

the laboratory connection

your community's link
to information, opportunities, and people
at Los Alamos National Laboratory

December / January 2004

a
word
from

Communications and External
Relations Division Director



The holiday season is a good time to reflect on the past year as well as look to the future. Having arrived at Los Alamos National Laboratory nine months ago, I am struck by all that we have recently been through and all that we have accomplished. Without doubt, LANL has become a stronger and better laboratory, much of which is due to the strength of the community of Northern New Mexico and the support that community has given to the Lab, especially during the past year.



David McCumber

Two Thousand and Three marked our 60th anniversary, and our celebration took on the theme: "Ideas that Change the World." Someone commented that ideas come from people and that people are the most important part of the laboratory. I couldn't agree more. Certainly, this concept forms the basis of one of Director Nanos's five priorities: Community Partnerships. The people that make up LANL, the people we work with every day, the people whose ideas change our world, are the same people who make up the great community of Northern New Mexico.

Looking toward 2004, I am thankful for our community and am committed to strengthening its bonds. We, therefore, dedicate ourselves to building on the past by creating a more productive present that will ensure an ever-brighter future.

Holiday Season Brings Out Laboratory 'Elves'

Many children in Northern New Mexico will have an elf named Andy to thank for just-like-new toys on Christmas morning this year. Andy is an anonymous Laboratory engineer who is part of one of the Lab's several Holiday drives for those in need.

For many of us, the holidays mean a halt to business as usual while we celebrate in our own individual way. It has become customary at the Laboratory for many employees to use their spare time to collect food, toys, and clothing for community members who are less fortunate. The Laboratory's annual Holiday Drive partners with the Salvation Army and other nonprofit agencies to identify less-fortunate seniors and families who could use a little holiday cheer. This year, the Lab's institutional Holiday Drive collected employee contributions of new toys and clothing and nonperishable food for several weeks before distribution on December 15.

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Over the past two years, Lab employees have donated hundreds of toys to Northern New Mexico children. They have also provided holiday meals and other food donations to more than 100 families.

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In addition to this effort, some Lab employees have identified the need for an auxiliary Holiday Drive that would accept used toys and clothing in good condition as well as food and personal hygiene and toiletry items.

One employee who stepped up to fill this need is Jerry Leyba, a property administrator for the Laboratory's Property Management group. Leyba has been acting as Santa Claus, both figuratively and literally, since 1972.

"I came from a very poor family. I can remember the days when we didn't have shoes," Leyba said. "When you experience that, you grow up and know that you have to be thankful and you have to give back to your community."

Leyba asks friends, coworkers, church groups and other nonprofit organizations for names and contact information for local needy families. He contacts the families and collects information about them, such as ages and clothing sizes. He also includes senior citizens referred by agencies like Amigos del Valle, Las Cumbres, and the Salvation Army.

Leyba is quick to point out though, that he works with many "elves."

"Jimmy Leal from the Los Alamos Fire Department has helped this project for the past eight years," he said. "Another elf, who prefers to remain anonymous, is a Laboratory technical staff member known as Andy who repairs toys and games."

Andy searches for discarded toys, restores them and gives them to Leyba to redistribute to children who otherwise might not receive anything for Christmas. In the last three years, he has restored dozens of boxes of toys as well as 14 bicycles, tricycles, scooters and

sleds. He gave these items to Leyba who distributed them to needy children throughout northern New Mexico.

"I believe that almost everything has value and I despise waste," he said. "When you see something that still has some value, why not put it in someone else's hands who has nothing?"

Andy grew up fixing cars throughout high school and in his spare time, he also repairs precision equipment for customers all over the southwest.

This year, Andy started his holiday toy search and repair project in March. He suggests that anyone who wants to be an elf just needs to practice forethought before discarding a broken toy or game.

"If you break a toy or a game, take all of the pieces, including the original box and the instruction sheet if you have it, and place it in a bag. Then take it to Casa Mesita," he said. "Someone else can fix that toy or game, as long as all of the pieces—or most of them—are kept together."

Andy said he also uses empty plastic shoeboxes and other containers to organize the toys before, during, and after the repair stage.

"If you're throwing any of this out, send these items to Jerry Leyba and I can pick them up from him," Andy said.

His other reason for repairing toys and games is that he is an environmentalist.

"If we used what we had more efficiently, we wouldn't have to make more of the same thing," he said. "I believe that everything should be reused. When you recycle discarded items, you're following nature's lead."

Leyba reiterated that Holiday giving is a very special gift in itself.

"The important thing is for people to think about others. The spirit of Christmas is in your heart—you just have to look inside and give," he said. "I know everyone is busy, but everyone can donate something: toys, nonperishable food, clothing, firewood, filled Christmas stockings, and/or gift cards."

New toys, clothing, and nonperishable food as well as personal hygiene items like toothpaste, bath soap, shampoos, toiletries and lotions are appreciated. However, used toys and children's clothing, including winter coats and jackets in good condition, will also be accepted.

Leyba said that, although perishable items are welcome for holiday meals, food gift cards from Smith's or a Wal-Mart supercenter might be more helpful.

"Employees who want to make a food contribution can purchase a food gift card that will then be distributed to local needy families," he said.

Leyba's program is an adjunct to the Laboratory's Holiday Drive. Donated items will be accepted until December 24.



Los Alamos National Laboratory – 2003 YEAR IN REVIEW

The year 2003 was an eventful year at the Laboratory, beginning with momentous management changes that began in January and continued throughout the year. There were also many praiseworthy accomplishments during 2003, and some of those are also highlighted here.

Challenges on the Hill

Our Laboratory family began the year with some painful losses. These included the loss of public confidence in our business practices and the departure of the Lab Director and his Principal Deputy. These losses resulted from serious controversy over Lab financial and business controls that arose initially from the misuse of government procurement by a few employees. Following the Director's resignation, Retired Vice Admiral George P. Nanos (USN) who had recently joined the Lab was named interim director.

With the active leadership of University of California senior executives, there

immediately began the most sweeping restructuring of LANL in its 60-year history. Leadership in the Security Division and the Audits and Assessments Office were replaced and those organizations were reorganized following scrutiny by both UC and NNSA. Additionally, the function of the Office of Security Inquiries that handled inquiries of waste, fraud, and abuse were transferred directly to the Audits and Assessments Office, which in turn reported directly to the auditor of the University of California.

By late January, it was announced that the Lab's Business Division would undergo a complete reevaluation and subsequent restructuring. UC solicited consulting expertise from private sector firms to initiate an independent evaluation of the Lab's key financial processes to determine business control and effectiveness. An interim structure was developed to support the evaluation effort and continue ongoing operations until a final determination could be made of what

needed to be done to restore proper business operations.

By mid-year, Director Nanos had been permanently installed, new administrative and business procedures were in place, reforms were initiated, and LANL was for the first time facing the prospect of being managed under contract by an institution other than the University of California.

LANL Celebrates 60th Anniversary

Los Alamos National Laboratory invited leaders from neighboring communities, New Mexico's congressional delegation and governor, officials from the University of California, and leaders of the U.S. Department of Energy and its National Nuclear Security Administration to events marking the Laboratory's 60th Anniversary in April.

Major events included anniversary recognition ceremonies, dedication of the new Nonproliferation and International Security Center and the Dual Axis Radiographic Hydrodynamic Test facility, and awards for the state's top students in the Laboratory's 13th annual New Mexico High School Adventures in Supercomputing Challenge.

Director Pete Nanos said the day's events gave the Laboratory an opportunity to honor community and government leaders whose support has been crucial to Los Alamos' 60 years of achievements in science, technology, and national security. He expressed hope that the six months of anniversary events, which began April 7, will mark where the Laboratory is today, and where it is headed.

The Laboratory's anniversary slogan is, "Ideas that change the world."

Activities marking the 60th anniversary took place throughout the summer and wrapped up in September with the



Dignitaries participating in a press conference at the Lab's 60th Anniversary celebration in April included left to right, former University of California President Richard Atkinson, NNSA Administrator Ambassador Linton Brooks, Lab Director G. Peter Nanos and New Mexico Senator Pete Domenici.

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publication of a special issue of Los Alamos Science magazine.

R&D 100 Awards

Los Alamos National Laboratory scientists captured eight of R&D Magazine's 2003 R&D 100 Awards, more than any other



To commemorate the Lab's 60th anniversary, a special exhibit featuring multi-generation Lab families was displayed at a variety of community events in the region.

Department of Energy laboratory. The University of California-managed National Laboratories, Los Alamos, Lawrence Berkeley, and Lawrence Livermore, combined for a total of 16 awards.

The latest winners bring the Los Alamos total to 78 awards over the past 16 years, 89 awards since first entering the competition in 1978. The projects recognized this year span a diverse range of scientific and technical areas—from innovative manufacturing techniques and advances in national security to revolutionary new materials.

In recognizing the achievement, Laboratory Director G. Peter Nanos noted that “many of these award-winning technical innovations were born out of Los Alamos’ mission to create science that serves society. This is evidence to the fact that Los Alamos remains home to some of the best science and brightest scientific minds in the world.

These innovations are the result of our pursuit of ideas that change the world.”

Over the years, the R&D 100 awards have become one measure of Los Alamos’ contribution to society. Technologies are nominated in open competition and judged by technical experts selected by the Illinois-based magazine.

Internet Speed Mark in Guinness World Records Book

Quick now, who holds the land-speed record for sending data over the Internet?

If you pulled out your Guinness World Records book and said Los Alamos National Laboratory, you might earn a pint of the dark

brew for which the donnybrook-deciding tome is named.

Los Alamos collaborated with researchers from the California Institute of Technology, European Organization for Nuclear Research, or CERN, in Geneva, and Stanford Linear Accelerator Center to set the record that the Guinness record-keepers recently certified as official.

Using off-the-shelf personal computers, the team blasted a trillion bytes of data from California to Switzerland at an eye-popping 2.38 billion bits, or 2.38 gigabits, per second. By comparison, a typical telephone modem connection transmits data at less than 56,000 bits per second.

At that speed, computer users could send full-length DVD movies to each other from halfway across the world in less than 20 seconds, or the entire Library of Congress in 14 hours.

“What’s remarkable about this achievement is that no special equipment is needed other than commodity Intel Ethernet cards that we fine-tuned,” said Wu-chun Feng, who heads the RADIANT network research team at Los Alamos’ Advanced Computing Laboratory. “And in a local-area network, the numbers are even better; we are running at about seven gigabits per second.”

Since 1955, the Guinness Book of Records has settled countless arguments in bars, libraries and even nuclear laboratories by collecting and confirming world record data with what the brewery calls “comprehensiveness and authenticity,” selling more than 94 million copies in the process, making it the world’s best-selling copyright book.

Hepatitis C Database Launched

University of California scientists at Los Alamos National Laboratory recently launched an Internet-based Hepatitis C Virus (HCV) genomic sequence database similar to the Laboratory’s human immunodeficiency virus (HIV) database. The new database is expected to become an important tool in Hepatitis C research.

Hepatitis C is a blood-borne virus that is transmitted principally via blood transfusions and intravenous drug use. The World Health Organization estimates some 170 million people — three percent of the world population — carry HCV, although most are unaware they are infected.

Roughly four million people in the United States are infected with the virus. The virus is a major cause of acute hepatitis, cirrhosis of the liver and liver cancer. There is currently no vaccine against Hepatitis C, and although some progress has been made in treating it, the currently available treatments are expensive, can cause debilitating side effects, and often are ineffective.

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According to Carla Kuiken, Theoretical Division staff member and developer of the HCV database, “the database was the result of funding from the National Institutes of Health for us to build a new set of databases based on the Laboratory’s HIV databases. The Los Alamos HIV databases have long been an important asset for scientists trying to find new drugs and vaccines against HIV/AIDS. Although Hepatitis C and AIDS are very different diseases, the pathogens causing them have properties in common, so the framework created for HIV could be adapted for HCV. This meant that an HCV database and associated tools could be launched relatively quickly.”

The genomic sequence database is the first of two new HCV databases to be made publicly accessible. Work has started on the HCV immunology database, which will become available in 2004. The databases share tools and analysis programs with HIV, and future tools will be developed in conjunction so both databases can profit from new developments.

Through the hepatitis C website (<http://hcv.lanl.gov> or <http://hcv-db.org>), the database can be searched on several fields. Background information in the database includes health and treatment information, epidemiological information about the date and place of sampling and of infection, genotype and subtype information, publication information and the location of each sequence on the HCV genome. Patient privacy is protected because the information in the database cannot be linked to a specific individual, while science is served as HCV biologists can readily compare their new data and new studies to previously published global data. In addition, the website offers a large number of tools and analysis programs, most of which were developed by the Los Alamos database groups.

Lab Produces Nuclear Weapons Pit for Use in Stockpile

Los Alamos National Laboratory has successfully made the first nuclear weapons pit in 14 years that meets specifications for use in the U.S. stockpile.



Dennis J. Lujan of the Pit Assembly Team works in a glove box to complete proof testing as part of the Lab's effort to build a fully qualified weapons plutonium pit.

The six-year effort at Los Alamos’ plutonium processing facility restores the nation’s ability to make nuclear weapons, a capability the United States lost when the Rocky Flats Plant near Boulder, Colo., shut down in June 1989.

“The Laboratory has delivered on a major commitment to the Department of Energy’s National Nuclear Security Administration, Congress, and the taxpayers,” said Lab Director Pete Nanos.

A pit is the fissile core of a nuclear weapon’s physics package. The newly made pit, called Qual-I because it was built with fully qualified processes, is for the W88 warhead,

which is carried on the Trident II D5 Submarine-Launched Ballistic Missile, a cornerstone of the U.S. nuclear deterrent.

“Our next challenge is to carry out the required experiments, analyses and computer modeling so we can certify that this newly manufactured pit will perform reliably in the stockpile, without conducting underground nuclear tests,” Nanos said.

Los Alamos’ certification work includes fundamental physics experiments, material studies, ongoing subcritical experiments at the Nevada Test Site, and hydrodynamic experiments at the newly completed Dual Axis Radiographic Hydrotest facility. Los Alamos has committed to complete the certification process and to have the ability to deliver a pit to the military that meets all stockpile requirements by 2007.

Los Alamos will make roughly half a dozen pits a year from now until 2007 to ensure that certification is completed successfully and to put into place the capacity to begin making 10 stockpile pits a year by 2007.

KSL Awarded Support Services Contract

Officials from Los Alamos National Laboratory and KSL Services Joint Venture signed a contract formalizing KSL Services as Los Alamos’ new site support services contractor.

KSL Services Joint Venture includes Kellogg Brown and Root Inc., partners Shaw Infrastructure Inc., and Los Alamos Technical Associates Inc.

The site support services contract is valued at about \$150 million per year, carries a five-year term with an option for an additional five years, and is the largest contract at the Laboratory. Services provided under the contract include facilities maintenance and repair, utility

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Successful Partnership Efficiently Forges New Frontier

A partnership between Air Curtain Destructors of New Mexico Inc., also known as Anvil Welding of Hernandez, New Mexico, and Laboratory staff has led to the successful completion of a two-year, \$1.6 million tree thinning project for the Laboratory. The project saved the Lab a considerable amount of money, made safety its first priority, and still succeeded in never violating state and federal air quality emissions regulations.

"Most of this project's success was a result of Tito Garcia's resourcefulness," said Lab project manager, Michael Dennis. "Mr. Garcia used continuous process improvement to help develop practical procedures and cost-effective solutions that are the hallmarks of a successful small business."

Dennis said that this was the first large-scale project in the United States using the air curtain destructor (ACD) units. It was also an example of excellence because Garcia's project crew had only one reportable injury during the two years work was performed.

"They had one of the most dangerous jobs here at the Lab because they were operating heavy equipment and were performing work with very high temperatures," Dennis explained. "Still, their only injury was someone who tripped and injured his hand."

One result of Garcia's continuous process improvement was that Garcia's crew reduced the waste generated by 99 percent.

"They reduced the uranium depletion to a fine powder," said Phoebe Suina, the facilities waste coordinator. "The burn was so fine that instead of having to sift the burned product, we ran a radiological screen on it and found no sign of contamination."

Garcia said his 30-year background in welding came into play when designing process improvements.

"I knew how hot the fire should be to accomplish our goal. I made my guys color charts to match temperature goals and that worked really well," Garcia said. "We also reviewed safety daily and also every time we acquired a new burn permit. We were able to consistently stay within air quality parameters. We never violated any of the air quality emissions regulations or polluted the air in any way, which is of utmost importance to the Lab and the surrounding communities."

Because ongoing safety training was paramount, Garcia participated in the Lab training offered to all subcontractors: General Employee Training, site-specific safety training, fire extinguisher training, and site inspections.

Suina added that every morning the project team had a safety briefing and walked through the site pointing out safety problems.

Suina said that the project staff is currently in the process of transferring the equipment over to Jemez and Santa Clara Pueblos. Mitigation crews from each pueblo will provide additional tree thinning for the Lab in Rendija Canyon.

The project, which had never before been attempted on this scale in the United States, resulted in the disposal of 150,000 cubic yards of forest thinning debris. The materials were disposed in a clean-burning ACD unit as part of the Lab's "Site-wide Fire Mitigation Project" initiated after the May 2000 Cerro Grande fire.



A crane loads wood debris into an air curtain destructor. The units often operated round-the-clock to take advantage of favorable air quality and burning conditions.

Under its contract, Air Curtain Destructors set up the burn unit sites and material management areas, managed the thinning debris, and operated and maintained the ACD units. The company's crew frequently operated the burning units on a round-the-clock basis to realize economies in operation and to take advantage of favorable air quality and burning conditions.

Dennis said that some of the process improvements would have proved challenging for a large organization like the Laboratory to adopt. But, he said, Garcia's flexibility and perseverance helped the project succeed. Another key to success was that Garcia had recruited and maintained a small crew of skilled and dedicated heavy equipment operators and sawyers whose day-to-day efforts were the foundation of the project.

"The situation at the beginning was kind of rocky because of our lack of knowledge of Lab procedures," Garcia said. "But then the Small Business Office got involved and helped us adapt to Lab procedures and it turned out to be a good deal for both me and the Lab."

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Successful Partnership Saves Lab Money and Forges New Frontier
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Garcia's crew was so efficient that they were able to complete extra work that wasn't on the original contract.

"We installed storm water controls, restored the sites to even better condition than when we started and also managed timber for firewood distribution to the public," Garcia explained.

The groundbreaking experience gained by the partnership between the Laboratory and Air Curtain Destructors of NM, Inc. has been mutually beneficial. Garcia has now been asked by the U.S. Forest Service to serve on a Forest Service Advisory Council to help manage forests statewide and has also applied for and been selected to perform other work at the Laboratory.

"It was an opportunity to grow. It opened doors," Garcia said. "We just completed a fencing contract at a different technical area and we now have another contract at an additional technical area."

Garcia added that he now feels comfortable and competent in negotiating contracts with the Laboratory.

Dennis said, "This project was a success in large measure because of the partnership between Air Curtain Destructors of NM, Inc. and the Cerro Grande Rehabilitation Project. It involved not only assisting the company through the Lab's Small Business Office, but also by integrating the ACD project into the larger fire mitigation initiative. Air Curtain Destructors of NM, Inc. proved to be a valuable partner in the fire mitigation initiative not only by exceeding expectations in performing the work, but also by working successfully with other project subcontractors."



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operations, waste removal, roads and grounds maintenance, and custodial services.

"We are excited to have the KSL Services Joint Venture join the Los Alamos family and look forward to working with its senior management team and work force in providing these vital services to the Laboratory," said James Holt, Los Alamos' Associate Director for Operations.

Los Alamos issued the site support services contract for competitive bid as part of an internal realignment effort and changes in the way the Laboratory approaches facility maintenance and infrastructure support.

Park and Ride Back on the Road

Returning after a four-year absence, the Park and Ride commuter bus service is receiving good reviews from passengers who commute to and from Los Alamos. The commuter service began operating May 12 and passengers pay \$1 per ride from Santa Fe and Española. Recently, service to and from Albuquerque was

added and rides to and from the Duke City are \$3.

Jim Holt, associate director for operations at the Lab, noted how important the bus service is to the Laboratory. He said it has had an impact on the parking situation at the Lab, where there is a shortage of parking spaces.

All Aboard America has begun tracking which bus routes are more heavily used and where improvements need to be made. The company has distributed surveys asking for input on how the bus service can be improved.

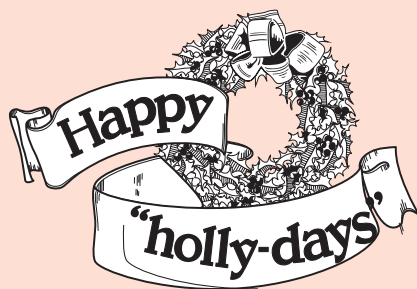
The program is funded by federal government road construction money, which will run out upon completion of a \$46 million highway improvement project on U.S. 84-285 between Santa Fe and Pojoaque.

The highway department and Governor's Office are looking at funding alternatives to keep the program solvent.



Park & Ride buses provide transportation to and from the Lab for commuters in Santa Fe, Española, and Albuquerque. The popular service was discontinued four years ago amid concerns about the safety record of the previous contractor.

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Ideas That Change the World



**Udall Congratulates
 Award-Winning Lab Student**

New Mexico Congressman Tom Udall, in Los Alamos for a Chamber of Commerce luncheon, took time out to visit with Gerardo Chowell-Puente, a Lab student employee honored recently for his work on SARS and other epidemics.

A native of Mexico who is a third-year doctoral student at Cornell University, Chowell-Puente received one of the National Prizes for Youth awarded by the Mexican Institute of Youth. Mexican President Vicente Fox made the presentation at his residence in Mexico City in November.



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