

# Sandia helps break the supercomputing speed barrier

DOE-Intel-Sandia project hits 1.06 trillion calculations per second; computer to be installed at Sandia

By Chris Miller

Lab News Staff

For years, it has been the Holy Grail of high-performance computing. And now it has been

achieved. And a collaboration of DOE, Intel, and Sandia did it.

Achievement of the computing milestone of one trillion operations per second (one teraflops) was announced at a news conference Monday in

Washington by DOE Secretary Hazel O'Leary, with a live audio link to Sandia and Intel.

The milestone was demonstrated Dec. 11 to DOE and Sandia officials in Beaverton, Ore., on an Intel massively parallel computer developed under direction of DOE for the Accelerated Strategic Computing Initiative (ASCI). ASCI is a 10-year program to move nuclear weapons design and maintenance from a test-based to a simulation-based approach.

The achievement ushers in a new era in which high-fidelity 3-D simulation is expected to enable scientists to reach the eventual goal of preserving a safe, secure, and reliable nuclear deterrent without underground testing.

"The United States can now re-establish its dominance in this market as an innovator," O'Leary said. "The US has clear leadership in the business of ultracomputing and nobody can doubt that leadership."

"Reaching a teraflops is a significant technical milestone, and I congratulate the Intel-Sandia team," says VP Gerry Yonas (9000). "Even more important, it says Sandia is entering the new millennium with a wholly new engineering tool, one that will change the way we do our jobs from now on. In fact [by suggesting a thousand models from which to choose the best one to

*"Sandia is entering the new millennium with a wholly new engineering tool, one that will change the way we do our jobs."*

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FUTURE SUPERCOMPUTER — James Tomkins (9224), teraflops project manager for procurement, checks the latest shipment of teraflops cabinets from Intel Corp. in Oregon. The teraflops supercomputer, with a computing capacity of 1.8 teraflops, should be up and running at Sandia by late spring. The computer will be used by all three weapons labs for DOE's Accelerated Strategic Computing Initiative. (Photo by Randy Montoya)

## Sandia National Laboratories **Sandia LabNews** Vol. 48, No. 26 December 20, 1996

### Happier holidays for the needy through Sandians' generosity

Holiday giving higher than ever this year

By Janet Carpenter

Lab News Staff



Sandia employees may have a lot on their minds this holiday season — like keeping their jobs or looking for new ones — but they also have thoughts

about those who are unable to provide what others take for granted. Thanks to the compassion, generosity, and hard work of Sandia employees, Santa will be visiting more homes in the Albuquerque area this year than expected.

At times it seems like the holidays have become only a commercial event. People are in a hurry. "Gotta-have-it" expensive toy supplies run out early. But for some needy people in the Albuquerque area, just being able to keep a roof over

their heads, the heat and lights on, and food on the table leaves no money for presents of any kind, let alone a "Tickle Me, Elmo" toy.

Holiday drives abound around the Labs this season, and giving levels are high. Here is a roundup of some the *Lab News* learned about. Undoubtedly, there are others.

#### Shoes for Kids giving breaks record

For more than 40 years, Sandians have participated in the annual "Shoes for Kids" campaign (Oct. 25 *Lab News*) led this year by Lisa Polito (12650). So far, Sandians have contributed a record \$9,500, including \$2,000 from Lockheed Martin Corporation. "Sandians, I'm so proud of them," says Mary Nation (12650), Community Relations Program Manager. "In this time of uncertainty they're going above and beyond. Our Sandians are

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### Realignment continues: Some impacts resolved, VSIP could resolve hundreds more

It's been 17 days since DOE Headquarters announced



approval of Sandia's plans to eliminate as many as 435 positions through the Workforce Realignment Process, and already several "impacted" employees have found other work within the Labs through cross-organizational matching, says Karen Gillings, Manager of Staffing Dept. 3535.

In addition, managers who had job openings posted in the big, Dec. 3 "realignment posting" still are considering the more than 500 bids received from impacted employees interested in filling those positions. (The original posting of almost 200 positions had to be "rescrubbed" after some employees discovered that a few of the openings they tried to bid on no longer existed. The final number of bona fide openings as of Dec. 6: 166.) Bidding for those openings closed Dec. 12; final selections are to be made by Jan. 13.

Meanwhile hundreds of other employees in both impacted and nonimpacted positions are thought to be considering applying for the package of benefits, including a minimum payment of \$20,000, offered as part of the Voluntary Separation Incentive Program (VSIP). The VSIP is expected to resolve many more impacts toward Sandia's goal of eliminating the positions without

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Experiments test Japanese nuclear reactor containment vessels	7		9	Q&A with NATO weapon-protection official Harold Smith

# This & That

Dear Santa - I know this is a big order and a bit late, but there's something I really want for Christmas this year: for every hard-working Sandian who wants and deserves to keep working at the Labs next year to be able to do so. If you can swing that, I promise to quit whining about the red Ferrari you've failed to bring me for so long.

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Stability - how sweet the sound! - It's premature to talk much about this now while we're currently in the early stages of a realignment and downsizing program, but Executive VP John Crawford said during the employee dialogue sessions several weeks back he's hopeful our budget and workforce will level out in a year or so. There are no guarantees, of course - and we'll still probably need to continue readjusting the Labs' skills mix - but our growing reputation for technical excellence is a strong Sandia selling point. And wouldn't some stability be nice? Our VSIPed, reengineered, reorganized, restructured, and "re-realigned" staff sure could handle some.

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Your shot at show biz - Old buddy Gary Shepherd (4911) desperately needs 15-20 volunteers to help with a "really big show" he's producing: the Central New Mexico United Way Adobe Awards ceremony on Jan. 15, which honors major individual and corporate givers. Gary is designing and producing the theatrical-type ceremony. The production is made possible through significant contributions of goods and services from community organizations and caring individuals. Gary needs help with loading/unloading and setting up stage props, stagehand work, and more on Jan. 14, 15, and 16, much of it in the evenings. A theatrical background is helpful but isn't required. If you can help or want more information, contact Gary at 845-8078 or via e-mail: gcsheph@sandia.gov.

Sandians have long given more to United Way (through the ECP program) than any other local group, pledging a whopping \$1.475 million this year (*Lab News*, Dec. 6). And speaking of generous Sandians, see Janet Carpenter's page-one story about the many holiday-season giving programs supported by Sandians. What a wonderful holiday tradition!

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Holiday (voicemail) greetings - What's the last thing to do before leaving Sandia for the holiday break? If you're thoughtful and care about your customers, it will be to change your voicemail greeting to let callers know Sandia is closed Dec. 25-Jan. 1 and that you'll be back Jan. 2 (or whenever you plan to return). If you're extra conscientious, you can even leave a number where you can be reached during the break.

\*\*\*

Attention married men! - A late warning: If your main holiday gift to your wife plugs into an electrical outlet - especially if the gift cleans anything - exchange it now while there's still time. Go trade it for something that shines or sparkles, and I'm NOT talking about a new set of dishes or cookware, guys. Now, hurry!

Larry Perrine (845-8511, MS 0129, lgperri@sandia.gov)

## President's Holiday Message



As we prepare for our annual holiday break, I want to thank each of you for your contributions during a year that has been one of our most successful ever.

Technical innovations were abundant across the Labs - in research, in

new programs, and in the many important projects that we carry out for the nation. Two results achieved during November and December are attracting national and international attention. Our "Z-pinch" experiments have shattered all records for X-ray outputs - 160 trillion watts. Similarly, Sandians working in partnership with Intel (at its Beaverton, Oregon facility) have set the world computing speed record - one trillion operations per second.

These are apt examples of the many great results Sandians produce when we partner together to achieve challenging goals. We all share in the joy of these and other accomplishments of this year and can take pride in being a part of this great laboratory.

In this holiday season, we can rejoice in the contributions we have made to "peace on earth" and can look forward, after a well-earned pause, to the challenges and opportunities of the new year.

The knowledge that we are highly valued by the nation and entrusted with responsibilities to secure and create a better future for all Americans should inspire us all. I can tell you there is no one I would rather face these great challenges with than you. Thank you for the wonderful support you have given me this year, and happy holidays to you and your families!

C. Paul Robinson



## Next Lab News is Jan. 17

With various schedule changes due to the holiday shutdown, the next issue of the *Sandia Lab News* is Jan. 17. The final deadline for news and classified ads will be noon, Friday, Jan. 10.

## Sandia LabNews

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Ken Frazier, Editor .....505/844-6210  
Barry Schrader, California site contact .....510/294-2447  
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## Atomic Museum adds sub-launched Trident

The National Atomic Museum added an important piece of the United States' nuclear weapons legacy Dec. 3 when a Trident I (C-4) submarine-launched missile arrived at the museum. The missile was donated by the US Navy.

During the Cold War, submarine-launched nuclear weapons became an important part of the United States' triad of strategic nuclear defense capabilities: warheads could be delivered from manned Air Force bombers, from Air Force silo-based intercontinental ballistic missiles (ICBMs), and via Fleet Ballistic Missiles (FBMs) launched from Navy submarines.

The earliest FBM was the Polaris, which became operational in 1960. (A Polaris is on display in the museum's outdoor exhibit area.) The Poseidon, with its Multiple, Independently Targeted Reentry Vehicle (MIRV) capability, entered the arsenal in 1971. The Trident I (C-4), which had much greater range than its predecessors, was commissioned in 1981 and is currently deployed in Navy submarines.

The new Trident exhibit, with its eight re-entry-vehicle (W76) mockups exposed, is now on display in the high bay's northwest corner. The exhibit replaces the TOPAZ space nuclear reactor.

## Feedback

Q: The new internal routing envelopes do not have "From" above the first column on both sides. This will cause confusion. The sticky seal also is not useful after about six times. We end up throwing the envelopes away before the routing spaces have been used because the material will fall out. Suggest you return to string ties. They last longer. Did someone try to reinvent the wheel here?

A: I was responsible for the mistake of the internal routing envelopes not having "From" above the first column on both sides and have fixed the artwork for future orders. The seal is designed to reseal 100 times, but sometimes it's rendered useless by coming in contact with dirt or lint. I have talked with Mail Service employees and they would prefer to stay with the white

envelope and work on improving the restick seal. We have had complaints about the brown string-tie government envelopes concerning difficulty handling the envelopes. They tend to hang up on each other. I talked with quality control people at the Government Printing Office and will clarify the restick flap specifications for the next order of internal routing envelopes.

— Dave Barton (15102)

## Welcome

New Mexico — David Fogelson (1565)  
Florida — James Walther (12660)

# US oil refineries check their burner emissions at Sandia's Combustion Research Facility

*Study confirms refinery industry's compliance with Clean Air Act amendments*

By Nancy Garcia

California Reporter

In a prime example of DOE lab-industry collaboration, a partnership with Sandia has potentially saved the oil industry millions of dollars through demonstrating US refineries' ability to meet new air quality regulations.

Whether refineries could keep emissions below requirements of the 1990 Clean Air Act amendments was unclear based on emissions measurements taken in the field. The regulations affect refineries because they burn fuel to heat crude oil for processing.

The industry turned to the Burner Engineering Research Laboratory (BERL) at Sandia's Combustion Research Facility, where a team including mechanical engineer Neal Fornaciari (8366) showed that existing processes regulated by the amendment.

"People didn't understand where and how these air toxics were being formed in combustion processes and also how they escaped combustion and went up the stack," Neal says. "What we found was if you operate your burner properly, these air toxics are not released. That's good for the refinery industry, because instead of needing new burners or after-treatment equipment, they can just focus on operating properly so as to not have emissions problems."

The three-year study, concluded in October, took place through several cooperative research and development agreements with the oil industry and other partners. Refinery industry partners joined through the Petroleum Environmental Research Forum. They were Chevron, Shell, Amoco, Texaco, Mobil, the Gas Research Institute, and the Southern California Gas Co. This group hired the Energy and Environmental Research Corp., which offers a field source testing service, to sample emissions at the BERL.

## 51 operating conditions checked

The project involved taking samples of emissions produced by 51 different operating conditions.

In addition to the industrial partners, Sandia and Lawrence Livermore National Laboratory (LLNL) provided chemical kinetics modeling to indicate how air toxins were being formed and burned so burner designs could be optimized if needed. The University of California, Los Angeles and Stanford University made reduced-scale experimental measurements.

Using BERL provided more control over conditions so the measurements were repeatable and traceable to well-defined operating conditions, Neal

says. Measurements provided insight into fluid mechanics and air toxics formation in the burners. Conditions that were varied during the study included firing rate, excess air, and fuel composition. The BERL burned simulated refinery fuel gas, a mixture of methane, propane, and hydrogen. This gas is normally produced as a byproduct of petroleum processing.

"We found out that refinery fuel gas is as clean-burning as natural gas," Neal says. "We helped show that as long as their burners are properly adjusted, no changes would be needed."

The 1990 amendments are intended to reduce emission of 189 substances. Any facility emitting more than 10 tons per year of one, or a total of 25 tons per year of any combination of these substances, would be defined as a "major source" and required to implement "maximum achievable control technologies." If this required burner replacement, the expense might have rendered US refineries unable to compete globally, Neal says.

In the project, the team looked at a few operating conditions in new burners that emit low oxides of nitrogen (a component of photochemical smog). The majority of measurements were taken with conventional process heater burners. The project required building a heat exchanger that simulated the time-temperature history in the convective section of process heaters. The industrial partners will now link the laboratory results to their field measurements.

Of the \$3 million in DOE funding for the



HOT RESEARCH — Neal Fornaciari at the two-story-tall structure of the Combustion Research Facility's Burner Engineering Research Laboratory.

## Sandia California News

three-year project, \$2 million went to Sandia and \$800,000 went to LLNL. A combination of DOE and industrial funding supported the other program participants.

Besides Neal, members of Dept. 8366 working on the project included Peter Walsh, Lloyd Claytor, Philippe Goix, and Rodney Sepulveda. Former Sandian Chris Edwards was also a member of the research team, as was John Wirdzek of Dept. 8361.

Denise Swink, DOE Deputy Assistant Secretary in charge of the Office of Industrial Technologies, calls the program an ideal example of national laboratory-industry collaboration.

Adds Jim Seebold of Chevron Research and Technology, "The industrial CRADA partners are at this moment bringing good science just in time to the EPA industrial combustion coordinated rule-making process."

## Employee death

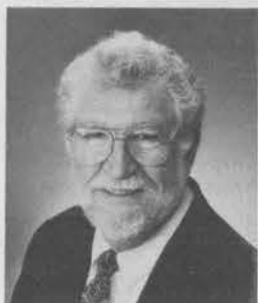


VAL PESTANAS

Val Pestanas of CRF II and TRL Projects Dept. 8346 died Dec. 3. She was 52 years old. Val was a Member of Technical Staff and had been at Sandia since 1983. She is survived by one sister, Victoria Pestanas. A native of the Philippines, she had been a Livermore resident for 13 years.

## Gene Ives retires, takes DOE Headquarters position

Gene Ives, Director of Nuclear Weapons Program Coordination Center 5200, who retired this month after 40 years of service to Sandia, has accepted the position of Technical Director for



GENE IVES

Military Applications and Stockpile Management with DOE in Washington. He will also assume the duties of the Deputy Assistant Secretary for that office.

Gene's career has centered around nuclear weapons programs since joining Sandia in 1956. He

has been a supervisor in a weapons system division, manager of the Advanced Systems Department, and manager of the Weapon Development Department. In 1984 he was promoted to director of Development Testing. He transferred to Sandia/California in 1985 to be Director of Weapons System Engineering, then moved to his

present position five years ago.

In his new post, Gene will be responsible for interpreting and implementing National Security policy for the nuclear weapons stockpile. He will lead and manage a Surety Office, responsible for policy and oversight of safety, security, and control of the stockpile; a Stockpile Management Office, responsible for the programs to assess the safety and reliability of the stockpile and implement needed alterations and modifications to the weapons; and the Office of Emergency Response, which includes the Nuclear Emergency and Search Teams (NEST) and Accident Response Group (ARG).

His responsibilities will also include the Office for Defense Programs production facilities at Pantex, Kansas City (AlliedSignal), Y12 at Oak Ridge, and the Tritium Facility at Savannah River; and an office for advanced manufacturing, which formulates and implements the Advanced Development and Production Technology (ADaPT) initiative.

Gene was to assume his DOE duties in Washington on Dec. 16.

# Teraflops speed

(Continued from page 1)

build], it will revolutionize the world's approach to engineering."

Jack Gibbons, the President's Science Advisor, equated the one-teraflops milestone to breaking the four-minute-mile running barrier. He said the computing power of the teraflops can be used for a variety of scientific research, from global weather forecasting, drug and pharmaceutical development, auto crash safety testing, to airplane design.

Craig Barrett, chief operations officer for Intel Corp., noted the teraflops is composed of standard computing hardware. "It uses the same microprocessors as in our standard desktop computers," he said. "This is a super way to have government and industry to cooperate in bringing about an achievement of this magnitude."

The teraflops computer, now the fastest supercomputer in the world, is being moved in sections from Oregon to Sandia/New Mexico over the next few months. It is being installed in Bldg. 880 in Area 1.

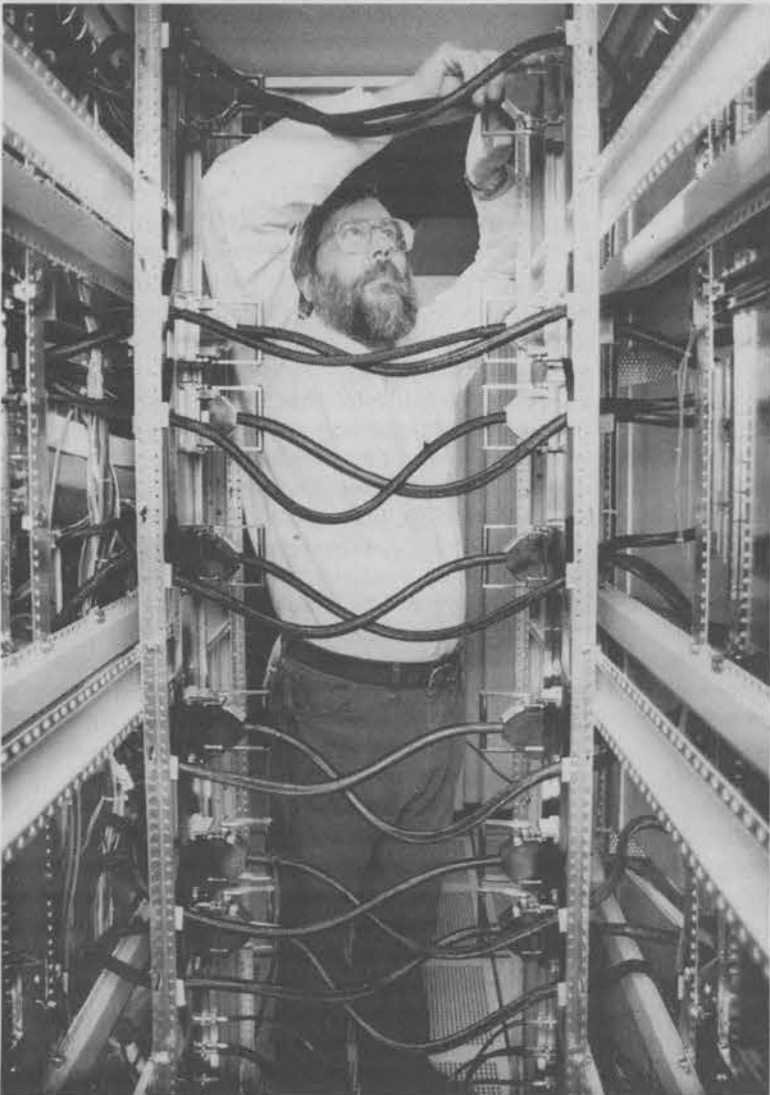
The full system will consist of 76 large computer cabinets, with 9,072 Pentium Pro processors and nearly six billion bytes of memory. It will cover about 1,600 square feet, enough to fill a moderate-sized home. The one-teraflops demonstration was achieved using 7,264 Pentium Pro processors in 57 cabinets.

The run took an hour and 20 minutes, and during that time, the machine performed 6.4 quadrillion floating point calculations.

Sandia computational scientists already are testing software applications that are key to ASCI's success on a five-cabinet system assembled recently in Area 4.

## Sandia a world leader

Sandia computational scientists are world leaders in the development of software applications for massively parallel supercomputers. Sandia, Los Alamos, and Lawrence Livermore national laboratories are refining existing applications and developing new applications tailored to terascale com-



MICHAEL HANNAH (4918), systems administration manager for the teraflops supercomputer, checks the installation of cables in one of the computer's disconnect cabinets, used to separate classified and unclassified computational work. Eleven cabinets, including two disconnect cabinets, are now installed at Sandia. The system eventually will consist of 76 cabinets. (Photo by Randy Montoya)

## Sandia has pushed the high-performance computing frontiers

Sandia has played a fundamental role in the brief history of high-performance computing, particularly in the development of parallel supercomputing and its applications.

The Labs first captured national attention for its work in massively parallel processing in March 1988 when it won two supercomputing prizes: the Karp Challenge for demonstrating unprecedented speedups using processors working together compared to processors running separately; and the Gordon Bell Prize for achieving a thousandfold speedup on three engineering problems analyzed with 1,024 processors working in parallel.

Until that breakthrough by Sandia, most computer scientists believed using even thousands of processors could speed up problem-solving by no more than 50 to 100 times the rate of a single processor. Over the years, Sandia has demonstrated a particular expertise for developing mathematical methods, algorithms, and software required for large-scale parallel processing.

Among Sandia's most notable software

applications developments — all of which will run on the teraflops and perform key ASCI work — are the CTH code used for computer modeling of high-speed impacts and the effects of nuclear explosions; a software package called CHACO that provides the means to make massively parallel computers easier to use by facilitating the mapping process that distributes computations across multiple processors; the PRONTO code, which can calculate structural mechanics and applied force, such as the crushing of a car or airplane in a crash or the deformation of a weapon upon impact; and ALEGRA, a series of codes that combines shock codes, such as CTH, with structural analysis codes.

Sandia's massively parallel quantum chemistry programs have been applied to several real-world problems in medicinal chemistry, including studies of anticancer drugs and environmental carcinogens. And Sandia scientists have used massively parallel machines to create 3-D models simulating underground formations for the gas and oil industry.

puting capabilities for ASCI.

The new computer, which is 10 times, and in some applications 100 times, more powerful than the fastest machine used today, will have a peak performance capability of about 1.8 teraflops, or 1.8 trillion floating point operations per second. It would take someone operating a hand-held calculator about 30,000 years to calculate a problem the teraflops computer could compute in one second.

"The outstanding applications software development skills of Sandia and our DOE partners complement Intel Corp.'s superb computer hardware capabilities to create a dynamic combination that promises to revolutionize computational science in many disciplines," says Bill Camp, Director of Computational Sciences, Computer Sciences, and Mathematics Center 9200 at Sandia.

DOE, Sandia, and Intel jointly announced the \$55 million teraflops development contract in September 1995 (*Lab News*, Sept. 15, 1995).

The computer represents the initial goal of ASCI, which could culminate in computers with hundreds of teraflops capabilities by 2005. Computers that powerful are needed to simulate the complex 3-D physics involved in nuclear-weapon performance, and to accurately predict the degradation of nuclear weapons components as they age in the stockpile. Powerful multiteraflops computers also will permit analysts to quickly run full-system 3-D simulations of complex accident environments, such as an airplane crash followed by a fuel fire, to predict safety against accidental nuclear explosions.

"Teraflops computing and ASCI provides an extraordinary opportunity for the three weapons laboratories in DOE to work together on behalf of the science-based stockpile stewardship program," says Sandia President and Laboratory Director C. Paul Robinson. "It is a very important step in shifting from a test-centered program to a computational-centered program."

ASCI will integrate the applications codes and ever-increasingly powerful supercomputers. Even larger multiteraflops machines will be

## Domenici: Sandia breaks one of the 'most storied barriers in computing'

Sen. Pete Domenici (R-N.M.) praised Sandia's progress in achieving supercomputing speeds of one trillion calculations per second.

"In reaching this milestone,"

Domenici said in a statement issued from his Washington office, "Sandia's scientists have broken through one of the most storied barriers in computing. This breakthrough is key to the ability of our labs, both Sandia and Los Alamos, to successfully complete [their] mission to ensure the safety of our weapons stockpile."

Domenici, chairman of the Senate Energy and Water Development Appropriations Subcommittee, has been a strong supporter of DOE's Accelerated Scientific Computing Initiative (ASCI). Sandia's teraflops Intel supercomputer is the first of three new supercomputers procured through ASCI. The others are an IBM system for Lawrence Livermore National Laboratory and a Silicon Graphics-Cray system for Los Alamos National Laboratory.

Domenici said these massive new computing capabilities were a key consideration in the decision to forego underground nuclear testing. The computing capability provides an alternative way to understand complex nuclear-weapon phenomena to certify the safety and reliability of the nuclear stockpile.

situated at Los Alamos and Lawrence Livermore national laboratories over the next few years into a robust problem-solving environment by developing tri-lab secure high-speed networks, high-speed, high-capacity storage facilities, parallel programming tools, and data visualization tools.

Sandia computer scientists have run applications on high-performance Intel computers over the past few years in a friendly competition with Japan to set computing speed records. Sandia/Intel and Japan continued to leapfrog each other's efforts until a team of scientists from Sandia and Intel achieved a computing speed of 281 gigaflops in December 1995 by linking two Intel Paragon computers. That record was promptly surpassed earlier this year by a special-purpose Japanese system's 368 gigaflops mark, a record which stood until this month's achievement of 1.06 teraflops.

# Realignment

(Continued from page 1)

layoffs, or "involuntary separations." Deadline to apply for the VSIP is 5 p.m., Jan. 6, the first Monday following the holidays.

## Still some realignment opportunities

Several hundred Sandians attended town meetings at the New Mexico and California sites Dec. 4 and 5 to hear more about the Workforce Realignment Process and pose questions to Sandia Realignment, Benefits, and Labor Relations specialists. Karen Gillings in New Mexico, and Bev Kelley (8522) in California, briefed employees on the anatomy of the Workforce Realignment Process and this year's realignment timeline.

During her talk, Karen emphasized that even after the VSIP application deadline has passed and qualified employees have been selected to fill some of the openings, impacted employees still may have some additional opportunities available to them for finding work within the Labs.

The *Weekly Bulletin* (on the Internal Web home page under the "Hot News" icon) will continue to publish new job postings based on staffing requisitions submitted to HR in coming weeks, although such postings are likely to be scarce, said Karen.

A "second-wave" posting containing the job descriptions of nonimpacted employees who want to resign and receive VSIP benefits will be made available to impacted employees Jan. 14 on Sandia's Workforce Realignment Web site, she said. (Look for the realignment icon on Sandia's Internal Web home page.) Impacted employees who see positions on this list that they might qualify for are encouraged to bid; a nonimpacted employee may be granted a VSIP if his or her departure would reduce the size of an impacted peer group by one. Bidding on this posting closes Jan. 22.

Karen stressed that impacted employees don't have to wait for the second posting to identify nonimpacted employees interested in giving up their positions in favor of VSIP benefits. She encourages employees and managers alike to identify and create their own resolutions, including "multiple linkage" situations (see the Dec. 6 *Lab News*), within their organizations and among their colleagues at Sandia.

In addition, managers are being asked to examine the credentials of impacted employees for possible matches with current and future staff augmentation requisitions (requests for contractor personnel); it's possible that some positions previously filled by staff augmentation contractors may be filled by impacted Sandians.

To be considered for such arrangements, an employee must enter his or her skills profile into Sandia's REX system (the Resumix Employment Expressway, formerly known as the Sandia Resource Profile), a skills-matching software program used by Dept. 3535 to process staff augmen-



HOURS AFTER DOE Headquarters announced its approval of Sandia's workforce realignment plans Dec. 3, Sandia and DOE officials briefed local newspaper, TV, and wire service reporters. Behind the table are (from left to right) Karen Hart, DOE/AL industrial relations specialist; Human Resources VP Charlie Emery; Human Resources Director Don Blanton; and Karen Gillings, Manager of Staffing Dept. 3535. California Laboratory VP Tom Hunter and Pat Smith, Sandia/California Director of Human Resources and Site Operations, briefed the news media in Livermore.



CHINESE DEFENSE MINISTER Gen. Chi Haotian and a delegation of Chinese military officials and diplomats toured Sandia/New Mexico Saturday, Dec. 14. Here Chi (left) is seen talking with Labs President C. Paul Robinson with the help of US interpreter Chen I-Chuan. During the six-hour visit, the delegation learned about the national laboratories' role in US national security, saw a variety of Sandia nonproliferation and arms control technologies, and toured the Cooperative Monitoring Center and Robotic Manufacturing Science and Engineering Laboratory. Chi met with President Clinton Dec. 9 and then embarked on a several-day tour of US military and research installations, including Sandia. (Photo by Walt Dickenman)

tation requisitions. Instructions for completing or updating a profile are contained in the Nonrepresented Employees Workforce Realignment Information Guide, available from managers, or via the "Staff Augmentation Job Opportunities" link on the realignment home page. Employees who already have updated profiles in the REX system need only let the REX administrator know they want to be considered for staff augmentation positions by filling out a form also on the Web site. (If you cannot access the Web, contact the REX administrator at 845-0095.)

As positions are filled, VSIP requests are accepted, and impacted peer group situations are resolved, managers are asked to keep employees apprised of their status in the realignment process, she adds. Employees whose VSIP requests are approved will be notified in a memo from Human Resources as soon as possible after approval, which may occur anytime after Jan. 13.

## Employees get answers

One concern expressed by several employees during the meetings' question-and-answer sessions was that the numbers of impacted positions in the technical staff ranks were higher than the numbers for administrative staff, even though Sandia management has stated it is reducing "overhead" costs.

Because there are so many more technical staff members than administrative staff members at Sandia, said Karen, it may look like realignment is targeting technical staff based on the "raw numbers"; in terms of percentages, however, about 3.5 percent of Sandia's technical staff positions (including MTS, SMTS, and DMTS), versus 5.5 percent of administrative staff positions (MLS), have been identified as impacted this year.

She reiterated that all impacted positions were identified through careful scrutiny of the Labs' current and future business needs and funding outlook. The

impacts span every Sandia location and most job classifications; the only classifications not affected are VPs, executive secretaries, and security police officers, she said.

When asked how the VSIP incentive payment compared with severance pay amounts, Karen said each employee's severance payments would be different based on years of service. She referred employees to Sandia Laboratories Policy (SLP) 4100, "Workforce Realignment," and SLP 4004, "Termination of Employment," for comparisons of benefits. She also cautioned that impacted employees who wait to be laid off have no guarantees; their impacted peer groups might be resolved without involuntary separations.

Several employees wanted to know how VSIP recipients' separation dates are determined. Karen says although April 17 is the last day a VSIP recipient can be on roll, and although employees may request a separation date on the VSIP request form, each employee's vice president will make the final determination about the separation date based on the division's business needs. Some vice presidents already have stated that, for budgetary reasons, they want VSIP recipients in their organizations off roll as soon as possible after Jan. 16.

Will there be another VSIP next year? "The realignment process for matching people with work is a tool that is available on an ongoing basis," says Karen. "There's a good chance there will be a need to realign employees skills in FY98, but whether a VSIP provision will be included in that process is becoming increasingly uncertain as DOE funding for 'worker transition' continues to dwindle. It is Sandia's desire that such an incentive will not be necessary."

Answers to many more common questions are available on the realignment Web site under the "Questions and Answers" link. The site also contains a "What's New" page, realignment resources, points of contact, details about outplacement assistance for VSIP recipients, updates about numbers of VSIP applications and remaining impacts, a spreadsheet for calculating VSIP withholding (Microsoft Excel required), and other realignment-related news and information.

## Gell-Mann speaks Jan. 9

Nobel laureate physicist Murray Gell-Mann will speak at Sandia on "From Simplicity to Complexity" on Thursday, Jan. 9, 10:30-11:30 a.m. in the auditorium of Bldg. 962 in Area 4.

## Holiday drives

(Continued from page 1)

pretty nice folks." Although shoes are given to Albuquerque Public Schools students during the holidays, the fund is open year-round. Donations can be made any time to the Shoes for Kids account #223180 at the Credit Union.

### Security Police have more to give

Security Police Association union members, pleased with their new contract and favorable outcome of several arbitration cases, decided to give something back to the community. Members voted to donate money from the cases to charity rather than putting it in the union treasury.

"We chose to give to All Faiths Receiving Home, St. Martin's Hospitality Center, Casa Angelica, and the Women's Community Association," says Union President Duane Carr (7435). "We've taken money out at Christmas in the past, but we wanted to make it a better Christmas for those who need it."

Lockheed Martin also donated \$2,000. The holiday fund is up to \$7,000; \$5,000 will go directly to All Faiths and the rest spread around. The union also challenged its members to donate \$25, \$50, or \$100 each to the Security Police Association Charity Fund (account #214710) set up by Ray Duran (7435) at the Sandia Laboratory Federal Credit Union. This money will go to adopt-a-family programs. Safeguards and Security Center 7400 employees are also contributing to the fund.

### Adopting families for the holidays

Audit Center 12800 has adopted a family. Social Committee members Debbie Rendon (12840), Renae Ishmael-Roberts (12820), Daniel Borrego (12840), and Nathan Sommer (12840) provided information about a family with three children from St. Martin's Hospitality Center. "We've had real good participation," says Debbie. "It's great."

Every year Human Resources Div. 3000 has a Winterfest Celebration. "We are donating to families from the Martineztown House of Neighborly Service," says Laura Gartling (3525). "We had a party with donation boxes and collected 15 cubic feet of all sorts of things, from toys to shampoo."

Command and Control Hardware Dept. 2612 holiday drive team members Shirley Theriot, Libby Green, Carl Leinheiser, Patty Trelue, and Jim McCoy found a family of six for the department to adopt from Martineztown and two elderly brothers from La Amistad Senior Citizens Center. "People have been really generous and good," says Shirley.

The ICADS/GNT Project members from several departments in Center 6500 had a holiday drive led by Cindi Reyes (6523). "My mother told me about a family at a local elementary school that needed help," says Cindi.

### Giving back to the community

The holiday drive by Information Processes Center 4600 and Center for Computing and Communications Systems 4900 was led by Gail Simons (4900). "We adopted two families through the Salvation Army," says Gail. "Most people are giving quite a lot; everybody's concerned." Gail says adopting families is more personal. Sandians meet the families when they



A PERFECT FIT, A PERFECT SMILE — An Albuquerque Public Schools student is fitted for shoes that prompt a big smile at a Kinney Shoe Store in Albuquerque last week. Sandians donated a record \$9,500 to the annual Shoes for Kids campaign this season and helped needy families in the Albuquerque area have a better holiday through generous giving to holiday drives around the Labs. The Shoes for Kids program, led by Lisa Polito (12650), will be able to supply more shoes and smiles like the one pictured here to APS students this year. "We'll be able to help needy students in 13 schools this year," says Lisa. "Last year we served 11 schools." (Photos by Randy Montoya)

deliver donations in person.

Paula McAllister (7901) and Facilities Computing and Information Systems Dept. 7901 (and friends of 7901, says Paula) adopted a family from St. Martin's Hospitality Center. "We've gathered what the family needs plus jewelry, goblets, socks, toys, and clothing," says Paula. "It's made my Christmas and given me the Christmas spirit earlier this year." Any donations the family cannot use will be distributed to others at St. Martin's.

Weapons Systems Div. 2000 sponsored a blanket and coat drive led by Wendy Bechdel (2000) for the San Jose Community. They also adopted a

family from St. Martin's for the holidays. "You can give back to the community," says Wendy.

The Secretarial Quality Process Council took a special approach to its holiday drive. "We asked secretaries to donate nightgowns and cologne to Barrett House clients," says project leader Rusty Wright (1314). "The women at Barrett House had to seek shelter from abusive relationships and are without the amenities that make life a little more bearable. We thought this would make them feel a little better."

Design, Evaluation, and Test Technology Center 9700 has been helping Albuquerque Public Schools families during the holidays for 27 years. Chuck Hurtado (9784) says they contact four to five schools in the valley (north and south). School councilors select the most needy families. "We concentrate on providing for the kids," says Chuck. The drive includes toys and food baskets.

Carrie Tingley Hospital patients are the recipients of the goodwill of Capital and Payables Accounting Services Dept. 10503 and Payable Accounting Services Team 10503-1. "The response has been great," says project coordinator Anna Baca. "People are so excited about it that the drive practically handled itself." The drive collected toys and nonperishable food, although people voluntarily brought clothing.

### Two sides to every story

Staff secretaries in Laboratories Development Div. 4000 led by Jackie Van Loh (4000) sponsored a drive to adopt a family from the Salvation Army. "What makes me feel good is seeing kids' eyes light up," says Jackie. "It's a double-edged feeling, though. You feel good that you can help and you also feel bad that these families are in such situations." A paper Christmas tree was pinned to a bulletin board with cards listing the family's needs and wishes. Employees chose a card and provided what was asked for in addition to contributing canned goods and good used clothing.

The Division Diversity Council (10000, 12000, and 15000) Holiday Event is adopting a family of seven from the Salvation Army and holding a clothing drive for Barrett House. "People have contributed canned goods, paper products, and toys," says Pauline Duran (10000). "We have 'stickies' listing the family's needs on a Christmas tree for employees to select and a box outside the CFO room in Bldg. 802 to collect contributions."

Public Relations and Communications Center 12600 has a coat and blanket drive for the San Jose Awareness Council to distribute to the San Jose Community. The drive is led by Volunteers in Action (VIA) program administrator Redd Eakin (12650).

"There's unprecedented giving by Sandians this year," says Redd. "I've never seen anything like it." Redd serves as the contact for employees to call if they're looking for charities to contribute to or organizations to volunteer for during the holidays and all year around. Redd matches volunteers to agencies and serves as the Sandia contact for those in the community looking for volunteers.

### Giving lasts after the holidays

After reading about community needs in the VIA newsletter, Al Lujan, Video Services Dept. 12614, called Redd to find a needy family for his family to adopt for the holidays. "Even if we weren't able to do it we'd find a way to help," says Al. "The family we're helping is in a real sad situation, a single mother with four boys who didn't even have coats for the winter and they live in a converted garage."

The family was grateful for the tree Al delivered to them and they were surprised by the lights and ornaments that came with it. "They were happy just to have a tree," says Al. He asked the mother what else they could do for them and decided he and his family would continue to help them even after the holidays were over.

"If I hadn't read the VIA newsletter, I might not have adopted a family for the holidays," says Al. "It makes a difference when information about community needs is provided through this newsletter."

## New Sandia ombudsman selected

A new ombudsman has been selected for Sandia/New Mexico. Don Noack brings almost 20 years of Sandia experience and four years of dispute-resolution and mediation experience to this position. He says he welcomes the opportunity to meet with as many Sandia organizations as possible to introduce himself and the services of the Ombuds program. Don was most recently a member of Diagnostics and Target Experiments Dept. 9577. He can be reached at 844-2145.

The Ombuds program, which has been in operation for four years, offers Sandians, contractors, and students a neutral, confidential setting where they may take disputes or share frustra-

tions, concerns, and complaints so that they may be resolved in a nonescalating way. Mediation, shuttle diplomacy, and team-building exercises are also a part of the program in addition to dispute resolution.

Sandia's other ombuds are Wendell Jones (845-8301) in New Mexico and Geri Albright (294-2065) in California. They would appreciate invitations to department meetings, center meetings, managers' meetings, and brown bag lunches to explain these services in more detail and to answer questions. To schedule meetings or appointments with any of them, call Debbie Noel at 844-9763.

# Japanese industry turns to Sandia to test nuclear reactor containment building safety

By Bill Murphy

Lab News Staff

It didn't go bang; it went whoosh. And it did so right on cue.

Engineers from International Nuclear Safety Dept. 6403 last week demonstrated that a one-tenth scale model of the steel containment vessel used in Mark II-class commercial reactors can withstand pressures significantly higher than they are designed for.

The test, conducted in a specially designed concrete fragment barrier, showed that the 19-foot-high scale model, built at Hitachi Works in Japan, withstood pressures of almost 700 pounds per square inch (psi) before springing a leak, six times its scaled design basis of about 112 psi.

Even more significant, says project manager Mike Hessheimer (6403), the tests served as real-world validation of Sandia's computer models of the vessel's behavior under pressure. Sandia's model had predicted that when the vessel was pumped up with nitrogen, it would fail at 652 psi; the actual failure occurred at 676 psi, developing a leak and tearing adjacent to the thickened insert plate surrounding the equipment hatch.

The test, the culmination of three years of meticulous preparation, was done under a \$22 million, multiyear contract for the Nuclear Regulatory Commission (NRC) and the Nuclear Power Engineering Corporation (NUPEC) of Japan.

"The goal of the NRC with this program," says Mike, "is to improve the analytical capabilities of the US nuclear industry and to increase our confidence in analytical tools."

NUPEC was interested in the modeling validation, too, but also wanted a real-world demonstration of the robustness of steel containment vessels, Mike says. Containment structures are designed to isolate nuclear reactors from the surrounding environment and to safely contain radiation in the event of a reactor accident. As such, the reactor industry has an understandable interest in showing the public that the vessels are more than capable of performing their functions. The Mark II boiling water reactor on which the containment vessel model was based is a common reactor design in both the US and Japan.

Both NRC and NUPEC, Mike says, were very pleased with the test results.

The Sandia tests are a continuation of an ongoing NRC program to study the ultimate capability of containment structures. Over the past two decades, Sandia and the NRC have collaborated on a number of similar tests. During the course of those efforts, Sandia has gained significant expertise in the testing and analysis of containment structures. That expertise led to the collaboration between the NRC and NUPEC and the continua-

tion of the research program at Sandia, Mike says.

The steel containment vessel test was just the first of two tests in the NRC/NUPEC series. In January, construction will begin on a mammoth 1/4-scale version of a prestressed concrete containment building near Sandia's Solar Tower. When it is built, the scale model will stand more than 60 feet tall and 40 feet wide, dominating the surrounding landscape. The model is based on containment structures for pressurized water reactors, which are used in both Japan and the US.

In a series of tests similar to those conducted on the steel containment model, Sandia researchers will build up to a final pressurization-to-failure test near the end of 1999.

Because of the size of the prestressed concrete model, it is not feasible to erect it within a fragment barrier. Instead, the model will be built at the center of a 2,000-foot-radius safe zone. While a catastrophic, explosive failure is a remote possibility, researchers do not believe it is likely. Concrete, they note, is more likely to crack and vent out its pressure rather than violently explode.

Although the test series is specifically aimed at the nuclear industry, Mike says that even engineers working outside the nuclear energy field

will find much of interest in the test results.

"The data we collect will help improve modeling techniques for steel and concrete structures for severe loads," he says. "The tests we are doing on the prestressing system is of interest to researchers looking at prestressing for bridges and other structures."



**HANDLING THE PRESSURE** — Sandia engineers Mike Hessheimer, left, and Vincent Luk, both of International Nuclear Safety Dept. 6403, check out a scale model of a nuclear reactor steel containment vessel prior to a major pressurization test last week. Mike and Vince are part of a Sandia team that is conducting a series of containment-vessel tests for the US Nuclear Regulatory Agency and the Nuclear Power Engineering Corporation of Japan. (Photo by Mark Poulsen)

## Sandia News Briefs

### Sandia-nominated university researchers win DOE-DP awards

Sandia university researcher nominees Steven Ceccio from the University of Michigan (Sandia sponsor, Tim O'Hern, 9111) and Richard Cairncross from the University of Delaware (Sandia sponsor Randy Schunk, 9111) have been chosen for the DOE Defense Programs Young Scientist and Engineer Awards. Both were invited to a Dec. 16 DOE Defense Programs award ceremony at DOE Headquarters in Washington, where they will receive an award from DOE's Vic Reis. Nominations for this award are based on the candidates' contributions to the DOE national security mission through collaborative research with the DP national labs. Richard Cairncross has also won a Presidential Early Career Award for Scientists and Engineers. The Presidential Award is the highest honor bestowed by the US government on outstanding scientists and engineers beginning their independent careers. The Presidential Award was to be presented to Richard by President Clinton or Vice President Gore.

### Sandia Lab Federal Credit Union earns 'number one' ranking

Sandia Laboratory Federal Credit Union (SLFCU) has been recognized as number one in the US in return-to-members among credit unions with more than \$250 million in assets. In a study, Washington-based financial consultants Callahan & Associates, Inc. did calculations and rankings on 16 different measures of value to credit union members. Some of those measures include: rates for borrowers and yields for savers; low or no fees; and member usage of different products and services. Callahan looked at the dividend/income ratio (what portion of income is paid back to members) and the loan/share ratio (how well savings are converted back into loans to members) and other key measures of performance. Of the approximately 220 credit unions with more than \$250 million in assets, SLFCU ranked number one. SLFCU, established in 1948 when Sandia was still the "Z-Division," is a financial cooperative, founded and directed by volunteers (they're currently all Sandia employees or retirees). The credit union is open to all current and former Sandia employees and members of their families.

## Fun & Games

**Tennis** — Sandia employees and retirees and their families and friends played in the Coronado Club Round Robin Tennis Tournament Nov. 2 at the Coronado Club tennis courts. Here are the results: Men's doubles 3.0-3.5 ranking — First place, David Sealey (7437) and Barry Schwartz (7500); second place, Elliot Schwartz and Jesse Herron; Men's doubles 4.0-4.5 ranking — First place, Barry Schwartz and John Wolfe (5921); second place, Roy Palmer (4918) and Wendel Archer (1251); Women's doubles — First place, Ruth Tillerson and Julie See; second place, Andrea Schunk and Linda Slutz; Mixed doubles — First place, Glenna Hickman (3535) and Wendel Archer; second place, Fred Cericola (ret.) and Sara Cericola.

## Congratulations

To Michelle Aquino and Gus Potter (7578), married in Albuquerque, Oct. 19.



GET A MOVE ON — Josue Gonzalez, a contractor with Waste Management of New Mexico, Inc., moves compacted, bundled trash from the conveyor system to the loading dock.

Photos by Randy Montoya

### Trash Majal: Sandia's new trash facility features state-of-the-art equipment

With the opening of the new Solid Waste Transfer Facility, Sandia has taken a major step forward in its efforts to properly manage solid waste while increasing recycling at the Labs.

The "Trash Majal", as some waste management wags call it, is bringing state-of-the-art equipment to the job of managing and recycling solid waste. At the same time, the facility's special capabilities make it possible to reduce the volume of solid waste that cannot be recycled and must be sent to an off-site landfill.

Because the Labs: 1) earns money for the paper and cardboard it recycles and 2) pays by volume for solid waste it must deposit in landfills, the facility is giving Sandia a neat, new one-two punch in handling trash more efficiently than ever, according to facility manager Gabe King (7577).

The primary function of the transfer facility is to screen incoming waste for hazardous or prohibited materials before it is sent off-site for disposal, Gabe says. The secondary function is to act as the Labs' recycling center. In addition to handling waste and recyclable material from Sandia, the Trash Majal also accepts recyclable materials from Los Alamos National Labs and local DOE offices.

(Continued on page 12)



CHECKING 'EM OUT — Peter Santa Maria, a contractor with Waste Management of New Mexico, Inc., which manages the solid waste facility for Sandia, looks over some of the 250 recycling totes that will be distributed throughout the Labs.



OVER THE TOP — Josue Gonzalez loads cardboard boxes into the Solid Waste Transfer Facility's state-of-the-art conveyor/compactor system. A neat, densely packed one-ton bundle of recyclable material comes out at the other end.



# Harold Smith's goodbye: NATO weapons-protection chairman lauds Sandia-designed vaults, technology

More than 35 members of NATO (North Atlantic Treaty Organization) and other US agencies visited Sandia recently for a meeting of the NATO Senior Level Weapons Protection Group (SLWPG). (Los Alamos National Laboratory and the Defense Special Weapons Agency also hosted part of the SLWPG meeting.) Sandia has been involved with this NATO group since the early 1980s, providing technical support and general oversight and sponsoring several SLWPG meetings at the Labs. This association has enhanced Sandia's involvement with other NATO groups and helped ensure the security of nuclear weapons in NATO.

John Kane of Weapons and CIS Security Program Office 5806 — a long-time advisor to the SLWPG delegation — coordinated the four days of meetings and demonstrations. These included presentations on integrated protection and surveillance of nuclear materials by Tom Sellers (5300), activated denial for weapon security by Steve Scott and Tom Goolsby (5511), the safe secure transport vehicle by Joe Roesch (5513), future detection/assessment technology by Dan Pritchard (5838), entry-control technologies by Frank Bouchier and Dave Hannum (5848), NATO security system assessment by Byron Gardner (5845), and robotics in physical security by Dave Hayward and Dan Poetz (5516). Susie Yoder (5806) handled the many administrative details associated with the conference.

During the visit, Bruce Hawkinson of the Lab News and Theresa Bourne (5804) met with the SLWPG Chairman, Harold Smith, Jr., Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological Defense Programs. Following are highlights from that interview.

**LN:** Your title used to be Assistant to the Secretary of Defense for Atomic Energy? But it's now nuclear, biological, and chemical?

**Smith:** Yes. Congress made that decision because the responsibilities of the office have increased.

**LN:** How has the mission of SLWPG changed since you took over as chairman in 1993?

**Smith:** If you go back to the beginning of SLWPG, about 1982, you think of the large number of weapons that were in Europe under NATO control, the different types of weapons that were available, the number of different bases. Then compare it today where there soon will be only one type of weapon stored on a very small number of bases and, most important, stored in the Sandia-designed vaults.

**LN:** Underground storage vaults?

**Smith:** That's correct. That makes them enormously safe. So the progress we have made from '82 to '96 is truly extraordinary. The progress over the last four years built, of course, on the past. What we have done is successfully implement the vault storage, and we have also implemented the so-called ETMs, or training munitions, which in an earlier day we would have called dummies. But these are not dummies. These faithfully reproduce the physical and electronic capabilities of the weapons and, therefore, allow us to train without exposing them to any kind of accidents. So there is no question that we have an easier job today than we did then. And there's no question but that the weapons are far, far safer today than they ever were in the past.

**LN:** But at the same time, the responsibility is higher. We are now trying to protect the free world with far fewer weapons, every one of those has to work, and they have to be protected.

**Smith:** I think we have more than enough weapons to protect NATO.

**LN:** So has the mission of SLWPG shifted since you took over, or is it going to stay about where it is — depending on, of course, anything like START 2 arms limitation?

**Smith:** The threat has changed radically. After all, the former Soviet Union is exactly that: the former Soviet Union. We're not targeting each other, so that particular threat we can honestly say has approached a minimum. But there are very key elements that we are still very worried about, such as terrorists, who might try to embarrass us at any one of the bases where we have weapons. So as long as we want to keep nuclear weapons part of the NATO arsenal, we cannot tolerate any kind of embarrassment, intrusion, or worse yet the stealing of a



HAROLD SMITH

weapon — which is I think extremely unlikely, again thanks to the vaults that Sandia built.

**LN:** You are concerned about the small possibility of terrorists taking over a base where nuclear weapons are stored. Are you aware of anything we're doing to counter that threat?

**Smith:** We have enormous intelligence networks and, of course, the bases themselves are exactly that — they're military bases. So I am not very concerned about that. We arrange for small forces to be there almost instantly; slightly larger forces follow; and even larger forces, if necessary, are deployed after that. All this makes sense thanks to the difficulty that even a fairly significant force would have in getting into the primary aircraft shelters or actually the vaults inside those shelters. It strikes me as a very small probability.

**LN:** Do you think that the proposed expansion of NATO is going to change the task that we have traditionally set for NATO and SLWPG?

**Smith:** We have no plans to change the basing whatsoever. Therefore, the mission of SLWPG will remain unchanged if and when NATO expands.

**LN:** Let's go into questions of specific interest to Sandia. What are we doing to help SLWPG at this point?

**Smith:** [Sandia President] Paul Robinson has already mentioned a number of times the first-class job Sandia did in promoting, designing, and indeed working with the prime contractor to install the vaults that are now located in a number of bases and inside the actual shelter where the airplanes that would carry those bombs are located. That's an enormous step forward. The now deceased, but still highly respected, Secretary General Manfred Werner was absolutely pleased with the work that had been done and complimented the SLWPG and, therefore, Sandia at meeting after meeting after meeting. His successor, Dr. Solana, is of the same bent, so Sandia can feel justly proud of the work they did. Now your work doesn't end there, of course. You are the world experts in access control, so we turn to Sandia. In fact, Sandia is always represented at every meeting of the SLWPG, not only to tell us what technologies are available here, but also to learn what technologies are needed. So it's both a push and a pull in the association, and it's been a very fruitful relationship.

**LN:** So does SLWPG really need Sandia as much as it once did?

**Smith:** I think the idea that all the work is done is foolhardy in a world that still has tens of thousands of nuclear weapons, not to mention a number of states and substates that would like to have nuclear weapons. So many of the things that you're working on interest SLWPG, such as detection of contraband material. By no means is the association between SLWPG and Sandia coming to an end.

**LN:** What are the priorities within SLWPG in the Safeguards and Security arena?

**Smith:** Areas that we want to really concentrate on are, of course, maintaining the high security that will be in force as soon as all the vaults are in place. And that is only months away. Then, we want to make sure, as we further reduce the number of weapons in NATO, that the vaults will be moth-

balled in such a way that if we choose to go back into those bases we can do it. We also want to make sure that training with the ETMs is done as effectively as possible. Sandia has done a very good job in modeling and designing exercises by which we see whether small teams of rogue outfits could, in fact, be successful in an attempt. The computer base that you've built up and the advice that you give is an ever-growing and ever-more-valuable tool, thanks in part to the computer skills that you have and your recognized reputation in modeling such events. Communications in nuclear matters have to be done with great care. Sandia is not without a lot of skills there as well. Intrusion devices, particularly relating to intruders that are carrying explosives, represent another field that is of importance to NATO and to SLWPG and where you also have a reputation and a good one. I could go on, but those are really the highlights.

**LN:** What threat do you see as represented by your very title? Nuclear is one thing, but what about biological and chemical? Does that in any way relate to SLWPG or is that another of the hats that you wear?

**Smith:** The answer is both. The biological and chemical refers to other parts of what really is a very rewarding portfolio. But it also has direct application to SLWPG. After all, one of the threats we really have to consider seriously is the use of chemical agents to attack a base.

**LN:** Which could mean that the group that was going to hold terrorists off for ten minutes is dead or incapacitated?

**Smith:** Exactly. So we are considering such threats, and SLWPG is the mentor because, again, the safety and security of the weapons is the question in hand.

**LN:** In another of your roles, as the head of the Cooperative Threat Reduction Program, what do you think are the major accomplishments?

**Smith:** I really appreciate the question. General Lajoie, who manages the Nuclear Cooperative Threat Program in my office, has now obligated over a billion dollars. And contrary to what Senator Evert Dirksen said — a billion here, a billion there, and pretty soon it adds up to real money — it turns out a billion dollars buys an enormous amount of dismantlement of former adversaries. I have recently been giving a series of talks in San Francisco and in Europe. I show slides that would water the eyes of anyone who lived through the Cold War. There are photographs of missiles without warheads, missiles coming out of silos, silos being destroyed, sunflowers being planted on the rehabilitated land on which the silos stood, ballistic missile submarines being cut up, and on and on and on. It is truly a very rewarding program that has made enormous strides over the past three and a half years, something in which this administration can truly take great pride. Furthermore, to make sure that the praise is correctly distributed, Congress recognizes the importance of this program and, therefore, funded it in Fiscal Year 97 at the full amount for which we asked and then added nearly \$100 million more with additional tasks. I think the Congress clearly recognizes that this is a nonpartisan, highly successful program that really is leading to an increase in national security literally all over the world. It certainly is for the Americans.

**LN:** And what role did you play personally? Were you heading up that entire program?

**Smith:** I did the most important thing a manager is supposed to do. I hired General Lajoie who reports to me and so, of course, I set the guidelines and I have overall direction and responsibility. I then report to my superior, Under Secretary Kaminski, and through him to Secretary Perry. It's been a major team effort.

**LN:** And you're saying goodbye to SLWPG and Sandia, at least wearing this particular hat, I understand?

**Smith:** Well, the point here is that I am a political appointee. . . I'm simply enjoying what I'm doing immensely. I will let the future turn the probabilities into facts, and then I'll make my decision.

**LN:** There is life in the outside world as well.

**Smith:** So I'm told.

# Mileposts

## December 1996



Alfred Foster  
40 2413



Wendell Jones  
20 11



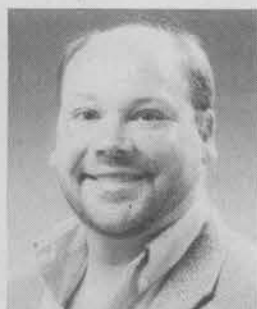
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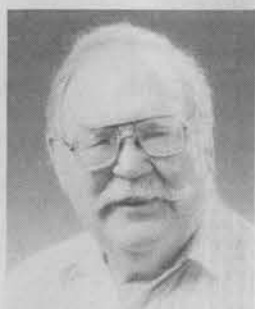
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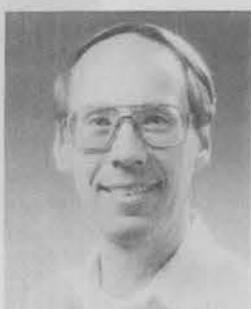
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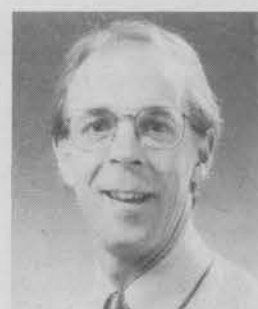
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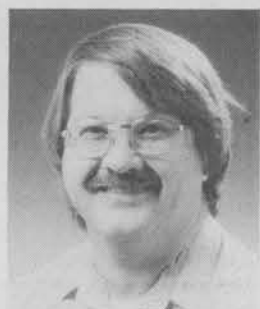
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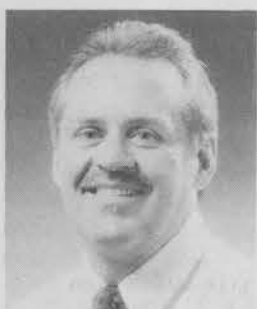
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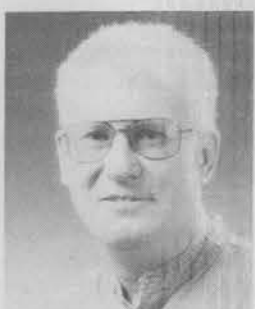
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20 6612



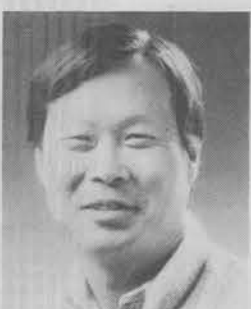
Charles Ringler  
20 5849



Michael Clough  
15 12615



Cliff Evans  
25 1272



Joseph Jung  
15 9118



Nancy Dytzel  
20 2300



Steve Stronach  
25 9753



Michael Mazarakis  
15 9531



Janet Bauerle  
20 2121



Terry Leighley  
35 2663

## Student with perfect SATs spends afternoons at Sandia

Sandians like to think of themselves as brothers and sisters under the skin of the residents of Lake Woebegone: you know, that mythical place where every child is above average. In such an environment, it's not easy to distinguish yourself based on academic achievement. However, that's exactly what high school student intern Roy Stogner has done.

The Sandia High School senior, who works about 20 hours a week with Dan Kral in Testers and Experimental Ground Stations Dept. 5715, made local headlines recently as one of fewer than 500 students nationwide who earned perfect scores on this year's SATs. More than one million juniors and seniors took the test; the average combined verbal/math score is about 1100, compared to Roy's perfect 1600. Scores above 1400 are considered exceptional.

As a Sandia intern, Roy is updating and cleaning up the computer code (C-language) associated with a ground station data analysis system maintained by the department.

"He's generally making the software more robust," says Dan of Roy's work. Dan says Roy is



PERFECTION — Sandia High School senior and Sandia student intern Roy Stogner tweaks C-code for a ground station data analysis system maintained by Testers and Experimental Ground Stations Dept. 5715. Roy was one of just 500 students nationwide to earn a perfect combined score of 1600 on this year's SAT tests.

self-motivated in his work. "He's not someone you have to worry about," Dan says.

Although he's a very bright student, Roy is modest; Dan learned about Roy's SAT triumph on the evening news.

"Channel 7 had called him here [at the lab] earlier that day," Dan says. "I thought they just wanted to talk to him as sort of representative of a typical high school intern. He never said a word to us about his SAT scores."

Although Roy is doing computer programming at Sandia, he says he "definitely" doesn't want to be a programmer when he finishes school. His interests now run to engineering with an aerospace bent.

In his spare time, Roy, who did an internship with the *Albuquerque Tribune*, writes science fiction. He calls it a hobby, but he's serious enough about it to have gathered "a wonderful collection of rejection letters" for his submissions.

Roy says he has not yet decided on a college but has applications pending at MIT, Cal Tech, Rensselaer, and other top-flight schools.

Based on his SAT scores, does Roy think of himself as one of the 500 smartest high school seniors in the country?

"I like to," he says. "But then, I do enough stupid things to make me wonder, to bring me down to earth."

— Bill Murphy



## Sandia Web Watch:

### Fast track to Sandia research and technology information



Folks who want an excellent summary of Sandia's technical work and facilities can visit the Labs' External Web site Research & Technology (R&T) Capabilities page, featuring our major research, development, engineering, and design capabilities. The site provides more than 40 direct

links to technical details about subjects ranging from Sandia's huge pulsed power accelerators to

## Trash Majal

(Continued from page 8)

Gabe says the facility is now handling about 50,000 pounds of solid waste each week, screening it for hazardous and prohibited materials and compacting it for transfer to an off-site landfill. The facility is also handling about 23,000 pounds of recyclable paper and 10,000 pounds of cardboard each week. That volume will expand when the Waste Management Department distributes 250 bright blue recycling totes and 1,000 recycling baskets (little cousins to the big blue totes) to the Labs' major paper-generating locations. Once the distribution is complete, the paper recycling cages and the yellow-taped boxes of recyclable paper will be gone forever.

The new system, designed to collect recyclable paper right at the source, should result in cleaner, more uniform, and thus more valuable, recyclable material.

Solid waste enters the transfer facility via some of the biggest bay doors in Albuquerque. The big doors, by the way, enable trash trucks to raise their beds high as they dump wastes at the facility. Once dumped in the building, all waste is screened for hazardous or prohibited materials, which are removed.

Paper destined for recycling is sorted according to grade. The best stuff, called "white ledger" in the recycling business, can bring more than \$100 a ton; at the other end of the spectrum, so-called "mix paper" — unsorted paper products of all kinds — may bring \$10 a ton on a good day. As Gabe says, it pays to presort waste paper at the source to keep the "mix" low and the "white ledger" high. The hope, Gabe says, is that the new recycling totes and baskets will help make on-site sorting and screening easier.

### Prohibited items

Screening has shown that 60 to 70 percent of all solid waste loads received in the solid waste transfer facility contain hazardous or prohibited materials, according to facility manager Gabe King. These include any liquids, asbestos-containing materials, spray paint and other aerosol cans, solvents, cleaning solutions, lead acid batteries, fluorescent light bulbs, and a variety of other materials. Even though disposed items may contain just small amounts of solvents or other hazardous substances, the disposal still constitutes a threat to the environment and is a potential violation of regulations.

Other prohibited items include containers with freon, propane cylinders, construction debris, classified materials (including classified folders), corrosive materials, radioactive materials, asbestos, and infectious waste bags (even if empty), and smoke detectors. Household wastes, brought from an individual's home and disposed of at Sandia, are also prohibited.

For information about activities related to solid waste disposal, call Gabe King at 284-4032.

dust-speck-sized micromachines.

The R&T Capabilities page is one of six top-level pages posted directly on Sandia's External Web site: <http://www.sandia.gov>. It can be found quickly by clicking on the Research & Technology icon at the top of that site or by typing in the address of the R&T Capabilities page: <http://www.sandia.gov/capabilities/capabilities.html>.

Page owner Milt Clauser (9201) has organized the 40-some R&T Capabilities into 10 major categories:

- Computing, Communication, & Information Science
- Electronics
- Energy & Environment
- Engineering & Systems Analysis
- Manufacturing
- Materials, Chemistry, & Physics
- Pulsed Power & Radiation Effects
- Robotics & Intelligent Systems
- Sensors & Monitoring Systems
- Transportation Technology

The R&T Capabilities page also links to detailed information about the Labs' technical Core Competencies and to User Facilities, which are available to US industrial and educational groups working cooperatively with Sandia. Also linked is Sandia's "Technology Showcase" page (click on "selection of Sandia's projects"), featuring timely and interesting technology areas. Current features include the Massively Parallel Computing Research Lab, Virtual Reality, and the Archimedes robotic assembly planning system. Sandians who develop new pages, or who have existing ones they believe should be listed on the R&T Capabilities page, should contact Milt by e-mail ([mjclaus@sandia.gov](mailto:mjclaus@sandia.gov)) or phone (845-8006).

("Sandia Web Watch" is a *Lab News* series featuring news and developments about Sandia's Web sites.)

— Larry Perrine

## Coronado Club

Dec. 20 — "Big Band Night" dinner/dance. \$7.95 all-you-can-eat buffet, 6-9 p.m. Music by Westside Sound, 7-11 p.m.

Dec. 22 — Sunday brunch buffet, 10 a.m.-2 p.m. \$6.95 all-you-can-eat buffet. Music by Bob Weiler, 1-4 p.m.

Dec. 31 — New Year's Eve Party; \$30/couple; prime rib dinner, 7-9 p.m.; music by Midnight Magic, 9 p.m.-1 a.m. Check ticket availability at Club office.

Jan. 2, 9, 16 — Thursday bingo night. Card sales and buffet start at 5 p.m., early birds' bingo at 6:45 p.m.

Jan. 5 — Sunday brunch buffet, 10 a.m.-2 p.m. Music by Bob Weiler, 1-4 p.m.

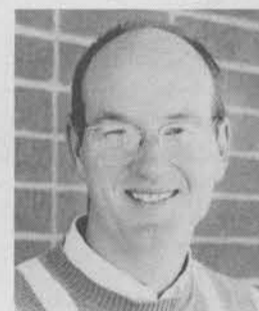
Jan. 10 — "Western Night" dinner/dance. \$7.95 all-you-can-eat buffet, 6-9 p.m. Music by Isleta Poorboys, 7-11 p.m.

Jan. 16 — Kids bingo. Buffet 5-8 p.m.; bingo 7-9 p.m.

## Supervisory appointment

DAVID PLUMMER to Manager of Electro-mechanical Engineering Dept. 2643.

David joined Sandia in 1985 as a member of the Safety Components Department. He has



DAVE PLUMMER

worked in mechanism design groups since coming to the Labs, except for a nine-month assignment as quality coordinator for the Energetic Components Center.

He has a BS and MS in mechanical engineering, both from Oklahoma State

University. David received the Sandia President's Quality Award in 1994 and an Employee Recognition Award in 1996.



YOU CAN'T HELP but look twice at this visual feast pattering around the Labs, but Steve Thoma, the truck's owner, says he doesn't notice people staring anymore. Steve, a contractor in Process Research Dept. 6212, decided to "Southwest" his 1975 Chevy pickup about five years ago. So he sprayed the exterior with pink stucco (the same batch he was covering his house with at the time), replaced the plastic dashboard with a wooden one, added a turquoise-stained grill and vigas and tile mosaics (a gecko on the cab's ceiling, a zia symbol in the bed), tiled the side trim, and hung a chile ristra from the rearview mirror. (The truck hasn't been "normal" for awhile; before the stucco it was covered with hundreds of postcards from around the world, a surface he decided was too high maintenance. In addition, it has run on propane since 1981.) Since the customizing, Steve and his rolling promotion for "Santa Fe style" have been invited to custom car shows and parades and have appeared in local newspapers and on TV stations around the world. A San Francisco filmmaker even included the truck in a documentary about custom cars. Steve, also a self-taught sculptor whose work is gaining acceptance in the Chicago folk art market, says stucco makes a great medium . . . uh, surface. Is he worried about ruining his masterpiece in a fender-bender? Not really; the truck weighs 6,000 pounds. Plus, he opines, stucco is better than fiberglass for body work any day. (Photo by Randy Montoya)