

Clouds vs. the sun: Clearing up the global climate forecast

Labs' atmospheric monitoring station on its way to the tropics

By John German

Lab News Staff

Even with satellite imagery and other high-tech tools, meteorologists have a difficult time forecasting tomorrow's weather today. How, then, can atmospheric scientists be expected to predict with any accuracy worldwide climates 10, 50, even 100 years from now?

Mark Aguilar and Mark Ivey of Environmental Characterization/Monitoring Systems Dept. 6612, along with several other members of a Sandia integration team, have spent the last several months piecing together their own small contribution to humankind's ability to predict long-term global climate changes. In mid-May, their Sandia-integrated Atmospheric Radiation and Cloud Station (ARCS) will be shipped to the tropical western Pacific Ocean, where it will spend the next 10 years watching clouds as they drift over a remote spot on the equatorial island of Manus, Papua New Guinea.

The project is a part of DOE's Atmospheric Radiation Measurement (ARM) Program, which is seeking to understand how sunlight and infrared radiation interact with clouds and, in particular, whether varying levels of atmospheric moisture could influence Earth's radiative energy budget to the point of causing

long-term, worldwide climate changes.

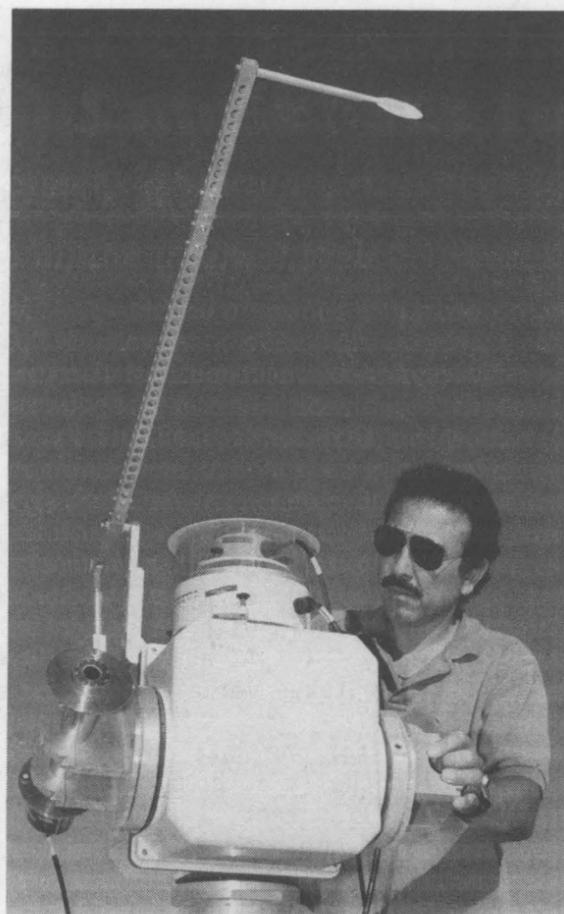
Data from the program are expected not only to help atmospheric researchers understand climate mechanisms in specific regions of the world, they also should lead to improved numerical models, called General Circulation Models (GCMs), that may one day help researchers and policy makers study the likelihood that Earth's climate could undergo a warming effect caused by emissions of man-made greenhouse gases.

Understanding El Niño

The ARM Program's goal is to establish groupings of atmospheric measurement stations in three primary regions of the world. Each region was selected because researchers believe weather mechanisms in the area play critical or not-yet-well-understood roles in the overall global climate picture.

The Tropical Western Pacific (TWP) region where Manus is located, for instance, is known in climate circles as the "warm pool" for its unusually warm ocean surface temperatures. The warm ocean supplies heat and moisture to the atmosphere above it, resulting in the formation of high-altitude cirrus clouds that disperse over the entire region and help regulate

(Continued on page 4)



SKY WATCHER — Mark Aguilar examines a solar tracker that follows the sun as part of the Atmospheric Radiation and Cloud Station (ARCS) outdoor sensor array. Until recently, the Sandia-integrated ARCS was set up on the southwest corner of 20th Street and H Ave., east of Tech Area 1 at Sandia/New Mexico. (Photo by Mark Poulsen)

Sandia National Laboratories Sandia LabNews

Vol. 48, No. 9

April 26, 1996



SAY "AWE" — Some of the more than 1,000 rocket buffs who gathered for the April 20 "Launch into Spring" event look skyward as a salvo of model rockets leap from their launch pads. The event, organized by the Hinkle Family Fun Center and sponsored by Sandia, the Albuquerque Rocket Society, and a number of other local organizations, featured scores of launches of rockets ranging from 18 inches to six feet or so in length. Sandia volunteers at the event demonstrated a small wind tunnel and rocket engine test stand. Admission to the event was one can of food for the Roadrunner Food Bank. More photos on page 7. (Photo by Randy Montoya)

Sandia 2000 conference called 'first step in a journey'

The Sandia 2000: United for Success managers' conference is over, but the gears it set in motion have just begun to turn. Jo Ann Romero, Manager of Leadership and Management Development Dept. 3526 and chair of the design team that put the conference together, said Sandians should view the conference "not as an event but as the first step in a journey."

The unprecedented meeting, which brought together more than 700 Sandia managers, directors, and vice presidents (*Lab News*, April 12), generated so much paper documentation, Jo Ann says, that it took up as much space in her pickup truck as "a cord of wood."

As the *Lab News* went to press, the multitude of minutes, forms, worksheets, and flip charts produced during the conference were being consolidated and compiled by design team members, Jo Ann reports. The resulting information will be analyzed and condensed to produce an official conference proceedings, an executive summary, and a conference summary document.

While it is too early to address specific results from the conference, some broad and tangible outcomes are already becoming apparent. As reported in the article "Participants offer views on Sandia 2000 managers' conference" on page 8, most line managers clearly appreciate the new environment of communication and teamwork among all levels of Sandia management that the conference represented. "I felt that for the first time in a while SQLC [Sandia Quality Leadership Council] was: (1) really working together; and, (2) was working at the same lab as the rest of us, not some other place," said one manager.

The *Lab News* will keep Sandians informed as more detail becomes available.

Labs' catalytic converter work may enable lean-burn car engines 5

Dr. Annette Sobel's unusual career mixes medicine and the military 6



This & That

Daily News easy to get - Readership for Sandia/New Mexico's new *Sandia Daily News* is starting to build, says Editor Bruce Hawkinson (12620), and it's easy to get. Most folks probably read it on the Internal Web (top of Hot News page) or on Sandia's bulletin boards. ("Thanks to all secretaries and other folks who are posting it," Bruce says.) But, for time-impaired employees and those who can't remember to check the Web or bulletin boards regularly, Bruce will e-mail or fax each *Daily News* issue to any employee. Give him a call at 844-4042.

Have a piece of humble pie. Bruce - Speaking of my colleague Bruce Hawkinson, Executive Staff Director Ron Detry (12100) caused him to be speechless for a moment (a difficult trick) last week as Bruce and I were preparing to interview Ron for the latest Sandia Quality Leadership Council (SQLC) summary report. Bruce uttered some shameless self-promotional statement, which prompted me to comment about his being a legend in his own mind. Ron then piped in with this: "Yes, Bruce continues to suffer from delusions of adequacy." (OK, I admit it. If we didn't like Bruce, we wouldn't slam him, but he takes verbal abuse so well and keeps coming back for more!)

Two-for-one sale on VP talks - Between writing columns for the *Lab News*, I actually do some honest work occasionally. (Did I hear gasps of disbelief?) In fact, I took over a new task recently: planning the revitalized employee town meetings featuring Sandia's VPs. We've scheduled two in the next two months that I think many of you will want to attend.

Roger Hagengruber, VP of National Security Programs Div. 5000 and Manager of the National Security Programs Sector, is up first. Roger will talk about what's happening and what's likely to happen in his considerable areas of responsibility on Wednesday, May 15, at 10:30 a.m. Chief Financial Officer Gary Riser (10000) will talk about a subject that we're all interested in - money - on Wednesday, June 19, at 10 a.m. Although the Labs' FY97 budget won't be firm by then, Gary may be able to peek a little further into our financial future.

Both Roger and Gary will give 20- to 30-minute talks, then field employee questions for the balance of an hour or so. Their talks will be in the Technology Transfer Center (Bldg. 825), and both will be video-linked to Sandia/California. Look for more details on Roger's talk soon.

Spell checker claims another victim - Several sharp-eyed Sandians brought an error to my attention in a recent issue of a Sandia internal newsletter. I can't repeat the misspelled word and keep my semi-prestigious job, so I'll just say that someone needs to be very careful to use that last letter in "assess." If you aren't careful, mistakes like this can make you look like a real - er, ah - you know what.

Last call to open house - This is my last chance to remind you that the Employee Communications, Media Relations, and Community Relations departments invite you to an open house in our new offices in Bldg. 811 on Thursday, May 2, 3:30 to 5 p.m. Again, 811 is located outside the tech area; it's the new single-story brick and stucco building north of Bldg. 800. Our main entrance is on the west side. I've just got to get busy now baking those tumbleweed cookies (what a great source of fiber!) for the open house. - Larry Perrine (845-8511, MS 0165, lgperri@sandia.gov)

Help us recognize Sandians

The *Lab News* wants to recognize employees who receive honors and awards. Call Bill Murphy on 845-0845 or send him a note at MS 0165. In California, contact Barry Schrader (8522) on 294-2447, MS 9111.

! Take Note

The New Mexico US-Japan Center is offering a summer "Technical Japanese" course in Albuquerque on Tuesday and Thursday nights beginning Tuesday, May 14. The course is open to scientists, engineers, managers, graduate students, and others with a technical background who need to acquire the basic skills required to monitor and disseminate Japanese scientific and technical information. No previous Japanese language ability is required. For more information, contact Michael Condon at 277-1495 or xmikec@nmjc.org or instructor Keiko Schneider at 277-1496 or kschenei@nmjc.org.

New Mexico Volunteers for the Outdoors is looking for volunteers for the Three Rivers Petroglyphs Project (approximately 36 miles northeast of Alamogordo), Saturday and Sunday, May 4 and 5. Help make the existing walking trail wheelchair accessible by clearing rock, grading the trail, spreading fine gravel, and lining the trail with large rocks. Camping will be available at the Lincoln National Forest Three Rivers Campground. For information, call project leader Jim Leverett in Las Cruces at 505-382-0361 (e-mail to leverett@zianet.com).

Scanners ready, set, go — Inventory '96 begins May 1

Like a diviner with a forked stick, your scanner-wielding property coordinator may come looking for bar-coded government property in your lab or office soon as part of Property Inventory '96, Sandia's annual property accounting process.

With a laser zap and a beep, each item scanned will update a computerized list of equipment Labs employees have agreed to steward for the American taxpayer.

But this year's inventory will be different from past efforts, says Jim Raines (7000), member of a reengineering team that has revamped Sandia's inventory process.

No longer will Div. 7000 property specialists visit your building in search of equipment. No longer will "property owning" employees be required to visit remote sites to check items loaned to contractors or non-Sandia facilities. And no longer will the annual inventory last more than a year.

Now individual centers are responsible for finding their own stuff and on their own terms. Only items with purchase prices greater than \$5,000 (rather than \$1,000), plus a few sensitive items, will be inventoried, reducing their number by 60 percent. Items that can't be found by



the time the inventory is complete will be deleted from shortage lists prior to the next inventory rather than sought year after year.

And when the three-month inventory window (May 1 - July 31) passes, Sandia will compile inventory results from the center inventory coordinators and submit its report to DOE.

"When it's over, it's over," says Jim.

The new process is quicker and cheaper at the request of the "customer," the inventory coordinators and property coordinators, who said repeatedly in interviews, during focus group meetings, and in surveys that the old inventory process was broken — it required too much effort and was too expensive, costing the line organizations millions of dollars in "hidden overhead."

"We're no longer aspiring for perfection," says Jim. "Sandia and DOE have agreed on some specific, cost-effective inventory goals that demonstrate responsible stewardship."

Pilot inventories using the revamped process were conducted in four Sandia centers in March. After the pilot, quality specialists Ron Diegle and Susan Harris (both 14700) evaluated the new process. Lessons learned will be applied to the Labs-wide inventory.

What can you do to make Inventory '96 hassle free? Jim recommends visiting the "assigned property confirmations" Internal Web page at <http://www-irn.sandia.gov/cgi-bin/templates/template_pacc.sh>, entering your name, making sure the property list is accurate, and finding all the property assigned to you before your inventory coordinator comes looking for it. — John German

Sympathy

To Roy Crumley (10232) on the death of his father-in-law, Duffy Dale Lowman, in Albuquerque, March 28.

To Mariann Johnston (12671) on the death of her father, Dick Johnston, in Grand Junction, Colo., April 11.

The *Lab News* is printed on recycled paper and can be recycled again along with regular white office paper.



Sandia LabNews

Sandia National Laboratories

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Albuquerque, New Mexico 87185-0165

Livermore, California 94550-0969

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Sandia National Laboratories is a multiprogram laboratory operated by Sandia Corp., a wholly owned subsidiary of the Lockheed Martin Corp. and a prime contractor to the US Dept. of Energy.

Ken Frazier, Editor505/844-6210

Barry Schrader, California site contact510/294-2447

Lab News fax505/844-0645

Published Fortnightly on Fridays by
Employee Communications Dept. 12622, MS 0165

LOCKHEED MARTIN

InfoDay '96 serves up technology tidbits and advice

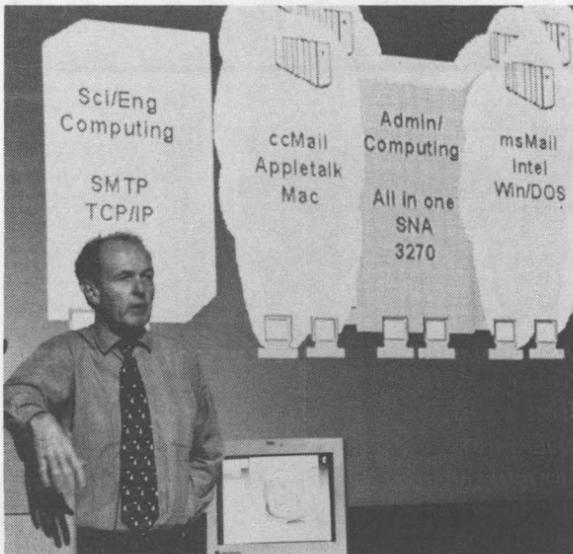
California site coordinates with Sandia/New Mexico as intranet and External Web take strides

By Nancy Garcia

California Reporter

Looking back at Sandia's growing use of the World Wide Web and Internet technologies in the year since the first InfoDay was held, Chief Information Officer Mike Eaton (4010) told employees at the California site he's learned that "the technology is hard, but the culture change is even harder."

Still, that change is apparent. Fran Current (4612) announced at the April 9 InfoDay '96 that Sandia now has about 8,000 Internal Web users, some 6,000 of whom are regular visitors to our intranet (Internal Web). Those numbers, Fran said, represent "just phenomenal growth — we're really pleased."



PROVIDING HIS VISION for a future information services work environment, Mike Eaton addresses an auditorium of listeners at Sandia/California's InfoDay '96.

Part of that switch has relied on access to the technology. Les Brown (8930) traced development of the communication infrastructure in California, and Rich Palmer (8901) described software enhancements that can enable access to a variety of old and new applications across all platforms and among the three defense laboratories.

Troubleshooting assistance has developed in California, as well. "In the past," noted Diane Gomes (8970), "if you had a problem, you literally called your friend or your neighbor or anyone who knew how to fix your machine." Since December 1995, however, the new Distributed Computing Services Dept. 8970 has been offering desktop and network support, hardware and software consulting, and configuration management to every center except 8900. The department was created during site realignment.

Reduce down time

"We reduce your down time," Diane said. "You don't have to spend three days working on why you're crashing with an 'error type 11' [common with 'init' conflicts on the Macintosh]." Eventually, she added, the site may create a centralized help desk for assistance with cc:Mail and desktop and network support.

Non-urgent requests for help can be sent via the Internal Web using a form that was pioneered by Center 8100. To find it, click on "Organizations" under the internal home page, select "8000," and at the bottom choose the California computer support and network support page. Or open <http://ca-mosaic/CCS.html>.

Current levels of support are based on each center's needs and funding. Eventually, however, Diane's group would like to model the Sandia/New Mexico customer service units, which support a geographic set of buildings.

Our own internal service order transactions have been modeled on the Web in an Electronics Prototype service order application developed and paid for by Center 8200, said Tracy Walker (8220). A variety of engineering software applications, including Smart Weld, originally created for Unix systems, have become accessible through the Web in a project spearheaded by Barry Hess (8220).

Now, a graphical interface on the Web allows users from a variety of platforms to easily use this and several different engineering codes.

Smile, you're on Candid Camera

Barry livened his short presentation by debuting an on-line camera he's trained on the Integrated Manufacturing Technology Laboratory courtyard, which users can move to see, among other things, if he's in his office (http://*.ran.sandia.gov/cgi-bin/getview.script).

Despite this sort of gee-whiz genius, developed and intended for internal use, Sandia's External Web development has been an entirely voluntary effort, pointed out John Larson (8940).

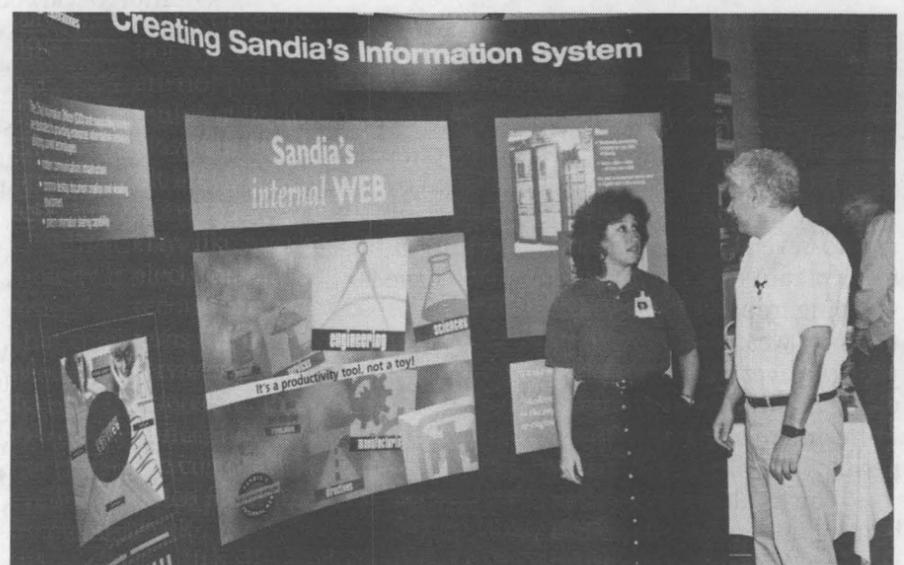
John is due to return to Albuquerque soon to lead efforts to bring Sandia's external Web presence up to the standards of our "world-class, very innovative" intranet. "We've spent the most money and effort on the Internal Web," he said. "That's about to change."

He envisions developing a project plan to present to Mike Eaton, Dan Hartley (4000), and the California site, which is currently advancing External Web efforts by evaluating a new search engine called Verity.

"For whatever reason," John said about the California site, "we've put our own page together. . . . Instead of duplicating efforts, we ought to have one front door to our site."

In the meantime, Karinne Gordon (8815) reminded the audience that Technical Communications provides both classification and style review free of charge for all External Web pages. Her group can also create and maintain Web pages for a fee.

In the library,



THE AUDITORIUM lobby held additional information, such as this display that Rita Hoak (4612) is showing to Rich Palmer (8901).

Sandia California News

Sandra Lormand (8950) pointed out, employees are being guided toward electronic resources that can perform feats that were once much harder to do. For instance, the Switchboard service searches all the country's white pages at once, while Alta Vista carries out subject searches on Web home pages.

Overall, Fran advised listeners, "it's hard to stay ahead, but you really have to pay attention to all these technologies because they're going to impact the way you do work."



HANDS ON — Visitors inspect an internal combustion engine model at Dept. 8818 Science & Technology Outreach's Science Discovery Center in Livermore, where members of the Consortium for Advanced Manufacturing - International met in March. The visitors included Bailey Squier, center left, director of CIM Standards and Technology in Arlington, Texas, and Emily Millett, center right, a member of the consortium's educational advisory board and school board official from Tallahassee, Fla.

Cloud station

(Continued from page 1)

atmospheric temperatures. (See "Hot or not? What's water got to do with it?" at right.)

In addition, the region is thought to play a critical role in the phenomenon known as El Niño-Southern Oscillation — a cyclic variability in the global climate system, marked by warming of the eastern Pacific Ocean every two-to-seven years and a southerly shift in the tropical rain belt — that is thought to have far-reaching implications for weather patterns over much of the Northern Hemisphere and perhaps the planet.

"The locale is best for understanding El Niño," says Mark Aguilar, "and for helping improve our understanding of climate processes near the equator and on the open ocean."

The Tropical Western Pacific will become the second operational ARM region when the Sandia ARCS station arrives on Manus this summer. (The US Southern Great Plains site, in south-central Kansas and north-central Oklahoma, became the first active ARM region in 1992.) In addition to the primary station on Manus, simpler ARCS stations will be installed at various other locations in the TWP region, including on the islands of Banaba and Christmas Island.

Mark and Mark plan to meet the ARCS equipment when it arrives on Manus in late August or early September to assist with its setup and resolve any last-minute technical difficulties. The station then will be left alone to do its job for several months at a time, with only periodic maintenance visits by local operators.

A gigabyte a day

Sandia was selected to do the integration work on the Manus station by Los Alamos National Laboratory, which manages the ARM Tropical Western Pacific Program Office for DOE. Mark Aguilar says integrating the system was a challenge because most of the atmospheric monitoring equipment was fresh out of the laboratory, with instruments contributed by various research facilities in the US and around the world. Many of the instruments were either new designs or designs modified for

Cloud station team garners two awards

The Tropical Western Pacific ARCS team recently has received a DOE ARM Program team award and a Sandia Employee Recognition Award (to be presented May 11) for its work on the Manus ARCS station project. In addition to several Sandians, the team includes representatives from Los Alamos, Argonne, Pacific Northwest, Oak Ridge, and Brookhaven national labs, as well as researchers from Pennsylvania State University and contractors from Bechtel (formerly EG&G), Beta Corp., and Gramm.

The ARM program is funded by the Atmospheric and Climate Research Division of DOE's Office of Health and Environmental Research and managed by Pacific Northwest National Laboratory.

"The locale is best for understanding El Niño, and for helping improve our understanding of climate processes near the equator and on the open ocean."

Hot or not? What's water got to do with it?

Scientists have long suspected that the addition of carbon dioxide and other man-made "greenhouse gases" into the atmosphere may cause a long-term warming of Earth's atmosphere. But naturally occurring atmospheric moisture may prove to be a far more significant player on the global climate stage than all the greenhouse gases combined.

Because greenhouse gases are thought to slightly warm the atmosphere by absorbing heat in the form of infrared radiation from Earth's surface, and because a warmer atmosphere can hold more water vapor, scientists suspect a feedback effect may occur — that increased water vapor in a warmer atmosphere might amplify the warming effect of an incremental increase of other greenhouse gases.

Water vapor is not, however, the only form of water in the atmosphere. It is pre-

sent as a solid and a liquid in clouds, and the effects of clouds are thought to be a major factor in determining the potential for long-term climate change. Clouds themselves can reflect incoming sunlight and therefore contribute to cooling, but they can also absorb and retransmit infrared radiation leaving Earth and contribute to warming. High cirrus clouds, for instance, may help warm the atmosphere. Low-lying stratus clouds, which are frequently found over oceans, can contribute to cooling.

As part of the international effort to understand global climate change, DOE's Atmospheric Radiation Measurement Program seeks both to describe the effects of clouds and moisture on the current climate and predict the complex chain of events that might influence the distribution and properties of clouds in an altered climate.

harsh tropical environments.

"Sandia's job was to integrate the instrumentation into a working, semi-autonomous data-gathering station that will operate reliably for 10 years or more," he says.

The primary component of the ARCS station is its outdoor array of sensors that measure such climate indicators as solar energy (sunlight), radiant energy emitted from the ground, cloud height and density, percentage of cloud cover, profiles of atmospheric moisture content, temperature, and wind direction and speed.

Four walk-in cargo shipping containers are outfitted with additional monitoring equipment. Unique data loggers store information until it can be transferred to tape in a nearby data van. Satellite communications equipment allows the researchers, from thousands of miles away, to monitor conditions inside the enclosures and shut down and restart the computers if necessary. A small amount of data can be transmitted to Sandia via satellite as well.

"We expect to be collecting between 400 megabytes and a gigabyte of data a day," says Mark Aguilar, "so most of it will have to be brought back on tape."

A utility van provides power distribution and a backup generator that can keep the computers running for three hours in case of a power-grid failure. "The system is designed to operate on its own without a lot of maintenance," he says.

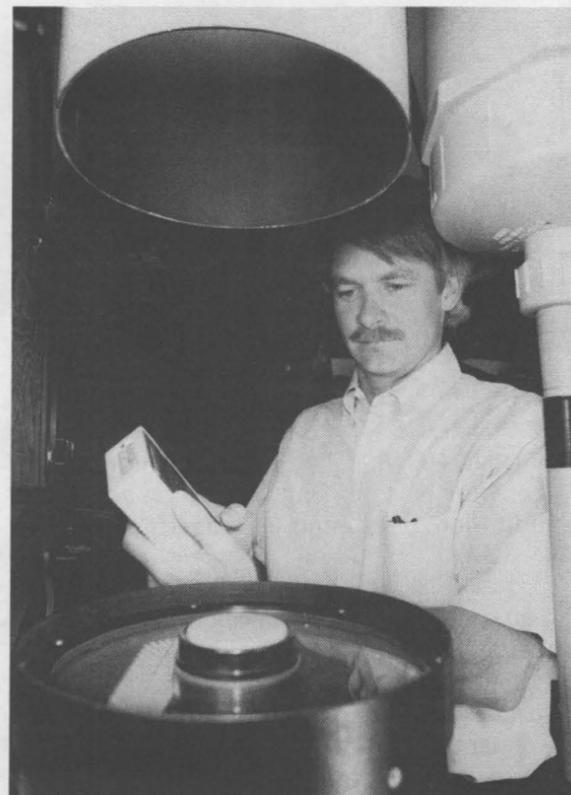
Putting it all together into a working system was "like putting 10 pounds of stuff into a five-pound bag," he adds.

Prototype for Alaskan site

Eventually, each ARM site will provide intensive data about climate indicators in a particular region of the world. Researchers hope to use this data in their quest to develop GCMs that divide Earth's atmosphere into a mesh comprising thousands of cells, then model climate dynamics on a worldwide scale. (Each ARM region, roughly 150 miles square, approximates the size of a cell in a typical GCM.)

Ultimately, it is hoped such models will allow humans to predict with some accuracy the long-term consequences of atmospheric changes, such as increasing levels of carbon dioxide and other man-made greenhouse gases, and aid decision makers in developing appropriate policies to deal with likely climate scenarios.

The Manus station also will serve as the



MARK IVEY TESTS an ARCS Raman lidar (light detection and ranging) instrument, a sensing device that monitors the altitude and density of atmospheric water vapor by measuring the backscattering of light from laser pulses emitted to the atmosphere. (Photo by Mark Poulsen)

prototype for later ARCS stations to be deployed at other ARM locales in coming years. Sandia is managing the next stage in the ARM program that will establish an ARCS station on the North Slope of Alaska, an area that interests climatologists because of its snow and ice cover, which is thought to reflect as much as 80 percent of the sun's energy back into space.

"The global atmosphere is a highly complicated system to try to model," says Bernie Zak (6612), ARM Site Program Manager for the North Slope of Alaska/Adjacent Arctic Ocean region. "We want to determine how a snow- and ice-covered surface is influenced by warming, how it influences warming, whether melt caused by warming would result in increased cloud cover, and what the radiative influences of the area's low-altitude ice clouds might be."

"We've learned a lot with the Manus system," says Mark Ivey, who, along with Mark Aguilar and several other Sandians who helped with the TWP project, will be integrating the North Slope monitoring system. "There are always improvements we can make. The Alaskan system will be better."

Sandia technology may enable lean-burn auto engines

Labs research part of Partnership for a New Generation of Vehicles CRADA

By Bill Murphy

Lab News Staff

Catalytic converters for automobiles were developed and refined to meet clean-air standards established in the 1970s and '80s. Now, with a new round of federal air quality and fuel economy regulations phasing in, emissions-control technology is being pushed to the very edge of the envelope.

A team of Sandia scientists has joined US automakers in a dash to be first across the finish line in a race to develop the next-generation catalytic converters that can meet the rigorous demands of the new regulations.

"Essentially, we are in a worldwide race to develop a catalytic converter that will enable lean-burn engines to meet stringent emission standards," says Steve Lott (6113), project manager for the Sandia effort and manager of the overall national labs involvement in the project. "The Japanese certainly take the race seriously because the stakes are so high. They're putting five to 10 times more resources into this challenge than we are."

The challenge? Automakers are attempting to increase fuel economy through a lean-burn strategy. According to federal clean air standards to be phased in over the next several years, they must reduce nitrogen oxide (NOx) emissions. This is not feasible using current-technology catalysts under lean conditions; therefore new catalyst technology must be developed.

Although the Japanese are in the thick of the race, US automakers are determined not to be left behind. That's why they've teamed up with the national labs to tackle the problem. The Low Emissions Partnership — a derivative of the Partnership for a New Generation of Vehicles — is tapping the expertise of DOE labs (Lawrence Livermore, Los Alamos, Lockheed Martin Energy Systems Y-12 Plant, Oak Ridge, and Sandia) and the combined engineering skills and manufacturing savvy of the Big Three US automakers to develop new NOx catalysts.

This collaboration has spanned a wide range of activities centered around the catalyst materials expertise at the national labs.

Carmakers know how to meet pending federal fuel efficiency standards: develop a leaner burning engine, one that operates with a higher air-to-gasoline ratio (18:1) than a standard engine (14.7:1). The catch is, a lean-burn gasoline engine, while it uses fuel more efficiently than a conventionally tuned engine, runs into trouble with NOx emissions — and *that* runs head-on into the new clean-air standards.

Flexibility of chemistry is key

Current catalytic converter technology handles carbon monoxide (CO) and hydrocarbon (HC) emissions satisfactorily, but doesn't do well with NOx emissions in the (relatively) low-temperature, high-oxygen environment of a lean-burn engine. Specifically, reduction of NOx by current converters is significantly depressed in the presence of excess oxygen — precisely the situation you want in a lean-burn engine. The challenge for automakers is to develop a catalytic process that effectively reduces NOx while efficiently oxidizing CO and HC in a lean-burn environment.

Sandia engineers have developed a promising response to the challenge using Labs-developed expertise in hydrous metal oxides (HMOs), a family of chemicals that when incorporated with catalytically active metals makes them ideally suited for catalytic converter applications. Those characteristics include a high cation exchange capacity, high

surface area, and flexible process chemistry — HMOs can be synthesized as bulk material or as a coating preparation.

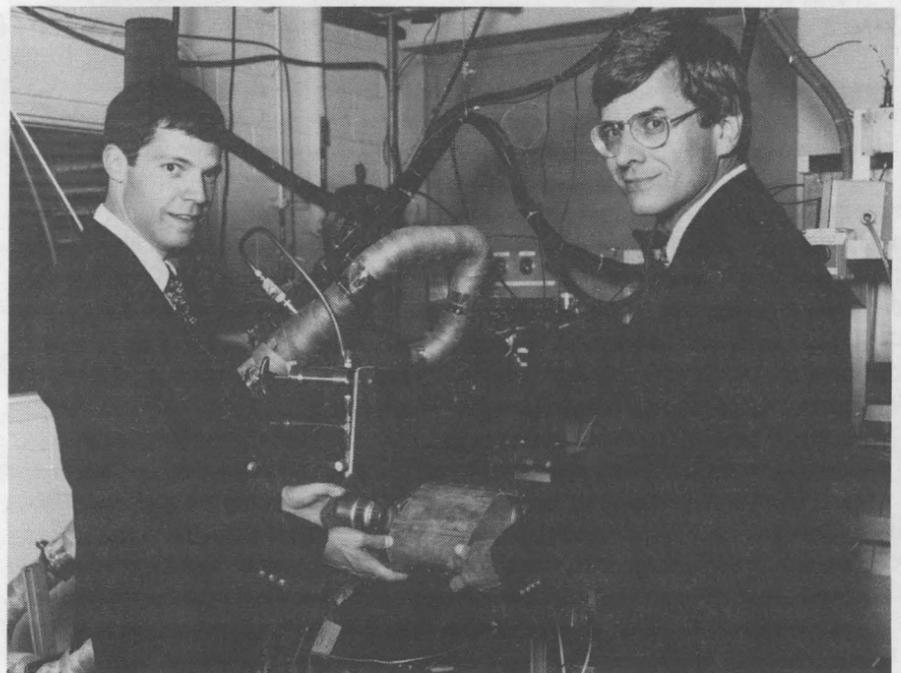
"The flexibility of the [hydrous metal oxide] chemistry has allowed us to prepare a large number of different oxide support and metal catalyst combinations and screen them for NOx reduction activity in simulated lean-burn automotive exhaust environments," says Tim Gardner of Sandia's Process Research Dept. 6212.

"Promising catalyst systems were then fabricated on small-scale cordierite monoliths using HMO coating and ion exchange techniques, and similarly tested." (See "Catalysts accelerate chemical reactions," below.)

The best catalyst systems were then evaluated on a larger scale in both bulk and coated forms, which involved significant process scale-up efforts. "One of the real strengths of our effort was our ability to scale-up the HMO coating and ion exchange processes to a full developmental size (110 cubic inch) catalytic converter," says Steve Lockwood of Ceramic and Glass Processing Dept. 1492.



FULL-SCALE prototype catalytic converter.



TESTING IT — Steve Lott (6113, left) delivers a Sandia prototype catalytic converter to Noberto Domingo (Y-12) at the Y-12 engine dynamometer facility.

This scale-up, Steve says, is very important to the automakers since it demonstrates the manufacturability of Sandia's HMO-based catalyst processes and allows actual engine testing of these new catalyst materials.

Sandians Linda McLaughlin, Ron Sandoval (both 6212), Amelia Sanchez, and Ted Montoya (both 1492) have played significant roles in the catalyst development, characterization, testing, and scale-up efforts, Steve says.

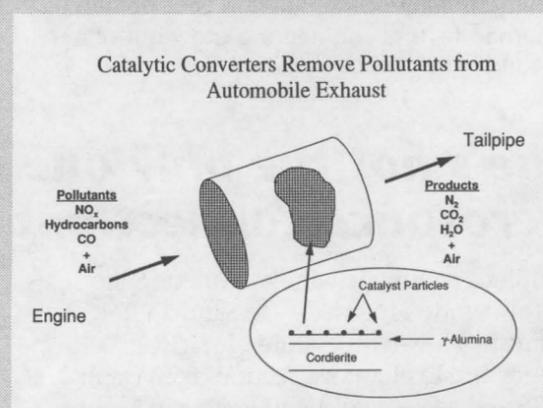
As a result of Sandia's work, an answer to the catalytic converter challenge may be at hand, a tangible example of technology transfer at its best. Sandia has delivered to the Y-12 lean-burn engine dynamometer test facility in Oak Ridge several full-scale catalytic converters fabricated using the HMO-based catalyst technology. The precise composition of the converters' coatings is proprietary information, but the end effect is a catalytic converter that — in tests using an engine dynamometer — rivals a benchmark catalytic converter.

"If Detroit doesn't get this problem solved, automakers can't sell the lean-burn engine," Steve says. "That means they'll have to come up with another solution [besides lean-burn] to meet the CAFE [Combined Automobile Fleet Efficiency] standards. Based on the high economic stakes, you can see how important it is to develop this lean-burn-enabling technology."

Catalysts accelerate chemical reactions

Catalysts are materials that accelerate a chemical reaction but are not consumed in that reaction. Catalytic converters are used in automobile exhaust systems to convert three classes of pollutants (nitrogen oxides, carbon monoxide, and hydrocarbons) produced by the combustion of fuel in the engine to less harmful constituents (ideally nitrogen, carbon dioxide, and water), which exit from the tailpipe. A typical automobile catalytic converter is made of a cordierite ceramic ($2\text{MgO}\cdot 2\text{Al}_2\text{O}_3\cdot 5\text{SiO}_2$) base material fashioned in a honeycomb design that provides a high surface-area-to-volume ratio.

The cordierite substrate is then coated with a washcoat, typically high surface area gamma Al_2O_3 powder, which serves as a support for the catalyst. A catalytically active material is incorporated into the washcoat. The exhaust gases passing



through the honeycomb are thus exposed to the catalyst-coated surface. Typical catalyst compositions used in today's vehicles include platinum, palladium, and rhodium metals, as well as other tailored oxide additives.

Physician, flight surgeon, commander, medical researcher, Annette Sobel flies high at Sandia

She's now using her experience for Labs' human-factors biomedical research

By Julie Clausen

Media Relations Dept. 12621

It's not your typical Sandia office. Sure, it's cramped like most, but the model of the F-16 and the autographed Blue Angels poster hint at the eclectic background of the occupant. Physician, fighter flight surgeon, lieutenant colonel in the Air Force Reserve, commander, and astronaut candidate — Dr. Annette Sobel stands out in a sea of electrical engineers and nuclear physicists.

Sometimes it means there aren't a lot of other Sandians with similar interests — at least in toto — to swap hospital horror stories with or to talk to about the handling quirks of the F-16. But Annette (or Annie, as she's called by co-workers) is accustomed to adjusting to her environment whether it be a field hospital in Honduras or Dryden Flight Test Research Facility at Edwards Air Force Base, Calif., where she was NASA's Flight Surgeon/Medical Director/Emergency Medical Services (EMS) Coordinator for space shuttle operations during Operation Desert Storm.

Her surroundings have ranged from the very primitive — such as Army surgical hospitals in Honduras and Panama — to the opposite end of the spectrum, such as the biomedical



REALITY RESEARCHER — Dr. Annette Sobel works with James Singer, a University of New Mexico student assigned to Dept. 5913, in Sandia's Virtual Reality Intelligence Simulation Lab. Her interest in human-factors engineering grew out of her background in aerospace medicine.

engineering labs of Case Western Reserve University or the virtual reality labs of Sandia National Laboratories. "I've seen environments in which the technology was close to none to very sophisticated command and control centers," she says.

One of the more unusual environments she at one time had the potential of seeing was space. In 1989, the US Army selected her as an astronaut candidate, and she went through the selection program. However, at the time there wasn't an opening for an Army mission specialist so her opportunity passed.

Annette's bio sketch is an interesting laundry list of schooling, jobs, and commendations: senior Federal Aviation Administration aeromedical examiner, clinic commander for the 150th Air National Guard medical squadron, graduate of the "Top Knife" F-16 Fighter Surgeons School, NASA flight surgeon, and senior flight surgeon in Panama during Operation Just Cause.

"Annie's done more in her relatively short life than most people could hope to accomplish in several lifetimes," says John "Jack" Jackson (5908), a co-worker in Systems Assessment & Research Center 5900, where Annette works.

Annette began her education in New Jersey where she majored in chemistry and computer engineering at Rutgers University. She joined the Army Reserve Officers Training Corps (ROTC) there, won a college scholarship,



FLIGHT SURGEON — Dr. Annette Sobel, in flight gear, with an F-16 at Kingsley Field Air National Guard Base, Klamath Falls, Ore., where she attended Top Knife Fighter Surgeons School in 1991.

incurred a four-year obligation to the Army, and was a distinguished military graduate.

She deferred her active service, however, while she pursued a research career and medical school at Case Western Reserve University in Ohio. There she did work in sequencing of insulin precursors at a time when researchers were first learning how to sequence DNA (deoxyribonucleic acid) molecules.

Saw fallibilities of doctors

In the mid-1980s, she went to Duke University to do her family medicine internship and residency. Her year as a family practice resident there made her realize the fallibility of doctors, especially when working under severe time constraints and "on the ragged edge of your own performance." This led to her interest in human factors psychology systems engineering.

The experience also fueled her interest in how medical equipment could be enhanced or refined to be an aid rather than a distraction to the user. One way to reduce the incidence of human error while working in a technologically intensive environment is to get the user involved in designing future generations of the equipment.

After finishing at Duke, she completed her four years of active duty in the military. During that time she became an Army flight surgeon
(Continued on next page)

She's not the only one in this pair with aerospace connections

Since coming to Sandia, Annette Sobel has also gotten married — to Sandian Rob Duncan, a low-temperature physicist in Optics and Exploratory Technologies Dept. 5725 and a Distinguished Member of Technical Staff. Rob's connection to the world of aerospace is through a NASA experiment he's working on that is scheduled to fly aboard the space shuttle in 2000. The Sandia/Jet Propulsion Laboratory/University of New Mexico experiment will make the most precise measurements ever of the transition of helium

from a fluid to a superfluid state, testing a theory that won the 1982 Nobel Prize in physics.

The pair, who married in 1994, also teamed up recently for another challenge. Rob attempted to run the Leadville 100, a 100-mile running race in south-central Colorado. Annette served as a member of the medical crew for the race. In addition, Rob recently ran 102 miles in the Pueblo Nuevo Race in Tucson, Ariz. Witnessing races like that gives her a chance to see applied human factors in action, Annette says.

(Continued from preceding page)

and was in charge of emergency medical services for the 82nd Airborne Division at Fort Bragg, N.C. Fighter surgeons school allows her to fly "back seat" in various aircraft — including F-16s and A-7s — but a certified pilot must be up front at the controls. In this way, she's accumulated more than 1,500 hours in the air, some of it flying MEDEVAC missions in Central America.

The exposure to airborne operations that supported local hospitals led her to decide to further her education in aerospace medicine. The Army did not have any positions open in the field at the time, so when her military obligation was up she pursued a master's degree and a residency in aerospace medicine at Wright State University in Dayton, Ohio, as a civilian with the support of NASA. She became a NASA flight surgeon and, while on active duty, transferred to the Air Force Reserves in 1990.

Interest in human engineering

While getting her master's degree, she had her first contact with Sandia through her involvement in several joint research programs between the Wright Laboratories and the Labs. The projects dealt with designing interfaces for enhancement of automatic target recognition systems.

This field, and the related field of "human factors engineering," became her specialty and are her primary area of interest even to this day. Human factors engineering and ergonomics involve the interface between people and technology and how to make those interactions more efficient. Studies of human interaction with aircraft instrumentation have resulted in improvements to aircraft designs to better fit the needs of the pilot and crew members. This attention to the needs of the "user" has trickled down to the area of medical instrumentation, especially in the surgical subspecialties. Annette believes these same considerations can be applied to medicine. She likens an aircraft to a surgical suite because a lot of time-critical decisions are made, highly sophisticated instrumentation is used in both, and there is the opportunity for a great amount of



DEDICATION AND DETERRENCE — Sen. Pete Domenici, R-N.M., left, and Vice Adm. Dennis Jones, above right, examining a neutron generator assembly with Labs Director C. Paul Robinson, were the two key guest speakers at the dedication of Sandia's new Neutron Generator Facility on April 11. Several hundred people attended. Domenici, chairman of the Senate Budget Committee, said the facility (*Lab News*, April 12) is an essential aspect of the nation's "very profound" new policy not to build new nuclear weapons. This decision, he said, puts enormous responsibility on the Labs' science-based stockpile stewardship program to build new parts over the next 20-40 years to ensure the safety and reliability of existing nuclear weapons. Jones, deputy commander-in-chief of the US Strategic Command, spoke as the customer of the new facility. "Everything we do in this business is impacted by Sandia," he said. "We have never been disappointed." He said science-based stockpile stewardship is in the "supreme national interest." He said Sandians working to build neutron generators — a key component of nuclear weapons that must be replaced regularly — are helping ensure that the nation has a nuclear deterrent that is "safe, reliable, and effective." He urged them all to "make sure you're doing the absolute best you can." He added: "I am proud to call you, in naval terms, shipmates."

(Photos by Randy Montoya)

error in high-workload environments.

These days, the problem for medical personnel is often one of too much information — so much so as to make it difficult to process and use in diagnoses. Researchers are actively seeking improved information systems that can distill information and conduct preliminary analyses, and "friendlier" equipment. She is involved in research in biomedical human factors engi-

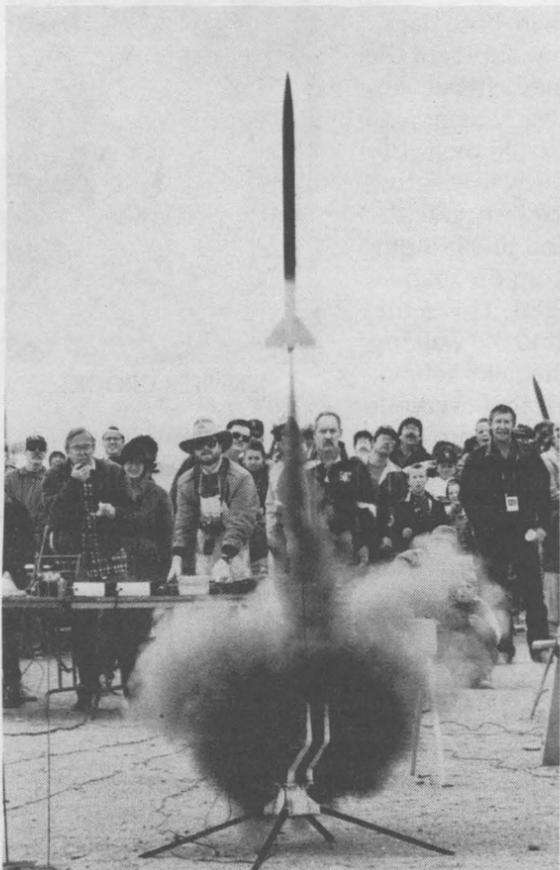
neering and prototyping human-machine interfaces for fieldable medical systems.

Since coming to Sandia in 1993 and earning her board certification as a human factors professional, she has served as a team member of the corporate ergonomics team and member of the Trade and Data Exchange ergonomic working group for DOE, and as a biomedical technology transfer consultant. In 1994 she transferred to Systems Assessment and Research Center 5900, which does national security work for the US intelligence and defense communities and for federal law enforcement agencies.

Currently, she's working on a variety of projects, all related to applied human factors. A previous joint project with Optical Systems & Image Processing Dept. 2524 involved application of Sandia expertise in automatic target recognition (ATR) to a medical imaging problem in the diagnosis of coronary artery disease. One of the standard examination techniques used involves imaging the heart during exercise treadmill stress testing. Radiologists compare images of the heart at rest and while being stressed, but the problem is in getting the before and after images to align. Misregistration can lead to a misdiagnosis.

Annette, Terry Stalker (2524), and Amy Yee (2523) have found that ATR algorithms are a useful tool in evaluating these images, similar to their application to mammography interpretation work spearheaded by Philip Kegelmeyer (8117) at Sandia/California (*Lab News*, Sept. 15, 1995). They have recommended that further study take place and the human decision-making process be further analyzed.

She's also working with Center 5900's Virtual Reality Laboratory (principal investigator is Sharon Stansfield, 5905) and the University of Pennsylvania to design a combat medicine training program using virtual reality for the Department of Defense Advanced Research Projects Agency. This would be used to teach nonphysicians how to perform triage and make critical treatment decisions.



HOLY SMOKE — A solid-fuel-powered model rocket leaves its launch pad in a cloud of smoke during the "Launch into Spring" rocket day April 20 at the Albuquerque International Balloon Fiesta field. Sandia and a number of other local organizations sponsored the event. Hundreds of model rocketeers, like the unidentified youngsters in the photo at right, punched holes in the sky with their homemade creations. Sandian and former Space Shuttle Commander Sid Gutierrez was on hand to sign autographs and answer questions about space flight and rocketry.

(Photos by Randy Montoya)

Managers offer views on Sandia 2000 conference

Editor's note: As part of the ongoing coverage of the April Sandia 2000: United for Success managers' conference, the Lab News asked a number of line managers for their impressions. The comments were solicited via e-mail from a randomly selected group of managers throughout the Labs.

Here are the questions we asked, followed by the responses received:

- What was your overall impression of the conference? In what way was the conference most useful to you?
- What would you like to see done differently at future conferences of this kind?
- Anything else of significance you want to add that we haven't asked about?



Ken Washington

Manager, Information Systems Applications Dept. 6614

Overall, I was extremely impressed with the content and the logistics of the conference. The blue and red teams deserve a great deal of credit. The conference was most useful to me by enabling me to hear the viewpoints of people who work in divisions and programmatic sectors other than where I work. The networking time spent with other managers was also extremely worthwhile. Finally, it was a rare treat to obtain unfiltered information from SQLC [Sandia Quality Leadership Council] about their views of the world, Sandia's mission, and potential future directions for the laboratories.

Now that we have done this once, we can probably fit the conference into one day. The "at home" session with our own division could have been left off in my opinion, since there are many other opportunities for us to interact with managers in our own division.

I definitely support doing this again. Even though several folks voted with their red dots against a repeat, I think not repeating would be a major mistake. If we fit it into one day, the networking value and information exchange between divisions is well worth the cost. By the way, I hope someone is looking into giving the red and blue teams an award.

Belinda Holley

Manager, ES&H Training Dept. 3524

The conference was a breakthrough for managers at all levels by concentrating on the future directions of the Laboratories and issues that we, as a team, need to rally around. Also, it provided me an opportunity to seek a better perspective of where we are and where we plan to go. Our level of success will be directly dependent on management's ability to team and communicate.

Pablo Garcia

Manager, Intelligent Systems Dept. 9671

What was my overall impression of the conference? In what way was it most useful to me? Well organized. Not a trivial task to get 700-plus Sandia managers to work to a schedule. It is useful to know that the VPs are as lost as everybody else.

What would I like to see done differently at future conferences? Focus on the day-to-day

problems line managers face: high overhead, very small pockets of funds, spending too much time selling to ourselves, no time to contribute technically.

Anything else of significance? The VPs need to agree how to make disinvestment decisions so that we can concentrate on the areas we (Sandia) want to follow at a good level of effort.

Jennie Negin

Manager, Web Services and Information Systems Training Dept. 4817

I liked one of Paul's opening comments: It was more like a college reunion than a Sandia managers' conference. The camaraderie was wonderful! It set the tone for a "let's work together" meeting. The teaming of SQLC was obvious (maybe for the first time) and welcomed. I was able to use the "partner not compete" [approach] to take a much-needed step and work closer with another Sandia organization. I felt it was a good two days — and I made lots of good contacts for work for my organization!

Jim Wang

Manager, Detection Technology and Organic Materials Dept. 8713

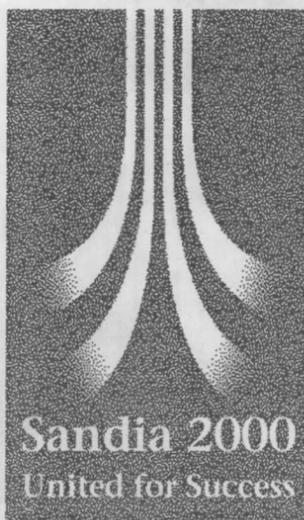
- I think the meeting had good intentions and was executed nicely.
- One of the major benefits for me was to meet other managers and network with them for future partnering and teaming opportunities.
- On the other hand, I don't think we can get any decisions made or major directions identified by so many people in the meeting.
- I enjoyed the after-dinner talk by Art Lange [he spoke on the need for change], but didn't learn anything new from the other two invited speakers.
- I felt a genuine desire from both Paul Robinson and John Crawford to make this meeting a success and design a future with us with

A dissenting view

(1) I didn't go.
(2) I have heard three different attempts at summarizing the conference from three different attendees. From them I conclude: (a) Talk's cheap and I've heard most of it before. (b) Where were all of these bold critics of the mess we got into with restructuring, trying to be a non-weapons lab, and declaring ourselves to be the economic competitiveness savior of the US economy. Leadership is being willing to take a stand when it is difficult or unpopular. I don't give a lot of credit to people who are so adept at following the crowd.

The answers to the first three straw questions at the conference are so obvious that it would be professionally embarrassing if the public learned that these were ever seriously discussed for so long by so many highly paid people. Hopefully, the proceedings have been properly classified.

— Name withheld by request



our buy-ins. I am glad for that and want to rally behind them. But, I'd like to see more leadership from them and other VPs to lead us into the 21st century.

With 1,000 managers and 8,000 employees, I think we have a real problem with too many managers. I'd like to see SQLC deal with this issue quickly and sensibly. By doing so, we can lift employees' morale and save overhead at the same time.

In summary, this meeting is a bold exercise. I'd like to give credit to the organizer, the design team, and the support team.

Jill Hruby

Manager, Materials Synthesis Dept. 8230

My overall impression was:

- Very useful to get first-hand information from the VPs regarding the strategic issues they have discussed and their current views
- Interesting to know what advice they get from others by way of presentations by the guest speakers
- Nice to have an expected time frame for having a strategic operations plan.

In future conferences, I think it would be beneficial to change tables every half day or so in order to hear a variety of viewpoints and meet new people. I also think some tactical issues like funding profiles, etc., could be discussed. I thought the meeting was extraordinarily well organized and executed. For a meeting of this size, more information was exchanged than I would have expected. The VP panel discussion was enlightening because we saw not only content but form of the various VPs and their personal interactions with each other.

Jennifer Crooks

Manager, Financial Management and Information Services Dept. 10401

I believe the single most important success factor is the participation of SQLC. The fact that [Labs Director] Paul Robinson and [Deputy Director] John Crawford were there both days not only sent the message but clearly demonstrated their sincerity in wanting to connect with and solicit input from the managers. This is the kind of "walking the talk" behavior that everyone wants from all of our management. It was greatly appreciated by all the managers there.



JENNIFER CROOKS

Ajoy Moonka

Manager, Advanced Nuclear Power Technology Dept. 6471 and a member of the conference design team

The conference was very successful in that all of Sandia's management was discussing Sandia's future as "we" and beginning to define our business identity for the future. . . . We must follow up and report progress on action items — otherwise it would be a waste of time and result in more cynicism.

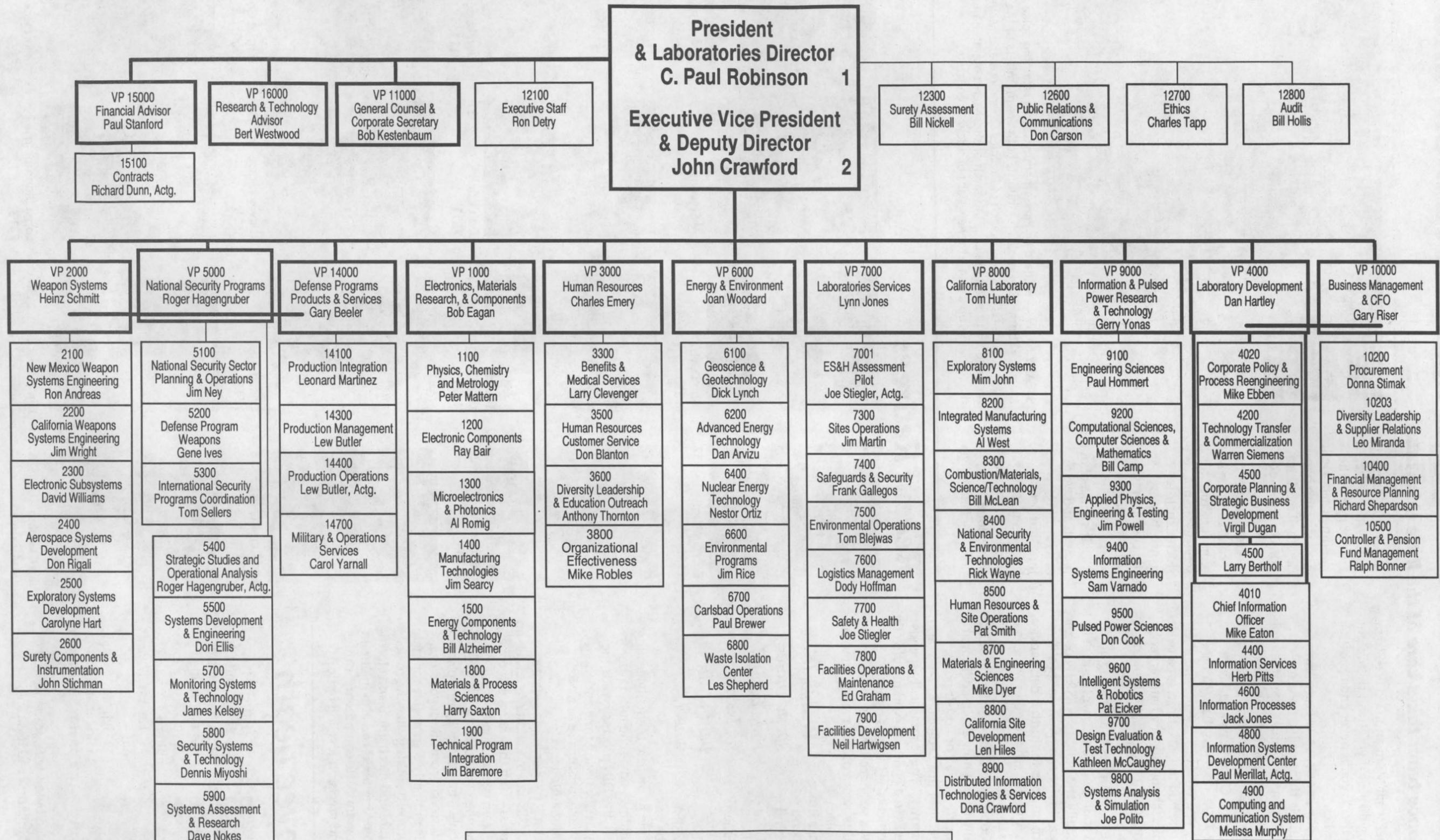
James Woodard

Manager, Production Program Dept. 14003

I felt that for the first time in a while SQLC was: (1) really working together; and, (2) working at the same lab as the rest of us, not some other place.



Sandia National Laboratories



The pace of organizational change at the center level and above may have slowed since our last publication of the Sandia organization chart (*Lab News*, Oct. 27, 1995), but there nevertheless have been a number of changes since then. They are reflected in this new chart.

April 1996



Facilities' 'Do It Now' Team listened to Mom and Dad

Maintenance team takes care of the little things first

Remember what Mom and Dad used to say about washing dishes? If you wash them right after you use them, you'll never end up with a sink full of dishes.

As everybody knows, parents are always right. It's a simple thing called preventive maintenance: If you take care of the little problems now, you'll rarely run into big ones.

The "Do It Now" (DIN) Team, a new branch of Facilities Operations and Maintenance Center 7800, does just that. (Not the dishes — the maintenance.) The ten-member team tackles one building at a time, on a twice-a-year schedule, taking care of whatever problems — from a hole in the wall to a broken lamp — it finds.

When the team arrives at a building, its members first tour the building with one of its occupants, usually the building's ES&H coordinator. The coordinator can point out problems while the team inspects for further deficiencies. From there they decide who handles what. Then they get to work.

"When people hear that we're in the building they usually let us know about additional problems through cc:Mail or Post-It notes," says team supervisor Jim Kadlec (7874-1), "and the to-do list grows." The team usually spends about two weeks in a building, working directly with the customer to get things right.

Do It Now's strength is in its speed. "Fulfilling individual work orders means jumping from place to place, job to job," says Jim. "We like to spend more time behind the tools, not behind the wheel."

Formal requests for repair (Maintenance Service Requests, or MSRs) need time to be prepared and people to prepare them. By dealing with entire buildings on a schedule, rather than job-by-job, the DIN process avoids the need for many MSRs, saving time and money. The team complements the use of MSRs through regular maintenance.

Do It Now can't fix everything — larger repairs require MSRs and modifications are left up to Facilities Express — but they know someone who can. If the team gets a request outside their expertise, its members will route the job to the appropriate people. The MSR desk is the place to call when DIN is working outside of your area.

The team is primarily responsible for maintaining "real property," things like the basic building structure and mechanical and electrical systems. Some members can also maintain or modify "programmable equipment," things like moving and precision-leveling optical

tables or refrigeration systems, that are not part of the building itself. Do It Now can also handle small modifications to real property, like moving an electrical outlet or reconfiguring systems furniture. Such services are not considered maintenance, however, so the customer is billed for the team's work.

"It's still a pilot project, and we're still learning," says Jim, "but people have been really satisfied with the work we've done."

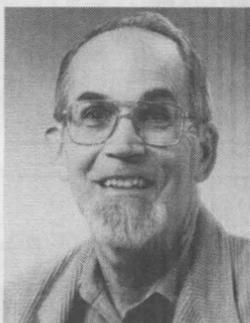
— Philip Higgs



STEADY NOW — Richard D. Parker hammers in a retaining spike while Marcos Martinez (both 7874) holds it straight. Both are members of the "Do It Now" maintenance team, a new branch of Facilities Operations and Maintenance Center 7800 that travels the Labs in search of short-term maintenance tasks. Here the team sets up a frame for new slabs of sidewalk concrete.

"We like to spend more time behind the tools, not behind the wheel."

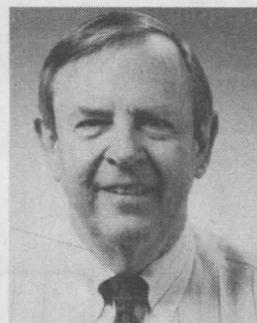
Recent Retirees



Bob Graham 37
1152



Bob Davis 34
1833



Al Stevens 27
6800



Celine Hanes 20
10503



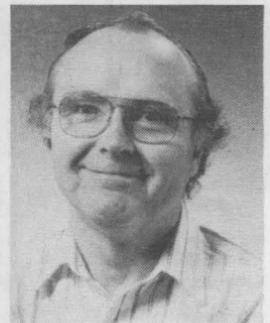
Cliff Mendel 27
9573



Dirk Dahlgren 30
4021



Don Cook 31
7511



Don Larson 43
9111



Earl Cummings 18
7812



Gilbert Apodaca 30
7613



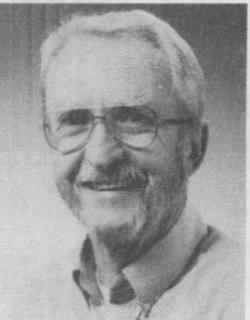
Harvey Morse 39
5513



Harriet Goodness 26
7900



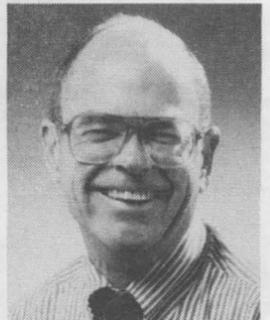
Jim Giachino 26
7402



Ken Ludwick 36
7814

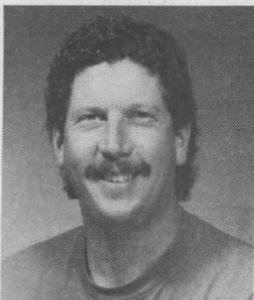


Lorna Bloomberg 20
7313



Mike Heck 32
2334

Employee death



JEFFREY MYERS

Jeffrey Myers of Receiving and Distribution Services Dept. 7613 died April 4 after a long illness.

He was 37 years old.

Jeff was a Grade 5 driver and had been at Sandia since 1978.

He is survived by his wife, Jeanette, and two daughters, Julianna and Jessica.

Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads Sandia Classified Ads

MISCELLANEOUS

- ACOUSTIC GUITAR, Yamaha FG-435A, w/teal sunburst finish, no case, \$225. Cerutti, 292-0186, ask for Steve.
- UPRIGHT PIANO, \$500; portable dishwasher, runs well, \$100; large metal desk, \$50; king-size waterbed, \$75 (complete). Estill, 883-1531.
- WEDDING GOWN, beautiful summer style, dry cleaned, size 8 tall, excellent, like new condition, \$125 OBO. Wing, 296-3826.
- EXERCYCLE, good shape, \$25; mini-trampoline, \$15. Duliere, 296-4785.
- PAINTBALL "HAMMER" RIFLE, w/7 oz. CO₂ tank, w/required accessories, \$200; HAM, 2-meter Icom, 2GX-AT, handheld, ARES modifications, \$300. Sanchez-Brown, 872-2413.
- QUEEN SOMMA BED, w/mattress, heavy-duty frame & headboard, \$350; large microwave, \$50; rangehood, \$30. Slack, 299-2314.
- STEREO RADIO, w/2-deck cassette, \$15; SAM virus protection for Mac V3, \$20 OBO. Poultier, 291-0607.
- LAWN MOWER, Craftsman, 3.0-hp, electric, 19-in. cut, \$25. Randour, 821-8523.
- BUILT-IN DISHWASHER, Whirlpool Supreme 400, avocado color, 3 different wash cycles, \$80. Webb, 828-2271.
- COMPAQ P90, w/ 14-in. monitor speakers, integrated, 8MB RAM, 4X CD-ROM, 14.4kps fax/modem, multimedia monster, \$2,100. Bowman, 255-7996.
- ORGAN, Lowrey Genie 44, 2 key-boards, w/bass foot pedals, excellent condition, free delivery, \$150. Hahn, 822-1341.
- RANGE HOOD, vented to outside, almond, 4 yrs. old, excellent condition, \$25. Meeks, 828-9825.
- USED DISHWASHER, great for rental or cabin, stainless-steel kitchen sink, faucet w/ strainers & garbage disposal. \$225. Baca, 291-8954.
- REGISTERED GELDING, 5 yrs., gray, beautiful, 15.3 hands, prospect, barrels, Western, jumping, dressage, excellent bloodlines, gentle, \$2,200. Arana, 873-9064.
- ROLL-TOP OAK DESK, S-type, from '20s, brass trim & pigeon holes, \$700 OBO. Dybwad, 296-9047.
- SOFA & LOVESEAT, beige/mauve, \$250 & \$150; coffee & end tables, \$50 ea. Patterson, 296-8022.
- TOOLS: Makita cordless drill, \$100; Ryobi radial arm, \$225; reciprocating saw, \$100; try before you buy. Galloway, 281-5671.
- SALTWATER FISH: zebra eel, \$75; lion fish, \$45; fame angel, \$45; marine beta, \$60; all eat well. Schell, 821-2600.
- POCKET DOOR, \$50; 2 La-Z-Boy rocker/recliners, black vinyl, good condition, \$100 ea. Peace, 275-8400.
- SOLOFLEX, excellent condition, \$150; formal dresses, sizes 4/6. Gordon, 867-5004.
- STAINLESS-STEEL SINK, w/garbage disposal, vacuum cleaner, sofa, loveseat, dresser, TV, humidifier, encyclopedias, clarinet, rower, prices? Moreno, 294-4268.
- HOME EXERCISE MACHINE, Aerobic Rider, mint condition, used for less than 600 repetitions, \$185. Taylor, 294-5300.
- ENGINE, AMC 232 Six, fits Jeep or Rambler, recently overhauled, complete except for carburetor & fuel pump, 85K miles, \$300. Frei, 281-2145.
- STEREO RECEIVER, Yamaha, Model CR-2040, 120 W/ch., some dead lights, otherwise perfect, \$150 OBO. Evans, 265-5229.
- EXERCISE BIKE, Weslo Aerobike 1250, variable resistance, calorie/pulse monitor, comfortable seat, like new, \$100 OBO. Hart, 821-2390.
- LIVING ROOM SET, sofa, loveseat, coffee/end tables, lamps, \$1,100 OBO; Bissel carpet cleaning machine, barely used, \$90 OBO. Moonka, 856-1110.
- ARMOIRE, \$95; ironing board/iron, \$25; headboard, \$35; desk/chair, \$70; coffee table, \$35; sewing machine cabinet, \$50; china, \$35; glassware, \$15. Price, 242-0263.
- SOLID FIR DOOR, new, unstained, unpainted, 75" x 39-1/2", new \$240, asking \$170. Pike, 866-5899.
- CONVERTIBLE SOFA, good condition, mauve, queen-size, \$100; loveseat, brown/white stripes, \$15; you haul. Ruby, 821-0982.
- KITCHEN APPLIANCES, gold: refrigerator, double-oven range, dishwasher, \$50 ea.; microwave, \$50; all good condition. Evans, 299-7105.
- CHORD ORGAN, Hammond, solid-state, Sounder III, good condition, recently checked by organ expert, \$150. Kerns, 821-4122.
- REFRIGERATOR, Admiral, side-by-side, energy-saving, frost-free, 20.1 cu. ft., \$195. Martel, 293-1892.
- LIVING ROOM COUCH, like new, \$195. Campbell, 856-9195.
- WATERBED, headboard, w/side rails & waterbag, \$25. Hernandez, 865-1231.
- GOLF CLUBS SET, left-handed, woman's, w/extras, \$125. Lambert, 292-8417.
- KENMORE WASHER, & electric dryer, 8 yrs. old, \$350 for both. James, 294-6837.
- KING-SIZE WATERBED, frame, mattress, & headboard, \$150; dining table, 42" x 59" w/leaf, 4 chairs, \$250. Hawley, 890-1310.
- SNOWBOARD, Burton Amp 6, Burton bindings, Sims gloves, all brand new, \$300. Gallegos, 344-5250.
- SPACEMASTER chest freezer, Sears, 17.2 cu. ft., flash defrost, 48-1/2" x 27-7/8" x 37-7/8", 5-wire baskets, very good condition, \$125. Rivera, 293-1880.
- IBM-COMPATIBLE 486/DX-2/66 MHz., Yamaha speakers, oak computer desk, \$1,100. Reilly, 344-5250.
- DOUBLE CASSETTE DECK, Technics, Dolby noise-reduction, automatic tape selector, remote-control playback, \$100. Hill, 856-6423.
- ARCHIE COMICS, w/Betty & Veronica, many double digests of last few years, 30 issues total. Wagner, 823-9323.
- WATERBED, queen-size, waveless, takes standard bedding, lacks head & foot boards, \$50 OBO. Harrington, 296-8208.
- DINING SET, mahogany, 40" x 62" table w/one 18-in. leaf, 6 upholstered chairs, china hutch, buffet, \$600. Thibeau, 281-5143.
- ORGAN, Thomas electric, perfect condition, pecan wood, music bench, \$225 OBO. Lloyd, 293-5996.
- REFRIGERATOR/FREEZER, Philco, w/ice-maker, almond, \$100. Sickles, 299-9650.
- TIRES, radial steel-belted, used, P225/75/R14, never flat or repaired, + or - 7K miles left, 3 for \$5 ea. Stamm, 255-2640.
- CRAFT SHOW, "A Mother's Work," Grace Church, San Antonio at Louisiana NE, May 4, 9 a.m.-4 p.m. Parma, 296-7959.
- SENIOR GRAPHITE DRIVER, King Cobre, \$125; 2 Persimon drivers, \$55 ea.; all-graphite Mizuno driver, El-turbo, \$55; more stuff. Stang, 256-7793.
- DRYER, Hotpoint, heavy-duty, 220V, works fine but has worn belt, \$65. Cooper, 881-2806.
- ARTS AND CRAFTS FAIR, La Cueva High School, April 27, 9 a.m.-4 p.m. Ekman, 296-3758.
- FITNESS SYSTEM, DP Ultra Gympac, adjustable bench, pulley weight system, \$295 OBO. McConnell, 271-2011.
- SADDLE, western roping, excellent condition, \$450. Sanchez, 864-9297.
- HAIG ULTRA WOODS, 1,2,3,4, good shape, regular shafts, new grips, \$100 OBO. Zownir, 256-3753.
- RV ROOFTOP CARRIER, enclosed & lockable, 3" x 24" x 17", \$100; 16-in. truck tires, & 8-hole rims, \$10 ea. Jones, 883-1284.
- WOMAN'S GOLF CLUBS, oversized, MacGregor, 1+ yr. old, great condition, 3-PW & 1,3,5W., \$200 OBO. Ricci, 256-7872.
- HAMSTER, teddy bear breed, female, 5 months, nice cage, bedding, food, accessories, books, \$40. Braithwaite, 822-1998.
- COUCHES, two 6-ft.-long couches, one has a hide-a-bed, good shape, \$100 ea. Henderson, 858-1321.
- SCHWINN AIRDYNE, w/all accessories, \$325; Pro-Form Cross Walk, \$275. Kopriva, 899-5005, ask for Pat.
- GARAGE SALE, April 26-27, TV, microwave, clothes, dishes, & more, 3629 Erbbe NE. Schrader, 298-4154.

DEADLINE: Friday noon before week of publication unless changed by holiday. MAIL to Dept. 12622, MS 0165, FAX to 844-0645, or bring to Bldg. 811 lobby. You may also send ads by e-mail to Nancy Campanozzi (nrcampa@sandia.gov). Questions? Call Nancy at 844-7522. Because of space constraints, ads will be printed on a first-come basis.

Ad Rules

1. Limit 18 words, including last name and home phone (We will edit longer ads).
2. Include organization and full name with the ad submission.
3. No phone-ins.
4. Use 8 1/2" by 11-inch paper.
5. Type or print ad; use accepted abbreviations.
6. One ad per issue.
7. We will not run the same ad more than twice.
8. No "for rent" ads except for employees on temporary assignment.
9. No commercial ads.
10. For active and retired Sandians and DOE employees.
11. Housing listed for sale is available without regard to race, creed, color, or national origin.
12. "Work Wanted" ads limited to student-aged children of employees.

DOUBLE-OVEN RANGE, electric, 4-burner, ovens have cleaning cycle, chrome vent hood, best offer. Schreiner, 266-6020.

TOOLS, work benches, BBQ, exercise bicycle (AeroStar G5), bearskin rug, antelope's head. Torres, 831-1988.

WINDOWS, 28" x 92-1/4", \$50 ea.; shower enclosures, 64" x 50" & 69" x 48", \$35 ea.; 2 louvered doors, 80" x 24", \$25. Record, 243-5103.

PAINTED PINE DRESSER, 5-drawer, 34" x 43", \$35; American People's Encyclopaedia set, \$50; books, Dr. Seuss, etc., \$50 ea. Bogdan, 883-8615.

COLOR TV, 19-in., Sylvania, \$45; red-wood burl coffee table, \$50. Shrouf, 821-0765.

COMPAQ 286 COMPUTER, 20MB HD, \$150 OBO; Epson dot-matrix printer, \$50 OBO. Klein, 884-8121.

TWO SWIVEL CHAIRS, brown, & table, for RV, \$40; upper bunk, access ladder, \$15. Eilers, 294-8582.

WHEELCHAIR, Venture lightweight, excellent condition, almost new, \$500 OBO. Barnard, 275-9223.

ANTIQUE ROLL-TOP DESK, large, 60+ yrs. old, \$150. Gorman, 292-7119.

MAGNAVOX AM/FM/SW digital compact radio, \$50; voice organizer, appointments, phone numbers, memos stored/recalled w/voice, \$150. Zarella, 831-1981.

DRAFTING TABLE, w/Vemco drafting machine, GBC2000 binding machine; GE electric cooktop; Brother portable sewing machine. McNiel, 344-7694.

JVC SURROUND RECEIVER, \$200; JVC VCR, \$250; floor standing speakers, \$450; Toshiba 26-in. TV, \$250; moving; all for \$1,000. Norton, 266-3417.

TRANSPORTATION

'79 CHEV. IMPALA, rust, 4-dr., rebuilt engine, good condition, \$2,000 OBO. Atencio, 284-3522 days, 867-3786 evenings.

'88 DODGE COLT DL, 4-dr., 5-spd., AC, AM/FM cassette, new clutch, tires, T-belt, & front brakes, excellent condition, \$2,500 OBO. El, 891-5732.

'89 FORD ESCORT, 4-dr., 5-spd., front-wheel drive, white, 65K miles, priced under wholesale at \$1,800. Weber, 821-8075.

'90 HONDA ACCORD DX, 5 spd., 4-dr., AC, CD, PS, PB, 82K miles, blue, excellent condition, \$7,900. Ruffner, 275-5764.

'93 JEEP CHEROKEE, 4WD, 6-cyl., 62K+ miles, bids through 4/30/96 until 4 p.m., shown Mon.-Fri. to 4 p.m., right to refuse bids, subject to prior sale, as is. SLFCU, 237-7384.

'84 HONDA ACCORD, new clutch, tires, & windshield, tinted windows, cruise control, 180K miles, \$2,200 OBO. Rider, 281-1121.

'91 MAZDA 626, 4-dr., 5-spd., AC, 47K miles, new tires, brakes, below book, \$8,250 OBO. Naru, 821-7490.

'90 MAZDA MIATA, red convertible, excellent condition, 72K miles, \$7,500 OBO. McGuire, 831-5566.

'94 FORD RANGER STX, extended cab, low miles, excellent condition, nothing down, finance SLFCU. Seamster, 884-1617.

'89 CHEV. CAMARO RS, V6, 5-spd., AC, PL, keyless entry alarm, cassette, tint, gray, \$4,600. Miranda, 293-8644.

'68 FORD F100 TRUCK, customized, mint condition, \$2,950. Lawrence, 275-2619, ask for David.

'87 NISSAN PICKUP, 4x4, excellent condition, 5-spd., AM/FM cassette, shell, 97K miles, \$4,100 OBO. Matthews, 281-8635.

'93 CHEV., ext. cab, short-wide bed, 1/2-ton, 4x4, 350 V8, loaded, high miles, Silverado, wholesale \$13,700. Showalter, 281-4211.

'95 DODGE NEON SPORT, 4-dr., 5-spd., airbags, 4W-ABS, PW, PM, PL, cruise, CD, 9,900 miles, \$11,800. Tweet, 293-6105.

'90 FORD BRONCO, full-size Eddie Bauer edition, 351 V8, off-road tires & custom rims, 83K miles, \$11,000 OBO. Grossman, 292-5424, ask for Brad.

'73 DATSUN Z40-Z, 63K original miles, rare, AT, AC, excellent original car, \$2,800 OBO. Torres, 294-7273.

'75 FORD ELITE, excellent condition, 1 owner, new tires, shocks, must see, \$1,795 OBO. Charles, 888-1365.

'81 CHEV. BLAZER, 4x4, 305 V8, AT, AC, original owner, very nice, \$3,950. Washburn, 275-3751.

'93 VW EUROVAN MV, PW, PL, premium audio, tinted windows, 38K miles, EC, \$15,900. Chadwick, 294-3493.

'89 DODGE COLT VISTA, micro van, FW drive, PS, PB, seats 7, AC, 5-spd., AM/FM stereo, good tires, EFI, runs excellent, \$3,995. Williams, 286-1988.

'89 FORD AEROSTAR XL, 31K original miles, red, V6, AT, AC, PS, PB, hitch, tint, AM/FM, excellent condition, below book, \$7,900. Limon, 892-6285.

'80 FORD COURIER PICKUP, custom convertible, new top, new clutch, custom wheels, roll bar, KC lights, alarm, \$2,000 OBO. Szklarz, 294-3769.

RECREATIONAL

HOME WEIGHT-LIFTING EQUIPMENT, wide assortment, benches, free weights, sell individually or as a whole. Gonzales, 299-3491.

SPECIALIZED "ALLEZ" BIKE, carbon fiber 54cm. frame, excellent condition, w/pump & seat bag, \$500. Benecke, 286-2154.

SCREEN TENT, Eureka 12-ft. Breeze-way, \$150; specialized "Hard Rock" & Diamondback "Topanga" mountain bikes, \$75 ea. Brown, 890-1184.

TWO TIMESHARES, wonderfully priced, for sale due to death in family. Ludwig, 856-5111.

'80 HARLEY DAVIDSON XL8, 21K miles, custom parts, runs/looks good, \$4,200. Christensen, 294-1880.

WINDSURFERS, excellent, intermediate/novice, great stability, \$165 ea.; buy both, will add extra booms, double sailbag. Gage, 293-1707.

'93 FIFTH WHEEL, 24-ft., excellent condition, fully loaded, \$10,000; '92 Dakota pickup tow vehicle also available. Campbell, 296-8304.

FISHING BOAT, Sears Super Game-fisher, 14-1/2-ft., w/suntop, cover, seats, Mercury 10-hp outboard; Shoreland'r trailer, w/spare, \$2,500 OBO. Hughes, 299-6674.

'78 VW BUS/CAMPER, carpet, closet, bed added, invested \$3,000, will sell for \$2,200. Shin, 899-2291.

BICYCLES: 26-in. Columbia multi-speed; 20-in. Murray BMX; 20-in. girl's Schwinn, as is, \$15 ea.; unicycle, \$20. Blackledge, 294-6030.

OLYMPIC GAMES, 1 ticket, preliminary gymnastics event, best seating, July 20, \$80. McKay, 266-8821.

BOOMERANG-THROWING CLUB, now forming, call if interested. Eckles, 299-6188.

REAL ESTATE

4-BDR. HOME, 2,050 sq. ft., 2-1/2 baths, split level, pitched roof, gunite pool, La Cueva district, big yard, \$179,500. Romero, 821-9743 or 291-8713.

2-BDR. TOWNHOUSE, 2 baths, 2-car garage, great room w/vigas, security system, east of Tramway, \$115,000. Teague, 298-1576.

3-BDR. HOME, w/loft, 2-story, 2 baths, CVD patio, 8104 Oakdale Pl. NW (off Ladera & Unser), 21 yr. old Silvega Thomas home. Romero, 831-4991, pager 969-1953.

3-4 BDR. HOME, 3-1/2 yrs., 1,809 sq.ft., 2-3/4 baths, loft, corner lot w/side-yard access, deck, far NE Heights, La Cueva school district, \$159,900. Sanchez 828-1859.

2-BDR. HOME, 1,000 sq. ft., 1 bath, excellent condition, automatic sprinklers, fireplace, private, 402 Virginia NE, \$65,000. Jaramillo, 255-2213.

3-BDR. HOME, 1-3/4 baths, 2-car garage, fireplace, special home, nice neighborhood, \$105,000. Vesper, 839-0095.

5-BDR. HOME, 2,550 sq. ft., 2-3/4 baths, new AC, appliances, RV/boat parking, excellent condition, 2817 Georgia NE, \$167,000. Murphy, 881-1520.

5-BDR. HOME, Mossman, 2-3/4 baths, 2,400 sq. ft., formal LR/DR, family room, large private yard, 3612 Dakota, \$169,500. Fisher, 881-8072.

4-BDR. HOME, 1,920 sq. ft., cul-de-sac, Dellyne Ct. NW (Taylor Ranch), LR/DR, large family room, w/fireplace, \$139,900. Kekich, 899-4777.

4-BDR. ANGEL FIRE HOME, 1/3 share, 2 baths, two decks, panoramic, wooded, private, ski, golf, fish, hiking close, \$35,000. Rockwell, 242-6237.

3-BDR. HOME, Rio Rancho, 1,540 sq. ft., 2 living areas, 2 baths, excellent condition, quiet neighborhood, \$108,900. Braughton, 892-7086.

3-BDR. HOME, 2,260 sq. ft., immaculate, remodeled, near KAFB, 2-car garage, 2 baths, spa/pool, patios, \$175,000. Horton, 266-4233.

WANTED

PEAVEY T-40 BASS GUITAR, in any condition; cement mixer; repair manual for '72-'75 International Travelall. Kureczko 281-8206.

CHILDREN'S BICYCLE SEAT, REI-or L.L. Bean-type. Amundson, 866-1300.

BABY BASSINET, good condition. Smith, 256-0652.

ROOMMATE, May to mid-Aug., nice house off Tramway, great view, 2 dogs, \$325/mo. + 1/3 utilities. Manginell, 296-7961.

CARTOP CARRIER, good condition & reasonable. Montoya, 296-4268.

LOST & FOUND

LOST: set of keys; one of them is marked "T-13". Roehrig, 281-2695 or 844-6787.

WORK WANTED

HOUSE SITTING, from May 15 to Sept. 15, by young, married, college graduates w/infant, referrals available. McGee, 247-4307, ask for Mark.

HOUSE SITTING, reliable, quiet post-doc, long term from 6/96 to 6/97. Burns 237-9026

HOUSE SITTING, West Side homeowner seeking affordable home in Jefferson Middle School district, will take good care for you. Field, 890-6523.

It's that time again — Sandia bond drive begins April 29

This year, find registration forms and info on the Internal Web

It's that time again. Starting Monday, Sandians will be able to purchase Series EE bonds through a payroll deduction plan during Sandia's annual savings bond drive.

The campaign is designed to make it easier for every Sandian to buy bonds, and this year the drive is going high-tech. Sandians with Web access can find registration forms, instructions, and a link to the US Treasury Department's home page with a table of current bond rates on Payroll Services Dept. 10502's Internal Web site. In addition to the sites, each center will have its own bond representative to answer questions and provide forms.

"We want people to really go for it this year," says Juanita Sanchez (12671), the campaign's coordinator. "Last year 85 percent of Sandians participated. This year I know we can go higher." Sandia has the highest participa-

tion rate of New Mexico companies with more than 5,000 employees.

The payroll deduction plan allows Sandians to set aside as little as \$1 a week toward the purchase of a \$100 bond, although higher amounts are encouraged. Bonds begin accruing interest on market-based rates immediately after their issue date, with interest compounded semi-annually. The US Treasury announces two rates May 1 and Nov. 1 of every year, one short-term and the other long-term. A series EE bond will earn interest according to short-term rates until five years after its purchase date, when long-term rates take effect. The short-term savings bond rate is 85 percent of the average six-month Treasury security yields and the long-term rate is 85 percent of the average of five-year Treasury security yields. The current short-term rate is 5.25 percent; the long term rate is 6.31 percent.

According to Stephen Meyerhardt, US Treasury Department Area Director, some people have the wrong idea about savings bonds. "They have the notion that buying bonds contributes to the national debt," he says, "which is an absolute myth. In fact, it is because of the national debt that the Treasury needs to borrow money."

Current US Treasury estimates reveal that savings bonds are the least expensive form of Treasury borrowing — for every billion dollars borrowed, savings bonds are \$70 million to \$80 million cheaper than T-bills, notes, or other Treasury issues.

Jim Tegnalia, now President of Lockheed Martin Advanced Environmental Systems Inc., is New Mexico's statewide Savings Bond Campaign chairman again this year, and VP Lynn Jones (7000) is chairing Sandia's campaign.

Savings bonds: 'Today's Decision, Tomorrow's Security'

Here are some reasons why more than six million Americans choose payroll deduction as a way to save:

- Bonds are affordable. You can put aside as little as \$1 per week.
- Bonds are safe. There is no risk of principal because funds are guaranteed by the full faith and credit of the United States.
- Bond earnings are market-based and keep pace with current market rates.
- Bonds have tax advantages and can be replaced if lost, stolen, or destroyed.

Infertility benefit provisions changed

The following information is provided by Sandia's Benefits organization:

Changes have been made to the infertility benefit under the Two Option and Triple Option Plans (TOP). Specifically, these changes are: (1) the purchase of eggs is not covered; and (2) once there is a confirmed diagnosis of infertility, Primary Care Physician (PCP) Option benefits are no longer available.

Except for covered participants who have begun infertility treatments under the Two Option and TOP plans, these changes go into effect May 15. Therefore, if you have incurred infertility treatments between Jan. 1 and May 15 this year in the TOP plans, your subsequent TOP claims will be automatically considered by The Prudential (Claims Administrator) under the benefits described in the TOP Member Handbook for claims incurred no later than Dec. 31, 1996. If you are continuing or are initiating infertility treatments and infertility treatments have been requested prior to May 15 but scheduled after that date, you must notify The Prudential in writing by May 15 to obtain the extended benefits. Send the written notifications to The Prudential by fax at 505-254-2870 indicating your scheduled appointment to continue or begin infertility treatments. Include your name, Social Security number, patient's name, PCP and specialist physician's name, and date of the appointment.

If Prudential is notified by May 15 of scheduled treatments, claims incurred before the end of this year will be considered by Pru-

dential under the benefits described in the TOP Member Handbook. After Dec. 31, the new benefit structure for infertility coverage will be applied to all participants.

For more information, call the Benefits hotline at 844-7575 or, from outside New Mexico, 1-800-417-2634. Ask for the "Infertility Benefit Update."

Coronado Club

April 26 — "Western Night" dinner/dance. \$6.95 all-you-can-eat buffet (\$7.95 for guests), 6-9 p.m. Music by Nite Rider, 7-11 p.m.

April 29 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

May 2,9 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

May 3 — Cinco de Mayo celebration dinner/dance. \$7.95 all-you-can-eat buffet, 6-9 p.m. Floor show 8-8:30 p.m. Music by Midnight Magic, 7-11 p.m.

May 5 — Sunday brunch buffet, 10 a.m.-2 p.m. \$6.95 all-you-can-eat buffet, kids 3-12, \$1, under 3 free. Music by Bob Weiler, 1-4 p.m.

May 10 — "Western Night" dinner/dance. \$7.95 all-you-can-eat buffet, 6-9 p.m. Music by Isleta Poorboys, 7-11 p.m.

May 12 — Mother's Day brunch, 9 a.m.-4 p.m. (Seatings at 9-11 a.m., noon-2 p.m., and 2:30-4 p.m.) \$8.95 all-you-can-eat buffet, kids 3-12, \$4.95, under 3 free. Menu items include baked ham, turkey, baron of beef, salads, deserts, breakfast items, and vegetables. All mothers receive a free flower. Reservations required (265-6791).

May 18 — Swimming pool opens for season, 11-5 p.m.

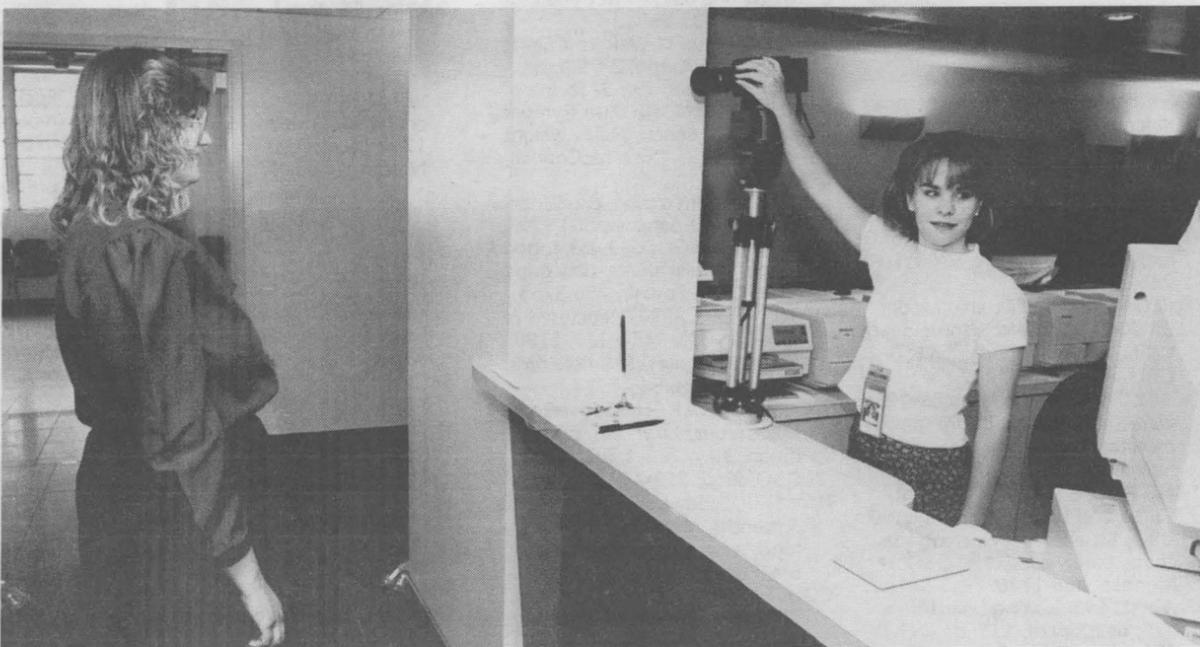
Both agree that savings bonds are a wise investment. "It's simple to purchase bonds through payroll deduction," says Jim, "and they make a safe and affordable investment."

"As good corporate citizens, we need to show our support," Lynn says.

The Web site, located on Sandia's Internal Web at <<http://www-irn.sandia.gov/organization/div10000/ctr10500/dpt10502/10502.html>>, will be available throughout the campaign. The registration form can be downloaded into a word processing program, filled out, and faxed or mailed to Dept. 10502. The fax number is 844-8464, and the mail stop is 0152.

Most questions can be answered from the Web site, but Sandians can also call Stephen Meyerhardt at 248-7860 for information.

Jim Wang (8713) is Sandia/California's drive coordinator and can be reached at 294-2786. Naomi Bitela, Sandia/New Mexico's Payroll contact, can be reached at 284-2403.



SAY CHEESE — Kimberli Gray, right, a temporary employee in Badge Office Dept. 7437, focuses a digital camera on Patricia Heath, Audit Services Dept. 12840, during the DOE-mandated rebadging process that began this month and will be completed for all Sandians by late May. The digital camera process allows employees to see their photo before it is printed.