This magnetic-powered train doesn't levitate, and, boy, can it move — and on existing tracks

'Seraphim' train could achieve high speed at a quarter the cost of 'mag-lev' technology

By Neal Singer

Media Relations Dept. 12620

The idea of very fast trains powered and levitated by magnets has tickled the imagination of the US public — without opening its wallet — for several decades. High construction costs and the difficulty in obtaining right-of-ways to lay new track have proved formidable obstacles.

Now a concept for a high-speed, magnetically powered train that does not levitate, is relatively inexpensive to build, and can run on already-laid track has been developed by Sandia scientists in Pulsed Power Sciences Center 1200.

Dubbed "Seraphim," the train is a spin-off from the coil-gun technology created at Sandia in the late 1980s for the Strategic Defense Initiative Organization.

A working model — a vertical, two-foot tall aluminum plate that slides along a rail, is powered by magnetic coils, and in only 12 feet reaches a speed of 34 miles per hour — demonstrates the potential of the propulsive technique.

The train, which would be the fastest in the US, is expected to travel at 200 miles per hour. The current maximum for commuters on the corridor between Boston and Washington is 100 miles per hour.

The train is a spin-off from the coil-gun technology created at Sandia in the late 1980s.

"We make Seraphim go that slow so it can travel on already-laid track," says project leader Barry Marder of Beam, Plasma, and Electromagnetic Theory Dept. 1241. "The original design was intended to shoot satellites into space at Mach 20." This is 20 times the speed of sound, the equivalent of 6 kilometers a second.

The so-called magnetic-levitation (mag-lev) trains under construction in Germany and Japan are expected to reach 300 mph, but they need specially designed track.

Allows an incremental approach

"This is an incremental approach to enter the world of high-speed, magnetically powered trains," says Bob Turman, Manager of Electromagnetic Propulsion/Beams Applications Dept. 1221. "We can convert further, if the public wants, at a later time." More work might be necessary, he says, because for very fast trains, "some of the existing right-of-ways will have too-sharp turns. At that later time, in those locations, we'd either buy new right-of-ways or elevate. For now, we'd just slow down the train."

Unlike mag-lev trains, which travel with no engine aboard, the proposed Sandia train would carry its own drive mechanism — a gas

(Continued on page 4)

Sandia National Laboratories

Sandia LabNews

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Medical coverage options to double in 1996; Choose Triple Option Plan or HMO

By Tammy Locke

Lab News Staff

Starting Jan. 1, 1996, the number of medical coverage options for nonrepresented Sandians will be doubled. The current two-choice system, consisting of the "Traditional" (Mutual of Omaha) Plan and a Health Maintenance Organization (HMO), will be replaced by a four-choice system consisting of the Triple Option Plan (TOP) and an HMO (still Lovelace at Sandia/New Mexico and Kaiser at Sandia/California).

About 300 Sandians and retirees participated in 19 focus group meetings last December to preview potential changes to the Medical Care Plan and to help Health & Work / Family Benefits Dept. 3343 determine what Sandians need from their Medical Care Plan. From focus group comments, changes were completed, and the new plan will be presented to Sandians this summer.

"For years, Sandians have been asking for choice, and the TOP plan will address this request."

Nonrepresented Sandians will enroll in either the TOP or an HMO. The premium costs shared by participants for the current Medical Care and HMO Plans will remain the same for the TOP during 1996. Represented people are not eligible to participate in the Triple Option Plan at this time; any Plan changes must be negotiated with their bargaining units.

Addresses employee concerns

Dr. Larry Clevenger, Director of Benefits & Medical Services Center 3300, says, "Benefits & Medical Services, as well as the Health & Work/Family Benefits organizations, is looking forward to this TOP plan since it will address various concerns of the Sandia population. For years, Sandians have been asking for choice,

(Continued on page 5)

ATOMIC VETERANS — Retired Sandians Ray Brin (left) and Leon Smith, at the National Atomic Museum's B-29 last week, recall their experiences with the atomic bombs that ended World War II (see stories beginning on page 6). Ray conducted development tests on the Fat Man bomb, escorted it for the Manhattan Project to Tinian island, and helped load it for the flight over Nagasaki. Leon worked with the fuzing systems of both the Little Boy and Fat Man atomic bombs, helped assemble them, and lost a coin flip to be the weaponeer aboard the Enola Gay for its flight over Hiroshima. He later was weaponeer for the Operations Crossroads B-29 atomic bomb drop over Bikini atoll in 1946.

(Photo by Randy Montoya)

This & That

Thanks, boss – I'm sure it'll take all Sandians who are under the new performance management process a while to get used to the new performance rating system and the performance descriptors: EP, HP, BP, UN, and PR. I couldn't recall exactly what they all stand for when I had my performance management meeting with my boss recently. He was kind enough to explain them to me at that time, and I want to publicly thank him here for all the UN ratings he promised to give me (UN equals "UNusually good work," he explained).

* * *

They got the David part right – Senior Technical Associate David Eley (6352) is a bit insulted that one software vendor can't get his name and job title right, despite always sending him two copies of every mailing. On one address label, they misspell his name Elay and show his title as "Instructional System." On the other label, they spell his name correctly, but do some highly questionable abbreviating of his title: "Senior Technical Ass." (I don't know David personally, but I think I may have worked with several of his colleagues.)

* * *

Tough boss – Overheard from one employee talking to another in a Sandia office recently: "Please don't rat on me to the boss. I have to leave on time today." That somehow reminded me of another statement I overheard years ago at a company where dedication and discipline weren't nearly as strong. One fellow was speaking to another one notorious for getting a jump on the traffic home: "You must've had a long day. This is the latest I've ever seen you leave early!" The same early-departing employee, as I recall, was fond of saying, "Man, it sure makes the day seem long when you get to work on time!"

* * *

A dubious honor – Speaking of bosses, the deadline for nominating people for Worst Boss of 1995 was June 30, but start thinking about whether to nominate your boss next year. According to the June 19 "Business Outlook" section of the *Albuquerque Journal*, a Texas management expert sponsors an annual worst-boss competition, and the "winning" boss actually gets a week-long Hawaiian vacation and a thousand bucks. The big question: If you nominated your boss and he (or she) won, would he thank you or fire you after returning?

* * *

Fit to be tied – Life does have its hassles. I needed some new golf shoelaces several weeks ago – nothing special – just average-length black laces. Tracing my steps: A major sporting goods store didn't have the right length. A shoe store had the right length, but only in white. Two department stores at a major mall didn't even sell shoe laces, despite having major shoe sections. Another shoe store had black laces, but in two lengths only – one too short and one too long, of course. Success at my sixth stop: a discount store. I didn't even need to play golf after that. I got plenty of exercise shopping – "exercised" actually – during the experience. If you've had a similar or even worse "life's little hassles" experience recently, send me the details on e-mail or at the mail stop below.

– Larry Perrine (845-8511, MS 0129)

Sandia LabNews

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LOCKHEED MARTIN

Supervisory Appointment

BILLIE WEATHERLY to Manager of JIT Procurement Dept. 10224.

Billie's work at Sandia has been in systems contracting and administrative systems analysis.

Billie Weatherly

She joined Sandia in 1975 as a clerical trainee in the Human Resources Center. She worked as a clerk in the EEO/AA, Design Definition, Security, Travel, and Design Information departments. She was records manager in Hazardous Waste and Environmental Protection Department and a Sandia contracting representative in the Procurement Center. Billie has also worked in the Logistics Center as a Supervisor of the Distribution Team, administrative systems analyst, and Acting Manager of the Receiving/Distribution Services Department.

She has a BA in business adminstration, with concentrations in both management and MIS, and an MBA from the College of Santa Fe.

Narath, Tegnelia to leave Sandia, Robinson to be acting Labs director

Sandia President/Director Al Narath and Executive VP/Deputy Director Jim Tegnelia are leaving Sandia Aug. 15 to operate a new Energy & Environment Sector for Lockheed Martin, Sandia Corporation's management contractor.

Al will be president of the new sector, and Jim will be vice president for business development. The new Lockheed Martin sector has been created to be responsible for the corporation's energy and environmental businesses, including operating and managing Sandia and other Department of Energy activities.

Current Sandia VP for Laboratory Development Paul Robinson (4000) will become acting director of Sandia National Labs until the government approves a permanent director and deputy director.

Additional Energy & Environment sector staff positions will be announced soon.

The July 19 Lockheed Martin news release announcing these changes says the new Energy & Environment sector will be headquartered in Albuquerque. Energy & Environment is the first Lockheed Martin business sector created since the March 1995 merger of Lockheed and Martin Marietta. Other sectors are Aeronautics, Electronics, Information & Technology Services, and Space & Strategic Missiles.

Responsibility for several major facilities

The new sector will have responsibility for the management of Lockheed Martin Energy Systems, which includes Oak Ridge (Tenn.) National Lab; Lockheed Martin Specialty Components in Largo, Fla.; Lockheed Martin Environmental Systems & Technologies in Houston; Lockheed Martin Idaho Technologies, which includes the Idaho National Engineering Lab in Idaho Falls; Lockheed Martin Utility Services, which operates enriched uranium plants in Ohio and Kentucky; the corporation's holdings in M4 Environmental Limited Partnership, in Oak Ridge; Technology Ventures Corp. in Albuquerque; and Sandia.

Al Narath has been President of Sandia Corporation and Director of Sandia Labs since 1989. He joined Sandia in 1959, rose through the research management ranks, and became executive vice president in 1982. He left the Labs in 1984 to become vice president for government systems at AT&T Bell Laboratories. He returned to Sandia in 1989, replacing retiring Sandia President Irwin Welber. Al has a PhD in physical chemistry from the University of California at Berkeley.

Jim Tegnelia, who led Lockheed Martin's (then Martin Marietta's) successful bid for management of Sandia Labs in 1993, has been Executive VP and Deputy Director at Sandia since the corporation began managing the Labs in October 1993. He is the former deputy director and acting director of the Defense Advanced Research Projects Agency (DARPA), and joined Martin Marietta in 1987. Jim has a PhD in physics from Georgetown University.

Paul Robinson has been Sandia's VP for Laboratory Development since 1991. He spent most of his early career at Los Alamos National Lab. Paul was chief negotiator and head of the US delegation to the Nuclear Testing Talks between the US and Soviet Union in 1988-1990. He has a PhD in physics from Florida State University.

Town meetings are next week

Sandia employees are invited to attend one of several town meetings to hear more about the management changes and new business sector. In Albuquerque, meetings are scheduled for Tuesday, July 25, 2-3 p.m., and Wednesday, July 26, 10:30-11:30 a.m. and 1-2 p.m., in the Technology Transfer Center (Bldg. 825). In Livermore, meetings are scheduled for Thursday, July 27, 1:30-2:30 p.m. and 3-4 p.m. in the auditorium.

The Lockheed Martin announcement was made after our normal deadline and too late for a major story. The *Lab News* will have more information in the next issue. *— Larry Perrine (12620)*

Hydrogen-fuel concepts take a spin at Sandia facilities

Sandia/California oversees two aspects of national research program

By Nancy Garcia
California Reporter

Experiments that may help take concepts about hydrogen fuel from something as intangible as a castle in the sky to a down-to-earth car on the road are under way at Sandia/California.

A team of researchers at this site provide technical coordination in two areas of the national hydrogen program under DOE's division of Energy Efficiency and Renewable Energy. In the area of hydrogen utilization, Jay Keller of Combustion in Engines & Furnaces Dept. 8362 is leading work to optimize an engine that would use hydrogen as part of its fuel supply. A significant part of the overall utilization program involves a multi-institutional collaboration with Ray Smith of Lawrence Livermore National Laboratory, Mike Swain of the University of Miami, and Norm Johnson and

Sandia CaliforniaNews

Dan Butler of Los Alamos National Laboratory. For hydrogen storage, George Thomas of Physical Properties of Materials Dept. 8715 is overseeing development of materials and engineering schemes to carry hydrogen in vehicles.

The most abundant element, hydrogen creates little more than water and a small amount of oxides of nitrogen when burned correctly in an engine. It can be made from a number of sources, such as electrolysis of water or natural gas reforming. Hydrogen is considered for use as an energy carrier and not as a primary fuel source.

An advantage over electric cars?

The real hook for hydrogen use as an energy carrier, Jay says, is reducing emissions. When burned, carbon-based fuels create carbon dioxide gas that contributes to global warming, poisonous carbon monoxide, smog-inducing nitrous oxide, and toxic emissions up to the part-per-million level. Also, the US imports about half its fossil fuel, leading to trade imbalance and energy security concerns. Jay says the US could take the lead and export clean-fuel hydrogen technology to developing nations such as China.

"My perspective is a global one. We need to stop burning hydrocarbon-based fuels," he says, "and we need to produce hydrogen in an environmentally benign manner."

The California Air Resources Management Board has mandated that 2 percent of all cars sold in the state beginning in 1998 have zero emissions. If emissions from power plants that create electricity to run electric vehicles are taken into account, then hydrogen-fueled vehicles, with their ultralow emissions, can potentially stack up better on this score than simple electric vehicles.

Experiments use single-cylinder engine

The collaborative group envisions creating a hydrogen-fueled engine to drive a generator, which would then power electric motors turning the car's wheels. This electric coupling is called a series-type hybrid approach. It allows the engine to be operated at a single speed for peak output. Electricity created by the generator would be stored in a battery or ultracapacitor. Those energy storage devices could also recapture energy usually lost to heat and friction during braking.

Experiments that demonstrate this concept will help frame how the hydrogen should be stored on the vehicle, says DOE Hydrogen Program Manager Neil Rossmeissl.

"The storage issue is probably the most difficult problem in using hydrogen to fuel vehicles," adds Peter. "If the engine is higher efficiency, you don't have to store as much hydrogen. But many schemes call for hydrogen to be drawn off a hydride using heat from the exhaust, and higher efficiency engines have lower exhaust temperatures."

To address the storage issue, George Thomas of Dept. 8715 manages efforts to create lightweight magnesium-nickel alloys that will absorb hydrogen when chilled and release it when heated. Hydrides can compact and safely store hydrogen, but they add weight and bulk to the overall vehicle.

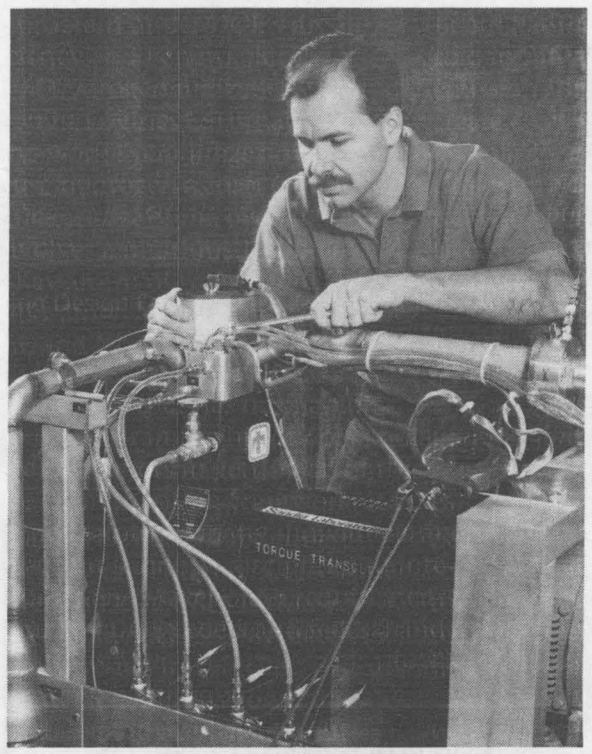
Final materials to be used in a hydride bed and heat exchanger will be selected based on systems analysis work by Jim Handrock of Structural Mechanics Dept. 8742. Karl Wally of Experimental Systems Dept. 8111 and Tom Raber (8412) are laying out the system design. Steve Guthrie (8715) is working on the hydride measurements with Walter Bauer of Materials & Combustion Technology Dept. 8302, while Jay Spingarn of Engineered Processes & Materials Dept. 8714 obtains the materials, Abby Sieber (8715) provides technical assistance, and Nancy Yang (8715) conducts optical analysis.

Hydrogen research began at Sandia/California two years ago with $1.5 million in annual funding. As the project proceeds, the research team intends to create an operating laboratory demonstration system with a hydrogen storage bed and a multicylinder engine capable of producing some 25 to 40 kilowatts of power. (The current engine, a modified refrigeration-unit power supply, produces about five kilowatts.)

Working with Lawrence Livermore

System concepts being tested in the experiments have been developed in conjunction with researchers from Lawrence Livermore, who have mathematically modeled the series hybrid idea. (They have calculated that a hydrogen-fueled car might be a significant improvement over a gasoline-powered engine, whose efficiency hovers around 20 percent.) Meanwhile, researchers at Los Alamos will use their Kiva fluid dynamic codes to model experimental results so the system can be optimized.

Ultimately, George says, hydrogen fuel cells will be preferable to engines for an on-board energy supply. Fuel-cell efficiencies can range up to 70 percent. Fuel cells operate by converting chemical energy directly into electricity. Fuel cells powered by hydrogen combine hydrogen gas with oxygen to create energy and water. Unlike conventional batteries, hydrogen fuel cells can be continually recharged and do not need to be replaced. Already, the space shuttle is powered by hydrogen fuel cells. However, these are too large and costly to be used on private vehicles.



HYDROGEN BURN — Luis Bernardez of Dept. 8362 works on Sandia's hydrogen engine at the Combustion Research Facility. Sandia/California researchers are providing technical coordination in two areas of the national hydrogen program.

Peter Lehman, head of the Schatz Energy Research Center at Humboldt State University in Arcata, Calif., is leading a project to power golf-cart-sized personal utility vehicles with fuel cells at the city of Palm Desert, Calif., where these vehicles are approved for driving on city streets. Lawrence Livermore Laboratory is collaborating with him to create a proton-exchange membrane fuel cell powered by hydrogen that would replace the six heavy lead-acid batteries that currently run these electric carts.

George expects his group will join in the Palm Desert project, handling on-board hydrogen storage and working on developing carbon materials and manufacturing techniques for the fuel cells. Some related exploratory work in tailoring carbon materials to store hydrogen has already been pursued by Don Cowgill (8715) and Tony Martino and Carlos Quintana of Fuel Science Dept. 6211 at Sandia/New Mexico.

"It looked fairly promising," George says, adding that although vehicles would provide the greatest improvements in air quality and energy independence if the country switches to a hydrogen economy, they are also "the hardest place to start. . . . It's a chicken-and-egg problem in some ways." The infrastructure hasn't been created to readily distribute hydrogen, although hydrogen production capabilities are probably sufficient.

But he adds, "If you have a market, if you have vehicles that will run, the distribution will come."

SENATOR BRIEFED — VP John Crawford (8000) recently briefed US Sen. Dianne Feinstein of California (right) on Sandia's mission while she was visiting nearby Lawrence Livermore National Laboratory (LLNL). Her May 31 visit to Livermore also included briefings from University of California President J.W. Peltason, Lawrence Berkeley Laboratory Director Charles Shank, Stanford Linear Accelerator Center Associate Director Jonathan Dorfman, and LLNL Director Bruce Tarter.
(LLNL photo by Brian Quintard)

Magnetic train

(Continued from page 1)

turbine that powers on-board electromagnets. The pulsed magnets induce reversed electric currents in a series of aluminum plates bolted to or near the track. The induced currents create their own magnetic fields that oppose those of the train's.

With the aid of optical sensors, the fields pulse on just as the magnets pass the midpoint of the aluminum plates and by repulsion propel the train forward. The plates would be preassembled in ladder-like sections — the plates serving as rungs — for fast, cheap bolting to the track.

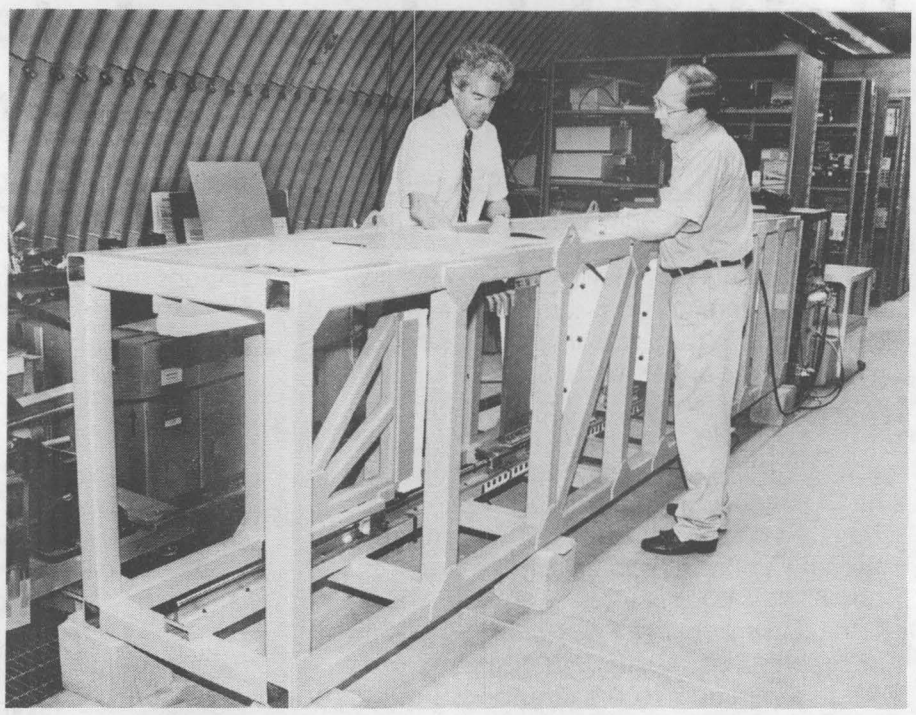
No new tracks required

Rather than travel suspended by magnetic fields, the train would ride on unpowered wheels made of steel or composite materials, thus reducing the cost and complexity of the system. The approach, again unlike the mag-lev system, permits old-style and new-style trains to travel on the same track.

Construction of the Sandia system should cost one-quarter of mag-lev systems, which propel trains by magnetic attraction from a series of stationary electromagnetic coils that must be powered along the length of the track.

The Sandia technology "is probably superior to that being used in the mag-lev systems under construction in Japan and Germany, but they've already committed to their method," says Barry. "Our technology now is ready, whenever the US public wants to spend the money."

The researchers are applying for funding to power an actual train.



LAB LOCOMOTION — Barry Marder (1241, left) and Bob Turman (1221) work with vertical two-foot-tall aluminum plate on a rail that they use to demonstrate the potential of a pulsed linear-induction propulsion technique for a magnetically powered train. The model is powered by magnetic coils.

"The Seraphim can achieve 300 miles an hour, but to do so, we'd need to lay new track machined to very tight tolerances, which is expensive, and then ordinary freight trains couldn't run on the line without wrecking the precision," Bob says.

The federal government currently has allocated about $1 billion to electrify the track in the US northeast corridor. This would increase the top speed of trains on the line to 125 mph. But those "captive" trains will be able to achieve those speeds only on those tracks, Bob says. The Sandia approach can be used on nonelectrified track.

"The other alternatives . . . are more cars and more freeways, or buying thousands of acres to protect new airport runways from infringement by suburbs."

Other than investing in trains, "The other alternatives for the public are more cars and more freeways, or buying thousands of acres to protect new airport runways from infringement by suburbs. There's no free lunch anywhere," Bob says.

Slow-moving shuttle trains such as those in the Dallas airport use a method similar to Sandia's to achieve speeds of 30 mph. These trains embed magnetic fields relatively slowly in a neighboring metal rail to generate a backward-moving wave of magnetic flux, which thrusts the train forward.

Performance improves with velocity

The Sandia method induces magnetic fields around the edges of a segmented aluminum rail placed along the track. This magnetic field repels the train. This difference allows a Seraphim-type train to achieve higher speeds, and is the basis for the acronym that forms its name: Segmented Rail Phased Induction Motor. Though a conventional linear induction motor such as those used by the Dallas train can achieve speeds of more than 200 mph — as an experimental model did in Pueblo, Colo., in the 1970s — its efficiency suffers at higher speed, while the performance and efficiency of the Sandia engine actually improves with velocity.

Money for the installed new train should be recoverable in five to ten years along the most populated rail lines, which carry more than one million passengers per year, according to Bob's economic projections. These routes include Washington-Boston, Houston-Dallas, the cities of the Great Lakes area, Chicago-St. Louis, Los Angeles-San Francisco, Los Angeles-Las Vegas, and Orlando-Tampa-Miami. A greater customer demand is anticipated because of shortened travel times and more frequent departures.

In the Sandia concept, costs for the new trains, which could reach billlions of dollars, would be defrayed by including airlines as partners rather than adversaries to the new mode of transportation, Bob says. "In Germany, Lufthansa is one of the investors in the mag-lev transportation system," he says. The trains — "planes without wings"— could quickly handle commuter trips of up to 200 miles, and could play a feeder role for airports.

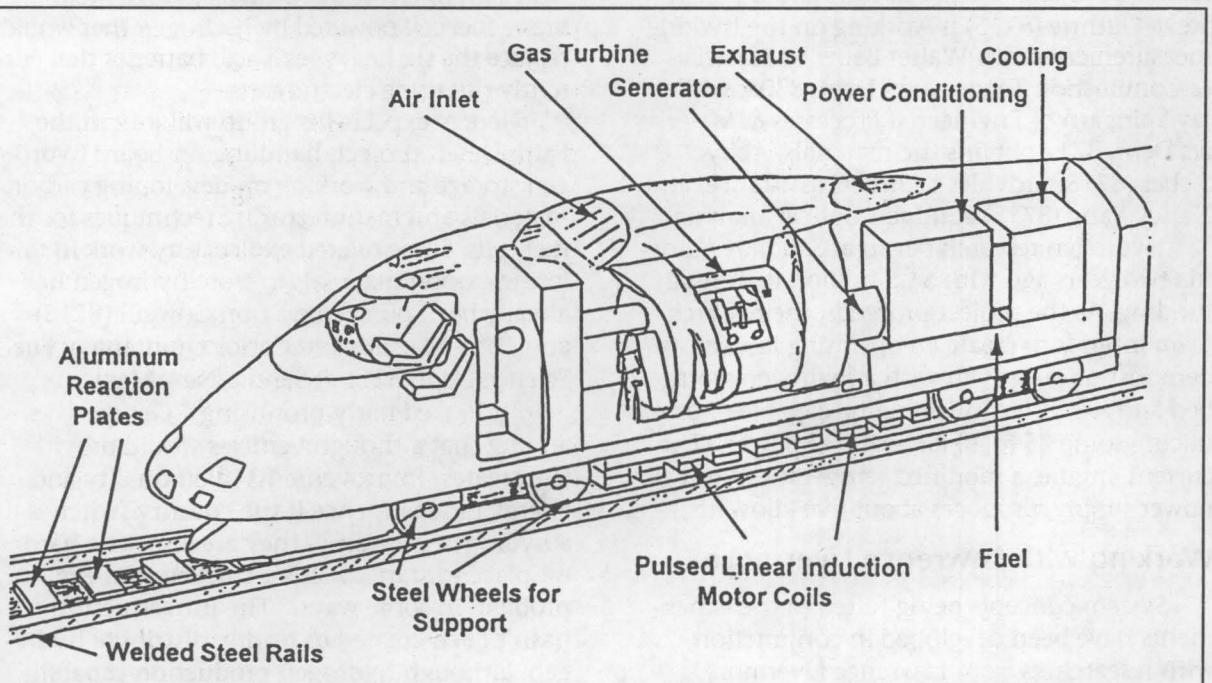
"Airline costs are highest for planes as they ascend and descend," Bob says. "The most economical arrangement would be for airplanes to fly long routes and very fast trains to fan out from the plane's destination."

Same principle as Sandia coil gun powers train

The Sandia train works on the same principle as a coil gun — itself a spin-off from Star Wars technology — conceived by Sandia to launch small satellites into space through an earth-bound gun rather than send them aloft in individual rockets.

In the coil gun, a projectile may be shot hundreds of miles by sequentially powering a series of electromagnetic coils as the metal object whizzes by. The empowered coils create reversed electric currents in any nearby piece of metal, accompanied by reversed magnetic fields. The resultant repulsion accelerates a projectile if the coils are activated sequentially just as the object passes it.

The Sandia train reverses the role of barrel and shell. The formerly active coils in the barrel become passive aluminum metal bars, while the acted-upon projectile becomes the train with its active electromagnets. The magnets are activated by sensors just as each magnetic coil —30 per "locomotive"— passes the midpoint of a metal plate below or to the side of the onrushing train.



SERAPHIM — Artist's conception of high-speed train proposed by Sandia investigators that uses standard railroad tracks and railcar wheels, with horizontal aluminum reaction plates located between the steel rails.

Sympathy

To Steven Gossage (13216) on the death of his father in Hutchinson, Kans., July 2.

To Lyndon Pierce (13216) on the death of his father, Ryan Pierson, in Albuquerque, July 7.

Medical options

(Continued from page 1)

and the TOP plan will address this request." (The Sandia Board was expected to give final approval to the plan this week.)

According to Dorothy Melloy (3343), Sandians have indicated they want more flexible medical plans to include more preventive care. Sandians also want a choice of physicians and hospitals, and help managing their health care costs.

The Triple Option Plan (and other changes to the Dental Expense Plan and Long Term Disability Plan) is designed to answer these needs, Dorothy says.

Within the TOP, three choices (the Primary Care Physician Option, the Organized Network Option, and the Traditional Option) are available each time an employee needs health care.

In addition to the current Medical Care Plan (the Traditional Option part of TOP), nonrepresented employees will have available an organized network of physicians who may currently be providers to Sandians.

". . . we are not restricting the choice of doctors. The TOP does not require anyone using the Sandia Plan to go to certain providers."

And for those employees who want to manage their costs more closely, an option similar to an HMO will be offered: a group of physicians will be available as Sandia primary care physicians who will coordinate care and provide preventive care for small copayments.

Focus group participants learned how the TOP works, then Benefits collected feedback on the groups' understanding and opinions of the TOP. The surveys were developed and results compiled by William M. Mercer Inc., a national benefits consulting firm. Ninety-eight percent of focus group participants said the TOP was a positive change, Dorothy says. Two percent were neutral and said before they could judge the plan, they would need to know if their current doctors would be included in the network of providers.

"This new plan sounds good!" concluded one focus group participant. "As many 'old-time' employees don't like change, this plan allows the ability to change without having to join an HMO."

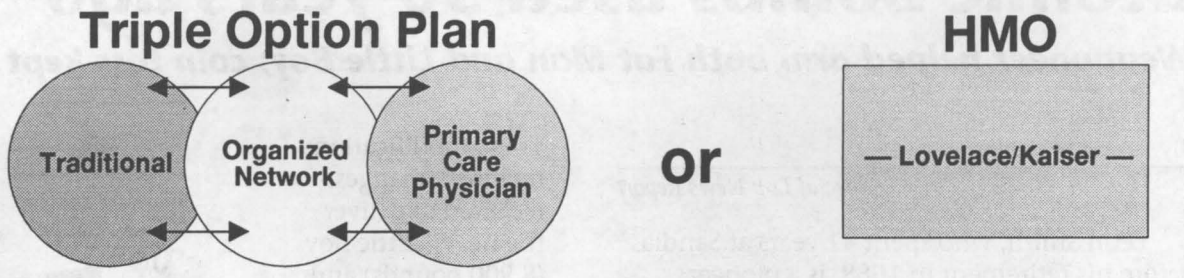
Doctors' names available soon

The names of the doctors and hospitals in the network will be available later this summer, after Prudential Insurance Company of America, the TOP administrator, has printed a complete provider directory. However, TOP lets you use any doctor or any hospital, says Dorothy. "We want to have the physicians most used by Sandians in the Organized Network and Primary Care Physician Options, but we are not restricting choice of doctors. The TOP does not require anyone using the Sandia Plan to go to certain providers. All Sandians have choices."

Other plans will be offered to nonrepresented employees to purchase: an optional enhanced dental plan with additional coverage called Dental Deluxe and increased long-term disability coverage under the Long Term Disability (LTD) Plus Plan. In addition, nonrepresented Sandians will be able to purchase Long Term Care Insurance, which helps cover nursing home and home health care costs for the employee and/or eligible dependents. The costs of these plans will be announced before open enrollment begins in the fall.

"The entire Benefit Choices Program is a major undertaking for our company, and we are excited about the choices and benefit enhancements it provides our employees and retirees," says Larry Clevenger.

Open enrollment options for medical care



Learn about choices early

As focus group participants learned earlier this year, the Triple Option Plan (TOP) is easy to use but will be a challenge to explain fully. Meetings were held the first two weeks of July with vice presidents, directors, and managers to give them early notification of the upcoming changes and additions to Sandia health care plans.

All nonrepresented employees and retirees will be receiving a *Benefits Choices '96* newsletter within the next few days.

During open enrollment in October, nonrepresented Sandians will make their first choice by enrolling in either the TOP or an HMO and choosing whether to continue participating in the Sandia-provided dental and LTD plan or enroll in Dental Deluxe, LTD Plus, and the new Long Term Care Insurance Plan. In addition to face-to-face meetings beginning mid-August, plan specifics will be published in the *Lab News* and *Weekly Bulletin*, and in *TNT* at Sandia/California. A booklet explaining the TOP and other plans will be distributed to all Sandians in late September to use during open enrollment.

Choosing a vendor for TOP

Benefits went through a lengthy selection process to choose a TOP administrator,

(Continued on page 10)

Three choices every time you need care

At open enrollment in the fall, nonrepresented Sandians will choose (1) either the new Triple Option Plan or the existing HMO for medical care, (2) to continue coverage in the Dental Expense Plan or purchase additional coverage through the Dental Deluxe Plan, (3) to continue in the basic Long Term Disability (LTD) Plan or purchase an additional 10 or 20 percent of LTD coverage, and (4) whether to purchase the Long Term Care Insurance Plan.

Existing and new plans are as follows:

Existing plans	New plans
Medical Care Plan or HMO	Triple Option Plan or HMO (same as existing plan; no changes are announced)
Dental Expense Plan	Dental Expense Plan or Dental Deluxe Plan
Long Term Disability Plan	Long Term Disability Plan or Long Term Disability Plus
	Long Term Care Insurance Plan

For all options in the TOP, the maximum out-of-pocket limit (the patient's maximum liability, including the deductible) remains unchanged from the current Medical Care Plan.

If Sandians enroll in TOP for medical care, they must choose a Primary Care Physician, even if the physician will not be used. By enrolling in the TOP, Sandians will have three types of medical care to choose from every time they need medical attention. The three choices are:

• *Primary Care Physician Option.* The patient chooses a primary care physician from the Network Directory. This physician provides initial physical exams and establishes health baselines from which to track the patient's overall care. Overall and preventive care is stressed when the patient is healthy. When the patient is ill, care is monitored and directed. If specialty care is required, the primary care physician will refer the patient to a specialist within the network. All employees will choose a primary care physician. After a copayment for service, the TOP pays 100 percent of all physician-directed care. There are no deductibles to meet and no claim forms to complete. Prescription drugs will be purchased with copayments. This option is an HMO with "no doors" — a feature Sandians requested. However, the employee can always "opt out" each time care is needed and use the other options described below.

• *Organized Network Option.* The patient directs his or her own care using any Network Provider listed in the Network Directory. The Network Physicians and Hospitals within the directory will charge Sandians a negotiated rate for services provided. Sandians must meet a deductible and pay a coinsurance amount based on a negotiated rate. The employee may need to file claim forms. This option is similar to the Traditional Option except that the charges are lower, allowing the patient to control more costs.

• *Traditional Option.* The Traditional Option is similar to the current Sandia Medical Care Plan but includes a $25 increase to the deductible. Now, the individual deductible is either $150, $200, or $300. In January 1996, these deductibles will be $175, $225, or $325. Most services will be reimbursed at 80 percent of "usual and customary," including hospitalizations and outpatient surgeries. In this option, the Sandian uses out-of-network providers and could be charged over the "usual and customary" amount. Some preventive care procedures are covered as described in the current Medical Care Summary Plan Description. Claims forms are filed to the administrator by the patient.

Retired Sandian Leon Smith helped assemble both atomic bombs used 50 years ago

Weaponeer helped arm both Fat Man and Little Boy; coin toss kept him off the Enola Gay

By Randy Maydew

Special Lab News Report

Leon Smith, who spent 41 years at Sandia before his retirement in 1988, is a pioneer nuclear ordnance engineer who worked "up close and personal" with the Little Boy and Fat Man atomic bombs that brought down the curtain on World War II. And as a young Army Air Force lieutenant, Leon, who had helped assemble both bombs, came within a coin toss of riding aboard Enola Gay on the B-29's historic flight over Hiroshima Aug. 6, 1945.

As loser of the coin flip, he spent that morning waiting on a second B-29, Big Stink, parked on an Iwo Jima runway, ready to take over the mission if the Enola Gay had to make an emergency landing.

Leon, who still lives in Albuquerque, saw no action that day, but his time aboard Big Stink wasn't wasted: In July 1946 he served as weaponeer aboard the same plane when it dropped a Fat Man replica bomb as part of the atomic weapons test series Operation Crossroads conducted on and around Bikini atoll.

Leon says the circumstances that necessarily surround an atomic bomb drop somewhat limit one's observation opportunities for posterity.

"We were so busy making the breakaway turn after the drop — to get as far away as fast as possible — that I didn't see the actual explosion," Leon says. "The first look I had was about 30 seconds later." He saw a spiral of smoke topped by a mushroom cloud, he says, adding, "We were flying high, but the cloud still went above us."

Leon was one of six young engineering graduates of the Army Air Force program at Harvard and MIT who, trained in electronics and radar, were selected by Robert Brode of Los Alamos to work on the Manhattan Project.

Brode's Electronic Engineering Group, from Z Division at Los Alamos, was responsible for the arming and fuzing of Fat Man and Little Boy. Leon and fellow lieutenants Morris Jeppson and Philip Barnes were assigned the job of weaponeers for the 509th Composite Group, which was being formed specifically to deliver the atomic bomb.

In November 1944, Leon went to Wendover Field in Utah, where the 509th was training. He recalls being driven by Brode to an isolated rocky hillside where Brode informed him of his fuzing duties with the highly secret operation.

An innocent question

"We sat on a rock and Brode told me a little about what we were to do," Leon says. "He described it as a fuzing job with six to seven cubic feet of available space. I remarked that seemed like an awfully large volume for a fuzing system and innocently asked if this was a biological or atomic bomb that we were to work on. Later, I was told that the question got my name in a black book and resulted in an investigation. I wasn't supposed to know so much."

The 509th was commanded by Col. Paul Tibbets, who eventually would fly the Hiroshima mission. Maj. Charles Sweeney commanded the 393rd Bombardment Squadron, the combat element of the 509th. The unit was officially designated on Dec. 17, 1944, and ultimately staffed with 225 officers and 1,542 enlisted men.

Seventeen B-29s were modified at the Glenn L. Martin Nebraska Co. and delivered to Wendover Field, Utah, in September 1944. These modifications included changes required to deliver the heavy Little Boy (8,900 pounds) and Fat Man (10,800 pounds) bombs, such as bomb bay doors; rack, sway bracing, and suspension systems patterned after Royal Air Force systems; and special wiring circuits required by the fuzing group.

During the next six months, the 393rd made about 100 drop tests from 30,000 feet altitude of "pumpkin" units, weighted Fat Man bomb cases so named because they had been painted orange. These tests were conducted at Wendover and at ballistic ranges at Salton Sea and Inyokern in California. Those tests were completed by June 1945, and the 509th was relocated to Tinian in the Marianas Islands, the B-29 base from which the Japanese home islands could be struck. Construction of special facilities at Tinian for the 509th started in March 1945.

Training bomb runs over Japan

Fifteen new Silverplate B-29s were specially modified to add electric propellers and fuel-injected engines and remove gun turrets (which reduced the weight by 7,000 pounds) and flown to Tinian. Elimination of the fuselage turrets also gave these B-29s higher speed and higher altitude capability.

Leon, Jeppson, and Barnes left Wendover by C-54 on June 25 to continue their training with the 509th in Tinian. The training included a half dozen long navigational flights to Iwo Jima (by then American occupied), and 16 bombing raids on Japan, in which "pumpkins" loaded with high explosives were dropped from high altitudes.

The targets used for the "pumpkins" were chosen using two parameters: They were (1) in the general area of possible targets for nuclear strikes and (2) had been previously bombed. These missions were conducted with flights of two to six B-29s, so the Japanese air spotters would become accustomed to seeing small formations at high altitudes.

Coin flip for who went

When the time came for the Aug. 6 mission over Hiroshima, Leon and Jeppson flipped a coin to see who would aid Navy Capt. William Parsons, the scientist responsible for Little Boy. Jeppson won, and was aboard Enola Gay on the historic flight. Leon says they were so busy in the preflight checks of the arming and fuzing systems that the historical significance of the toss never occurred to him.

Following VJ Day, the 509th was transferred to Roswell Army Air Field, N.M., in October 1945, where it continued to work with Z Division in the flight testing of nuclear weapons.

DAVE'S DREAM CREW— Leon Smith, weaponeer, is in front row far right in this photo of the crew of Dave's Dream, the B-29 that dropped a Fat Man-style atomic bomb over Bikini atoll in the atomic weapons test series Operations Crossroads in July 1946. From left, back: 1st Lt. Robert Glenn, flight engineer; Maj. William Adams, navigator; Maj. Woodrow Swancutt, airplane commander; Maj. Harold Wood, bombardier; Capt. William Harrison, copilot; and Ensign David Anderson, weaponeer. From left, front: Capt. Paul Chenchar, Jr., radar observer; Tech. Sgt. Jack Cothran, radio operator; Cpl. Roland Modlin, scanner; Cpl. Herbert Lyons, scanner; and Leon Smith. Not pictured: Brig. Gen. Roger Ramey, Task Group 1.5 Commander; Col. W. J. Blanchard, Air Attack Commander; Col. D. R. Sutherland, bomb commander. (Photo courtesy of Leon Smith)

Leon, by then a civilian employee of Los Alamos, again flew with the 509th during Operation Crossroads. In January 1946, a Joint Task Force of Army, Navy, and Air Force representatives was organized to determine "the effects of the atomic bomb upon naval vessels in order to gain information of value to the national defense." Ninety-three target vessels — including battleships, aircraft carriers, cruisers, destroyers, submarines, landing craft, and merchant ships — were carefully spaced and instrumented to measure the effects of the July 1 air, and July 25 underwater, explosions in the Bikini lagoon. This massive operation required 242 ships, 156 aircraft, and 42,000 people.

Thirteen B-29s, designated Task Group 1.5 under Brig. Gen. Roger Ramey, were assigned duties of weather and radiological reconnaissance as well as the bomb drop itself. Practice ballistic drop tests were conducted near Alamogordo before the B-29s went on to Kwajalein in the Marshall Islands for the Crossroads tests.

Leon served as weaponeer for the July 1 air drop, which was conducted from a height of 32,000 ft. The B-29 commander was Maj. Woodrow Swancutt. The plane involved was the same one on which Leon had stood by for the Hiroshima mission. The plane was now named Dave's Dream in memory of a bombardier with the crew, Dave Semple, who had been killed several months earlier in a crash near Los Lunas, N.M. (see crew photo).

When the final score was tallied for both Bikini nuclear tests, all but nine of the 92 target ships were either sunk, suffered damage, or reflected the seriously lingering effects of dangerous radioactive contamination. However, Crossroads demonstrated to the political leaders and the Navy that the US fleet was far from obsolete. Although it was determined that ships should undergo certain design changes

(Continued on next page)

Former Sandian Ray Brin conducted tests on Fat Man bomb, loaded it for Nagasaki flight

Engineer active in Manhattan Project from 1944-46

A retired Sandia engineer, Raymond Brin, contributed to many aspects of the Manhattan Project in 1944-1946. He conducted development tests of the Fat Man bomb and coordinated nuclear bomb and B-29 aircraft compatibility tests at Los Alamos; Wendover Army Air Field, Utah; Kirtland Army Air Field, N.M.; and Tinian island in the Marianas.

Ray was a US Air Force private first class in the Army Special Training Program at Ohio State University when he was transferred to Los Alamos on March 15, 1944, to work on the Manhattan Project. He worked in Division E-2 under the direction of Norman Ramsey and Bernard Waldman until April 1, 1945. He helped develop V-Site into a high explosive (HE) assembly facility, for mock-up and mechanical testing.

He then coordinated the design and construction of a B-29 bomb bay section, which was mounted on wheels for mobility, to simulate the Little Boy and Fat Man bomb installations. For security reasons, the only airplane equipment used was the H-frame and bomb hoists. The H-frame and release mechanisms were borrowed from the British, who had developed the single bomb lug release mechanism (with sway bracing) for the 12,000-pound blockbusters carried by Lancaster bombers. Los Alamos developed loading techniques and handling equipment, such as hoisting cradles, with this bomb bay mockup.

Too many bolts in original Fat Man

Ray conducted many tests of the original 1222 Fat Man sphere, which evolved into the 1560 Fat Man. He trained others in methods of assembling the 1222 HE sphere and developed rear cone attachments for the 1222. (The 1222 Fat Man design was subsequently discarded because 1,500 bolts were required for the assembly and because of poor ballistics.) He also conducted cold, vibration, and acceleration shock load tests on HE and inert units.

Ray worked in Pajarito Canyon on tests of HE units. The units were dropped eight feet onto a concrete slab to measure explosive sensitivity. Both 20 mm cannon and .50 caliber machine guns were fired at the units to determine armor effectiveness.

Seventeen Silverplate B-29s were modified (for nuclear weapon carriers) at the Glenn L. Martin plant in Nebraska and delivered to Wendover Air Field, Utah, in September 1944. Ray worked with the 509th Composite Group in aircraft liaison — compatibility of the nuclear bombs with the Silverplate B-29s. He supervised the installation of the bomb loading pit and turntable installation, monitored the loading of the ballistic drop test units, conducted in-flight temperature tests on the first 1560 Fat Man unit, and checked out the B-29 airplane wiring using the Silverplate ringout (electrical) box.

Three B-29s from the 509th flew three Fat Man assemblies, less the nuclear material, from Kirtland Army Air Field, N.M., to Mather Army Air Field, Calif., and then on to Tinian. Ray loaded these bombs for shipment and was the Manhattan Project escort of Fat Man to Tinian.

He accompanied the Hiroshima standby B-29, Big Stink (later named Dave's Dream), to Iwo Jima as reloading supervisor. His assignment was to reload Little Boy onto Big Stink if the Enola Gay suffered mechanical failure and had to make an emergency landing on Iwo. He participated in the checkout of Bock's Car and the loading of Fat Man onto Bock's Car for the Nagasaki flight. He was awarded the Army Commendation Medal for his contributions.

From October 1945 to March 1946, Ray worked for Glenn Fowler (who would later become a Sandia vice president) in Los Alamos' Z Division (the Los Alamos branch that moved to Sandia Base in Albuquerque in late 1945 and eventually became Sandia). He checked out B-29s for test drops, coordinated a bomb release mechanism rework program, and assimilated B-29 information and drawings.

From April 1946 to July 1946 he was assigned (under the direction of Fowler) to work with Task Group 1.5 of Operation Crossroads. This Army Air Group, commanded by General Roger M. Ramey and located at Roswell Army Air Field, N.M., was assigned 13 B-29s to carry out this high-altitude test of a Fat Man bomb at Bikini. He coordinated installation of precipitrons (radioactive particle precipitators) in the B-29s used for radiological recovery. Ray helped install radio equipment on Kwajalein for a communications net between Kwajalein, Bikini, and Enyriku. He conducted the B-29 electrical and radio preflight checkouts for all practice aircraft drop tests and for the Crossroads Able drop test of a Fat Man at 32,000 feet altitude.

Ray played a vital role in the epoch-making history of Los Alamos, Hiroshima, Nagasaki, and Bikini. He returned to Sandia in 1948 after graduating in mechanical engineering from Ohio State. He transferred to the new Sandia/Livermore branch in 1956 to work with the Lawrence Radiation Laboratory on weapon projects. He was project leader for the thermonuclear B-15 bomb. In 1966 he transferred to Nevada to manage the Tonopah Test Range. He held several middle-manager engineering positions in Albuquerque before his retirement from Sandia in 1982. Ray is a member of the National Atomic Museum Foundation. He recently volunteered to chair a committee to restore the museum's B-29, which will be renamed Dave's Dream.

— Randy Maydew

The fuzing system used to detonate the early atomic bombs

The fuzing system on the Little Boy and Fat Man bombs with which Leon Smith worked consisted of multiple radars used in conjunction with timer and barometric pressure switch arming devices.

The main fuzing component was a radar unit named Archie that had been developed from an aircraft tail-warning radar unit. The unit bounced its signal off the ground and — at a predetermined altitude above the target, say 2,000 feet — would close a switch, sending the firing signal to the remainder of the fuzing system. For reliability, each bomber carried four Archie units, and an agreed reading by any two would initiate the signal.

The first arming device consisted of timer-operated switches. The timers were 15-second delay units, activated when arming wires were pulled by the bomb release. The purpose of the timer switches was to prevent premature detonation in case the Archie unit was activated by signals reflected from the plane itself.

The second arming device was a barometric pressure switch that was activated when the bomb dropped to an atmospheric pressure corresponding to an altitude of 7,000 ft.

When both the timer and pressure switches were triggered, the radar signal would detonate the bomb at the preset altitude.

The controls and monitoring for all these functions were put together in a unit called the Flight Test Box, located just aft of the flight engineer in the front compartment of the B-29. Lead-acid batteries supplied the power to the radars and firing system.

It was Leon's responsibility to check out these systems both preflight and during flight to ensure that they were functioning as designed.

Author Randy Maydew flew B-29s over Japan

Randy Maydew — the author of the articles on pages 6 and 7 — who retired in 1991 after a 40-year engineering career at Sandia, flew 30 missions as an Army Air Force B-29 navigator from Saipan to Japan in 1944-45. After getting his degrees in aeronautical engineering from the University of Colorado, he worked for three years for the National Advisory Committee for Aeronautics, then joined Sandia in 1952. He was chief of aerodynamics at Sandia for 23 years, responsible for the aerodynamic design of nuclear weapons, rockets, and parachutes. His last four years at Sandia were spent as managing editor of *Sandia Weapons Review* and *Sandia Technology*.

Randy still lives in Albuquerque. He says he's enjoying his retirement, keeping busy with freelance writing, volunteer work at the National Atomic Museum (he's a Trustee and the museum's technical editor), and keeping up his pecan farm in Las Cruces, N.M.

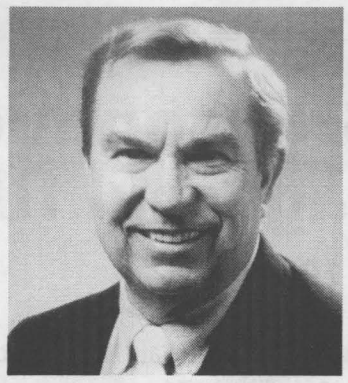
(Continued from preceding page)

and have radioactive-contamination washdown systems, the overall conclusion was that "the atomic bomb is not at present, nor will it be for some time to come, a practical weapon for use against a fleet at sea."

Leon came to work at Sandia in 1947 as an engineer of a bomb fuzing group. He was promoted to Director of Electromechnical Systems in 1961 and held a variety of nuclear engineering director positions (Components, Weapons Development, Exploratory Weapons Development, Monitoring Systems) until his retirement in 1988.

Mileposts

July 1995



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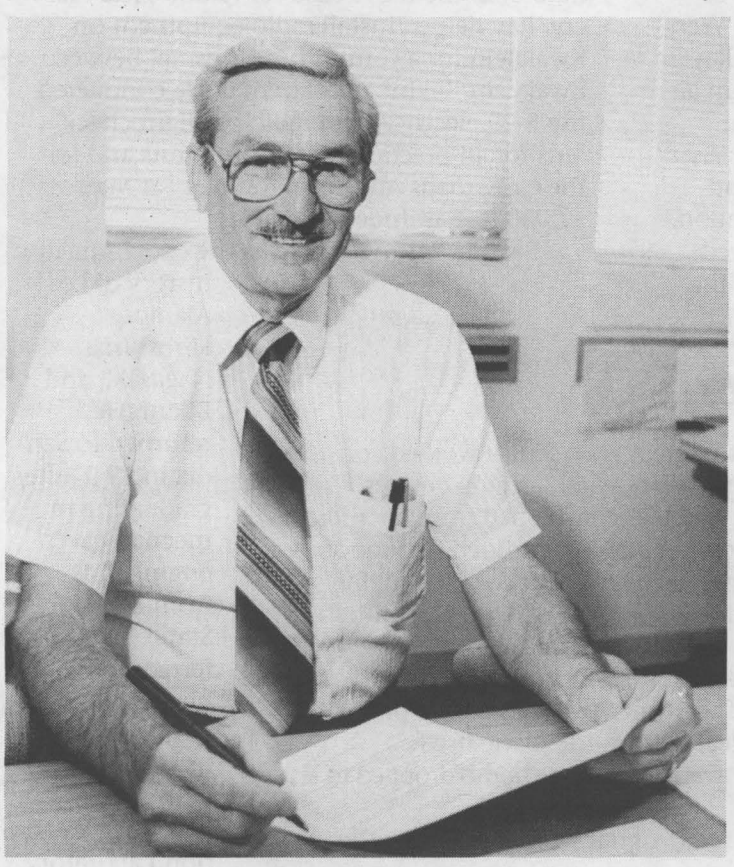

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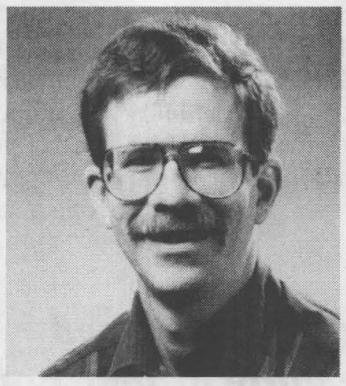

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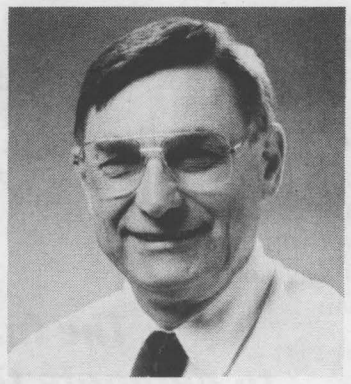

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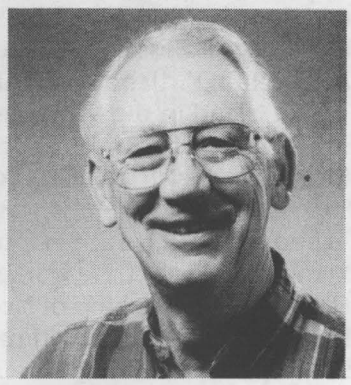

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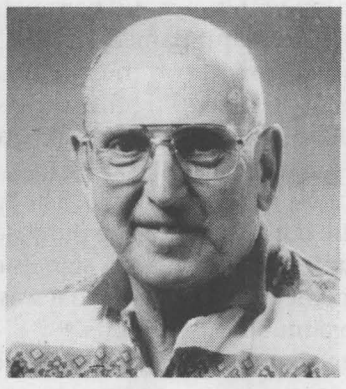

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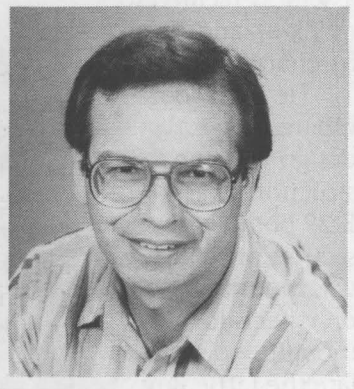

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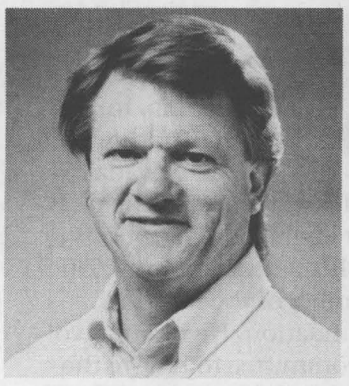

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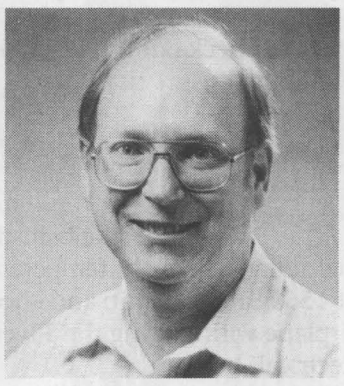

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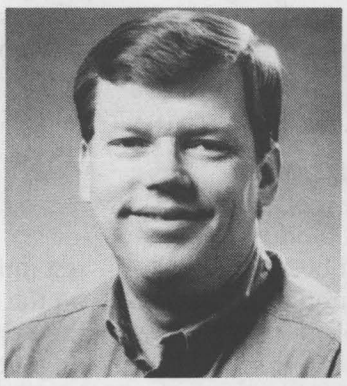

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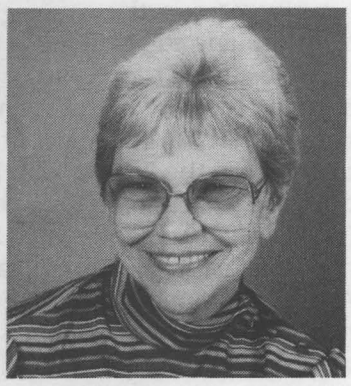

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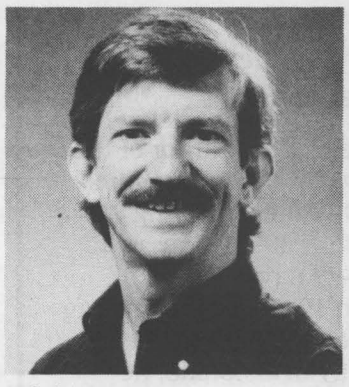

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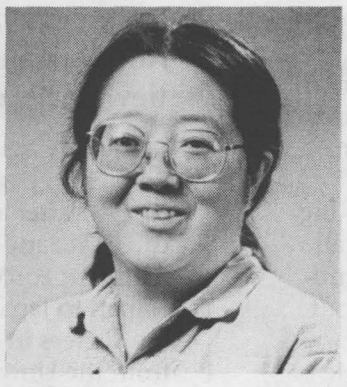

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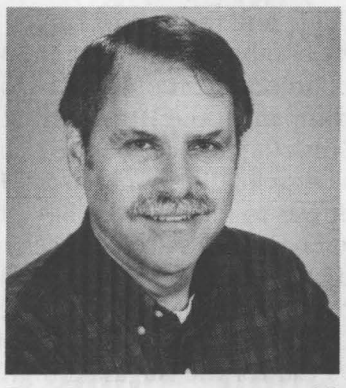

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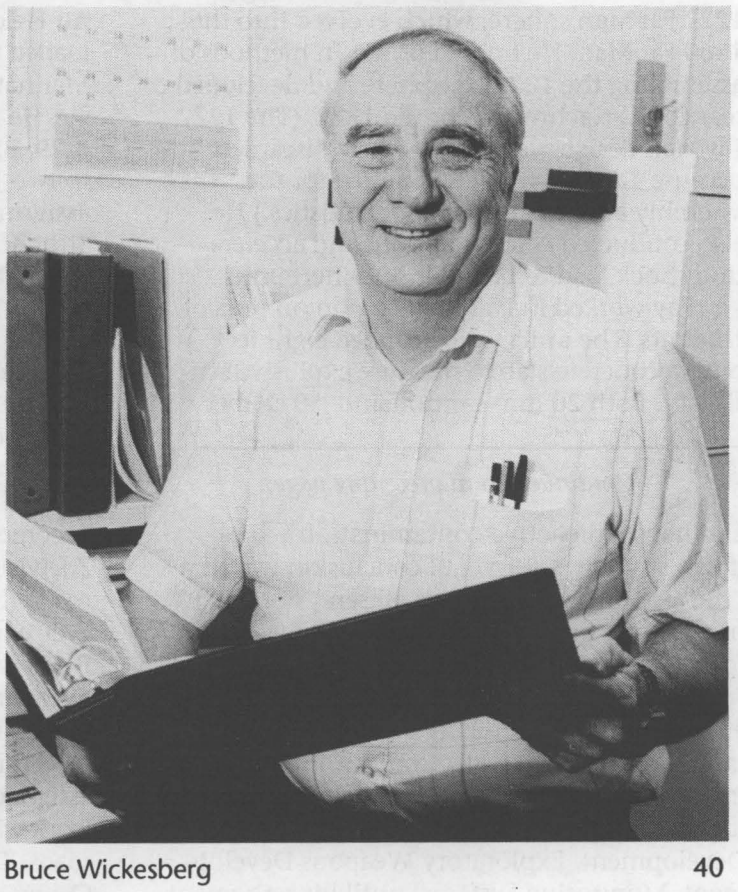

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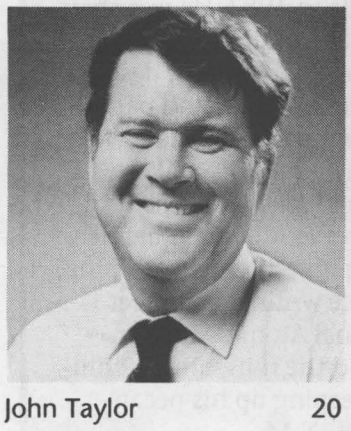

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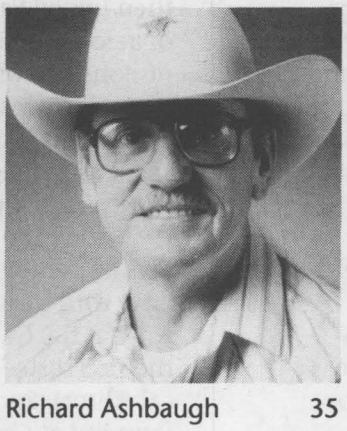

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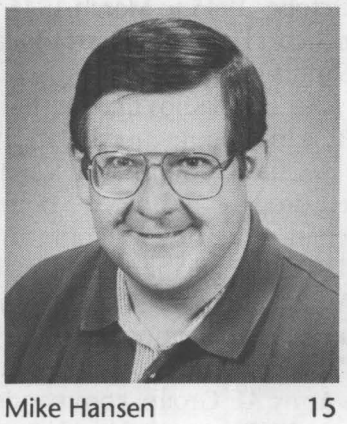

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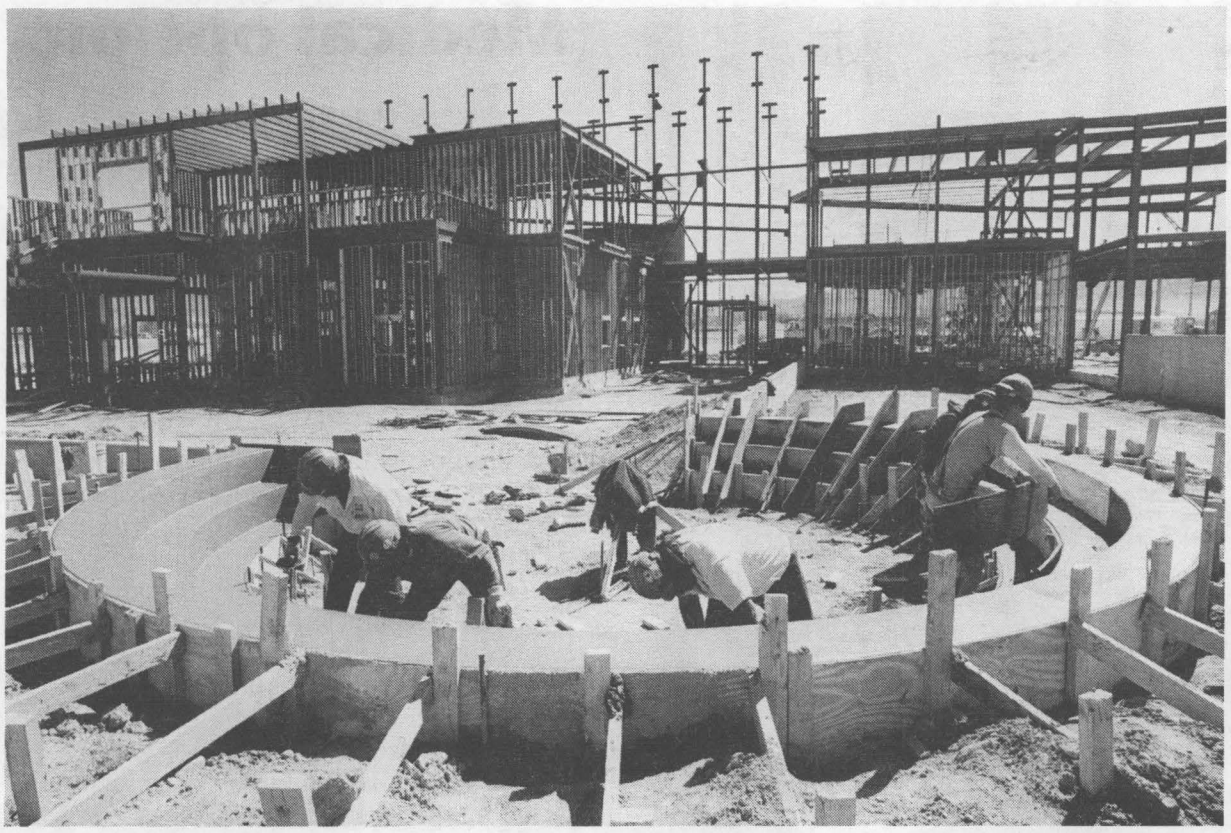
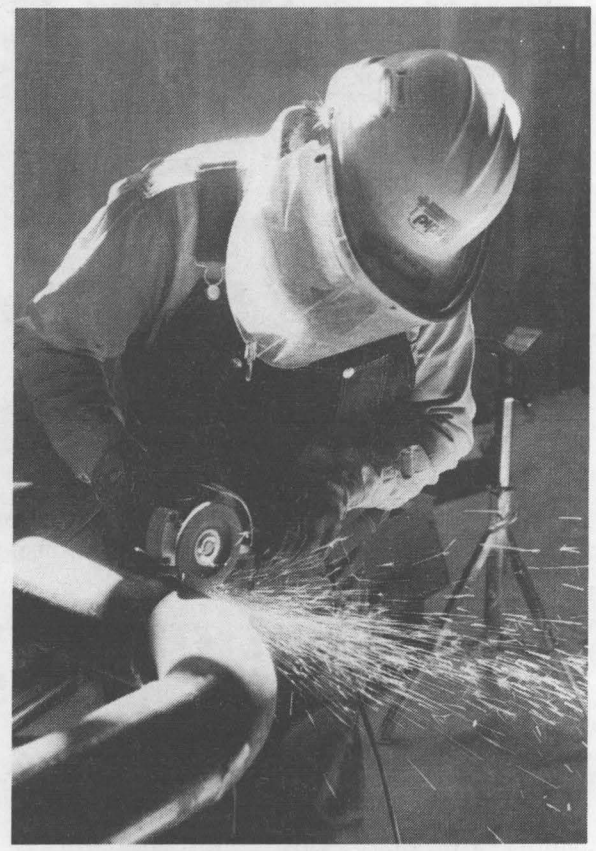


HARD HAT HEAVEN — Workers remove supports from the outdoor amphitheater at the new Robotic Manufacturing Science and Engineering Lab (RMSEL). The RMSEL, which was designed to be accessible for technology transfer tours, also features an outdoor dirt track for testing mobile robots.



HOMER JONES grinds down a weld in the basement of the RMSEL.

New construction gives Labs needed space and a facelift

State-of-the-art facilities popping up around Sandia

If you've noticed an abundance of bulldozers, cranes, and dump trucks around the Labs lately, it's because Sandia is undergoing a construction boom. There are more line-item and general plant projects (GPP) under way at Sandia now than ever before. Currently, 15 buildings are under construction, with projects totaling $241.5 million.

"This is an extremely busy time for our project management teams," says Don Glidewell of Corporate Construction Program Office 7903. "Virtually every line-item building under construction is unique in its design and function. It provides some interesting challenges to our design and construction teams."

Don says the new Center for National Security and Arms Control (CNSAC) building presents unique challenges because it must be designed and built to security standards not applied to other facilities. Don says separate areas within the building have their own elevators, stairs, and security systems. Treaty verification, arms control, and related technical activities are the main tasks that will be performed at the facility, which is expected to be occupied in 1996.

TILE TIME — Jimmy Lujan of Business Environments lays tile in the new Center for National Security and Arms Control (CNSAC) building, a four-story facility expected to be occupied in 1996.

The new Robotic Manufacturing Science and Engineering Lab (RMSEL), expected to be completed by January 1997, also has many unique features. Pam McKeever (7903) says the main design feature of the facility is a hallway that dissects the building. It will serve as a tour route for technology transfer visits. Pam says most of the laboratories have windows facing the center hallway so visitors can observe the work being done inside the labs. Other features include an outdoor amphitheater for lectures and demonstrations and a dirt track to test mobile robots.

And there's more. The Nonnuclear Reconfiguration (NNR) complex relocates several non-nuclear programs to Sandia, including the Neutron Generator program from the Pinellas plant in Florida and the Milliwatt Generator Heat Source program from the Mound plant in Ohio. The new Explosive Components Facility (ECF), located northeast of Area 2, houses explosives laboratory areas and remote explosive storage magazines. Development of weapons evaluation, explosive and neutronic components, and power sources will be the primary tasks performed at the ECF.

In addition to these line-item projects, there are several general plant projects going on at Sandia. These include the construction of small new facilities and the expansion of existing facilities. Don says there are three generic

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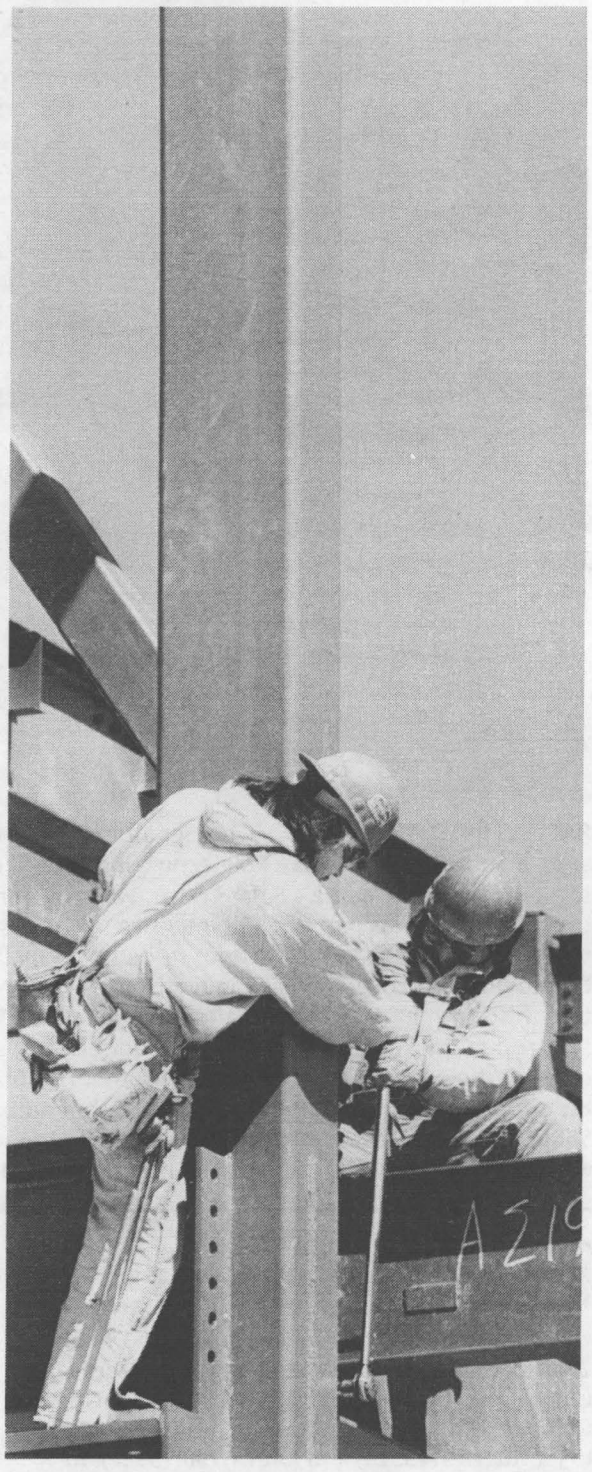
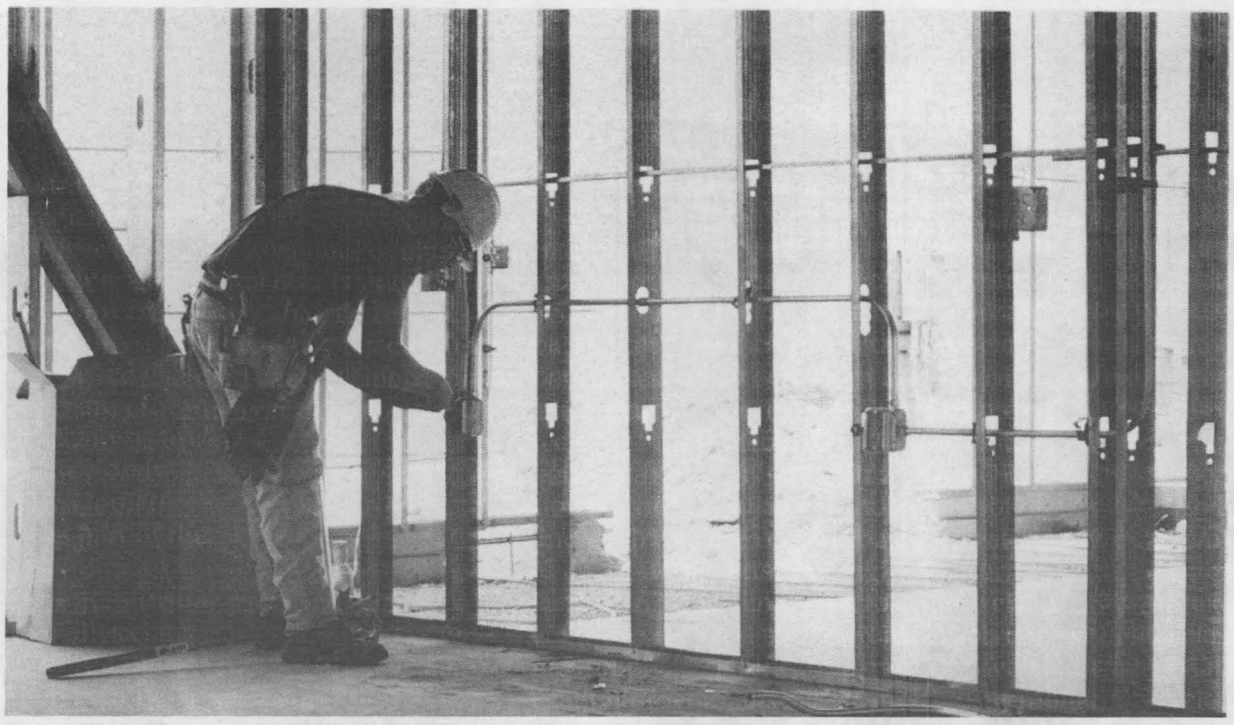


BEAM ME UP — Steelworkers tighten bolts at the two-story RMSEL. Completion of the RMSEL is scheduled for January 1997.



WIRED — An electrician installs wiring in the Integrated Manufacturing Design Facility (IMDF). An average of 700 construction workers are on site every day at Sandia.

Construction

(Continued from page 9)

GPP buildings currently under construction, with more planned for the near future.

"This has been a very productive year for Sandia's Corporate Construction Program," says program manager Jim Furaus. "It is the most construction that has been accomplished in one year in the history of Sandia. One of the key factors in getting all of this work done is emphasis on teamwork. It takes the combined efforts of many individuals and engineering and scientific disciplines to integrate customer and stakeholder requirements, as well as satisfy DOE orders and federal and local regulations."

RACING INTO THE FUTURE — US Senator Jeff Bingaman prepares to race a solar car against Shaun Tsabetsaye, a Southwestern Indian Polytechnic Institute (SIPI) student from Zuni pueblo. Sen. Bingaman visited SIPI students July 6 at Sandia's Solar Tower, where students demonstrated their solar energy projects developed over the summer as part of SIPI's intensive six-week summer program. The DOE-sponsored SIPI program provides Native American high school students from all parts of the US with the skills, knowledge, and motivation to pursue a college degree in math, science, or technology. Ten Sandians are serving as SIPI project mentors this summer, including Walter Worobey (2411), who is giving 10 students a physics, chemistry, and electronics background to help them understand solar energy. Walter says his students are "very bright, enthusiastic — it's hard to keep up with them." Ruth Bitsui (3613), Sandia's SIPI program coordinator, says the program is just ending its second year but administrators can already be proud of its success: a former SIPI student, impressed with a SIPI field trip to Lawrence Livermore's supercomputing facilities and the University of California (UC), Berkeley, is now enrolled at UC studying computer science.

Fun & Games

Tennis — Results for the Round-Robin Doubles Tennis Tournament played July 8-9 at the Coronado Club tennis courts: First place Men's Doubles went to Cliff Ho (6115) and Gary Porter (USAF), and second to Joe Ruggles (13314) and John Wolfe (5921). In Women's Doubles, Shigeko Porter and Tomoko Hisaki took first place, and second place honors went to Carmen Allen (9215) and Yuko Hirayama. Doug and Diane Cloud placed first in Mixed Doubles, and second went to Fred and Sara Cericola (ret.).

* * *

Bowling — SANDOE Bowling Association April/May Bowlers-of-the-Month include: Scratch — Ron van Theemsche (2709), 682, and Rena Yellowrobe (6423), 548; Handicap — Fred Gunckel (ret.), 664 and 700, and Liz Domme-Hansen (10502), 506 and 668.

Medical options

(Continued from page 5)

Dorothy says. Procurement Center 10200 handled the competitive procurement, and the process was directed by Sandia contracting representative Dan Salmen (10244). Some of the criteria important to the selection process were:

Physician Usage. Are the family physicians and specialists in the network matched closely with the physicians that Sandians are using? A database of compiled usage for 1994 was used to determine which network most closely matched the group of physicians Sandians use, and this database was used as part of the selection criteria.

Quality. What process does the administrator use for selecting and retaining physicians and hospitals within the network? Are there centers of excellence that build on quality processes to treat certain illnesses? How is the network managed?

Accessibility. Is all necessary medical care, including specialist care, close to where Sandians live and work? Are there enough physicians with open practices to offer acceptable waiting times for appointments and urgent care?

Choice. Are there enough physicians and hospitals to offer a range of choice within the network for Sandians?

Long-term cost management. Can a Triple Option Plan be effectively administered for a reasonable charge? Are costs controlled by eliminating waste and inappropriate charges?

"We reviewed all the medical proposals received, keeping in mind Sandians' needs," Larry says, "and I believe an excellent network has been secured through Prudential . . . The other coverages being presented will also help Sandians who want additional benefits."

Other employers' views of Triple Option Plan

The *Lab News* contacted a couple New Mexican employers to get their opinions on the Triple Option Plan:

• *State of New Mexico Employee Benefits Bureau.* Susie Varela, benefits administrator, says the bureau switched to the Triple Option Plan in 1992. "It's working great for us now," she says. "The state has saved a lot of money, and the group health insurance rate for state employees has even decreased 5 percent." Susie says the first three or four months were rough because the employees were unfamiliar with the plan, but now most of them choose the Primary Care Physician Option because it provides the "highest benefit level" to the patient.

• *Public Schools Insurance Authority.* Olivia Trujillo, deputy director of the insurance authority, says her group has used the Triple Option Plan since October 1993, and she describes the plan as "very successful — people have a choice." Trujillo says her agency had its greatest savings the first year, achieving "lower copayments and increased benefits." And employee-paid premiums, remaining constant since the plan was brought in, were guaranteed not to be raised through at least June 1996.

Congratulations

To Teresa Garpstas and Rex LeGalley (13914), married in Kauai, Hawaii, July 11.

Sandia Classified Ads

DEADLINE: Friday noon before week of publication unless changed by holiday. MAIL to Dept. 12622, MS 0413, or FAX to 844-0645. You may also send ads by e-mail to Nancy Campanozzi (nrcampa@sandia.gov). Questions? Call Nancy on 844-7522.

Note: The number of ads received is steadily increasing; our space is not. To resolve this, we are now limiting people to one ad per issue. We will also strictly enforce the word limit and ask your help to keep ads as short as possible.

Ad Rules

1. Limit 18 words, including last name and home phone (the *Lab News* will edit longer ads).
2. Include organization and full name with the ad submission.
3. No phone-ins.
4. Use 8½-by 11-inch paper.
5. Type or print ad legibly; use accepted abbreviations.
6. One ad per issue.
7. We will not run the same for sale or wanted 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 for occupancy without regard to race, creed, color, or national origin.
12. "Work Wanted" ads limited to student-aged children of employees.

MISCELLANEOUS

FREE LAVA ROCKS, more than 100 pounds. Ewen, 836-3563.

CHAIR, excellent condition. Sanchez, 877-0526.

HAWKIN RIFLE, 50-caliber, $200; 1860 Navy revolver, $60; 1864 Army revolver, $60; all black powder. Wanya, 294-2050.

FREE KITTENS, 6 wks. old on 7/5, very cute. Messer, 272-8396.

CAMERA TRIPOD, $15; tennis racquet stringer, for regular, oversize/ widebody racquets, $25; stereo rack, walnut finish, $15. Horn, 821-6721.

COLORADO BLUE SPRUCE (6 ft. & very healthy), digging & delivery negotiable, $120. Bauck, 856-5472.

BEDROOM SET, Bassett, walnut (light) dresser, mirror, nightstand, headboard, frame, box spring, excellent condition, $250. Myers, 271-1525.

FREE ROCK, u-haul-it, 4.5 cubic yards, coarse garden size. Stephens, 766-6674.

FREE KITTENS, 3 black/gray males, 2 female calicos, ready now. Waddoups, 865-7952.

PRECIOUS MOMENTS COLLECTION, $35 to $100. Wenzelburger, 256-9370, after 5 p.m.

SUPER SINGLE WATERBED W/S, like new, Western headboard; electric range w/hood vent. Garcia, 343-8207.

CLARINET, Bundy, excellent condition, used only 1 yr., $250. Sorenson, 298-1593.

35MM CAMERA, Minolta, SLR, includes Model X-370N, MD28-70/3.5-4.8 zoom lens, MD 50/1.7 lens, electroflash model 220X, $495. Kaiser, 828-1660.

COLOR LITHOS: Cia's "Periko Lund"; Bendell's "Miss America Pageant '87"; rare Asian art poster, $40 OBO. O'Keeffe, 899-7661.

TRAILER HITCH, fits '81 and later 900 series Saab, except '90-'91 SPG, new $180, will sell for $35. Horton, 883-7504.

MAYTAG GAS DRYER, free; 30-gal. electric water heater, $25 OBO. Jackson, 281-8927.

WATERBED, king-size, mattress & heater, HIB premium support K (Ultra R), $50. Bouchard, 831-4766.

SOFA & CHAIR, $200; 1.3 cu.ft. refrigerator, $60; 5-pc. oak-veneer dinette set (new $399), $225. El, 891-5732.

GREEN SOFA, w/wood trim, $150; gray dash cover for '94 Dodge Shadow, $15. McDonald, 265-9646.

SEGA GENESIS SYSTEM 2, w/4 controllers, including 2 cordless, 5 games including Mortal Kombat 2 & NBA JAM TE, $225. Martinez, 873-0530.

WINDOW AIR CONDITIONER, $25; rowing machine, like new, $50; kitchen table, $15. Gentry, 298-3574.

CHOICE BURIAL PLOTS, Sunset & M. Gardens, bargain price. Babcock, 299-3121, for more info leave message.

VIOLIN, bow & case, excellent condition, $350. Marder, 291-8140.

WEDDING GOWN, size 6/8, chantilly lace bodice & train, empire waist, full-length mantilla veil, simple but elegant, $100. Seyfer, 292-0179.

SKIL JIGSAW, 1/3-hp, variable speed, $25; Skil circular saw, 2-1/4-hp, w/extra blade, $45. Stocks, 823-1541.

CARDIO-GLIDER, excellent condition, rarely used, $175. Valencia, 255-9365.

WADING POOL, molded plastic, 5-ft. diameter, 12-in. deep, excellent condition, $7. Meeks, 828-9825.

FREE RIVER GRAVEL, 2-3 in., approx. 2 yards, you haul, I'll help load. Ward, 296-2207.

TWO VCRs, Mitsubishi & Magnavox, good condition, need tune-up, $75 & $50, respectively. Barnes, 265-2836.

AUDIO TAPE RECORDER, Norelco, reel-to-reel, w/lots of tape, $25. Smith, 299-6873.

TOW HITCH, fits down-sized Jeep Cherokee, 3,500-lb. capacity, mounting hardware included, $35. Ohrt, 292-1316.

IBM-COMPATIBLE COMPUTER, 486DX66, 16-MB RAM, 300-MB HD, SVGA card & monitor, Windows Microsoft Office, $850. Burstein, 899-8971, after 6 p.m.

CHARBROIL GRILL, w/tank, $30; extra butane tank, $10; Phillips portable CD player, $50. Schmitt, 856-1280.

FREE FILL DIRT, 2 cubic yds., you haul. Duncan, 271-2718.

ROTOTILLER, Toro, 5-hp, $250. Wrobel, 293-0283.

FUTON, w/cover, $160; sewing machine table, $75; desk chair, $50; Regina vacuum, $90, futon frame, $125. Price, 242-0263.

QUARTER HORSE FILLY, full-blood, 2 yr. old, $500 OBO. Everett, 873-6132.

REFRIGERATOR, new GE Spacemaker, 3.8 cu. ft., $100; TV, RCA, XL100, 19-in. color, $75. VanLeeuwen, 296-6767.

HOTPOINT WASHER, heavy-duty, Whirlpool dryer, electric, large-capacity, $300/pair. Epperson, 888-3155.

ELECTRIC LAWN MOWER, Black & Decker, 18-in. electric, $40; covered cat litter box, new, $4. Lippis, 898-8429.

COLOR TV, Zenith, 25 in., $110; water-skiing equipment, top-of-the-line, $75 ea. OBO; 35mm Rolleflex, $50. Schowers, 822-8494.

GAS MOWER, $20; Coleman gas lantern, $10; black plastic tubing, 1" ID x 100', $5; used law chairs, $2 ea. Hayes, 299-1200.

SWIVEL STOOL, w/footrail, padded seat & back, new condition, $15. Siegrist, 293-4148.

WASHER/DRYER SET, Maytag, excellent condition, $300/pair; couch & loveseat, good condition, $100 OBO. Vigil, 899-0046.

PC-RAM, 1x9 SIMM, 1MB, 4 ea. 3-chip, $120; 4 ea. 9-chip, $100, all $200. Mix, 299-7547.

CORNET, Bundy, classic, complete restoration, Serial #23276, best offer to recover repair costs of $278.71. Guthrie, 888-4341.

EUROPEAN DOUBLE BED, w/mattress, $75; Smith-Corona electric typewriter, $30; Sharp electronic combination typewriter/printer, $100. Tibbetts, 293-2856.

BAR, imported wood from Guatemala, w/built-in wine rack & glass rack, w/2 stools, $400. Wernicke, 298-4819.

SECTIONAL, beautiful, purchased @ La-Z-Boy Galleries on 5/25 for $2,450, brand new, will sell for $1,850 firm. Milliman, 291-8105.

GATEWAY, 486DX33, 8 MB RAM, 200 MB HD, 14-in. non-interlaced SVGA monitor, sound blaster card, speakers, $900. Gelet, 897-5042.

CELLULAR BLINDS, Hunter Douglas, ivory or salmon, perfect condition, pole rods w/brackets, natural wood. Hill, 856-6423.

TENNIS RACKET, Prince CTS Synergy DB 26, grip size 4-3/8, like new condition, $50 OBO. Zanders, 856-7857.

UTILITY TRAILER, $250; washer & dryer, $250; freezer, $100; tree stands, $45 ea.; coffee table, $20. Knight, 839-0948.

REFRIGERATOR/FREEZER, $125. Osburn, 286-1758.

RABBITS, free to good homes. Fischer, 296-6122, leave message.

SLEEPER SOFA, couch; antique secretary; maple dinette; Brother's word processor; Whirlpool; chest; computer/monitor. Dunivan, 296-3937.

MOVING SALE: drafting table, air compressor, table saw, shredder, camper shell, tent, camping equipment, lumber, misc. Kerschen, 881-7461.

JVC TAPE DECK, dinette table; electric ice-cream freezer; full-size dual-control electric blanket. Barton, 268-7349.

WATERBED, queen, bookcase headboard w/mirror, padded rails, captain's pedestal, lots of storage, dark oak, $225. Klenke, 898-8771.

QUEEN-SIZE WATERBED, walnut bookcase headboard, 6 underdresser drawers & hydroflex mattress, w/3 sets sheets & mattress cover, $195. O'Dowd, 299-1789.

FREE LAWN MOWER, Sears, gasoline, runs poorly; free Sears charcoal grill, fair condition. Ballweg, 345-3524.

BEDROOM SET, matching single headboard w/frame, mattress, box spring, 2 nite stands, dresser, desk & chair, $600. Voccio, 266-7881.

COFFEE/END TABLES, contemporary, 3-pieces, black w/brass accents, excellent condition, $250; glass dining table/chairs, $150. Romero, 821-8749.

GLASS-TOP TABLE, black wrought-iron, 42-in. diameter, w/4 matching cushioned chairs, $100 firm. Farrell, 881-2443.

BIKE RACK, Yakima, dual, upright mounting, locks, towers, cross bars, upright lock jaws, used once, $190. Church, 281-5215.

MOVING SALE: woodburning stove, w/forced-air options, best offer; couch, $75; microwave, $50; dryer, $100; kitchen items. Rector, 286-1217.

HANDGUNS, .22 Beretta, semi-auto, w/tip barrel; Charter Arms .44 special revolver, Pachmyer grips, $150 ea. Dodson, 271-0468.

MULTI-USE ROWER/EXERCISER, $35; new tan LBB coats, $3 ea.; electric heaters, $5 & $15. Goodwin, 294-6702.

MOVING: Gulbransen premiere organ, $1,375; 54-in. Weber baby grand piano, $2,550, excellent condition. Conant, 884-8546.

WOOD CABINETS, w/wh. formica tops, never installed, $250; travertine marble coffee tables, moving, must sell, $350. Gonzales, 877-7747.

TRANSPORTATION

'93 NISSAN SENTRA E, 4-dr., AC, PB, antilock, PS, low miles, must sell, great condition, $9,750. Smith, 292-6425.

'84 DODGE W150, $4,000; '79 Starcraft pop-up, $2,000; '73 Mustang, $2,000; '69 Plymouth Satellite, $1,000. Morrow, 281-3417.

'89 BUICK CENTURY, 4-cyl., fuel-injected, 4-dr. sedan, AT, PS, PB, AC, good outside/inside, $3,000. Hinnerichs, 298-5525.

'71 VW BUG, good body, good interior, good engine, needs paint, $1,400 OBO. Lesperance, 262-0633.

'94 HONDA ACCORD EX, 4-dr., AT, excellent condition, $18,200 OBO. Archuleta, 865-1899.

'90 ACURA LEGEND, 2-dr., AT, AC, sunroof, power everything, only 47K miles, excellent condition throughout, $15,500. Evans, 265-5229.

'81 TOYOTA CELICA GT LIFTBACK, 120K miles, light blue, blue cloth interior (excellent condition), cruise, 5-spd., runs well. Hatch, 281-0543.

'91 FORD TEMPO GL, gold, 4-dr., loaded, only 36K miles, below book @ $6,700. Thalhammer, 298-8521.

'68 TRIUMPH GT6, wire rims, new paint, upholstery, tires, too much to list, true classic, $3,750. Kissam, 266-1671.

'73 DODGE CORONET, 4-dr., 6-cyl., high mileage, runs well, $600. Mitchell, 281-6841.

'87 MAZDA 323 LX, 4-dr., 5-spd., very clean, great family car, $2,500. Wix, 898-9086.

'93 TOYOTA CAMARY, forest green, dark-tinted windows, excellent condition, must see, 22K miles, $13,900. Sisneros, 292-1854.

'89 CHEV. CORSICA, V6, 4-dr., PS, AC, stereo, good condition, $3,000. Voelkel, (510) 455-4389.

'81 FORD F100 PICKUP, 6-cyl., 4-spd., short-wide body, $2,000. Marquez, 873-4702.

'83 MEGNA, V45-750, $3,000 OBO; '83 Buick Regal, 6 cyl., $2,500 OBO, both vehicles excellent condition. Ortiz, 766-5676.

'79 FIAT CONVERTIBLE, new top, good repaint, excellent overall condition, 72K miles, $3,000. Salmen, 881-8612.

'93 MAZDA MIATA, 1,500 miles, as new condition, garaged & covered, lots of extras. Marlman, 883-8660.

'90 BRONCO II, 5-spd., AC, 4 WD, excellent condition, AM/FM, 75K (highway miles), $7,800. Sais, 864-6986 or 423-3218.

'50 WILLY'S JEEP, w/canvas top, 12V electrical, new front hubs, good condition, runs great, $1,600 OBO. Grasser, 271-9603.

'85 NISSAN STANZA, original owner, 46K miles, excellent condition, $3,250; '81 Chev. Silverado pickup, $2,500. Anderson, 883-2647.

'91 FORD MUSTANG, low miles, CD player, superb condition, $10,500 OBO. Brown, 266-1653.

'85 FORD F-150, 4x4, AC, dual tanks, 92K miles, 4-spd., 5.0L, EFI V8, long bed, $3,850. Wernicke, 298-4819.

'62 CHEV. FLATBED, 20 ft., C60 manual, hi-low rear end, V8 engine, good body, tires & upholstery, $2,500. Armstrong, 888-1887.

'86 FORD MUSTANG GT, 5.0, fully loaded, T-top, low mileage, excellent condition, all records, manuals, $5,500. Rivera, 299-2834.

'71 MERCEDES 280S, 4-dr., AT, AC, PS, PB, perfectly maintained & driven, always garaged, white w/blue interior, $9,500. Richards, 296-2272.

'89 FORD TEMPO, metallic red, gray interior, PS, PB, AC, 65K miles, $3,299 make offer. Zamorski, 293-7706.

'93 SUBARU LOYALE WAGON, front-wheel drive, 5-spd M/T, 32K miles, AC, PS, PB, white, excellent condition, $9,500. Stueber, 867-3074.

'87 MAZDA RX-7 SPORT, blue, 5-spd., alloy wheels, AC, cassette, good tires, less than 50K miles, excellent condition, $7,500. Mattern, 856-6313.

RECREATIONAL

MOUNTAIN BIKE, $175. Eikelberg, 296-0899.

BOY'S MOUNTAIN BIKE, 24-in. Huffy, excellent condition, very little use, $60. Langwell, 293-2728.

KAWASAKI KX-80, runs perfect, $650. Lachenmeyer, 268-7818.

BICYCLE, 10-speed, Sears Free Spirit, $50. Doran, 255-9321.

'72 RUNABOUT BOAT, fiberglass, Emerald 15 ft., w/Evinrude 25-hp outboard motor, $900 OBO. Claussen, 293-9707, leave message.

'93 MOTOR HOME, 34-ft., Cummins Diesel Pusher, 6-spd., Allison World transmission, 7K miles, must sell, $65,000. Padilla, 864-4787 or 873-5847.

'88 HARLEY-DAVIDSON, 1200cc Sportster, low miles, S&S carb., plus extras, $6,300 firm. Mitchell, 281-6841.

GIRL'S BIKE, 20-in., like new, $50; 5-spd. man's Ross mountain bike, $40; boy's 20-in. bike, $30. Keener, 294-1919.

GIRL'S BIKE, Schwinn Fairlady, 20 in., excellent condition, $65. Goetsch, 892-8366.

'84 HONDA, Goldwing Aspencade 1200, intercom helmets, CB, cruise control, AM/FM cassette, 26,500 miles, like new, $4,600. Jaramillo, 864-8153.

REAL ESTATE

LOTS, north side of Heron Lake, 3-10 acres, locked gate, beautiful wooded area. Roehrig, (505) 588-7330.

REC CONTRACT on Belen property, valued at $14,000, 10% interest, good pay record, 30% discount, $7,150. Norwood, 292-0072.

FOOTHILLS HOME, 3,033 sq. ft, hardwood, spa-room, custom molding, built-ins, over $43,000 in upgrades, stunning/new, $299,900. Henry, 296-1781.

3-BDR. DW, Tijeras, 2-wooded acres, 1,568 sq. ft., island kitchen, 24 x 30, 2 baths, 2 car garage, redwood deck, $92,000. Carillo, 281-7059.

4.19 ACRES, east Sandia Mountains, Magic Valley, breathtaking views, utilities, 20 min. from Albuqueque, $63,900. Gabbard, 294-6904 or (510) 833-1933.

3-BDR. HOME, 2 baths, open & light floor plan, vaulted ceilings, 4+ yrs. old, in Nor Este Estates, LaCueva schools, $154,900. York, 828-9505.

5-BDR. HOME, nice family neighborhood, near Academy, new roof, 2,300 sq. ft., 2 story, $158,000. Reese, 828-0113.

3-BDR. HOME, 1 yr. old, 2-1/2 baths, living room, loft, formal dining, 2,000 sq. ft., two story, Tramway/Lomas area, $205,000. Brockett, 294-7304.

TWO 2.5 ACRE LOTS, Pine Meadow Ranches near Ramah, NM, valued at $6,500 ea., will sell $6,100 each OBO. Holloway, 294-5815.

3-BDR. HOME, University area, 2 baths, 1,980 sq. ft., on large corner lot, workshop, fenced backyard, $174,500. Hotchkiss, 256-0848.

4-BDR. BRICK HOME, new pitched roof, great yard, Menaul & Tramway, $169,500. Pohl, 299-1087.

WANTED

VINYL MINIBLINDS, 42" x 44" wide, 64" long, need three. Baker, 888-4220.

FREE PLANTS, for Club House, artificial or real, any size, will pick it up. Wagner, 823-9323.

FRENCH SPEAKERS for lunchtime conversation, weekly or bi-weekly. Dale, 291-9020.

BOAT MOTOR, 25-hp or larger, in good condition. Dempsey, 281-9101.

NEED ENGINE, transmission from '67 VW squareback/fastback; also Subaru 360 parts, 10-in. tires. Roberts, 866-5422.

NORDICTRACK SKI EXERCISER, Excel model or better. Lennox, 821-0474.

HEALTH-RIDER or Aerobic-ride. Bonzon, 828-1066.

STIHL CHAINSAW, Models 038, 044 or 051. Wright, 296-3850.

QUILTERS to contribute "Card Trick" block for charity quilt, also taking new members for quilting club. Gregory, 245-9309, call Cindy.

'85-'87 BIG WHEEL MOTORCYCLE, Yamaha 350 or 200E. Dramer, 821-8107, leave message.

ROOMMATE to share expenses w/single mother of one son, 4-bdr. mobile home, located at I25 & San Antonio. Crosby, 858-3128.

BUILDING MATERIALS, used or new, cheap or free, will haul. Fenimore, 298-8052.

WORK WANTED

HOUSE SITTING/RENT, by young married couple attending UNM graduate school, fall semester, details negotiable. McGee, 857-0661.

RESPONSIBLE 15 yr. old would like to babysit, northeast area only. Rodacy, 293-2668.

LOST & FOUND

FOUND: set of keys (6), one has a yellow rubber rim, Area 4, Bldg. 962, in auditorium area. Walker, 845-7010, call Vicki.

FOUND: gold wedding band, near Coronado Club pool, in June. Semonisck, 845-9877.

Cutting government paperwork and learning about the environment

High School students simplify 400-page Sandia report to 10 pages

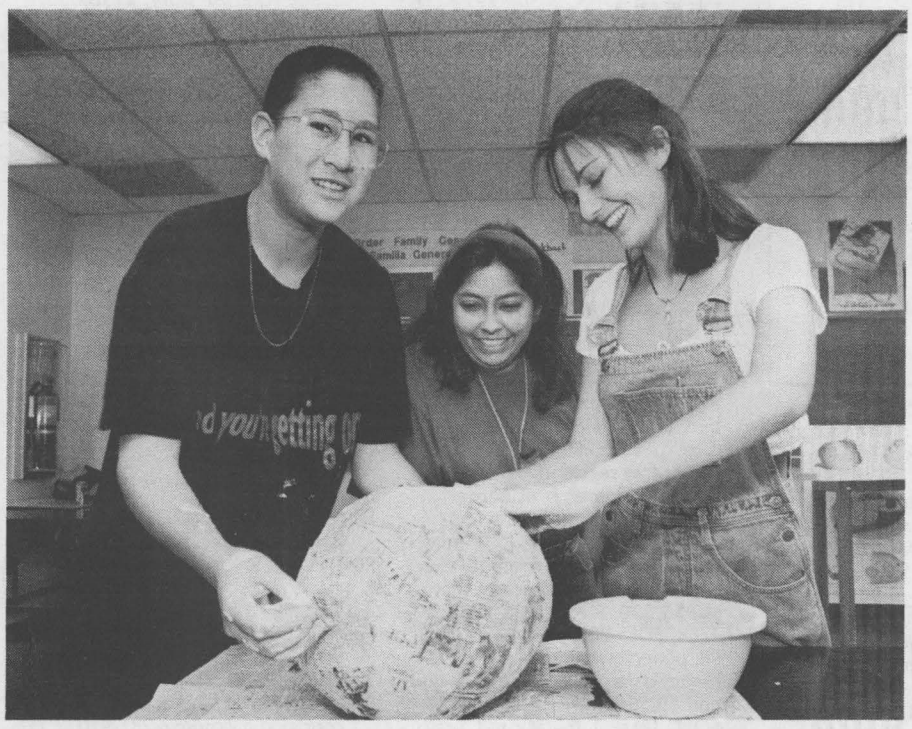
By Kathy Kuhlmann

Media Relations Dept. 12621

A group of local high school students have done their part to help reduce the amount of paperwork in the government.

Last fall, students at Rio Grande High School (RGHS) in Albuquerque and some Sandia employees began working together to simplify a massive environmental report and in the process, learned from each other.

Students in the "School within a School" program received sections of Sandia's extensive Annual Site Environmental Monitoring Report so they could provide their comments and opinions. The report, a public document prepared by Sandia for DOE, focuses on the Labs' work and compliance in environmental protection and monitoring. In its full form, the report runs approximately 400 pages, daunting reading for even the most interested individual.



ENVIRONMENTAL EXCELLENCE — Daniel Ramirez and Rita Apodaca, ninth graders at Rio Grande High School, work on an "environmental piñata," made from recycled newspapers, as teacher Margaret Palladino watches. Daniel and Rita excelled in a Sandia-sponsored environmental curriculum this past year and were awarded with offers of summer employment at Sandia to continue work on environmental programs.

The students worked to create a readable 10-page version of the full report. This supercondensed interpretation will be made available to those on the standard distribution list as well as to local libraries and schools late this summer. The summary describes, in nontechnical terms, the environmental monitoring work Sandia does.

The idea for this program originated last summer in Sandia's Air Quality Dept 7575, whose staff were interested in educating students about science and in making the environmental document more readable. The department's near-term goal was to shorten the full report by at least 100 pages.

Stephanie Pope, a University of New Mexico undergraduate biology student contracted to work for Sandia, was assigned to carry out this educational project. Stephanie worked with Margaret Palladino, an RGHS science teacher. Together they developed the curriculum for the Environmental Monitoring Report Education Program.

The "school within a school," which combines math, science, and English, with an emphasis on computer technology, seemed ideal for introducing the new curriculum. Each class, consisting of students of different ability levels, received four chapters of the environmental report — air quality surveillance, ground water monitoring, terrestrial surveillance, and water monitoring — and was asked to provide comments, which formed the basis of the 10-page summary. Almost 60 students participated in the program during the recently completed school year.

"The program brought the real world into the classroom," said Margaret. "It forced the students to think beyond their normal daily activities and routines. I think it's easier for them to learn when they can link what they're learning to reality."

This mini-course in environmental reporting was supplemented by weekly classroom presentations from Sandia scientists and two field trips to the Labs. In addition, as a class assignment each participating student had to design an air filter, based on the knowledge he or she had gained about air monitoring.

The students who exhibited outstanding achievement in the environmental curriculum, including both the air filter project and class participation, were recognized at an RGHS ceremony. The winners, Daniel Ramirez and Rita Apodaca — they'll be sophomores this fall — were offered an opportunity to work at Sandia on ecological surveillance and air monitoring projects and on the next version of the condensed environmental report. They also received certificates and day packs.

The ceremony also included interactive environmental demonstrations by Sandians, photo displays of the students working on air and water monitoring projects over the past year, and information about jobs at Sandia.

A curriculum is currently being reviewed and developed for a similar program for next school year.

Did you know?

$3 a week provides care for one day for a disabled person whose family needs temporary help caring for the person?

— Ernest C. Philanthrope

Employee Contribution Plan
Building our community with unity

ECP

Coronado Club

July 21 — Friday night buffet/dance. $7.95 all-you-can-eat buffet, 6-9 p.m. Music by Three Legged Willie, 7-11 p.m.

July 23 — Sunday brunch buffet, 10 a.m.-2 p.m. $7.95 adult members, $8.95 guests, $2.95 for children 4 to 12, free for children 3 and under. Music for buffet by Bob Weiler and Los Gatos, 1-4 p.m.

July 27, Aug. 3, 10, 17 — Thursday bingo nights. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

Aug. 4 — Friday night buffet/dance. $7.95 all-you-can-eat buffet, 6-9 p.m. Music by Isleta Poorboys, 7-11 p.m.

Aug. 6 — Sunday brunch buffet, 10 a.m.-2 p.m. $7.95 adult members, $8.95 guests, $2.95 for children 4 to 12, free for children 3 and under. Music for buffet by So Rare, 1-4 p.m.

Aug. 11 (Friday) — Kids' bingo night. Buffet, 5 p.m., with cartoons and movies. Bingo starts at 7 p.m. Free hot dog and soft drink for all kids playing bingo.

Welcome

New Mexico — Michael Lord (6749), James Ramsey (6749), Christine Stockman (6749)
California — Mark Christon (1513)
Massachusetts — Janet Wang (2151)
Nevada — Cindy Hemphill (12820)
Utah — Mark Grazier (6117)

this month in the past...

Sandia LAB NEWS

40 years ago...On the 10th anniversary of the Trinity test shot, unleashed in a deserted section of the Alamogordo Air Base, the *Lab News* recalled: "At 5:30 a.m., July 16, 1945, there occurred the 'unprecedented, magnificent, beautiful, and terrifying' detonation of the world's first nuclear fission bomb."

35 years ago...The Atomic Energy Commission conferred its Award of Honor on Sandia's Livermore Laboratory for passing the 3 million man-hour mark with an exceptional safety record. Attesting to the Livermore Lab's fine record, Sandian John Rogers was featured in a *Lab News* photo, holding a severely damaged safety shoe that saved John from injuries when a quarter-ton chunk of metal fell on his foot. John was obviously shaken, though, as the photo caption said he "now wears safety shoes wherever he goes — even walking or dancing."

30 years ago...Sandia's Livermore Laboratory received this letter from a schoolboy in England who had seen a Sandia ad in *Scientific American*: "I am very interested in explosives, and I was wondering if you could send me literature on what you do at Livermore. I would also be very grateful if you could send me some 'recipes' of explosives I might be able to make in the school laboratory here." Sandian George Damoulos sent the student a copy of *Sandia Science and Engineering* and referred him to the Atomic Weapons Research Establishment in England.