

Sandia Plays Prominent Role in Future of Nuclear Power

Concern over global warming and predictions of a future energy crunch have rekindled national interest in nuclear power. Politicians, researchers, and even some environmentalists are taking a second look at this much-maligned power source because of its potential for generating power without producing "greenhouse" gases such as carbon dioxide.



BILL SNYDER (6900) has served as a director for nuclear energy since he started this work at Sandia in 1973. As of July 1, he heads the new Select Initiatives Directorate.

Because of expertise gained in more than 15 years' work for the Nuclear Regulatory Commission (NRC), Sandia is playing a prominent role in commercial nuclear power's future in the US. Until recently, much of the work has been done in Exploratory Nuclear Energy Systems Directorate 6500, in conjunction with researchers in various other organizations. However, on July 1, that directorate was dissolved and its departments incorporated into Nuclear Energy Technology Directorate 6400 (see "Nuclear Energy Directorates Merge").

"Sandia is playing a vital role on behalf of DOE in the future of commercial nuclear power in a number of areas," says Bill Snyder, former 6500 Director and now Director of Select Initiatives 6900. Work being done affects not only the nation's 108 operating nuclear plants but also future designs, the so-called "second generation" of reactors.

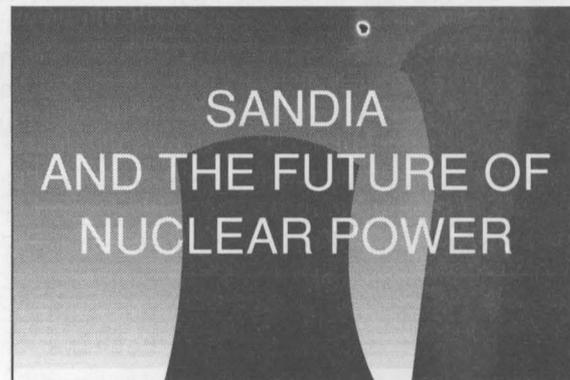
The Aging of Nuclear Power Plants

Over the past 30 years, the industry has invested \$200 billion in nuclear power plants, which supply about 20 percent of the nation's electricity. Coal is still the most common fuel burned in American power plants, but like other fossil fuels, it has the undesirable side effect of raising atmospheric carbon dioxide levels. Carbon dioxide and other greenhouse gases can trap the earth's heat near the surface in much the same way a greenhouse works.

Nevertheless, nuclear power development in the US has experienced a hiatus. No new reactors have been ordered since 1978, and dozens ordered after 1974 have been canceled. Even if construction on a new plant were to start today,

it would be another 12 years or so before it was finished, based on past average construction schedules. An industry objective is to reduce this to six years.

At the same time, many of the nation's existing nuclear power plants are approaching "middle age," or even nearing the end of their licensed lifetimes. In the early 2000s, the 40-year licenses granted to the oldest plants will begin to expire.



Already, some of the earliest plants built in the early 1960s have been taken out of service.

Prolonging Plant Life

Faced with losing four or five plants a year in the US between 2007 and 2012 as licenses expire, DOE has launched a comprehensive program to study the possibility of prolonging the useful lives of existing plants, Bill says. "If we have to replace these existing plants, we're talking about a cost to utilities in this country of about \$17 billion to \$20 billion per year in current dollars," he notes.

Working with the nuclear industry, Sandia is
(Continued on Page Four)

'As Convenient as Possible'

Paper Recycling Pilot Study Begins Next Week

Last April, Earth Day centered attention on our planet's delicate ecological balance — and the fact that the earth's fate is in the hands of the human beings who inhabit it. Earth Day discussions focused on, among other things, the continuing depletion and/or pollution of natural resources — trees, water, clean air — that sustain life as we know it, and ways to reverse the consumption trend.

Emphasizing environmental concerns and their effect on all of us — and, in the process, saving some trees — are the goals of a waste-paper-recycling pilot study that begins Aug. 1 in

"Paper, including cardboard, accounts for between 40 and 50 percent of the estimated 2200 tons of trash generated each year at the Labs."

Bldg. 891. "As we all know, Sandia uses a lot of paper," says Don Schubeck (3412), recycling coordinator at Sandia, Albuquerque. "In fact, paper, including cardboard, accounts for between 40 and 50 percent of the estimated 2200 tons of trash generated each year at the Labs.

"We hope the pilot study in Bldg. 891 will show us how to implement a broader recycling program that could eventually involve all of Sandia. We need to devise the most efficient approach to recycling that we can; for the benefit of the taxpayers who support us, we need to minimize costs and maximize returns."

(Continued on Page Eight)



LAB NEWS

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JULY 27, 1990

Sandia Plays a Key Role

Specialty Metals Processing Consortium Will Help US Industry Keep Advantage

A relatively few companies in the US — perhaps three dozen — make up the domestic specialty-metals industry. They produce materials for jet engines, chemical plants, nuclear reactors, and similar vital applications, including defense hardware that must work reliably after years in stockpile.

During the hard economic times that these companies endured during the past decade, they lost part of the research-and-development capability that's critical to a high-tech industry. Now, though, a new consortium, formed with Sandia's assistance, is beginning — through

(Continued on Page Six)



FRANK ZANNER (DMTS), and Mark Miszkziel (both 1833) operate an electron-beam furnace that will be used for some of the SMPC-related research conducted at Sandia.

This & That

Informal Fridays, Anyone? - Got a note recently from a Sandian who said she heard that Fridays are now being designated as "dress-casual" days and - if true - wanted me to announce it in the LAB NEWS. Sounds like a grass-roots movement to me, but I could go for it. Some Sandia folks have jobs that call for casual dress on a regular basis, but most of us "desk jockeys" feel the need to dress up regularly. I certainly don't see anything wrong with those who want to wear a nice pair of jeans and other casual clothes on Fridays. Remember how nice and relaxed we looked on "Vision Day" back in April?

Maybe we could try it on a one-time basis next month and see how it goes. What do you think about the idea of "Informal Fridays" at Sandia? Let us know by sending a note with your opinion to Division 3162 (no phone calls, please). Results next issue.

* * *

Price of Noncomformance in China - Robin Cassell (5260) sent a copy of a 1989 Wall St. Journal article reporting that 18 factory managers in China were executed by a firing squad last year for poor product quality at Chien Bien Refrigerator Factory near Beijing. Seems a bit severe, but Sandians not inclined to support the Labs' Quality Initiative might want to rethink their position.

* * *

Update on Nuclear Power - Nuclear power has long been - and continues to be - the subject of much debate and controversy. Well-meaning individuals and groups on one side of the nuclear power issue say that - despite some risks - it's one of the safest, cleanest, and most reliable ways to generate power. Other equally well-meaning folks claim it's unsafe and too expensive when all the costs - including nuclear waste disposal - are considered. A simple fact, though - whether you like the concept of nuclear power or not - is that this country relies heavily on it today, generating about 20 percent of our electricity in nuclear plants. We'd have some serious power shortages without it.

We begin in this issue a series of articles about nuclear power - focusing on R&D that Sandia is doing to ensure safety and on Labs work on advanced nuclear power concepts. The work is concentrated in Nuclear Energy Technology Directorate 6400. I think you'll find the series interesting and enlightening. Julie Clausen (3161) is the author.

* * *

Thanks to La Cueva Tutors - The principal and assistant principal at Albuquerque's La Cueva High School recently sent a very complimentary letter to Information Services Director Herb Pitts (3100), expressing gratitude for the many Sandians who serve as volunteer tutors. The "dean" of the group is Curtis Mueller (2818), who has tutored at La Cueva for three years. Two-year volunteers include Ed Cole (2142), Ron Hahn (7262), Bill Hartman (5214), Jonathan Weiss (9313), and Robert Chiu (former Sandian). One-year volunteers include Brandon Ahrens (7265), Floyd Braaten (2513), Phil Bennett (6323), Laura Halbleib (7321), Bill Larson (9224), Alex Pimentel (1821), and Patti Wormington (7311).

The open-ended tutoring program at La Cueva is conducted in cooperation with Sandia's Volunteers in Action program. Anyone interested in doing volunteer tutoring at La Cueva or at any other school can contact Al Stotts (3163) on 4-2282.

•LP

Educational Outreach

Sandians to Share Science Expertise With Schools

Sandia is kicking off a new program this fall to donate technical expertise on a regular basis to science and math teachers in public and Bureau of Indian Affairs schools throughout New Mexico, but primarily in the Albuquerque area.

Participants in the Science Advisors Program will spend the equivalent of one day a week offering assistance with curriculum and suggesting ideas for experiments and classroom demonstrations to teachers in kindergarten through the 8th grade. They will be assigned to one school for the entire school year.

Though they will not interact with children on a regular basis nor tell teachers what and how to teach, science advisors will serve as a resource for teachers, supporting school science programs and providing information and clarification.

"The objective is to improve science and mathematics instruction by assisting teachers to upgrade and expand their knowledge of scientific and technical concepts, by upgrading instructional equipment used in science classes, and by encouraging students to pursue careers in science and technology," says John Otts (30), manager of Sandia's K-12 Educational Outreach programs.

The time that science advisors spend in the program will be charged to the SNL Educational Outreach organization. The program is fully endorsed by Sandia management. Interested staff, including those who are uncleared, are encouraged to participate.

"The Science Advisors program is a worthwhile project that will also be personally invigorating and rewarding," notes Ray Heath (30), the Science Advisors Program coordinator for Albuquerque Public Schools.

"Employees can be assured that their contributions will be acknowledged, appreciated, and considered a significant element of their job assignments at SNL," adds John.

Those interested should contact John and his staff on 4-2198.



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SCIENCE ADVISORS in Sandia's new program to offer volunteer assistance to science teachers in public schools review classroom experiments designed to teach students the joy of discovering nature. From left are Kevin Malone (5265), an advisor in last May's pilot program at Santa Clara Pueblo Day School; Ray Heath (30), Science Advisors Program coordinator; Carol Yarnall (9002), an advisor at Tesuque Pueblo Day School in the pilot program; and Cindy Phillips (1423), an advisor at Zia Pueblo Day School.

Brown Bagging With the Boss**Employees Discuss Concerns With the VP**

There is such a thing as a free lunch — and, to boot, there's a vice-president there to answer questions.

VP John Crawford (8000) has initiated a series of "Brown Bagging With the Boss" sessions, at which 20 to 25 employees representing all organizations at Sandia, Livermore join him for an informal lunch and talk about anything that's on their minds. A similar program began at Sandia, Albuquerque in March.

Chosen at Random

Those invited are chosen at random with the help of a computer program that selects an equal number of nonsupervisory employees from each of the five directorates. Twenty-one employees enjoyed a sandwich and a 90-minute

question-and-answer period at the first session earlier this month.

More than 30 topics — ranging from budget matters to Tiger Team findings — were covered. Some representative questions:

- How does Sandia look for reimbursable work?
- If you're aware of safety or other problems that the Tiger Team didn't report, whom do you contact?
- What can be done about severe space problems in some work areas?
- Do increasingly tight budgets mean consolidating more programs with those in Albuquerque?
- What's Sandia doing in response to DOE's new emphasis on educational outreach?

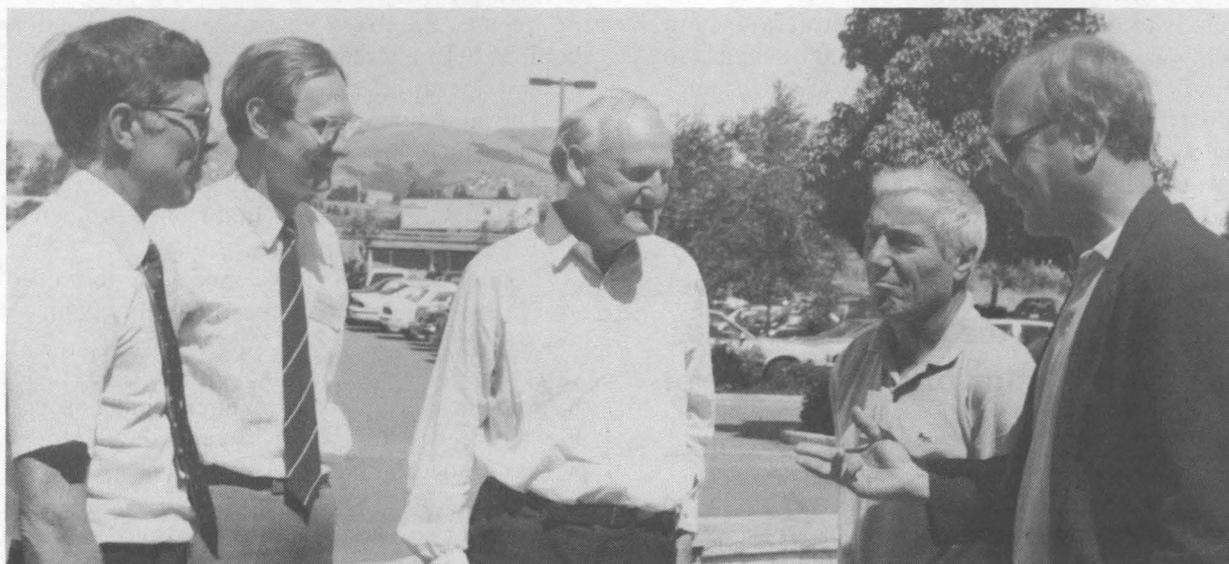
John says the first Brown Bagging session gave

him a fine opportunity to learn about the concerns of people he doesn't see every day. "I'm looking forward to future sessions," says John. "One-on-one contacts are an excellent way to improve vertical communication lines — an improvement definitely needed, according to past studies."

John hopes to invite some of the Sandia, Albuquerque VPs to participate in future sessions at Livermore.

One employee attending the first Brown Bagging meeting was pleased that he'd finally had an opportunity to visit with the vice-president and commented, "I know he listened to what we said and gave us straight answers to several concerns."

The second Brown Bagging session, for which invitations were mailed last week, will be Aug. 7. ●



RESEARCHERS FROM AROUND THE WORLD attended a recent workshop hosted by Sandia at the Pleasanton Hilton. The scientists are working on ways to predict the deformation and failure of various materials, with the eventual goal of producing better-quality parts and lowering production costs in the metal-forming, fabrication, and welding industries. Shown are workshop leaders (from left) Mel Callabresi (8243); David Hayhurst, University of Leicester (England); Fred Leckie, University of California-Santa Barbara; Jean Leamitre, University of Paris (France); and host Doug Bammann (8243).



**SANDIA
LIVERMORE NEWS**

Take Note

Ray Rychnovsky (8432) captured a first-place award (color, scenic category) in the Outdoor Writers Assn. of America photo competition for his print of a sunset over the water. His winning photo will be used on the cover of the *Salt Water Sportsman* 1991 outdoors calendar. Ray has written articles about fishing for several magazines and is a regional editor of *California Angler* and a contributing editor for *Pacific Fisherman*.

Congratulations

To Suzanne and John (8163) Didlake, a daughter, Charlotte Marie, June 23.

**feed *li*back**

Q. Recently I requested that a piece of Sandia equipment be shipped to a contractor facility, and the Transportation people duly collected it from me. However, when it arrived at the contractor, an integral part of the equipment had been broken in transit. The breakage was demonstrably attributable to inadequate packaging for shipment. Conversations with people in Shipping and Receiving provided the consistent response, "We're sorry, but you'll have to find the money to replace the equipment yourself." Why are Sandia's Transportation and Shipping and Receiving organizations not financially responsible for their mistakes?

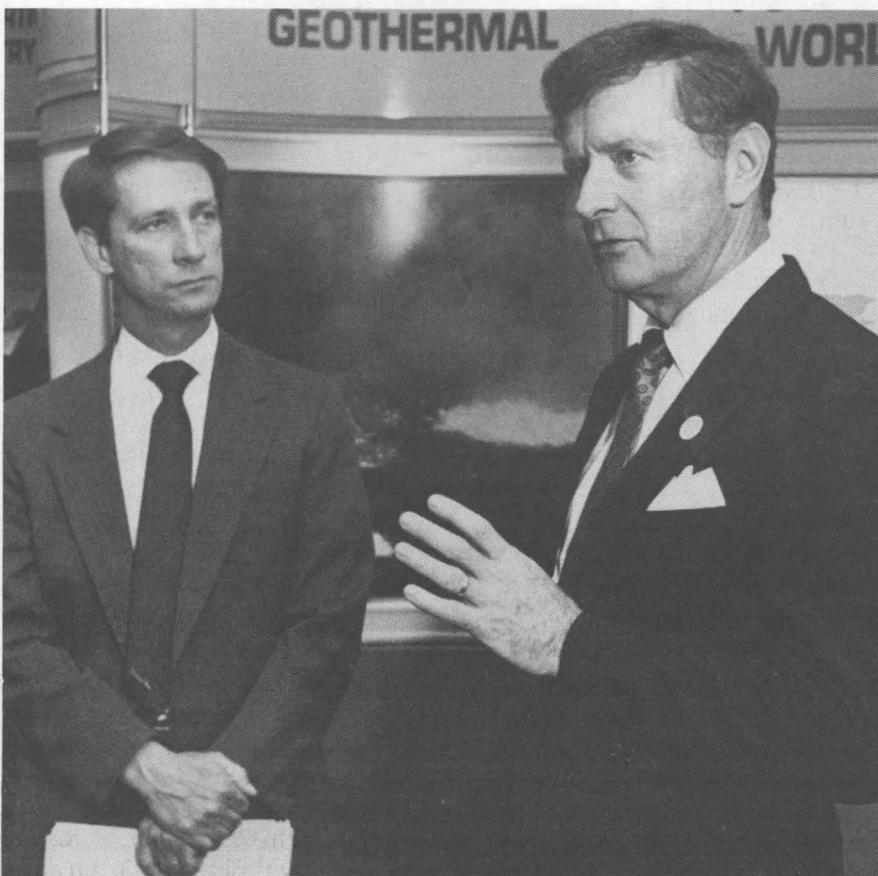
A. The issue, it seems to me, is to determine why the mistake occurred, and then spend the necessary time and effort in education and training to prevent a recurrence. We package and ship thousands of pieces of gear, much of it very fragile. We don't have a "standard product" for which we can develop a standard package based on developed and tested specifications. As a result, we are going to occasionally package something that subsequently gets broken in transit. It may be our fault; it may be the fault of the transporter. In any event, we want to do it right, and we can always learn from our mistakes.

Regarding the "financial responsibility" issue, I think it impractical to budget for a fund from which we pay for damages that are proved to have resulted exclusively from improper packaging. The cost of investigations and administration would not likely add value to the process. We

would prefer to concentrate on finding what went wrong, determining what could go wrong, improving the process, and preventing problems from happening. We will commit to working closely with our customers to assure understand-

ing of their needs and will strive to package the product right — the first time. Sorry for your unfortunate experience. Thank you for bringing this to our attention.

Jim Martin — 3400



DURING A RECENT VISIT to Sandia, DOE Deputy Secretary Henson Moore (right) received briefings on Labs work related to weapons, arms control and verification, energy and environment, WIPP and Yucca Mountain, and environmental R&D. Here, he's with Virgil Dugan, Director of Advanced Energy Technology 6200, in front of a Bldg. 823 display depicting some of Sandia's energy work.

DOUG LOESCHER (6474, left) and Larry Bustard (6471) have been working with General Electric to improve the manufacturability and lengthen the lifetime of probes used for measuring corrosion potential in nuclear reactors.



(Continued From Page One)

Nuclear Power

managing DOE's Nuclear Plant Life Improvement Program. The multifaceted program is charged with developing an understanding of the consequences of aging nuclear power plants, with the goal of extending their useful lives.

Through the Plant Life Improvement Program, Sandia is:

- Working with the nuclear industry to define key techniques for managing aging processes. The procedures will provide assurance to the public and to the NRC that nuclear reactors will continue to operate safely if a license is renewed;

- Participating in a demonstration program to evaluate two nuclear power plants for license renewal and to gain the necessary approvals from the NRC; and

- Performing research regarding aging of important nuclear power plant components, such as electric cables.

Nuclear Energy Directorates Merge

On July 1, Exploratory Nuclear Energy Systems 6500 was dissolved and its departments merged with Nuclear Energy Technology 6400.

Former 6500 Director Bill Snyder heads the new Select Initiatives Directorate 6900, where he is working on a science and mathematics education agenda for New Mexico public schools and on how more rational environmental standards and regulations for site cleanup and remediation could be evolved through research and education. Bill plans to retire from Sandia this fall. He has served as a director for nuclear energy since he started this work at Sandia in 1973.

Dave McCloskey, Director of Nuclear Energy Technology 6400, worked with Bill in the initial development of nuclear energy programs. Dave will oversee all of Sandia's work on nuclear power for civilian and space applications.

"We look forward to sharing the future of nuclear power," Dave says. "A new generation of nuclear plants is being developed that will offer a safe, economic, and environmentally acceptable alternative to meet the pressing energy needs that will certainly occur in this country and worldwide.

"We're excited about the potential of nuclear technology for space power, energy transmission, and propulsion."

One expected accomplishment of the program is to define the license-renewal process. The first step is to define which systems, structures, and components at a nuclear plant should be subject to detailed license-renewal review. A way to accomplish this was prepared by David Carlson — formerly Supervisor of 6521 and now on special assignment to 6001 — and adopted by the nuclear industry for submission to the NRC last October.

"Sandia is playing a vital role on behalf of DOE in the future of commercial nuclear power in a number of areas."

The NRC has been briefed and is responding to this industry position.

Sandia has also been instrumental in supporting development of industry reports describing acceptable aging-management strategies for key nuclear power plant components such as reactor vessels, containment structures, piping, and cabling.

Under the leadership of Hugh Bundy (6471), five industry reports are being prepared by DOE. The Electric Power Research Institute (EPRI) is preparing five additional reports in conjunction with other organizations. Together, the 10 reports will provide the NRC with the industry perspective on many license-renewal issues. During the next year, the reports are expected to bring about substantial interaction among Sandia, utilities, EPRI, and the NRC regarding license-renewal regulations.

License Renewals

To demonstrate the feasibility of license renewal, Sandia is participating in a project with two utilities that are evaluating their nuclear plants for license renewal. The two plants plan to submit license-renewal applications to the NRC in 1991. The goal: receiving renewed licenses by 1993.

Larry Bustard, Supervisor of Advanced Nuclear Power Technology Division 6471, says this

"If construction on a new plant were to start today, it would be another 12 years or so before it was finished."

would be an important milestone for the nuclear industry. "Without a demonstration that license renewal can be achieved, many utilities may forego the expense of pursuing the option," he says.

To support the licensing process, Sandia is also studying the aging behavior of critical components. For example, researchers in Materials and Process Sciences 1800 are investigating aging of cable materials, while others — under the leadership of Doug Loescher (6474) — are supporting development of monitors to assess sus-

ceptibility of plant systems to materials cracking due to corrosion and stress from steam and water inside the plant. Stan Rosinski (6471) has been working to learn how radiation embrittlement

"Without a demonstration that license renewal can be achieved, many utilities may forego the expense of pursuing the option."

affects performance of reactor vessels and their support structures.

Sandia also is working to streamline the license-approval process for new plants. Currently, utility companies must obtain two separate licenses, one to build a plant and one to operate it. It can take as long as six years to complete all requirements to obtain a construction permit and an additional five years or more to complete construction and obtain an operating license. Finally, a year of testing is usually required before a plant is placed into full commercial operation.

The more time it takes a plant to begin operating, the higher the cost. In the 18 years it took New Hampshire's Seabrook plant to gain an operating license, cost of the plant soared from a projected \$1 billion to an estimated \$6.3 billion.

Longer time spans also leave more room for error in energy-demand forecasts of utility companies, Bill Snyder says.

Larry Bustard leads Sandia's efforts to tackle the problem. One approach for streamlining the approval process is to develop an early site-approval process for nuclear power plants. Instead of requiring submission of preliminary designs to obtain approval for site preparation, this strategy would allow for an independent review of the geology, meteorology, and other characteristics of the proposed site.

In April, DOE authorized Sandia to work with the nuclear industry to test the pre-approval concept. This fall, Sandia plans to select a utility with a candidate nuclear power plant site to participate in the exercise.

Another aspect of DOE's streamlining efforts is prelicensing for standardized reactor designs. The program calls for preapproval of reactor features by the NRC. If a standardized design is built on a preapproved site, the operating license would only be subject to a review for compliance with the application, Bill says.

Together, the two aspects could allow for streamlined licensing and could reduce approval time by about half.

"What DOE and Sandia are doing is to separate the design of the reactor from site approval and allow these two things to proceed in parallel but with a degree of compliance we've not had before," Bill says. ●JClausen(3161)

Welcome

Albuquerque — Dawn Abbott (3532), Barbara Jennings (7223), Emily Lujan (22-2), Douglas Nordquist (7822), Everett Saverino (2314); *Other New Mexico* — Kathryn Bentley (22-2), Adrian King (9131), Melissa Micelli (21-1), Karen Sparks (3531), Rebecca Vahle (22-2).

Elsewhere: *California* — Mark Johnson (1128); *Florida* — Daniel Pond (7223); *Illinois* — Robert Bryan (1164), Michael Levenhagen (5176); *Maryland* — John Hoffman, Jr. (7233); *Massachusetts* — Thomas Thurston (1152); *Montana* — Daniel Minter (1833); *North Carolina* — Ted Neil (1823); *Tennessee* — Pamela Ramsey (122); *Texas* — Kevin Seager (6323); *Utah* — Kent Wells (7843); *Wisconsin* — Raymond Goehner (1821).



'A Much Wider Talent Pool'

Special Project Assignments Now Featured in *Weekly Bulletin*

If you thought you noticed something different about last Monday's (July 23) *Weekly Bulletin*, it wasn't your imagination.

A new section of the bulletin, "Special Part-Time Project Staffing Postings," will, it's hoped, offer an informal, nonbureaucratic, and efficient way for project leaders to fill short-term job assignments demanding special expertise. These bulletin listings are for on-roll, regular full-time employees who would appreciate the challenge of an additional assignment, according to Ralph Bonner, Director of Human Resources 3500.

Filling the part-time project assignments listed in the bulletin will not require the formal approvals, detailed reviews, and documentation involved in Sandia's traditional post-and-bid

"Project leaders frequently need help on special project subtasks. Usually it involves finding a person with a particular expertise."

system, says Al Villareal (3533), who administers the system and monitors policy and procedure changes introduced in it. "The new 'advertising' system for these special assignments should result in a much more rapid matching process," he says.

Employees selected to fill the part-time assignments won't transfer to the project organization, but their time will be funded by the project for which they're working — a matrix-management approach that allows the project manager to go outside the traditional structure to tap resources in other organizations. "That setup is consistent with the recent philosophy change from FTE [full-time-equivalent]-based project management to a system that is dollar-based," notes Al.

It's fitting that the first part-time project assignments listed — all related to verification technology — were for project leader Gene Roseth (9243), who came up with the idea in the first place. "Project leaders frequently need help on special project subtasks," says Gene. "Usually it involves finding a person with a particular expertise.

"Often, such a person is not assigned to the project or isn't even available within the immediate organization. In the past, that meant conducting an informal word-of-mouth search for someone who fit the requirements *and* who had the time available."

'Wealth of Talent'

"But that approach limits the available talent pool," Gene continues. "There's a wealth of talent available at Sandia; yet, of necessity, the project leader's search has been pretty much confined to employees with whom he or she is acquainted or those who have done similar work in the past.

"This system, if it works as we hope it will, should vastly improve communication — and get the word out a whole lot faster — about assignment needs throughout the Labs. I think it can have only a positive effect on work quality, since the object is to match the right person to the right job in as efficient a way as possible."

For a trial period, Org. 9000 will serve as a sort of "guinea-pig" test organization: the group that lists part-time jobs and sees how the system works. If the new system is well accepted by employees — which is key to the system's success, notes Roger Hagengruber (VP 9000) — and if results are as expected (a better mix of talent from a broader area, as well as increased productivity and better use of time by employees in the part-time

jobs), the program will very likely be expanded in the future to include other organizations.

How does the system work, and what should you do if you're interested in one of the part-time assignments advertised? "If you think you need more information or clarification about the job, you should call the project leader whose name is listed," suggests Gene. "Then, if you're still interested, your next step would be to discuss the possible assignment with your immediate supervisor.

"After all, your supervisor is the person who knows what kind of work load your regular organization will be experiencing in the next six months to a year, and whether you could be spared for, say, six months at one-quarter time."

Sealing the Deal

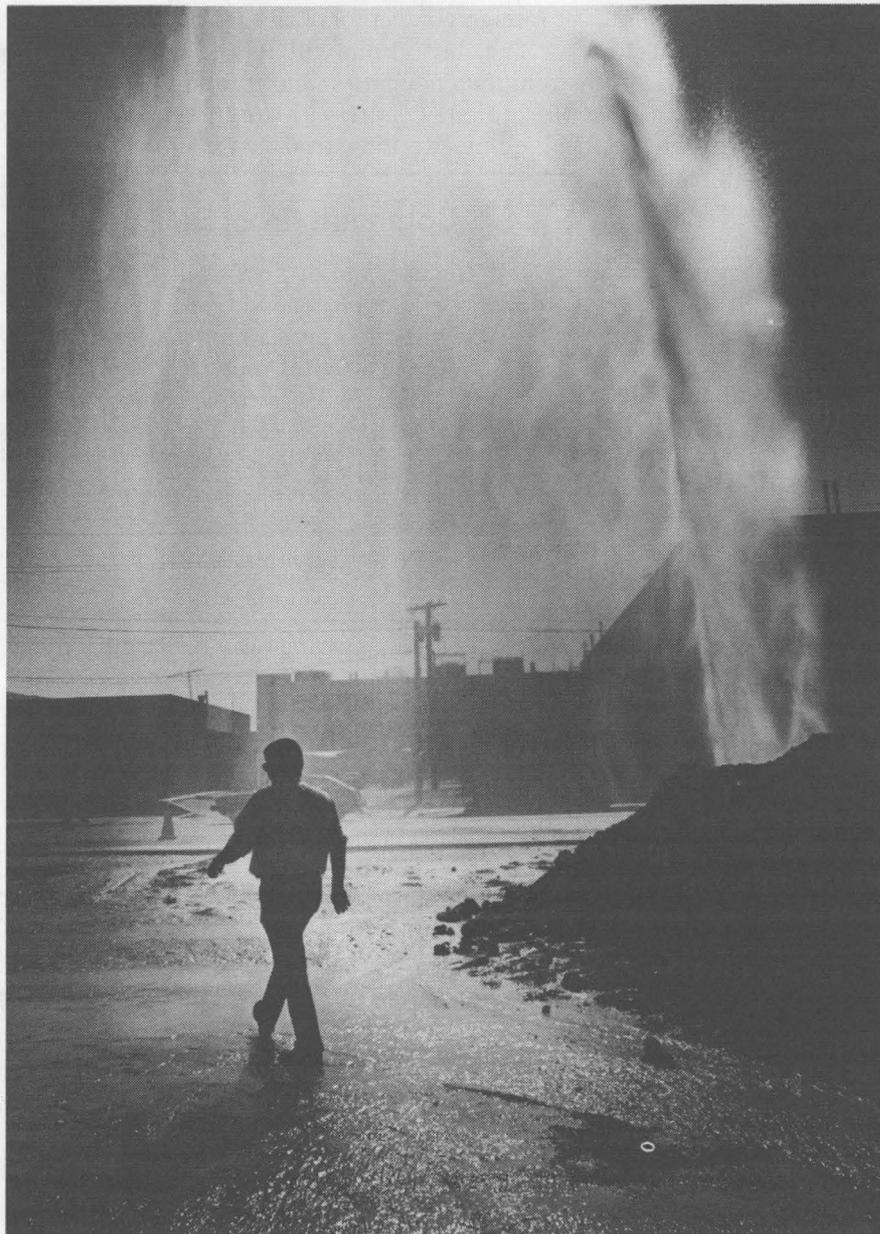
If the supervisor agrees, the next step would be an interview with the project leader. "Once a person is chosen to fill a part-time project assignment,

the two organizations involved — the person's 'home' organization and the project organization — would seal the deal with an informal agreement," says Al. The agreement would cover such items as the length of time the employee will be assigned to the project and what percentage of his or her time will be spent on the part-time task.

"I think that this idea of Gene's is a beautiful example of what [President] Al Narath asked us to do at Vision Day in April," notes Al. "We were asked to think about what we as individuals could do to help fulfill the goals of Sandia's Strategic Plan — and to devise ways to improve quality and efficiency in our own organizations.

"Gene did exactly that. As a project leader, he asked himself, 'How can I do my job better?' and came up with what appears to be a streamlined way to fill short-term project assignments with the best-qualified people from a much wider talent pool."

●PW



OLD FAITHFUL opens a branch location? No, but this was the result when construction workers hit an uncharted water main last week near the Atomic Museum (the pipe wasn't on any of KAFB's or Sandia's utility maps). Presumably, it's coincidental that the famous geyser is in Wyoming and this upstart was on Wyoming Blvd. (Photo by Randy Montoya, 3162)

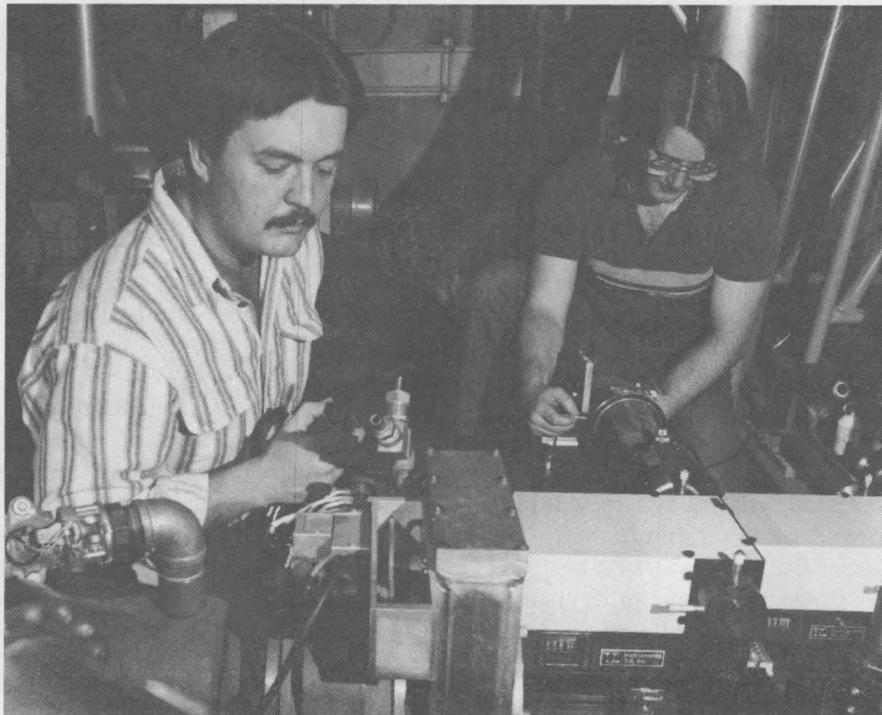
Take Note

Rising health-care costs and lack of access to basic health services for millions of Americans are growing concerns. A public forum on health-care system reform, sponsored by Bear Canyon Chapter 4380 of the American Association of Retired Persons and the Health Care Access and Action Coalition, will be held Aug. 9 at 1:30 p.m. at the Bear Canyon Senior Center (4645 Pitt St. NE). Panelists will discuss problems in the health-care system, consumer input to change, and ethical issues involved in the process. For further information, call Pat Johnson on 242-7913.

Food supplies for New Mexico's needy families are low at this time of year. The Albuquerque Post Office will help relieve that situation with its fifth annual food drive for the Roadrunner Food Bank on Saturday, Aug. 4. During their normal deliveries, letter carriers will pick up donations of nonperishable food items placed near mailboxes. For further information, contact Sherry Speck at the Roadrunner Food Bank on 247-0401.



INDUSTRIAL INTERN Mike Grose (left), of Inco Alloys International, tests a window rotation device on Sandia's vacuum-arc-remelt research furnace, while Rod Williamson (1833) makes adjustments on a monochromatic imaging spectrometer used for making measurements while the furnace is operating. Mike is the first industrial intern to come to Sandia as a result of the Labs' interaction with the Specialty Metals Processing Consortium.



(Continued from Page One)

Specialty Metals

training of employees and in other ways — to help specialty-metals producers restore their technology base.

“Even though the industry has recovered somewhat, it's still economically fragile,” says metallurgist Frank Zanner (DMTS, 1833), who has a long-standing concern with specialty metals. “There's more and more competition from Europe and the Pacific Rim. It would be a serious blow to the US if the domestic industry lost its viability.”

To Frank, to several other Sandians, to some industry leaders, and to DOE, it made sense for specialty-metal companies to work together in

Though US specialty-metals technology still leads the world, foreign technology has been catching up.

research on shared problems — and for Sandia and DOE to play a part. Combined efforts led to formation of the Specialty Metals Processing Consortium (SMPC).

On July 18, DOE Secretary James Watkins and SMPC President Robert Torcolini signed an agreement for substantial DOE support of SMPC's research activities. Each of the 10 SMPC members will contribute \$50,000 annu-

ally for the five-year term of the agreement, and DOE will match the sum. The funds will be used strictly for research.

A strong research program is important because the specialty-metals industry relies heavily on high-technology processes. Though US technology still leads the world, the technology base of foreign competitors has been catching up.

The consortium will also be a mechanism to strengthen education and training for people in the industry, partly through the experience gained by two industrial interns a year working

Comment From SMPC

“The companies are pooling research dollars to work on generic process problems that are directly applicable to the industry sector. This is a vital industry where the United States maintains a competitive edge. Through collaboration of the government labs, industry, and universities, it is likely that we can keep, or possibly even increase, this edge.”

— Robert Torcolini, SMPC President

on research projects and then returning to their companies with broader knowledge of metallurgical research. The first of these interns, Mike Grose, of Inco Alloys International, is now at Sandia, working with Process Metallurgy Div. 1833.

Dan Arvizu, Manager of Technology Transfer

Consortium Members

The following companies have joined the consortium as of the agreement-signing:

Allegheny Ludlum Steel Corp, Brackenridge, Pa.; Allied-Signal Aerospace Co., Garrett Engine Div., Phoenix, Ariz.; Carpenter Technology Corp., Reading, Pa.; Cytemp Specialty Steel Div., Titusville, Pa.; Howmet Corp., Alloy Div., Plymouth, Mich.; Inco Alloys International, Inc., Huntington, W. Va.; United Technologies Corp., Pratt and Whitney Div., East Hartford, Conn.; Special Metals Corp., New Hartford, N.Y.; Teledyne Allvac Corp., Monroe, N.C.; Teledyne Wah Chang Albany, Albany, Ore.

and Industrial Relations Dept. 410, says, “The consortium comes on the heels of a collective agreement on semiconductor equipment manufacturing technology signed last August with SEMATECH. Sandia has numerous cooperative research and development contracts with private companies, but we are particularly enthusiastic

“No one company had the resources to solve the problems alone.”

about the potential of consortia that embrace whole sectors of industry. I think this agreement will be the forerunner for other partnerships working with government and universities in a number of fields.”

Familiarity Breeds Respect

Sandia was in a position to facilitate SMPC's formation because Frank Zanner both knows the industry and is known by many in it. “I came to Sandia from this industry in 1969,” says Frank. “I've worked with many specialty-metals firms over the past few years, doing joint experiments. So I was glad when some of their people suggested that I look into what we could do to strengthen the tech base. All the companies let me into their facilities. At that time, they wouldn't have talked directly to each other, because they're fierce competitors. But I saw that the companies had the same kinds of problems, and that no one company had the resources to solve the problems alone.”

As a first step, Sandia invited all the US companies, along with university representatives, to a conference in June 1988. Speakers from industry and universities talked about major prob-

(Continued on Next Page)

In Specialty-Metals Research

Sandia Has Become a Melting-Pot of Expertise

Sandia's unique people and equipment blend in a way that promises to make the Labs a major partner with the Specialty Metals Processing Consortium. The LAB NEWS asked a few folks how they fit in.

Mike Maguire (1833): “Electroslag remelting [ESR] is a way to remove porosity and impurities. In the ESR furnace, we often start with an electrode formed in the vacuum induction furnace. The electrode and the new ingot each act as a pole for an electric current, which heats a slag consisting of a mixture of molten oxides and fluorides. As the electrode melts in this slag — like a stick of butter dipped into a pot of hot water — the metal drips down and forms the ingot. We're particularly concerned with control systems, which need to be ‘smarter’ so producers can scale up their operations. We're looking at the electrical waveforms that go into the furnace and come back out. They give a more fundamental indication of what's going on than the method

now used, which essentially just looks at the average voltage.”

John Brooks (8312): “I'm investigating solidification behavior in large ingots, which is knowledge industry needs to successfully melt special metals in large quantities. One problem is that as the metal solidifies, its composition can vary — there's nonuniform distribution of the alloying elements. If we understand effects like this, we may find ways to prevent defects.”

Phil Sackinger (1511): “I do computer simulations of processes in the vacuum-arc-remelt [VAR] furnace. Viewports in that furnace can be used for high-speed photography of the arc, and voltage signatures have been recorded and correlated with arc conditions. That's important for the model. Recently, I've been trying to benchmark the simulations with previous experimental results. Once that's done, the computer model will have some predictive capability, which will be useful in experiments being done for industry.”

Rod Williamson (1833): “VAR is used throughout the specialty-metals industry as a secondary-melting process. Mike Grose [SMPC industrial intern] and I are developing methods of process control for both high- and low-current VAR, using the arc plasma emissions emanating from the furnace viewport. These emissions contain information about the chemistry of the electrode, condition of the arc plasma, and metal transfer rate and frequency. These parameters measure properties that directly influence product quality and production efficiency. As far as we know, this source of information has never been tapped, and there are no control standards based on it.”

Other researchers include Lee Bertram (DMTS, 8243), doing stability analyses on transient defects that occur during solidification; and Bob Fisher (1833), working on an electron-beam furnace that may provide new technology for specialty-metals processing.

(Continued from Preceding Page)

lems in important specialty-metals processes.

"When the speakers had finished," says Frank, "I saw people looking around, realizing — maybe for the first time — that they could benefit by pooling their resources."

It took well over a year and a half to put the consortium together. Industry participants did much of the work of drawing up bylaws and operating rules. A key feature of the agreement between SMPC and DOE is that the consortium isn't obligated to spend its money at Sandia. "If SMPC decides it can get better value by contracting with another DOE lab or a university for a research project, it's free to do so," says Frank. "That's the way it should be. Good technology is driven by the marketplace. Neither Sandia nor any other organization should have a lock on the program because it happened to get in the door first."

Unique Facilities

Sandia's facilities for specialty-metals research, however, are not duplicated elsewhere in the US and promise to be a major attraction for the consortium. They include a vacuum-arc furnace in which it's possible to view the arc while the furnace is operating, a special electroslag furnace in which researchers can make detailed measurements, and a vacuum induction furnace. An electron-beam furnace now being used for other work will probably be applied to specialty-metals research in the future.

Research done with these facilities will, when consortium funds are paying for the work, be restricted to problems common to all consortium members. No proprietary information is to be involved. To help ensure that the research is of common interest, the members of SMPC will

Comment From Sec. Watkins

I firmly believe that the thousands of scientists and engineers working in the DOE complex can and must play a significant role in developing the technologies that will help America to stay economically competitive. Specialty metals are critical not only to American economic competitiveness in areas ranging all the way from microelectronics to airplanes, but they are also vital to America's national security.

Under the SMPC agreement, member companies will be able to work directly with Sandia's best engineers and scientists. They will also be able to use some of the world's most sophisticated equipment to drive the state of the art in specialty metals. From DOE's perspective, we stand to gain insights into the technologies and techniques used by the specialty-metals industry through this opportunity to work more closely together.

— Secretary of Energy James Watkins

Also Corrosion and Mechanical Stress**Specialty Metals Take the Heat**

The kinds of metals produced by the members of the Specialty Metals Processing Consortium (SMPC) aren't for file cabinets or car doors. They're what an engineer may choose when faced with the challenges of extraordinary mechanical stress, heat, or corrosion — such as temperatures of 1500°–1800°F or acid at 300°–400°F. They're also used for things that have to last a long time without replacement, such as surgically implanted artificial joints.

A few examples of objects made from specialty metals:

- Aerospace: bolts, shafts, turbine blades and vanes, afterburners, and thrust reversers for jet engines; rocket engine parts;
- Nuclear power systems: control-rod drive mechanisms, springs, ducting;
- Medical: dental prostheses, hip implants, artificial knees;
- Chemical and petrochemical industries: valves, reaction vessels, piping, pumps;
- Piston engines: turbochargers, exhaust valves, valve-seat inserts; and
- Steam plants: blades, bolts, stack-gas reheaters.



FRANK ZANNER (DMTS, 1833, left) and Phil Sackinger (1511) discuss the solidification of a titanium ingot. They're standing in front of a vacuum induction furnace used for metallurgical research.

review each year's proposal for research.

Commercially valuable information can be withheld for three years, after which it will be published. During the three years, however, the information will be shared freely within the con-

"Good technology is driven by the marketplace."

sortium. The outcome could be a substantial competitive advantage for the US companies. Sandia will hold any patents resulting from consortium research done here, but the consortium members will have licensed rights to use patented technology.

In such a ground-breaking arrangement, many efforts were necessary inside and outside Sandia. "A lot of people at Sandia helped," says Frank. "Roger Hagenruber [9000] provided critical, highly respected influence at the right time. Bill Alzheimer [7400] helped with advice through the whole process. Gerry Yonas [400], Dan Arvizu, and their people were extremely helpful. Bob Stromberg [412] was in from the beginning, and I don't know what we would have done without him. Kurt Olsen [4050] did a lot of legal work. The entire management chain of Org. 1000 was supportive, particularly Mark Davis [1880], who has championed process re-

"There were many champions for the program in DOE."

search for the last 20 years. He and my supervisor, Jim Jellison [1833], approved my spending a lot of time on the project — that was vital."

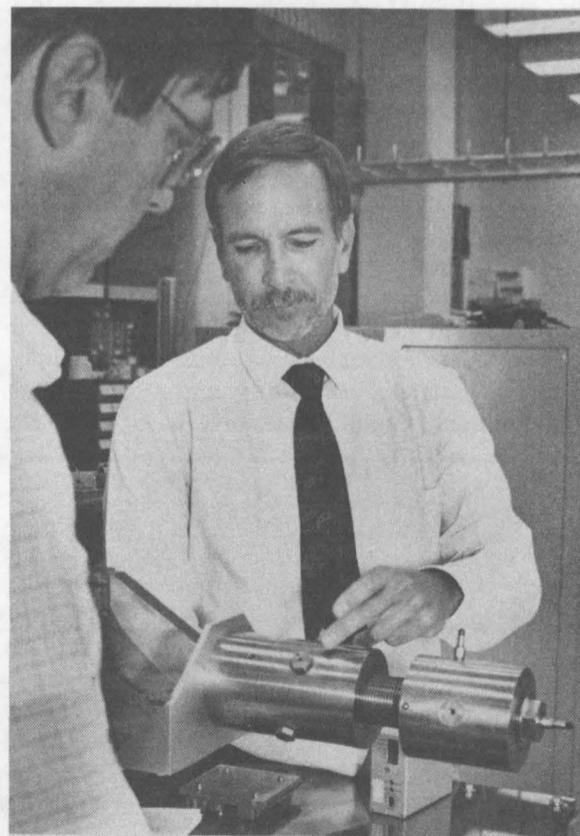
Other Sandians will be responsible for research programs conducted with the various facilities (see "Sandia Has Become A Melting-Pot of Expertise").

Frank credits several people in industry for

their contributions, especially Robert Torcolini, an executive with Carpenter Technology Corp. and President of SMPC; Gern Maurer, SMPC Vice-President, from Special Metals Corp.; and Dale Pretz, a Carpenter Technology attorney. Other industrial participants were on committees drafting bylaws and doing preliminary work that made the formal agreement with DOE possible.

"There were also many champions for the program in DOE," says Frank, "including Bryan Siebert and John Hnatio in Defense Programs, and Darrell Bandy and Gil Maldonado in Albuquerque Operations."

"You don't build something like this consortium in the limelight," Frank concludes. "You have to work day by day, at the nitty-gritty level. That's how we got this far, and that's how we'll continue." ●CS



TOM HITCHCOCK (9123), recent recipient of the Civilian Career Service Award from the Office of the Secretary of Defense, discusses a weapon component with a colleague. Tom was honored for his work on the Munitions Technology Development Program, a \$30-million-a-year cooperative effort of the DoD and DOE that supports 33 projects in warhead technology, energetic materials, component development, and computer simulation. During his three-year assignment in the Office of Munitions from September 1986 to August 1989, Tom also amended the program's management structure to facilitate technology exchange between DoD and DOE.

COLLECTION BARRELS for recyclable white office paper will be placed near copying machines on each floor of Bldg. 891 during the paper-recycling pilot study that begins Aug. 1. Each barrel will be clearly marked; Don Schubeck (3412), Sandia, Albuquerque recycling coordinator, made sure of that last week.



(Continued from Page One)

Recycling Study

The pilot study, planned for at least a three-month trial period and a maximum of six months, is strictly voluntary; Bldg. 891 employees may or may not participate as they choose. The focus will be on unclassified copier paper, laser printer paper, and white office paper accumulated at individual desks on a day-to-day basis — plus cardboard.

(Colored paper won't be included in the study because it must be bleached before recycling, making the process very expensive as well as an electricity gobbler. Likewise, daily newspapers, because they're printed on a relatively poor grade of paper, won't be included.)

"We've tried to set up the program so that people won't have to spend a lot of extra time participating," Don notes. "We're making it as convenient as possible."

Basically, the idea is simple. If you're participating, set aside a tray, cardboard box, or even a desk drawer to keep used white paper (any color ink) that's clean and free of gum, food, and other contaminants (small staples are okay). When the

container gets full, drop the contents off at one of the collection barrels — plainly marked with signs — placed near copying machines on each floor. "Everybody travels to the copier sometime in the course of a week," Don says, "so dropping off the paper at a collection point shouldn't involve a special trip."

What about Sandians in other buildings? Is there any reason they can't join the Bldg. 891 effort if they're so inclined? "None whatsoever,"

"Once the hammer mill gets through with it, it's just one giant jigsaw puzzle."

says Don. "We certainly don't want to discourage anybody; in fact, additional participation — even though it's not quite as convenient for folks in other buildings — would indicate the kind of grass-roots support and enthusiasm that's necessary for a really successful recycling program."

Don hopes to solicit volunteers on each floor of 891 to check the collection barrels from time to time and, when barrels are full, to arrange pickup by calling the appropriate person in the Custo-

Another Side of the Coin: Waste Minimization

Conserving natural resources doesn't just mean recycling what you can (see main story). It also means not using them in the first place.

For example, Sandia, Albuquerque recycling coordinator Don Schubeck (3412) says there are several ideas on the table that, if implemented, would cut back on the use of paper (and especially unrecyclable paper) at Sandia. Some of them:

- Eliminating the use of yellow ruled pads and other colored paper, except where absolutely necessary;
- Converting Just-in-Time office supplies — such as telephone answering pads — to white paper only;
- Printing more documents, including memos, back-to-back;
- Eliminating a separate distribution sheet for memos unless there's no other choice; and
- Minimizing the number of city telephone directories (especially the yellow-pages section) distributed to employees.

Next week (starting July 30), all mail stops will receive a survey form asking how many city phone directories are needed (separate counts for white and yellow-pages sections), says Judy Hubbard, Supervisor of Mail Services Section 3154-4. "We're asking that people order no more than they absolutely require," she says. "For example, if one yellow-pages section would suffice for a division, yet each of the 12 division members needs the white pages, that's the count we should get: 1 and 12." The survey forms should be returned to Mail Services no later than Aug. 8 so that an accurate order can be placed with US West.

The paper-saving ideas mentioned above are simple, but pages saved one at a time can make a real difference over the long haul. "I'm sure there are many ways we can minimize the use of paper and other recyclables," says Don, "and I encourage Sandians to tell me about their ideas." Call him on 4-4936.

Recycling: Around For a Long Time

Recycling activities are not new at the Labs. For example, for about 40 years — most of its existence — Sandia has been recycling precious metals at the directive of DOE and its predecessors. Used metal from the Labs goes into the DOE pool of precious metals, where it's subsequently smelted and impurities removed. The cost of recycled metals is about 40 percent of the metals' market price, so the program more than pays its way. Scrap metals — pure lead, aluminum, copper, and others — from Sandia are also recycled.

Laser printer cartridges (used for unclassified material only) are sold to a local recycler at the once-a-month Labs auction. Approximately 150 cartridges go on the block each month and sell for between \$2 and \$3 each, according to Carolyn Lucero (3414-2), former supervisor of the Operations Section in the Property Reapplication Division.

Other materials used by the Labs and made available for recycling include telephone directories and noncontaminated oil from highway vehicles used by the Transportation/Safeguards organization. (GSA, which has maintenance responsibility for Labs Motor Pool vehicles, recycles the oil from them.)

A Sandia, Albuquerque Recycling Team — established this month — will be looking for other recycling opportunities. Other team activities include educational programs about recycling, soliciting volunteers and generating publicity for recycling projects, and coming up with ideas for waste minimization (see "Another Side of the Coin"). Team members, besides recycling coordinator Don Schubeck (3412), are Perry Molley (1415), Julie Clausen (3161), Jim Fish (3220), Jim Blankenship (3411), Louise Bland (3414), Jim Davis (3423), Linda Stefoin (3543), Harry Chaney (3745), and Jim Winter (7813).

dial Services Division. Once picked up, the recyclable paper is dumped into a trailer parked at the southwest corner of the dock at the west end of the building.

When it's full, the 45-ft.-long by 8-ft.-wide by 8-ft.-high trailer, owned by the contract recycler chosen to participate in the pilot study (US Recycling of Albuquerque), is hauled away to the recycler's local facility. The recycler delivers an empty trailer (same size) to the Bldg. 891 dock when it hauls away the full one.

Before it leaves Albuquerque, the paper's run through a hammer mill, which punches chunks out of it, reducing its volume. Then it's baled and shipped to a recycling mill (the nearest's in Snowflake, Ariz.). "The hammer-mill operation is im-

"Each ton of paper made from recycled pulp saves 17 trees, 4200 kilowatt-hours of electricity, and 7000 gallons of water."

portant from a security standpoint," Don points out. "Though there won't be any classified paper in the lot, there might be paper that could be considered sensitive — old phone directory pages, for example. Once the hammer mill gets through with it, it's just one giant jigsaw puzzle."

(Continued on Next Page)

Going Through Phases

Weapon Development Is Systematic Process

Because of Sandia's historical connection with the US nuclear weapon program, the LAB NEWS and other Sandia publications sometimes remark that a weapon is in Phase 2, Phase 3, or whatever — and then explain no further. Given the wide range of non-weapon work done by Sandians, however, it's a safe bet that many — probably a growing number — can deduce only that Phase 2 occurs before Phase 3.

To the rescue comes a recent report by Glen Otey (5160): *DOE Nuclear Weapon RD&T [Research, Development, and Testing]: Objectives, Roles, and Responsibilities* (SAND89-1243). Here's a synopsis of Glen's explanation; readers who want more detail can consult the 33-page report itself:

The Department of Defense (DoD) and the Department of Energy (DOE) share responsibilities for nuclear weapons.

DoD defines performance requirements and physical characteristics (called Military Characteristics — MCs), provides delivery systems, trains and deploys the necessary people, and has custody of the stockpile. DOE designs, develops, tests, and produces nuclear weapons, carries out exploratory and advanced development, and monitors and certifies the technical quality of the stockpile.

Seven Major Phases

The DOE process for each weapon includes seven major phases. The first begins after the Secretary of Defense approves a mission need statement. Interaction between DoD and the DOE laboratories — Sandia, Los Alamos, and Lawrence Livermore — usually starts in the pre-Phase 1 period, as mission needs and ways to fulfill them begin to be defined.

Phase 1 — Concept Definition — includes studies by DoD, DOE laboratories, or both. Areas of study may include potential weapon applications, preliminary analyses of effectiveness, trade-offs in delivery systems and warheads, and preliminary MCs. A Phase 1 report gives DoD information for deciding whether to continue developing the weapon and helps the DOE labs plan their research, development, and testing.

Phase 2 — Feasibility Study — determines the technical feasibility of meeting the mission need. Each of two competing design teams — one from Lawrence Livermore and Sandia, Livermore, and the other from Los Alamos and Sandia, Albuquerque — proposes candidate warheads. (Competition through Phase 2 encourages new

ideas and serves as a form of peer review.) The feasibility study may involve tests, including underground nuclear testing.

DoD and DOE conduct a joint Phase 2A study to identify a baseline design that balances resources and requirements. At this point, DOE normally chooses one of the two competing design teams.

Phase 3 — Development Engineering — includes design, prototyping, and testing of the weapon. Studies are conducted to ensure that the design will meet the stringent safety requirements imposed on nuclear weapons. Phase 3 overlaps the next two phases.

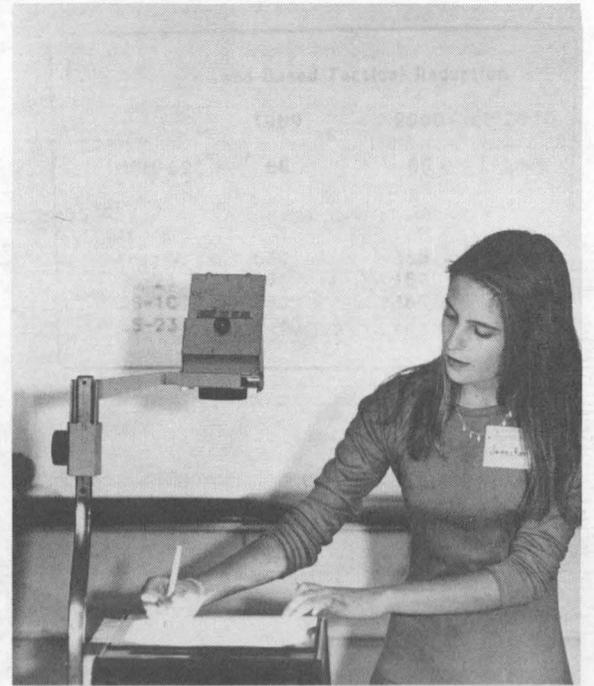
Phase 4 — Production Engineering — is when the DOE production complex begins to procure and fabricate materials and components for producing weapons. The design team supplies production information such as complete drawings.

Phase 5 — First Production — is the period when DOE evaluates whether all quality requirements are met by the product and the production processes. Further studies are done on the safety of the weapon system and on the adequacy of operating procedures. If no further development is needed, the design becomes a standard stockpile item.

Phase 6 — Quantity Production — is full-scale production at the rate necessary to meet deployment schedules. This phase includes stockpile evaluation: Stockpile sampling and laboratory and flight testing determine whether the stockpiled weapons continue to meet quality requirements. Production changes or stockpile modernization may be included.

Phase 7 — Retirement — begins when a weapon type is withdrawn from the stockpile. The weapons are disassembled; inspections provide information that can contribute to R&D for future designs as well as assessment for stockpile systems with similar components.

Throughout the process, testing is necessary for research and for the design, certification, and stockpile evaluation of weapons. Sandia conducts tests and simulations to determine whether weapons remain safe, secure, and reliable after exposure to many environments. Among the facilities needed for these tests are rocket and gun facilities; sled tracks; drop towers; high explosives; and x-ray, gamma-ray, and neutron pulse generators. In addition, some underground testing may be conducted at the Nevada Test Site. ●CS



JENNIFER ROGERS of Sandia High School was one of several Albuquerque high-school students who took a Sandia-sponsored summer-school course, "Information System Design," taught by John Sharp (2818) at Albuquerque Academy. Jennifer and her student colleagues recently presented the results of their class project to Sandia management and members of the technical staff. The class, using a new modeling technique, developed extremely complex data bases from what began as very simple information systems.

Employee Death



Jo DeHerrera of Business Management Div. 7822 died June 24 in a rafting accident.

She was 34 years old.

Jo was a Member of the Labs Staff and had been at Sandia since October 1983.

Survivors include her parents, two brothers, and four sisters.

Retiree Deaths

Ernest Montoya (67).....June 1
John Von Dreele (69).....June 3
Dorothy Douglass (85).....June 20
Robert Flaxbart (75).....June 21
Monroe Blaylock (70).....June 23



(Continued from Preceding Page)

Cardboard can be deposited in a metal cage — also in the dock area. "We don't expect people to make special 'cardboard runs,'" notes Don, "but if they're heading into Tech Area I and expect to pass the west end of the building, that's the time to deposit the empty boxes from that last shipment. It's important to empty out packing material — plastic peanuts or bubble material, for instance — from cardboard containers before putting them in the metal cage."

Why Bldg. 891?

Bldg. 891 was selected for the pilot study, Don says, for a number of reasons: Hall niches provide places for collection barrels, keeping them from congesting hall traffic; space for the recycler's trailer is available in the dock area; and the metal cage provides a collection point for cardboard.

Paper recycling isn't new at Sandia. The Labs recycled paper from 1972 to 1986, when

the program was discontinued because it was labor-intensive (in terms of custodian work) and, therefore, quite costly. "We hope the pilot study will show us ways to lower costs and come up with a more efficient process," says Don. "I believe we can do that if enough individual em-

"What's really important is the cost to the environment when you don't recycle."

ployees decide to take on some of the responsibility — and the climate is right for that. It's predicted that the '90s will be a decade of natural-resource conservation and environmental consciousness, in contrast to the conspicuous consumption of the '80s.

"One of the most important results of this study will be participation level — how many of the 360 people in Bldg. 891 choose to get involved. If the response is good, it bodes well for

the future of recycling at Sandia." Results of the pilot study will help determine the feasibility of a major, more comprehensive paper recycling effort in the future, Don adds.

"Paper recycling isn't really a matter of dollars and cents," Don continues, "though Sandia receives between \$50 and \$100 a ton, depending on the type of paper. What's really important is the cost to the environment when you don't recycle. Consider this: Each ton of paper made from recycled pulp saves 17 trees, 4200 kilowatt-hours of electricity, and 7000 gallons of water — not to mention high vehicle-fuel and labor costs of logging."

Don welcomes volunteers — not only for the Bldg. 891 program, but for possible future recycling efforts. Some of the jobs to be filled: monitoring collection sites for neatness and safety, removing inappropriate items from collection containers, and coordinating collections in certain areas. If you'd like to help, give Don a call on 4-4936. ●PW

MILEPOSTS

LAB NEWS

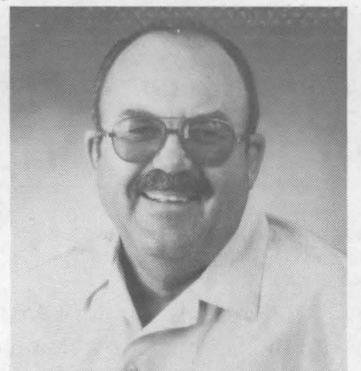
July 1990



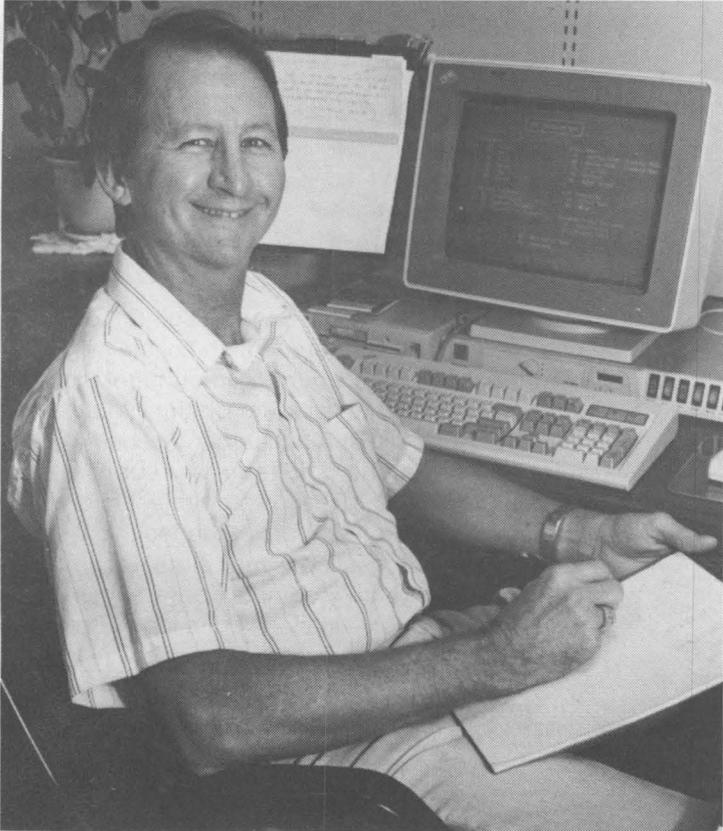
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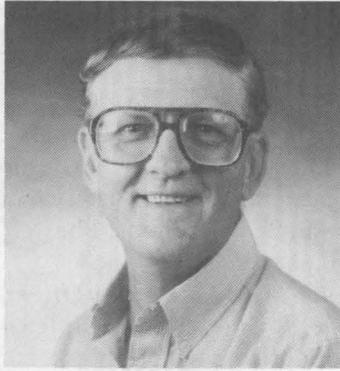
Jim Hopwood
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Dan Talbert
(7523) 25



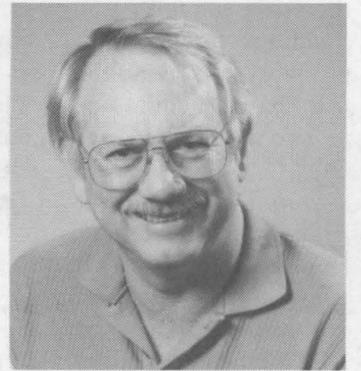
Herb Sutherland
(DMTS, 6225) 20



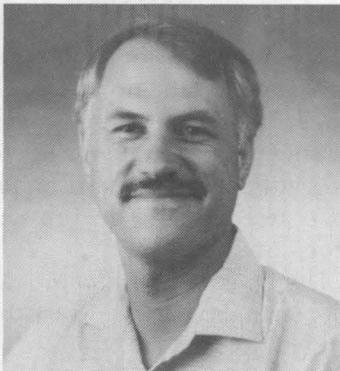
Arlo Nord
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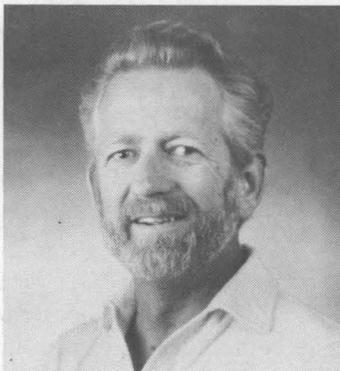
Federico Salas
(7813) 25



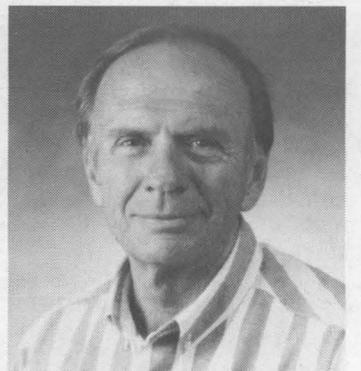
Johnny Allen
(8532) 25



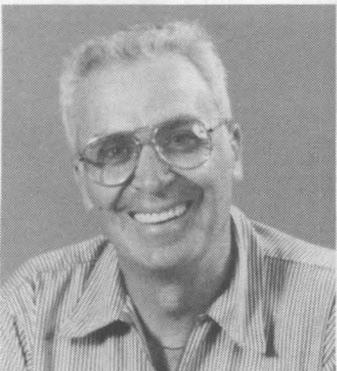
Mike Heiser
(2613) 20



Edward Shoaf
(5171) 25



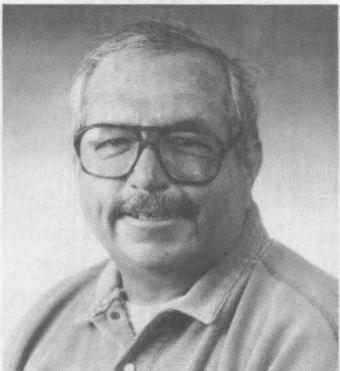
Malcolm Woodward
(7545) 35



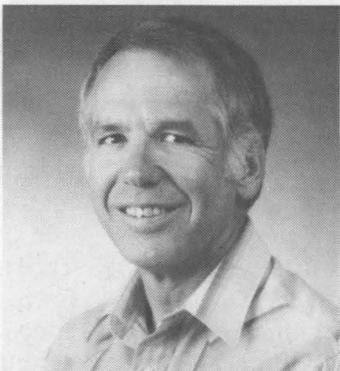
Clarence Rogers
(8513) 30



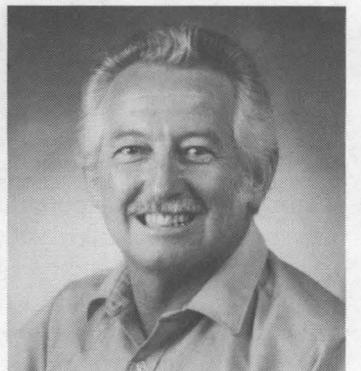
Bruce Van Domelen
(412) 30



Ernesto Montoya
(7411) 25



Keith Johnstone
(9241) 20



William Lynch
(5233) 30

Take Note

If you wonder what nutrients your soil does or doesn't have, take a sample to the Albuquerque Garden Center (10120 Lomas NE). Cost is \$3 for a single test or \$13 for the full range of testing. Results with specific demonstrations that can help you prepare or amend the soil for optimal growing conditions will be mailed to you. Proceeds from the testing benefit the Albuquerque Council of Garden Clubs. For information, contact the Garden Center on 296-6020.

The International Field Emission Society will hold its 37th Annual Symposium at Albuquerque's Sheraton Old Town Inn July 30-Aug. 3. Symposium topics are related to the theory and application of field electron emission, field ion emission, and field desorption. Researchers from various scientific disciplines — surface science, metallurgy and materials science, thin films, electron and ion sources, and ceramic superconductors — will present a total of 188 oral and poster papers. Programs and further information can be obtained from Gary Kellogg (1114) on 4-2079.

Favorite Old Photo



BATHING BEAUTIES, southern Oklahoma style, around 1915, included my mother, Essie Winston, on the right. The others are aunts and cousins. Those really *are* bathing suits that they're all wearing. They're enjoying a day at a recreational area called Devil's Den, near Ardmore, where people went to picnic and swim — I remember going there as a boy. Probably my father, George Norris, Sr., took this picture not long before he and my mother were married.
— George Norris (ret.)

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MISCELLANEOUS

SEWING MACHINE, \$60; man's bicycle frame, \$40; old Shakespeare volume, \$40; Genesis I speakers, \$40; all OBO. Jones, 294-2172.

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EDELBROCK INTAKE, Holley 4-bbl. carb., for Ford 302, 351; Edelbrock valve covers, \$175/all. Bouchard, 265-8148.

'87 ENCYCLOPAEDIA BRITANNICA, leather-bound, w/yearbooks, used once, \$900. Hammond, 281-9354.

SCREEN DOORS, 36" LH, 36" LH, 32" LH, w/hardware & keys, w/upper glass left, \$45/ea. Rodriguez, 345-0212.

DOORS: storm, closet, exterior, swinging, free. Gelbard, 275-7948 evenings.

ANTIQUE UPRIGHT PIANO, hand-carved walnut cabinet, \$1900. Pompeo, 265-9182.

CRAFTSMAN ARC WELDER, 113-1923 in 230V 37-amp., max. out 20-200 amp., trade for 110-volt in, 20-60 out, wire or rod. Roberts, 255-9527.

COLLIE, spayed female, 2 yrs. old, sable & white, registered, \$100. Blakley, 294-2289.

LOVE SEAT, striped pattern, beige-gold, foam cushions & bolsters, 62" long, 38" deep, 34" high, \$100. Rainhart, 821-3690.

GARBAGE BAGS, \$6/box; 3' x 5' painting, geese flying in moonlight over woods & water, cost \$250, sell for \$50. Grant, 821-3822.

TRAVEL TRAILER, 8' x 40', w/2 tip-outs, \$5000 OBO. Ramos, 262-0003.

RIVER ROCK, 3" or 4", free, you haul. Wright, 836-6729.

CASEMENT WINDOW, Andersen, 4' x 4'6", \$80. Scheibner, 345-9351.

FOUR TRUCK TIRES, 235/85R16, \$20/ea. Harrison, 255-7978.

MICROWAVE OVEN, Litton Memorymatic 455, variable power, temperature control w/probe, push-button electronic controls, instructions, cookbook, \$125. Schkade, 292-5126.

BUMPER-STYLE BIKE RACK, \$15. Joseph, 299-6989.

CLOTHESLINE POLES, heavy-duty, \$10; Action Lane recliner, \$200. Harris, 299-4559.

CRAFTSMAN REEL LAWN MOWER, w/grass catcher, \$40; quart & pint canning jars, \$3/case; pressure canner, \$30. Lange, 292-5648.

CAB-OVER CAMPER, 8-1/2', Idle-time, refurbished interior, corner jacks, \$2400 OBO. Potter, 299-6053.

CUSTOM-MADE GOLD TIE CLASP, gold top on real elk tooth w/Elks Fraternity emblem on chain, \$80. Hines, 821-8592.

TRAILER HITCH, Reese 71726, 2000-lb. capacity, 200-lb. tongue weight, universal mounting on bumper absorber cylinders. Lagasse, 293-0385.

OAK DINING TABLE, 4 chairs, \$100; Formica kitchen table, 4 chairs, \$75; swing set w/glider, 3 swings, \$75; Roman Teller violin, \$2000. Montoya, 884-5174.

COUNTERTOP, new, 10' long, left end mitered, \$15. Guttman, 888-5114.

CAMPING TENT, new Wards 8' x 10', \$65; VCR, JVC model HR-D220U, VHS format, 4 heads, remote, \$85; exercycle, Bollinger Ergometer, \$50. Patrick, 265-4569.

QUEEN-SIZED SOFA SLEEPER, \$150; rocker, \$50; chrome Jackman wheels & tires for Ford Ranger, \$250/set. Manning, 898-6084.

KELVINATOR FREEZER, upright, white, 32" W x 62" H x 26-1/2" D, \$100. Pendall, 265-3008.

CAR SEAT, Evenflo One-Step, rear-facing for babies or forward for toddlers up to 43 lbs., cost \$75, sell for \$45. Mooney, 281-2612.

NINE-DRAWER DRESSER, w/mirror, \$75; secretary, \$130; recliner, \$15; bar, w/CO2 bottle & regulator, empty keg, storage compartment, 110-volt refrigerator unit. Powell, 877-4939.

DINING TABLE, 40" round, light-color wood, \$100; 13" portable color TV, \$80. Gendreau, 266-7573.

DINING-ROOM SET, 1920s, carved dark oak, table, 6 chairs, 3 side pieces, \$3500; 3 European brass/crystal chandeliers, 1940s. Caskey, 298-6428.

SIMMONS SOFA SLEEPER, rust plaid, \$70. DeReu, 275-2336.

REFRIGERATOR, 19 cu. ft., w/ice maker, Sears Kenmore, harvest gold, \$275 OBO. Heald, 281-8826.

GARAGE SALE: household & baby furniture/items, chest of drawers, Craftsman self-propelled mower, \$225, more; July 27-28, 12800 Comanche NE, #48. Levan, 293-0079.

ANTIQUE MAHOGANY DRESSER, needs work, \$30; Big T swing set, \$25. Bauer, 266-8480.

'65 AIRSTREAM TRAVEL TRAILER, 17', self-contained, w/AC, \$2100. Carter, 821-6383.

FIBERGLASS TOPPER for small pickup, \$200 OBO; tubular steel overhead rack for small pickup, \$100. Wilson, 299-1480.

MALE CAT, 2-1/2 yrs. old, neutered, free to good home. Rhoden, 293-5301.

CRAFTSMAN 10" RADIAL SAW, extra blades; Craftsman shop vac; ranch oak twin bed. Hatch, 296-2773.

PHILCO REFRIGERATOR, harvest gold, left hinge, 5+ yrs. old, 14 cu. ft., \$100 OBO. Liguori, 256-3613.

KEYBOARD, Casio CT460. Dansby, 821-5665 evenings.

COBRA PROGRAMMABLE SCANNER, w/antenna, Model SR12, hand-held, 16-channel, \$50 OBO. Eckles, 265-6262.

QUEEN-SIZE FOUR-POSTER BED, parchment white, light blue trim, \$125; steel office desk, \$95; gas grill, \$45. Schubeck, 821-3133.

STEREO SPEAKERS, Acoustic Research 2AX, \$50/pr. Claussen, 293-9704.

FRANKLIN STOVE, cast iron, takes 30" logs, 10' stovepipe, 48 firebricks, will deliver in town, \$175. Hawkinson, 281-1281.

CHALMERS SILVER BOLO, never used, cost \$300, sell for \$200. Burton, 275-9483.

PICNIC TABLE, traditional style, 6' long, 2x6 pine w/redwood finish, \$50; Commodore C64, w/games, \$90. Schaub, 821-7242.

H. H. SCOTT RECEIVER, solid-state, VS, made in late '60s, \$15. Guilford, 255-6294.

ANTIQUE PIANO, oak, upright, \$500; cypad in pot, free to good home. Dupree, 294-1835.

MOVING BOXES, 33 book, 13 med., 3 large, 3 dish, misc. sizes, buy individually or \$50/all. Hietala, 867-9577.

OSCILLOSCOPE, Heath, 5", solid-state, 6-mHz, triggered sweep, with all data, \$50. Weber, 275-3719.

AUTO-HAULER TRAILER, 20', tandem, all steel, lights, NM title, \$900. McClenahan, 294-8454.

GARAGE SALE: furniture, piano, flute, clarinet, weight set, appliances, doors, books, more; July 28-29, 13131 Cedarbrook NE. Carter, 293-6750.

TWO MATURE YUCCAS, 10'-12', you dig, you haul, free; pole for basketball backboard, free. Lindell, 299-8452.

SHOP MANUAL for '80 Pontiac Phoenix, Chev. Citation, \$7. Brown, 884-8581.

CAMP TRAILER, '68 Apache, solid-state pop-up, sleeps 7, sink, stove, icebox, battery, light, exhaust fan, \$1200 OBO. Suber, 275-1933.

TRANSPORTATION

MOUNTAIN BIKE, man's 18" CyclePro, recently overhauled, new parts, \$135 OBO. McKenney, 268-7390 leave message.

'84 MERCEDES 190E, silver, sunroof, AC, 5-spd., \$10,800. Eyster, 898-1184.

'90 MOUNTAIN BIKE, Diamond-back Ascent, 19", \$365. Ginn, 843-9143.

'83 INVADER, 17', w/stern drive, 145-hp Volvo motor, full canvas, Shoreline trailer, \$5700. Childers, 344-9281.

'78 PONTIAC BONNEVILLE, 301 V-8, AC, PW, AM/FM, PB, 120K miles, one-family car, \$1600 OBO. Troncoso, 897-1167.

'75 CHEV. IMPALA, 350-CID, AC, PS, PB, 130K miles, needs work, engine rebuildable, \$500 OBO. Moya, 865-5765.

'86-1/2 NISSAN HARDBODY, 4x4, king cab, 4-cyl., AC, AM/FM cassette, extended warranty, all receipts, dealer-serviced, 70K miles, \$6500. Ortiz, 281-3496.

'86 TOYOTA CAMRY, white, 5-spd., AC, cruise. Goldsmith, 260-1600.

'87 SCHWINN PRELUDE 10-SPD., 25-1/2" frame, \$250. Kovacic, 256-9867.

'87 VW GOLF GL, 4-dr., 5-spd., AC, Nakamichi audio system, 42K miles, extended warranty. Paulsen, 823-2440 leave message.

'83 PLYMOUTH HORIZON, 5-spd., 30-35-mpg, 4-dr., AM/FM cassette, original owners, \$1500 OBO. McDonald, 294-9576.

'78 YAMAHA XS750, 18K miles, new front tire, garaged, no battery, \$600. Harris, 1-864-2375.

'77 SUZUKI GS750, full fairing, recently rebuilt engine, electronic ignition, K&N filters, new tires, chain, sprockets, \$950 or make offer. Brigham, 292-4399.

'68 HONDA TRAIL 90, no battery, \$50. Scheibner, 345-9351.

BICYCLE, Fuji Gran Tourer, 21", mixte frame, 12-spd., \$95. Joseph, 299-6989.

TAKARA 10-SPD. BICYCLE, \$50 OBO. Owen, 299-3487.

'83 JEEP WAGONEER, all power options, cruise, tilt, AC, leather seats, 360-ci. V-8, 97.5K miles, \$6500. Irwin, 291-9382.

'68 VW BUG, disassembled engine needs bolt inserts in block, \$200 OBO. Axness, 884-3524.

'84 GMC SIERRA CLASSIC PICKUP, 3/4-ton, tow & camper packages, 44K miles. Potter, 299-6053.

'88 HONDA SHADOW 800, purchased new in Nov. '89, 500 miles, backrest, helmets, \$3500 OBO. Gibson, 821-8316.

'80 PORSCHE 928S, 5-spd., leather, 63K miles, \$12,500 OBO; '74 Jensen Healey, Lotus DOHC engine, 4-spd., \$5500 OBO. Mantelli, 298-2603.

'86 TOYOTA CELICA GT, AT, AC, AM/FM cassette, 23K miles, white w/blue interior, \$8350. Dobranich, 298-4547.

'64 DODGE DART GT, 2-dr., slant-six, push-button AT, one-family car, \$300. Melick, 867-2860.

'78 CHEV. CAPRICE, 4-dr., NADA retail \$1250, sell for \$1100 OBO. Young, 884-7836.

'65 PEUGEOT 404, 4-dr. sedan, doesn't run, parts car or convert to electric, you transport, \$100. Clark, 298-4913.

MAN'S BICYCLE, Nishiki Century, 10-spd., 23" frame, 27" wheel, French blue, \$85. Bickes, 293-4037.

'81 FORD T-BIRD, AT, AC, passed emissions test, \$2300. Whitman, 266-9313.

'66 FORD PICKUP, 4-spd., rebuilt 352 V-8, new brakes, glass, kingpins, radiator, heater, \$2700. Winowich, 255-2611.

'80 CITATION, 2-dr. hatchback, 4-cyl., AC, PS, PB, \$1200 OBO; '81 Dasher, diesel, 4-dr. hatchback, 35+ mpg, \$950 OBO. Trump, 296-1984.

'77 NOVA, 66K miles, AT, AC, 6-cyl., SB radials, 2-dr., \$1200 OBO. Rogers, 822-8355.

'78 MERCURY COUGAR, 351-CID, C-4 tranny, complete, will deliver, \$250. Powell, 877-4939.

'78 CHEV. 1/2-TON PICKUP, AT, AC, PS, PB, V-8, \$2400 OBO. Jinzo, 897-2349 after 5.

'82 PLYMOUTH SAPORO, 5-spd., AM/FM cassette, AC, \$1200. Gendreau, 266-7573.

'88 TOYOTA SUPRA TURBO, AT, removable roof, extended warranty, 19K miles. Hughes, 293-7320.

FREE SPIRIT 10-SPD. BIKE, \$45; girl's 20" banana-seat bike, \$30. Levan, 293-0079.

'75 YAMAHA ENDURO 400, 5K miles, new top end, new seat, \$500 OBO. Hogan, 345-1264.

'89 OLDS. CUTLASS SUPREME, V-6, PS, PB, AC, PW, PL, AT, cruise, stereo, asking pay-off. Disch, 299-8171.

'81 DELOREAN, stainless steel, black leather interior, 5-spd., PW, PB, AC, 30K miles, \$14,900. Love, 298-6484.

VOLKSWAGEN BAJA, for RV towing, professionally rebuilt engine & transaxle, 1855 lbs. dry, extras, \$2300. Stephenson, 299-3914.

'89 PONTIAC GRAND PRIX SE, white, V-6, 5-spd., loaded, power sunroof, anti-lock disc brakes, \$14,900. Yagow, 899-0854.

'79 MERCURY COUGAR, 82K miles, \$1500. Rhoden, 293-5301.

'79 GMC PICKUP, Sierra heavy-half, 350 V-8, AT, PS, PB, 67K miles, blue/white, below book, \$1995. Fields, 821-5509.

'81 MAZDA RX7, white w/brown interior, AC, 5-spd., AM/FM tape radio, sunroof, \$4000. Tormey, 821-5142.

'83 TOYOTA CELICA GT-LB, AM/FM cassette, AT/OD, EFI, cruise, 38.6K miles, AC, white, sun louver, \$5150; man's 10-spd. bicycle, \$40. Stang, 256-7793.

'78 MOTO GUZI V50 MOTORCYCLE, needs engine work, make offer. Pryor, 294-6980.

'79 AMC CONCORD, needs new engine, good for parts, body okay, \$200 OBO. Martinez, 345-0632.

'79 PONTIAC VENTURA, AC, AT, PS, PB, V-8, 4-dr., stereo AM/FM cassette, 4 speakers, original owner, \$1000. Jackson, 888-4081.

'86 NISSAN 300 ZX TURBO, dark red, T-top, 5-spd., 53K miles, new tires, bra, \$11,950. Davis, 294-1048.

LINDY SKYLINE RV, 21', Chev. engine, fully equipped, awning, front & rear hitches, 20K miles, \$15,000. Catanach, 265-2290.

'74 HONDA, 125cc, 16K miles, \$100. Hawkinson, 281-1281.

'81 VW VANAGON, 7-passenger, 4-spd., \$3100 OBO. Schaub, 821-7242.

'78 PONTIAC FORMULA FIRE-BIRD, recently rebuilt engine & transmission, performance extras, \$2500. Cook, 296-3064.

'73 SUPER BEETLE, rebuilt engine, seats need reupholstery, \$1500. Franklin, 869-2130.

BICYCLES: Schwinn LeTour, Schwinn Lil' Chick. Hatch, 296-2773.

REAL ESTATE

1 ACRE, in Forest Lakes near Durango, Colo., \$9500. Meyer, 821-0123.

3 ACRES VACANT LAND, irrigable, Bernalillo. Meyer, 836-0920 evenings.

2-BDR. MOBILE HOME, 12' x 60', '78 Liberty, 1 bath, 4' chain-link fence in front, \$6000 OBO. Silva, 881-6544.

2-BDR. HOME, Ridgecrest area, landscaped, redwood deck, garage, wood stove, \$65,000. Saxton, 268-9065.

BRICK HOME, Glenwood Hills, views, solar, storage, new deck, storm windows, water softener. Carter, 293-6750.

3-BDR. MOBILE HOME, 14' x 70', 2 baths, R-30 truss roof. Moore, 884-0238 or 281-9316.

WANTED

CHILD-CARE PROVIDER, responsible person, weekdays in our home, beginning Dec. 3, child will be 11 mos. old. Cocain, 275-9505.

12-GA. SHOTGUN, double barrel, must be in good condition. Zamora, 865-6280.

SOCCKER GOALIE needed for new Rio Grande Club girls team, must be born in '79 or '80. Geer, 265-2094.

NINTENDO CONTROL with 2 joy sticks. Underhill, 294-5774.

ELEGANT HOME WANTED, 2-yr. lease, approx. 2400 sq. ft., Sandia Heights, Ridgecrest, or Four Hills, Sept. 1, for person on temporary assignment at Sandia. Krantz, FTS 896-1724.

HOUSING, summer-hire and spouse would like to housesit or sublet any time between Aug. 10 and Sept. 28. Hale-Lewis, 266-8395.

HOME FOR TWO KITTENS, black & white, blue eyes, medium hair, 10 wks. old, litter-trained, female, free. Dubicka, 296-6557.

DIGITIZER CURSOR for Summagraphics Bit Pad One. Weber, 275-3719.

ROOMMATE, female, nonsmoker, share 3-bdr. 1-3/4-bath house in NE Heights, \$250 mo. plus 1/2 utilities. Schafer, 299-6217 leave message.

NATIONAL GEOGRAPHIC MAGAZINES, past issues. Fjelseth, 296-2257.

TWO CHILDREN'S PERSONAL FLOTATION DEVICES. Cibicki, 877-7098.

HOME for Australian shepherd/springer spaniel mix, 5-yr.-old spayed female. Field, 268-0025.

LOST AND FOUND

FOUND: Cross pen, July 6, near intersection of 9th & "I" Sts. Reineke, 4-1246.

SHARE-A-RIDE

FULL-TIME VANPOOL SEATS AVAILABLE, along N-14, Frost Rd., Tijeras, ride every day. Yelton (281-2893) or Burns (281-3922).



Coronado Club Activities

Family Fare = Fantastic Food + First-Class Fun

AN ALL-YOU-CAN-EAT BUFFET at Family Fare tonight (July 27), served starting at 6 p.m., features spaghetti, fried chicken and fish, corn dogs, chile dogs, french fries, and a salad bar. This may be the bargain of the century for families large and small; supper costs just \$4.50/adults and \$2.50/children under 12. Then it's send-in-the-clowns time — in this case, Kangaroo Katie, with marvelous magic and other entertainment from 7 to 8. Make your reservations now for an evening the whole family will enjoy (265-6791).

WEDNESDAY FAMILY NIGHTS in the pool/patio area are going swimmingly, it's reported. August brings five more opportunities to relax with the family after work. All kinds of rea-

sonably priced food is available, and special activities are planned for the kids. Best of all, the pool stays open until 8 p.m.

CHUCK-WAGON SPECIALS next Friday night, Aug. 3, include prime rib, poached halibut, broiled salmon (all \$7.95), and filet mignon (\$8.95). Afterward, stomp around to c/w ditties served up by those ever-popular Isleta Poor Boys from 8 p.m. to midnight.

YOU CAN COUNT ON a month of Sunday brunches in August. Yep, it's really true: On Aug. 5, 12, 19, and 26 (10 a.m. - 1 p.m. all four days), the city's best brunch bargain will be available. Each Sunday's menu will feature bacon, French

toast or pancakes, baron of beef and turkey or ham, new potatoes or potatoes au gratin, and streusel or Danish pastry. Always available, of course, are scrambled eggs, that famous green chile stew, salads, desserts, juices, champagne, and Bloody Marys. Prices are \$5.95/adults, \$2.50/children ages 3 through 12, and free/toddlers under 3. Reservations recommended.

BINGO MANIA continues in August, with chances to play twice each week — budget bingo every Tuesday and regular bingo every Thursday. The starting bell's at 5:30 p.m. each night — that's when card sales start and the food line opens. Budget bingo starts at 7, and the regular bingo early-bird session begins at 6:45.

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

July 27-28 — "The Traveling Bandit Show," Albuquerque Children's Theatre presentation, wild-west comedy for children written by ACT director Sue Ann Gunn; 1:30 & 3:30 p.m., Rodey Theatre, 277-3121.

July 27-29 — "Something's Afoot" by James McDonald, satirical poke at Agatha Christie murder mysteries and musical styles of the past, presented by the Albuquerque Civic Light Opera; 8:15 p.m., 2:15 p.m. Sun.; Popejoy Hall, 345-6577.

July 27-Aug. 5 — Exhibit: "From the Land of Dragons," collection of rare fossils, mostly from China; 9 a.m.-6 p.m. daily, New Mexico Museum of Natural History, 841-8837.

July 27-Sept. 14 — Exhibit: "Raymond Jonson: Geometric Form in the Pursuit of a Unifying Principle"; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues. evening; UNM's Jonson Gallery, 277-4967.

July 27-Oct. 14 — "Georgia O'Keeffe and the Stieglitz Circle," exhibition examining the group of artists (including O'Keeffe) who were affiliated with Alfred Stieglitz, the photographer, gallery owner, and champion of early twentieth century avant-garde art; 9 a.m.-4 p.m. Tues.-Fri. (5-9 p.m. Tues. evening), 1-4 p.m. Sun.; Upper Gallery, UNM Art Museum, 277-4001.

Events Calendar

July 27-Oct. 16 — "Birds/Portraits," exhibit of 40 oil portraits of birds seen in the Southwest by Austin, Tex., artist Benita Giller; 9 a.m.-5 p.m. daily, New Mexico Museum of Natural History, 841-8837.

July 28 — Summerfest '90: Korean Night, ethnic food, arts & crafts, dances; 5-10 p.m., free, Civic Plaza, 768-3490.

July 28 — "Salsa Picoso," dance to music performed by 13-musician salsa band directed by Hector Garcia; 8:30 p.m.-midnight, UNM Continuing Education Bldg. (1634 University NE), 277-6945.

July 28-29 — Sandia Mountains Discovery Days: activities at several sites in the Sandias, with displays, demonstrations, storytelling, and appearances by Smokey the Bear; 9:30-5 p.m., call for schedule, 243-3696.

July 28-Aug. 12 — 10th Annual Cowboy Classic Western Art Show, free, \$1 parking, noon-5 p.m., Fine Arts Gallery, NM State Fairgrounds, 265-1791, ext. 228.

Aug. 1 — Children's Festival, for children of all ages; games, arts & crafts, face-painting, sponsored by the South Broadway Cultural Center; 9 a.m.-3 p.m., South Broadway Community Park, 848-1320.

Aug. 2 — Our Lady of the Angels Feast Day, Bull and Corn dances; call for times, Jemez Pueblo, 843-7270.

Aug. 4 — Summerfest '90: Cajun, Jamaican,

and French Night, ethnic food, arts & crafts, dances; 5-10 p.m., free, Civic Plaza, 768-3490.

Aug. 4 — Santo Domingo Feast Day, Corn Dance; call for time, Sandia Domingo Pueblo, 843-7270.

Aug. 5 — Arts in the Parks: "Remember When '50s," featuring Likely Story, the Henry Spencer Band, dance contest, door prizes, sponsored by Albuquerque Parks and Recreation Dept.; 1-5 p.m., Montgomery Park, free, 768-3490.

Aug. 5 — 40th Anniversary Celebration of NM State Garden Clubs, lawn and style show; 1-5 p.m., Albuquerque Garden Center (10120 Lomas NE), free, 296-6020.

Aug. 6 — "Modern Day Achievements Among the New Mexico Pueblo Indians," lecture by All Indian Pueblo Council Chairman Herman Agoya; 10 a.m., Indian Pueblo Cultural Center, free, 247-4907.

Aug. 6-12 — Sunwest Bank/Charley Pride Senior Golf Classic, proceeds benefit St. Joseph Hospital & Health Care Foundation, Presbyterian Health Care Foundation, Lovelace Medical Foundation, and All Faiths Receiving Home; for information and tickets, call 247-GOLF.

Aug. 7 — 4th Annual Senior Citizens Day, various activities for senior citizens; 10 a.m.-4 p.m., Indian Pueblo Cultural Center, free, 843-7270.

Aug. 10 — San Lorenzo Feast Day, Corn dances; Acoma and Picuris Pueblos, 843-7270.

Fun & Games

Golf — Sandia Women's Golf Association held a nine-hole tournament July 14 at UNM North Golf Course. The following winners received awards: Flight A — Karen Varga, first low net; Karl Ricker (7321), second low net; Shirley Kendall, third low net; Flight B — Marlene Shields (7542), first low net; Betty Worley (ret.), second low net; Teri Carpenter (3731), third low net; Flight C — Shirley Lopez (3745), first low net; Lupe Massoth (2632), second low net; and Janice Montoya (153), third low net. The closest-to-the-pin award was presented to Minnie Shurick, A Flight; Betty Turk (4000), B Flight; and Linda Rosario (3733), C Flight. Shirley Lopez won a chip-in award. Karen Varga was tournament director.

August tournaments include Tijeras Arroyo (KAFB) on Friday, Aug. 10. Format will be 4-clubs and a putter. Guests are welcome and dinner will follow the game. The first tee-time is 5:15 p.m. Other August events are Arroyo Del Oso on Aug. 4 (18-hole), SWGA 18-hole championship at Los Altos Aug. 19 and Ladera Aug. 25, and Tierra Del Sol Country Club in Belen (par-3 executive course) Aug. 25. For information about the tournament schedule and SWGA participation, contact Teri Carpenter on 256-0614.



AVID RUNNERS — For 15 years, a group of Sandians has been running home together from work at the end of the day. All told, they figure they've run about 129,000 miles (collectively, of course), not to mention 75 marathons among the five of them. From left are Terry Bisbee (2618), Bob Rieden (2314), Henry Dodd (6225), Kathie Hiebert-Dodd (9115), and Gerry Quinlan (2821).