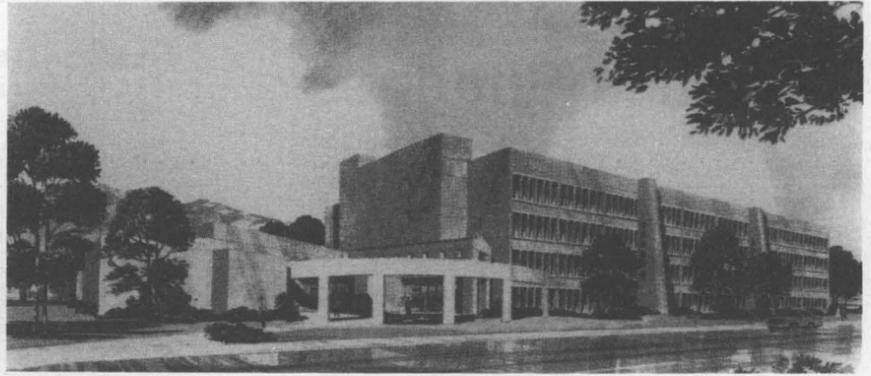
Jeff says many of the current activities in Buildings 805, 806, and 807 will be moved to the Integrated Materials Research Laboratory, the Weapon Program Primary Standards Lab, and the Explosive Component Facility.

Sandia/California Leading Way

While planners scratch their heads over changing Sandia/New Mexico to meet near-term and future demands, they have fewer problems dealing with Sandia/California.

"The California site is ahead of New Mexico in terms of site conversion," says Jeff. "They started thinking about it sooner than we did, and they have the advantage of not being on a military reservation. Also, they're primarily one organization, so there's a lot less debate over new projects."

He says California site plans call for dramatically shrinking its secure area to one small area,



ARCHITECT'S RENDERING shows what the Center for National Security and Arms Control (CNSAC) will look like when it is finished. The \$34.5 million building going up in the center of Tech Area 1 is one of several major construction projects planned or under way to modernize facilities at Sandia/New Mexico. CNSAC will be the Labs' first building designed specifically for national security and arms control work.

then creating even smaller secure areas, where needed, in other buildings outside the primary security area.

"They just put up a four-building interconnected complex [Defense Engineering Laboratory, Bldgs. 940-943]," he says. "One is an office building, two are lab buildings, and the fourth is a mechanical building. It will have some very localized secure operations, but the rest will be open for other activities. They thought it through and did a very nice job."

Gary Shamber, Manager of Planning and Construction Management Dept. 8611, says changes at Sandia/California are intended to create a campus-type atmosphere more inviting and "user friendly" for visitors and industrial partners, and more relaxed and comfortable for employees.

(Continued on Page Eight)

Buildings for the Labs: Present and Future Construction

Following is a list of major Sandia/New Mexico construction projects and their current status, including estimated costs, locations on the Labs site, and intended purposes (where determined).

There are no major construction projects currently under way at the California site, following completion of several expansions and new buildings during the past couple of years, but both sites have ongoing projects to modernize storm and sanitary waste systems, water systems, transportation systems, and other basic infrastructure. Most of that work, however, is required at the New Mexico site because it is older.

Proposed and Funded Facilities

Integrated Materials Research Laboratory (IMRL) — Will provide common space for research in physical and chemical sciences, microelectronics, and photonics; consolidates existing facilities, integrates different research functions, and facilitates technology transfer. Located in Tech Area (TA) 1; originally funded in 1988; estimated cost \$27.9 million; ready for occupancy.

Weapons Production Primary Standards Lab (WPPSL) — Providing the only primary standards capability in the weapons complex, will centralize and modernize DOE's primary standards capability for the weapons production complex. Located in TA1; originally funded in '88; estimated cost \$17.7 million; ready for occupancy.

Explosives Components Facility (ECF) — A modern facility to replace much of the work now performed in TA2; will provide consolidated design and testing facilities for development of weapons evaluation, explosives components, neutronic components, and power sources research. Located in TA1; originally funded in '88; estimated cost \$27.8 million; 66 percent complete.

Center for National Security and Arms Control

(CNSAC) — First permanent structure built at Sandia to house related technical activities in national security and arms control. Located in TA1; originally funded in '90; estimated cost \$34.5 million; construction in progress.

Technology Support Center (TSC) — Located in TA5; originally funded in '91; estimated cost \$30 million; in architectural design stage.

Robotics Manufacturing, Science, and Engineering Lab (RMSEL) — Will support the weapons complex by improving environmental and occupational safety of production and dismantlement operations. Also will promote transfer of technologies to US industry to facilitate private sector development of systems required by DOE, and to enhance US competitiveness. Located in TA1; originally funded in '92; estimated cost \$33 million; architectural design currently in review.

Strategic Defense Facility (SDF) — Provides facilities for strategic defense research and test activities. Located in TA4; originally funded in '86; estimated cost \$66.3 million; space allocated and being filled.

Planned Facilities

Processing and Environmental Technology Lab — TA1; estimated cost \$43.6 million; project plan approved by DOE.

Consolidated Waste Management Center — TA5; estimated cost \$30 million; plans being reviewed by DOE/KAO.

Jupiter X-Ray Simulator Facility — TA4; estimated cost \$240 million (shared equally by DOE and the Defense Nuclear Agency); under study with no plans yet drawn.

Proposed Facilities

Program Support Center — Mostly administrative space. Estimated cost \$21 million.

Geoscience Research Laboratory — Estimated cost \$27.6 million.

Laboratory for Industrial National Security

Applications of Computing and Computer Aided Engineering — Estimated cost \$50 million.

Aerodynamics Laboratory — Estimated cost \$65 million.

Investment Casting Addition — TA3; estimated cost \$3.7 million.

Warehouse Complex — Estimated cost \$4.6 million.

Reactor and Weapons Test Facility — Estimated cost \$50 million.

Fabrication Facilities — Estimated cost \$77 million.

Other Construction Projects

Several projects costing less than \$1.2 million each (the budget threshold above which they would be classified as line item projects), all in TA1, have been authorized. They are, with estimated completion dates:

Independent Vulnerability Assessment Facility (IVAF) — October '94.

Warehouse Addition — June '94.

Facilities Shop Building — May '95.

Lens Testing Facility — April '94.

Facilities Information Technology Building — July '95.

Administrative Office Building — August '95.

Radiography Addition — November '94.

Radioactive Mixed Waste and Assay Facility — February '95.

Off Base, Back on Someday

Jeff Everett, Manager of Facilities Planning Dept. 7308, says that while the changing focus of Labs work has placed some New Mexico Sandians off-site, many of them are in those offices simply because there is no suitable space for them on-site.

However, as current and future construction provides new space, he says, most of them will move back to the Labs area.

(Continued from Page Seven)

Facilities Changes

He says that involves a mix of shrinking the secure area, expanding landscaping, improving site and building signs, enhancing pedestrian and vehicle routes, maintaining architectural harmony, and improving site communications and safety.

"We're looking at every aspect of the way we work, to see how we can improve," says Gary. "Our customers have been flashed a green light to create new business for the Labs, and it's important that we, in turn, provide the setting they and we need to be able to reach these goals together, while continuing to meet DOE objectives and requirements. It's a challenging task."

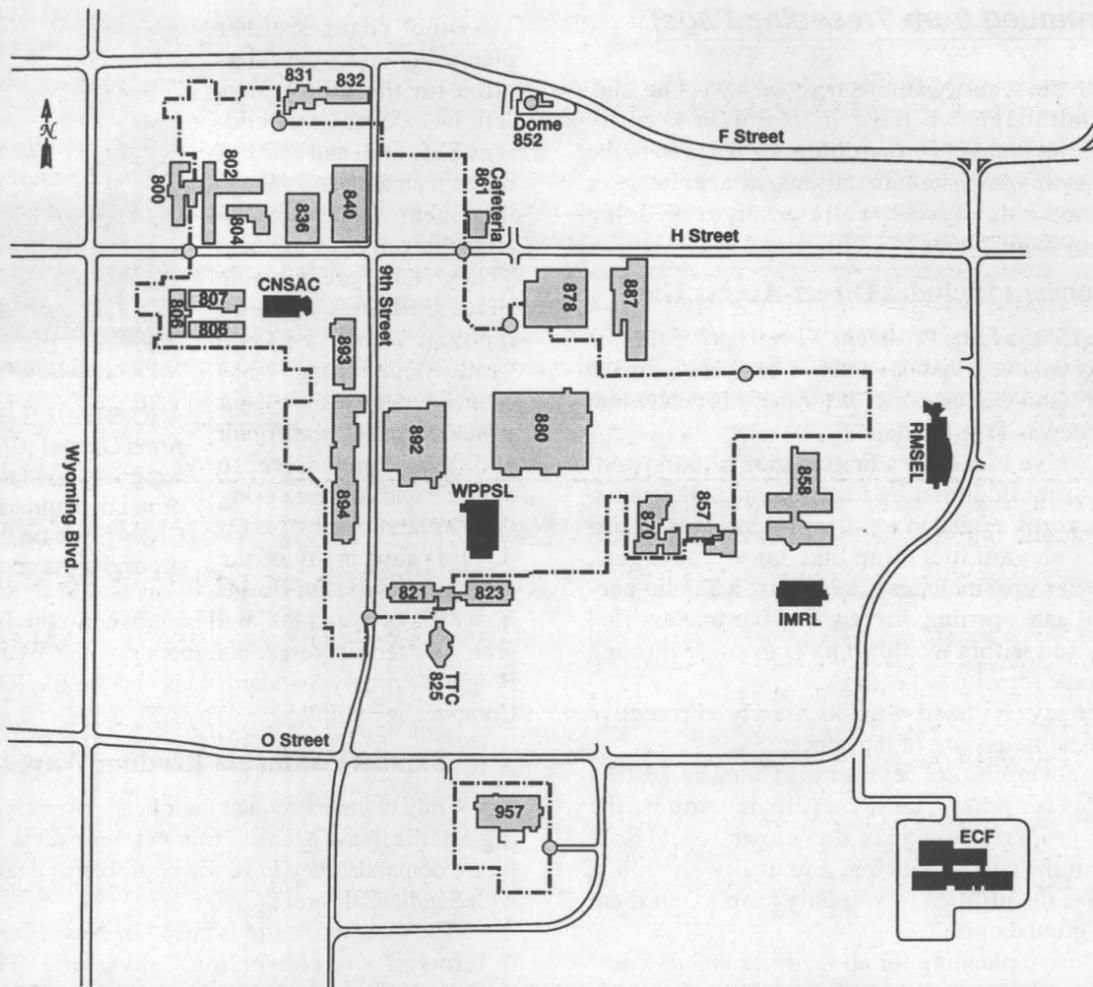
Data Base Catalogs Labs Sites

Meanwhile, Charlie Thomas, Manager of Planning and External Interfaces Dept. 7305, is overseeing establishment of a data base describing facilities now in use and non-built-up areas of Labs property. He is also representing Sandia in discussions with the Air Force and other interested parties to determine whether — and if so, where — a road to ease traffic pressure could be located within base boundaries.

The issue of locating a road through the base to ease the pressure on traffic moving from south of Albuquerque to east of the city has been discussed for years, but despite the end of the Cold War and the Air Force's willingness to consider options, Charlie says formidable obstacles remain.

For example, part of the data base he's been assembling characterizes undeveloped land scattered across base property lying among Labs tech areas. Nearly all proposed routes for a "loop" road fall across areas that would require some degree of remediation before they could be considered for public access.

"So even if we could find ways to avoid the Manzano Base area, explosive test areas, the sled



FIVE NEW BUILDINGS in varying stages of planning or construction (see page seven for descriptions) are shown in black in this map of Tech Area 1 and its surroundings. Selected existing buildings shown in gray help put the area into perspective.

track, the Air Force laser facility, the electromagnetic pulse test area, and other active sites," says Charlie, "we'd still have environmental restoration sites, archaeological sites, wildlife species preservation areas, and other things like that to consider."

Characterizing buildings and possible structure sites is a less knotty problem than the loop road issue, he says, and has more direct bearing on

Sandia development.

"When we're finished, someone needing a building site will be able to come to us and outline needs — not in the flood plain, a certain distance from any explosives area, have to have utilities, and all the rest — and we'll be able to come up with descriptions of all building sites meeting those criteria," he says.

The data base also catalogs existing buildings, including type of space, occupying organization, condition of roof, and other physical characteristics. Building the data base and plotting everything correctly is a big investment, he says, "but once we're there, it will be a valuable asset in planning."

•HK

Keeping Customers Happy

Planning May Change, but Basics Remain

No matter what else changes at Sandia — its mission, the approach to planning for the mission, where the work will be done, or any number of other things — the basic job of keeping such a vast area operating doesn't change.

For Tony Chavez, Manager of Facilities Operations Dept. 7814, those basics amount to seeing "that the lights work, the air conditioning and heat work, and we have a happy customer."

Even daily preoccupation with basics, though, haven't kept members of his department from adopting new ways of dealing with their work. Like other organizations, they're trying to use "quality" tools to refine their processes.

"We used to work out of buckets of money, but now we're working with detailed budgets," he says. "We're struggling with how to do business a better way."

Doing More with Less

Among the problems he has to solve daily, Tony says, is maintaining more square footage with fewer people doing the hands-on work. He says Labs square footage has doubled since 1977 — to about five million square feet today — while the number of "people working with screwdrivers" has decreased.

In addition, the world has changed. "A big difference is ES&H requirements," he says. "We've always had requirements, but they haven't been as tough as they are today. Another problem we face every day is complexity: The complexity of equipment has really challenged us."

Changing from old ways of doing things to

quality processes is difficult, he says; not because employees aren't willing to change, but rather, because it takes time. Also, he says, sometimes the plans handed down from upper management present great vision, but vision that's difficult to realize.

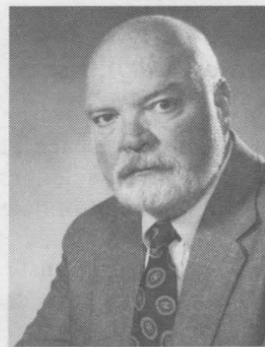
"To some people, quality means the best money can buy, not necessarily what the customer needs," says Tony. "For example, some people think if the customer needs a Volkswagen and you give him a Cadillac, that's quality. If he needs a screwdriver you can buy at Kmart for 50 cents, but you give him one you bought from a special tool supply house for \$50, you've given him quality. We've been trying to change that mentality, and I believe we've been successful."

Customer Satisfaction Survey

In an attempt to measure the effectiveness of training and its impact on customers, Tony has worked with a team of crafts people to develop a customer satisfaction survey. It is simple, short, and quick, and has helped greatly in making changes in work habits that benefit customers.

Reduced to simplest terms, he says, "The mission of the Laboratories changes from day to day, but our mission is still to operate and maintain a facility. I've discovered that, for the most part, if you do what's right, what makes good business sense, it fits right in with corporate guidelines. I always try to just do what's right, and every time someone reviews our work, it turns out that we're doing the right things."

Employee Death



JAKE JACOBS

James "Jake" Jacobs, Director of Facilities Program Management Center 7300, died suddenly Dec. 26.

He was 59 years old.

Jake joined Sandia in 1959. He became a supervisor in 1968 and led several groups before being promoted to manager in 1977. He was named Director of Nuclear Security Systems in 1988 and transferred to his most recent position in the Facilities organization in 1991.

Jake received many honors during his career, most recently the Army's Outstanding Civilian Service Medal. He was a Fellow of the Institute of Nuclear Materials Management and received a Distinguished Service Award from that group.

He is survived by his wife Dolores and three sons.

Sympathy

To Fred Schkade (1956) on the death of his father-in-law in Texas, Nov. 19.

To Gerry Crowder (9612) on the death of his father, Kenneth Crowder, in Albuquerque, Nov. 27.

To Dixie Chavez (1956) on the death of her mother in Albuquerque, Dec. 13.

(Continued from Page One)

Upward Feedback

points out, it will grow increasingly possible to discern trends in employees' opinions of managers. From 1992 to 1993, the average Labs-wide rating (all managers, all items on the questionnaire) increased from 3.62 to 3.83, she says. That's on a 1-to-5 scale in which 5 is excellent, 3 is satisfactory, and 1 is unsatisfactory.

At first glance, that increase may not look like much. But Susan says it represents a shift of about 20 standard deviations — statistically, quite a significant change. Also, the number of ratings in the "unsatisfactory" category dropped by about half. "The quality approach ensures that you improve what you measure," says Susan, "and Upward Feedback appears to be providing quality metrics for Sandia managers."

Summarized information is available at three levels — Labs-wide, division, and center. "These summary reports don't contain names, comments, or individual manager information," says Susan. "They simply report the means [averages] of questions as responded to in the specified organization." Labs-wide data for previous years has gone to the office of the president and division data to each vice president. Center directors may call Susan on 844-4258 to request a summarized center report.

Sandia-wide results broken down by category are in the table on page one. For high- and low-ranked individual items, see "What Sandia Managers Are Good At — and Not So Good At" at right.

"We hope there'll be broad participation this time," says Susan. "We're trying to make it easier for both the Sandians providing the feedback and the managers being ranked by completing the whole process in three months, January through March, instead of taking eight months as we did last time. This compressed schedule will avoid major holidays, summer vacations, and the performance and rate review period."

The schedule tentatively calls for distribution and return of questionnaires in January, preparation of reports for managers in February, and feedback meetings by managers with employees in March.

Not Just Another Survey

The 1992 Upward Feedback had a participation rate of 75 percent. In 1993, participation declined to 54 percent. In both years, about 65 percent of participants included individual comments.

Susan says, "The decline could be in part because it hasn't been made sufficiently clear to Sandians that Upward Feedback is completely distinct from another survey. That other one is 'Sandians' Perspective,' also known as the Stanek Survey. It was offered to all employees in the summer of 1991 and again to many employees last fall. Because Upward Feedback occurred in both 1992 and 1993 — with a pilot version in 1991 — it's possible that some Sandians felt over-surveyed."

But the two surveys serve different purposes, says Susan. "The Stanek Survey isn't about individuals. It's a gauge of employee morale, of opinions of the Labs as a whole and of things such as benefits and broad Sandia policies. A person's responses may be affected by his or her feelings about an individual manager, but the results don't go to that manager."

Upward Feedback results, by contrast, go directly to the manager and are valuable to him or her as a guide for improvement. "You have the chance to help yourself by encouraging your manager to improve in ways that will benefit you in your everyday work," says Susan.

Same Form, but Comments on Back

The survey form has the same items this year as in 1993, making it easy for managers to track progress. But the Upward Feedback project team

is making other changes in response to suggestions after last year's Upward Feedback. Last year, for instance, employees were asked to type or word-process their individual comments, to preserve anonymity while saving the expense of transcribing. This year, however, comments written on the reverse of the questionnaire will be transcribed by Dept. 3531 before the manager sees them.

Many of the ideas for improvements came from follow-up surveys in 1992 and 1993 asking participants what they liked and didn't like about the program. These ideas were considered by the Upward Feedback committee. There won't be a follow-up survey this time, says Susan. "We got enough good suggestions the past two years that

we're still working on putting them into effect."

One suggestion that's being adopted but that won't happen until next year is the resumption of skip-level evaluations. "Skip-level" means employees evaluate the manager two levels up in the organization — their boss's boss. That was done in 1992 but dropped in 1993 when Labs restructuring eliminated a level of management.

For most employees, that means next year they'll be evaluating their directors.

Though this year's Upward Feedback is all set to go, Susan says there's still plenty of work to do in developing next year's skip-level survey. Anyone interested in helping with the project can give her a call on 844-4258. ●CS

What Managers Are Good At — and Not So Good At — According to Labs Employees

Over the past two years, a pattern has begun emerging in Upward Feedback when all Sandia managers' scores are combined. According to project leader Susan Harty (3531), all but one of the following items were in the same low- or high-ranked group in both 1992 and 1993, but each item received higher marks in 1993. (After each item is the Sandia corporate value it reflects.)

The six highest-ranked items (those that employees said their managers excelled at) in 1993 were

- Actively implements Sandia's policies, programs, and procedures in regard to the environment, safety, and health (quality)
- Provides a work environment where there is equal opportunity for all employees regardless of gender, ethnicity, race, or disability (respect for the individual)
- Works to protect and enhance our health and safety (respect for the individual). Note: This is the only high-ranked item that wasn't in the top group in 1992.
- Creates an environment in which individ-

uals refrain from offensive behavior (inappropriate jokes, sexual harassment, offensive language, etc.) (respect for the individual)

- Demonstrates a commitment to the future of Sandia, not just to personal career advancement (integrity)
- Promotes the capabilities of our organization to others (leadership)

The lowest-rated items (those that employees said their managers were least successful at) in both 1992 and 1993 were (in no particular order, and with the corporate value listed afterward)

- Removes barriers to successful teamwork (teamwork)
- Ensures that I know the value of my contribution to the whole (teamwork)
- Effectively negotiates work requirements (quality)
- Establishes criteria to measure progress toward meeting requirements (quality)
- Disciplines and criticizes constructively (respect for the individual)

Hey, Does Anybody Out There Know How To . . . ?

International E-Mail Forum Helps Product Users 'Work Out the Bugs'

A typical message Randall Smith (2335) finds in his e-mail when he arrives at work each morning: "I have heard that there is a C compiler for Xilinx parts, and would like to know more about this work. Can anyone direct me to it please?"

In a few hours, electronic answers to the perplexed questioner's query will probably arrive from the desktops of engineers around the world.

Randy coordinates a new electronic-mail forum established by Sandia for users of Xilinx (pronounced Zi-links) field programmable gate arrays (FPGAs) — a kind of programmable integrated circuit often found in the circuitry of computing equipment. FPGAs may also have applications in automobiles, programmable appliances, and manufacturing. At Sandia, FPGAs are used in digital signal processors developed for automatic target recognition, for example.

Programming FPGAs can be labor intensive. Because software available for designing and configuring the circuits is relatively new, and because the circuits themselves are so complex, "engineers spend more time working out the software bugs and learning how to use the FPGAs than actually designing configurations and integrating them into systems," says Randy.

He and others at Sandia found that hot line numbers established by vendors were of little use in finding solutions to FPGA problems because the vendors had less experience using the software tools and circuits than did the users. "Because

FPGA technology is so new, anyone who uses them is going to have the same type of problems and questions," says Randy.

The new e-mail forum, called the Xilinx International Users Forum, connects FPGA users worldwide who have access to the Internet, the info highway used widely in the international computing community.

"Anyone who subscribes to the Forum through the Internet can now pose their questions about FPGAs electronically, and can get answers from users all over the world within a few hours," he says. The Forum now has approximately 550 subscribers (including 181 companies and 48 universities) in 31 countries.

"Nowadays, almost any company, large or small, can gain access to the Internet for less than the average household phone bill," says Randy.

He hopes establishing the forum, a pilot program for sharing information among users of a specific technology, will lead to other, similar e-mail-type forums. "It's proven to be quite valuable to tie together people in industry, universities, and government who are doing common tasks," he says. ●JG

Welcome

Albuquerque — Rose Mary Eakin (12640).
Elsewhere: California — Carole Barron (1323), Pennsylvania — Michael Readey (1845).

Hints for Young Scientists**'A PhD Is Not Enough,' Says Peter Feibelman**

There's many a slip 'twixt the cup and the lip, goes an old proverb. Or in the case of scientists, that might be "many a veer 'twixt school and career."

All too often, says Peter Feibelman of Surface and Interface Science Dept. 1114, young scientists don't get the advice they need in making the tricky step from graduate school to a scientific career. "I just about fell through the cracks myself," he says, describing how he began with the naive notion that a PhD in physics from a top university would guarantee a rewarding professional life.

At Sandia since 1974, Peter has used the hindsight of his own experience — and the successes and failures of others whom he has observed — to offer novice scientists some well-focused advice. It comes in the form of *A PhD Is Not Enough*, which Peter describes as a "pocket mentor." The book is published by Addison Wesley.

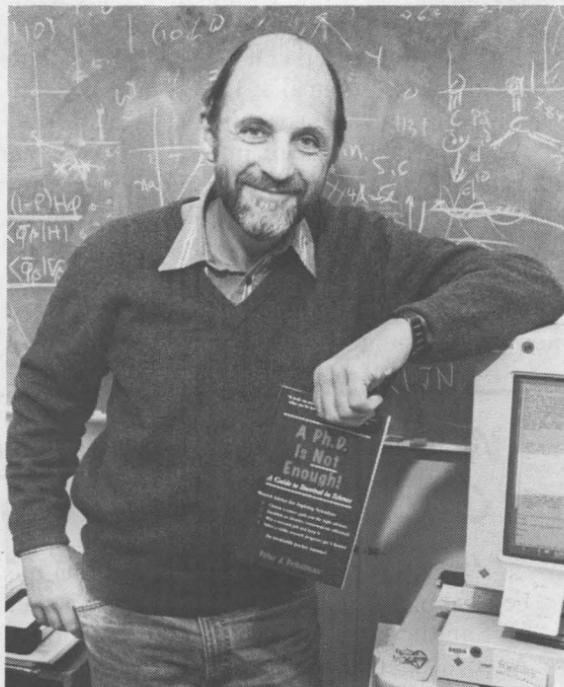
Though *A PhD Is Not Enough* is aimed at his professional colleagues — or potential colleagues — it was an evening and weekend project.

The just-over-100-page volume is intended to help scientists apply their talent to establishing a career that will be good both for them and for the society that invested in their education, says Peter. And it's for more than his fellow physicists. "I worked very hard to make the book accessible to people across the sciences," he says. Before publication, he had the manuscript read by friends in fields such as molecular biology, chemistry, and computer science.

Starting from a negative — the could-have-been-disappointment of his own career and the missteps of others — Peter used the benefit of a 25-year career to encapsulate advice about choosing a thesis advisor and a postdoctoral job, giving talks "that will make people want to hire you," writing papers that are timely and compelling, choosing a career path (university, industry, or government?), doing well in job interviews, writing successful grant proposals, and establishing a research program.

Not knowing about such things can have dire results.

"I've seen job candidates come to Sandia, give horrible talks, and never realize how they were



PETER FEIBELMAN

affecting the people listening to them," says Peter. "Or they're asked a standard question, such as 'If we give you a half-million dollars to set up a lab, what will you do?' and they haven't a clue how to answer it. I've seen others get jobs, but flounder and fail because they didn't understand how to get their career going in the right direction."

Reflecting on these observations, he says, he began "scribbling my scientific autobiography during some long airplane trips." Only a few paragraphs of that material became part of the book, but the "scribbling" led him to write about key aspects of a scientist's career that are seldom taught by professors and are discovered by the aspiring scientist only through trial and error.

Every scientist needs to find where he or she fits best, says Peter. "It's not better to work at Sandia and worse at a university, or the other way around," he says. "It's worth thinking seriously about which choices are better for the individual, and interviewing people at various laboratories.

"My book is an attempt to help bright people apply their brightness to making themselves happy." •CS

Sandia News Briefs**Sandia Wins Clean Air Challenge**

Thanks to 6.6-percent employee participation, Sandia won first place among large employers (more than 2,000 employees) in the recent Albuquerque Clean Air Challenge. To be eligible for prizes awarded by a drawing, employees were asked to send in pledge cards promising to use alternative transportation the week of Dec. 6-10. Sandra Harris (7815) won one of the grand prizes, a \$500 savings bond. Sandians also won 21 other prizes in the individual drawings. By sending in their pledge cards during the campaign, Sandians also indirectly contributed 620 new trees to the City of Albuquerque. Tree New Mexico has promised to plant one seedling in an Albuquerque park or landscape area for every returned pledge card, resulting in a total of 2,000 new trees in the Albuquerque area.

Labs to Work with Industry to Improve Portable Electronics Batteries

Sandia has signed a cooperative research and development agreement (CRADA) with AT&T Bell Labs and three battery manufacturers — Eveready Battery Company, Rayovac Corporation, and Wilson Greatbatch Ltd. — to work jointly to identify and characterize a carbon material that can be used as an anode for rechargeable lithium ion batteries. The aim of the research is to improve these batteries, currently being introduced by Japanese companies, to power new lines of cellular phones and camcorders. Sam Levy of Exploratory Batteries Dept. 2523 is leading Sandia's effort in the CRADA. The groups hope the work will enable US manufacturers to better compete in this emerging market.

Sandia Joins Task Force to Evaluate Soldering Technologies

Sandia and 18 industry, military, and government organizations have formed a task force to evaluate environmentally friendly, low-residue soldering techniques for use in manufacturing military electronic components. The task force was organized by Manufacturing Systems Reliability Dept. 6613; Ron Iman is the project leader. The effort is supported by task-force-member contributions and DOE matching funds. Texas Instruments co-chairs the task force with Sandia. Project work will be conducted at several sites. Task force members will meet regularly to discuss issues and results, and will solicit input from other organizations.

Send potential Sandia News Briefs to LAB NEWS, Dept. 12660, MS 0413.

Take Note

Technical papers are being solicited for the 16th annual Ideas in Science and Electronics Exposition and Symposium (ISE '94) to be held May 17-19 in Albuquerque. Co-sponsored by ISE, Albuquerque Section IEEE, and Rio Grande Electronic Representatives Association, this electronics showcase features free tutorials and technical paper seminars. Topics in the ISE '94 Call for Papers include artificial intelligence, communications, signal processing, instrumentation and testing, medical/biomedical instrumentation, pulsed power applications, robotics and remote manipulations, and smart highways. Anyone interested in presenting at ISE '94 should send a one-page abstract by Jan. 15 to Technical Program, ISE Inc., 8100 Mountain Road NE, # 109, Albuquerque, NM 87110-7827 (phone 262-1023, fax 265-1143).

"Vacuum Basics for the Novice," a short course presented by the American Vacuum Society, New Mexico Chapter, will be presented Tuesday, Feb. 8, 9 a.m.-5 p.m., at the Albuquerque Holiday Inn Pyramid. Woody Weed of Thin Film, Vacuum, and Brazing Processes Dept. 2471 is the instructor. The course is designed for newcomers to applied vacuum technology and people who want to familiarize themselves with the field. It is intended primarily for the technical novice who needs an understanding of the vacuum environment, as well as the equipment and instrumentation used to produce and measure it. However, anyone whose business it is to select, use, market, or repair vacuum equipment, instruments, or processes (or to communicate effectively with those who do) is welcome to attend. Registration fee is \$250. For registration information, contact Carol Blair on 271-9216. For technical information, contact Woody on 845-9267.

People interested in improving their speaking skills, giving presentations, or improving their self-confidence in front of audiences are invited to join a local Toastmaster group, where these skills can be learned and practiced in a supportive environment. Kirtland MCs meet Thursdays, noon-1 p.m., in the second floor conference room in Bldg. 20203 (Wyoming and F Street). For information, call Cindy Gregory (3521) on 245-9309.

Fun & Games

Bowling — SANDOE Bowling League Bowlers of the Year for the 1992/1993 season were determined in November, and they competed in the Bowler-of-the-Year tournament on Dec. 5 at Holiday Bowl to determine overall winners. The winners are: Scratch — Jerry Long (ret.), 649; Rena Yellowrobe (6423), 553; Handicap — Reyes Chavez (7433), 536 and 641; and Dorothy Castro (DOE), 504 and 684.

November Bowlers-of-the-Month include: Scratch — Don MacKenzie (1554), 644; and Helen "Charlie" Husa, 513; Handicap — Reyes Chavez, 591 and 672; and Ruby Cochrell (6400), 459 and 633.

Computer Glitch Caused Inaccurate Savings Plan Reports

A computer problem caused Fidelity Investment's automated voice response system to dispense inaccurate information from Dec. 11 through Dec. 22, giving some Sandia participants Savings Plan balances that were different from their actual dollar amounts.

No investors lost any principal, interest, or dividends due them, and by the time of the printing of this notice, all corrections should have been made and entered.

If you have questions or want more detailed information, please contact Rebecca Spires (3542) on 844-9965.

What's the Moral of This Story?

ES&H Pros Turn Misfortunes into Lessons for Others

When a nasty chemical is spilled at Sandia or a worker is hurt, the incident doesn't just end when the spill is cleaned up or the worker is released from Medical.

Most incidents are entered into DOE's Occurrence Reporting and Processing System, a computerized memory that tracks unusual happenings within DOE. Then a team of Labs ES&H pros tackles the occurrence to find out exactly what took place and why.

After the investigation is complete and a root cause (main, underlying reason) is established, team members ask: "What's the moral of this story?" The answers, referred to as "lessons learned" from the incident, are perhaps the most important part of the investigation, says Leland Byers of ES&H Assessments Dept. 7001.

"If something happens in one part of the Labs, we want to let everybody at the Labs know so that similar incidents can be prevented in the future," he says.

Lee is coordinator of Sandia's ES&H Operating Experience program, a mechanism by which

Sandia shares its lessons learned among Sandians and with other DOE facilities. Sandians may occasionally find one-page tip sheets, called ES&H Operating Experience Reports (OERs), in their mailboxes. Each report contains accurate information about an occurrence or practice and a person to call for more information.

Lee also scouts the DOE-wide occurrence reporting system for applicable lessons learned from other DOE facilities. Subject matter for the tip sheets sometimes come from that system or from DOE safety publications.

Lee emphasizes that Operating Experience Reports don't always feature bad occurrences. When a Sandia group is doing something good that's noteworthy, that information is also reported. OERs fall into three categories: lessons learned (accidents or near misses), noteworthy practices, and suspect materials (counterfeit parts, etc.).

OERs are regularly distributed to ES&H coordinators, facility managers, and DOE/AL and DOE/KAO offices. Center ES&H coordinators are encouraged to distribute them to employees if the lessons are applicable to work in their center. Since May 1992, when the program started, 24 of the reports have been distributed.

Lee says several of the reports have been catalysts for making improvements in Sandia work practices or policies. He asks that Sandians let him know if they take any action as a result of an OER. ●JG

ES&H OPERATING EXPERIENCE	
Correlated and Distributed By: Sandia National Laboratories Albuquerque, NM 87185 ES&H Assessments Department, 7001	
WATER HAMMER ACCIDENT KILLS HANFORD WORKER	
TYPE: Lessons Learned	Vol. 2, No. 17A
DESCRIPTION	
On June 7, 1993, a journeyman power operator at the Hanford Site entered a steam pit to open a valve. He was fatally injured after a water hammer ruptured a cast-iron valve, filling the operator's work space with steam. The worker died a week later, on June 14, from lung injuries.	
Abe Greenberg, Utilities Manager at Westinghouse Hanford Company, gave a presentation to interested Sandians, other individuals responsible for Kirtland Air Force Base steam systems, employees of Los Alamos National Laboratory, and Department of Energy employees on October 22, 1993. Abe discussed the details of the accident, the causes, the lessons learned, and the actions required to prevent similar events.	
The presentation was video-taped and is available from Marty Peterson, Department 7817, (505) 844-9365.	
Radio Sandia's Bruce Hawkinson interviewed Abe to help communicate the important lessons learned from this accident. The interview will air on Radio Sandia, 1610 AM, sometime during the week of November 1, 1993.	
LESSONS LEARNED	
There were an abundance of lessons learned and corrective actions identified from this occurrence. Some of the generic lessons learned for management when overseeing any activity were:	
<ul style="list-style-type: none"> • Identify hazards and prioritize corrective actions based on risk potential • Eliminate or control the hazards • Have procedures to address hazards control • Train workers on those procedures • Communicate management intent that procedures be followed • Check to be sure procedures are being followed 	
ES&H HAZARD CATEGORY:	P1 Boilers and other Pressure Vessels T2 Steam, Steam Lines Z1 Confined Spaces, Vaults, Pits, Excavations, Chambers
MIIP REQUIREMENT:	5.3 PHA Implementation 6.5 Design Control
CONTACT:	Call Lee Byers, 845-8206 for further information.
REFERENCE/SOURCE:	Occupational Safety Observer, DOE Office of Safety and Quality Assurance, Vol. 2/No. 9 and Vol. 2/No. 10
<small>As a means of measuring the effectiveness of the OE Program, if any action is taken within your area, in response to this report, please inform Lee Byers (505) 845-8206. Your feedback is both important and appreciated. To our knowledge, the information in this report is accurate. If you find a technical inaccuracy, please notify Lee Byers (505) 845-8206.</small>	
<small>Please let Lee Byers know if the efforts to update the distribution list have failed. Corrections will be implemented promptly.</small>	

Congratulations

To Cathy and Bill (7714) Mairson, a son, James Michael, Nov. 16.

To Kathy and Bill (9615) Pregent, a daughter, Elizabeth Lauren, Dec. 7.

To Theresa Garley (7141) and Louis Gonzales, married in Los Lunas, Dec. 3.

THE PROS OF PREVENTION — This Operating Experience Report was prepared when a worker at Westinghouse Hanford was killed after a valve inside a steam pit ruptured. Abe Greenberg, Utilities Manager at Hanford, recently shared lessons learned from the incident during a talk at Sandia.

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

Deadline: Friday noon before week of publication unless changed by holiday. Mail to Dept. 12660, MS 0413 or fax to 844-0645.

Ad Rules

1. Limit 20 words, including last name and home phone (the LAB NEWS will edit longer ads).
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8 1/2" by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per category per issue.
8. No more than two insertions of same "for sale" or "wanted" item.
9. No "for rent" ads except for employees on temporary assignment.
10. No commercial ads.
11. For active and retired Sandians and DOE employees.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.
13. "Work wanted" ads limited to student-aged children of employees.

MISCELLANEOUS

- SANGO CHINA, 97 pieces, Blue Ridge, platinum trim, unused, \$150. Cianciabella, 268-7150.
- PRINTER, Epson FX286-NLQ, \$85. 30-day return. Dietzel, 294-4702.
- CHILTON REPAIR MANUAL, for Mazdas from '78-'89, models MPV, GLC, RX-7, 323, 626, 929, and MX-6, 500+ pages, \$15. Martel, 293-1892.
- CALCULATOR, HP 325, never used, still in box, \$30. Dwyer, 271-1328.
- HANDMADE CHINESE RUG, 100% wool, \$675; five Madame Alexander dolls, bent knee walkers, \$115; five Kachina dolls, \$35. Cooley, 255-5297.
- SKI RACING PANTS, Tyrolia, men's size 30 regular, worn twice, \$50; JBL bookshelf speakers, originally \$350, asking \$125. Nagel, 242-7832.
- SERGER, Singer Quantum Lock 4, top-of-the-line, differential feed, \$450 OBO. Hutchinson, 823-2620.

LOOK CARBON PRO PEDALS, never used \$100, used \$70; new Look arc cleats, \$10; studded cleats, \$8; IBM DSDD floppy disk drive, 5-1/4-in. Williams, 856-5722.

SAILBOARD, 12-ft. Sprint, beginner/intermediate, Mistral 5-meter sail, Thule sailboard rack, w/ski attachments, \$325. Green, 281-4533.

OUTDOOR SPA, 5-person, 4 yrs. old, \$2,500. Hunter, 865-5745.

WASHER & DRYER, Montgomery Ward, extra-large capacity, 4 yrs. old, excellent condition, \$400. Langwell, 293-2728.

PATIO DOOR, sliding glass, 6-ft., complete w/rails, jams, and sliding screen, good condition, \$30. Jones, 881-8341.

PIANO, Yamaha, purchased at factory in Tokyo, walnut, console, full keyboard, \$1,675 OBO; desk, 30" x 60", 4 drawers, \$45. Both excellent condition. Fjelseth, 857-0240.

GE ELECTRIC DOUBLE OVEN and separate 4-burner cooktop w/vent hood, approx. 27 yrs. old, works great, remodeled so must sell, \$150 OBO. Waggoner, 293-4755.

PANASONIC MATRIX PRINTER, 11-in., 24-pin, \$100. von Riesemann, 822-0548.

OAK DRAFTING TABLE, 3' x 5', w/parallel bar, \$125; vehicle tow bar, 5,000-lb. capacity, \$100; large side-by-side refrigerator, \$250. Wernicke, 237-9332.

COAT, woman's size 14, wool, long, egg-shell color, lined, fox fur collar, \$35. Locher, 266-2021.

COMPUTER DESK, oak, w/shelf, pencil and file drawers, 35"H x 48"L x 24"D, great student desk, \$65. Harrington, 899-1277.

MAGNAVOX COLOR TV, 25-in. screen, console, remote control, excellent condition, \$250. Wade, 857-9114.

PIONEER TURNTABLE, Model PL-510, \$20. York, 828-9505.

COLOR PRINTER, Hewlett Packard Deskjet 500C, \$400. Spencer, 275-8468.

CANOE, Old Town Penobscot, 16-ft., w/tie downs, \$400. Williams, 856-5722.

WOOD BURNING STOVES, Sierra or Avalon, EPA-rated. Both in great shape. Ask for Steve. Garcia, 343-8207 after 6 p.m.

SCHWINN EXERCISE BIKE, extras, like new condition, \$75. Esterly, 296-9759.

SOFA BED, light beige color, queen-size, \$150. Palmquist, 281-5951.

REFRIGERATOR, \$125; moving boxes, \$110 for lot or sell individually; king-size pedestal waterbed, \$125; engine stand, \$40. Schrader, 298-4154.

CAMERA, Mamiya NC-1000, 35mm, w/50mm lens, good condition, \$65; Vivitar 152 flash, \$15; or both for \$75. Lojek, 898-2979.

Feeling Rejected? Please Follow the Rules

Some "unclassified ads" are rejected because they do not meet requirements. LAB NEWS staff members do not have time to call people who submit ads, so non-qualifying ads are rejected *without notice*. The most common reason for rejected ads is that Sandians do not list their full names and organization numbers; this information is not printed, but it is necessary to verify that the ad was submitted by a Sandian. The rules are printed at the top of the ads in each issue, and Sandians are encouraged to clip and save a copy.

CONDOMINIUM, at Pagosa Springs, Colorado, near Wolf Creek Ski area, elegant double unit, sleeps 8, Feb. 19-26, \$450. Diegle, 856-5608.

COMPUTER, IBM compatible, 640K, 30MB HD, 3-1/2-in. & 5-1/2-in. floppies, Hercules graphics, software, 9-pin printer, \$300. Hietala, 867-9577.

ROCKING CHAIR, solid hardwood, high back, \$65; motorcycle helmet, safety high-impact windshield, gray fiberglass, "Star LTD," \$50 OBO. Stang, 256-7793.

SHOP MAINTENANCE MANUALS, for '84 Ford light trucks, complete set, \$35. Fisher, 275-3869.

WORD PROCESSOR, Brother Model WP-760D, perfect for student papers, barely used, \$150. Skogmo, 292-9773.

RIFLE, Browning .243 BLR, w/4X Nikon scope, \$400. Jimenez, 296-9256 after 7 p.m.

BROOMSTICK SKIRTS, all cotton originals, some w/blouses, size 23-in. waist, 26-30-in. length, \$40-\$50. Anderson, 293-2490.

TRANSPORTATION

'84 JEEP GRAND WAGONEER, outstanding condition, power everything, towing package, leather upholstery, 103K miles, \$6,000. Kercheval, 1-864-6549.

'79 PORSCHE 928, loaded, 5-spd., 4.5L V8, leather interior, pampered, only two owners, must see, \$8,500. Philbin, 828-2413.

'80 DATSUN PICKUP, 5-spd. standard transmission, gray, needs paint, good body, excellent engine, \$1,400; woman's bike, \$75. Cooley, 255-5297.

MOUNTAIN BIKES: 20-in. Fisher HKII, \$250; 21-in. Stumpjumper Comp., \$400. Both in excellent condition. Dwyer, 271-1328.

'75 DODGE PICKUP, 3-spd. 318, highway mileage, trailer hitch, extra wheels, some rust, dependable, runs well. Krumel, 281-4406.

'86 DODGE RAM VAN, 15-passenger capacity, highway mileage, used as Sandia Labs commuter. Trujillo, 865-0253 or Monnet, 865-9741 after 5:30 p.m.

'82 YAMAHA VIRAGO, 750cc, fairing and Vetter bags included, approximately 20K miles, needs battery, \$850 firm. Romero, 294-4709.

'74 PLYMOUTH VALIANT BROUGHAM, 46K original miles, 318 V8, AT, AC, PS, PB, one owner, excellent condition throughout, \$2,000. Langwell, 293-2728.

'85 SUBARU GL STATIONWAGON, 4WD, 5-spd., red, AC, 112K miles, very good condition, \$3,000. Green, 281-4533.

'86 MERCEDES 300SDL, turbo diesel, classic extended body, low mileage, immaculate, \$24,000. Williams, 856-5722.

'62 CHEV. TRUCK, 2-1/2-ton, 20-ft. flatbed, rebuilt 350 CID engine, strong, running, and clean, \$3,500. Ask for Jim. Burke, 864-7270.

'91 KAWASAKI KX250 DIRT BIKE, looks good, runs well, \$1,750. York, 828-9505.

TOURING BICYCLE, Maruishi Road Ace, 23-in. frame, 12-spd., like new, \$80. Hietala, 867-9577.

'83 MAZDA 626 TOURING SEDAN, 4-dr. hatchback, 5-spd., all power, AC, low mileage, excellent condition, \$2,500 OBO. Anderson, 293-2490.

REAL ESTATE

2.1-ACRE HOME SITE, in Tome, irrigated, most underground utilities, Albuquerque local phone service, beautiful, green, \$35,000 OBO. Bevington, 1-864-3529.

2-ACRE BUILDING SITE, Cedar Crest area, \$25,000/acre, possible terms. Netz, 281-3607.

2-BDR. TOWNHOUSE, Central/Tramway area, 2 full baths, 2-car garage w/opener, fireplace, sunlights, more, \$75,500. Romero, 294-4709.

3-BDR. PATIO HOME, Northeast, 1,420 sq. ft., 8 yrs. old, 2 full baths, 2-car garage, fireplace, balcony w/great views, \$110,000. Bur, 821-2515.

4,000 ACRES, trees, water, hunting, 95 miles from Albuquerque as crow flies, \$195,000, 30% down, carry balance. Manon, 345-4006.

WANTED

SNOW SHOES, adult size. Benischek, 268-0658.

METAL DETECTOR, to borrow for sweeping home remodel site for nails. Nagel, 242-7832.

PROFESSIONAL MASSAGE TABLE. Hymer, 293-6029.

DINING ROOM TABLE, 54" or 60" round, prefer mahogany or cherry wood, w/leaves and chairs. Larsen, 837-1994.

MATERNITY CLOTHES, sizes 8-10 or medium, winter/spring, business attire, dresses, and casual. Romero, 294-4709.

HOUSE TO SHARE, non-smoking Sandian, prefer private bath, have two nice cats, need by Jan. 31. Jones, 294-2172.

HOUSE TO RENT, 2-3 bedroom, no pets. Ask for Bob. O'Neill, 266-8810.

LOST & FOUND

LOST: Silver cross, about 1-in. long, fell off of chain on Dec. 8. Please return to Bldg. 880/B3. Goodness, 844-4404.

FOUND: Watch, at Johnson Gym men's room after SERP basketball games on Dec. 18. Forster, 294-3564.

Coronado Club Activities

Poorboys Tonight — Jammin' in January

START THE NEW YEAR RIGHT — with those year-round favorites, the Isleta Poorboys. They'll be on the club stage tonight, Jan. 7, playing your favorite country and western tunes from 7 to 11 p.m. And of course there'll be some menu favorites: T-bone steak (\$11.95) or grilled halibut (\$10.95) — not to mention that other favorite, the all-you-can-eat buffet for just \$6.95, featuring baked ham, baron of beef, and roast turkey breast. Call for reservations (265-6791).

IT MAY BE COLD, but the cheer is warm at the club's Sunday brunches and tea dances. The first one this month is Jan. 9, when brunch is served from 10 a.m. until 2 p.m. Bob Weiler and the Cats play for the tea dance from 1 to 4 p.m. It's a bargain, at \$6.95 for adult members, \$7.95 for guests, \$1 for kids 4-12, and still free for toddlers 3 and under. Reservations required — call 265-6791.

KIDS' BINGO is always fun, and it comes back to the club next Friday, Jan. 14. Kids who

play bingo get a free hot dog and soft drink, plus a chance to win some nifty prizes. A buffet is served starting at 5 p.m., and bingo begins at 7 p.m. Before bingo, the kids will enjoy the antics of Pixie T. Clown and Friends. If your child has a January birthday, give the club a call (265-6791) — those obliging folks will reserve a special table for the child and friends, and will provide birthday cake and balloons.

BIG FOLKS' BINGO — Every Thursday night is bingo night, and that means guaranteed fun and possible prizes. Card sales and the buffet line open at 5:30 p.m., and early-bird bingo starts at 6:45. Members showing their membership card get \$1 off the cost of a bingo packet and a 10-percent discount for the buffet. Bingo packets are \$5 for a single packet (12 games), \$9 for a double, and \$13 for a triple. Games include Jackpot Specials, the Fortune Wheel, Last Chance, and U-Pick-'Em (where the payoff can be as high as \$2,000).

Long-term Care Presentations Planned for January 19

Two out of five Americans age 65 or older need nursing home or custodial care. Such long-term care can place an enormous financial and emotional strain on families.

Sandia's Benefits Department is sponsoring a presentation that can answer questions about long-term care (what it is, who's eligible, who pays for it, how much it costs, and what to look for in a long-term care program). Living wills, durable power of attorney, and other personal planning issues will also be discussed briefly.

Presentations take place Wednesday, Jan. 19, at the Technology Transfer Center (Bldg. 825) beginning at 10 a.m. and 2 p.m. Each session will last approximately 1-1/2 hours.

Long-term care can affect anyone. All employees, retirees, and spouses are invited to attend either session. Seating is on a first-come basis.

Sandia in the News

This is a periodic column listing a selection of print and broadcast news reports about Sandia. It is provided by Media Relations Dept. 12630 to give Sandians a sense of what is being said about Labs work in national and international media.

BBC-TV's "Tomorrow's World" ran a feature about Sandia's micro steam engine. Besides a concise description of how the engine operates, the piece aired video of the engine at work — piston movement could be easily seen.

The international magazine *Science News* chose the micro steam engine as one of its top 10 materials news stories of 1993. The magazine's summary: "A micrometer-scale steam engine perched on a silicon wafer can deliver 100 times more power than electrostatic motors of the same size."

The *Denver Post* and the *Rocky Mountain News* published stories about a new five-year, \$35-million Sandia/Science Applications International Corp. agreement to develop and construct 25-kilowatt solar-thermal dishes capable of producing enough electricity to power about 25 homes. Project manager Paul Klimas (6201) is quoted extensively.

USA Today reported on the possibility of Sandia experts visiting the unfenced New Mexico Boys School early this year to study ways to prevent escapes from the facility without creating a prison atmosphere.

Parade Magazine referenced work being done by Sandia and the other DOE national labs in support of President Clinton's clean car initiative.

The *Star-Ledger* (Newark, N.J.) ran a major story, with photo, about the cooperative research and development agreement between Sandia and Emcore Corp., of Newark, that aims to develop a new generation of metallorganic chemical vapor deposition systems. The piece quotes Emcore president, Norm Schumaker: "We are pleased to cooperate with Sandia... in this effort to maintain US leadership in the important area of materials growth systems."

Mention of Sandia's work with Bicicletas Corp. to make titanium bicycle crank arms showed up in the *Miami Herald*.

Automotive News quoted Heinz Schmitt (VP-2000) on the possibility of using virtual reality technology as sales tools in car dealership showrooms. "I think you could make the car dealer's job more exciting by having one of these virtual reality helmets on the customer and having the customer drive the car and actually experience the car he's specifying," Heinz said.

A recent *Villisca* (Iowa) *Review* feature story described a new Ames Lab-sponsored elementary school science carnival patterned after a similar Sandia/California effort. The story mentions that "two Californians," Donna Opdahl and Dean Williams

(both 8526), traveled to Iowa to help six Ames Lab scientists get the program off to a good start.

A lengthy front-page story in the *Providence* (R.I.) *Journal* used Sandia's work with General Motors to develop lighter-weight materials and to lower emissions as examples of a new cooperative spirit between government labs and industry.

London's *Daily Mail* ran a short story on application of Sandia's sticky foam as a nonlethal weapon that could retard thieves and burglars.

The *New York Times* and *San Francisco Examiner* were among the papers to mention Sandia's advanced engineering contributions to the world's first luxury resort to use sun and wind power exclusively. It's located in the Virgin Islands.

The *San Francisco Examiner* carried a piece on work Jim Martin (1153) is doing with electrorheological fluid — it solidifies instantly when exposed to an electric field — and likened it to the "liquid metal" from which the shape-changing killer robot of "Terminator 2" was fashioned.

CNN's "Future Watch" news feature made a quick reference to Sandia, Bellcore, Hewlett Packard, and Digital forming a coalition to develop technology for the information superhighway being touted by Vice President Gore.

A *Newsweek* magazine article that discusses improvements in computer and ATM security quotes James Holmes (9612) and identifies him as a biometrics expert.

A lengthy technology transfer-related piece in Arizona's major daily, the *Arizona Republic*, leads with an anecdote about a Phoenix businessman meeting with Jeff Sniegowski (1325) to talk about various applications of the micro steam engine. ●

Counterintelligence Briefings Scheduled For January 20-21

Ray Semko, DOE Headquarters' Office of Counterintelligence, will present three briefings about international intelligence activities to Sandians on Jan. 20-21. The sessions are titled "Defensive Information to Counter Espionage" (DICE).

Semko's updated DICE IV briefings will be at the Secret/National Security Information level, open to Sandians holding "L" or "Q" clearances. Attendance will fulfill the annual security refresher requirement; seating will be on a first-come basis.

Briefings will be presented:

- Jan. 20, 2-3:30 p.m., Bldg. 962 auditorium.
- Jan. 21, 8:30-10 a.m., Bldg. 825 (TTC) auditorium.
- Jan. 21, 10:30 a.m.-noon, TTC auditorium.

Semko has more than 20 years' experience as a counterintelligence specialist, including management of counterintelligence and espionage investigations for the Army. Before moving to DOE, he worked in the Threat Countermeasures Branch of the Defense Intelligence Agency.

He was invited to Sandia by the Labs' Counterintelligence (CI) Program Office, the Operations Security Program, and the Security Education Program. Questions about the briefings should be addressed to Christine Garcia of the CI Program Office (7400) on 844-8263 (fax 844-3242). ●



UNPLUGGING ALONG — The Labs' administrative computing systems recently switched off an old Unisys computer, transferring everything to an IBM system. The changeover from a mixed system to all-IBM was a project taking several years, says Dorothy Rarick, Manager of Operating Systems Dept. 10324. Among the people on the project team were (from left) Charles Cote (10326), Anne Cosbey, Jim House, Ramona Gauna, Bob McCornack (all 10325), T. C. Adams (10329), Nancy Marsh, Ziggy Piscotty, and John Reddy (all 10325).