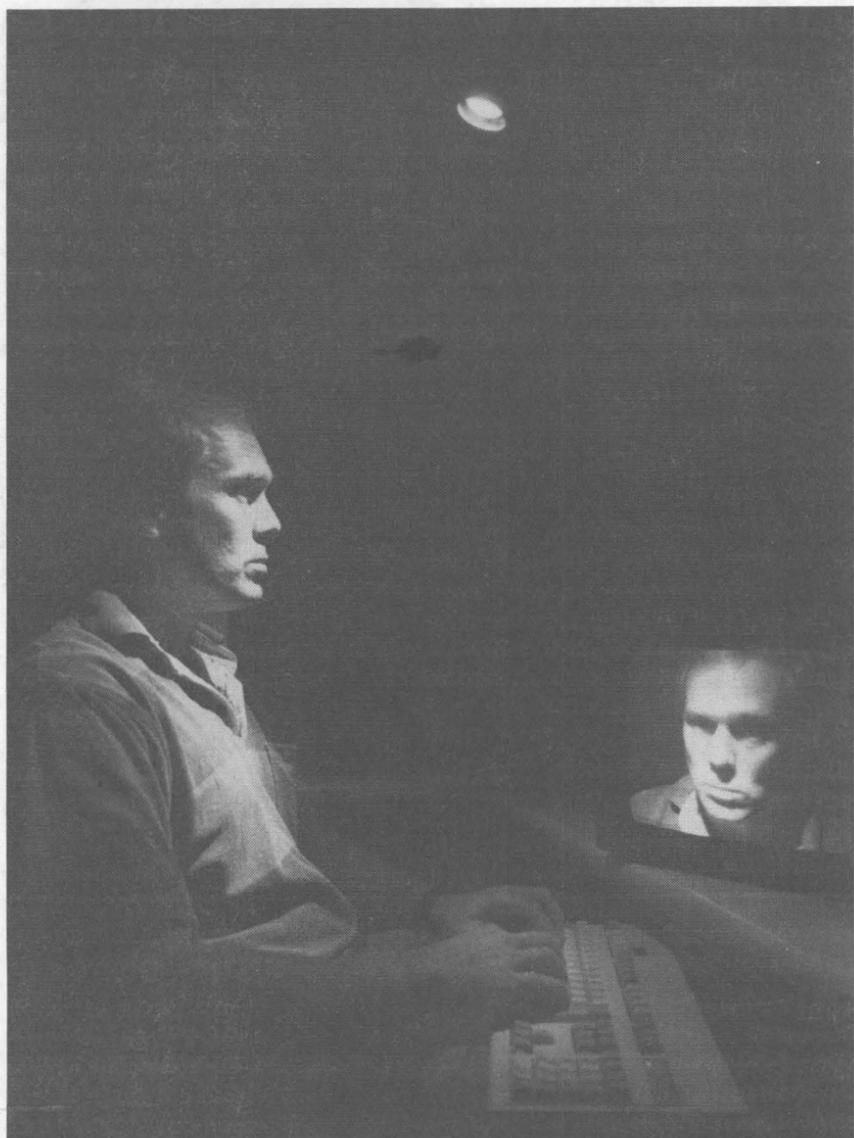


Unique Electronic Security System Recognizes Familiar Faces



FAMILIAR FACES — Don Sheaffer (8455) demonstrates a unique security system that permits or denies access to a secured area depending on whether or not it recognizes a person's face. Because the system identifies a person visually, it requires no user interaction. The authorized user simply passes through a secured doorway. (Photo by Randy Montoya)

When most of us recognize an old acquaintance at the movie theater, it usually takes a second or two to attach a name to the face. That's because in that brief instant, the human mind sorts through enough information to muddle most computers, making hundreds of decisions based on thousands of facts, until, at last, a recollection.

But can you train a computer to recognize people that quickly and accurately — accurately enough to trust that computer with protecting classified information? That's what three Sandia/California researchers asked two years ago, and they've come up with a unique concept for a security system that recognizes familiar faces electronically.

The concept, called PASS (for Personnel Administrative Support System), is a computer-based visual recognition security system that grants or denies a person's access to a secured

There's no ID card or badge, no number to punch in.

area, such as a laboratory or vault, depending on whether that person is authorized for access. The PASS system itself is still in the demonstration stage.

"PASS would work anywhere there's a limited number of people who want to get into or out of a particular area," says PASS co-developer Jamie Meacham of Telemetry Systems Dept. 8454, "just about anyplace that bears a sign 'Authorized Personnel Only.'"

Because PASS is a visual recogni-

tion system, the computer does all the work. The cleared user simply passes through a secured doorway. There's no identification card or badge, no personal identification number to punch in, no fingerprint verification, and no iris check — no human interaction with the system at all. (See "Visual Recognition vs. Biometrics" on page ten.)

The PASS concept was developed by Jamie, Don Sheaffer of Test Data Processing Dept. 8455, and Trish Larson of Electronic Sensor Dept. 8453. Jim Barham (ret.), a former Sandia department manager, launched the development project two years ago.

Computer Compares Snapshots

Here's how the PASS concept works: A video camera above a secured doorway takes a snapshot every few seconds and sends the image to the system's computer. Whenever a person's head appears in the snapshot, a detection algorithm isolates and extracts that person's face from the image.

Using this electronic image, the PASS system tries to identify the individual in the video frame. To do this, the system relies on a neural network, a way of computing that simulates the biological functions of the human brain. (See "Neural Networks Offer Brain-Like Responses" on page three.)

To identify the individual, the neural network, trained to recognize certain people, picks out a possible identity for the person in the snapshot. An edge enhancement algorithm exaggerates facial features, and changeable

(Continued on Page Three)

Cost-Saving Drives Change

Labs Converting To Weekly Pay Schedule for All

The Laboratories-wide drive to cut costs prompted Payroll (152) recently to haul out and dust off a long-discussed proposal to convert the entire lab to a single weekly pay plan. The result of the revisitation is that the plan will become reality for 1993.

"Having two pay frequencies, as we do now — weekly and semimonthly — requires two separate payroll processes," says Jennifer Crooks, Manager of Payroll Dept. 152. "It's more costly and less efficient, and with the Labs' current emphasis on efficiency and cost-saving, we decided to make the change."

Affects 4,300 Employees

She says about 4,300 employees now paid semimonthly will be affected by the Jan. 1 change. A large percentage of them have direct-deposit arrangements with the Sandia Laboratory Federal Credit Union, which has been working with Payroll to minimize the impact of the changeover.

Credit union officials say members will be contacted early this month with information about

(Continued on Page Seven)

**What's Happening in
Energy & Environment
— See Page Five**



LAB NEWS

VOL. 44, NO. 24

SANDIA NATIONAL LABORATORIES

DECEMBER 4, 1992

Duke University Medical Center Team Says...

Some Hybrid Microcircuits Lab Workers May Have Experienced Ill Health Effects

Some Sandians who worked in the now-closed Bldg. 880 Sandia Hybrid Microcircuits Laboratory during the 1980s may have experienced a variety of ill health effects resulting from their work there, according to an independent medical evaluation commissioned by Sandia management. Possible effects, based on an evaluation of 25 employees who worked in the lab, include chronic headaches, respiratory problems, and neurological symptoms such as memory loss.

The study was done by a Duke University Medical Center team that also included experts from the US Environmental Protection Agency. Results from the study were presented to Dr. Larry Clevenger, Director of Occupational Medicine Center 7030, in mid October.

Key Conclusions

- The study's key conclusions:
- Ample opportunities existed for intermittent worker overexposure to the volatile organic solvents trichloroethylene (TCE) and toluene,
 - Many employees probably suffered temporary

health effects, including mild narcosis (dizziness, lightheadedness), as a result of their exposures, and

• Several employees with higher exposures have clinical signs consistent with chronic solvent-induced encephalopathy (a disease of the brain).

While no definitive diagnoses related to past exposures have been made, studies continue to better understand the precise nature of employees' health concerns, Larry explains.

Results to Study Group and QAT

Results from the study also have been distributed to the 25 Labs employees who made up the study group and to members of a Quality Action Team (QAT) on toxicological concerns that was formed by Sandia in April 1991. The QAT was established to provide a participatory process for documenting and investigating these employee health concerns.

The QAT is composed of representatives of Hybrid Microcircuits Lab employees, their supervisors, representatives of the Metal Trades Council, (Continued on Page Seven)

This & That

Sorry, Barney - In the last issue, we had a photo of Barney Doyle (1111) with the 15-year-old PDP-11/34 computer that his group still uses. Barney thought it might be the oldest computer still in regular service at the Labs.

Not so, say a couple of Sandians. Bill Peters of Stockpile Evaluation Dept. IV (364) at Pantex says his group still uses eight PDP-11/34s that collect about 98 percent of the data collected at Pantex; some have been in use since about 1975. Doug MacMillan (8453) says an Intel 4004 microprocessor has been operating at Sandia/California since about 1975, and since 1977 has gathered data in the Tritium Research Lab 24 hours a day, seven days a week.

* * *

First in a Series - Not often do we come right out and ask you to read something in the LAB NEWS, but we hope everyone who wants a better understanding about how Sandia works today and where we're headed will take the time to read the series of LAB NEWS articles by Sandia's line VPs. The first, by Dan Hartley (6000), discusses what's going on in the Energy and Environment Sector (see page five). A companion article also is included (page four), explaining sectors and why they are increasingly important at Sandia. The next two articles, by Roger Hagenruber (5000) and Gerry Yonas (9000), will discuss what's happening in the Defense Programs and Work for Others sectors; they will be followed by other VP articles - one per issue if everything goes according to plan.

Thanks to our busy VPs for participating in this series. If you find their articles informative and helpful, please let them know.

* * *

He May Ski Up the Hill - Several Sandians have 40-plus years of service, but they've got more than a ways to go to match the employee who retired from AT&T recently. John Elliott gave new meaning to the word "experienced," accumulating 58 years and seven months of service at AT&T. Before retiring, the 70-something Elliott revealed that quiet rest isn't in his retirement plans - longer ski vacations in Vermont are.

* * *

Box Merchant to the World? - Let's hope the US doesn't turn into that, but if a new computer keyboard we got recently is an indication, we may be headed that way. The keyboard was labeled "Assembled in Taiwan," and the box was labeled "Assembled in USA."

* * *

What a Card! - I met a fellow recently who is both an ordained minister and a lawyer. He said he once thought about the comprehensive collection of services he might offer - everything from blessing the unborn to probate activities. His business card, he added, could have included the slogan "All services pre-natal to post-fatal."

* * *

Calorie Gods Are Watching, Too - Every week or so, someone brings doughnuts to the office, even though few of us here are seriously malnourished. I've noticed how unashamedly everyone here grabs those "fat pills" early in the morning, but toward noon, people typically take a quick look around to see if anyone's watching before taking any remaining ones. Feeling a little guilty, perhaps?

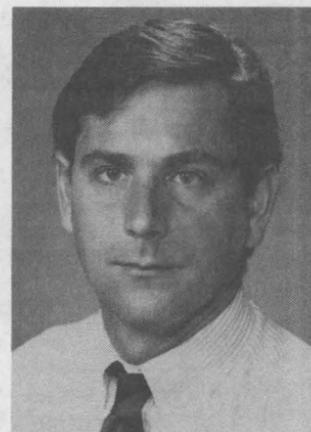
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LAB NEWS Schedule - Our Dec. 18 issue will be the final one for 1992. We resume our fortnightly publication schedule on Jan. 8. •LP

Supervisory Appointments

PAUL NIELAN to Manager of Structural Mechanics Dept. 8742.

Paul joined Sandia in 1980, first working in



PAUL NIELAN

the Applied Mechanics Department on the W79 and W82 artillery projectiles. He later worked on the Excalibur program definition study; the Janus program, an Army reimbursable program involving armor-piercing projectiles; and the Antipasto finite element mesh generator. Most recently, he was involved in the gas transfer program and Phase 1-2 studies.

He has a BS in engineering science from the State University of New York at Buffalo and an MS and PhD in mechanical engineering from Stanford. He is a member of ASME.

Paul enjoys running, skiing, and tennis. He and his wife Jacqueline Chen (8351) have a six-month-old son and live in Danville.

* * *

JIM BARTEL to Manager of Tritium Management Dept. 8281.

Jim joined Sandia at Livermore in 1974 in the Materials Department. He then spent seven years in



JIM BARTEL

the Solar Central Receiver Department, two years of which he spent managing the start-up and test of the Solar One plant near Barstow. He later joined the Component Engineering Department, supporting gas transfer system design work. Most recently, he has worked in the California Quality

Organization, providing training and facilitator support in the use of quality tools.

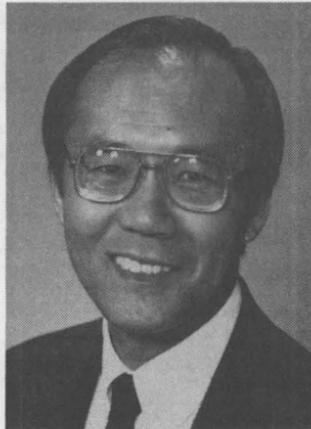
He has a BS in chemistry from Canisius College in Buffalo, N.Y., an MS in inorganic chemistry from Wayne State in Detroit, and a PhD in physical chemistry from the University of Michigan. He is a member of the American Chemical Society and the American Society for Quality Control.

Jim enjoys skiing, gardening, camping, travel, and sailing. He and his wife Charlotte have two children and live in Pleasanton.

* * *

JIM WANG to Manager of Materials Diagnostics Dept. 8713.

Jim joined Sandia to work in the Combustion



JIM WANG

Research Department, first helping to develop laser-based instrumentation to measure particulates for combustion exhaust monitoring. Following that, he worked on gas transfer systems in the Component Development Department, then moved to the Exploratory Systems Department

to work on the materials program for SDI. His latest assignment has been to develop carbon foams

(Continued on Page Three)

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Savings Bond Rates Announced

The market-based interest rate for US Savings Bonds (Series EE) has been set at 5.04 percent for the period Nov. 1, 1992, to April 30, 1993. Rates are set each May and November according to financial market averages during the preceding six months.

However, bonds purchased since Nov. 1, 1982, and held five years or longer earn the greater of two possible rates: either the average of semiannual market-based rates during the holding period, or the minimum rate in effect when the bond was purchased. At redemption, either the average or the minimum rate is applied and compounded semiannually to determine the value of the bond. So a bond purchased now and held for five years or more is guaranteed to earn no less than the current minimum - 6 percent - even if market-based rates remain lower than that.

Bonds held less than five years earn fixed rates ranging from 4.16 percent at six months to 5.75 percent at four years from issue.

Recorded information about bonds is available by calling 1-800-4US-BOND.

Neural Networks Offer Brain-Like Responses

Sorting through an electronic library containing hundreds of people's faces to find a similar, but not exact, match requires a lot of data crunching, says Jamie Meacham (8454).

To make the PASS system work, he says, its developers combined two proven software techniques — neural networks and classical correlation — in a new way. The neural network first identifies an image that looks most like the person requesting access. This significantly reduces the amount of data examined because it rules out hundreds of possibilities before any calculations are made.

Then the person's identity can be verified with classical correlation algorithms, calculating similarities between only a few stored photographs of an authorized person and the real-time snapshot taken by the PASS system's video camera.

Neural networks are useful for analyzing and reducing large sets of data because they have large information capacities and compute at extremely fast rates. "Even a simple neural network can compute highly complex algorithms with a small amount of computation," says Jamie.

Makes Its Own Decisions

In addition, he says, neural networks can make decisions, which is why they're used for artificial intelligence applications. "You set up the structure and tell the network what the proper answer is, and it will teach itself how to best solve the problem," he says. "A neural network literally makes judgments on its own."

"Just like the brain, neural networks operate on the premise that if certain parameters are met, a node will 'fire,'" he says. "A programmer can adjust certain parameters affecting how the neural

network adapts itself, or learns, but other than that, the computer decides how to arrive at the right answer."

That's why such networks are good for a facial recognition security system — the computer decides which of a person's facial features are most important in verifying his or her identity, says Jamie. "That makes it harder to bust the system," he says.

Because neural networks can take a tremendous amount of data and capture from that data only what information is needed, say PASS co-developers Don Sheaffer (8455) and Trish Larson (8453), they are also using neural networks to compress telemetry data.

"Neural networks can find patterns in data very quickly," says Don, "which can help us assess the working condition of test hardware and analyze post-test data much more effectively."

(Continued from Page One)

Familiar Faces

features (such as hairstyle) are removed from the image, making identification easier.

"The response we want during the preliminary identification stage is 'This is probably Joe,'" says Jamie. "Once the computer recognizes Joe, it must then make sure that the person is in fact Joe, and not someone who just looks like Joe."

If the person's face is recognized by the neural network, the snapshot — essentially a pixel (dot) map of a person's face — is compared with several other stored photographic images of the same authorized person using a classical correlation algorithm. (Photos of authorized personnel are stored previously in the system's data base.) If the pixel-by-pixel correlation between the snapshot and the stored photos is strong enough (greater than a statistically significant number), the secured door is electronically unlatched.



Because the identification and verification functions are performed separately, the system takes only seconds to grant or deny access, says Jamie. "Most developers of computer-based visual recognition systems try to train the computer not to make a single mistake, or they try to correlate a person's image with every stored image," he says. "That's difficult and time consuming, especially as the set of authorized personnel grows. PASS is trained to first recognize an individual and then do the calculations."

Low Cost, Small, Portable

In preliminary tests, the PASS system never permitted access to an unauthorized person, and it granted access to authorized persons 51 percent of the time. Although the system obviously needs more development before it could be sold and used as a commercial software product, Jamie believes it shows a lot of commercial promise. The system is now the subject of a Laboratory-Directed R&D (LDRD) proposal.

The major components of the PASS system include a video camera, an IBM personal computer, and a commercial digital signal processor (DSP), so a commercial version of the system would be relatively inexpensive, small, and portable, says Jamie. The cost of the system components would add up to about \$10,000, he estimates.

Offspring of the current PASS system would probably work best for permitting or denying
(Continued on Page Ten)



ELECTRONIC SNAPSHOTS — PASS co-developer Jamie Meacham (8454) explains how a neural network helps identify an individual before any correlations are drawn by the system's computer, reducing the time it takes to permit or deny access. On the screen behind Jamie are electronic snapshots and edge-enhanced facial images of PASS's three developers: (left to right) Don Sheaffer (8455), Jamie, and Trish Larson (8453).

(Continued from Preceding Page)

as the anode material for rechargeable batteries.

Jim was named a Distinguished Member of Technical Staff in 1988. He is active in the American Institute of Aeronautics and Astronautics, the Electrochemical Society, and the honorary science fraternity Sigma Xi.

He has a BS in mechanical engineering from National Taiwan University, and an MS and PhD from MIT in aeronautics and astronautics, specializing in fluid mechanics.

Jim enjoys tennis, jogging, swimming, and horseback riding. He and his wife Vivian have two children and reside in Livermore.



SANDIA/CALIFORNIA retirees gathered recently for their annual dinner. Some 300 were there and heard remarks from VP John Crawford (8000) and Executive VP Lee Bray (30) about the transition to a new managing and operating contractor for the Labs. Seen here are (from left) retirees Rex Richardson and John Cordial, along with John's wife Carmen.

What's It All About, Orval?

Sectors — Now Dominant Force In the Way We Do Business

Last year, the Sandia Management Council announced the establishment of our three sectors — Defense Programs, Energy and Environment, and Work for Others. When the announcement was made, many Sandians probably didn't realize the far-reaching effects, but it is evident now that the sectors have had, and will continue to have, a profound effect on the way we do business. The sectors are actually "driving" the Labs, and our future will be built around them — even our budget is organized according to sectors now (LAB NEWS, Nov. 13). To give Sandians a better understanding of how the sectors operate and why we're now organized that way, the LAB NEWS recently visited with Executive VP Orval Jones (20), to whom the three sector managers report.

All three sector managers are also VPs of Divisions — Roger Hagengruber (5000), Gerry Yonas (9000), and Dan Hartley (6000). In addition to this article, the LAB NEWS has asked these VPs to write articles for us about their sectors — what's happening now and what's being planned. The first of these, by Dan, begins on page five. Roger's and Gerry's articles will be published soon.

Here are Orval's answers to our questions about sectors and related subjects:

Why did we adopt the sector concept?

The seeds of our sector concept were really planted in the early '70s during the "energy crisis," when the Sandia mission was clearly broadened to include taking on a new mission in energy R&D. Before then, we were a single-purpose, nuclear weapon lab, but our expanded mission turned us into a multi-purpose lab, with new customers and new kinds of work. Our organizational structure continued to reflect our heritage of a single-purpose nuclear weapons lab for many more years. But, when we developed our *Strategic Plan* in late 1989 and early 1990, with its commitment to total quality management, and really started to gear up for the rapidly changing times, the concept of customer requirements figured prominently. It was evident that we needed to restructure the Labs to better serve a wider variety of customers. Although our primary responsibility continues to be stewardship for the nuclear weapons program, we are now clearly not just a single-purpose lab with a few sidelines. We are an organization pursuing several major lines of R&D endeavor. Our sectors were established to reflect this.

What's the relationship of the sectors to divisions?

The divisions are the functional organizations that are responsible for accomplishing the work and, in general, are collections of complementary capabilities and special facilities.

The divisions were dominant in the past, but our sectors are now. In a sense, we have shifted the center of gravity from the divisions to the sectors.

Congratulations

To Lynn and Ike (9727) Evans, a daughter, Erin Marie, Aug. 25.

To Lauren and John (6112) Waggoner, a son, Michael Robert, Oct. 9.

To Lori and Greg (1562) Sjaardema, a daughter, Tracy Ann, Oct. 27.

To Karen and Peter (1332) Winokur, a son, Jacob Calvin, Nov. 1.

To Cindy and Rick (1325) Anderson, a son, Charles Nathanael, Nov. 2.

To Barbara and Mark (6216) Powell, a daughter, Nicole Denise, Nov. 3.

To Dorthe (9236) and Brad Carr, a son, Samuel Andrew, Nov. 9.

To Ann and David (2346) Grice, a daughter, Sarah, Nov. 18.

Sectors draw on the talents, capabilities, and facilities in the divisions to serve the needs of our customers. In effect, the sectors "drive" our future directions, and the divisions support them. The sectors utilize resources across the Labs — across all divisions. The sectors' responsibilities are to understand customer needs, to implement programs and projects in response to those needs, and finally to ensure that customer requirements



EXECUTIVE VP Orval Jones (20): "We are an organization pursuing several major lines of R&D endeavor. Our sectors were established to reflect this."

are met — all with the support and close cooperation of our divisions.

Will the dominance of the sectors affect the size of the divisions and the smaller organizational units?

Division sizes will be adjusted to support the sectors, based on the needs of our customers. Customer needs will drive the mix of talents and capabilities that we maintain. Some organizations will decrease in size, and others will grow. Certainly, employees in organizations that are shrinking are concerned about this — that's natural. We realize that it's uncomfortable for some of these employees, but we also believe that our employees understand that the nature of our work is changing and that we must adapt to changing times. Although the future is uncertain, our budget is healthy, and we have plenty of work for all of our people. Some folks will need to be retrained for other jobs, perhaps in other organizations, but for the foreseeable future we expect to have jobs for all hard-working Sandians who are willing to adapt.

For example, some work in the nuclear weapons research, development, and testing areas is being cut back or even phased out. We aren't doing nearly as much Phase 3 [development and engineering] work now. This is affecting Component Development and Engineering Support Div. 2000 considerably. On the other hand, DOE's new National Energy Strategy has increased opportunities and funding for us in the

Energy and Environment Sector, so we're going to need more help there.

One of my main tasks is to make sure that we don't move too quickly in moving people around and cutting back capabilities. We certainly don't want to move so fast that the process becomes disruptive or even destructive, but adjustments certainly are going on, and we expect them to continue.

How do our core competencies fit into all of this?

Our five core competencies are microelectronics and photonics, engineered materials and processes, physical simulation and engineering sciences, computational simulation and high-performance computing, and pulsed power. We established a Core Competencies Manager — Paul Fleury, also the Division 1000 VP, to be an advocate for our core competencies and to ensure that they remain strong and properly supported. He is responsible for regularly "taking the temperature" of the core competencies and advising the Sandia Program Council and sector managers about what's needed to keep them healthy. The core competencies are our differentiating strengths — the heart and soul of Sandia. They are the areas in which we have special and, in some cases, unique capabilities and facilities. Heinz Schmitt (VP-2000) has been tasked to serve in a similar capacity for our core support (formerly called direct support) capabilities.

We've concentrated on sectors, divisions, and core competencies, but do you think most Sandians have a good general understanding of how things work at the top — how decisions are made and who is in charge of what?

Many probably do not. We've made a lot of changes in the way the Labs is structured and managed in the past few years, and it can be pretty confusing to folks who don't work in management. At DOE's preproposal conference to select a new Sandia management and operating contractor, we showed a chart that explains our management responsibilities and accountabilities. Although it won't answer all questions, I think Sandians would find it informative and helpful. You might want to print that along with this interview. [See chart below.]

•LP



Summary of Responsibilities & Accountabilities

Responsibilities				
Sandia Management Council (SMC)	Sandia Program Council (SPC)	Administrative Mgt. Committee (AMCO)	Sector	Division
Develops corporate strategy & establishes corporate goals	Plans and directs technical programs and core support/core competencies	Establishes corporate overhead strategy and plans	Generates program revenue	Supports and executes sector programs
Integrates corporate policy, plans, and customer needs	Provides guidance to AMCO for indirect programs	Partners with SPC	Provides program vision & roadmap	Builds & maintains organization and capabilities
Major lab and site decisions	Creates strategy for development, investment, and disinvestment	Solicits customer feedback	Customer development and interaction	
1-10 year horizon	1-10 year horizon	Maintains oversight of overhead programs	Coordinates across sectors and divisions	
		1-5 year horizon	Ensures core competency support	
Accountabilities				
President	Executive VP for Direct Programs	Executive VP for Adm. & Site Mgt.	Sector Manager	Division VP

What's Happening in Energy & Environment?

By Dan Hartley (VP-6000)

Editor's Note: To help Sandians better understand what's going on throughout the Labs, we asked all Sandia line vice presidents to write LAB NEWS articles about what's happening in their areas. Space and busy VP schedules permitting, we plan to publish one article per issue until all of them have had their say. Because the Labs' business is now organized by sectors, we chose to begin the series with the three VPs who are also sector managers — Dan Hartley (6000), Roger Hagenruber (5000), and Gerry Yonas (9000). We start with Dan, VP of Division 6000 and Manager of the Energy and Environment (E/E) Sector. Because the sector concept is new and still something of a mystery to many of us, we also have a companion article on the facing page explaining more about sectors — why we're organized that way and what it means for Sandians. And now, here's Dan.

ECM, IWRP, SIVC — even the Energy & Environment activities have sunk to acronyms. I guess that's what happens when lots of ideas start to emerge all at once and you have to say them all in one breath. It's true though, that a lot is going on in our area — the managers in Energy & Environment constantly report that "we're drowning in opportunities." Thanks to lots of hard work by lots of people all over the Labs, we are capturing those opportunities in hopes of developing Labs-wide participation in these new and exciting areas.

I'm going to discuss Energy & Environment as a Sector, not as an Organization. The Sector represents the sector-program-project structure that manages all the work we do for Energy & Environment customers, and that work is spread all across Sandia organizations. The sector is responsible for customer, budget, project, business strategy. The line organization is responsible for people, skills, career development, performance. If I had a wish, it would be for all of you to think sector-program-project when you talk about the work that's done.

So what's happening? First of all, we're organized; second, we're growing the business at an average rate of 30 percent over the last two years; and third, we're trying to place that growth all across the Labs.

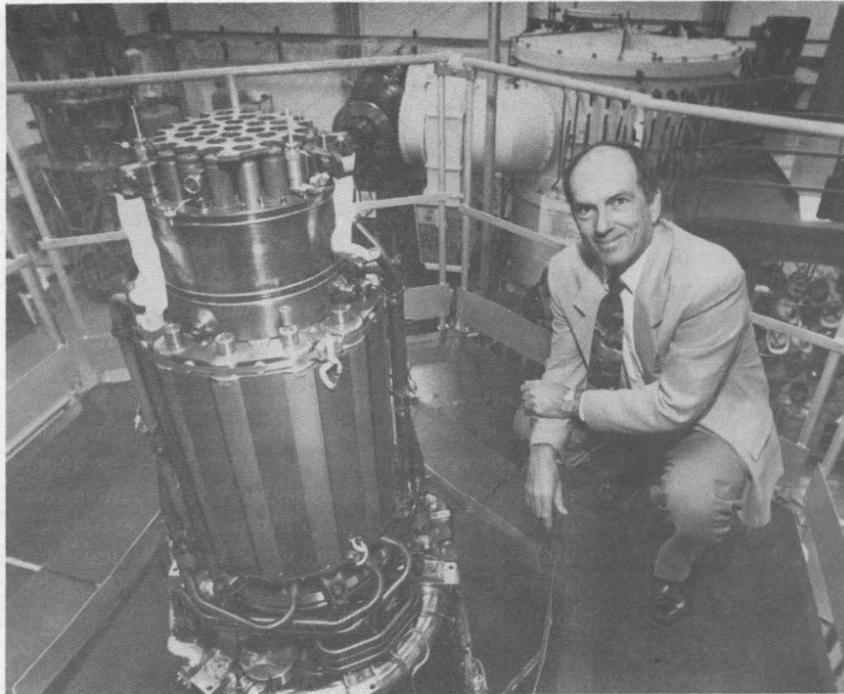
Organized or Sectored?

Did I say we were organized? See, even I jump back and forth on organization and sector — bear with me, it'll all come together at the end. We have a Sector Operations Center, 6900, under Tom Hunter's leadership, to help us develop sector-wide business practices, strategic planning, and a focus for international program growth. Then we have four Centers aligned with E/E program areas: (1) Applied Energy (Solar and Fossil) under Bill Marshall, 6200, (2) Nuclear Waste Management under Dori Miller, 6300, (3) Nuclear Energy under Nestor Ortiz, 6400, and (4) Environment under Joan Woodard, 6600. The E/E Sector's fifth program area, Energy Research, is under Peter Mattern, 1010, so he can manage it relative to the company's core competency umbrella. [Peter directs the Core Competency Support Center 1010.]

We also created two competency centers in 6000 to provide the principal tech base support for E/E: (1) Geosciences under Dick Lynch, 6100, and (2) Nuclear Test and Engineering under Jim Rice, 6500.

We're Growing

Now comes the good part. Opportunity is busting out all over! It should be no surprise that Energy & Environment are truly important issues to the country, indeed to the world, today — and tomorrow. DOE's energy programs have crept upward over the last few years and we have doggedly maintained or increased our market



SCOPING OUT TOPAZ — Dan Hartley, VP-6000 and Manager of the Energy and Environment Sector, is seen here with a TOPAZ Russian space nuclear power system. Two of the reactors installed for research purposes near the University of New Mexico (UNM) are being studied by a team of scientists from Sandia, UNM, Los Alamos National Lab, and Phillips Lab, and several Russian scientists. (Photo by Randy Montoya)

share. Environment (spelled LEO DUFFY) has grown enormously — to \$6 billion per year for DOE — and we have succeeded in capturing an important part of their technology development effort. Joan Woodard's Center for Environment was created just over two years ago, with virtually no program in place. Today that "LEO DUFFY" activity is \$100 million dollars at Sandia, and it's been matrixed widely — about \$20 million in Joan's center. [Editor's Note: Leo Duffy is Assistant Secretary for Environmental Restoration and Waste Management at DOE Headquarters and has worked closely with Sandia for several years.]

Environment

Let me take you through a brief tour — starting with environment. Our biggest efforts are all driven by the needs of the Nuclear Weapons Complex to achieve cost-effective, timely cleanup of 40 years of gunk, and to provide a basis for designing Complex 21 (and hopefully the private sector, too) in a model, environmentally conscious way. The strategy of that program at Sandia has been to (1) lead *integrated site demonstrations*, employing the SANDIA WAY of doing business — systems approach to complex engineering problems, (2) putting our special capabilities in lead roles, like robotics, and (3) providing across-the-board customer support for difficult real

problems at Hanford and Savannah River. We're also in the lead role for the "LEO DUFFY" program in international program development and in education.

Joan's championing of integrated site demos has showcased Sandia's project integration skills. We use a real problem, like Sandia's chemical and mixed waste landfill, to team with industry groups that want to demonstrate new cleanup technologies. Working with DOE and EPA, we then demonstrate the benefits (or failures) of those new technologies. Our landfill project has already shown that we can reduce the cost of site characterization by 50 percent.

These integrated demos are also employed in our nuclear weapons business, where we are demonstrating destruction and disposal of weapons

"We've set the stage for tremendous interaction with industry."

components while separating and properly handling the toxic material, explosives, heavy metals, solvents, and classified parts.

Reaching beyond the traditional cleanup role, though, is equally important. The ability to develop and demonstrate Environmentally Conscious Manufacturing (ECM) approaches to weapons production — which we've done with processes at Kansas City and Y-12 (where we've reduced chlorofluorocarbons [CFCs] by a factor of 10!) — has given us an entry to the private sector. We're working with Motorola on an ECM project to replace CFCs in microelectronics production — and it's a real success. We've set the stage for tremendous interaction with industry on many aspects of ECM — it seems unlimited — and ECM has become a "household word" with industry. The National Center for Manufacturing Services (NCMS) and the EPA both recognize Sandia's special competency in ECM.

Another big success in environment has been Pat Eicker's robotics activity. Pat's group (1600) has become one of the primary national centers for intelligent machines, and he has real systems working on real environmental problems in the complex and in industry.

I can't neglect the international aspects. We're coordinating that for DOE, through Tom Hunter's organization. Tom is on his third trip to Russia in the last two months. We already have a deal with Ukraine to provide technology assistance for cleaning up the Chernobyl mess. We're working with Russia and Hungary to help on broad environmental problems, and we're starting a deal with Mexico to help the Maquiladoras on the border,

(Continued on Page Six)

Dan Describes the 'SANDIA WAY'

During the many strategic planning efforts that have been under way at Sandia, from corporate to department, we discovered a common theme that attempted to define how Sandia actually does its work in a differentiating way. If you look at many of the mission statements, generally the second paragraph says it — with a few adjectives that fine tune it: That is — we solve problems, and we take the systems approach:

- We form multidisciplinary teams,
- We engage many organizations,
- We cover the spectrum from basic research to application:
 - Our engineering projects have sound scientific support,
 - Our scientific product can be related to an engineering project.

This SANDIA WAY — sometimes called R to D to A (research to development to application), sometimes called full systems approach, and sometimes called integrated systems — does set us apart, and is a strength we want to maintain.

(Continued from Page Five)

Energy and Environment

and get more ECM to their processes. It's fun, it's challenging, it's real, and it will involve nearly all of the Labs. Our congressional delegation is particularly proud and supportive of these international outreach efforts, because it helps put New Mexico on the world map.

Another very important part of our environmental effort is the scientific support we give to WIPP (Waste Isolation Pilot Plant) and to the proposed Yucca Mountain commercial-nuclear-waste repository. As you may know, both have been tremendous technical challenges and sources of considerable controversy. Both are large efforts, involving more than a decade of Sandia work, teaming with other labs and with industry. Sandia's efforts on both are exemplary.

The credibility that exists on WIPP, in the eyes of the National Academy of Sciences and DOE, and many others, is a tribute to our team here and especially to the persistence, objectivity, and scientific contributions of Wendell Weart, 6303. Apart from the political and emotional issues surrounding WIPP, Sandians can be especially proud of our institution's role. And because of our efforts, the WIPP project has received congressional support this year, evidenced by land withdrawal and continued funding to support our research program. This means more work for Sandia, and more opportunity to demonstrate our leadership.

The Yucca Mountain repository is a parallel project where Sandia plays a similar scientific support role. Our contributions are of high quality, but the future is more nebulous. The country is not completely convinced it's ready for this repository. Our future on Yucca Mountain will probably be at a lower effort than currently, but no one can replace our historic, scientific understanding of the site.

Nevertheless, WIPP and Yucca Mountain have resulted in Sandia developing a world-class capability in performance assessment which, coupled to our nuclear energy capability in risk assessment, puts us in a national leadership role in those skills. Dori Miller and Nestor Ortiz are building on these competencies to develop additional new roles for Sandia that will support broad issues in energy and environment.

Another area that leverages both our energy and environment efforts is geosciences. We aggregated our various "geo-efforts" (science, repository design, oil and gas, geothermal) into the new center led by Dick Lynch. We're convinced this will become a national center for geoscience and geotechnology.

Energy

I hope everyone knows that Sandia is this country's largest contributor to energy R&D among the national labs. We were very successful during the '70s in building an energy program at Sandia that covered the spectrum from fundamental studies (our Energy Research Program) to systems-level responsibilities in nuclear reactor safety and renewable energies, and even field work in oil and gas. Our robust systems approach (the SANDIA WAY) kept us as a major energy player when interest and support waned in the '80s. Energy is now re-emerging as a critical international issue, and Bill Marshall is leading us over the threshold of significant opportunity to make even more impact.

What's new in our applied energy work is our focus on working directly with industrial partners to make many of our past technology advances happen in the marketplace — technology transfer at its very best. We perform joint projects in our Oil Recovery Technology Partnership, and our Design Assistance Center is the focal point for our



JEFF MORGAN (2664) displays "electronic innards" of the receiver unit for a Sandia-developed oil exploration borehole seismic system. The system is designed to do high-speed seismic mapping from boreholes up to 15,000 feet deep at temperatures up to 400 degrees F and pressures exceeding 8,000 psi. Jeff worked with other Sandians in Department 2664 and Department 6114 to field test the system this year, and they are now continuing work to refine it. This project is an example of one that is "matrixed." The Energy and Environment Sector manages it, and Sandians in several divisions are involved.

work with industry to install renewable energy systems for special applications in the US, Mexico, the Caribbean, Central America, the Pacific Island region, and in other locations worldwide.

Recently, we defined our role with one of the largest CRADAs [cooperative research and development agreements] ever put together by DOE — the US Advanced Battery Consortium. Sandia's historical leadership in battery development, coupled with our good relations with industry, has served us well. Getting the CRADA together and approved was just short of a 12-month running of the gauntlet, but we made it —

"Sandia is this country's largest contributor to energy R&D among the national labs."

thanks to Nick Magnani, 6204; Paul Butler, 2525; Paul Robinson, 4000; and others.

We are also preparing to modernize the Solar Central Receiver at Barstow, Calif., in a cost-shared partnership with several utilities, state agencies, and the Electric Power Research Institute. This project, Solar Two, will put central receiver technology into the 21st century where it belongs — new working fluids, new heliostat systems, new balance-of-plant technologies.

We also have two new major thrust areas that should do well: (1) Transportation — focused on hybrid vehicles, electric vehicle infrastructure technologies, and several minimum-emission research topics, and (2) Industrial Waste Reduction Program (IWRP), a close cousin to Environmentally Conscious Manufacturing, but more specifically stressing the waste minimization aspects. IWRP is jointly led by Sandia and Los Alamos National Lab for the DOE Conservation Program. We have a number of projects already under way and expect a potentially explosive growth. More energy is consumed in this country by inefficient industrial processes and inattention to waste than can be generated by 50 new one-gigawatt power plants.

On the fundamental energy research side, after

nearly a decade of trying, the Phase 2 construction project for the Combustion Research Facility at Sandia/California is finally getting strong DOE support. Secretary Watkins sent a letter to the Office of Management and Budget two weeks ago asking that it be included in our FY94 budget. Steve Binkley, 8301, and Bill McLean, 8300, have persisted on this effort for several years.

We also have potential for significant new projects in global climate change, where John Vitko, 8102, is a recognized leader among the DOE participants. John has put together a comprehensive, Labs-wide proposal for cloud monitoring from small satellites and unmanned aircraft. We also have Bernie Zak, 6612, setting up a ground-monitoring system in Alaska.

Wil Gauster, 6906, is leading an effort for a growing role for Sandia in ITER (International Thermonuclear Experimental Reactor). Wil is deputy design team leader for the US, and is working in Garching, Germany.

And let's not forget nuclear energy. Nestor Ortiz and Don Gallup, 6474, lead an active project with the Russians to test one of their space nuclear power systems for potential use. Their reactor, called TOPAZ, is now installed next to UNM with Sandians, 30 Russians, and folks from Los Alamos and Phillips Lab crawling all over it. We are also working with DOE to keep the nuclear energy option alive by helping to extend the life of existing nuclear power plants, and shortening the time to build and license advanced light water reactors.

Our nuclear energy folks are also getting a new major building in Tech Area 5, the Technology Support Center, which will finally give Jim Rice, 6500, and his folks a first-class place to work.

It's hard to stop elaborating because so many new things are happening — and much of that growth is because we're capitalizing on our strategic plan objective called SIVC — which means to take the *Systems* approach for larger projects, seek *International* aspects for our work, embrace all of the Labs in these efforts and be sure we are working on the most important problems in order to *Vitalize* the sector, and seek broader *Commercial* partnership and opportunity. I consider this our SIVC responsibility.

The Matrix

I said we were spreading the work all over the Labs. This is true, but the notion of matrixing is not uniformly understood at Sandia. I don't believe in the pure matrix for Sandia, where a dedicated program manager finds all of his or her other support from remote functional organizations — it's inefficient, limits the common feeling of the team, and is generally maligned in contemporary management literature. The other extreme, total vertical integration, where everyone in a project is collected in one organization, pays the penalty of fiefdom growth and poor Labs-wide resources sharing — but it is efficient. We think our system combines good elements from both approaches. On average, I think 60 percent of the project should be in the organization owning the customer interface responsibility, while the rest can be matrixed (our customers generally concede to 80 percent). So the best way to get all of Sandia involved and satisfy our customers is to "matrix" out the customer responsibility with the work. This is what we've generally done. Five years ago, we matrixed less than 20 percent of our work; today it's at 40 percent and growing.

Get Involved

Finally, at a laboratory as large and diverse as ours, it's difficult for everyone to know what's going on in the sectors and to understand how their talents might be brought to bear on critical problems. We're trying extra hard this year to get the messages out about our programs and to invite everyone to be a part. We're running a series of

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Microcircuits Lab

and representatives of the industrial hygiene and medical departments.

A statement of work for potential consultants on the study was approved by consensus through the QAT and a request for proposals distributed to 12 qualified organizations. With approval from the QAT, Duke was then chosen.

Duke's study focused on a group of 25 current employees who were assigned to the microcircuits lab for at least a year between 1980 and 1989 and whose job assignments involved fabrication and/or development of the electronic components. A matched control group of Sandia employees who had no history of solvent exposure was also formed by the Duke team for comparison purposes.

Microcircuits Widely Used

Hybrid microcircuits, used in products such as radar, automobiles, cellular telephones, and the space shuttle, are miniature electronic circuits typically assembled onto ceramics. They provide approximately a five-to-one reduction in size compared to printed wiring boards, but are not as miniaturized as silicon integrated circuits. Sandia does not manufacture the circuits in large quantities, but rather does development and prototype work.

Hybrid microcircuit operations started in the late 1960s in Bldg. 828. The lab moved to Bldg. 880 in 1972, and then to its present custom-designed facility in Bldg. 878 in 1989.

Although Sandia management had already

Call Medical If You're Concerned

Employees who have health concerns that they believe may be related to conditions in the workplace, such as presence of chemicals or excessive noise, should always ask for assistance, says Dr. Larry Clevenger (7030). In general, the best approach is to notify your manager and arrange an appointment with an occupational physician in Department 7030 (8527 at Sandia/CA) for further discussion and evaluation.

Employees with urgent medical needs can be seen at any time, even without an appointment; emergency medical services (such as an ambulance) are available at Sandia/NM by dialing 144 from an on-base phone and at Sandia/CA by dialing 911.

(Continued from Preceding Page)

Energy/Environment

"opportunity seminars" in the Technology Transfer Center this fall, where each program director is explaining his/her work and soliciting new ideas. So far, they have been well attended. We're working on a Job Fair concept for early winter, and we're forming manager-to-manager "buddy systems" with other line organizations to cultivate partnerships. If you have additional ideas for new work that fits Sandia's Energy and Environment Sector, let us know; if you just want to be better informed for your own future career options, come to our events. Finally, if you believe as I do, that Sandia is an important element in solving national problems, then help us all by committing to proactive involvement in all of Sandia's work responsibilities, and try to do so by using — and understanding — our corporate values of teamwork, integrity, quality, leadership, and respect for the individual.

Our opportunities have never been greater; our position has never been stronger. We will join efforts across Sandia to provide solutions to energy and environment issues that are vital to our nation. ●

Stringent Safety Requirements Now Protect Employees from Overexposure

From the late 1960s through the 1980s, Hybrid Microcircuits Laboratory employees may have been occasionally exposed to chemicals such as toluene and trichloroethylene (TCE) because of then-less-stringent approaches to working with the chemicals. Many of today's stringent requirements did not exist during the time exposures may have occurred.

For instance, a veteran microcircuits employee recalls that petri dishes containing chemicals were normally left uncovered, and towels used to wipe up small spills were not placed in covered receptacles, allowing fumes to be released into the air. Gloves were not required for workers as they are now.

Lack of proper ventilation for several processes, including ultrasonic cleaning operations, also provided opportunities for exposure to chemical fumes. In addition to chemical haz-

ards, some of these processes also produced excessive noise levels; workers now wear earplugs for such operations.

In Bldg. 880, containers of used solvents were sometimes left in the laboratory until they were full, occasionally even overflowing. An employee recalls that once, a freon degreaser located outside the clean room leaked freon from its container that was near an intake vent where make-up air was pumped into the clean room. Also in the clean room, the photoresist spinning operation was conducted without venting.

Sandia industrial hygiene specialists report that operations in today's Hybrid Microcircuits Lab in Bldg. 878 are in full compliance with Occupational Safety and Health Administration requirements concerning worker exposure to hazardous materials.

moved hybrid microcircuit work out of Bldg. 880 and into the more-modern Bldg. 878 site, employee concerns about past exposure to chemicals were made known to DOE's Environment, Safety, and Health (ES&H) Tiger Team during its audit of the Labs in the spring of 1991.

"The Tiger Team's attention to the employee concerns certainly stimulated our investigative effort and heightened our awareness and commitment to discovering the root causes of these problems," says President Al Narath. "That, after all, was a primary goal of the Tiger Team initiative."

"The normal work practices typical of the industry in the 1980s were used in the Bldg. 880 lab during that decade," Larry Clevenger says. "Our practices today are much more rigorous than they were during the 1980s."

In light of Bldg. 880's history, the current Bldg. 878 worksite has been the subject of close attention. In fact, operations were suspended there for about six months last year during a reassessment of its operations and procedures. At the completion of that examination, in October 1991, the lab reopened.

"These kinds of actions have been typical across all of Sandia in an effort to minimize future problems in all of our laboratories," Larry explains.

"There is no question," says Sandia VP Glen Cheney (7000), "that Sandia has an ongoing responsibility to learn as much as it reasonably can

about any potential solvent exposures to our workers and the ramifications of those exposures. The Duke study is just one of the products of this effort we've undertaken. We also have institutionalized a number of important ES&H initiatives, including rigorous employee training, greater attention to safe operating procedures, more systematic environmental monitoring, and substitution of less-hazardous materials in the workplace."

Larry says the Duke team did an excellent job evaluating a complex situation, particularly considering that the Bldg. 880 lab has been dismantled and there was limited objective exposure data for the team to use.

Based on a recommendation from the Duke team, Larry will ask the DOE Office of Epidemiology and Health Surveillance to consider conducting a study involving other DOE sites to include a larger sample of people.

He says his office is consulting with Sandia study group employees and working with them to conclude additional diagnostic tests that are currently under way. ●AStotts(7161)

(Continued from Page One)

Weekly Pay Schedule

how it will deal with the impending change.

The first weekly payday for Sandians affected by the change — those now being paid semi-monthly — will be Jan. 14, for the week ending Jan. 7.

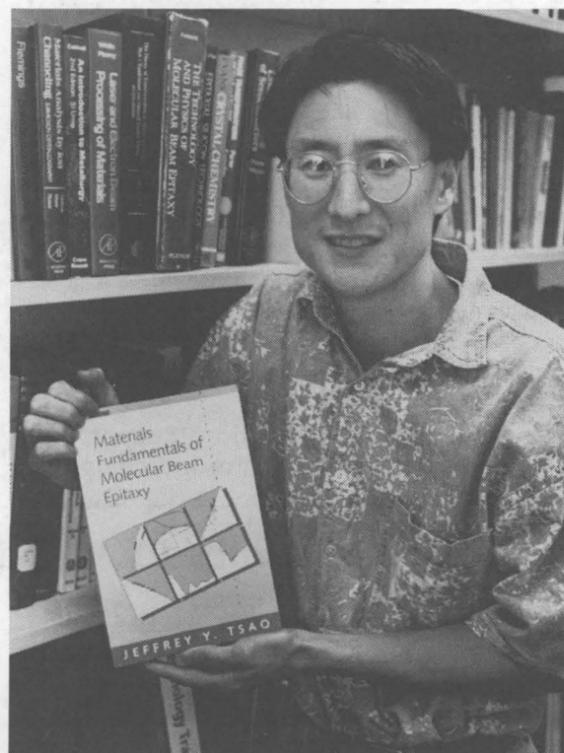
The semimonthly pay frequency pays people in advance of Sandia's weekly cycle of attendance and job-cost assignment, Jennifer says, and has, therefore, always increased the risk of inaccuracies in pay amounts and attendance reporting.

She says biweekly or monthly pay cycles have been discussed in the past, but because existing labor contracts require weekly pay, adoption of either in place of the semimonthly plan still would leave the Labs with two separate payroll systems.

Details about the change will appear in the Dec. 7 issue of the *Weekly Bulletin*. ●HK

Sympathy

To Vicky Blackberg (7615) on the death of her father in Albuquerque, Nov. 23.



NEW BOOK — Jeff Tsao's *Materials Fundamentals of Molecular Beam Epitaxy* was recently published by Academic Press. Jeff is Manager of Semiconductor Materials Dept. 1311. The 300-page book covers the basic materials science principles that apply to molecular beam epitaxy, including bulk phase equilibria, thin film structure and microstructure, and surface morphology and composition. The book is intended to be useful to both graduate students and researchers.

'Spotlight on Quality'

Labs' Best Internal Suppliers Earn Moment in 'Spotlight'

As part of National Quality Month in October, Labs employees were asked to submit the names of Sandia's most outstanding internal suppliers — employees or teams that use quality principles to provide excellent products or services to other Sandians.

Judith Mead, Manager of ES&H Program Customer Service Dept. 7203, says 24 individuals and teams were nominated for this year's "Spotlight on Quality" recognitions; of those, 17 were selected.

This is the second time "Spotlight on Quality" recognitions have been made, she says. In all, 33 employees and employee teams have received the distinction (16 were selected last year). This year's 17 outstanding suppliers are named below. In addition, they will be recognized at Division 4000 Road Shows during the next two weeks (see "Employees Invited to Attend Division 4000 'Road Shows'" below).

Debra Nissen of ES&H Project Dept. 8601 for serving, in addition to her regular duties, as the Quality Assurance Coordinator for ES&H and Facilities Management Center 8600 and for providing all information and written source data to be included in the consolidated Tiger Team Action Plans for Sandia/New Mexico and Sandia/California.

Mary James of Accounting Services Dept. 151 for determining her customers' requirements and helping them with budget concerns in a timely manner.

Randolph Shibata of Procurement Dept. 7212 for his role in the timely placement of a contract for classified services between Sandia and a British aerospace company.

Russ Skocytec, Manager of Thermal and Fluid Engineering Dept. 1513, for exemplifying teamwork, quality, leadership, empowerment, and respect for the individual while managing reimbursable work for the Minuteman III Weapon System Safety Assessment study.

Jeffrey Jortner of Massively Parallel Computing Research Laboratory Deputy Manager Office 1408 for helping implement a world-class research environment in the Massively Parallel Computing Research Laboratory.

Joe Madrid of Computer-Aided Manufacturing Dept. 2483 for the outstanding computer support he provides for employees in Manufacturing Technologies Center 2400, especially his promptness in responding to customers.

Larry McCartney, Glenn Riggins, and Judith Tripp of Test Data Analysis Dept. 2722 for consistently exemplifying the principles of quality, accountability, and customer feedback in accommodating customer test schedules, performing accurate analyses of raw data, and running quality checks of their work.

Sheila Carr of Applications Support and Enhancements Dept. 7325 for her computer



THE "Q" CREW — Regina Valenzuela, a video specialist in Video Services Dept. 7153, joined 16 other employees and employee teams who earned "Spotlight on Quality" recognitions recently as part of National Quality Month in October. Regina, who edits and produces videotapes for Sandia employees and line organizations, was nominated by some of her internal customers because she, in their words, is particularly conscientious about their needs and makes suggestions to improve visual and sound quality.

programming applications support of Human Resources Information Systems Dept. 7532. She seeks feedback from her customers and handles complaints quickly, often working on her own time to satisfy her customers, according to her nominees.

Mike Rollo of Maintenance Operations Dept. 7812 for working long hours to ensure that ES&H concerns for Bldg. 878 are addressed and, in addition to his regular assignment, being in charge of maintenance for Bldg. 878. His nominator writes: "Some good quality training would be for some SNL employees to spend a workday with Mike."

Eric Ryder of Performance Assessment Applications Dept. 6313 for his outstanding performance as a technical specialist auditor during a recent Quality Assurance audit of a Labs contractor.

Walt Dalby of B61 Projects/EPW Dept. 5111 for contributing to the success of qualification evaluation teams as a design engineer and for always doing the job right the first time.

Dept. 2631 VCP Team: Carl Sicking, Greg Wickstrom, Greg Haseman, and Jim Hole of Command and Control Hardware Dept. 2631 for meeting and often exceeding their customers' requirements and for consistently applying Sandia Software Quality Guidelines during software

development.

Beverly Ortiz of Application Support and Enhancements Dept. 7325 for the customer-orientation, responsiveness, and quality training she provides for new users of Office Vision, Sandia's electronic mail system.

Regina Valenzuela of Video Services Dept. 7153 for her quality approach to editing technical video tapes, especially for being particularly conscientious of her customers' needs and making suggestions to improve visual and sound quality.

Rudy Jaramillo of Architectural Design Dept. 7946 for his role in office space renovation in Bldg. 880, especially for providing innovative suggestions to accommodate customer needs/wants within the budget limitations.

Angelina Gurule of Technical Publications Dept. 7151 for her help and interaction with unions and management in the design, fabrication, and installation of a plaque that commemorates Workers' Memorial Day (entrance to Bldg. 800).

Badge Office Team: Denise Finley, Mary Hampton, Sandra Harris, Phyllis Lusader, Sara Reid, Brian Rogers, Cathie Sanchez, David Sealey, Louetta Tidwell, and Esther Welp of Visitor Access and Administration Team 7437-1 for providing temporary badges to large groups of DOE employees and contractors for classified visits. Their quality performance gives guests a good first impression of Sandia. ●JG

Welcome

Albuquerque — Gloria Bean (21), Suzanne Mills (21), Flora Price (21), Denise Ramos (21), Heather Tate (21), Sandra Warner (21), Vicki Walker (21). **Other New Mexico** — Constance Brooks (21), Lori Carroll (21), Joy Cox (21), Sylvia Denney (21), Susan Knisely (21), Phyllis Krause (21), Sherri Sanchez (21), Les Shephard (6302), Traci Strandberg (21), Amber Vieth (21).

Elsewhere: Massachusetts — Kwan Kwok (6474); **New Jersey** — Jeffrey Mahn (7731).



Employees Invited to Attend Division 4000 'Road Shows'

Laboratory Development Div. 4000, created last year to help pull together Labs-wide initiatives, is holding a series of management "Road Shows" this month at both the California and New Mexico sites.

During the sessions, Paul Robinson, VP of Division 4000, will discuss progress made on some of the Labs' major initiatives and outline future plans and opportunities for Sandia. In addition, he will join Labs President Al Narath in making this year's "Spotlight on Quality" presentations to 17 employees and employee teams judged to be among Sandia's most outstanding internal suppliers (see "Labs' Best Internal

Suppliers Earn Moment in 'Spotlight'" above).

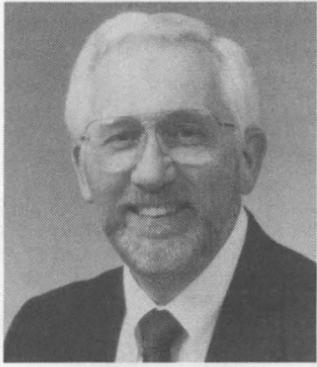
"Road Show" sessions at Sandia/California take place Dec. 8 in the Bldg. 904 auditorium. Employees with last names beginning A through L should attend the 8:30 a.m. session; employees with last names beginning M through Z should attend the 10 a.m. session.

Sessions at Sandia/New Mexico take place Dec. 15 in the Technology Transfer Center (Bldg. 825). Employees with last names beginning A through H should attend the 8:30 a.m. session; I through P should attend the 10 a.m. session; and Q through Z should attend the 1 p.m. session.

Baremore and Searcy Are New Center Directors

JIM BAREMORE has been named Director of ES&H Program Management Center 7020.

"I am impressed with what I have seen in the ES&H Program," says Jim. "There are many talented



JIM BAREMORE

people who are working hard to meet DOE requirements. However, DOE is increasing its oversight and requiring more and more of Sandia. The challenge is to staff and support the ES&H Program in these times of declining budgets, as

well as prepare for the transition to a new Laboratories contractor."

Jim joined Sandia's Technical Development Program in 1963. He left several years later to work on his PhD in electrical engineering. He then served as a captain with the Army Signal Corps in Vietnam from 1968 to 1970, when he returned to Sandia full-time. He was promoted to Supervisor of the Electronic Timers and Protective Systems Division in 1972 and worked on development of the MC 2898 electronic timer used in the Mk4 AF&F (arming, fuzing, and firing) system.

In 1979, he transferred to the Security Systems Integration Division and was responsible for several computerized alarm systems. Jim went to Washington in 1983 to help develop a survivable and enduring nuclear command and control center for the Defense Communications Agency. He was technical lead on the data bus design, which was the key to the modular building block concept developed by the study team.

He was promoted to Manager of the Safeguards Application Department in 1984 and was responsible for development of the Safe Secure Transport (SST) vehicle systems and for advanced studies supporting the DOE Transportation Safeguards Division.

From 1988 to 1990, as a member of the Laboratory Development Staff, Jim served as Sandia's Congressional Liaison. In 1990, he led formation of the new Manufacturing Programs Department in the Environment and Transportation Center, with the objective to begin a new Sandia initiative in environmentally conscious manufacturing. In 1991, he transferred to the Quality Improvement and Primary Standards Center to head the newly created Project Management Office. The Office's mission was to perform the Order Compliance Self-Assessment of Sandia and

report the results to DOE.

Jim's education includes a BS from Missouri School of Mines, an MS from UNM, and a PhD from the University of Missouri, all in electrical engineering.

He enjoys amateur radio and skiing. Jim and his wife Peggy (7817) live in the NE Heights. He has two grown children.

JIM SEARCY has been named Director of Manufacturing Technologies Center 2400.

"I am delighted to have this opportunity, and I think that being Director of 2400 is one of the most



JIM SEARCY

exciting jobs at Sandia," says Jim. "Center 2400 is a key organization for Sandia's future. It includes facilities and people with the skills needed to resolve the technical issues posed by the advanced manufacturing initiatives and the Defense

Programs Sector plans for Complex 21 and manufacturing development engineering.

"I believe we have a bright future, but along the way we have challenges, some of which are new for us," he continues. "These include becoming more agile, learning how to do cost-effective small-lot fabrication, making all our processes environmentally conscious, keeping and enhancing our customer focus, and keeping our people safe, healthy, motivated, and successful."

Jim joined Sandia in 1974 as a member of the Initiating and Pyrotechnic Component Division, where he led a project to develop a new explosive from a laboratory curiosity to utilization in production components. In 1977, he transferred to the Environmental Research Division, where he led the Solar Heating and Cooling project to assess negative environmental effects caused by solar materials. He received a letter of commendation from DOE in 1978 for this project.

He joined the Exploratory Batteries Division in 1979 and led a project to develop a one-hour thermal battery. He was chairman of Li(Si)/FeS₂ thermal battery standardization task force. In 1984, he was co-recipient of the DOE Award of Excellence for significant contributions to the Weapons Program.

Jim was a member the Storage Batteries Division from 1984 to 1986. He was named Supervisor of the Exploratory Batteries Division in

1986 and led a group responsible for all phases of lithium battery research, development, and production. In 1990, Jim was named Manager of the Materials and Environmental Sciences Department. He transferred to the Materials Program Development Department in 1992 and then went to the Battery Projects and Engineering Technology Programs Department.

Jim has a BS in chemistry from Lamar State College of Technology and a PhD in physical chemistry from Purdue University.

Jim enjoys gardening. He and his wife Ursula have two children and live in the NE Heights. ●JC

Take Note

St. Martin's Hospitality Center is planning its annual Christmas Card Shower to be held Dec. 11 and needs Christmas cards to decorate its day shelter for the homeless. The "shower" provides messages of holiday greetings for the homeless people helped by the Center. St. Martin's serves about 300 men, women, and children daily and offers various services including showers and clothing, mental health programs, substance abuse programs, and job assistance. Please send holiday greetings to St. Martin's Hospitality Center (Box 27258, Albuquerque, NM 87125) so they arrive the week of Dec. 7. For more information, call Cyndi Yahn or Linda Jackson at the Center on 843-9405.

New Mexico Volunteers for the Outdoors (NMVFO) will offer project leader training on Jan. 9 at the Sandia Ranger Station. Topics include project planning and organizing, working with agencies, and running NMVFO projects. An overview of trail engineering and maintenance will also be provided. (An in-depth trail maintenance class will be offered later in the year.) Call the NMVFO Office on 884-1991 to enroll.

The Mid-Rio Grande Chapter of the American Red Cross is planning the fifth annual Festival of Trees Dec. 4 to 6 at the UNM Continuing Education Center to raise funds for Red Cross disaster services. Festival of Trees presents decorated trees (cut and growing) and wreaths for the community to view and purchase. Festival events throughout the weekend include an arts and crafts fair, workshops and demonstrations for the whole family (holiday decorations, treats, gifts, gift wrap, etc.), caroling, food, and entertainment. A preview party will be held Friday, Dec. 4, from 5 to 9 p.m. Festival hours are 9 a.m. to 8 p.m. Saturday and 9 a.m. to 4 p.m. Sunday. Preview night tickets are \$10 each or two for \$15. General admission tickets for Saturday and Sunday are \$2 each, children under 12 free. Call 265-8514 for tickets.

Supervisory Appointment

CHARLENE (CHUCK) WIUFF to Manager of Administrative Dept. 1201.

Chuck joined the Labs in 1983 as a member of the Financial Policies and Procedures Division, where



CHUCK WIUFF

she worked on procurement policies and procedures and design of the Integrated Procurement System. In 1987, she transferred to AT&T in North Carolina under AT&T's Corporate Audit Professional Development Program (CAPP), performing

financial and management audits.

In late 1989, Chuck joined the engineering staff in AT&T's Network Services Division in Virginia supporting FTS2000 (Federal Telecommunications System through the year 2000) and

was responsible for program support and testing the system for the General Services Administration (GSA). She received AT&T's Gold Award for the GSA testing effort. She transferred to AT&T Business Communication Services in 1990 as manager of the FTS2000 Program Planning and Control organization.

In 1991, Chuck returned to Albuquerque and joined the System Studies Group in the Policies and Procedures Division. She led the Manpower Contracting Study, worked on several financial system changes, and was co-leader of the Financial Information System development project. She was named Chief Financial Officer consultant earlier this year.

Chuck has a BBA in business computer systems and accounting and an MBA in management information systems, both from UNM.

She enjoys home decorating, sewing, walking, and reading. Chuck and her husband, Terry Krueger, have one daughter and live in the NE Heights. ●JC

Sympathy

To Diana Mares (7544) on the death of her husband in Albuquerque, Oct. 26.

To Don Tipton (5151) on the death of his father in Oklahoma, Nov. 15.

To Mort (9723) and Elaine (5167) Lieberman on the death of his mother and her mother-in-law in Chicago, Nov. 24.

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Sandia News Briefs

New Labs-USABC CRADA Takes On Electric Vehicle Batteries

DOE announced recently a new \$3 million cooperative research and development agreement (CRADA) between Sandia and the US Advanced Battery Consortium (USABC), a consortium of Chrysler, Ford, General Motors, and the Electric Power Research Institute. Under the CRADA, Sandia will help develop materials and do fundamental studies of lithium polymer batteries for electric vehicles.

The CRADA is part of a larger effort by DOE and the USABC to develop advanced batteries that would make electric vehicles widely available by the year 2000. Also announced were similar CRADAs between USABC and Argonne National Laboratory and USABC and Idaho National Engineering Laboratory.

Sandians Named Officers of Electrochemical Society Sensor Group

At a recent Electrochemical Society meeting, Mike Butler of Microsensor Research Dept. 1315 was elected chairman and Tony Ricco (also 1315) was elected secretary-treasurer of the Electrochemical Society's Sensor Group.

The Sensor Group is the fastest-growing section of the Society, with more than 400 members. Both Sandians will serve for two years.

Sandia Paper Recognized at Shock and Vibration Symposium

A technical paper co-authored by four Labs researchers recently won the Henry Pusey Best Paper Award at the 63rd Shock and Vibration Symposium in Las Cruces, N.M. Authors are Vesta Bateman, Neil Davie, and Fred Brown of Experimental Mechanics Dept. 2741 and Bill Leisher of Transportation Development Dept. 6643.

The paper, titled "Calibration of a Hopkinson Bar with a Transfer Standard," was cited for its creative and effective use of testing and analysis techniques for making Hopkinson Bar shock calibration testing traceable to standards of the National Institute for Science and Technology.

Sandia Paper Wins Award at AVS Meeting

A technical paper co-authored by Randy Schunk of Computational Fluid Dynamics Dept. 1511 and Bob Fisher of Liquid Metal Processing Dept. 1833 recently won the Bunshah Award for the best paper presented at the 1991 American Vacuum Society Vacuum Metallurgy Division Conference in Pittsburgh.

The paper, titled "Two and Three Dimensional Flow Simulations of Ingot Growth in an Electron Beam Furnace," discusses computational models used to investigate the role of fluid mechanics in solidifying and shaping ingots produced using electron beam melting.

Technical Coaches Needed for Supercomputing Challenge

Dick Allen (1422) and Spencer Nelson (1955), Labs coordinators for the 1992-93 New Mexico High School Supercomputing Challenge, say Sandians are needed to volunteer as technical coaches for teams of high school students involved in this year's Challenge.

More than 500 students from 65 high schools participate by devising computational solutions to scientific problems. Coaches help teams define projects, monitor their progress, and provide information about science, math, and software. For more information, call Dick on 5-7825 or Spencer on 4-9357.

Instructional TV Series Wins Award at International Conference

Several Sandians helped produce an educational videoconference series that recently won a first-place award at Telecon XII, an international conference on teleconferences, business television, and distance learning. The series, titled *Waste Minimization and Pollution Prevention*, received the "Best Distance Learning Program 1992 Higher Education — Live Programming" award from the US Distance Learning Association.

The eight-part training series was produced by UNM's College of Engineering and Waste Management Education and Research Consortium. Barry Granoff (6611), Sandia technical advisor to the series, coordinated the "Solvents and Organic Chemicals" program, including technical presentations by Randy Watkins, Robyn Stiefeld, and Ed Weinbrecht (all 6611). Joan Woodard, Director of Environment and Transportation Center 6600, was the lead presenter for the introductory program titled "An Introduction to Waste Management."

Send potential Sandia News Briefs to LAB NEWS, Dept. 7162.

(Continued from Page Three)

Familiar Faces

access through secured doors, says Don, especially in areas with routine traffic and relatively small groups of cleared personnel. Such a system is well-suited for applications within the DOE and DoD weapons complex, where secured laboratories with limited access are commonplace. Because PASS is relatively portable, the military could also benefit from such a system, he says.

Future PASS systems might also be used in airports or other ports of entry to identify known criminals or drug smugglers, classified vault areas where secretaries often stop work to check people's credentials, prison gates and doorways, and police squad cars (to run preliminary identification checks on arrests).

Don says he can also envision using such a system in stores to verify the identity of credit card users, sending image information through a telephone hookup to a central verification office. "But that's way into the future," he says. ●JG



Briefer than Tiger Team Visits

DOE Tech Safety Appraisals Scheduled

DOE Technical Safety Appraisals (TSA) that some employees liken to "Son of Tiger Team" are scheduled for Sandia's New Mexico and California facilities, beginning with a pre-appraisal session this month and ending in Albuquerque in March.

Mike DeWitte of ES&H Program External Interface Office 7026, the overall TSA process manager, says the appraisals will be conducted by representatives from DOE's Defense Programs (DP-67) Office of Inspections and DOE/AL's Safety Programs Division.

Bill Mairson (7026) says the two organizations have conducted joint appraisals at other facilities in the past, but this is the first time for a joint TSA at Sandia.

Sandians involved in the process include Bill, providing liaison between Sandians and appraisal team members and preparing Sandians likely to be questioned during the appraisal; Dody Hoffman (7601), providing most of the logistics for Sandia/New Mexico; Dick Traeger (7022), providing budget management for TSA activities and managing negotiation and preparation of the TSA action plan; and Cliff Yokomizo (5301), providing most of the logistics for Sandia/California.

Bill says a preliminary appraisal will be conducted Dec. 14-17, followed by full appraisals of Sandia/California Jan. 19-28 and Sandia/New Mexico Feb. 23 through March 4.

"Elements of several programs make up the TSA process," Bill says. "Team members will refer to the Tiger Team assessment, past TSAs, and site-specific written plans, standards, and procedures in performing their audits."

The 11 "functional areas" they will examine, Bill says, are organization, administration, radiation protection, nuclear criticality safety, engineering/technical support, emergency preparedness, safety assessment, quality verification, fire protection, and environmental and energetic materials safety.

He says that DOE/AL will also focus on construction safety, firearms safety, and packaging and transportation.

Their objective, he says, will be to learn how Sandia operates and to identify major issues, problems, and strengths through personnel interviews, observation of operations in progress, and review of documentation.

More on the TSA process will appear in future issues of the LAB NEWS. ●HK

Visual Recognition vs. Biometrics: A Lot of Variables Either Way

Developers of the unique PASS security system explored a lot of different avenues before deciding on facial recognition as its identification technique, says Jamie Meacham (8454).

They first tried fuzzy logic combined with biometrics (determining the degree to which a person fits into a group based on such physical attributes as height and weight). But such approaches fell short, he says.

"People's weight can change significantly depending on the time of day or what they ate for breakfast," he says. "And it's too difficult to compile a data base of personnel biometrics variables. Every time a variable changes, a whole new set of calculations is required."

With visual recognition, there are still a lot of variables to consider, says Jamie, such as differing hairstyles from day to day, skin color, and whether or not a person is smiling or wearing eyeglasses. But such variables can be elimi-

nated with the right detection algorithms.

Still, says co-developer Don Sheaffer (8453), one of the biggest problems with a security system based on facial recognition is getting enough detail. "Everybody has eyes, a nose, and a mouth," he says. "It's difficult to distinguish between people electronically. The greater the resolution, the greater the accuracy."

"PASS is also likely to miss minor differences in facial features, such as the differences between twins," says Jamie. "But a security guard is likely to grant access to a twin, too."

Future PASS systems might be able to zoom in on facial features for a high-resolution pixel map of someone's face, says Don.

Other common applications for image recognition techniques include optical character recognition scanners, such as those used to grade multiple choice tests, and pattern recognition systems, used by meteorologists to study patterns in weather data.

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

Deadline: Friday noon before week of publication unless changed by holiday. Mail to Dept. 7162.

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

WATERBEDS: king 6-drawer under-dresser, \$100; supersingle w/bookcase headboard, \$150; both w/mattress, heater, liner, sheets; full-size desk, \$40; sofa, \$75. Spiller, 884-8757.

CANON T-90 CAMERA, w/extra 28mm to 300mm lens & TTL flash, \$600; Winchester Model 100, semi-automatic 243-cal., Leupold scope, \$275. Bowland, 256-1861.

PANASONIC WORD PROCESSOR, model KX-W1500, includes 3-1/2-in. diskettes & ribbons, \$250 OBO. To, 293-7455, after 5 p.m.

RADAR DETECTOR, brand new, \$95; trumpet, \$125; trombone \$125; electric dryer, almond, \$150; gas stove, green, \$25. Wiseley, 298-3195.

SKI BOOTS, Salomon SX-92 Equipe, size 335 (8-1/2 to 9-1/2 w/4 fit adjustments), cost \$375 new, asking \$160. Schkade, 292-5126.

SKIS, 180cm Volkl Targa Comp w/Tyrolia bindings, too late for ski swap, \$65. Moore, 281-2480.

SKIS, Rosignol-Strato, 205cm, no bindings, used 3 yrs., \$60. Smirollo, 898-1699.

SOFA & LOVESEAT, matching, blue contemporary style, pub backs, reclining seats, excellent condition, paid \$1,800, sell for \$500. Love, 281-1112.

PIANO, Baldwin Howard, parlor grand, 5'8", ebony, 6 yrs. old, hardly used. Moss, 298-2643.

BUSHNELL BINOCULARS, 7x35, w/case & shoulder strap, \$50. Smith, 299-6873.

ORIENTAL RUG, wool, 9x12, burgundy, blue, & beige, \$30. Lippis, 898-8429.

BEDROOM VANITY, solid oak, w/mirror & bench, \$50. Jeske, 899-2216.

COUCH, light brown, \$200 OBO; pine dining set w/4 chairs, \$100 OBO. Guidotti, 884-7594.

TRAMPOLINE, 5' x 10' mat, needs repair, 9' x 15' steel frame for pit mounting, over 100 steel springs, \$1, cash-and-carry. Maxwell, 299-2027.

MISMATCHED RIMS SET, for your muscle car, 14-in front, 15-in. rear, \$60. Nowlen, 296-8680.

BEDROOM FURNITURE: bunk beds, dresser, desk, chair; viola w/case, 14-in., imported; Nintendo & games; Game Boy games. McMurtry, 298-2155.

HUNTING RIFLES: Remington 700 Mountain 270, Winchester Super Grade 338. Hardin, 821-6186.

"THE SPLENDOR OF BAROQUE" LP, set of six, by Philips, w/book, new. Wagner, 823-9323.

MINOLTA VHS CAMCORDER, full-sized, w/batteries & carrying case, professional capability, \$450. Stuart, 265-7315.

'79 POP UP-TRAILER, new tires & spare, sleeps six, rack for carrying materials. Gonzales, 873-3789.

DOG HOUSE, small, insulated, shingled roof, \$25. Behr, 292-0549.

ELECTRIC STOVE, very clean, \$100. Bouchard, 265-8148.

BARRECRRAFTERS SKI RACK, SR-11, fits compact and intermediate sized vehicles w/external rain gutters, \$50. Solberg, 884-8413.

WOMAN'S BIB SKI PANTS, small, navy, stretch, \$25; Oakley eye shades, \$25; white patio/kitchen chairs, ice cream style, \$35. Sackett, 292-1048.

SKIS, 180cm Volkl Targa competitions w/Tyrolia bindings, \$50, firm. Moore, 281-2480.

WICKER/RATTAN COUCH, tan & brown cushion, good condition, \$40; file cabinet, 2-drawer, metal, \$15. Adelman, 899-8699.

CALCULATORS, HP 28S & HP 28C, both like new, with manuals, \$85 & \$65 respectively. Hietala, 867-9577.

ROWENTA PROFESSIONAL IRON, almost new, \$50. Caskey, 294-3218.

MAN'S ROLLERBLADES, size 6.5, fits woman's size 8, 3-buckle, used indoors only, \$110. Weirick, 281-1462.

DAYBED, white w/brass trim, \$15; single mattress, new, paid \$80, sell for \$50; camp stove, \$10 OBO. Schmale, 265-7580.

MUSICAL AMPLIFIER, Fender Twin Reverb, 200 watts, new, \$500; EPI stereo speakers, 3-way w/10-in. woofers, both \$200. Newton, 892-8939.

SCHWINN DX900 EXERCYCLE, like new, \$200. Smith, 292-7540.

WORLD CUP SKIS, 35mm, white, blue, & red, w/Tyrolia bindings & 42-in. poles; Heierling Firebird boots, size 4, good condition. Wagner, 823-9323.

SAFETY SHOES, size 7-1/2 D, brown, oxford tie, new, \$10; Kenmore 1560 sewing machine, zig-zag, slightly used, \$50; Fortman, 298-2550.

LANDSCAPE ROCK, red volcanic type, free. Trembl, 888-3917.

McLEAN WIRE WHEELS (4), reversed 15x10 all chrome w/225 50 15 tires, excellent condition, worth \$1,100, sell for \$850 or trade up on Daytons. Montoya, 272-8150 (home) or 857-1754 (pager).

CHAINS, cable type for radials, new, still in box, fit P235/70R-15 through 16-in. LT tires, 2 pairs, \$30/pair. Letz, 293-4525.

PAPASAN CHAIR, 36-in., wicker base, cream cushion w/teal & rose colored flowers, new, must see to appreciate, \$50. Sisneros, 299-6408.

ART SUPPLIES: frames, flat, mats, & glass; woman's turquoise pendant necklace, state fair winner, \$90; hexagon coffee table, \$18. Sublett, 884-4426.

SOFA SLEEPER, tuxedo style, 7-ft., orange, excellent condition, \$120. Wright, 256-9210.

FRONT DOOR, 36" x 79", solid, w/hardware, ready to install, English oak color, good condition, \$35. Chavez, 842-6374.

MINOLTA MAXXUM 5000 SLR CAMERA, automatic, w/50mm lens, bag, box, & papers, \$225. Nichols, 281-0801.

BELL MOTORCYCLE HELMET, size 7, best offer. Prior, 281-5532.

WINDOW SHADES (4), woven wood, 58" W x 46" L, \$15/ea; queen-size bookcase headboard, walnut veneer, w/reversible rattan doors, \$75. Hansen, 883-7137.

BUNK BEDS, blond wood veneer, w/dresser/desk combination & mattresses, like new, \$295 OBO. Moreno, 294-4268.

SEARS-SHERELINE METAL LATHE, miniature, 3-in. swing, vertical milling attachment, extra tooling, \$175. Paustian, 255-5127.

SHIMANO SPD SHOES, size 43, \$30. Golightly, 293-5987.

TAYLOR-MADE ICW-II IRONS, 3-SW, regular flex shaft, used 5 mos., new condition, paid \$550, asking \$400 OBO. Sena, 293-2765.

MARBLE-TOP BAR, w/4 stools, \$350; gun cabinet, \$150; 2 printers; Wyse terminal; S-100 cabinet/boards; misc. drives & parts. Ethridge, 271-8985.

ELECTRIC HOSPITAL BED, new, never been used, cost at \$2,000, asking \$1,000 OBO. Bronkema, 271-2389.

CAMPER SHELL, for full-size pickup, on Ford F-100 w/long bed, \$250 OBO; Dyna-Gym exercise equipment, \$20 OBO. Dixon, 298-5617.

CAMCORDER CASE, large professional grade, movable partitions, new, \$22. Wayland, 299-2587.

SHOTGUNS: Browning double automatic, 28-in. modified, \$350; Remington 11-48 automatic, 26-in. imp. cylinder and 28-in. full, \$275. Krenz, 298-0619.

SOFTWARE, latest version of Aldus "Pagemaker" and ZSoft's "Publisher's Paintbrush," \$150/ea. Luther, 293-4462.

ANTIQU TWIN BED FRAME, extra long, w/headboard & footboard; twin frame w/headboard, good condition. Riley, 275-7488.

AZTEC RADIANT WALL HEATERS, like new; Magnavox 8-track/FM boom box, \$55; old-fashioned hi-fi in nice Danish cabinet, \$150. Lawrence, 268-5479.

LEUPOLD SPOTTING SCOPE, 30mm x 60mm. Jimenez, 296-9256.

BIONAIRE HUMIDIFIER, model CM-2.5, almost new, used one season, \$35. Murphy, 881-1520.

C-64 COMPUTER, disk drive, color printer & software (including word processing, printshop, & games), \$195. Dunivan, 296-3937.

FULL-SIZE BED, \$70; Cardco LQ3 printer, serial/parallel, \$150; Epson RX80, \$120 OBO. Swanson, 281-2735.

SEWING MACHINE, 1970 Singer Stylist w/ziz-zag disks, carrying case, instruction book, accessories, \$50. Evans, 831-4736.

GUINEA PIG, Abyssinian black & brown brindle female, good tempered, good w/children, w/cage, \$10. Ray, 294-7720.

CHOW PUPPIES, AKC-registered, 1 cream & 2 silver females, 2 cream males, \$200/ea. Smith, 299-5060 or 892-5717 (5 to 9 p.m.).

MAN'S SKI PANTS, navy, 32S & 32R, \$30/ea.; woman's parka, small, gray/black, \$30, like new. Pitts, 293-5481.

SEWING MACHINE, Singer Touch & Sew, zig-zag, decorative stitches, all attachments, excellent condition. Seyfer, 292-0179.

OAK ENTERTAINMENT CENTER, excellent condition, 36"H x 56"L x 17"W, smoked glass doors, 2 shelves, covered TV area, \$195. Rockett, 298-2589.

EPSON EQUITY II, 640K, 20-Meg. HD, color monitor w/EGA card, DOS 5.1, \$550. Everett, 296-0920.

CLASSICAL GUITAR, 1976 Juan Orozco student model w/hardshell case & strings, \$400 OBO. Linebarger, 291-0417.

CHILD'S ROLLER BLADES, brand new, size 7; wicker dressers, 1 tall & narrow, 1 short & wide. Strascina, 294-0305.

DP UNIVERSAL GYM, \$250; king-size waterbed, w/headboard console, \$80; CalSpa 8-person hot tub, \$2,495; 3 violins, \$125-\$325. Mounteer, 897-2708.

MILLING MACHINE, bench top, R-8 spindle, 7-spd., 2-hp single-phase motor, 9 x 18-in. table, \$1,250, including stand. Sena, 873-1665.

BABY GRAND PIANO, completely reconditioned, \$2,200 OBO; antique two-tiered table, \$100; antique chair, \$100. Garcia, 344-3406.

YAMAHA KEYBOARD, w/synthesizer, \$245 OBO; king-size waterbed frame, \$45; sewing machine cabinet, \$20; TV & stereo stands. Hill, 836-1006.

SELMER SIGNET 123F OBOE (resin), \$750; King 1122 marching French horn (brass), \$650; both in excellent condition. Kipp, 821-6563.

TRANSPORTATION

WOMAN'S BICYCLE, 26-in., 10-spd., new tires & thorn-proof tubes, great condition. \$50. Honeycutt, 299-7544.

'71 DODGE VAN, AC, low miles, runs well, fish-ready (sink, icebox, bed, carpet, boat rack, & new tires), \$2,300 OBO. Romero, 873-1591.

'87 CORVETTE COUPE, 33K miles, glass & hard tops, 2-tone silver, AT, leather, Bose stereo, \$17,000. Raymond, 822-4700.

BICYCLE, Murray, child's size, w/training wheels, 1-1/2 yrs. old, very good condition, kid's legs just got too long, \$40. Leslie, 299-4159.

'88 FORD TEMPO GL, 4-dr. sedan, maroon, PS, PL, PB, AC, AM/FM cassette, 57K miles, \$4,000 OBO; folding bicycle, \$75. Guidotti, 884-7594.

'77 CHRYSLER CORDOBA, top condition, 90K original miles, alternator, new tires, leather interior, 20 mpg, \$1,800 OBO. Padilla, 873-0271.

'88 FORD DUMP TRUCK, 460 ci, heavy duty, 5-spd., PS, PB, PTO, AC, \$13,500 OBO. Pierce, 281-8814.

'85 HONDA CIVIC, station wagon, has been totaled, best offer. Jennings, 255-5950.

'91 OLDS CUTLASS CIERA SEDAN, 4-dr., 23K miles, fully loaded. Gonzales, 873-3789.

GIRLS' BICYCLES: two 26-in., 10-spd., w/thorn-resistant tires, \$40/ea; one 20-in., \$30, all in good condition. Behr, 292-0549.

'84 SUBARU WAGON, 4-WD, as is, \$1,500 OBO. Bott, 866-0378.

'91 MITSUBISHI ECLIPSE, hatchback, 3-dr., 4-cyl., AT, AC, PS, AM/FM stereo, white w/gray interior, low miles, \$8,850. Stude, 897-4352.

'63 FORD GALAXIE, 4-dr., 390 V8, new tires, 2-tone paint, bumpers, dash & interior refurbished, runs well, excellent condition, \$4,200 OBO. Stang, 256-7793.

'88 DODGE CARAVAN SE, cruise, captain's seats, tilt wheel, 2.5L engine, AM/FM, AC, PS. Dillon, 256-0076 evenings.

'89 TREK 1100 RACING BIKE, w/pump, 52cm aluminum frame, 21-spd., Suntour components, Chromoly fork, quick release hubs, black & turquoise lettering, \$250. Douglas, 281-9843.

'91 NISSAN 240 SX, red, 17K miles, AT, sunroof, not a sports car for insurance purposes, drives great, \$15,000. Hodge, 293-0933.

'69 MUSTANG, 302, \$2,950 OBO. Carr, 247-1870.

MAN'S MOUNTAIN BIKE, Mongoose Alta, 26-in., blue, chrome alloy frame, fully loaded, ridden once, paid \$330, sell for \$200. Sisneros, 299-6408.

'85 BERLINETTA CAMARO, original owner, V-8, AT, fully loaded, mag wheels, white & burgundy, well maintained, 41K miles, \$4,995 OBO. Bland, 344-9969.

'81 HONDA GOLDWING, all chrome, full light bars around rear, many extras, must see, \$2,800. Duffy, 275-2857.

'90 CHEVY 4x4 PICKUP TRUCK, cruise, AM/FM cassette, tilt steering, camper, 50K miles, single owner, excellent condition, \$16,000. Histia, 292-0497.

BOY'S BICYCLE, 20-in., strong chrome-moly frame, heavy-duty rims, pads, looks new, great gift, \$110. Connor, 268-1682.

BIKES: AMF tricycle, 12-in., \$10; girl's 20-in. Diamondback, \$50. Prior, 281-5532.

MOUNTAIN BIKE, Huffy, 18-spd., 24-in, \$50. Golightly, 293-5987.

'87 CHEVY SUBURBAN, 50K miles, 4WD, manual hubs, 4-spd., tint, tilt steering, AM/FM cassette, excellent condition, \$9,800. Kelly, 299-3527.

'86 FORD RANGER PICKUP, 5-spd. overdrive, 26K miles, rebuilt engine. Jimenez, 296-9256.

HAWTHORNE MAN'S BICYCLE, 3-spd., excellent condition, \$35. Strance, 298-0258.

'86 HONDA CT110 MOTORCYCLE, bought new in 1989, excellent condition, approx. 1,000 miles on odometer, \$800. Smith, 1-384-5182.

'29 MERCEDES SSK GAZELLE car kit w/manuals & many options, for '74-'80 Ford, cost \$12,500, make offer. Ethridge, 271-8985.

'89 CORVETTE COUPE, red, AT, Bose, leather, power seats, Alpine CD, 25K miles, excellent condition, asking \$23,000 OBO. Lenhart, 898-1200.

'85 OLDS CUTLASS CIERA, 4-dr., 1 owner, good condition, asking \$3,000 OBO. Clair, 298-3114 after 5 p.m.

VALVOLINE GO-CART, new, valued at \$1,350, sell for \$1,000 OBO. Crockett, 296-3855.

'84 CAMARO BERLINETTA, loaded, power windows, mirror, & seat, T-tops, excellent condition, 69K miles, \$3,400. Kelly, 299-9130.

MAN'S BICYCLES: Schwinn World Sport, 23-in., 12-spd., \$125; Centurion 53cm, 12-spd., \$100. Garrett, 294-4970.

'85 KAWASAKI ELIMINATOR, 900cc, excellent condition, quick, EZ ride, black, \$1,850 OBO. Roybal, 836-5062, leave message.

'81 TOYOTA PICKUP, 127K miles, AM/FM cassette, 4x2, shell, AC, rear seat, 5-spd., new Michelins, excellent condition, \$3,200. Harding, 265-4020.

'84 HONDA ACCORD LX, 5-spd., 4-dr., gray, approx. 120K miles, \$3,000. Hale, 275-7870.

'79 JEEP CJ-5, 78K miles, very good condition, 258 6-cyl., 3-spd., soft top, \$3,600 firm. Hubbard, 293-5779.

REAL ESTATE

3-BDR. HOME, North Valley, 1.75 bath, 1633 sq.ft., woodstove, fireplace, large kitchen, privacy fencing, fruit trees, \$85,000. Vanderbeek, 344-9570.

2-BDR. MOBILE HOME, 12 x 65 Marlett, large living room, dining room, refrigerator, stove, washer & dryer, fenced lawn, can be relocated. Fisher, 881-8611.

1-BDR. MOBILE HOME, 12 x 50 American, furnished, Terrace Park, must sell, \$4,000. Rando, 821-8523.

3-BDR. HOME, Candlelight, Georgia O'Keefe district, 2-bath, large great room, 2 fireplaces, open, bright, beautiful. Smith, 292-2524.

RESIDENTIAL LOTS, all city utilities, South Valley area, 2 blocks north of Rio Grande High School on Bartolo, \$19,500. Romero, 299-3296.

CORNER LOT, 2.25-acre, El Cerro Mission Ranchettes (Los Lunas), paved, power, septic tank, leveled for home site, \$29,000 OBO. Lusader, 298-3469.

3-BDR. HOME, 1,950 sq.ft., 2 full baths, sun room, efficient woodburning stove, La Cueva district, possible assumption for SLFCU members. Chavez, 828-2106.

WANTED

LEATHER IMPRINTING MACHINE, reasonable price. Bowland, 256-1861.

FLATBED TRAILER, 6'6" x 12' minimum size, dual axle, lights, brakes optional, will use to haul Snow Cat for Search & Rescue. Berry, 897-3652.

SKI EQUIPMENT for 4-yr. old boy, skis (Alpine), size 9-11 boots and bibs. Gieri, 294-6473.

UTILITY TRAILER, 4-ft. wide minimum. Moss, 298-2643.

BRIO TOY TRAIN SET PIECES, used. Stromberg, 299-8591.

GERMAN SHEPHERD PUPPY, w/papers, for daughter's Ho Ho present. Padilla, 873-0271.

VIEWMASTER REELS, old or new. Broyles, 821-6177.

COLLABORATION ON PHD DISSERTATION, damage mechanics approach to materials evaluation, material choice flexible, could use 1/2 FTE to supplement 1/2 FTE on UPT. Oscar, 345-7046.

SNUG TOP, LEER TOP, OR SUPER-SHELL, for '89 Mitsubishi Mighty Max king cab pickup. Montoya, 272-8150 (home) or 857-1737 (pager).

BASSETT HOUND PUPPY, AKC-registered, for Christmas gift, would like to pick up on Dec. 23 or 24, sooner if necessary. Baker, 888-4220.

TABLE TENNIS TABLE, regulation size, 3/4-in. minimum table thickness. Cericola, 298-2426.

TIRE CHAINS: will trade my 13/14-in. tire chains for your 15-in. chains. Pitts, 293-5481.



Coronado Club Activities

Get Together with 'Together' Tonight

DECEMBER BEGINS and ends at the Club with the music of "Together" — the band plays for the dinner/dance tonight, Dec. 4, and again on New Year's Eve. So come on out and sample the sounds. While you're at it, sample a magnificent menu: Tonight it's filet mignon or golden fried shrimp for \$11.95, or the all-you-can-eat buffet featuring baron of beef, baked ham, and roast turkey breast for \$6.95. Reservations suggested (265-6791).

THREE SUNDAY BRUNCHES and tea dances help make December a special month. On Dec. 6, Bob Weiler and Los Gatos provide the music, and on Dec. 13 it's the Best Shot Band. (The other date is Dec. 20 — more next issue.) Champagne brunch is from 10 a.m. to 1 p.m. both days; it's \$6.95 for all you can eat (\$7.95 for non-member guests). The dancing starts at 1 p.m. and continues until 4 p.m. Reservations required (265-6791).

JUST ONE MORE Bingo Night is on the Club calendar this month: Thursday, Dec. 10. As usual, the buffet and card sales start at 5:30 p.m., and the Early Bird session begins at 6:45 p.m. Fun is guaranteed, so come on out and play before the holidays.

SANTA'S COMING! To the C-Club! Yes, ol' St. Nick will visit the Club for the annual Children's Christmas Party, from 10 a.m. to noon. The kids will get special gifts and treats, there'll be cartoons to watch, and the whole family can enjoy a low-cost buffet. Just to add to the fun, Loren Kahn and her enchanting puppets will perform at 11:30 a.m. And there's more — parents can purchase a photo of their child(ren) with Santa, or they may bring a camera and take pictures themselves. All this, and ADMISSION IS FREE. (For this special event, *members only, please — no guests.*)

FALSE ADVERTISING? No, it's a bonus when a band named Trio Grande is actually a quartet — it just makes their music that much more enjoyable. The band will be on stage for a special Saturday night, Dec. 12, from 7 to 11 p.m., playing your favorite C&W music. Some favorites are on the menu, too: filet mignon or golden-fried shrimp, two-for priced at \$14.95, or the deservedly famous all-you-can-eat buffet featuring chicken breast and baron of beef for \$6.95. Reservations recommended (265-6791).

Events Calendar

Events Calendar items are gathered from various sources. Readers should confirm times and dates of interest whenever possible.

Dec. 4-6 — Holiday Fair '92, poinsettias, Christmas cactus, fresh wreaths, garlands, handcrafted gifts & decorations by more than 40 New Mexico artisans; 10 a.m.-6 p.m. Fri. & Sat., 10 a.m.-4 p.m. Sun.; Albuquerque Garden Center (10120 Lomas NE), 296-6020.

Dec. 4-6 — "The Glass Menagerie," by Tennessee Williams, New Mexico Repertory Theatre presentation; 8 p.m. Tues.-Sat., 2 p.m. Sat. & Sun.; KiMo Theatre, 764-1700.

Dec. 4-13 — Exhibit, "The Intimate Collaboration: Prints from Teaberry Press," retrospective look at Teaberry Press; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues., 1-4 p.m. Sun.; UNM Art Museum, 277-4001.

Dec. 4-13 — "Reckless," comedy by Craig Lucas, author of "Prelude to a Kiss," directed by Allison Davis (7024); 8 p.m. Fri. & Sat., 6 p.m. Sun.; Vortex Theatre, 247-8600.

Dec. 4-19 — "Annie," musical based on long-running Orphan Annie comic strip; 8 p.m. Thurs.-Sat., 2 p.m. Sun.; Albuquerque Little Theatre, 242-4750.

Dec. 4-23 — "Muttonman Discovers Columbus," exhibition investigates Native American humor through cartoons drawn by Navajo artist Vincent Craig; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues.; UNM Jonson Gallery, 277-4967.

Dec. 4-23 — Exhibit, "Rio Grande Blankets/Frazadas del Rio Grande: Late Nineteenth Century Textiles in Transition," illustrates history and recent revival of Hispanic weaving; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues., 1-4 p.m. Sun.; UNM Art Museum, 277-4001.

Dec. 4-Jan. 10 — Exhibit, "Bernadette Vigil and Luis Tapia: A Selection of Paintings and Sculptures," work of both native New Mexicans transcends the genre of folk art dealing with traditional Hispanic subject matter; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

Dec. 4-Jan. 13 — Exhibit, "Dinosaurs, Penguins, and Whales: The Wildlife of Antarctica"; 9 a.m.-5 p.m., New Mexico Museum of Natural History, 841-8837.

Dec. 4-Feb. 7 — Exhibit, "Route 66: The Real Road," photo history of the famous highway in Albuquerque from 1926 to the present, features diners, tourist courts, gas stations, and a look at the old National Trails Highway; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

Dec. 4-Feb. 14 — Exhibit, "Then/Now: 1492/1992," prints by art students from Cibola and Rio Grande high schools inspired by the history of New Mexico and its relationships to their identities; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

Dec. 4-Feb. 21 — Exhibit, "An Albuquerque Album:

Photos of a Changing City," more than 300 photographs of Albuquerque taken between 1883 and the 1960s, contrasted with 1992 photos of the same subjects; 9 a.m.-5 p.m. Tues.-Sun., Albuquerque Museum, 243-7255.

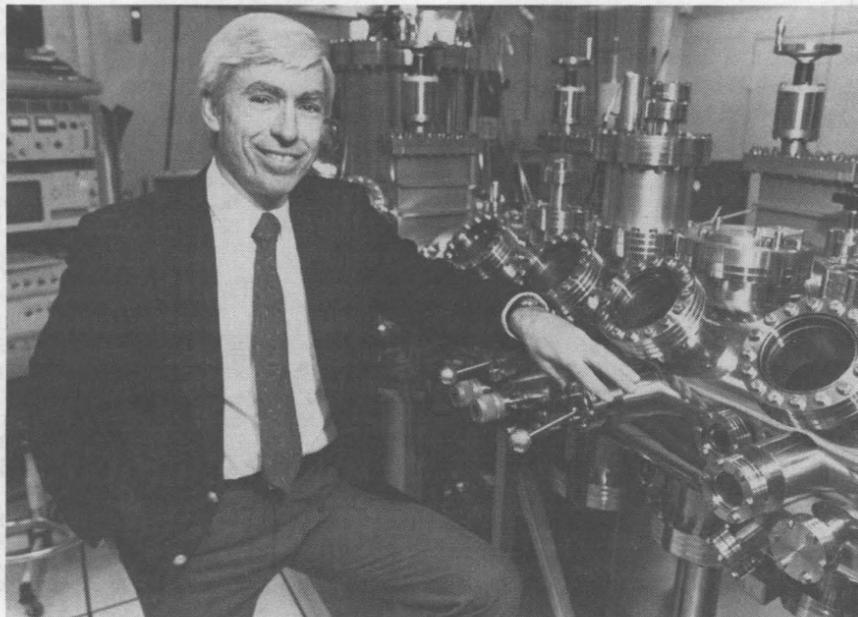
Dec. 4-March 1 — "Nora Naranjo-Morse: Earning Her Place Under the Willow," Santa Clara Pueblo artist exhibit featuring sculptural pieces in bronze, wood, and clay; 9 a.m.-4 p.m. Mon.-Fri., 10 a.m.-4 p.m. Sat., noon-4 p.m. Sun.; Maxwell Museum of Anthropology, 277-4405.

Dec. 4-May 21 — Exhibit, "Heritage of the Andes: Peoples and Cultures of Tropical South America," museum collection of South American art and artifacts depicting lifeways of the indigenous peoples of the region; 9 a.m.-4 p.m. Mon.-Fri., 10 a.m.-4 p.m. Sat., noon-4 p.m. Sun.; Maxwell Museum of Anthropology, 277-4405.

Dec. 5 — Holiday Crafts Show; 9 a.m.-5 p.m., 709 Dakota SE (between Louisiana & San Pedro), 255-3083.

Dec. 14 — "Celebration of the Season," holiday concert for senior citizens, Chamber Orchestra of Albuquerque, music by Handel, Mozart, & Berlioz, plus traditional holiday fare, sing-along; 1 p.m., St. John's United Methodist Church (2626 Arizona NE, near Menaul & San Pedro), 881-0844.

Dec. 20 — "The Best Nowells That E'er Befell," concert of music from the Middle Ages and Renaissance performed with voice and replicas of period instruments, Música Antigua De Albuquerque presentation; 4 p.m., Central United Methodist Church (1615 Copper NE, at University Blvd.), 842-9613.



TOM PICRAUX of Defense Programs and Military Applications Dept. 1102 gets a new title beginning Jan. 1. He'll be President of the Materials Research Society (MRS), an international professional society with more than 11,000 members. Tom, an MRS member since 1978, was elected last fall by other MRS members. He has also held the offices of first and second vice president, and he's served on the MRS council. Tom notes that the MRS will celebrate its 20th anniversary during his term.

Fun & Games

Volleyball — The Fall 1992 SERP A-League volleyball season championship and the post-season tournament were both won by the NetWits. Team members include Bob Anderson (1661), Lester Arakaki (9538), Donna Chavez (7031), Ree Gerchow (122), Larry Kovacic (2476), Marlon Long (C-Club), Roger Moore (2476), Steve Presley (DOE), and Charles Ringler (9549).

Bird Watching — Every year since 1900, the National Audubon Society has sponsored its Christmas Bird Count. Novice and experienced birders take one day to list the birds they see. The public is invited to take part in the count; Society membership not necessary. The count is an all-day event, rain or shine, blue skies or blizzard. Following are the scheduled local count locations and contacts. Contact the person listed for more information.

- Bosque del Apache National Wildlife Refuge, Socorro; Saturday, Dec. 19; contact Steve Cox on 345-2385; meet at Refuge Headquarters, 7 a.m.

- Albuquerque; Sunday, Dec. 20; contact Hart Schwarz on 266-1810; meet at Corrales Shopping Center (NW corner of Coors and Alameda), 7:15 a.m.

- Sevilleta National Wildlife Refuge; Thursday, Dec. 17 (Five Points) and Saturday, Dec. 19 (West Side); contact Ross Teuber on 265-8962 or the Refuge on 1-864-4021.

- Sandia Mountains; Sunday, Jan. 3; contact Tamie Bulow on 298-9116; meet at Pete's Mexican Restaurant (North Hwy. 14, one-half mile north of Sandia Crest turnoff), 7:30 a.m.

- Zuni, NM; Saturday, Dec. 19 (Zuni); and Sunday, Dec. 20 (Bluewater); call Steve Ingraham on 1-863-4751.

Retiree Open House

The Labs is holding an open house in honor of retiree Robert Lindsey (2401) in the Area 1 Cafeteria (Bldg. 861) on Friday, Dec. 11, from 1:30 to 3:30 p.m. Refreshments will be served. Friends and acquaintances are invited.

Earnings Factors August 1992

Long-Term Savings Plan for Management Employees (LTSPME)	Earnings Factors
AT&T Shares	.9630
Government Obligations	1.0081
Equity Portfolio	.9731
Guaranteed Interest Fund	1.0066
South Africa Restricted Fund	.9863
Long-Term Savings and Security Plan (LTSSP)	
AT&T Shares	.9630
Guaranteed Interest Fund	1.0067
South Africa Restricted Fund	.9863
Equity Portfolio	.9731
Employer Stock Fund	.9630