

Sandia Investigators Make Progress in Search for Possible Environmental Restoration Sites

Three scenes from the Labs' past:

A building somewhere in the Coyote Canyon test area needs sanitary facilities. A hole is dug and a septic tank put in.

A facility in Tech Area 3 needs a nearby source of fuel oil. An underground storage tank is installed.

Scrap metal pieces or solvents used for cleaning circuit boards aren't needed any more, so they're buried in a pit where it appears the material won't cause any problem.

From this sort of routine activity during Sandia's 40-plus years of operation — conducted within the bounds of environmental protection practices generally accepted at the time — have come about 190 environmental restoration sites

"We don't see anything . . . that's an imminent danger to anyone."

now being dealt with by Environmental Programs Dept. 7720. As a part of DOE's increased commitment to environment, safety, and health, and continuing work that has gone on for more than six years, people in this department are investigating sites where something that happened in the past might now threaten the environment.

Plans for assessing the actual condition of the

How to Get More Information About Environmental Issues

Wondering about environmental matters at Sandia? Employees are urged to ask questions about remediation of environmental restoration sites, as well as any other environmental issue. Call any number listed under Community Relations Div. 3163, and someone there will either have the answers or find them.

Because the environment is currently a much-discussed topic, employees may wish to keep this issue and refer to the articles in it when responding to questions from family or friends. The LAB NEWS will publish other environmental restoration updates as developments warrant.



UNDERGROUND STORAGE TANKS, removed this summer, are inspected by Art Rodriguez (7721). The locations where a number of aging underground tanks were removed are on Sandia's list of sites to be assessed and dealt with as part of the environmental restoration program.

sites are being drawn up, and the detailed assessments will be made in the next months and years.

No 'Emergency' Sites at Sandia

One of the Labs' technical areas, Tech Area 2, contains the only sites classified as "time critical" for finding out what's going on underground and determining whether there is in fact a threat to the environment. (See "Sandia's Top Priority," page six.)

All other Sandia sites are in a lower-priority, less-urgent DOE category. No Sandia site is in DOE's most urgent "emergency" category.

A site's inclusion on the list of 190 doesn't

mean that hazardous materials were definitely released to the environment. Many sites are listed because (often scanty) records of past use, or the memory of someone being interviewed about past activities, give reason to believe that hazardous materials *might have been* there.

"Let me emphasize that this is a list of *potentially* contaminated sites," says Gordon Smith, Manager of Department 7720. "As an illustration, if we're interviewing people and someone says something like, 'Well, I'm pretty sure that 20 years ago I saw somebody drive a truck over there and dump something,' that's enough to say it's a

(Continued on Page Four)



LAB NEWS

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Sandians Support 'Shoes for Kids'

As in past years, Sandians who are interested in helping others less fortunate are being given an opportunity to buy a pair of warm shoes for a child.

Called the "Shoes for Kids Campaign," the project seeks donations to purchase a pair of boots or shoes at lower-than-normal cost. Youngsters are chosen based on need by their school principals and will be fitted and provided with new footwear this month at Kinney Shoes.

According to Mary Ellen Gallegos, principal of Eugene Field Elementary School, these shoes may be the only ones these children have to wear all year.

The cost of a pair of shoes this year is \$25. Donors may write checks to "Shoes for Kids" and send them to Liz Scott-Patterson (5501), Bldg. 892, Rm. 100. Liz asks that donations be made as soon as possible. Contributions received later than Dec. 18 will go into a fund for next year.

Participation in the program can be both heartwarming and sobering, notes Liz. Children often write thank-you notes relating that the shoes they receive are the nicest shoes they've ever had and that they help them run faster and keep warm when it's cold outside.

One year, Liz helped fit a little girl who asked lots of questions about the Sandia scientists who paid for her shoes and made Liz promise to buy her another pair of shoes the following year. Liz later learned from the school principal that the youngster lived with her addict mother in a local "crack house."

Sandians have participated in the Shoes for Kids Campaign for more than 30 years, says Liz. Last year, 180 youngsters — the largest group so far — were fitted with new shoes through the program. ●



LAURENCE BROWN (left, 2471) and Dean Pershall (3511) discuss plans for the Dec. 7 meeting of the New Mexico Professional AISES (American Indian Science and Engineering Society) chapter, which recently became the first professional chapter recognized by the national AISES organization. About 25 professionals from Sandia, DOE, and other area organizations founded the local group. Laurence is chapter vice president. AISES seeks to increase the number of American Indian scientists and engineers and to develop technologically informed leaders within the Indian community. Anyone sharing that goal may join; associate membership is available to non-Indians and to American Indians who are not scientists or engineers. For more information about the group or upcoming meetings, call Dean on 5-9914 or Laurence on 4-7103.

**Venky, Ev Beckner to Leave Labs;
Fleury from AT&T Will Be VP-1000 —
See Pages Seven and Eight**

This & That

20/20 - Patricia Newman (5028) wants to know: "Are there any other second-generation 20-year Sandia veterans around?" When she celebrated her 20th service anniversary with Sandia in March, she began wearing the 20th-anniversary pin that her pop, John Tolmie (dec.), received from the Labs in 1970.

* * *

Innovative Cleanup Effort - Fifteen years ago, workers installing a grounding rod for a light pole at Sandia, Livermore caused a 60,000-gal. diesel oil leak when they accidentally punctured an underground line. When the leak was discovered about two weeks later, part of the fuel was removed from the trench, but most remained in the ground.

Back then it was pretty common just to leave such sites alone, thinking they would do very little or no harm, but environmental protection and cleanup movements today are changing the way we all do things, and some innovative solutions are being pursued. That's the case at this Livermore site, where naturally occurring bacteria in the soil will be "encouraged" to consume the hydrocarbons still in the soil - bioremediation, it's called.

You can read more about this technology in a sidebar (on page four) that goes along with other articles about the status of Sandia's environmental restoration program (main story begins on page one). All is not good news - the Labs obviously has some genuine environmental concerns - but I hope the stories will put our environmental concerns and problems into the proper context and maybe even help lay to rest some unfounded fears.

* * *

Wastewater Update - Speaking of environmental updates, see page nine for a piece written originally for the *Albuquerque Journal* by VP Glen Cheney (7000) about the low-level radioactive wastewater disposal issue. I think Glen's summary of the problem is something that all Sandians will find worth reading.

* * *

Favorite Old Photos Needed - As space allows, we publish "favorite old photos" and captions provided by Sandians. For the first time that I can remember, we don't have a one waiting to be published. A general guideline: Photos with the best chance of being published are ones that aren't simply old, but that also include some action, show some historical perspective, emphasize the unusual, or illustrate contrast between the times. If you have an old photo that you'd like us to consider, bring it by the LAB NEWS office in Bldg. 814, Rm 1. We can probably tell you right away if it's a good candidate. In Livermore, see Barry Schrader in Bldg. 911, Rm. 134.

* * *

From Across the Big Pond - Assistant Editor Charles Shirley found this one in a recent issue of *New Scientist* (published in London): "Computerspeak continues its effortless spread. Here's one computer expert replying on a phone-in programme to a complaint about the time that it took to get through on the telephone to the expert's computer company: 'We are continually increasing our decreasing of wait time.'"

* * *

Words Is Hard to Use Proper - Spotted on the packaging for a new board game: a blurb hyping it as a "classic new" game. ●LP

Carlson Succeeds Chernoff

Carlson Named KAO Manager

Kathleen Carlson has been named area manager of DOE Albuquerque's Kirtland Area Office (KAO). She succeeds Al Chernoff, who has become project manager for the Uranium



KATHLEEN CARLSON

Mill Tailings Remedial Action Project (UMTRA).

Carlson is now responsible for administering DOE's contract with Sandia, the Inhalation Toxicology Research Institute, and Ross Aviation. Her previous position was with DOE's Waste Operations Branch in the Waste Management and Operation Surety Division.

She joined DOE in 1975 with an MS in health physics from the University of Minnesota, working in ES&H and Waste Management programs in Idaho Falls, Idaho. In 1980, she became program manager for Transportation Research and Development in DOE/AL's Waste Management Program. She has also been W84 and W89 program engineer and cruise missile program manager while in the Weapons Program Division, as well as Deputy Manager for the UMTRA project.

Carlson was honored as DOE/AL's FY90 "Boss of the Year." She is a member of the New Mexico Network for Women in Science and Engineering.

Earnings Factors September 1991

| Long-Term Savings Plan for Management Employees (LTSPME) | Earnings Factors |
|--|------------------|
| AT&T Shares | .9697 |
| Government Obligations | 1.0122 |
| Equity Portfolio | .9840 |
| Guaranteed Interest Fund | 1.0071 |
| South Africa Restricted Fund | .9908 |

Long-Term Savings and Security Plan (LTSSP)

| | |
|------------------------------|--------|
| AT&T Shares | .9698 |
| Guaranteed Interest Fund | 1.0071 |
| South Africa Restricted Fund | .9905 |
| Equity Portfolio | .9837 |
| Employer Stock Fund | .9697 |

Welcome

Albuquerque - Maureen Barrett (21-1), Peggy Butler (21-1), Todd Culp (7723), Deborah Dominguez (3742), Maxine Gallegos (21-1), Sharon Ortiz (21-1), James Riley (3727), Jacquelyn Von Loh (21-1); *Other New Mexico* - Paula Schoeneman (21-1).

Elsewhere: Massachusetts - Elsa Glassman (3524).

Congratulations

To Pam and Randy (2814) Lober, a daughter, Kara Lynn, Oct. 17.

To Theresa (1842) and Gary (1822) Zender, a son, Michael Aaron, Oct. 26.

To Patti and Victor (9343) Harper-Slaboszewicz, a son, Charles Ray, Nov. 3.

To Vanessa Watkins (9216) and Byron Miles, married in Hempstead, Tex., Oct. 19.

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Employee Death

Evelyn Miller of Production Administration Sec. 3121-1 died Nov. 11 after a long illness. She was 54 years old.



EVELYN MILLER

Evelyn had been at the Labs since 1964. She is survived by her husband Warren (6316), one daughter, and two sons (including Larry Carrillo of Division 9331). The family has announced that a memorial fund has been established in Evelyn's name at the Sandia Laboratory Federal Credit Union. The fund will be used to sponsor research by the United Scleroderma Foundation.



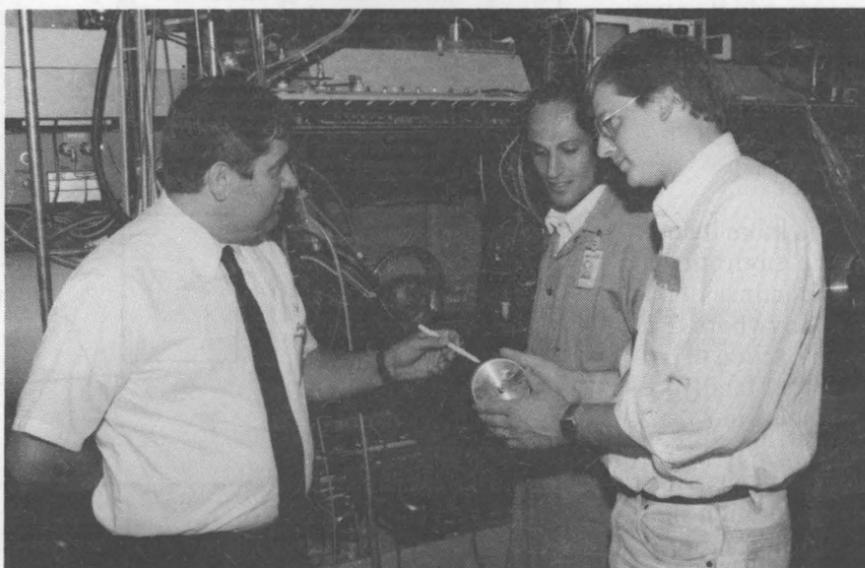
Plowing Ahead

Sandia Transfers Welding Technology To Tractor Builder John Deere

The list of capabilities at Sandia encompasses such diverse areas as solar energy, weapon design, hazardous waste cleanup, arms verification, robotics, and all kinds of testing. Private enterprises that have benefited from the Labs' expertise range from foam manufacturers to solar energy firms.

Now a new industry can be added to the list of those that are benefiting from decades of work in weapons and energy research — agriculture, or more specifically, the manufacture of durable, reliable tractor parts.

Through a joint effort with John Deere, a builder of agricultural, industrial, and consumer products, Sandia is providing welding expertise to improve the production of heavy-duty components. The result: John Deere is investigating the advantages of improving critical weld joints with a cost-saving feedback system designed at Sandia, Livermore.



JOHN DEERE representative David Trees (left) and Sandians Tony DeSousa (center) and Tony Bentley (both 8484) examine a welded part. Sandia is working with the farm equipment company to transfer welding feedback technology that monitors and then automatically adjusts welding processes while such parts are being manufactured.

Outgrowth of Weapon Program

The cooperative venture is part of an ongoing technology transfer program at Sandia intended to make manufacturing technologies available to the private sector — technologies that until recently have been used primarily for weapon development and design. Sandia also benefits from the exchange of knowledge, because it expands the Labs' understanding of other uses of technology and often has applications for advanced research and development at the Labs.

John Deere learned of the Sandia feedback system when a company representative attended the annual convention of the American Welding Society (AWS) last April in Detroit. At the convention, Sandia researcher Tony Bentley (8484) gave a presentation about his Feedback Control System for Arc Welding, which he has been refining for the past four years. Tony is one member of a team developing a system tailored especially to the needs of John Deere and possibly useful for other Sandia projects. Other members of that team are Lee Bertram (8243), Bill Winters (8245), Beth Fuchs (8243), Tony DeSousa (8484), Ed Walsh (8483), Dean Williams (8243), Leonard Napolitano (8432), Edward McKelvey (8432), and Scot Marburger (8484).

One of Sandia's goals for the feedback system is to eliminate the need to destroy welded parts to test for welding quality, by bending them, bursting them, or cutting them open. Another goal is to reduce the need for non-destructive testing, such as radiography and ultrasonics testing.

"All of these tests are expensive and time-consuming," says Tony Bentley. "Some of the weapon parts Sandia tests cost thousands of dollars apiece. So what we're trying to do is eliminate post-weld inspection by doing the inspection while we're making the part. That's our goal — to do in-

spection during, not after the welding, to make it automatic."

David Trees, from the John Deere Technical Center in Moline, Illinois, realized that the Sandia technology might be used in the company's manufacture of tractors. To test this idea, he brought two components, including a mockup of a weld joint, to Sandia, Livermore, to see what could be done with them.

They Gotta Be Tough

Parts for transmissions are critical, notes Tony, and have higher quality requirements than many other parts. They must transmit full horsepower from the engine to the wheels, yet endure heavy shock loads in the process. They also must be of exceptional quality, and distortion caused by welding must be predictable. John Deere would like to apply the feedback system to other parts as well.

But there are some differences between Sandia's welding feedback system and the one sought by John Deere. Sandia's welded parts are primarily made of stainless steel; John Deere's are of various carbon steels. For the system to be used by John Deere, it has to work with that company's materials. Also, Tony's controller was designed for the gas tungsten arc (GTA) welding process, which is used extensively throughout the weapons complex, but John Deere would like to apply the system to the gas metal arc (GMA) welding process.

After a few months of cooperative research with John Deere, the Sandia team succeeded in al-

tering the automated welding feedback system for carbon steel parts, and is currently learning what needs to be done to make the system work for GMA welding. GMA welding is slightly more complicated to control than GTA.

In arc welding, an electric current passes between an electrode and a part, which melts the part and allows it to join with another part. As in all weld joints, the depth to which the weld penetrates the original metal is critical. A weld joint must be strong enough to withstand specific pressures, yet it must not be so extensive that it weakens the surrounding metal.

Sandia first automated its arc welding process 10 years ago using a technique developed by Scot Marburger (8484). Scot's feedback control system uses a fiber-optic cable to measure the amount of light emitted by the glowing metal (the hot part being welded). The amount of light, in turn, is an indicator of weld penetration — how much metal is being melted. In other words, the amount of light is proportional to the amount of hot metal.

The amount of light measured by the sensor goes into a computer, which feeds information back to the welding machine, which then adjusts the heat.

"What this leads to is a quality control mechanism," notes Tony. "For the desired penetration, how much light will be emitted?"

The heated metal in a stainless steel weld is more localized than in a carbon steel weld, meaning the amount of light emitted is more directly proportional to the penetration in the case of stainless steel. The heat is more diffuse in carbon steel, causing more light to be emitted elsewhere, such as on the back side of the weld.

To accommodate this difference in the properties of the two metals, Sandia researchers modified their system to make measurements of visible as well as infrared light to determine the amount of penetration in a weld. They presented the results of their research in November at a John Deere Technical Conference in Illinois.

Though researchers and engineers have been trying for years to incorporate feedback systems into manufacturing processes, most modern methods for feedback design are extremely complicated and are based on calculations that are difficult to understand, says Tony.

Tony used a much simpler method, known as Quantitative Feedback Theory, after taking courses from Isaac Horowitz, an engineering professor at UC Davis and Sandia consultant who developed Quantitative Feedback Theory. ●LD



**SANDIA
LIVERMORE NEWS**

TAKING PART IN a recent Sandia Secretarial Seminar at Livermore are (from left) Patty Sainsbury (8542), Cecelia Soares, a veterinarian and the keynote speaker, and Karen Simkins (5355). The speaker's subject was "Beyond Survival: Growing Through Transitions." Patty and Karen are members of the Secretarial Committee that planned the seventh annual workshop event.



Congratulations

To Ellen and John (5365) Liebenberg, a son, David Wade, Oct. 26.

(Continued from Page One)

Environmental Restoration

potentially contaminated site and to add it to our list. We don't know that the site is actually contaminated, but we'll definitely investigate it. So we've been putting a lot of effort into making sure that we've got the potential sites identified."

No Imminent Danger

"It would be nice to say that in more than 40 years of operation we've left the environment completely undisturbed," Gordon continues, "that there's nothing to worry about anywhere. But we've found a site that does require action to protect the groundwater — a chemical landfill in Area 3 — and other sites, such as some in Area 2, that may need remedial action."

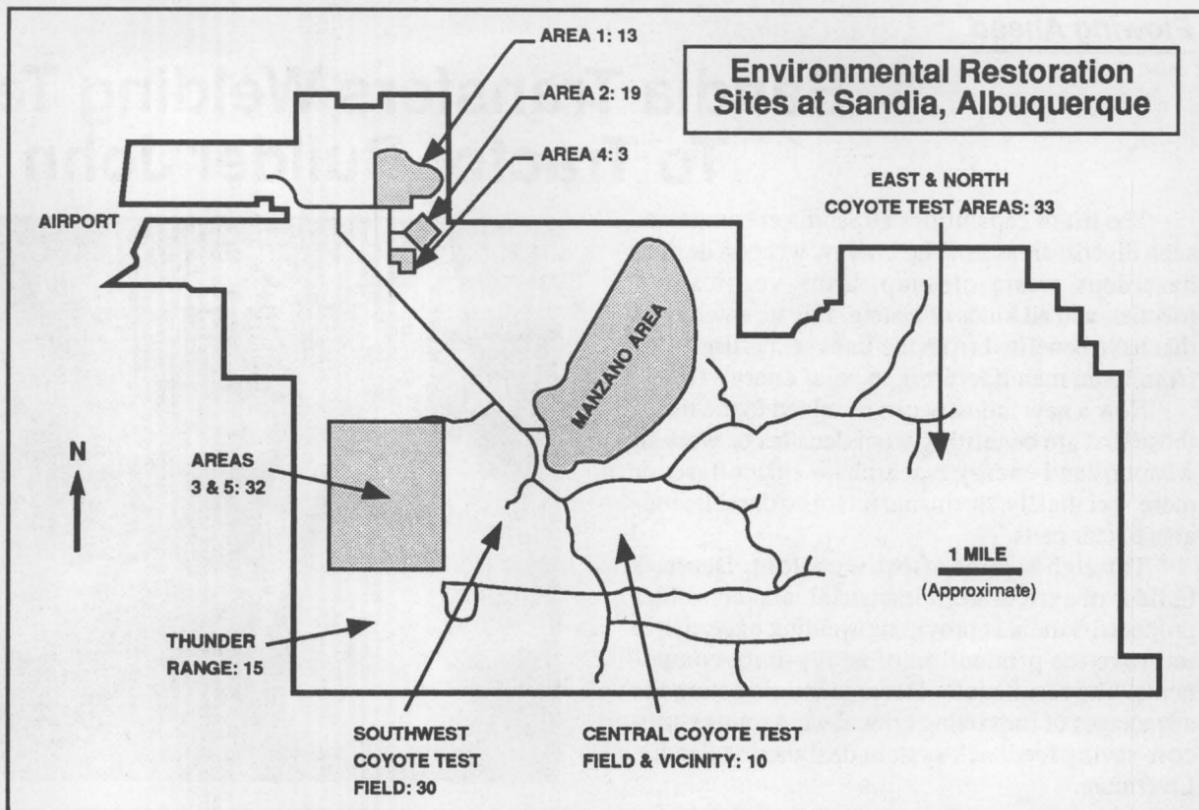
"What I can say is that after extensive efforts to identify these environmental restoration sites, we don't see anything — chemical or radioactive — that's an imminent danger to anyone at Sandia or to anyone else living or working in the vicinity. Our main job now is to continue assessing the sites, and to deal with them according to their urgency."

If clean-up of a site is needed, it begins after the site has been completely assessed, Gordon explains. Sandia is negotiating with the Environmental Protection Agency (EPA) for a schedule

Groundwater is one of the most important considerations in setting priorities for site assessment.

that would have the Labs begin the formal assessment process for 10 percent of the most critical sites within a year, and another 25 percent within two years.

"Sometimes people ask why we don't just go in and start cleaning up," says Gordon. "The answer is that we need to know what's there, how far any contamination might have spread, and what



ENVIRONMENTAL RESTORATION site distribution at Sandia, Albuquerque is indicated on this map. The number of sites in each area is approximate, as are the scale and all map locations. About five sites that do not fall into any of these areas are not shown.

actions we can take without doing further damage. We don't want to make things worse. We also want to be confident that our remedial action is effective, so that someone looking back years in the future won't point to our well-meaning mistakes."

About 160 of the 190 sites are at Sandia, Albuquerque. The rest are at other locations where Sandia conducts or has conducted operations, such as Tonopah Test Range in Nevada and White Sands Missile Range in New Mexico. Environmental restoration sites at Sandia, Livermore, monitored under a different program conducted by Environmental Protection Div. 8542 (see article below), are not included in this count.

About 30 of the Albuquerque sites are septic tanks and drainfields; approximately the same number are various disposal sites where solids or liquids were or might have been buried; about 20

are locations where explosive or burn tests were conducted; about 15 are the locations of now-removed underground storage tanks that leaked fuel oil or transformer oil; and about 10 are accidental oil spills (motor oil, transformer oil, etc.).

The remaining 85 or so (Albuquerque and elsewhere) are a variety of test or storage sites where hazardous materials might have been involved at one time or another. The potential hazards to the environment include the possibility of either a toxic chemical or of radioactivity at some level above the natural background.

Protection Centers on Groundwater

Threat to the groundwater — or potential threat — is one of the most important considerations in setting priorities for dealing with the sites. (Continued on Next Page)

Environmental Restoration at Livermore

Enticing Bacteria to Clean Up a Diesel Spill

Fifteen years ago, workers installing a grounding rod for a light pole at Sandia, Livermore punctured an underground line used to transfer No. 2 diesel fuel from a tank to a pump station. By the time the leak was discovered about two weeks later, an estimated 60,000 gallons had spilled.

Part of the fuel was removed from the trench, but most remained in the ground. It's in an area some 40 feet across and about 100 feet deep.

Now, hydrocarbon-consuming bacteria are figuring into the effort to clean the soil contaminated by the spill.

"We're encouraging natural processes," says project manager Sandy Leo (Environmental Protection Div. 8542). "The bacteria are already in the soil, but they don't thrive. For one thing, they're aerobic bacteria, which means they need oxygen to live. Not much oxygen is available to them where they are. We're going to give them water, food, and oxygen to help them consume the hydrocarbons in the fuel."

The bacteria will be fed with a mixture similar to lawn fertilizer — phosphorus, potassium, and nitrogen — and will receive oxygen either dissolved in water or in the form of hydrogen peroxide.

Research conducted at the University of Notre Dame on soil cores from the area confirms

that the bacteria do remediate the soil. Other research on a remediation system design and on modeling of fluid and nutrient transport has been done by Argonne National Lab; future modeling will be done at Los Alamos National Lab.

Bacteria Prefer the Light Stuff

If the bacteria consumed everything in the fuel, nothing would be left but water and carbon dioxide. Though bioremediation doesn't normally go that far in actual practice, it does go far enough to take care of the toxic hydrocarbons.

"Diesel oil is a complex mixture," says Sandy. "Its constituents range from light hydrocarbons such as methane to heavy ones such as paraffins, waxes, and asphalt. The bacteria prefer the light end — they start consuming that the way people nibble hors d'oeuvres. Then they go on to the heavier stuff. We expect to have some of the heavier hydrocarbons left at the end of the project. But they aren't hazardous, and they aren't mobile — they'll stay in the same area and won't be a threat."

Bioremediation is attractive for several reasons, says Sandy. "If we excavated the soil and shipped it to a landfill, the toxic material would still exist," she explains. "And we'd be buying a piece of landfill forever. We — Sandia or DOE or both — would be partly responsible for whatever

happened at that landfill and could wind up paying for anything that had to be done there years or decades from now.

"So we prefer to treat the waste and turn it into the benign materials left after the bacteria consume the light hydrocarbons. The economics of moving versus treating also support that approach. The cost of moving the soil, which would require a large engineered, constructed hole, could be \$35 million. With all the possibilities and contingencies we've looked at for bioremediation, we don't foresee a cost of more than \$5 million."

The Sandians working on this project are cooperating closely with regional environmental regulators. It isn't formally designated as a technology transfer project, says Sandy, but the idea is to end with enough understanding to use the same process elsewhere. Oil spills are a common problem, and when the spill reaches deep into the earth, there's no simple solution for remediation.

This is the only major environmental restoration project going on at Livermore, says Sandy. A landfill that has been investigated and shown not to contain hazardous materials will probably require only a cap. Other small sites have been investigated as well, but nothing of concern has turned up. ●CS

Instead of Doing Easy Fixes**Strategy: Zero In on the Most Problematic Sites First**

Many of the environmental restoration sites being investigated at Sandia would be relatively straightforward to clean up, and tackling them first would quickly bring down the numbers. So why not do it that way?

Gordon Smith, Manager of Environmental Programs Dept. 7720, explains how Sandia sets priorities for environmental restoration. "We're following a process that ensures we put our effort into the areas that are most likely to cause problems," he says. Gordon emphasizes that Sandia is doing this rather than simply trying to make its "scorecard" look good. "We're concentrating on sites such as the Area 3 chemical and mixed-waste landfills and on Area 2," he says.

As Sandia investigators locate sites, they pursue more detail about them by interviewing present and retired workers who may know about the areas, by studying aerial photos, and by reviewing any records that exist about the sites.

When available information is in hand, investigators develop plans that define the scope of

Tools for field investigation include monitoring wells, soil gas surveys, and magnetic and radar scans.

work to be accomplished and consider alternative corrective measures. "The measures can range from doing nothing but monitoring the site to conducting comprehensive clean-up efforts," says Warren Cox, Acting Supervisor of Environmental Impact and Restoration Div. 7723, "with all kinds of combinations in between."

In addition to applying a DOE ranking system, Sandia has developed its own ranking based on four characteristics: volumes of waste and hazardous materials, the form of the materials (solid, liquid, or gas), the distance to the water table, and the distance to water wells that are in production.

"The landfills that Gordon mentioned came to the top of our list almost immediately," says Warren. They include a Tech Area 2 landfill and two landfills in Area 3, one for chemical waste and another for radioactive waste. The latter is now designated a mixed-waste landfill, because it has received wastes with both radioactive and

chemical constituents.

Next in priority are septic tanks and drain fields. Because they are liquid systems, any hazardous materials in them are more mobile than solid material. Septic tanks and drain fields are also often associated with photo labs, explosives work, or other potential sources of hazardous chemicals.

Tale of Two Landfills

All this attention to getting the priorities straight doesn't mean there's been no tangible progress yet. Field investigations have taken place at the chemical waste and mixed-waste landfills. Work plans are being drafted for field studies of more than 50 other sites, including

Environmental Restoration Investment to Grow

A look at present and expected funding for environmental restoration reflects a path of increasing investment. Total funding for Albuquerque sites in FY91 was \$5.4 million. (This sum includes funds for investigations at Tonopah, Kauai, and other sites, but not Livermore.)

A significant increase is anticipated in FY92 — \$12.2 million is expected. Another major step in expenditures is anticipated in FY93, for which Sandia is requesting \$35.5 million.

For the five years beginning in 1993, \$260.8 million is likely to be requested for the Sandia environmental restoration effort.

"The need for environmental restoration funding has grown as we have learned more about the sites to be restored," says Gordon Smith (7720), "and as we work with DOE in updating Sandia action plans to meet new requirements."

The increase in staffing during the last few years also indicates Sandia's larger investment in the environment. From a staff of two in 1984, Sandia's environmental group has grown into the 85-member (including on-site contractors) Environmental Programs Dept. 7720.

those in Area 2 and several septic tank and drain fields. Sandia environmental experts are also spearheading a regional investigation to increase understanding of the water table beneath Kirtland AFB and surrounding areas.

Two of the Sandia sites — the chemical landfill and the mixed-waste landfill — have been selected by the DOE Office of Technology Development as locations for demonstration projects. These projects are intended to demonstrate and develop tools that can be used to better understand and remediate similar waste sites in the DOE weapon complex.

Several Division 7723 members, working with officials from the New Mexico Environmental Department, have developed an innovative agreement to allow continuing studies and eventual remediation of the chemical waste landfill. Trichloroethylene (TCE) at levels above EPA standards was found in water samples from wells monitoring the site early in 1990. "We're still talking with the state people about our strategy, but we want to take an 'inside out' approach," says Alva Parsons (7723), who has worked on ways to deal with this landfill.

The Sandia environmental specialists believe that in this case the most effective and efficient corrective actions will result from focusing first on the source of the TCE. Determining the precise extent of contamination beneath the landfill will come later, and corrective actions will depend on the source and the pathways that the TCE is following.

Monitoring wells have already been placed in the area, and samples of the air just above the water tables in those wells show that contaminants exist in gas phase. This fact suggests that a system to pump air out of the monitoring wells and remove pollutants may help reduce the groundwater problems.

Another step in studying the landfill is to do a geophysical survey with magnetic and radar technology developed by the Navy. That survey will reveal the location of pits and metallic objects under the surface. Later, a shallow-soil gas survey will give a two-dimensional picture of where TCE and other volatile organic pollutants are concentrated near the surface. Then deeper tests will

(Continued on Page Six)

(Continued from Preceding Page)

because groundwater is a vital water source in New Mexico. Only one site, a chemical-waste landfill in Tech Area 3, is known to have affected the groundwater. There, small quantities of trichloroethylene (TCE) — a common constituent of solvents and cleaning fluids, and a suspected (but not definite) cause of cancer — have been found in monitoring wells near the landfill, and action is being taken to eliminate the source.

The TCE at this site does not pose any immediate threat to public health, both because of the remote location — 4 miles from the nearest water

In effect, the rules have changed: Once-acceptable practices are no longer permitted.

well other than the monitoring wells — and the low concentrations. (The 4-mile-distant drinking-water well is also sampled regularly, and no TCE has ever been found.) In quarterly sampling of the monitoring wells, explains technical task leader Cindy Ardito (contractor), the TCE concentration has occasionally exceeded the EPA limit of 5 parts per billion, sometimes reaching as much as 24 ppb.

This amount is well below the New Mexico Water Quality Control Commission's limit of 100 ppb. The Food and Drug Administration sets tolerance levels for TCE in food in the 10-30 parts per million range, more than 1,000 times as much as the EPA allows in water.

Additional Sites Aren't New

Warren Cox, Acting Supervisor of Environmental Impact and Restoration Div. 7723, says Sandia's efforts in identifying possible problem sites have increased the number during the last few years. A draft DOE report released about three years ago listed 117 Sandia sites to be investigated for environmental restoration. (According to local DOE officials, the final version of the report is now being reviewed.) "It's not that the others are new sites," says Warren. "Whatever sites we find were already there, waiting to be discovered."

Warren notes that operations at these sites were conducted by the methods generally accepted at the time, years or decades ago. Like everyone else, Sandia has learned more about environmental matters since then. In effect, the rules have changed, and once-acceptable practices are no longer permitted.

The new sites have been identified through a program going on since 1985. A survey of septic systems added a number of sites to the list, as did

investigation of underground storage tanks containing hazardous materials.

An example of another type of site is any of a dozen or so "firing sites," Warren explains. They are typically in the Coyote Canyon blast area or "Thunder Range" south of Area 3, where explosives have been tested. In many cases, depleted uranium was used in the tests and scattered by the explosion. Most of the uranium was removed by health-physics technicians after the tests, and then the areas were surveyed by Geiger counter and determined to be safe. Because of the way the areas had been used, however, they are on the list of potential problem sites.

Other sites with relatively limited environmental damage include oil spills in the Motor Pool, at the steam plant, and at the Solar Thermal Test Facility ("Solar Tower"), where 30 gallons of oil was spilled and then burned off, says Kathy Gaither (contractor), who tracks the sites. Other typical sites are several small waste-burial areas associated with test facilities, such as the old cable site in Coyote Test Field.

But each site, no matter how large or how small a problem it's believed to be right now, will be investigated. "We'll be spending a lot of time and effort to make sure we give each site the attention appropriate to its condition," says Warren.

•CS/WKeener(3163)

Waste Sites There Since 1948**Sandia's Top Priority: Tech Area 2**

Sites in Area 2 are now the Labs' top priority for assessment and environmental restoration. Inactive waste sites in this area (about a half mile south of Area 1) have been a high priority since the first list of inactive waste sites was released by DOE, and assessment of the sites now ranks above other activities.

In the most recent rankings of environmental restoration program activities at Sandia, only Area 2 is in the DOE category designated "time critical."

"Time critical means an assessment is needed to determine if current circumstances present an

No Sandia environmental restoration site is in DOE's most urgent or "emergency" category.

immediate and significant impact to human health or the environment," explains Warren Cox, Acting Supervisor of Environmental Impact and Restoration Div. 7723.

All other Sandia sites are in a less urgent, lower priority category. No Sandia site is in DOE's most urgent or "emergency" category.

Although investigation of the Area 2 sites is considered urgent, routine tests by the Air Force at the nearest water wells, 1¼ miles away, have shown no sign of contamination. A monitoring well for sampling groundwater close to the sites is to be completed within a few months.

Septic Systems Raised Concern

"Previous priority rankings had not taken into account septic tank effluent in Area 2," says John Cochran (7723), principal investigator of inactive waste sites at Area 2. "By knowing the types of activities that occurred in a building and making a few assumptions, we can calculate potential releases to the environment. For example, assume that in 1948 the septic system for Bldg. 904 began receiving an effluent stream containing a few parts per thousand of a contaminant, flowing at one gallon per minute for eight hours a day, five days a week. If this were the case, the cumulative release would have been significant."

Area 2 was built in 1948 by Los Alamos Lab as the world's first production and assembly facility for nuclear weapons. (Sandia became a separate lab in November 1949.) Weapon assembly operations continued for about 10 years. From the late 1950s to the present, major Area 2 activities have been the development and testing of conventional high explosives and explosive devices.

Had to Research History

John and his colleagues have had to piece together the history of Area 2. "There's no records center where you can query the history of operations at a particular location," he says. "Information has come almost exclusively from old aerial photographs and interviews of long-time employees."

Area 2 problems and potential problems are typical of DOE facilities used since the late 1940s, says John. To date, 19 inactive waste sites have been identified in and around Area 2. They include three landfills (radioactive, chemical, and classified — for material, not documents), seven septic systems, the locations of four leaking underground gasoline tanks (now removed, but the sites will be assessed), two potentially radioactive surface sites, a high-explosives burn pit, a rocket-powered centrifuge, and a firing site.

The water table is about 500 feet below the surface. Testing is required to determine how deep contaminants have leached into the ground. "Contaminants have migrated 500 feet to the water table from one landfill in Area 3, which has increased our sense of urgency in Area 2," John says.

A work plan to install a groundwater monitoring well and to conduct a geophysical survey has been submitted to DOE, the Environmental Protection Agency, and the New Mexico state government for review and comment. Preliminary tests of the geophysical instruments were conducted in July. The full survey, conducted by the Navy with prototype tools it has developed to locate ordnance, began Dec. 2. This is the first application of these tools at an inactive waste site. The monitoring well will be completed in the spring.

The entire assessment and selection of restoration methods for Area 2 is expected to take about 10 years and cost about \$10 million.

•WKeener(3163)



AREA 2 LANDFILL received material between the 1950s and its closure in 1988. John Cochran (7723) is principal investigator of Area 2 environmental restoration sites, which are considered the most urgent at Sandia for assessment to determine whether they present any threat to human health or the environment. Here, John checks a map of the area.

**New Sandia Group
Helps Prevent
Future Pollution**

Sandia organizations that need to use hazardous materials in their activities — and consequently need environment-related permits — now have a more centralized source of information about what permits are required and how to get them.

As a result, says Jim Fish, Supervisor of newly formed Pollution Prevention and Environmental Monitoring Div. 7725, Sandians will find it easier to get timely, consistent answers. The formation of Jim's organization is also part of a Labs-wide effort to coordinate all of Sandia's pollution prevention activities.

The formation of this division is in line with how environmental regulation is starting to be conducted nationally. "The Environmental Protection Agency is looking simultaneously at the different parts of the environment," Jim explains. "For instance, you wouldn't want to do something that improves air quality but increases the risk of water pollution. The EPA is trying to unify regulations for air, water, and solid wastes to make them more consistent and cost-effective."

Jim believes that the consolidation will reduce the number of different administrative actions that organizations have to take in environmental protection matters. At the same time, the more consolidated approach will reduce the risk of creating future environmental restoration sites like the 160 now being investigated at Albuquerque.

For more information, Jim can be reached on 845-9644.

(Continued from Page Five)

Zeroing In

use augers to bore beneath the landfill. That will permit a three-dimensional look at contaminants and give clues about how they are moving toward the water table.

The chief investigator for the mixed-waste landfill is Bob Knowlton (7723). He has initiated several measures to help understand what is in the landfill and where. Four monitoring wells have been drilled and are now checked quarterly to detect any chemical or radioactive pollutants that may have entered the groundwater beneath the site. To date, none have been detected. Eighteen auger test holes reaching to a depth of 150 feet were bored on the perimeter of the landfill, and surface testing was also done.

Data so far show that the only contaminant that has migrated to any significant extent is tritium, which has been detected as far as 100 feet below the landfill. The water table is about 400 feet farther down. Because the tritium moves slowly through the soil and has a half-life of only 12½ years, it's unlikely that it could reach the water table even if no remediation steps were taken.

Additional soil borings, samples, and another monitoring well are planned for the coming year, says Bob. The new well will be angled from outside the landfill to reach the water table beneath it. Data from the well and the landfill samples will provide needed data to improve models of the subsurface and to help make sure that no other contaminants are moving toward the groundwater.

•CS/WKeener(3163)



To Become a Dean of Engineering**Venky Says Good-Bye to Labs, Hello to Academia**

If he could tell opportunity when to knock, Venky Narayanamurti might not be leaving the Labs quite so soon. But the Vice President of Research and Exploratory Technology 1000, who has been at Sandia since May 1987, couldn't turn down an offer to become Dean of Engineering at an up-and-coming university. He'll begin his new post at the University of California at Santa Barbara on Jan. 2.

"I strongly feel that one should do different things to renew oneself," says Venky. "For me, five to seven years is optimal. If I could have tailor-made my career here, I would probably have stayed another year or two. But someone nominated me for the position at Santa Barbara, and I found that it's one of the few universities I would care to go to. It's a fine institution for someone in my field [solid state physics], but at the same time it's young and growing, so I can still make my own impact."

Reflecting on his time at Sandia, Venky says the Labs' spirit of national service is one of the strong impressions he'll take with him. "We're viewed as an objective institution," he says, "a group of people who have high standards of objectivity and integrity and who put our expertise to work for the nation."

Joy and Frustration

He believes the ability of Sandia researchers is starting to become widely recognized in the scientific world. "Everybody has known about Bell Labs for a long time," he says. "But because of Sandia's more isolated location and the history of classified work, it's harder for our people to get the degree of external recognition they might get somewhere else. So the extremely good quality of the people here has been both a joy and a frustration. I hope I can continue to be a spokesman for the Labs' capabilities."

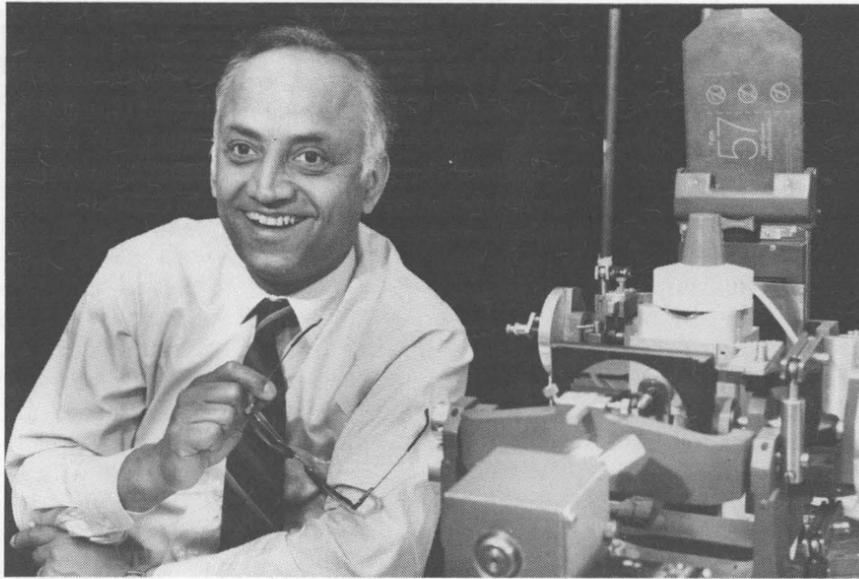
He also notes that several major prizes won by Sandians for technical accomplishments have done much in recent years to lift the veil from the Labs. Some of those are the E. O. Lawrence Award, received by Tom Picraux (1110) last year (Sandia's fourth winner); the Electron Microscopy Society of America's Burton Medal, received by Joe Michael (1822) in August; the American Physical Society's John H. Dillon medal for Ken Schweizer's (former Sandian) research in polymers; and a number of R&D 100 awards won by Sandia teams in such areas as laser technology and parallel computing.

The growing openness of Sandia is also making a difference. "The way we're beginning to work with industry is a major change. We had several people in 1000, even before technology transfer got the kind of encouragement it has now, who were in the vanguard of forming relationships with industry. As another example, when I came to Sandia, DOE had already approved the Integrated Materials Research Lab. Now we're seeing that come to fruition as an outside-the-fence facility where we can interact with industry and universities. The computational sciences folks are also now outside the fence in Area 4. This will make it easier to participate in national initiatives in high-performance computing.

"I'd also like to see further teaming between Sandia and Santa Barbara. We have had, for example, collaborations in compound semiconductors, polymers, and materials science for some time. And I'd especially like to work toward teaming with Sandia, Livermore, because it's close geographically."

Moves between Management, Research

One innovation that Venky brought from Bell Labs was encouraging scientists to move back and forth between management and technical work. He encouraged that at Bell Labs, he says, and found it hard in the early stages but common practice now.



VENKY NARAYANAMURTI, in a lab where much of the structural work on thallium-containing high-temperature superconductors was done — "an area in which Sandia is a leader," says Venky. (Photo by Randy Montoya, 3162)

At Sandia, he inaugurated that kind of movement by creating research positions for several department managers. "Now," he says, "when I see some of our supervisors choosing to go back to technical work as well, that's refreshing. It's given them a chance to become active scientifically once again, and it has let them renew themselves, which we all need to do — no matter how good we are as managers. Though it's not a uniformly accepted practice yet, I think it's becoming much more so, and not just in technical areas."

Venky says a return to science is part of what he plans to accomplish by the move to Santa Barbara. He expects to have a personal research program, with graduate students and post-docs working in it. "I hope to see Sandia hiring some of my students!" he says.

He also expects to take a personal hand in building up the Santa Barbara engineering school. It's one of the few areas in a budget-strained state where growth is planned. Addition of 25 new engineering faculty members to the present 125 is planned, and Venky says he'll be personally recruiting each of those professors. He says the university's present work in several areas, such as compound semiconductors, polymers, and materials sciences, is already first-rate — "as good as the best in the country" — and he plans for others to reach that stature.

As for Sandia and its future, he notes that funding is getting more complex and that regulatory requirements complicate research. "Sandia simply has to find new ways — this is important in

Venky Advanced Teamwork

"Venky has exemplified the Sandia values [teamwork, integrity, quality, leadership, and respect for the individual] through his daily work and his interactions with other Sandians and customers. In particular, he has been especially instrumental in advancing interorganizational teamwork at Sandia. We wish him the very best in his new position, and count ourselves fortunate to have had the privilege and pleasure of working with him for the past five years."

Al Narath

the restructuring and quality processes — that allow the technical research folks to do their work," he says. "Management and administrative structures will have to let that happen. The core competency structure is a step in that direction.

"Changes in the world are important to recognize," he continues. "Al Narath has clearly enunciated that Sandia is in the national security business. But we recognize that it's not only traditional defense, but also the economic health of the country, that's vital to the future. That's why the increasingly outward-looking nature of the Labs is so encouraging."

Any final words? "I'll miss many Sandians. But having been here the last few years, I feel much more qualified to do the job of a dean of engineering. And I'll always be an ambassador for Sandia." ●CS

Takes New Post Jan. 13**Fleury Named Sandia Research VP**

Paul Fleury, currently Director of the Physical Research Laboratory, AT&T Bell Laboratories, at Murray Hill, N. J., has been named Vice President



PAUL FLEURY

of Research and Exploratory Technology 1000, effective Jan. 13. He succeeds Venky Narayanamurti, who is retiring to become Dean of Engineering at the University of California, Santa Barbara.

Paul joined Bell Labs in 1965 as a Member of Technical Staff in the Quantum Electronics Research Department. He was promoted to Head of the Condensed State Physics Research Department in 1970 and became Director of the Materials Research Laboratory in 1979.

In his present position, which he assumed in 1984, he has had responsibility for fundamental research in all aspects of physics, including con-

densed matter, atomic and molecular, astrophysics, low-temperature, and theoretical physics, as well as biophysics.

Paul received his BS and MS in physics from John Carroll University and his PhD from MIT. He has twice been a visiting Fellow at Oxford University. He has five patents and has published more than 120 scientific articles. Among other honors, he is a Fellow of the American Physical Society and the American Association for the Advancement of Science. He is active in the American Physical Society and the National Research Council. In 1985 he received the Michelson-Morley Award for his experimental research in laser and non-linear optics in condensed matter.

Fleury Selection Endorsed

Venky Narayanamurti, whom Paul Fleury will succeed as VP-1000, says "I've known Paul as a scientist and colleague for more than 20 years. He's a wonderful person to work with, and I'm really delighted he has agreed to come to Sandia."

Leaving Sandia after 30 Years

Ev Beckner to Become DOE Deputy Assistant Secretary

Everet Beckner, who has been on special assignment at DOE Headquarters since July 1990, is retiring from Sandia to become Principal Deputy Assistant Secretary for Defense Programs. He is scheduled to begin his new position Dec. 9 and will report to Assistant Secretary for Defense Programs Richard Claytor.

Ev was Vice President for Defense Programs 5000 when he accepted an assignment as Energy Secretary Watkins' Special Science Advisor for Weapon Programs. His experience in that position, he says, led him to accept the position of Principal Deputy Assistant Secretary when it was offered.

"I had never thought of leaving Sandia early or going to work for the federal government," he says. "But the experience of the last year and a half put me in a position to better understand the Department and what it needs in order to accomplish its objectives. I suspect I wouldn't have considered leaving Sandia for DOE if I hadn't seen that firsthand, as well as becoming acquainted with the people involved. Now, I feel I have a better understanding of what's needed, and I believe I can contribute to the successful completion of a number of things. All those considerations made the decision easier."

Wasn't Planning 30-Year Labs Career

Reflecting on his Sandia career, Ev says, "Like a lot of people, I didn't come to Sandia from graduate school expecting to make it a 30-year career. When I joined in 1961, I figured I would start my career there and see how things worked out. And it turned out to be 30 years, during which I saw a lot of change, especially the expansion of programs in energy and reimbursables.

"It was a wonderful career," he continues, "be-



EVERET BECKNER

cause of the work I had the opportunity to do, and because the people I worked with couldn't have been better."

Ev joined the Labs research staff as a plasma physicist and was named Supervisor of the Electro-Physics Research Division in 1965. He became Manager of the Plasma Physics Re-

search Department in 1970. He later managed the Laser Physics Research Department.

In 1973, he was promoted to Director of Physical Research, a position with responsibilities that included development of technology for high-power pulsed electron accelerators, pulsed nuclear reactors, studies of radiation effects on materials, and the Sandia laser fusion program. He became Director of Waste Management and Geotechnical Projects in 1978. In that position, his responsibilities included the early work on site characterization for the Waste Isolation Pilot Plant (WIPP) and early studies of the Nevada Test Site as a possible repository for commercial nuclear waste. He became Director of Energy Programs in 1982.

Ev was named Vice President of Energy Programs in 1983 and became Vice President of Defense Programs in 1986. He is a Fellow of the American Physical Society and a member of the American Association for the Advancement of Science.

Executive VP Orval Jones (20) says, "All Sandians can feel proud that Ev has been selected to fill such an important position. Although our relationship must, of necessity, change, we look forward to working with him and supporting him."

Sandia President Al Narath adds, "We'll miss Ev. He played an important role over the years in supporting Sandia's development into a major R&D laboratory. Now, we wish him well as he takes on an important new assignment."

Many Challenging Possibilities

Although Ev's precise areas of responsibility in his new position have not yet been set, he says he expects to be active in a number of nationally important areas, including the evolution of the weapon labs, arms control, nuclear non-proliferation, and the reconfiguration of the weapon complex.

"In general," he says, "I'll be the Assistant Secretary's deputy in any part of the responsibilities of Defense Programs that may be required. It's a challenging opportunity to deal with large-scale problems during a time when the Department is having to change many of its operations — a time when the whole world is in a period of unbelievable change."

Everet urges Sandians to "keep up the good work" and not become overwhelmed by the pace of changes being thrust upon everyone involved in nuclear weapon activities. "I have many friends and colleagues whom I plan to stay in touch with, for both personal and professional reasons," he says. "I expect to be in and out of the Albuquerque area for both family and official reasons, and I look forward to keeping up old friendships while creating new ones." ●CS

Sandia News Briefs

White House Kicks Off Electric Car Battery Project

Nick Magnani, Manager of Power Sources Dept. 2520, represented Sandia's battery program at a White House ceremony Oct. 25 that announced the start of a four-year research project aimed at developing a new generation of batteries for electric cars. The goal of the \$260-million project, funded jointly by DOE and the US Advanced Battery Consortium (USABC), is to make electric vehicles widely available by the year 2000 and to develop batteries that give electric vehicles greater range and performance.

Present at the ceremony were President Bush and DOE Secretary Watkins, as well as representatives of the USABC, a partnership of major US auto manufacturers including General Motors Corp., Chrysler Corp., and Ford Motor Company, with support from the electric utility industry.

As part of the project, Sandia hopes to transfer some of its existing battery technology to industry as well as initiate new development projects. "Basically, we expect to provide technical support necessary to help USABC meet its goals," says Nick.

Ron Loehman Becomes Distinguished UNM Professor

Ron Loehman, Manager of Chemistry and Ceramics Dept. 1840, was recently named a Distinguished Professor in the University of New Mexico's Chemical and Nuclear Engineering Department. The appointment gives Ron a more formal connection to the university and recognizes his role as co-director of the UNM/Sandia Materials Research and Development Laboratory, now under construction at UNM's new research park.

The professorships, established last year, allow technical employees to commit 20 percent of their time to university research and teaching. Ron is the ninth Sandian to be named. Distinguished professors are appointed through a vote of tenured faculty in the appropriate UNM department.

Dish-Stirling Technology May Soon Produce Electricity

Sandia has entered into a joint venture with Cummins Power Generation aimed at developing cost-competitive solar power based on dish-Stirling solar technology. By 1995, Cummins (a subsidiary of Cummins Engine Company) plans to produce solar power systems that could be used for pumping water in remote locations, powering remote villages, or supplementing existing utility grids.

Dish-Stirling technology has been under development by DOE since the late 1970s. A dish-shaped concentrator — consisting of many membrane mirrors — tracks and focuses sunlight onto a receiver located at the dish's focal point. Inside the receiver, heat from the intense sunlight vaporizes sodium metal, which condenses and heats helium gas inside an adjacent Stirling heat engine. The alternating heating and cooling of the helium inside the engine drives a power piston and alternator to make electricity.

Rich Diver of Solar Thermal Electric Technology Div. 6217 says dish-Stirling systems have achieved the highest rate of sunlight converted to usable energy ever recorded in a solar system: about 29 percent.

Send potential Sandia News Briefs to LAB NEWS, Div. 3162.

Employee Death



ROBERT WEGE

Robert Wege of Computer Procurement Div. 3723 died Nov. 22 after a long illness. He was 52 years old.

Robert had been at the Labs since 1985. He was a Sandia Contracting Representative.

He is survived by his wife, son, and daughter.

Retiree Deaths

- Edward Haut (74).....Oct. 4
- Robert Walter (75).....Oct. 5
- Aileen George (67).....Oct. 13
- Edward Wood (76).....Oct. 17
- Richard Koppel (67).....Oct. 21
- Pete Vigil (70).....Oct. 24
- Melvin Petersen (77).....Oct. 24
- Herman Goldenberg (66).....Oct. 27

Sympathy

To Tom Gutierrez (2481) on the death of his mother-in-law in Albuquerque, Nov. 7.

To Warren Miller (6316) on the death of his wife and to Larry Carrillo (9331) on the death of his mother at Stanford Medical Center, Calif., Nov. 11.



Low-Level Radioactive Wastewater: Sandia's View

by Glen Cheney

Vice President for ES&H & Facilities Management

Editor's Note: The following "OpEd" piece was submitted by Glen Cheney (7000) to the Albuquerque Journal, and it was scheduled to run in an issue earlier this week along with some other views about the slightly radioactive wastewater that Sandia had planned to discharge into the sewer system. Because this wastewater issue has raised so much interest, the LAB NEWS is reprinting the piece for employees and other interested readers who may not have seen the original printing in the Journal.

As explained in an ES&H Update that was distributed to all Sandians last week, the wastewater is a result of experiments that Sandia conducted on fuel that will power the new production reactor at DOE's Savannah River Plant in South Carolina. The wastewater contains extremely low levels of radioactivity — its radionuclide content actually meets the Environmental Protection Agency standard for drinking water. Despite that, the City of Albuquerque has revoked a discharge permit for the wastewater that it issued to Sandia in June 1990 and is now conducting a six-month study of the entire issue of low-level radioactive waste disposal.

In this article, Glen discusses the issue and explains why he believes the City needs a valid ordinance and waste monitoring system.

Albuquerque has experienced much recent public discussion about the use of the sanitary sewer system for disposal of slightly radioactive wastewaters. Some of the discussion has centered on points of genuine disagreement. But much of the discussion has been on topics about which there is no real disagreement. Areas of agreement include:

- As a result of its research and development activities, Sandia generated 50,000 gallons of slightly radioactive wastewater. This water more than meets all federal and state requirements for sewer discharge. In fact, if this water appeared at the input of any municipal water system it would meet all EPA standards for radionuclide content. Of course, to make it potable, it would still require treatment to remove algae and bacteria. By way of comparison, this water has about the same level of radioactivity as beer and about one-sixth that of milk.

- Sandia was asked by the Department of Energy to do work we knew would create low-level radioactive waste. Before generating this wastewater, Sandia applied to the City of Albuquerque for a discharge permit. The permit was granted. When Sandia was ready to discharge, Sandia went to the City again to notify city officials of our intent to discharge. The permit was then revoked. An Albuquerque ordinance prohibiting discharge of any radioactive wastewaters to the sanitary sewers had been discovered. It was the basis for revoking the permit.

- The present city ordinance makes no distinction between naturally occurring radioactivity and what human activities might add. It also contains no provisions requiring careful record keeping or monitoring of waste. These activities are essential if compliance is to be verifiable.

- Albuquerque's municipal water currently contains safe but nonetheless measurable levels of radioactivity. So radioactive wastewater is in our sanitary sewers constantly. The Rio Grande, into which our sanitary sewers empty after treatment, has considerably more measurable radioactive material, mostly as the result of the mineral composition of New Mexico soils.

- The Nuclear Regulatory Commission (NRC)

is charged by the federal government with regulating the discharge of radioactive wastewaters to sanitary sewer systems from commercial users of radioactive materials. In New Mexico, NRC authority has been granted to the State.

- Numerous cities along the Rio Grande and elsewhere in the United States have adopted the NRC guidelines in their city ordinances. These include Austin, Denver, Phoenix, and El Paso.

- It is the opinion of the Albuquerque city attorney that the City has no authority to regulate radioactive wastewater discharges to limits stricter than those of the NRC and State. (This type of situation is not unusual. The City also has no authority to regulate either liquor sales or the licensing of drivers.)

- Even in the absence of any legal obligation, Sandia sought a discharge permit from the City. Sandia also agreed to support a city administration proposal to amend the city ordinance to allow regulated low-level radioactive wastewater discharges to the sewer system. Sandia took these actions voluntarily to encourage open, candid dialogue with the City and to help establish city discharge standards.

There are also points of disagreement. Opponents to any change in the city ordinance have charged Sandia with being unwilling or unable to tell the community about the radionuclide content of future discharges. It is very difficult for us to accurately predict the R&D activities we may be asked to perform in the future. So accurately predicting our wastes is virtually impossible. But we are fully committed to obeying all federal and state standards for any and all discharges.

In another point of disagreement, it is charged that there has been no definitive study of the health

and environmental effects of future Sandia and other Albuquerque NRC licensee discharges to the sewer. Sandia's position is that NRC regulations for safe low-level radioactive wastewater discharge limits already incorporate the findings of an environmental assessment. Moreover, the NRC limits are based on the recommendations of national and international scientific bodies whose purpose is to recommend safe practices for radioactive material handling. The \$30,000 study now being sponsored by the City Council may be valuable as a means to provide public information. Selecting experienced, highly qualified experts to do the study will be an essential step toward achieving a valid, enforceable city ordinance.

Throughout the public discussion of this issue, Sandia's credibility and integrity have been questioned. This has been extremely painful to those of us who work at Sandia. We are part of this community. Many of us were born here or have lived here for decades. We have raised our children here. Sandians have contributed to the economic, cultural, and political life in New Mexico. We are as eager as any to preserve both our environment and the health of all New Mexicans. When the debate over this issue has sought to portray us as uncaring, cynical outsiders, it has not served the public interest.

So, where do we go from here? The City Council has commissioned a \$30,000 six-month study. Sandia is pursuing alternative disposal methods. Sandia will not discharge low-level radioactive wastewaters to the sewer during this six-month period without City approval. But we believe that the City's most productive course is clear. The City needs a valid city ordinance. Under present law, that means adopting the NRC and State guidelines. The City also needs to institute a monitoring system to assure itself and the public that valid limits are being met by all present and potential dischargers. ●

A Short Play

Retiree Meets Restructuring

Editor's Note: Old LAB NEWS editors don't mellow — they just seem to get progressively irreverent. Former editor Bruce Hawkinson (4302), once an actor of small repute, is now trying his hand at playwrighting and has submitted the following one-act play about restructuring at Sandia. All critics are encouraged to call him direct.

*The Scene: A Social Occasion
The Context: The Current Restructuring Effort — Worthwhile but not to be Dealt with Reverently 100 Percent of the Time
The Rationale: It's Therapeutic to Smile at Ourselves Sometimes
The Players: A Retired Sandian (RS) and a "Division Supervisor" (DS)*

RS: Congrats, I hear you've been promoted to manager.

DS: Nope, no promotion, but I'm now a Manager Level One, or M1.

RS: Sounds like a rifle. You still head up a division, right?

DS: No, divisions are run by vice presidents these days.

RS: You're kidding! I'd heard that VPs were more visible these days. So what are you doing?

DS: I run a department.

RS: I thought you said you hadn't been promoted.

DS: I haven't. I didn't go up to it. It came down to me.

RS: And you report to?

DS: A director.

RS: So you report to a director, and you manage a department, but you're not a department manager.

DS: Not the kind of department manager you remember.

RS: (After a pause) So what are real department managers doing if supervisors are running the departments?

DS: They're Manager Level Twos, or M2s, and they're assigned to special projects or support offices, reporting to directors or VPs.

RS: But you don't report to them.

DS: Right.

RS: Tell me again about vice presidents running divisions.

DS: "Division" is now the name for some vice presidencies. And some of them are "sectors," not to be confused with "sections."

RS: But divisions and sectors are still composed of directorates.

DS: No, they're composed of centers. Each center is run by a director — who's often assisted by an M2 or two.

RS: You mentioned sections. Are they still around?

DS: Not really. They're now teams, and they're supervised by team supervisors.

RS: I suppose Small Staff knows about all this.

DS: Oh, yeah — no more Small Staff. Essentially, those folks are now part of SMC, or Sandia Management Council.

RS: Thirty years at Sandia, been gone for a year, and I feel like a new hire! ●

feed back

Q: We generate a lot of styrofoam packing waste at Sandia. I've thrown it away by the boxful, but this stuff is terrible and really needs to be recycled. Its manufacturing process pollutes the environment and its disposal overloads our landfills because it takes decades to decay. At another national laboratory where I used to work, we kept it in large trash barrels for anyone who needed it, even for personal use. Perhaps Sandia's Shipping Department could make use of it. Besides business purposes, Sandians could use it to mail gifts or pack their belongings when they move. It's a great filler in large gardening pots—ask Sandians for other uses and I'm sure they'll think of plenty!

A: We assume you are referring to the styrofoam pellets or "peanuts" that some companies use for packing purposes. Though Sandia does not use this kind of packing material, our Shipping Organization will recycle it by using it for outgoing shipments. Please contact Rey Griego (3744) for disposition instructions. Also, the Recycling Committee is investigating ways to dispose of this material. Thank you for your interest in recycling.

Jim Martin (3400)

Q: Occasionally, I use overnight mail to expedite delivery of urgently needed information to customers or contractors. Sandia's policy requires a letter of justification, signed by a supervisor, each time I want to spend the whopping \$9.95 for an overnight package. I find this policy curiously archaic, especially when, as an MTS, I can authorize thousands of dollars on a purchase order or Just-In-Time order. I never have a problem obtaining a supervisor's signature, but the cost of my time doing so can be significant relative to \$9.95 (it doesn't take much of a staff member's time to cost Sandia \$9.95) and the extra time required tends to negate the reason for using overnight mail: to save time. Why doesn't Sandia permit MTSs to authorize overnight mail and direct the costs to a relevant charge number, as we do for a JIT item? I think this would save time and money and be consistent with our "empowered" culture.

A: In 1988, an audit team criticized Sandia for the large amount of money spent on items mailed by overnight express. The response to this audit was to have the line supervision sign a letter of authorization, except for items generated by mail services clerks. The volume of express mail has dropped dramatically since then. Also of concern is a Security Brief describing the rules for sending documents up to and including Secret Restricted Data (SRD) through express mail—in this case, DOE Order 5634.14 is used for guidance. The order includes having a supervisor authorize the mailing. We are currently working on a charge-back procedure that will allow anyone to approve express mail by charging it to their project number, which will take effect Oct. 1, 1992.

Herb Pitts (3100)

Q: A situation arose in our organization recently in which the wife of one of our co-workers became ill and needed a liver transplant. As the situation required a trip to San Francisco and considerable time off for this employee, we decided it would be helpful if his co-workers could donate vacation time to alleviate his burden of having to be off work for such a long time without pay. It now seems that this is against Sandia policy. Since so many companies have set this precedent, why is it that Sandia cannot formulate a policy to help people in such a traumatic situation?

A: While we appreciate the desire of our employees to help another employee in distress, we are bound by the terms of our prime contract (Article XI, Paragraph 1) to follow the personnel policies and practices of AT&T and Bell Laboratories. Neither AT&T nor Bell has programs that allow

employees to transfer vacation for the benefit of another employee. An extensive study has been made on this issue, and it was determined that the most viable way of allowing Sandia employees to make contributions to another Sandia employee is to make a personal donation through a private organization or trust fund.

Paul Stanford (100)

Q: The small-value purchasing program is a wonderful idea. For years, we have estimated that \$50 worth of DIP circuits probably cost \$150 by the time it got through the purchasing jungle gym. I'm sure the program will save significant time and money.

The one problem is having to haul the \$51 Reimbursement Voucher up to the Department Manager for a signature. That person is busy, and since a staff member can sign for \$1,000 on a regular purchase order, it's hard to see why the same staff member cannot also sign for \$250 worth of small-value purchases.

A: Thanks for your compliment on the Individual Small Value Purchasing (ISVP) program. It appears that the Purchasing Organization may have found another way to be responsive to its customers.

Acquisition approval levels are determined by Chief Financial Officer Directorate 100 based on the policies of our parent company, AT&T. ISVP is a pilot program for emergency purchases documented in SLI 4600, "Employee Travel and Business Expenses." The maximum allowable charge has been raised from \$100 to \$250 for consistency with AT&T, and the approval level for a division supervisor has remained at \$50, also consistent with AT&T. As we get new information on AT&T approval policies, or as the nature of ISVP changes, we will consider revising these approval levels.

However, the ISVP program is a secondary procurement method, to be used only when a time-critical need exists, prepayments are required, or it makes good business sense. It was never intended to circumvent the primary methods of procurement, of which there are several, all with lower approval levels than ISVP. They are Just-In-Time (JIT, reference SLI 6620-1), General Stores (SLI 6470), Accelerated Procurement (SLI 6631), and Purchase Order (SLI 6631 and 6631-1). I encourage you to take advantage of the primary or secondary procurement method that is best suited to meeting the specific needs of the business.

Paul Stanford (100)

Q: I'm totally in favor of recycling and I wish more could be done. In Bldg. 836, however, one aspect of the paper recycling program strikes me as dumb. Paper in our office and in others is collected in cardboard boxes supplied by Sandia to people who are moving to a new location. It seems to me that we are packing a penny's worth of wastepaper in a quarter's worth of box. It also seems Sandia has run out of boxes.

My office has a scenic view of the Bldg. 836 dumpster area. Almost every day the custodians deliver many boxes to the dumpster as trash. Would it not make sense to use the trash boxes for paper collection? (Though some are too big and would be immovable if filled with paper.)

A: Sandia's wastepaper recycling operation utilizes cardboard boxes preprinted with the Recycle symbol on the side. These are obtained from Transportation Div. 3423 by calling the dispatcher on 4-8048. Our arrangements require the recycler to return the boxes to Sandia for reuse, though for a short time, we did run out of boxes. Archive or moving boxes are not to be used for recycling. The standard copier paper box may be used if the full

box is identified as "Recycle Paper" and its lid is taped down. Sandia is also recycling cardboard boxes, but because of work force limitations, not all buildings are yet part of the operation.

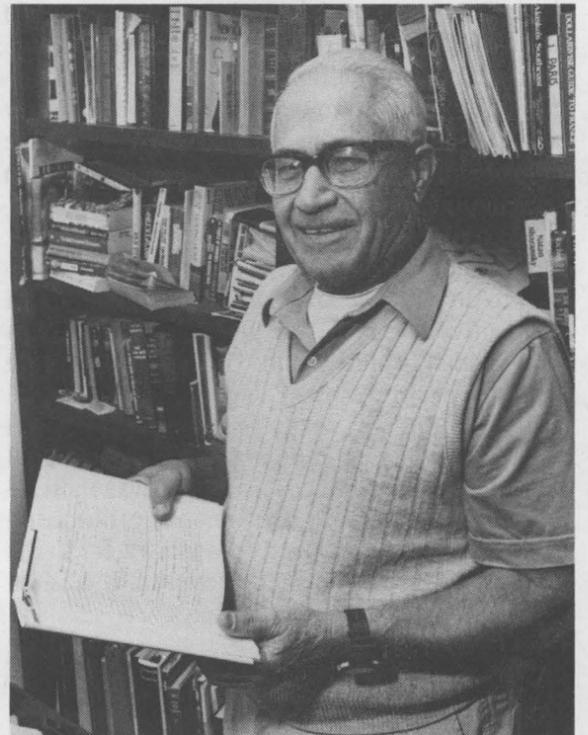
Jim Martin (3400)

Q: As part of Family Day activities, an exhibit was set up west of the TTC Bldg. on the packaging and transportation of radioactive waste. The exhibit was simple but excellent. I purposely brought my family to get their reactions, even though I don't work in this technology area. After a few words of explanation, I baited my 17-year-old son for a response. He was amazed that people have concerns about transportation of nuclear waste after seeing the shipping vessel. It doesn't take a PhD in metallurgy, such as I have, to judge the robustness of the design. My point: take it on the road. If a picture is worth a thousand words, how many million words is it worth to see the product? Get your act together, Sandia container people, and haul that trailer around New Mexico. Park it in Taos, Santa Fe, Moriarty, everywhere.

A: Thank you for your compliment. DOE already has traveling exhibits of spent fuel casks and other radioactive material transport packagings. The WIPP project brings the TRUPACT II to cities and towns along likely delivery routes in New Mexico. These displays are generally effective.

The package you saw is not related to the WIPP project or other programs in New Mexico. It will be used to ship intensely radioactive capsules to irradiation facilities. Since not all radioactive or hazardous materials are shipped in sufficient quantity to require the same degree of accident resistance, these packages are somewhat atypical of those used for most of the 2 million shipments made each year. As a result, the usefulness of this particular package as a public information tool may not be as great as those already used by DOE.

Tom Hunter (6300)



NICK DELOLLIS (ret.) recently became a Fellow of the Society for the Advancement of Material and Process Engineering (SAMPE). After more than 23 years at the Labs, Nick retired in 1980. The same year, his book *Adhesives, Adherends, Adhesion* was published. As chairman of a task group on adhesives in the International Standards Organization, he was responsible for development of the first international standards on adhesives. Nick holds 16 patents. While at Sandia, he worked in organic materials; another retired Sandian from that group, Gene Frye, is also a SAMPE Fellow. Only 42 Fellows had been inducted by the 12,000-member organization before Nick. Nick and his wife Dorothea live in Albuquerque.

UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS • UNCLASSIFIED ADVERTISEMENTS

Deadline: Friday noon before week of publication unless changed by holiday. Mail to Div. 3162.

Ad Rules

1. Limit 20 words, including last name and home phone.
2. Include organization and full name with each ad submission.
3. Submit each ad in writing. No phone-ins.
4. Use 8 1/2 by 11-inch paper.
5. Use separate sheet for each ad category.
6. Type or print ads legibly; use only accepted abbreviations.
7. One ad per category per issue.
8. No more than two insertions of same "for sale" or "wanted" item.
9. No "For Rent" ads except for employees on temporary assignment.
10. No commercial ads.
11. For active and retired Sandians and DOE employees.
12. Housing listed for sale is available for occupancy without regard to race, creed, color, or national origin.
13. "Work Wanted" ads limited to student-aged children of employees.

MISCELLANEOUS

KIRBY UPRIGHT VACUUM, w/attachments, \$100. Nickerson, 884-4670.

WIND-LOAD TRAINER, new, All American Products, Model 45, direct drive, fits most full-sized bicycles, \$85. Desko, 883-2662.

CAR SEATS, white, for '79-'87 Mustang, front & back, like new, \$45; transmission, \$35; rear end, \$15. Robertson, 299-7561.

WASHER/DRYER, Whirlpool, heavy-duty washer, electric dryer, good condition, avocado green, approx. 12 yrs. old, \$75/ea. OBO. Smith, 271-1959.

SOFA, in good condition, \$125. Sanchez, 292-1982.

GEMEINHARDT FLUTE, w/case, like new, appraised at \$275 to \$300, will take \$250. Schaub, 865-9581.

BUCKET SEATS (2), high back, \$50. Meeks, 292-5915.

WALL FURNACE, 30,000-Btu, direct vent, trade for 1 cord oak or 1-1/2 cords pine; Sears vent hood, shelf-style, \$100. Moore, 294-5646.

FOUR-POSTER WATERBED, queen-size, cherry finish, waveless mattress, 2 yrs. old, \$350 OBO. Hernandez, 344-5431.

CRIBS, w/mattresses, 2 white, 1 yellow, clean, \$30/ea. Potter, 299-6053.

DROP-LEAF DINING TABLE, Ethan Allen, solid maple, extends to 78 inches, \$400. Krahling, 268-8126.

ANTIQUE OAK ICEBOX, White Mountain Grand, excellent condition, \$500. Petersen, 275-7467.

GIRL'S BEDROOM SUITE, twin headboard, dresser, bookcase, mattress, box spring, excellent condition, \$1,200 retail, sell for \$350 firm. James, 294-6837.

JENNY LIND CRIB, \$40; car seat, \$10; booster seat, \$5. Montoya, 821-5189.

KENMORE REFRIGERATOR, ice-maker, \$110; queen-size waterbed, bookcase headboard, \$100; round kitchen table, w/4 chairs, \$75. Johnson, 898-5962.

MINOLTA MAXXUM 7000i, w/3200i flash, AF zoom 35-80mm, haze filter, portrait card, close-up card, case, photo bag, reasonable offer. Hudson, 821-3968.

DIAMOND SOLITAIRE, .67KT, set in 18CT gold, 2-10CT gold bands, appraised at more than \$3,000, asking \$1,500. McKeever, 299-4050.

KITCHEN TABLE, on brass pedestal, 45-in., glass, square w/rounded corners, 4 upholstered chairs, \$150. Raines, 275-5854.

KEYSTONE CHROME RIMS, locks, nuts, & caps, 14x7s, 5-3/4-in., for all GM products, \$125 for all 4. Gutierrez, 865-9542.

SKIS: K2 207cm, GS-Electra, \$20; Blizzard Fans, 150cm, w/Salomon 101 bindings, \$15; Equipe STX, 170cm, \$15. Johnson, 898-7244.

FREEZER, 18.5 cu. ft., chest-type, 4-1/2 yrs. old, \$175. Parker, 292-8150 or 293-3955.

BEDROOM FURNITURE: black lacquer, queen/full headboard & rails, 6-drawer dresser w/mirror, 2 bedside tables. Pantuso, 892-3641.

NORDICTRACK SKI EXERCISE MACHINE, Model 505, \$400. Lorence, 275-3586.

BEARDED IRIS, free, you dig. Horton, 883-7504.

FIREPLACE ACCESSORIES: grate, mesh screen, fireset, best offer. Martin, 299-3004.

LARGE SOFA, in good condition, \$125. Sanchez, 292-1982.

TWO BASKETBALL TICKETS, UNM vs. Arizona State, Dec. 7, chairbacks, \$25. Volk, 299-1702.

REDSKIN STARTER JACKET, worn one season, white, excellent condition, \$40 OBO. Koehler, 298-2488.

TENT, Sierra Designs Flashlight, 3 seasons, 2-person, \$65 OBO. Wronosky, 296-7265.

CONTEMPORARY FURNITURE: solid green sofa, 2 chairs w/ottoman, green/gold floral print. Linnerooth, 299-6558.

UPRIGHT PIANO, 1906 Tryber, original keys, reconditioned, \$600, negotiable. Fajardo, 299-4219.

CROSS-COUNTRY SKIS, Trak child's 150cm, w/poles & boots, step-in bindings, \$30. Cuyler, 292-8076.

FRANKLIN STOVE, complete, \$200 OBO. Bland, 265-6286.

NEW MEXICO CAMP RESORT MEMBERSHIP, sells for \$995, affiliated w/coast-to-coast. Eaton, 869-2847.

SKI RACK, Barrecrafters, roof-mounted, holds 4 pairs, fits '84 Cutlass & similar cars, cost \$80 new, sell for \$40. Perrine, 293-1429.

ENTERTAINMENT CENTER, teak, w/TV turntable, excellent condition, needs bracing, \$50. Crego, 292-0266.

EXHAUST PIPES & MUFFLERS, Harley-Davidson FXR Crossover; double sliding doors, complete w/frame & hardware, \$40. Gonzales, 344-4933.

DYNASTAR 195cm SKIS, w/Geze bindings, both 5 yrs. old, \$100. Sisson, 243-5383.

FIREPLACE INSERT (antique), \$200; gas dryer, \$35; metal desk, \$20; DP exerciser, \$45; solid-core doors, \$25. Marquez, 898-3169.

DRUM SET, 5-piece, high-hat, 20-in. cymbal, drummer's throne, \$250. Mareda, 296-0135.

BOLIVAR SPEAKERS, pair, 8-in., 3-way, \$100 OBO. Harris, 299-4559.

CORAL for saltwater aquarium, good selection. Cropp, 296-1877.

VACUUM SWEEPER, Kirby Tradition, excellent condition, well-maintained, w/full set of attachments, \$125 OBO. Freyermuth, 299-2053.

BLUE-POINT SIAMESE CAT, 5 yrs. old, neutered, has shots, free to good home. St. Clair, 898-2041.

CONN ORGAN, w/bench, excellent condition, walnut finish, \$700. Haynes, 293-9208.

LARGE CAMERA BAG, \$45; Pro Albinar tripod, panhead, case, \$35; Bogen ballhead #3055 (new), \$40; quick-release plate, \$10. Wayland, 299-2587.

CLASSICAL GUITAR, Juan Orozco, 1976, w/hardshell case, spruce top, extra sets of strings, Dampit included, \$300. Lineberger, 275-7931.

CASSETTES, Russian language course, \$46; paper shredder, \$75; AT&T telephone answering machine, \$40; all below cost. Balint, 298-2652.

MOTHER'S ANTIQUE RED OAK DRESSER, w/beveled mirror, \$265; Victorian 4-drawer chest, \$225; both OBO. Ramel, 821-0475.

TAIL GATE, 5th wheel Flo Thru, for Ford '87-'91. Billmaier, 296-6332.

FREEZER, Kenmore, 20 cu. ft., upright, excellent condition, '78 or '79 model, \$150. Kadlec, 299-2034.

LITTON MICROWAVE, \$45; cross-country skis, \$45/\$30; RC model battery charger, \$20; controller, \$18; Marchal lights, \$20. Dietz, 821-3903.

HIDE-A-BED COUCH, \$100; complete king-size water bed, \$100; two living room chairs, \$40 each. Tipton, 293-9285.

NIKON EM CAMERA, 35mm, Vivitar flash, original manual, \$165. Wrons, 275-0856.

COMPAQ DESKPRO COMPUTER, 640 KB, 20MB hard disk, 360KB floppy drive, w/Princeton EGA/CGA color monitor, \$500. Smith, 243-0714.

WOMAN'S SKI BOOTS, size 8-1/2; Christmas tree stand; side-view mirrors for trailer towing; lavatory faucet; National Geographic magazines; doors. Moss, 298-2643.

EXERCYCLE, Bollinger Ergometer, w/speedometer, odometer, timer, & 40-lb. flywheel, excellent condition, cost \$177, will sell for \$75. Bear, 881-7128.

SKI RACK, Barrecrafters, \$25; tire chains, \$10; bicycle carrier, bumper, \$10. Madsen, 294-3235.

SCANDINAVIAN FURNITURE: combination desk & bookshelf, \$400; dining table, 4 chairs, \$300; sideboard w/lower/upper sections; \$250. Teak. Loudon, 256-3684.

NORWOOD LOOM, 8-harness, many extras, including sectional beam, warping board, tensioner box, yardage counter & shuttles, \$2,300. Mulligan, 298-7320.

SAILS: 3.9 & 4.4 windsurfing Hawaii, \$135 & \$140; North 5.0 Wave, \$175; 6.0 Infinity, \$200; 7.0 Sl. Speed, \$180. Healer, 298-6967.

IBM/PS2 model 30/286, 42M hard, color VGA, 1.44M floppy, Lotus 123, Word Perfect 5.0, excellent condition, \$1,000. Brown, 294-5545.

PALOMA WATER HEATER, 44,000-120,000-Btu., \$50 OBO. Iman, 299-6500.

SPINET PIANO, Baldwin Acrosonic, like new, beautiful appearance, tone, wonderful Christmas gift, \$1,800. Bickerstaff, 898-5529, evenings.

MINIATURE DACHSHUNDS (3), ready for homes Christmas week, choose yours early, AKC-registered, parents on premises, \$200 each. Simmons, 293-9294.

BRONCO TOP, white, full-size, fits '80-'86, good shape, \$500. Luikens, 271-0019.

TREADMILL, 1/2-hp/DC, pulse, speed 0-6 mph, distance, calories, variable incline, excellent condition, \$295 OBO. Liguori, 256-3613.

ANTIQUE TVs (2), early & late 1950s, neither works, cabinets in good condition, yours for the hauling. Hinds, 869-2191.

YAESU AMATEUR RADIO STATION, complete, FT 101 ZD, FT 901, FV 101 Z, SP 101, YD 148, \$600; Heath HD-10 Keyer, \$20. Graham, 296-0462.

TRAVEL CERTIFICATE, America West Airlines, male or female, through Dec. 9, \$100 value for \$75. Roberts, 864-3529 (Belen).

SOFA BLOCK STEREO/TV CABINET, book cabinets, lamp table; large airline-approved animal carrier, w/water bottle. Peters, 294-0363, after 5 p.m.

SKIS, Rossignol, 195cm, w/Solomon 727 bindings, \$45; woman's ski boots, 7-1/2-8, San Marcos, \$35; Sanyo stereo & speakers, \$100. Nagel, 298-2779.

HARLEY-DAVIDSON SPORTSTER PARTS: aftermarket frame & girder front end, \$250 each or trade. Souther, 281-3465.

HUMIDIFIER (whole house), \$20; Rainbow vacuum w/power head & all attachments, \$85; Weed Eater \$5; push lawn mower, \$20. Hovorka, 294-6981, leave message.

FREEZER, upright, 16-17 cu. ft., Signature, non-defrosting, avocado, \$165; Honda generator, model EX1000, 1000 watts, \$450. Hole, 255-1444.

KIMBALL PIANO, w/bench, studio upright, maple, excellent condition, contemporary design, \$2,500. Zeuch, 269-4969.

ART OBJECTS, fitness stepper, rowing machine. Senglaug, 281-8002.

HOLIDAY/PARTY DRESS, Gunne Sax brand, strapless, dark green velvet, size 5, \$25. Clausen, 884-1483.

COMMODORE 64, printer, programs, games, \$180; TRS-80 pocket computer, printer, programs, \$100; Panasonic AM/FM cassette, remote, turntable, \$110. Hale, 823-9563.

ROWING MACHINE, perfect, \$75; microwave oven, full-size, 700 watts, temperature probe, programmable, hardly used, \$100. Olsen, 294-2333.

ZENITH VCR, remote control, maintenance certificate, practically new, hardly used, \$250. Misak, 892-3033.

LOWREY ORGAN, in perfect condition, \$450 OBO, call for appointment. Tedesco, 888-1068.

COAT, size 14, red wool, 3/4-length, broad shoulders, w/genuine black-leather inserts, very striking, new. Sons, 889-0496.

WATERBED, queen-size, w/underdresser & linens, \$150; skis, \$25. Mozley, 884-3453.

SOFA, off-white, \$45; table & chairs, \$30; papasan chair, like new, \$65. Howard, 839-9203.

LIVING ROOM CHAIRS (2), gold, asking \$30 for both. Campbell, 888-3135.

BEDROOM FURNISHINGS: light wood, 6-drawer dresser & matching bookcase, \$150/set; twin mattress & springs, excellent condition, \$75/set. Abel, 296-6089.

AT&T 6300 COMPUTER, w/dual floppy & monitor, keyboard, MS/DOS & Multimate word-processing software, \$275. Shunny, 265-1620.

PANASONIC VCR, VHS, needs service; TEAC cassette deck, Kenwood receiver, both very good condition; each \$70 OBO. Baldwin, 822-1860.

WATERBED MATTRESS, 8-in. fiber-filled super waveless, like new, fits California King frame, includes liner, heater, & accessories, \$150. Horton, 266-4233.

MICROWAVE OVEN, Litton, digital touch control, 1.2 cu.ft., \$125. Miller, 268-5992.

GREAT PYRENEES PUPS, AKC-registered, 10 wks. old, 1st & 2nd shots, 3 males, \$300 each. Ouellette, 867-2440.

EXERCISE BIKE, air-resistance type, simultaneous arm/leg action, 7-function ergometer w/pulse monitor, new condition, \$200. Ricco, 828-1997.

OAK TABLE, 30" x 60", \$20; service manual for '79 Datsun 280ZX, free. Kolb, 271-1775.

TRANSPORTATION

'85 TOYOTA TERCEL, 4-dr. liftback, AT, AC, PS, PB, 65K miles, excellent paint, body, upholstery, garaged, maintenance records available, \$3,775. Adams, 256-7265.

'78 DATSUN 200SX, 5-spd., 2-dr., AC, runs well, good body, \$950 OBO. Smith, 271-1959.

'87 SPRINTER MOTORHOME, 22-ft., Chev. 30, w/3500cc engine, 21K miles, new tires, separate shower, awning, TV antenna, roof rack. Nunez, 884-3623.

'86-1/2 TOYOTA SUPRA, AT, AC, AM/FM cassette, leather interior, excellent condition, one owner, \$9,800. McKeever, 299-4050.

'85 TOYOTA TERCEL, AC, 5-spd., AM/FM, \$3,200. Hammond, 294-2045.

'86 BUICK CENTURY LIMITED, silver/gray, all power, AC, AM/FM cassette, 4-dr., maintenance records, 96K miles, \$4,250. Sharpton, 897-2883.

'73 CADILLAC ELDORADO CONVERTIBLE, 501 cu. in. V-8, AM/FM cassette, leather seats, FWD, \$2,000 negotiable. Burnett, 298-1078.

'69 MUSTANG FASTBACK, 6-250, one owner, garaged, mechanically sound, excellent condition, new clutch, brakes, carburetor, \$4,000. Snyder, 296-5771.

'79 YAMAHA MOTORCYCLE, 100cc, less than 1,000 miles, excellent condition, \$600. Maxam, 898-2435.

MAN'S 10-SPD. RALEIGH RECORD BICYCLE, 27-in., great condition, clean, shiny, ready for Christmas, must see to appreciate, \$100 OBO. Freyermuth, 299-2053.

'66 FORD MUSTANG, 289 engine, all stock, AT, AC, looks good, runs great, \$4,500. Blackberg, 266-0984.

'91 ESCORT LX, 4-dr., AT, AC, PS, PL, cruise, cassette, extended warranty, 17K miles, \$8,325. Dennis, 823-9734.

'85 CHRYSLER FIFTH AVENUE, AC, PS, PB, PW, new front brakes, \$3,500 OBO. Stichman, 293-6096.

'75 PONTIAC GRAND PRIX, 400 V-8, red, original owner, \$1,300. Strall, 821-5280.

'75 DODGE PICKUP, faithful 1/2-ton, w/trailer hitch, 3-spd., 318 V-8, \$1,100. Krumel, 281-4406.

'83 FORD F250, XLT-460, 4-spd. manual, trailer pkg., heavy-duty shell, 72K miles, super clean. Luikens, 881-1382.

'74 STARCRAFT TRAVEL TRAILER, 22-ft., sleeps 4, spare wheel & tire, sway bars, hitch, completely contained, \$3,195. Barber, 884-4969.

'74 VW SUPER BEETLE, 6K miles on rebuilt engine, new brakes, interior in excellent condition. Peters, 294-0363 after 5 p.m.

'80 TOYOTA COROLLA STATION WAGON, 135K miles, runs well, \$1,000. Chow, 281-9235.

'79 MERCEDES 450 SLC, cream, w/leather interior, V-8, AT, PS, PB, power sunroof, garaged. Wilson, 884-3128.

'61 CORVAIR STATION WAGON, \$250 OBO; Toyota R-20 Engine, \$100; Corvaair parts car, \$200 OBO. Mozley, 884-3453.

'82 BMW 320, runs great, sunroof, AM/FM cassette stereo, new tires, \$3,500 OBO. Howard, 839-9203.

'78 MAZDA GLC, looks bad, runs well, under 100K miles, \$700. Criel, 821-5932.

'85 JEEP CHEROKEE, 4x4, 4-dr., 5-spd., AC, white, 85K miles, \$5,500. Kolb, 271-1775.

'79 MONTE CARLO, 1 owner, 50K miles, V-8, AT, AC, PS, PB, AM/FM cassette, clean, \$2,300. White, 294-5692.

'80 BUICK SKYLARK, 2.5L, standard 4-spd., AC, PS, PB, PL, good condition, \$1,800; 10-speed bike, \$40. Puccini, 821-3171 or 255-0568.

GIRL'S BICYCLE, pink, 20-in. wheels, knobby tires, coaster brakes, padded handlebars & center bar, in almost-new condition, \$60. Becker, 821-4494.

BRIDGESTONE BICYCLE, 10-spd., professional road bike, w/28-in. diam. wheels, \$100 OBO. Schneider, 299-6243.

SCHWINN BICYCLE, new, w/less than 20 miles, 12-spd., aqua blue. White, 839-0602.

SILVER EAGLE 10-SPD. BIKE, new tubes & tires, \$75. Zownir, 256-3753.

REAL ESTATE

4-BDR. HOME, mountain living, 2,175 sq. ft., 2 baths, on 1.2 acre, large decks, views, 20 min. east of Albuquerque, \$153,500. Lyons, 281-9283.

3-BDR. HOME, Eastridge area, great home, many extras, close to KAFB, 1,732 sq. ft., \$99,900. Baca, 275-2049.

3-BDR. HOME, 1-3/4 baths, 1,450 sq. ft., 2-car garage, Eldorado district, \$79,500. Parker, 292-8150 or 293-3955.

3-BDR. HOME, large MBR, 1-3/4 baths, great room w/vaulted ceiling, fireplace, fully landscaped, east of Tramway, near Copper, \$93,000. Sprauer, 275-0092.

PLACITAS, 2 ACRES IN TIERRA MADRE, great views, quiet location, best price in area, \$48,000. Bott, 823-2821.

2-BDR. MOBILE HOME, '85 Baywood, 14 x 56, pitched roof, on river, in Truth or Consequences, \$52,500, will negotiate. Eaton, 869-2847.

4-BDR. HOME, study, den, wrought iron, 3 baths, appraised 90, now low 80s, near UNM & Kirtland. Hendren, 883-5070.

5-ACRE TRACTS, Albuquerque west-side, near I-40 & Coors, & on Paseo del Norte ext., \$120,000-\$300,000. Maxam, 898-2435.

ADOBE HOUSE, 8% assumable FHA, solar, fenced, updated, much more, in Belen, \$41,000. Roberts, 864-3529 (Belen).

WANTED

MAGAZINES, *Sunset* and *Better Homes and Gardens*, will pick up. Lucero, 821-6735, leave message.

DORM-SIZE REFRIGERATOR, 1-1/2 to 2-1/2 cu. ft., good condition. McConahy, 884-5071.

ALUMINUM EXTENSION LADDER, 16-ft.; wheelbarrow; large spring horse for child. Kerr, 299-7527.

GRAND CANYON BUFFS, 9 days boating entire canyon to Lake Mead, May 25 to June 3, \$1,075 group rate, includes all meals. Shunny, 265-1620.

GIRL'S WINTER CLOTHES, size 3T, in great condition, prefer separates & sweats, few dresses OK. Swanson, 298-1237.

SKI BOOTS, man's size 13, will trade skis for boots. Johnson, 898-7244.

VCR TO PLAY PAL TAPES on NTSC television. Hamilton, 271-8643.

OLYMPUS XA CAMERA. Wronosky, 296-7265.

AQUARIUM, 20- to 30-gal., with accessories. Essenmacher, 865-7066.

"CRAZY" DAISY WINDER. Newman, 299-2729.

TWO TICKETS for Lobos vs. Arizona, Dec. 14, for UA Alum. Wrons, 275-0856.

PILOT(S) FOR PARTNERSHIP: Cessna 170, 172R/G, 177R/G, 180, or 182R/G; 1/5-1/2 interest dependent on cost. Shapnek, 281-5913.

ROOMMATE to share 2-bdr. house, non-smoker, \$230/mo plus 1/2 utilities. Indian School & Pennsylvania area; Chev. truck rims, chromed. Golden, 299-1274.

TRAILER, enclosed, utility, lockable & weather-tight, approx. 5 x 8. Skogmo, 292-9773.

CHILD'S MOTORCYCLE HELMET; Sportster disc brake front end. Souther, 281-3465.

CHILD'S CLIMBING TOYS, such as Little Tykes Gym or Treehouse, also outdoor swing. Chow, 281-9235.

QUEEN-SIZE WATERBED, semiwaveless, oak, in good condition. Hovorka, 294-6981, leave message.

WORK WANTED

BABYSITTING JOBS WANTED for seventh grader who has completed American Red Cross course. Geer, 265-2094.

SHARE-A-RIDE

CORRALES & RIO RANCHO VANPOOL has openings for full-time & part-time riders, don't fight the snow & traffic, take the vanpool. Duran (891-3251) or Boatman (892-3570).



Coronado Club Activities**This Month, You Gotta Wait Until You're Invited**

THE CLUB WILL be occupied by private parties most Friday evenings this month. The only exception: Dec. 20, a Cowboy Christmas Party with the Isleta Poor Boys. Come on out for loads of good eats that chuckwagon cooks never dreamed of, and lots of high-stepping music. Reservations are required, and the wise will make them soon by dialing 265-6791.

NO SUBORDINATE CLAUSES, but both Santa and the Mrs. will be at the Club Saturday morning, Dec. 14, from 9 to noon. The kids will love the cartoons and the goodies, not to mention the 10 a.m. performance of Robbie Weinstein in "Flights of Fancy." It's free for the kids, and there's free coffee for the adults.

HERE'S THE LOWDOWN on New Year's Eve — You can enjoy a dinner of roast prime rib of beef and shrimp scampi, and you might feel a swoon coming on when you hear the sweet,

swinging music of Orly Saavedra and his Big Band. The enjoyment starts with dinner from 7 to 9 p.m., and the band plays from 9 p.m. to 1 a.m. The price of \$35 per couple (members; non-member guests are \$55 per couple) also includes a bottle of champagne, a continental breakfast at 12:30 a.m., and plenty of noisemakers to bring in the new year. Tickets are going fast — get yours at the Club now!

NOW FOR SOMETHING completely different, especially different from sitting home Tuesdays wishing there were election returns to watch: Drop in for a Drop-In Tuesday at the Club. Games and more games, from darts to ping-pong to cards to dominos to who knows — even tennis, if you're up to it. It all goes on from 4:30 to 9 p.m. every Tuesday. For a group of four or more, a pitcher of beer or soda is half price. All non-alcoholic drinks are also half price. Bring your friends, meet your friends, or make some new friends!

Events Calendar

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

Dec. 6-8 — Arts and crafts exhibit, "Ye Merry Olde Christmas Faire," featuring storefronts, Santa, carolers, and music in the style of Charles Dickens; 10 a.m.-9 p.m. Fri., 10 a.m.-6 p.m. Sat., 10 a.m.-5 p.m. Sun.; State Fairgrounds, 296-1491.

Dec. 6-21 — "Burn This," New Mexico Repertory Theatre presentation of a love story by Lanford Wilson about contemporary New Yorkers (adult theme and language); 8 p.m. Tues.-Sat., 2 p.m. Sat. & Sun.; KiMo Theatre, 243-4500.

Dec. 6-21 — "A Christmas Carol," by Charles Dickens, adapted by Richard Jones; 8 p.m. Fri. & Sat., 2 p.m. Sun.; Albuquerque Little Theatre, 242-4750.

Dec. 6-22 — "The Gifts of the Magi," a musical adaptation of the short story by O. Henry; 7:30 p.m. Fri., 2 p.m. and 7:30 p.m. Sat., 6 p.m. Sun.; The Vortex Theatre, 247-8600.

Dec. 6-22 — Exhibit, "Cows," everything you wanted to see and hear bovine; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues.; study gallery, UNM Art Museum, 277-4001.

Dec. 6-22 — Exhibit, "An American in Italy: Photographs of Tuscany by Bill Adams," history and archaeology of ancient hill towns in the Val di Chiana; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues.; Van Deren Coke Gallery, UNM Art Museum, 277-4001.

Dec. 6-Jan. 9 — Exhibit, "The Sagebrush Ocean," more than 60 Cibachrome color and black & white prints by author and photographer Stephen Trimble, based on his book *The Sagebrush Ocean: A Natural History of the Great Basin*, shows wide range of desert ecosystems from salt-encrusted dry lake beds to 13,000-ft. alpine peaks, a map, and text excerpts from the book; 9 a.m.-5 p.m., New Mexico Museum of Natural History and Science, 841-8837.

Dec. 6-Jan. 10 — Exhibit, "Abstract Art: A Manifesto of Liberation," presentation of art from the '30s that emphasizes spiritual liberation through color and non-objective form; 9 a.m.-4 p.m. Tues.-Fri., 5-9 p.m. Tues.; UNM Jonson Gallery, 277-4967.

Dec. 6-Feb. 9 — Exhibit, "USS New Mexico Battleship," in commemoration of the 50th anniversary of World War II to honor veterans from all branches of the service, sponsored by the Navy League of the United States and the Albuquerque Museum; 9 a.m.-5 p.m. Tues.-Sun.; Albuquerque Museum of Art, History, and Science, 243-7255.

Dec. 6-Feb. 9 — Exhibit, "Horse Tales: An Evolutionary Odyssey"; 9 a.m.-5 p.m., Museum of Natural History and Science, 841-8837.

Take Note

UNM is again offering "Entrepreneurial Engineering" (ME 456) in the spring semester. Working engineers and graduate and senior engineering students take the course. The class works in teams, usually starting four new businesses each semester. Staff members with technical or business backgrounds who have in mind possible business developments are especially invited to enroll. The class meets on Tuesdays beginning Jan. 21 from 5:30 to 8:30 p.m. at the UNM Mechanical Engineering Building, Rm 218. Enrollment must be completed in the Student Services Building Registration Center (telephone 277-5548) by Jan. 24. Cost for the three-unit class is \$194.25. For more information, call Prof. Bill Gross on 277-6297.

For the fifth year, KGGM TV-13 and United Way of Greater Albuquerque are sponsoring the Holiday Sharing Center, which accepts donations and volunteers through Dec. 21. The Holiday Sharing Center accepts food, clothing, and toys, but the primary purpose is for people to share their time and talents with others. In the past people have participated by writing holiday cards for the elderly; decorated trees for shut-ins; played Santa or Mrs. Santa for kids in hospitals; served meals at food lines for the homeless; played musical instruments for senior centers, non-profit agencies, and hospitals; and many other things. Volunteers may call the Center on 768-1077, Monday through Friday, between 8 a.m. and 5 p.m.

Fun & Games

Bridge — The Sandia Bridge Club plays bridge Thursday nights at 7 in the Coronado Club Eldorado Room. Individual players, pairs, or groups — as well as players new to the game and experienced duplicate players — are welcome to join. A \$1-per-player fee is returned as prizes. Stop by the Coronado Club on a Thursday evening or call Jim Kwak (4341) on 294-2524. The bridge club is a Sandia Employees Recreation Program activity open to all those eligible for SERP.

Cross-Country Skiing — Retiree John Shunny is again teaching cross-country skiing for the Sandia Employee Recreation Program (SERP). A lesson consists of a morning of demonstrations and learning on the snow just below Sandia Crest; in the afternoon after lunch the group goes on a gentle ski tour on a cross-country ski trail in the woods. The lesson costs \$16. A rental package — skis, poles, and boots — is available for \$8 plus tax. Call the SERP office to schedule your lesson. Snow permitting, lessons are held every Saturday.



LEARNING to treat multiple-injury victims in a disaster are (from left) Kay Dannis and Rae Duffus, two Sandia registered nurses acting as victims and at the same time showing Bobbie Vital (5311) where to find pressure points for stopping the flow of blood from a wound. The three attended a START (Simple Triage and Rapid Treatment) class sponsored by Medical Div. 8527 (Livermore) and taught by Nita Archambault (8527). To make conditions more realistic, victims pretended to be in great pain and were smeared with fake blood. Livermore Sandians are encouraged to sign up for future classes through the Medical Division.