

Beam power: Sandia's rapid-fire, low-cost pulsed energy beam is going commercial

Technology by spin-off company Quantum Manufacturing Technologies could triple life of some products

By Neal Singer

Media and Employee Communications Dept. 12620

With exclusive license to relevant patents, two researchers from Sandia are commercializing an energy beam that has demonstrated an extraordinary number of practical applications. A news conference announcing the licensing agreements was held Tuesday in Albuquerque.

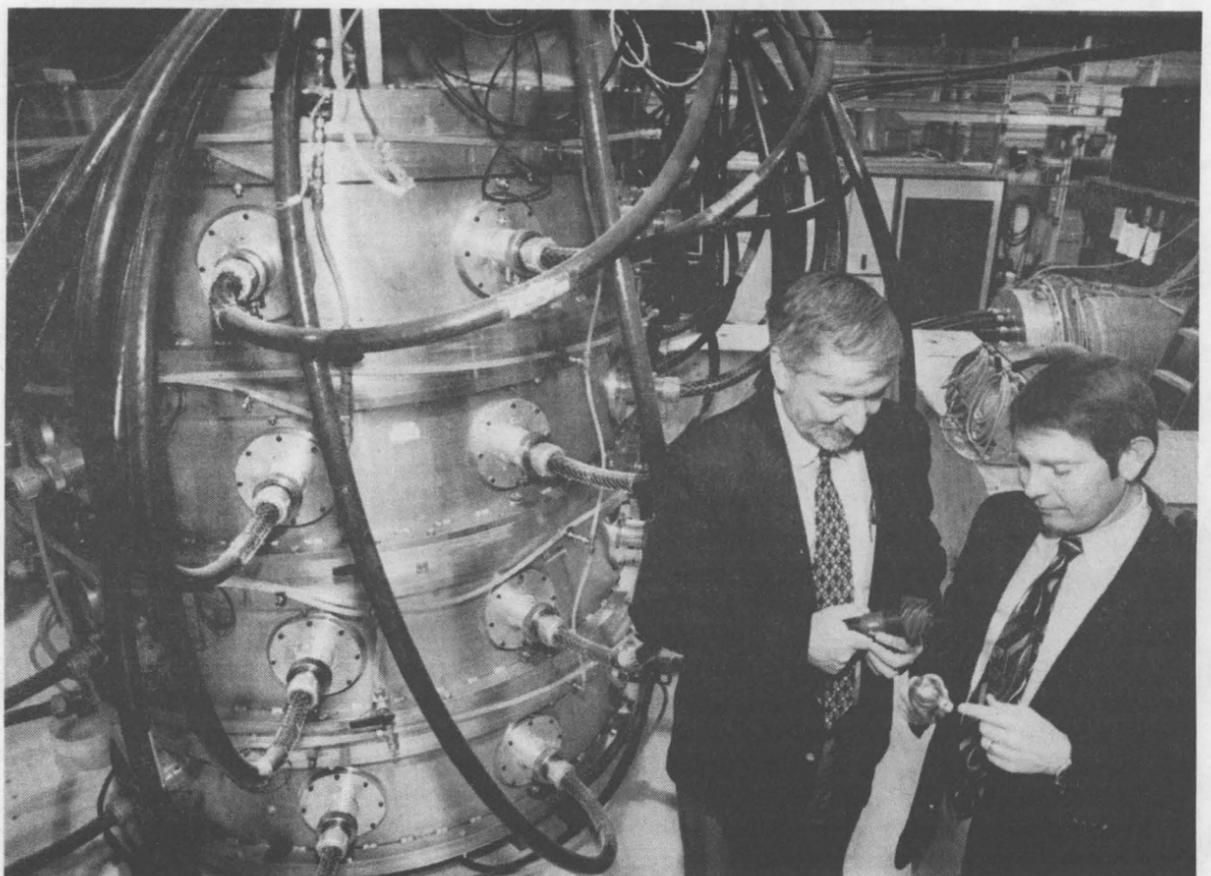
Created on a small scale in Russian laboratories and made practical in the United States, the beam is composed of lightweight ions — atoms with positive electrical charges.

Their energetic bombardment, which makes surfaces smoother or harder, is expected to double or triple the life expectancy of products ranging from tools and dies to jet engine blades and medical implants.

Quantum Manufacturing Technologies Inc., the Albuquerque-based company of physicist Regan Stinnett and engineer Gene Neau, is being capitalized with \$4.2 million in phased start-up

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Using pulsed-power devices for manufacturing is "one of the most innovative applications in years."



IONS FOR INNOVATION — Gene Neau, left, and Regan Stinnett, next to the RHEPP I accelerator in Area 4 last week, examine an artificial hip joint treated with their ion beam technology. They are the founders of Quantum Manufacturing Technology. (Photo by Randy Montoya)

Budget exercises no great cause for alarm, John Crawford says

Labs Deputy Director John Crawford says Sandia's senior leadership has a message for employees: Don't put too much stock in rumors you hear resulting from various "budget exercises" being conducted by management.

"We'll be working a variety of budget scenarios over the next three or four months," John says. "In general, the expectation [among management] is that our revenue stream will be down a bit and so we'll be taking fairly conservative positions. There'll be a lot of volatility in what we do over the next few months."

This is nothing new, John says. "We go through this cycle every year. About this time of year, the budget looks about as bad as it's ever going to look."

"It is a fact," John says, "that we are on a downtrend" but maybe not as severe a downtrend as early estimations had suggested.

Early projections were 'conservative'

Early projections were based on a "very conservative" estimate of a \$1.0 billion revenue stream. Using those numbers, the Laboratory Operations Council conducted a "budget exercise" — a "what-if" process based on the \$1.0 billion budget assumption. Even as

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Sandia National Laboratories

First-of-its-kind managers' meeting helps SQLC plot Labs' course

Sandia managers stir company pot, start recipes for success

For much of its 47-year-or-so history — especially during the long Cold War era — Sandians didn't worry much about what the Labs would be doing and how it would be funded. The original mission was clear. Nuclear weapon design, development and testing, and related defense work kept Sandians busy and well-funded.

It's a different world and a different way of doing business today. Funding isn't nearly as easy to come by now that nuclear weapons work has been scaled back to its current "stewardship" role — basically stockpile surveillance and above-ground testing of components and systems (no nuclear explosions). Design work on new weapons systems has ceased. Sandia still has other defense- and energy-related work, some work for other government agencies, and cooperative work with

industry, but much of that has been scaled back, too.

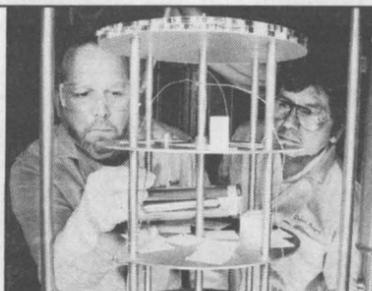
Who's going to pay the bills?

Employees and management at all levels are therefore concerned about the future — how the Labs' missions are changing, how Sandia can best contribute to national security and international peace, how we can work effectively with private industry, and who's going to pay the bills (the "latest best guess" is that Sandia will get about \$70 million less in FY97 government funds than it's getting this year; see related story at left). These issues were the primary focus of the managers' two-day conference last Tuesday and Wednesday, April 2-3. The conference for all levels of managers was the first such

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Invisible gases revealed on video by new laser imaging system 3

Labs' fastest computer renders underground waste flow in 3-D 5



6 Neutron generator facility begins Sandia's production mission

9 Job restructure teams propose "integrated" classification system

This & That

Managers gone; productivity up? — Hundreds of Sandia managers were discussing the future of the Labs — where we're headed, how we're going to get there, who's going to pay the bills, etc. — at the two-day managers' conference last week at the Albuquerque Convention Center. With most managers there, several were speculating about whether the overall productivity at Sandia increased or decreased measurably those two days.

Seriously, one thing became clear at that meeting: Shaping Sandia into an organization that can prosper in the future is going to be tough and probably painful. Difficult decisions will have to be made to move us from our formerly secure, entitlement-type situation where "Uncle Sugar" took care of us into a world where we must prove our worth constantly and do it more efficiently. I assure you this isn't just scary rhetoric. It's reality, and it's going to take all of us working together to keep this proud institution going strong. Our summary story about the conference begins on page one. A team is putting together conclusions and recommendations from the meeting. Look for more details in our next issue and perhaps in some special communications, including how you can provide input to help shape our future.

* * *

Winston and I agree — A reader called a while back to give me a hard time because I ended a sentence in this column with a preposition. Such transgressions against the English language make some English purists shudder, but the call reminded me of several entertaining paragraphs from a textbook (*Grammar for Journalists*) that I kept from my first college journalism class. I can't tell the stories any better than the author, so I'll reprint the paragraphs verbatim.

"Newspaper editors would agree that Winston Churchill had good reason to be miffed when an overzealous clerk in the Foreign Office, in checking the manuscript of a speech by the prime minister, circled one sentence which ended with a preposition. Noting this, reports *This Week Magazine*, Mr. Churchill scribbled on the margin: 'This is the kind of nonsense up with which I will not put.'

"The Churchillian comment reminded *This Week* of the story of the little boy who refused to listen to a bedtime story and trotted upstairs to bed. When his father followed, still carrying the story book, the boy asked acidly, 'Why did you bring that book that I didn't want to be read to out of up for?'"

Author E. L. Callihan then pointed out, "It is now considered proper to end a sentence with a preposition when such a construction makes the sentence clearer, or more emphatic, or more natural. However, the little boy was carrying a good thing a bit too far."

* * *

Crunchy creative cookies at May 2 open house — Mark your calendars. All of us in the Employee Communications, Media Relations, and Community Relations departments invite you to come check out our new digs in Bldg. 811 on Thursday, May 2, from 3:30 to 5 p.m. We're located outside the tech area, so all employees and our many retiree friends are welcome; 811 is the single-story brick and stucco building just northwest of Bldg. 800. Our main entrance is on the west side. I'll be busy baking cookies for the big event during the next few weeks. I won't give away my complete recipe secrets, but I'll bet many of you didn't know there's a practical use for those huge quantities of dry tumbleweeds that blow around New Mexico every spring!

— Larry Perrine (845-8511, MS 0165, lgperri@sandia.gov)

Budget exercises

(Continued from page 1)

that exercise was being conducted, John says, budget projections began to firm up. "The numbers began rolling up between \$1.1 and \$1.2 billion — it changed that much in a week. But what happened was, notions of that first exercise rattled all the way through the company," sparking a flurry of alarmist rumors about downsizing and new rounds of staff reductions. Those rumors, John says, are unfounded.

John says current planning is based on a baseline budget of \$1.1 billion for the next fiscal year — which management feels is conservative.

"Right now, we're starting to allocate our indirect resources and size our infrastructure for '97; it will truly be a bare baseline budget. In it we'll have none of the infrastructure investments that we normally make. As our income increases from \$1.1 billion, we'll start adding in the infrastructure investments that we can and should make."

Too early to set staffing levels

John says no decisions have been reached regarding staffing levels in FY97. "It's still too early for that," he says. A number of factors need to be considered before any conclusions about staffing levels can be reached. For example, John says, decisions have to be made about procurements in FY97; the Labs has a \$700 million procurement budget. Will we spend that much in FY97? That has to be determined, John says, and that determination will influence decisions about staffing levels.

"Also, we got a leg up on '97, because the VSIP [Voluntary Separation Incentive Program] took us a bit lower than we were projecting. So we're about 150 people lower going into '97 than we'd thought we'd be; we're entering the year in a better posture."

Because of the volatility in Washington regarding budget issues, and because this is an election year, John says, "we'll have about as good a picture as we're going to get" by late August regarding the FY97 budget.

After the election, John says, "there could be another cycle of change, regardless of the outcome [of the election], and we'll have to deal with that around the first of the year."

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Who to contact for PR & Communications help

Public Relations & Communications Center 12600 (of which the *Lab News* is a part) sometimes gets feedback from other people at Sandia who don't know how to get help with public relations and communications efforts. The following list is intended to help Sandians get hold of the right individual with a single phone call:

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'Invisible' gas leaks show up on television monitor

New system extends range of remote gas imaging

By Nancy Garcia

California Reporter

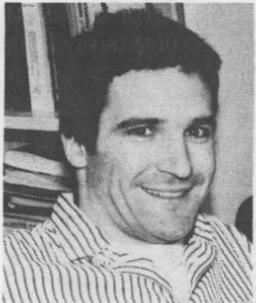
"Candid camera" is coming to gas leaks soon, courtesy of a new technology developed at Sandia/California for the Navy.

The remote laser imaging system allows operators to create real-time television views of normally invisible gases. Scientist Tom Kulp of Industrial and Environmental Programs Dept. 8366 led tests last month at the Nevada Test Site's Remote Sensor Test Range to demonstrate a prototype of the new system.

The Sandia group — consisting of Tom, contractor Randy Kennedy, and postdoctoral employee Peter Powers (8366) — videotaped plumes of benign sulfur hexafluoride flowing from the test range wind tunnel. The plumes were detected from as far away as 360 meters (1,200 feet) at concentrations as low as 2 parts per million.

Young engineer earns recognition

Engineer Andy Hazelton's accomplishments while on the staff of Sandia/California's Advanced Manufacturing Technologies for Metals Processing Dept. 8240 have brought



ANDY HAZELTON

him the Society of Manufacturing Engineers' 1996 Phillip R. Marsilius Outstanding Young Manufacturing Engineer Award.

He will accept the award in Ann Arbor, Mich., in May during the North American Manufacturing

Research Conference. Two Sandia managers and two outside collaborators nominated Andy for the honor.

Andy worked at Sandia from 1990 until last month, when he left for a job in private industry. At Sandia, he helped integrate Sandia's practical machine shop expertise with its basic engineering strengths. "The program has grown from a nonfunded, scattered effort in 1990 to a \$1.5 million project involving several engineers and technicians," he said in an interview before his departure. He guided development of an Advanced Machining Laboratory that opened in 1994 in the Integrated Manufacturing Laboratory. There, Andy worked on ways to inspect and accept small lots of machined components directly off the machine tool with no need for post-process inspection. This on-machine acceptance approach is being integrated with other Sandia manufacturing projects, hardened and demonstrated for transfer to the nuclear weapons complex's production facilities.

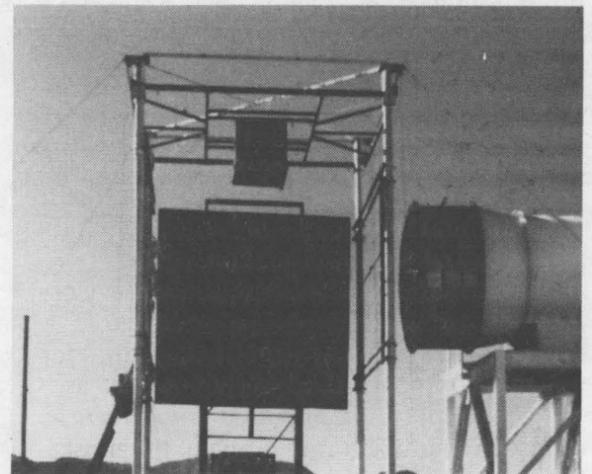
Andy also took an interest in training other promising future manufacturing researchers, having supported seven university-level students in the past three years.

"This is the first time we were able to test with a controlled gas concentration," Tom says, "and the longest range ever."

The long-range system is adapted from a previous device that was created for the Navy that detects leaks up to 30 meters away. That system is being manufactured by a commercial firm (Laser Imaging Systems). The new system uses a CO₂ laser to illuminate normally invisible gas with infrared light, which the vapor absorbs, and scans the laser and a detector field-of-view across a 12-foot-square contrast grid behind the plume. On the television screen, the backdrop appears bright, and the gas resembles dark gray billowing smoke.

"The benefit of imaging for leak detection," Tom says, "is you just look at the picture and see where the plume is. This is a new form of laser remote sensing."

The advantage of being able to detect gases from at least 300 meters (1,000 feet) is that the system can be mounted on a helicopter or small plane to monitor refineries or pipelines from the air. Absorption of the backscattered laser light reflected from the ground would provide contrast to make the infrared-absorbing plumes show clearly. More than 70 different chemical vapors have been identified that absorb infrared light at the CO₂ laser wavelengths, so the



THIS SET-UP at the Remote Sensor Test Range includes a wind tunnel nozzle at right and a backscatter target at left.

system can be used to detect many kinds of leaks.

Using a different approach that involves a pulsed laser source and a focal-plane array sensor, another long-range laser remote imaging system is under development through a project for the Gas Research Institute and the DOE Fossil Energy Program to image natural gas leaks.

Sandia California News



AGRICULTURE TEAM —Members of the Lockheed Martin System of Labs Agriculture and Food Processing Team recently made a site visit to Sandia/California. The Lockheed Martin System of Labs activity is a prototype effort, led by Al Narath of the Lockheed Martin Energy and Environment Sector, to develop a subsystem for the Idaho National Engineering Laboratory (INEL), Oak Ridge National Laboratory (ORNL), and Sandia National Laboratories that could be extended to all the DOE labs. The Agriculture and Food Processing Team is one of 12 such teams. Meeting participants included, standing from left to right, Ron Stoltz (8202), Dave Shriner (ORNL), Paul Reep (INEL), Roger Kisner (ORNL), and Stan Wullschleger (ORNL). Seated from left are Pat Eicker (9600), Sheridan Johnston (8103), Shirley Sandoz (INEL), and Joe Harris (1536). The team has subsequently visited ORNL and INEL. A visit to Sandia/New Mexico is planned April 16-17. One outcome of the site visits will be the creation of a business plan to chart the course for joint program development.

★ Congratulations

To Sherry (8210) and Ole Bown Ingwerson, an adopted son, Christian Alan, Oct. 14.

To Regina and David (8526) Nagel, a daughter, Angela Marie, Dec. 22.

Quantum

(Continued from page 1)

funds from Rainbow Technologies, a NASDAQ-listed company in Southern California. Regan is on entrepreneurial leave from Sandia; Gene retired last year after 33 years at Sandia.

Quantum Manufacturing completed agreements with Sandia in mid-March that, for a fee, provide the new company exclusive license to Labs patents issued or pending that define the new technology. In addition, DOE has approved a cooperative research and development agreement (CRADA) under terms of which Quantum Manufacturing will fund further developments by Sandia in those areas.

"The application of pulsed-power devices for use in manufacturing is one of the most innovative applications in years," says Sandia President C. Paul Robinson. "The original field of high-current, high-voltage accelerators was created to serve defense needs. It is quite rewarding to see this technology used in commercial applications."

Russia, Cornell, and Sandia

How technology came together from Russia and the United States to produce a commercial beam generator is as close as most science gets to being an adventure yarn.

Says Regan, "A magnetic switch developed at Sandia and a magnetically insulated ion-beam generator developed at Cornell University, when combined to produce very short-duration pulses of very high average power, achieved effects I first noted in a Russian research laboratory in Tomsk."

The three sources were of equal importance, says Gene: the Russian lab demonstrated changes in material, the Cornell diode "doesn't blow up when used repetitively," and the San-

dia switching technology creates pulses of high average power.

The beam's ions expend their considerable energy as they strike the first few micrometers of most materials, melting their surfaces. The cooling rate exceeds a billion degrees a second and realigns the surface atoms.

Heals, hardens, smooths materials

When the beam is directed at metal tools, gears, and airplane fuselages, as well as at materials that include welds or are made of certain polymers, the improved microstructure results in healed microcracks and smoothed or hardened surfaces.

The surface treatment also protects aluminum from corrosion by better homogenizing impurities present in all aluminum alloys.

Because the process releases no effluents and uses no heavy metals or solvents, it is considered a "green," or ecologically friendly, technology.

Increasing surface longevity of metal parts helps ensure safety and reliability of the nation's aging nuclear weapons stockpile because it prolongs usefulness of electronic components that deteriorate over time.

The beam also has been shown to crosslink polymers — the large molecules from which plastics are made. A scientist at Oak Ridge National Laboratory, Eal Lee, used an ion beam to treat plastic optical lens material and found that a steel ball used to scratch the plastic was itself scratched, while the plastic was undamaged. The treatment could be used to increase scratch resistance of ski goggles or airplane windows, though a color change occurring during the process is an obstacle to commercial application.

The beam also improves bonding properties of Teflon and polyethylene to epoxy, the adhesive, from six to 20 times.

The ion beam technique is different from

ion implantation, a far more expensive process that changes the structure of materials by actually inserting ions into bombarded material at room temperature. The ion beam uses ions merely to deliver large amounts of energy to the surface of materials — causing extreme changes in temperature that effect changes in surface structure. "We use about one ion to every 10,000 used in ion implantation — about the same ratio as the costs involved," says Regan. The high-energy ions can arrive at more than 100 pulses a second — a formerly unachievable rate of energy delivery.

Says Steve Glidden, President of Applied Pulsed Power Inc. in Ithaca, N.Y.: "There are so many potential applications for the ion beam that even if 99 percent don't work commercially, there are still enough to be successful." Applied Pulsed Power is a small company involved in development of equipment for pulsed ion sources.

Quantum Manufacturing Technologies will focus on opportunities in the tool and die, aerospace, automotive, and select segments of the manufacturing and plastics industries.

An eventual application could be hardening, polishing, and corrosion-proofing of artificial hip joints. The process could increase the implant's life expectancy from 10 years to from 20 to 30 years, reducing the number of major surgeries otherwise unavoidable for physically active recipients.

The company already has seven employees. Business plans call for it, within 18 months, to employ 10 people and build a third-generation prototype. Within 2 1/2 years, it is expected to have 30 employees and have completed installation of its first customized system.

The capitalization is the largest amount ever obtained through intermediation of Technology Ventures Corporation, a Lockheed Martin subsidiary that helps convert government technology into private enterprise.

How did this repetitively pulsed ion beam technology come about?

"The question comes up, if this beam is so revolutionary, yet is a reasonably inexpensive approach to improve a wide variety of materials, why haven't others capitalized on it?" says Regan Stinnett, president and director of ion-beam technologies for Quantum Manufacturing Technologies Inc. "The answer is, because all the pieces of the puzzle didn't exist until three years ago."

In the late 1980s, Regan was part of a scientific exchange that took him to government laboratories in the former Soviet Union. In the Tomsk Polytechnic Institute in Siberia, he observed the improved hardening and extended wear properties that physicist Gennady Remnev had created by applying very brief pulses, 50 to 100 nanoseconds, of ions of a hydrogen-carbon gas to tiny surface areas of various targets. The beams and equipment were too unreliable, with too short a useful lifetime, to be more than a laboratory curiosity. (Later research at Sandia revealed that hydrogen — the lightest element, with the smallest ions — has maximum penetration, and that ion beams made of heavier elements become increasingly inefficient because thermal conduction removes heat from the material faster than it can be applied.)

Meanwhile, scientists at Cornell University, working on contracts from Sandia and DOE, had developed an ion-beam system capable of providing repetitively pulsed, intense ion beams at energy levels that matched those needed for treatment of materials according to the Russian work.

The key feature, developed by Cornell

researcher John Greenly in 1988, added an anode made of plasma, confined and positioned only by magnetic fields, to create intense pulses of ions. The method did not destroy hardware and was potentially scaleable to commercial systems. A magnetic field allows the device to be built with small gaps, creating a higher ion current density by a factor of 10,000, says Regan.

Sandia's piece of the puzzle

The third piece of the puzzle was solved at Sandia, where a single-shot ion accelerator was converted to a rapid-firing machine by employing magnetic switches capable of very fast, repetitive action. "Gas and water switches are arc-driven: they dissipate energy, tear up hardware, and only work well a few times a day," says Gene Neau, who will serve as vice president for pulsed power development in the new company.

The magnetic switches, first investigated in the late 1970s at Sandia, were installed in 1991 under Gene's direction in the huge RHEPP I accelerator. RHEPP — an acronym that stands for "repetitive high energy pulsed power" — can be used to explore applications of repetitive pulsed power for inertial confinement fusion and treatment of materials used in weapons systems, as well as for dual benefit applications in US industry.

The latest-generation ion accelerator is a much smaller version. Constructed under the direction of Gene and Regan, it fits in a medium-size room. The treatment depth of materials is controllable by varying the ion

energy and type of gas used as ion beam source, though the beam system isn't yet flexible in changing functions — "we have to reconfigure the system rather than turning a knob," says Regan.

Also, the lifetimes of the new machines are unknown, and questions about the uniformity of the beam when applied over large areas, rather than the centimeter-square areas needed for laboratory tests, are still unanswered.

"These are engineering issues that we know we can solve, not fatal flaws," says Regan. "Our customer base will share the expense of beam development, so that our national defense — which needs this technology — won't have to pay for it." He says the company already is working with other companies — they range from small to "Fortune 500" in size — to validate the applications.

Much of the "proof-of-principle" research on material modifications induced by ion beams was done by a joint team of specialists in Pulsed Power Sciences Center 9500 and Materials and Process Sciences Center 1800, says Center 9500 Director Don Cook.

Results of combining the technologies were first reported in a paper published in the 1994 Materials Research Society symposium proceedings by Regan, who led investigators from Sandia, Cornell, the University of New Mexico, and Los Alamos National Laboratory.

By 1994, Regan and Gene saw the commercial possibility in bringing together the different technologies, and in 1995, Quantum was born.

Supercomputer helps track underground waste in 3-D

Modeling complexity 'right up there' with fluid dynamics

By John German

Lab News Staff

Four hours, 17 minutes, 46 seconds — less time than it takes most Americans to figure their taxes.

That's how long Sandia's 1,840-node Intel Paragon supercomputer, among the world's fastest-operating computers, worked recently on a three-dimensional data set with millions of unknowns to arrive at an answer to an oozy problem — how far and fast, and in which direction, liquid waste migrates in a particular subterranean environment.

Sandia researchers David Alumbaugh and Greg Newman, both of Geophysics Dept. 6116, have been working on the complex problem of three-dimensional underground imaging based on subsurface electrical properties for almost two years as part of a computer modeling project funded by Sandia's Laboratory Directed Research and Development (LDRD) program and DOE's Office of Energy Research (Basic Energy Sciences) and Environmental Management (Office of Technology Development).

They say the answers the Paragon is providing may eventually lead to 3-D computer images that would help environmental remediation clean up underground contamination, hydrologists explore aquifers, mining companies map boundaries of mineral deposits, and petroleum companies site wells for maximum oil extraction.

"In the past, we've been confined to stacking a series of two-dimensional analyses on top of one another to get a three-dimensional picture of an underground environment, like a CAT scan," says David. "With the supercomputer, we've shown we can take a data set with millions of unknowns and convert it to a useful three-dimensional model that tells us what's going on down there . . . It's more precise than a 2-D model."

A speedy worker

The Paragon is such a fast worker because, unlike a typical desktop workstation that solves problems one at a time, it breaks up huge computational problems into thousands of smaller tasks and works on all the tasks simultaneously with its hundreds of processors. The technique is called massively parallel computing or, more specifically, multiple instruction, multiple data (MIMD) computing.

David helped gather the three-dimensional data for the experiment four years ago as part of his PhD thesis while at the University of California at Berkeley. Five 60-meter-deep wells were drilled at a site at UC's Richmond Field Station, one at each of four corners of a roughly 45-meter square and one at the center. Then, through the center well, 50,000 gallons of salt water was injected into a gravel aquifer 30 meters below the surface to simulate a liquid waste plume.

As a magnetic dipole source was lowered into the center well (emitting an 18 KHz sinusoidal electromagnetic wave), readings of the magnetic field's strength and direction were taken at various depths from the other four wells. Because the salt water plume's electrical conductivity differed from that of the surrounding aquifer, the readings contained information about how far and in what direction the plume had migrated from the center well, as well as about the aquifer's porosity.

Similar readings were taken before and after the injection. Each set of readings provided some 924 data points. (DOE and a consortium of oil and mining companies funded

the data-collection project.)

But the recent Sandia computations were more an experiment in computer modeling than an environmental remediation exercise, says David. The Berkeley data were used because "it was the only good 3-D data set available," he says.

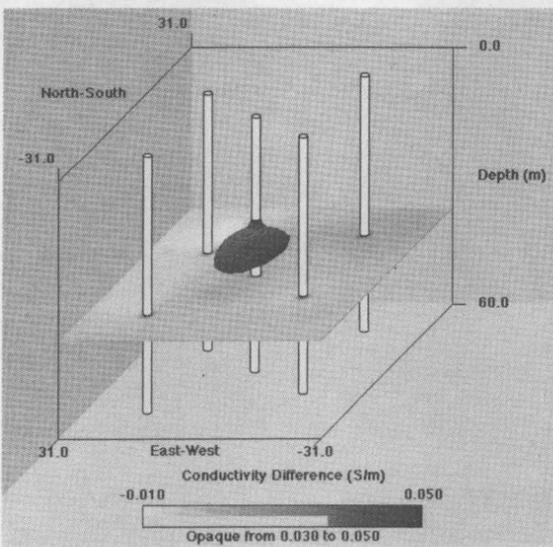
Greg and David spent the first year of the two-year LDRD modifying existing modeling codes for massively parallel computing and the second year preparing imaging codes for the three-dimensional data set. Ironically, arriving at an answer on the Paragon required only a few hours.

Cell groups assigned to processors

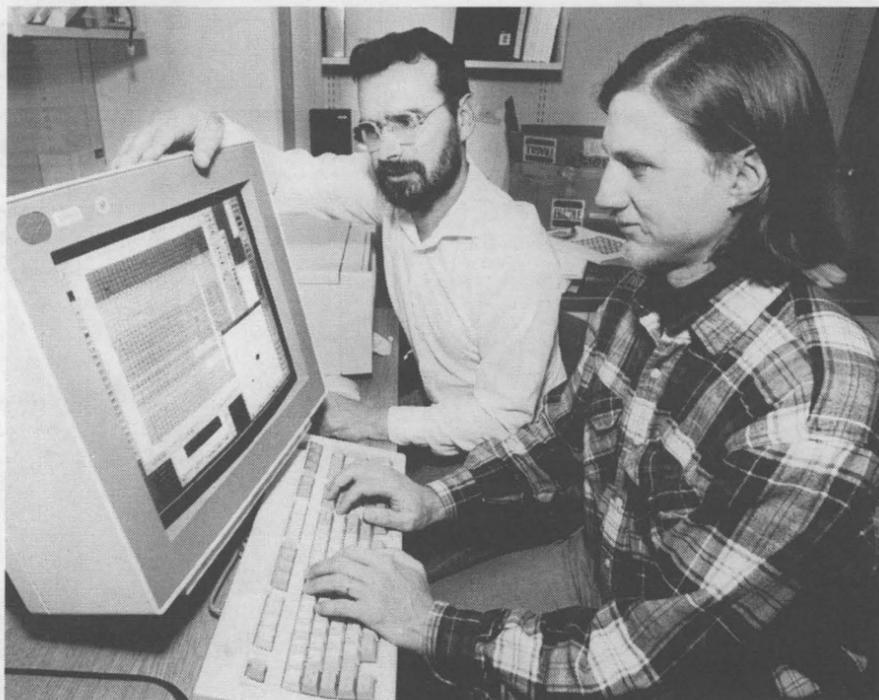
To make the data set more palatable to the Paragon, the researchers divided the underground volume into thousands of cubic cells, each cell a 2-meter (6-1/2-ft) cube. The result was a cell mesh 40 cells wide, 40 cells long, and 50 cells deep. The mesh was then divided into groups of cells, each of which was assigned its own processor.

Next, the researchers set out to develop ways of reading and writing data to and from the processors and across processor boundaries. "Data from each cell interacts with data from all the cell cubes adjacent to it — along its six faces and 12 edges," Greg explains. "For each of the 80,000 cells, we had to define how and when that cell communicated with its neighbors on different processors."

The result of two years of preparation and less than five hours of computing was three pairs of 3-D color images — one pair illustrating the aquifer's electrical conductivity before salt-water injection, one pair showing it after injection, and the third pair highlighting the before-and-after conductivity differences.



THREE-DIMENSIONAL IMAGE of the UC Richmond site showing four corner wells and a center well, through which salt water was injected to simulate a liquid waste plume. The image shows the before-and-after differences in the site's electrical conductivity; the dark spot near the center well represents the salt water plume.



FAST WORK ON A FAST MACHINE — Greg Newman (left) and David Alumbaugh (both 6116) review data from a recent supercomputing project. The two used Sandia's Paragon supercomputer and measurements of an underground waste site's electrical conductivity to produce three-dimensional images of a simulated waste plume to see how far and in which direction it had migrated.

David says the complexity level of 3-D underground waste migration modeling is "right up there" with modeling fluid dynamics, the "climbing Mt. Everest" of computing.

The modeling effort paid off in several ways. "We found that the hydrologists who had analyzed the Berkeley data were 90 degrees off about which direction the plume was migrating," David says.

Hydrologists had assumed an eastward flow based on limited well measurements, but the Paragon images clearly indicated a northward flow, probably owing to a complicated aquifer permeability structure.

Oil, minerals, and water

The project's success also may help alter researchers' perceptions about how they gather underground waste migration data. "The more data points you have, ultimately the better information you get," he says. "But 60 square meters quickly becomes a huge problem. We want to help in the design of future geological surveys so the best data sets can be collected for 3-D modeling applications."

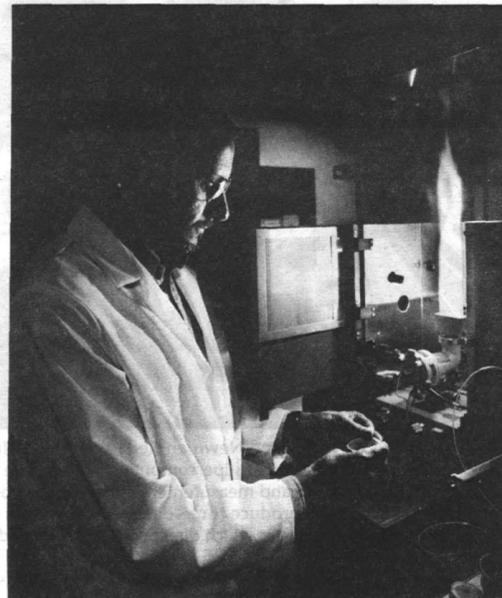
He says Sandia has helped Lawrence Livermore National Laboratory with an oil field survey and is planning to use the data-interpretation method at a simulated waste site at Idaho National Engineering Laboratory.

Ultimately, they hope the project and others like it will be useful for measuring high permeability zones (to aid in oil recovery operations and hydrology studies), as well as for mapping mineral deposits (which tend to be more conductive than their host rock).

The two delivered a paper about the modeling part of the project — titled "3-D Massively Parallel Electromagnetic Inversion" — during Supercomputing '95 in San Diego in December. Greg says the presentation was well received. "We heard a lot of good comments," he says.

Other Sandians involved in the project included Ed Barsis (now retired), who David says is "always looking for supercomputer applications"; John Shadid (9226), who coordinated 9200 participation in the project and assisted Lydie Prevost and Ray Tuminaro (both 9222), who helped develop the 3-D modeling codes.

"This project really pushed the envelope on what we can do with the supercomputer," says David.



CHEMICAL ANALYSIS — Mike Courtney (14466) uses an atomic absorption spectrometer to conduct chemical analyses of neutron tube target and sources. Here the flame from the spectrometer is visible. A broad range of chemical analyses are used to support neutron tube and generator processing.

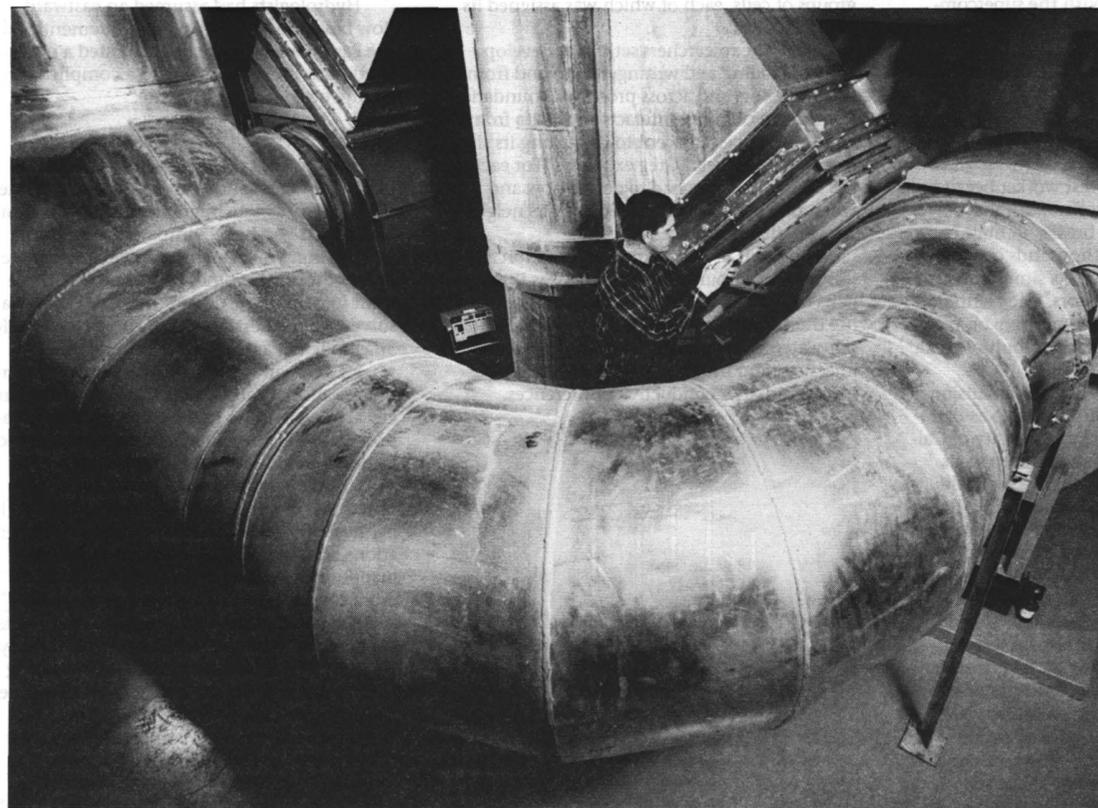


BAKE STATION — Mike Lopez (14483) makes adjustments at a neutron tube bake station. The high vacuum bake station is used to thermally treat and evacuate neutron tubes before the final pinch-off (sealing) occurs. The process is critical to ensure the long-term reliability of the tube.

Photography by Randy Montoya



PASSING THROUGH — Ruth Bargman-Romero (1484) uses a "pass-through box" to move a mold from assembly into encapsulation, eliminating the need for gowning when transferring a product into a restricted area.



EXHAUSTING SYSTEM — Sean Knighton (14466) examines the dedicated tritium exhaust system that supports the tritium envelope process areas. The once-pass-through air is 100 percent hepafiltered before being released to the environment. The large ducts and fan motors shown here are part of the exhaust system.

Neutron Generator Facility opens, marks a major milestone of new production mission

Remodeled 'cookie factory' will manufacture neutron tubes, generators

By Bill Murphy

Lab News Staff

They don't make cookies — the round silicon wafers used for microcircuits — there anymore, but the old "cookie factory," Bldg. 870, is back in the production business. The 91,000-square-foot Neutron Generator Facility, which emerged out of the remains of the cookie factory in a \$25 million remodeling/rebuilding project, was officially dedicated in an April 11 ceremony.

Scheduled VIP attendees included Labs President and Director C. Paul Robinson; US Sen. Pete Domenici (R-N.M.); Vice Admiral Dennis Jones, USN, Deputy Commander in Chief, US Strategic Command; Major General Al Joersz, DOE's Principal Deputy Assistant Secretary for Defense Programs; and other representatives from military and government organizations.

Sandia was assigned production responsibility for neutron tubes and neutron generators in the fall of 1993. Neutron tubes and generators are vital components of US nuclear weapons and they must be replaced periodically.

As Chuck Loeber (formerly DOE/AL, Weapons Quality Division) has written: "After the Cold War ended, the DOE complex no longer needed to be as large as it had been. There would be no new weapons production . . . [A DOE/AL reconfiguration study] recommendation was to close Mound, Pinellas, and Rocky Flats."

Sandia has always had design and prototyping responsibility for neutron tubes and generators, but the production had previously been carried out at DOE's Pinellas (Fla.) facility. When Pinellas closed, personnel, equipment, and inventory were moved to Sandia to help the Labs carry out its new tasks.

Larry Pope, Manager of Analytical Services Dept. 14466 and a Sandia representative on the DOE/AL reconfiguration study, credits the former Pinellas personnel with making

the transfer of production responsibilities as smooth as it has been.

"We identified 87 [Pinellas] positions that entailed critical skills we needed if we were to succeed in this mission," Larry says. "We successfully recruited 84 people — and all the critical skills. Those folks are here now and by and large, they've been very enthusiastic about the move. They've been vitally important to what we're trying to do here and are a major contributing force to the fact that we're on schedule with this process."

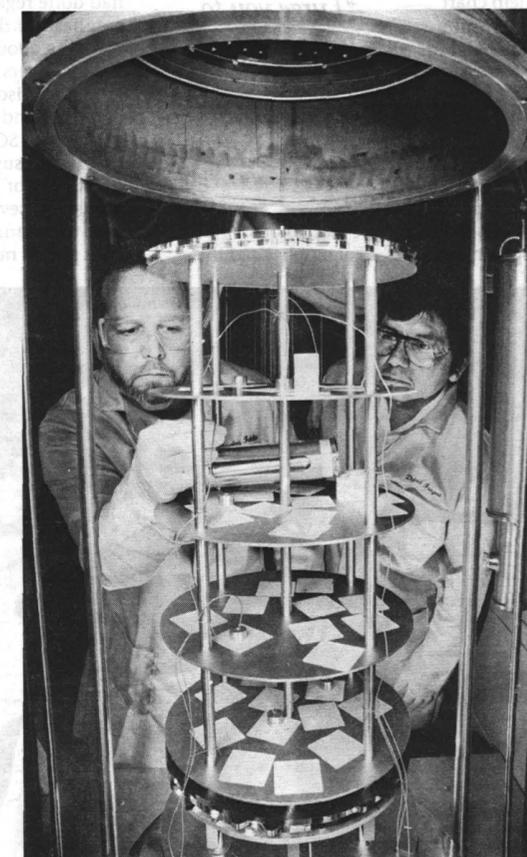
The schedule Larry refers to has been a demanding one. Consider: The building project was authorized in September 1993, shortly after Sandia was handed the production mission. The building design was approved in June 1994, with contracts awarded in September 1994. The general contractor, Henderson Construction, completed the facility in January 1996, 30 days ahead of schedule and within budget.

While the new construction was progressing, Defense Programs Products and Services Division 14000 was simultaneously gearing up for its production mission. Design work on a next-generation neutron generator and tube proceeded in parallel with construction. Sometimes, the construction was literally occurring side by side with design and prototyping work.

"We actually moved into the east annex [wing] a year ago," Larry says, "and into the west annex last August."

"The whole process," Larry says, "has been a tribute to the cooperation among the user [Division 14000], Facilities [Center 7900], and the contractor [Henderson]."

"The challenge has been to keep to the neutron tube and generator production schedule while making this major move. We — Sandia — have done that. We're on the same schedule [for the new tube and generator] as we would have been if production had stayed at Pinellas."



HYDROGEN BRAZING FURNACE — Doug Foldie (left, 14483) and David Fragua (14483) prepare neutron tube subassemblies for joining in a computer-controlled and electrically heated hydrogen furnace. The hydrogen atmosphere eliminates oxidation of metal piece parts.



IF IT WERE EASY, anybody could do it! Sandia managers were asked to do lots of intense thinking at the all-managers' conference. However, at last report, neither this unidentified fellow nor any other managers strained anything severely during the two-day event.

Labs managers

(Continued from page 1)

gathering in recent history. It was titled "Sandia 2000: United for Success."

More than 700 Labs managers and directors and the leaders of the three unions representing Sandia employees joined President Paul Robinson and the VPs to help chart the course for the Labs' future and to figure out ways to work more effectively and more efficiently. Comments about the future from three very frank guest speakers provided lots of fuel for the discussions.

In opening remarks, Paul emphasized the

"I urge you to try to manage your groups as if you had no power whatsoever."

need for strong teamwork throughout the Labs and better leadership from the management team. "I've always put more faith in leadership than in management," he said. "I urge you to try to manage your groups as if you had no power whatsoever."

Paul said he hoped the conference would be a step in building a road back toward a more tightly integrated management team. He asked, "How did we lose the ability to team as they did in the Manhattan Project? That was probably the supreme example of teamwork."

Fundamental questions explored

The managers explored six fundamental questions that were prepared and discussed before the conference by the Sandia Quality Leadership Council (SQLC — the Labs' vice presidents, president, and several key directors).

The six questions explored the relative emphasis the Labs will place on our various missions, the importance of working with industry and how industry money can be used to help fund work of mutual interest, the importance of partnering with other public and private institutions, workforce stability questions, our internal business structure, and how we can improve the Labs' effectiveness and efficiency by adopting private-sector-like business practices while continuing to operate primarily with government funding.

SQLC representatives in a panel discussion Tuesday morning provided their thoughts about some previous planning they had done regarding these questions. They emphasized they took a 20-year approach to thinking about the Labs' future. After that, the managers broke into eight "town hall" groups to discuss their reactions to the SQLC planning and provide their own perspectives back to the SQLC representatives. The participants also suggested additional fundamental questions for SQLC to consider. The SQLC reps spent several hours that evening poring over the managers' input and responded back to the managers the next morning.

"How did we lose the ability to team as they did in the Manhattan Project?"

Robinson & Crawford pleased, encourage employee input

President Paul Robinson and Executive VP John Crawford were both pleased with the managers' meeting. "Jo Ann Romero, Phyllis Owens, and all the team members did a marvelous job," John said. "And the managers worked hard and effectively. I'd rate it as an outstanding success."

Paul said, "Spending two days with the complete management team discussing how we build our future was a great experience. The next step is to iterate our goals, get more specific about the targets we're aiming for in the future, and — most important — for managers to discuss this information with the full Sandia staff and capture their wisdom." (The SQLC plans to complete its list of strategic objectives by the end of May. Sandians should check with their managers and watch for more published information about how all employees can provide input.)

Dialogue about the questions continued in several forms and forums throughout the second day. In the end, the managers' input and suggested actions will be used with further input from employees as key ingredients by SQLC for the next set of Sandia strategic objectives.

Suggestions offered to every division

In a final exercise, all managers (in groups of eight) provided feedback to each Sandia division about how their current practices are perceived. After that, each division's managers met as a group to review and discuss the feedback they received, and to give their commitments for improving working relationships across the Labs.

At *Lab News* deadline time, the conference proceedings was being prepared, with a draft due out in the next few weeks. The April 26 *Lab News* will cover conference conclusions and recommendations and managers' comments about the conference.

"Sandia 2000" was cosponsored by Business and Leadership Development Dept. 3526 and the Sandia Managers' Forum, which originated the idea. Jo Ann Romero (3526 manager) chaired the program design team, and Phyllis Owens (3526) chaired the logistics and support teams. — Larry Perrine (12620)

Sandia Labs Week of Caring

Come join us for Family Day!
April 20, 1996
8 a.m.-5 p.m.

Martineztown House of Neighborly Service

A nonprofit Albuquerque social service agency serving at-risk youth and senior citizens

Activities available for the whole family:
Painting, planting, building, repairing.

For further information, contact
Paul Grandon: 272-7615
e-mail: pdgrand@sandia.gov



SANDIA MANAGERS at last week's managers' conference enjoy a lighter moment during a serious talk by consultant Bill Scherer about creating teams and partnerships. He stressed that truly successful teams have open, candid communication and common goals that all members understand and support.

Teams develop 'integrated' job structure system

New employee job classification system retains distinctions between technical, administrative functions

By the end of the calendar year, most non-represented Sandians — technical *and* administrative — will probably be classified in their jobs based on a new set of criteria designed to simplify and streamline the classification process. The new "integrated job structure" criteria, and the processes by which they are applied, are intended to be more objective, more accurate, more equitable, and more reflective of the outside marketplace than current criteria, says Ed Cassidy, Manager of Compensation and Job Evaluation Dept. 3545.

The criteria are being developed by a joint administrative/technical job restructure team. The two teams — the MLS (Member of Laboratories Staff) Restructure Team and the Technical Job Structure Committee — began their work independently but both had the same goal: to address shortcomings — real and perceived — in Sandia's current job classification processes (*Lab News*, Nov. 10, 1995).

The Technical Job Structure Committee was formed to address a requirement in the new operating contract that "all jobs shall be described, evaluated, and placed into a structure using a job evaluation system acceptable to the Contracting Officer." The MLS Restructure Team resulted, in part, from a reengineering initiative based on Red Team recommendations.

In the course of their work, the two teams came to realize that many of the issues they were grappling with were common to both the technical and administrative sides of the house. "There was a growing sense that we needed to be talking to each other," says MLS Restructure Project Team Leader Kirsten Randolph (3545).

'Integration is in the processes'

That realization led to the development of a proposed "integrated job structure." Although on first hearing the term, you might conclude that this "integration" eliminates distinctions between technical and administrative jobs, that is "absolutely not the case," says team member Rod May, Manager of Customer & Business Development Dept. 9706. "The new structure recognizes that there are fundamental differences between technical and administrative jobs. It doesn't try to shoehorn all jobs into one classification structure. That would be impossible," Rod says.

Rather, he explains, "the meshing — the integration — is in the processes."

The new integrated job structure, Rod says, "involves a shift in the way we think about job classification and career tracks at Sandia. But we think people will like it."

The integrated job structure is supported by common philosophies and processes that will allow for more similar treatment of Sandia's administrative and technical employees. For example, there will be similar movement, reclassification, and advancement processes. There will be no restrictions on who can bid for job vacancies — although bidders will be responsible for specifying how they meet the posted job requirements.

The new structure creates career "ladders" — a Technical Staff ladder, a Technologist ladder (formerly Technicians), an Administrative Staff ladder, and a Management ladder. On each ladder are a number of rungs. In principle, each Sandia employee can be appropriately placed on one of the rungs of the appropriate ladder. The ASA classification is not part of the current restructure effort; however, application of the same philosophies and processes could be considered for the ASA classification later.

A presentation for managers about the Integrated Job Structure will be made at the next Managers' Forum, April 25, 2-4 p.m. in the Building 962 auditorium (Room 1402). Seating is limited. Contact Sharon Trauth (844-1957) or Russ Skocypiec (845-8838) for more information about the Managers' Forum. Presentations for nonmanagement employees on the integrated job structure proposal are being planned.

MLS Restructure Team member Ashley McConnell (3545) says the new integrated job structure is based on the recognition that managers require the most effective tools possible if they are to be held accountable for the business implications of their classification decisions. The new structure incorporates a set of tools to help managers satisfy the expectations of accountability for their decisions. One such tool, Ashley says, is a set of "Level Criteria," one for each career ladder — Technical Staff, Administrative Staff, and Technologist. The criteria establish a scale to distinguish the different levels in skills, knowledge, and abilities. These levels define "floors," or minimum criteria, that will help managers place employees on the appropriate rung of their classification ladders.

The second tool is an Occupation Guide that contains "working as" occupations to which all employees will be coded. These are brief, market-driven descriptions of occupations in which individuals spend the bulk of their working time. "Working as" occupations will provide the system with the important salary link to the external market. These occupations are clustered into groups called "job families" — financial, science and research, or information systems, for example — a shorthand way of guiding managers to the appropriate area of the Occupation Guide.

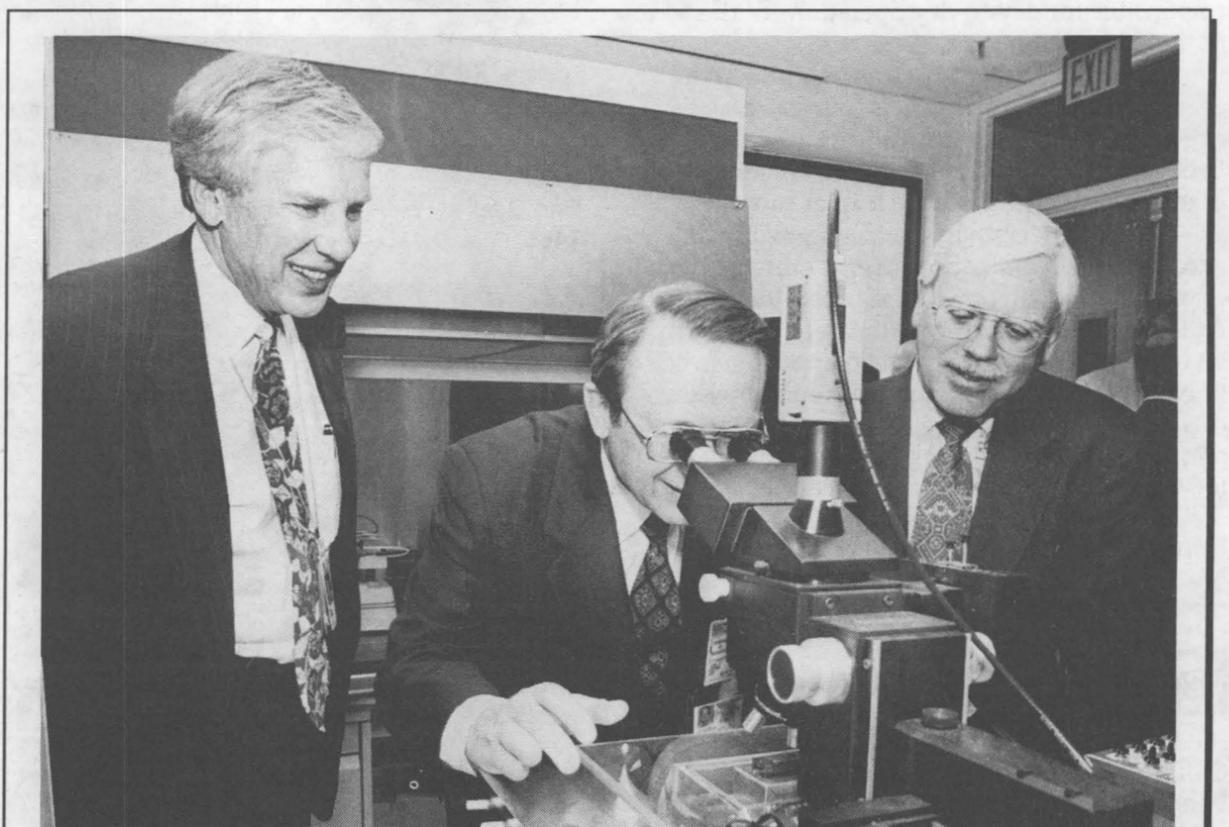
Here's a hypothetical example of how the process will be applied when managers begin using the system next fall: A manager has on her staff someone performing financial work. In the Occupation Guide the manager locates the "Financial" job family, reviews the "working as" occupations and determines which one best describes the employee's work. Using the "level criteria" the manager deems that the employee's responsibilities are such that he should be placed on a particular rung of the Administrative Staff career ladder. The appropriate use of the tool set, Ed says, should ensure that Sandians performing the same kinds of work are placed in the same occupations. The Job Evaluation staff would only be consulted if managers had difficulty in finding the right occupations in which to place an employee.

No salary adjustments at this time

Although some Sandians may find themselves on a new rung of their career ladder, no salary adjustments will be made at this time. Frequently a job restructure results in a recalibration of an employee's current work in relation to work performed by peers. "This process has everything to do with making sure that all Sandians are properly placed [on the ladder]," Ed says.

The new integrated job structure will be pilot-tested this spring, says Technical Job Structure Committee Project Leader Shirley Emin (3545). That piloting, Shirley says, will give a representative group of managers — organizations from across the Labs will be involved — a chance to try out the job structure tools. The pilot is a "dry run." It will be invisible to the employee. Its purpose is to serve as a "validity test" for the placement tools, says Mary Kay Austin (7900), a member of the MLS Restructure Team.

Based on the results of the pilot test and comments from managers, Mary Kay says, the restructure teams will fine-tune the tools in anticipation of implementing the system Labs-wide before the end of the calendar year.



VIEWING MICROTECHNOLOGY — Vance Coffman, Executive Vice President and Chief Operating Officer of Lockheed Martin Corporation, uses a microscope to view one of Sandia's famous microengines during a tour of the Microelectronics Development Laboratory on March 29. Labs Director C. Paul Robinson, left, and Bob Eagan, VP of Electronics, Materials Research, and Components Div. 1000, right, accompanied him on the tour. Coffman spent a day at Sandia meeting with Labs officials and hearing briefings on a variety of technical work, including high-performance computing, synthetic aperture radar, electronics quality/reliability, microelectronics, and ion-beam fusion.

Sandia forges partnerships with regional universities

Sandia strengthens links to NMSU, New Mexico Tech, UTEP

By Kathy Kuhlmann

Media Relations Dept. 12621

Mix some Sandia top brass, a couple of academic alliances, and some hands-on regional support and the result is a program that's being touted as a model for future ventures between Sandia and academia.

The Sandia/University Partnership program was formed in 1994 to encourage collaborative efforts between Sandia and regional universities. The program, an outgrowth of earlier, ad hoc work with these universities, provides a focused approach to blending the resources of the Labs and schools.

Significant first-year accomplishments include establishment of a Future Aerospace Science and Technology Center at the University of Texas at El Paso (UTEP) to study the effects of aging on aircraft structures.

The unique management structure of the partnership program provides a link between the universities and Sandia top management, representing a strong commitment from Sandia's leadership. This, combined with a regional Sandia presence, provides a direct avenue to Sandia resources and an open communication link between partners.

The program began with an alliance between Sandia and New Mexico State University (NMSU) in Las Cruces. It was expanded to include UTEP and the New Mexico Institute of Mining and Technology (NMIMT) in Socorro. There are partnership offices on all three campuses.

Sandia VPs oversee program

Dan Hartley, VP for Laboratory Development 4000, has executive responsibility for the overall Sandia/University Regional Partnership as well as for the NMSU partnership. Heinz Schmitt, VP for Weapons Systems 2000, oversees the Sandia/UTEP partnership. Joan Woodard, VP for Energy and Environment 6000, has assumed responsibility for the NMIMT partnership. Dan Arvizu, Director of Advanced Energy Technology Center 6200, is responsible for day-to-day operations of the entire partnership.

A panel of Sandia directors provides management oversight and access to resources needed to make the partnerships successful. Each of the universities has a panel made up of academic leaders to provide similar support.

"This partnership has helped us evolve an excellent model for Labs/university interaction, clear executive interfaces, and Labs-wide participation," says Dan Hartley. "I plan to team with several other VPs to develop a comprehensive university relations program that encompasses this regional model as well as our recruiting program, research funding programs, and focused strategic academic alliances."

Dave Hasti (6202) is manager of the Sandia/University Partnership Regional Office, located in

Las Cruces, and is the on-campus director at NMSU and UTEP. Larry Teufel (6202) is the on-campus director of the Sandia/NMIMT partnership.

Dave says establishing a partnership office in close proximity to the universities and having specific individuals assigned as on-campus directors has "shown a real sense of commitment to making this program work. We're out here with these people, representing Sandia's interests and resources."

"The program has been enormously successful. Both Sandia and our academic partners seem to recognize the potential and opportunity that the partnership presents and go out of their way to make it work."

Says Heinz, "The partnership with these universities is strategic to Sandia mission success in university relations, economic outreach, and diversity. The personal contributions and frequent contact in the field are crucial elements to the success. This is another example where experimenting and prototyping has paid off."

The Sandia/University Partnership Regional Office works closely with Sandia's Diversity Leadership, Education Outreach, University Collaborative Research, and Technology Transfer organizations.

The new Future Aerospace Science and Technology Center at UTEP is funded by the Air Force Office of Scientific Research. Collaborative research with Sandia was an incentive to locate the center at UTEP. In addition, Sandia and Hewlett Packard partnered with the College of Business Administration and Economics at NMSU to create a pilot team learning center, used by faculty, administration, and small business for planning activities.

'Major step forward'

The Sandia/University Partnership program has been a "major step forward in our work with universities," says Dan Arvizu (6200), who is responsible for its day-to-day operations. "The partnership program has provided us with a way to manage these relationships at a corporate level."

"These schools are known for their research strengths and high-caliber students," says Dan. "In addition, each has a specialty focus that we have been able to benefit from. The universities, in turn, profit from the tremendous resources available at the Labs. The three components provide a way to measure the success of the program to all parties."

The NMSU partnership centers on research and development in engineering and physical sciences, manufacturing, and business assistance. Work with UTEP concentrates on manufacturing outreach, research in engineering and science, and international business and environmental improvement assistance in support of US companies and the North American Free Trade Agreement. The NMIMT association focuses on oil and natural gas technology, explosives and energetic materials, and environmental engineering and sciences. All of the regional partnerships have a strong interest in minority education.

Recent Retirees



Don Odell 44
1486



Cal Sifre 33
7433



Bruce Wickesberg 40
2674



Ed Smith 28
2645



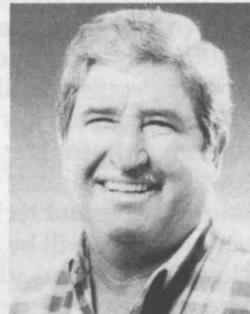
Von Madsen 36
1567



Jim Myers 32
1481



Glenn Riggins 39
2663



Frank Comiskey 41
7611



Zora Freeman 20
7435



Virginia Padilla 27
12300



Larry O'Connell 39
1531



Gay Dybwad 27
1411

Welcome

New Mexico — Elizabeth Bell (9651), David Clifford (9427), Janet Mitchell (6821), Dirk Vanwestrienen (4411)

California — Michael Tebo (4612)
Georgia — Peter Sholander (9417)

Congratulations

To Lauren Dyer and Dave Swahlan (5511), married in Albuquerque, March 16.

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

MISCELLANEOUS

HOOKED ON PHONICS, \$150; TV teddy & videos, \$40; unicycle, \$50. Baca, 867-5402.

ELECTRONIC WIZARDS SPECIAL, Realistic stereo receiver, 50W/ch, bad preamp, otherwise good, repairable, says Hudson's Audio, \$20. Harrington, 292-1458.

MARSHALL JCM 800, 100-watt lead head, \$450 OBO; Marshall 2x12 speaker cab Celestion speakers, \$200 OBO. Cerutti, 292-0186, ask for Steve.

DROP-IN RANGE/OVEN, 4-burner, Magic Chef, for RV, new, in box, \$300 OBO. Harrison, 821-9099.

MOWER, Craftsman, rear bag, 20-in., used twice, \$150; Southwestern-style butcher block, \$100. Foflygen, 294-9768.

RAILROAD TIES, 9-ft. long, great condition, paid \$9.50 ea., asking \$8 ea. OBO. Schultz, 275-9349.

EARACHE PAIN RELIEVER for children, in original box; Disneyland Paris stereoscope w/40 3-D pictures. Wagner, 823-9323.

L-SHAPED SECTIONAL SOFA, 17-ft. long, newly upholstered, brown/tan striped, \$400. Binasiwicz, 857-0057, ask for Cindy.

HANDMADE BRUSSELS LACE TABLE-CLOTH, napkins, 52-in. round, \$150; Victorian armchair, off-white, excellent condition, \$450. Frames, 344-6451.

WICKER COUCH, chairs, end tables, foot rest, table, all \$300; dining table, w/4 chairs, \$150. Shin, 899-2291.

RIFLE, Rem ADL, 30-06, glass bedded, weaver 4X, sling, recoil pad & case, \$390. Norton, 294-1538.

THULE rack w/locks, gutter mount, mid-to-full-size vehicle, \$100. Madrid, 891-1509.

STEREO CD PLAYER, Craig, in-dash, pullout, 50-watt, programmable, \$95; AMD 120MHz CPU (Pentium-75 performance), 16kb L1, w/fan, \$70. Marshall, 293-3207.

WASHER & DRYER, Maytag, good condition, \$100; Sears chest freezer, good condition, \$50. Sherman, 292-3297.

MIG WELDER, Hobart Handler, like new, w/tank regulator, hood, paid \$890 new, asking \$675. Perryman, 281-3020.

UPRIGHT FREEZER, Westinghouse, 21 cu. ft., \$280; Sears Lifestyle, 3500ps treadmill, \$350; exercise bike, \$80; microwave, \$80. De La Rosa, 898-0424.

RV ACCESSORIES: TV antenna, Winegard Road Master 2000, \$70; hydraulic camper jacks, \$60 ea.; air conditioner, 13,500 Btu, \$300. Jones, 883-1284.

DOOR, combination storm/glass/screen, self-storing, 32 in., white, \$30. Luikens, 881-1382.

TWIN BED, Somma II, complete, like new, \$100. Graham, 865-9427.

TREADMILL, Health Trak Plus, your pace, like new, paid \$100, asking \$60. McCirk, 884-4592.

WOMAN'S WATCH, quartz movement, "Noah's Ark" set w/marquisite stones, very unique, worn 3 times \$40. Wilson, 293-2228.

COUCH & LOVESEAT, w/oak trim, hunter green & mauve, matching coffee table & end tables, antique claw legs, \$1,600; woman's 25-in. 10-spd. \$80. Hardison, 271-2838.

PRINTER, Star 1000, 9-pin, IBM-compatible, good condition, w/cable, ribbon, paper, \$40. Duvall, 881-4406.

BED, twin bed w/sturdy mattress & butcher block style, \$80. Jones, 856-1837.

DUAL CASSETTE TAPE DECK, Technics, almost new, \$90. Hill, 856-6423.

AUTO PISTOL, Firestar .45ACP, subcompact, like new, in box w/papers, three magazines, \$430 OBO. Salmen, 881-8612.

COMPUTER, APPLE II C+, Image Writer II printer, 2 disk drives, color monitor, \$175. Sanchez, 897-4514.

FENDER JAZZ BASS SPECIAL, fretless, pearl white, J/P pickups, w/hard case, \$440 OBO. Kureczko 281-8206.

NORDICTRACK PRO, w/electronic pkg. & adjustable incline, new \$600, excellent condition, \$450 OBO. Roth, 828-0730.

MITSUBISHI COLOR TV, 19-in., \$35; 13-in. B&W TV, \$10; both work fine; lamp, 34-in., w/shade, \$10. Cocain, 281-2282.

LIVING ROOM FURNITURE, matching peach sofa, loveseat, chair & 2 ottomans. Adams, 299-6337.

LAWN FERTILIZER SPREADER, centrifugal-type, like new, \$10. Burch, 857-0654.

YAMAHA CLAVINOVA, CVP5, new \$3,000, \$1,200 OBO. Westfall, 884-8701.

FULL-SIZE MATTRESS and box spring, w/frame, \$75. Petruno, 843-7627.

UNIVERSAL GAS RANGE, '40s vintage, 4-burner top, w/griddle & original manual, excellent condition, \$550. Jordan, 299-4004.

CRIB-N-BED, Childcraft, honey oak, \$500; Kolcraft stroller, \$80; both new, still in original boxes. Turner, 294-0846.

MAPLE DRESSER, 5-drawers, 30" x 42", \$45; drafting table, \$30. Bogdan, 883-8615.

PEDESTAL DINING TABLE, oval, smoked glass, 4 upholstered pedestal chairs, \$50. Schreiner, 266-6020.

GARAGE SALE, April 13-14, starting at 8 a.m., washer/dryer, free swingset, 2228 Skybrook Dr. NW, off Unser/98th. Jean, 833-2165.

COLT CAR-15, .223 cal., Colt 3x scope, collapsible stock, pre-ban, extra magazines, case, \$1,200. Roth, 344-7060.

SEWING MACHINE, Bernina 830, excellent condition, w/all attachments, \$400; tow bar for VW Bug or Ghia, \$50. Blaine, 299-1036.

ELECTRONIC PIANO, \$900; Schwinn 27-in. man's, 10-spd., \$60; Huffy 26-in. woman's 10-spd., \$50. Newby, 296-8264.

ARTS AND CRAFTS FAIR, at LaCueva High School, April 27, 9 a.m. to 4 p.m. Ekman, 296-3758.

WEIDER HOME GYM, never used, still in box, \$125. Grumblatt, 294-4738.

CEDAR FENCING, 70-ft., 6-ft. dog-eared cedar, excellent condition, heavy-duty gate, almost new, cost \$450, make offer. Field, 890-6523.

WATER BED, king-size, heavy wood frame, \$25. White, 255-9586.

GOLF CLUBS, Ping Zing, black dot 1&3-SW, great shape, new grips, \$350 OBO. Whitaker, 296-3424.

ULTRASONIC HUMIDIFIER, Holmes HM-460, used 1 season, needs filter, in original box, \$30. Miranda, 293-8644.

LUNA PRO, by Gossen, 1 owner, 1973, prime condition w/original leather case, \$75. Lenfest, 292-5780.

MATCHING SOFA SLEEPER and loveseat, earth tones, \$125. Newcom, 293-5180.

STAINLESS STEEL SINK, \$20; imitation-marble cabinet top, sink, vanilla, 57-in., \$20; indoor soccer shoes, 9M, \$15. Biffle, 293-7043.

WOOD FOLDING CRIB, Cosco travel play pen, Evenflo exer-saucer; Tunturi rowing machine, like new, \$50. Skinner, 275-1462, evenings, ask for Donna.

COUCH, gold-floral pattern, good shape, \$100 OBO. Owen, 294-8149.

ENCYCLOPEDIA, '95 New Book of Knowledge, 21 volumes, only full-sized set designed for school-aged children, \$450. Cole, 275-7126.

COMPLETE RC PACKAGE, plane, radio, engine, tested, real sharp, \$350; Super Skybolt, w/ST 71, \$200. Savage, 837-2692.

FUTON, full-size, w/frame, excellent condition, \$150. Hachigian, 262-0331.

MICROWAVE OVEN, \$75; 3-cu. ft. refrigerator, \$125; manual push mower, \$50; papa-san, \$50; Toyota radio, \$20. Bonzon, 828-1066.

SKILSAW, worm-drive, w/case, \$75; Stanley router, w/accessories, \$65; Shakespeare electric trolling motor, \$35. Wright, 296-3850.

TOOLBOX, Truk Mate by Delta, for back of pickup truck, \$75. Franzak, 857-9718.

CLARINET, Bundy, woodie, good condition, \$150; trombone, good condition, \$150. Aragon, 888-3473.

'88 FORD PICKUP ACCESSORIES: Diamond Plate running boards, \$50; dash cover, tan, \$10; bug shield, \$10. Ritchey, 299-7082.

FURNITURE: 2 sofas, dresser, chest of drawers, stacking rattan end tables; Schwinn Airborne. Lange, 856-1952.

WAVELESS FLOTATION MATTRESS SYSTEM, recliner, table/floor lamps, pictures, twin bed, radial tires, motorhome shocks, porta-a-crib, high chair. Fisher, 881-8072.

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

Ad Rules

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

CAMERA, 35mm Canon T50 SLR, programmed AE, 80-200 zoom lens, case, flash, manuals, cleaned/serviced, \$195. Wilson, 865-1406.

EXERCYCLE, good shape, \$25; mini-trampoline, \$15. Duliere, 296-4785.

GOLF CLUBS, new RH Crown Vipers, 3-SW, \$200; LH metal woods, (1, 3, 5), bubble shafts, \$180. Stauder, 898-0597.

LEADING EDGE COMPUTER 80286, 40MB HD. \$200 OBO. Sjaardema, 299-8042.

HEALTHRIDER, (new) to trade for good Schwinn Airborne; York 2001 weight bench, \$200; twin bed, \$75. Maddox, 298-3815.

TRANSPORTATION

'90 PONTIAC TRANS AM, white, 16K miles, excellent condition, 305 V8, AT, AC, stereo, NADA retail. \$12,100 OBO. Berg, 898-2100.

'94 DODGE CONVERSION VAN, high-end conversion & standard pkg., TV, VCR, well-maintained. Gonzales, 299-3491.

'90 DODGE D-250, 3/4-ton, 4x4, 360 c.i., 4-spd., AC, AM/FM cassette, all service records, 84K miles, excellent condition, \$7,500 firm. Szklarz, 292-3995.

'88 FORD TAURUS, V6, 58K miles, clean, bronze, 4-dr., \$4,100 OBO. Randolph, 299-2057.

'85 VOLVO 740 TURBO, 94K miles, new transmission, muffler, tires, excellent interior, \$6,500 OBO. Blickem, 323-9145, after 5 p.m.

'90 TOYOTA 4RUNNER, SR-5, 4-dr., 4WD, V6, AT, gold/tan, 65K miles, \$15,000. Grazier, 292-7926.

'85 TOYOTA PICKUP, 4x4, AT, new AC, battery, belts, hoses, 127K miles, runs great, must sell, \$4,900 OBO. Cooper, 881-2806.

'88 FORD BRONCO II, excellent condition, \$5,500. Neil, 291-9760.

'69 CHEVELLE SS 396, silver, must see, hot car, \$8,000 OBO. Pate, 299-4319, ask for Michael.

'93 TOYOTA, 4x4, X-cab, V6, AC, cruise, many extras, 37.3K miles, excellent condition. \$16,150 OBO. Caddell, 828-4603 or 239-4219.

'95 CHEV. BLAZER LT, 4WD, 4-dr., leather, fully loaded, \$24,500. Winter, 899-2198, ask for Denise.

'86 FORD BRONCO, full-size, 4WD, runs well, good tires, new belts, \$6,000. Martinez, 281-7058.

'82 CHEV. S-10, w/camper, blue/white, great condition, \$2,200 OBO. Atencio, 284-3522 days, 867-3786 evenings.

'94 LAND ROVER DISCOVERY, 21K miles, 4x4, 5-spd., V8, ABS, air bags, warranty, beautiful, \$26,500. Alvin, 294-5170.

'95 JEEP GRAND CHEROKEE, Laredo, 4-dr., 4x4, 4L, 6 cyl., 4W-ABS, loaded w/extras, factory & extended warranty, 24K miles, \$23,500 OBO. Heise, 275-0099.

'68 MUSTANG, AT, 4K miles, rebuilt 289 engine, runs but needs work, \$950. Gibson, 877-9457.

'80 MERCEDES 450SEL, gold, leather interior, sunroof, runs well, \$6,900. Friday, 243-1078.

'91 TOYOTA COROLLA DX, 4-dr., high mileage, impeccable, repair records available, \$7,000 firm. Dingman, 298-5800, leave message.

'86 MUSTANG GT, 5.0 HO, 5-spd., white w/black accent, tinted windows, 85K miles, \$4,850. Anderson, 281-4539.

'81 CHEV. CONVERSION VAN, excellent condition, dual AC, captains' chairs, fold-out bed, 115K miles, clean, \$3,995. Black, 281-9016.

'91 TOYOTA, 4x4, extended cab, 70K miles, all w/factory options, completed dealer recommended maintenance, \$14,400. Amundson, 866-1300.

'90 CHEV. CAPRICE CLASSIC, small V8, fuel injected, AT, AC, 68K miles, \$5,100. Martin, 343-9719.

'92 FORD RANGER XLT, 38K miles, V4, 5-spd., silver, tint, excellent condition, original owner, must sell, \$7,000 OBO. Oakes, 293-4034.

'92 SATURN SL-2, 4-dr., 39K miles, completely loaded, CD player, 5-spd., excellent condition, \$10,250 OBO. Mancuso, 275-9225.

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

'95 PLYMOUTH NEON, black, AC, 5-spd., cruise, alarm, 14K miles, AM/FM cassette, 2-dr., PB, PS, \$10,800. Romero, 291-8713 or 821-9743.

'78 FORD, step-side camper shell, 300-CID, 3-spd., AM/FM, new tires, new paint, 74K miles, great shape, \$2,900 OBO. Martinez, 296-9035.

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

'67 FORD LTD, perfect for restoration, \$2,000 OBO. Estill, 883-1531.

'90 MUSTANG GT, AT, AC, cruise, alarm, sunroof, PW, new tires, 98K miles, \$8,995. Jelinek, 898-4997.

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

RECREATIONAL

'79 MOTORHOME, 23-ft., low mileage, 350 engine, roof air, sleeps 6, rear bath, GMC chassis, \$7,950. Sifford, 869-3982.

BOAT, 15-1/2-ft., Terry bass boat, 25-hp, Mercury motor, tilt trailer, \$1,200. Weirick, 298-2153.

'85 VIKING POP-UP TENT, sleeps 6, \$1,125; 2 boy's bikes, good for first-timers, \$25 ea., 35-yr.-old Schwinn bike, classic, excellent condition, \$75. Cibicki, 877-7098.

'73 CHRISRAFT BOAT & TRAILER, 19-ft., 4-cyl., inboard, new carpet, good condition, \$3,000 OBO. Romero, 831-1974, ask for Robert.

'72 HONDA MOTORCYCLE, 350cc, 4,547 original miles, original owner, \$2,500 OBO. Kinney, 293-3256, leave message.

'93 HONDA HAWK STREET BIKE, 250cc less than 4K miles, excellent condition, \$2,200. Washburn, 294-5921.

'73 HONDA CB500 FOUR, needs ignition coil & TLC, good motorcycle, for weekend mechanic, \$125 OBO. Kawola, 298-5813.

'78 ASPEN CAB-OVER CAMPER, 11-1/2-ft., self-contained, refrigerator, 4-burner stove/oven, water heater, furnace, 2 sinks, jacks, \$800. Armstrong, 888-1887.

'79 HONDA CB750F MOTORCYCLE, windshield, trunk, soft bags, very good condition, \$1,000 OBO. Kallenbach, 869-5237.

FISHING/SKI BOAT, 18-ft. Browning, tri-hull, fiberglass, 150-hp Volvo I/O, new interior, seats 8, lots of extras, \$4,000 OBO. Hunt, 858-1927.

'84 WINNEBAGO, Chieftain Class A, 454 chassis, 55K miles, microwave, AC, new awning, generator, at Base car lot, \$13,500. Cordova, 299-1652.

'92 SAILBOAT, MacGregor, 26-ft., 15-hp outboard, many extras, excellent condition, \$10,500 OBO. Bentz, 857-0728.

BOY'S BIKE, Schwinn, 10-spd., \$35. Harris, 822-0236.

KAYAK, everything you need: spray skirt, flotation, paddle, helmet, \$500. Phillips, 262-0987.

REAL ESTATE

4-BDR. HOME, 1,850 sq. ft., 1-3/4 baths, 2 living areas, fireplace, NE area, 6 minutes to Eubank gate, \$117,900. Winfield, 275-3514.

3-BDR HOME, 1,960 sq. ft., large kitchen, LR/DR, family room, study, 2 fireplaces, excellent condition, great neighborhood, 1000 Espanola NE, \$148,900. Winowich, 255-2611.

2-BDR. MOBILE HOME, 1985 Liberty Ridgewood, 14x70, 2 baths, needs to be moved, book value \$11,500, asking \$9,500 OBO. Garcia, 281-3209.

3-BDR. TOWNHOUSE, loft, 2-car garage, 2 baths, fireplace, raised ceiling w/beams & corbels, adobe accents, saltillo tile, views, \$147,500. Pierce, 299-2801.

MOUNTAIN LAND, 3-17 acres, foothills, below Sandia ski area, great views, trees, stream, \$15,000/acre, trade considered. Clement, 890-0515.

EAST TEXAS HOME, 75 acres, 3,000 sq. ft., 10-acre peach orchard, cows, pond, stream, fish, deer. Rogers, (903) 863-2730.

3-BDR. PRESLEY HOME, 1,552 sq. ft., dining room, family room w/fireplace, hot tub, 10 minutes from Kirtland AFB, \$121,600. Doyle, 292-6352.

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

WANTED

SWING SET, good condition, reasonable price. Golightly, 823-2568.

FUEL ECONOMY STORIES for pre-'89 Toyota 4Runners. Zirzow, 281-9896.

TELESCOPE, greater than 10 cm reflector diameter, eye pieces, equatorial mount preferred, less than \$100. Nevers, 294-6495.

YOUR BARBIE COLLECTION from '59-'72, collector will pay good prices, cash. Eddy, 299-4536.

DEPENDABLE ECONOMY CAR, 5-6 yrs. old, for working UNM student, for in-town use, \$1,000 down, w/\$150-month payments. Nation, 291-1219, ask for Shane, after 6 p.m.

HOUSE SIT, by visiting scientist, from July 6 to August 4. Peterson, 845-8864.

HOUSEMATE, female/male, in 3-bdr. home, separate baths, washer/dryer, 2-car garage, fireplace, walk-in closets, \$275/month + 1/2 utilities. Ewen, 836-3563.

ROOMMATES: Share a great new 3-bdr. house in N. 4-Hills, \$325-\$375/mo. +utilities. Jones, 296-2796.

'89-'90 SUBARU, 4WD w/5-spd. dual-(not single) range transmission, AC, good/excellent condition. Sanders, 256-1797.

USED BANDSAW PARTS, older 12-in. Craftsman, Model 113-12620 or equivalent, cast-metal frame. Schamann, 298-5192, leave message.

ELECTRIC LAWNMOWER, small, good condition. Tremi, 823-2996.

LOST & FOUND

LOST: Woman's prescription glasses, partial blue frames, lost on 3/12/96. Petty, 844-4240.

LOST: Woman's pin, filigree gold, surrounding sapphire & pearls, Coronado Club, Wednesday, April 3, at 9700 retirement party. Mathews, 881-7368.

SHARE-A-RIDE

CARPPOOL, from Los Lunas area to Area I, working compressed workweek. Hernandez 865-1231 or 845-9053.

Sandia News Briefs

Popular 'DICE' security briefings scheduled April 30, May 1

Ray Semko, Energy Counterintelligence, DOE HQ, will provide four DICE (Defensive Information to Counter Espionage) briefings at Sandia/New Mexico on Tuesday, April 30, and Wednesday, May 1. Semko has more than 20 years' experience as a counterintelligence (CI) specialist including responsibility for management of all CI and espionage investigations conducted by the Army. Before joining DOE, he worked for the Threat Countermeasures Branch, Defense Intelligence Agency. As has been the case with his previous DICE briefings for Sandians, Semko will provide current information on worldwide intelligence activities and how these activities affect Sandians. All briefings are unclassified. The briefings are at 9-10:30 a.m. and 1:30-3 p.m. each day in the Bldg. 825 (TTC) auditorium. Attendees will receive Annual Security Refresher credit.

David Vehar wins ASTM Award of Merit

David Vehar, Nuclear Facilities and Diagnostics Dept. 9362, has been named recipient of the American Society for Testing and Materials Award of Merit for his contributions in the area of neutron and gamma ray dosimetry standards and for his promotion of the internationally recognized ASTM-Euratom symposia on reactor dosimetry. The award, the highest honor the society can bestow on a member, also names David a Fellow of the society. The award will be presented at the June meeting of ASTM Committee E10.

Kansas State University honors Sandian Ron Iman

Ron Iman, Manufacturing Systems Reliability Dept. 6613, has been selected by the College of Arts and Sciences at Kansas State University to receive its 1996 Distinguished Service Award. The award will be presented during spring graduation ceremonies at Kansas State on May 18. A dinner will be held in Ron's honor on May 17. Ron holds three degrees in statistics from Kansas State. He and his wife Rae (11300) are members of the KSU President's Club. Ron also has a master's degree from Emporia State University and was the recipient of ESU's Distinguished Alumni Award in 1994.

Send potential Sandia News Briefs to Lab News, Dept. 12622, MS 0165, fax 844-0645.

Colores! program features Sandians

Supercomputing is the topic of the next *Colores!* on KNME-TV Channel 5 on Wednesday, April 17, at 7 p.m. The program, "The Art of the Chip," looks into the world of information processing, problem solving, graphics, and entertainment, through computers. Carl Diegert of Computer Architectures Dept. 9215 and Mark Boslough and David Crawford, both of Computational Physics Research and Development Dept. 9232, will be featured along with other New Mexico supercomputing experts, including Rick Light and David Forslund (Los Alamos National Laboratory), former Sandian Creve Maples (Muse Technologies), Brad Carvey (President of Free Range Digital Imaging), and Richard Draper (Intel Corporation). The program is scheduled to be rebroadcast Saturday, April 20, at 4:30 p.m., May 29 at 7 p.m., and June 1 at 4:30 p.m.

Take Note

Sandia's Child Care Resource and Referral Program is sponsoring a parent seminar, "Guidance for Preschoolers," on Tuesday, April 16, in the Technology Transfer Center (Bldg. 825), noon-1 p.m. For information, call Lynn Beard (3343) at 844-1492.

Retiring and not seen in *Lab News* pictures: Wallace Newman (1561), 36 years; Mildred Smith (10221), 20 years; Kathryn Matijevich (7611), 19 years.

Retirement open houses

Sandia is holding open houses in honor of retirees Earl Cummings (7812) in the Coronado Club on Monday, April 15, 4-6 p.m.; Norman Grandjean (12333) in the Coronado Club on Monday, April 15, 4:30-7 p.m.; and Norman Brown (6472) in the Coronado Club on Thursday, April 18, 4:30-6:30 p.m. Refreshments will be served. Friends and acquaintances are invited.

Coronado Club

April 11, 18, 25 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

April 12 — "Western Night" dinner/dance. \$6.95 all-you-can-eat buffet (\$7.95 for guests), 6-9 p.m. Music by Isleta Poorboys, 7-11 p.m.

April 19 — Family Night Out, 7-11 p.m. \$5.95 all-you-can-eat buffet (\$7.95 for guests), kids 3-12, \$3.50, under 3 free; buffet served 6-9 p.m. Music by Together, 7-11 p.m.

April 21 — Sunday brunch buffet, 10 a.m.-2 p.m. \$6.95 all-you-can-eat buffet (\$7.95 for guests), kids 3-12, \$1, under 3 free. Music by Bob Weiler, 1-4 p.m.

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

Sympathy

To Richard Caudell (2615) on the death of his sister, Patricia Smith, in Michigan, Feb. 17.

To Dick Brow (1845) on the death of his mother, Ruth Brow, in Dresden, N.Y., Feb. 26.

To David Schultz (2314) on the death of his mother, Katherine Marie Fitzgerald, in Chicago, Feb. 27.

To Ellen Edge (4605) on the death of her mother, Jeanette, Dec. 13, and her sister, Barbara Jean, Jan. 28, in Portland, Ore.

To Fernando Uribe (1411) on the death of his father, Antonio Uribe, in Kansas City, March 19.

To Ernie Sanders (5831) on the death of his mother, Sylvia Sanders, in Clinton, Okla., March 26.

To Nora Armijo (10210) on the death of her mother, Jesusita Esquibel, in Albuquerque, April 4.

Recent Patents

Regan Stinnett (9505, on entrepreneurial leave), and John Greenly, Lansing, N.Y.: Method and Apparatus for Altering Material.

James Novak (1315) and James Wiczor (1315, on entrepreneurial leave): Feed Rate Measuring Method and System.

Narayan Doddapaneni and David Ingersoll (both 1523): Electrolyte Salts for Power Sources.

William Sweatt (5725) and Lynn Seppala, Livermore, Calif.: Method for Changing the Cross Section of a Laser Beam.

Is your morning traffic into Sandia a bit better? Maybe here's why

Recently Sandia and Kirtland Air Force Base joined forces to conduct a traffic study at the Wyoming and Eubank entrances.

It was prompted by the overwhelming backups in the mornings on Eubank and also on Wyoming. Inputs were solicited from all interested parties. They pointed fingers at the new signal lights at 20th and G (just inside the Eubank gate) and at Gibson and Eubank, the guards' verifying base stickers, and at times overall road conditions.

The study determined that some or all of those things contributed to traffic backups, but it also discovered something else: The peak in morning traffic had moved from 7:30 a.m. in 1993 to 6:50 a.m. now.

What had changed? Sandia's new hours. With the 9/80 workweek now in place for virtually all Sandians who opt for it, most people arrive earlier. The traffic study team found that the timing of the city traffic signals on Eubank had not been coordinated to this earlier movement of traffic. A timing problem with the signals on Wyoming at Central and at Zuni was also discovered.

"We were quick to contact the City of Albuquerque traffic engineers," says Charlie Thomas (7316), who along with Ed Tooley (also 7316) and a contractor were the Sandia

members of the study team, "but at this time the city opened the new overpass at Eubank and I-25. This opening only prompted more commuters to use Eubank. To make a long story short, city traffic engineers retimed the signals from the overpass to the Kirtland gate. Traffic is now flowing better, still not super, but better."

The study found similar problems on Wyoming. Timing and synchronization of stoplights on Wyoming has just been completed.

Charlie says the study also identified a number of problems bicyclists are having entering and exiting the Eubank gate. Kirtland and Sandia officials are working together to reach solutions. One result: Sandia has revised the hours and policy of its "Contractor Gate," allowing use of that gate by bicycles and keeping it open until 6 p.m. Mechanical changes to the Eubank gate are also being considered. In the longer term, an upgrade of Eubank south of Central is being proposed by the city. Bike paths are expected to be included.

A Base Traffic Working Group has recently been formed to look at traffic-related problems on a continuing basis. If you have any matters to bring to its attention, contact the Sandia representative, Wayne Burton (7912), at 844-9807.