

Deed done

Energy, Lab modernization highlight Spencer Abraham's first visit to ORNL

Spencer Abraham capped a process officials say required "work, creativity and change of culture" during his first visit to Oak Ridge as Energy Secretary—the deeding over of a parcel of land that will be the site of three privately funded research buildings at ORNL.

The June 18 signing ceremony before an assembly of DOE complex employees transfers the parcel—essentially the east parking lot—from DOE to the UT-Battelle Development Corporation. With private development funding, modern, state-of-the-art facilities will be built sooner rather than later—or never, if all depended on scarce tax dollars.

The Secretary's penstrokes were witnessed by Tennessee Sen. Fred Thompson, Reps. Zach Wamp and Jimmy Duncan, ORO Manager Leah Dever and ORNL Director Bill Madia, who has emphasized the need for a Laboratory modernization program in the face of increased competition for resources and talent in the scientific community.

Abraham, in fact, told the audience in Wigner Auditorium, which included ORNL staff members as well as some from Y-12 and the East Tennessee Technology Park, that "up-to-date resources was one way to keep recruiting and retaining the best staff members to meet the challenges the country faces."

Earlier, the Energy Secretary was treated to a driving tour of ORNL. The route mingled the old, including structures built during the Manhattan Project that are still in service—with the "new," such as the 1950s-era cafeteria—with the future, including a microscopy laboratory that will be added to the High Temperature Materials Laboratory.

Energy, however, was the theme of this initial visit to Oak Ridge. He made the most public stop of his visit at ORNL's Buildings Technology Center and adjacent Cooling, Heating and Power Laboratory, both dedicated to research advancing energy conservation and power generation.

"We must not lose sight of the link between energy security and our national and economic security. Our ability for economic growth is affected by the energy supply, as is national security," he told a sun-drenched gathering at the BTC, where he saw appliances that consume less electricity and distributed generation systems that produce more of it.

Minutes later, at the assembly in Wigner Auditorium, he said it was "humbling" to be in the "city" (See ABRAHAM, back page)



Curtis Boles

The transfer of a parcel of DOE land for three privately funded buildings was a weighty moment executed in light-hearted fashion. From left are ORNL Director Bill Madia, Rep. Zach Wamp, Energy Secretary Spencer Abraham, Rep. Jimmy Duncan, Sen. Fred Thompson and ORO Manager Leah Dever.



ESD researcher Sandy McLaughlin gauges a pine tree's growth on the ORR.

ORNL studies the talked-about mountain air

Never ask a man if he's from the mountains," a man from western North Carolina once quipped to Gov. Mike Easley. "If he is, he'll tell you. If he's not, there's no need to embarrass him by asking."

Easley was one of three state governors who spoke at the third annual Governors' Summit on Mountain Air Quality in Gatlinburg last month, hosted by Tennessee Gov. Don Sundquist. The North Carolina governor's anecdote reflected the region's pride in the southern Appalachian Mountains.

Unfortunately, the same range is also blanketed in a canopy of air quality concerns. Pollution from surrounding urban areas has contributed to ozone, acid rain and haze.

Environmental Sciences Division researcher Sandy McLaughlin is taking advantage of ORNL's proximity to these mountains by studying the effects of ozone on forest trees near the top of Look Rock, a vantage point on Chilhowee Mountain near the Great Smoky Mountains National Park. Funded by the U.S. Forest Service, Sandy's experiments, which include poplars, pines, red oaks, chestnut oaks and hickories, are providing insight into ozone's potentially adverse effects on tree growth.

On a clear day, you can see Clingman's Dome, Mt. LeConte and even Mt. Mitchell, which is more than 100 miles away.

On a hazy day, it's a different story. Smoky Mountains Superintendent Michael Tollefson received an e-mail one day from a concerned citizen, telling him that someone needed to clean the lens of a camera that provides a Smokies vista on the Web. Tollefson told the summit audience he was sad to report that this was the way it actually looked.

At the governors' summit, a variety of views were expressed by panelists from the Environmental Protection Agency, the Southern Appalachian Mountains Initiative, the Tennessee Valley Authority, the American Lung Association and others. ORNL Director Bill Madia also presented the technological aspects of President Bush's energy plan (see page 2). The panelists were then presented with questions from the audience and the governors in attendance.

The dialogue at the meeting was intense at times and contrasting perspectives were offered, but one common theme prevailed: Air pollution recognizes none of the imaginary boundaries imposed by cities, counties and states; thus, a

(See AIR, page 2)

regional approach can be the only successful approach to cleaning the air.

The three governors took a step toward a unified strategy by signing the Southern Air Principles agreement. The collaborative contract aims to enhance local, state and regional efforts to protect and improve air quality. The governors hope to be joined soon by other states in the South.

They emphasized the Clean Air Act, enacted by Congress in 1977 and amended in 1990. According to Georgia Gov. Roy Barnes, "There are some who say that economic prosperity and environmental degradation are inextricably woven together. But this does not have to be the case."

Representatives from the EPA and other champions of the CAA point out the impressive strides in reducing air pollution, while the country has maintained significant growth. Since 1980, emissions of volatile organic compounds have been reduced by 33 percent, carbon monoxide by 22 percent, particulates by 55 percent and sulfur dioxide by 28 percent. Toxic pollutants such as lead and mercury have also been considerably reduced.

Despite these dramatic achievements, one class of pollutant has actually increased in emissions over this period: nitrogen oxides (NO_x), which are largely emitted by cars and coal-fired power plants. When combined with volatile organics and sunlight, NO_x forms ozone in the atmosphere.

Sandy and his colleagues suspect an ozone role in regional forest insect infestations.

The effect of ozone on humans is fairly well publicized—at high concentrations it attacks the lungs like a chemical fire. In many cities, heeding the one-hour and eight-hour average warning levels has become a part of daily life.

But ozone affects the physiology of trees in a

different way. A tree moves water from its roots, through the trunk and out to the branches through a process called transpiration. The tree gives off this moisture through tiny pores in the leaves called stomates, which open and close in daily patterns.

"What we think may be happening," Sandy says, "is that the pores are staying open longer due to the high ozone levels and the tree is forced to use more water than it would normally use. This means you have dried down the soil and increased the moisture stress on the tree so that it is growing more slowly."

Stress from increased moisture produces further injurious results, including the tree's increased susceptibility to bark beetles. It takes energy and pressure for a tree to defend itself against would-be invaders. When a beetle pierces the bark, the tree tries to carry it out on a slow and sticky wave of sap exuded through the wound hole. However, weakened trees have less sap and less water available to produce the pressure needed to drive the beetles out.

"Bark beetles are a natural pest, but they are made more of a problem by moisture stress and climate change," Sandy says. The warmer winters predicted in the future will not provide the low temperatures required to kill back the beetle population. This combination of a warmer, drier environment makes for a naturally more effective pest.

"It's a serious threat, and where it stops, who knows?" Sandy ponders. "If ozone is playing a role in this, it's just one more rationale for cleaner energy and for looking at ways of producing or using alternative fuels that don't create high levels of NO_x and lead to the formation of ozone."—Jason Gorss *ornl*

Jason Gorss is a summer intern working with the Office of Communications and Community Outreach.

Madia stresses role of energy tech at Governor's Summit

For the first time in the three-year history of the Governor's Summit on Mountain Air Quality, the agenda included a perspective on finding a balance between energy and air quality. ORNL Director Bill Madia was a panelist at this session, along with TVA Director Skila Harris and Rep. Joe Barton, chair of the Energy and Air Quality Subcommittee.

All three panelists stressed the fact that our current way of life depends upon copious amounts of energy and a reliable means of meeting energy demands. While developing clean, renewable energy sources should be a key component, the panelists agreed that a balanced supply is necessary—one that includes fossil fuels as an essential part of the U.S. energy mix.

"Today, everyone understands that our energy supply is inadequate, our energy infrastructure is outdated and our consumption is inefficient," Bill said, alluding to the three fundamental energy problems facing the country. Bill's presentation focused on President Bush's energy plan and the role of technology in addressing all sides of this three-pronged issue.

Bill accentuated the need for a diversity of sources on the supply side of the equation, including reevaluation of the nuclear power option, which he called the strongest part of the President's plan. "Since Chernobyl," Bill said, "we have experienced 5,000 reactor years of safe, reliable operation." But he also emphasized the growing scarcity of uranium and the need to extend its usefulness through breeder technologies and reprocessing.

He also mentioned new turbines being developed for hydropower plants that will help reduce the impact on fish.

Regarding transmission of power, Bill focused on the development of a high-temperature superconducting cable for the Southwire Corporation. The new technology carries three to five times the electrical current of existing copper cables while occupying the same amount of space.

Bill commented on the importance of improving the efficiency of energy consumption. He highlighted the development of a heat-pump-driven water heater that uses one-third as much electricity as a conventional electric water heater. "If we could deploy this development nationwide, we could reduce the United States' total energy consumption by one full percent," Bill said.

Gov. Sundquist summarized the key role that technology will play in providing answers to the country's complex energy issues: "Solutions that find a balance between energy, the environment and the economy are the only solutions that will withstand the challenges of today and tomorrow."—Jason Gorss *ornl*



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Curtis Boles

Records Policy and Management's Marie Swenson recently picked up some reading material at the United Way's book fair. It can be safely assumed that Marie is a grandmom—actually two grandchildren and one on the way.

Lab Notes

Streaming to see the Secretary

One thing different about June 18th's visit from Energy Secretary Spencer Abraham is the way a good number of staff members saw him. Using "streamed" video and audio, 264 employees watched or listened to the Secretary's talk at their desktops.

That roughly equates to a good-sized auditorium full of people.

"All you need is a connection to the network and software that reads Real Audio or Quicktime files," says the Computing, Information and Networking Division's Deborah York. "The software is free and probably already on your machine. There are test links on the Web page (www-internal2.ornl.gov/netvideo) to see if you can connect."



Brett Pate

Abraham: A new way to reach out

Space was limited in Wigner Auditorium to allow for guests from Y-12 and the East Tennessee Technology Park. Although the talk was piped live to ORNL CATV locations including other auditoriums, streaming video gave staff members another avenue to see the talk.

The contact for Real Audio and Quicktime is Ken Pate, 574-5666; and Bruce Johnston, 574-8806, for Real Audio and Unix platforms. Call Bruce if you'd like to have an event streamed live. Existing video can also be converted to be viewed on the Web, anytime.

Vortek, ORNL light up for industry

One lamp could light half of Neyland Stadium for a night game, but it's an even better tool for industry. Reg Allen, president of Vortek, Inc., came to ORNL June 7 to sign a memorandum of understanding with Laboratory Director Bill Madia, who made the football analogy at the ceremony.

ORNL has installed one of Vortek's 300,000-watt lamps in Bldg. 4508. The lamp was originally developed by Vortek, based in Vancouver, British Columbia, to light huge areas. Metals and Ceramics Division researcher Craig Blue discovered its applicability for fusing wear-resistant coatings to aluminum and other alloys. It also uses much less energy than more conventional coating processes.

The Vortek president noted that he receives many proposals for Vortek products, but Craig's enthusiasm made a telling difference. Soon private companies will be able to take advantage of a state-of-the-art manufacturing resource at ORNL.

SNS: 200 down, 87,800 to go

Workmen poured the first concrete pad at the Spallation Neutron Source site last month. Dick Davis, of the SNS construction project office, said that the first pad is for the "front-end building," which will house the ion source. Those first 200 cubic yards of concrete are a fraction of the estimated 88,000 cubic yards that the SNS will require overall. In addition, 4200 tons of rebar, which reinforces the concrete, has been ordered for the project, Dick said.



Dave Wilfert

SNS: Concrete progress

Getting that 'lived in' look

Here's another construction project that's going well: Last month *ORNL Reporter* featured Team UT-Battelle's project with Habitat for Humanity in the Heiskell community. At the time the home was little more than the foundation and some floor trusses. Now, in a matter of weeks, the walls are up, the roof is on, siding hung, wiring strung and plumbing plumbed.

Barring some inspections, sheetrocking and paint, it's practically ready for the cable guy.

"I'm really proud of the tremendous support we've gotten from ORNL people," says Brenda Hackworth, an HFH coordinator who works in the Office of Communications and Community Outreach. In addition to singular volunteers from divisions like Plant and Equipment, the Leadership Team and groups from the Logistical Services; Quality Services; Operational Safety Services;

Environmental Sciences; Engineering Technology; Robotics and Process Systems; Human Resources, Computing, Information and Networking; and Instrumentation and Controls divisions have dedicated or have signed up for specific Saturdays to work on the house.

A seasoned team of HFH regulars manages the building project. Also ongoing has been the rehabilitation of a home, an Aid to Distressed Families of Appalachian Families project led at ORNL by Tim Myrick.

Reported by Bill Cabage

Cyclists roll by Lab, just for a Hoot

ORNL became a motorcycle Mecca for a day on June 20, playing host to just about every type of bike imaginable as nearly 500 of them gurgled and hummed through the Graphite Reactor parking lot. The visit was part of the Honda Hoot Four Corners Ride, a four-point loop that began at the American Museum of Science and Energy, then continued to the K-25 plant, the Graphite Reactor, and finally the Oak Ridge Civic Center. At each of the four checkpoints, participants had their "passports" stamped to be eligible for a prize drawing.

According to Roger Haveman of Dorr, Mich.—one of more than 100 volunteers who helped organize and run the Hoot—the Graphite Reactor stop added a sense of historical perspective to the surrounding rural landscape. He said he was surprised to learn about the abundance of technology and rich national history in the area. A few riders took a break from the saddle and toured the landmark.

The Honda Hoot, sponsored by *Cycle World* magazine, headquartered in Knoxville this year after departing its

original home in Asheville, N.C. The Four Corners Ride was just one piece of the four-day extravaganza, which included daily rides, manufacturers' exhibits and demonstrations, tours of local attractions and, of course, parties. Knoxville is slated to host the Hoot for at least the next two years, so we may see some ORNL employees flaunting their treasured two-wheelers at the 2002 event.—*Jason Gorss*



Fred Stronh

Honda Hoot volunteers process bikers as they arrive at the Graphite Reactor parking area.

P-AAA primer

No, Price-Anderson isn't an accounting firm. It's a law that drives the Lab's accountability for nuclear program safety

You may have heard of the Price-Anderson Amendments Act. If you have, it was probably mentioned in a serious tone of voice. ORNL has a scrupulous P-AAA program, and for many good reasons.

Adherence, required by law, to Price-Anderson standards is seen as an effective route to safe nuclear and radiological operations. Moreover, running afoul of "P-triple-A" can mean money out of a contractor's pocket in fines. Violations could also jeopardize the Lab's many important nuclear-related programs, nearly every aspect of which comes under the Price-Anderson domain—from operating the High Flux Isotope Reactor to working with low-level radiological materials under a lab ventilation hood.

Mike Walls, who handles the Lab's Price-Anderson compliance program out of the Office of Independent Oversight, says ORNL's heightened emphasis on P-AAA reflects the Leadership Team's approach to safety assurance.

"Self-assessment is vitally important," Mike says. "You identify and assess your own facilities first, find any weaknesses and promptly address them."

Those under P-AAA scrutiny who say the Lab's Price-Anderson office is "looking for problems" are probably correct.

So what is Price-Anderson? It's not an accounting firm, as a lot of people initially guess.

The Price-Anderson law goes back to the Atomic Energy Act of the 1950s. It provides indemnification—financial insurance—to nuclear power operators in case of a nuclear accident. The potential financial risk that an accident carries with it—possibly billions of dollars—would have stymied any growth in nuclear power. Most companies could never assume that kind of risk.

Under Price-Anderson, a nuclear facility's liability for a nuclear accident is capped at \$700 million. Otherwise, say the law's supporters, the technology could never advance under the weight of the financial risk.

The law mainly applied to public utilities, or so it was thought until a set of amendments to the law in 1988 brought DOE's nuclear operations more concretely into the picture. Congress, in effect, insures ORNL's and other DOE nuclear operations against accidents. That level of commitment from Congress does not come with a wink and a nod.

"DOE has a thorough nuclear safety program with rules addressing quality assurance, occupational radiation protection, and nuclear and radiological facility safety management. Documented safety analysis, thorough design and work processes, training and records management are some of the

many program aspects, and it's all geared toward DOE's assuring Congress that it will meet the safety requirements," Mike says.

"The Department's Office of P-AAA Enforcement and Investigation has a reporting system, separate from occurrence reporting, for Price-Anderson issues only. Technically, reporting is voluntary, but all contractors pay close attention to DOE's expectation to report."

If lawmakers were to lose faith in DOE's ability to run its nuclear operations safely, suspension of the "insurance," outside regulation, or even suspension of DOE's nuclear and radiological operations, could result.

In response to the 1988 law, DOE established its Price-Anderson program and gave it enforcement clout. Facilities can be—and have been—fined for lapses in Price-Anderson-related operations. In fact, ORNL has had that experience.

The Lab was fined \$123,500 in 1998 over a series of mainly work-process-related violations in its reactor operations. A streak of several occurrences, none of them grave but also none that were self-identified, added up to a perception of, in Mike's words, "less than perfect work processes."

However, Mike says the Lab received credit and a reduced, or

mitigated, fine for quickly addressing those problems.

In contrast, last year Lockheed Martin Energy Systems drew a P-AAA fine of just over \$1 million for findings related to several Y-12 operations. There was, Mike points out, "zero mitigation" (i.e., for prompt self-identification and correction) on that judgment.

Mike cites a troika of goals in ORNL's Price-Anderson program that are geared toward minimizing the risk of violations and fines: Timely identification, timely reporting and timely correction. The emphasis on "timely" is deliberate, surely before a problem becomes "self disclosing."

"One of the things we dwell on is timely identification," Mike says. "We want to find the precursors to problems before there's any self-disclosing event in our own programs. With the 1998 Notice of Violation, things had the appearance of being lax. We want to find the problem areas early and address them before an event occurs and before others find them."

Toward that aim, ORNL has streamlined its screening and reporting system. Issues that arise go before a review board that decides what is reportable to DOE through the Noncompliance Tracking System, or NTS, and what should be tracked and addressed internally. The Lab has had a significant

increase in the number of issues it has identified and reported over past years.

That increase in reports is perfectly all right, says Mike, who recalls that a paucity of self-reports in the past did not go unnoticed and lent itself to the perception at DOE of a "culture of arrogance" that "we've fought hard to overcome."

He observes, only half joking, that those under P-AAA scrutiny who say the Lab's Price-Anderson office is "looking for problems" are probably correct.

"NTS report numbers have gone up because ORNL has instituted a much-improved program of issues screening and reporting. As long as violations (and any subsequent fines and penalties) stay low, that's fine," Mike says. "The Leadership Team is keenly aware of the benefits of solid Price Anderson performance. Their view is, 'We're going to appropriately report things and, by doing so, showcase the good things we are doing.'"

Work that comes under Price-Anderson Act purview at ORNL includes all nuclear operations, including radiological. That means, Mike notes, not only the most obvious, directly affected tasks, like running a nuclear reactor or operating a hot cell, but also such activities as procurement efforts responsible for making sure replacement parts are nuclear qualified. Design, design review, and other work (including maintenance support) in support of nuclear and radiological activities are also included.

Divisions most directly affected by P-AAA include Research Reactors, Chemical Technology, Metals and Ceramics and the Chemical and Analytical Sciences divisions, which represent the Lab's 10 nuclear facilities. However, the arms of P-AAA spread out to most other divisions. For example, the Facilities and Operations organization is continually involved in support services, and the Instrumentation and Controls Division often develops instrumentation that is nuclear related. "If you are in direct support of a nuclear or radiological operation, you're in P-AAA space," Mike says.

ORNL's Price-Anderson office, which comes under the Office of Independent Oversight, also interacts closely with Bechtel-Jacobs, which has about 50 facilities at ORNL in "P-AAA space" under its environmental management umbrella.

A new, more open approach that the UT-Battelle Leadership Team brought in last year has paid dividends, Mike says.

"They've done a magnificent job of improving the culture of openness and of getting awareness of Price-Anderson accountability down to the line level," he says. "It's clear to me that we've got a much better system of continuous performance assessment and people taking ownership of nuclear safety where it belongs, at the line level. 'Let's get it out of that Walls guy's hands and put it at the line level, where they can interpret Price-Anderson in the context of their own operations and activities.'"

Office of Independent Oversight Director Jan

Preston adds, "The Laboratory's overall objectives are for the line to know our operations better than anyone else can ever hope to; recognize needed improvements before someone even comes close to getting hurt; and enhance operations to ensure that they are safe, efficient and compliant. If we do that, and keep DOE informed as we go along in accordance with the P-AAA program requirements, we won't have to worry about being fined."

The 1998 fine was truly a wake-up call, Mike says. ORNL has since resolved to present itself to the DOE enforcement arm as a national laboratory determined to meet and exceed its Price-Anderson obligations. Crucial to accomplishing that was getting safety messages and practices out of the bureaucracy and into the work areas.

Mike, who self-deprecatingly admits that he's probably part of that bureaucracy, believes the Lab is currently on a good track toward demonstrating an improved culture of safe nuclear operations.

"We feel like, 'ORNL, you've really got your mind right.'"—B.C. [ornl](#)

ORNL people

Felix Paulauskas of the Engineering Technology Division has been appointed an adjunct professor of Materials Science and Engineering in the Department of Materials Science and Engineering at the University of Tennessee in Knoxville. Adjunct faculty are directly involved in helping UT support graduate students and participate in collaborative research with UT's faculty.

Corporate Fellow **Tuan Vo-Dinh** of the Life Sciences Division has been appointed adjunct professor in the University of California, San Francisco, School of Medicine's Department of Neurological Surgery.

Corporate Fellow **Lynn Boatner** occupied the *Angel Dacal Catedra*, an invited professor chair, at the National Autonomous University in Mexico City during the week of May 13–20. During his stay at the university's Institute of Physics he did collaborative research and helped install a new electronic nuclear double resonance microwave cavity.

Peggy Emmett, of the Computational Physics and Engineering Division, and **Tom Kress**, a retiree from the Engineering Technology Division, were named fellows of the American Nuclear Society at its recent annual meeting. Peggy was cited as one of the original developers of the MORSE Monte Carlo Transport Code System and as the continuing software specialist for the MORSE family of codes. Tom was cited for his technical contributions to the field of reactor safety.

Michael Hu of the Chemical Technology Division has been invited to be an associate editor for the *Journal of Nanoscience and Nanotechnology*.

Oak Ridge National Laboratory

Reorganization panel scans information

ORNL's Organizational Task Force, commissioned this spring to study ways to better align the Lab with its mission and reduce its cost of doing business, is busy summarizing information gathered so far from inside and outside ORNL.

Deputy Director for Operations Jeff Smith, who is co-chairing the group with Deputy Director for Science and Technology Lee Riedinger, says the group will spend this month developing models based on what they've learned.

ORNL Director Bill Madia announced the organizational structure study on April 30, asking staff members for input over the summer. He gave an "earliest" implementation goal of this October.

According to Jeff, the group is

- reviewing alignment of the Lab's capabilities
- reviewing the number of management layers and spans of control and

- reviewing the alignment of organizations with the Lab's customers, from a funding perspective.

A number of focus groups comprising division directors, corporate fellows, senior scientists, program managers and staff within each directorate have been meeting; also under study are previous organizational review efforts conducted at ORNL in the mid and late '90s. Representatives from Los Alamos, Pacific Northwest and Argonne national laboratories have spoken to the task force about organizational concepts used at their institutions.

Jeff says the task force has been asked to "define at a high level the key functions that must be performed, regardless of organizational construct." A Web site (home.ornl.gov/leadership/org_review) lists committee members, gives progress updates and includes contacts for submitting suggestions, observations and questions to the task force.

Majority complete Work Environment survey; progress report given on ongoing initiatives

ORNL's Quality of Work Environment Survey, which employees were asked to complete last month, drew a 60-percent response. That will give ORNL management a good bank of information to draw upon toward decisions aimed at making the Lab a better place to work.

Results of the QWE survey will come a little later, says Ombudsman Steve Stow. The survey contractor, International Survey Research, which ran the survey on its own server, is currently crunching the numbers.

In the meantime, Steve provides an update of some ongoing initiatives, some of which were sparked by the earlier Quality of Work Life survey:

Fitness Center. Quotes on the equipment are being received and plans are continuing for full implementation of the fitness center. It is anticipated that around the end of the fiscal year the center, which will be located in Building 4500-South, will be up and running.

Child Care. Discussions with DOE and with KinderCare are continuing and could be finalized this summer. If all negotiations are successful, design and construction activities can get under way, but actual construction probably will not begin until this winter.

Financial Planning Seminars. A series of 10 seminars was held this last spring at the credit union and at ORNL. "These were quite successful and another series is being scheduled for this fall," Steve says.

Bring-Your-Child-to-Work Day. On April 26, 340 kids accompanied parents to work. "Very well received," says Steve.

Community Day. Plans are being drawn up for a Community Day, possibly this October, when the Lab will be opened up to anyone who wishes to visit.

Business Travel Issues. A Travel Focus Group is making significant changes to the way travel is handled. The objective is to be responsive to the needs of the ORNL traveler and to provide options that benefit the traveler. Recommendations will be presented to the Leadership Team in July.

Enhanced Pension Multiplier. "It is certainly incorrect to say that the survey was the reason that the pension plan was upgraded, as negotiations on this issue were under way before the survey was conducted, but it is reasonable to say that the extremely high ranking of this initiative helped to speed up the negotiations and make this happen sooner," says Steve.—B.C. [ornl](#)

Team UT-Battelle can help your cause

Team UT-Battelle has been organized to assist the many volunteer activities of ORNL employees. These efforts can include community-related activities for charities or cultural events. If you have a favorite cause or project that you think Team UT-Battelle might be able to help organize or gather support for, contact Bill Pardue, 576-0235, pardueb@ornl.gov.

Expanded lots, 'incidental' spaces

Providing parking after the digging starts requires 'lots' of planning

Construction on three privately funded research buildings, part of ORNL's Facilities Modernization Program, will likely commence this fall once contracts are awarded and initial building preparations are made.

Not unnoticed by Lab employees has been the fact that the three buildings will occupy much of what is now the east, or "main," parking lot. In fact, the deed that Secretary Abraham signed during his June 18 visit was for that particular tract of land, turning it over for the private development.

Concurrent with the new construction, plans are being made to make sure employees will have a place to leave their cars when the digging starts, says Facilities and Operations' Faye Brewer, who is heading up a parking steering committee. "Plans include new and expanded parking lots—and they'll go into action as soon as this month when expansion begins on two lots," she says.

"Staff members will first see an expansion of the flagpole lot across from Building 4500 North. That lot will grow from about 88 to 280 spaces," Faye says. That's prime parking, some of which will be allotted, at least initially, on the basis of needs by the directorates in the area.

"Also, carpoolers will receive preference on the new lot, so if you're able to share a ride with a neighbor, here's an added incentive to saving on gas money," she says. A Website is being developed to help prospective carpoolers match rides with co-workers.

During the flagpole lot construction, cars normally stationed there will have to locate elsewhere. The parking committee is taking steps to ease this crunch and those to follow by establishing more "incidental" parking spaces. One example of incidental parking will be a row of 36 new curbside spaces along Sixth Street on the east side of Building 4500-North, which will go in before the flagpole lot work begins. Other incidental spaces will appear along some avenues and in areas that currently host environmental management projects.

Not as conspicuous as the flagpole lot expansion is a nevertheless larger project: the expansion of the "hill" lot atop the rise overlooking what are now the 6026 trailers. This lot, now unused and largely unknown to staff, could supplant the east lot as a "main" lot in the near future. It will be expanded from a currently unused 227 spaces by about 300 new spaces.

The hill lot is accessible from White Oak Avenue at the corner of Building 6011. If you currently park

on the lower end of the east lot, it might be worth your while to drive up to the hill lot for a look before the work starts. A sidewalk on the lot's west end provides good access to the 4500 complex.

Parking planners, who include Faye and F&O's Tony Medley and Bud Brickeen, are also studying an idea to establish a staging area for fleet vehicles in the open and expansive northwest lot, along Bethel Valley Road, to free spaces near the buildings.

Parking spaces along Bethel Valley Road in front of the 7000, or east support, area will soon be

in the area on the south side of the Lab, where holding ponds are currently being cleaned up and filled. That work depends on the funding and timing of the surface impoundment remediation project. Nearby, some of the south parking lot, behind the High Temperature Materials Laboratory, will have to make way for construction of an annex onto HTML, but the new lots in the holding pond area will eventually pick up that slack, and more.

"We are identifying other areas that are suitable to turn into parking," Faye says. "It's usually just a handful of those incidental spaces—five here, 20 there—but together they add up. Three big lots—the flagpole lot, the surface impoundment lots and the 6026 trailer lots—will eventually add nearly 1600 spaces."

"The Facilities Modernization Initiative's success

means parking habits at ORNL will change—for some, significantly. In the short term, there could be parking crunches. In the long run, as existing lots are expanded and new lots are built, parking supply will meet demand," says Faye.—B.C. [ornl](#)



Slated for expansion, the "hill" parking lot sits on a hill above the current east parking lot. These views look west



(left) and east. On this day, save for the Photography van, the lot was unused. Business is about to improve.

Jim Richmond

replaced by a landscaped berm. That work is intended to give the Lab a more picturesque approach. Expanded parking on either end of the 7000 area will replace those spaces.

In the long term, parking lots are planned for below the hill lot, where the 6026 trailers now sit and

Parking, traffic coming inside the perimeter

Parking plans at ORNL are closely tied to another big change—revised access control. The Lab's switch from perimeter- to building-based security is already in progress with the initial distribution of proximity cards and installation of proximity readers.

Building-based security means that employee parking will eventually be an option in areas that are currently "inside the fence."

The turnstiles along the current perimeter fenceline will swing freely when the prox system is activated on October 1, says ORNL Security Manager Bill Rich. That change will be accompanied by a culture change that includes line managers being more responsible for security, increased vigilance in spotting unbadged individuals on the campus and for awareness that there will be more campus traffic.

Initially, permission to drive and park inside the fence will be controlled by parking permits distributed on the basis of need. That list is currently being compiled. In time, possibly as soon as July 2002, parking in available slots "on campus" will be available on a first-come basis, except for slots set aside for reasons that include medical passes and carpoolers.

"Employees who drive on-site will have to be especially cautious," says Bill. "The combination of new construction and ongoing remediation projects means that truck and heavy-equipment traffic will at times mix with general employee traffic and the usual pedestrians. People will need to use utmost caution and observe all traffic rules."

Some intersections could also become busy, including Central and Fifth Street, which will eventually be accessible from Bethel Valley Road, and White Oak Avenue and Melton Valley Access Road, which will be a main Lab entrance when construction begins this fall.

The Lab speed limit is 25 mph.

Computer simulation of blood flow could increase cardiac arrest survival

Frank, 42, fell to the floor at home, a victim of cardiac arrest. His brother Jim immediately put his ear to Frank's chest. Frank's heart had stopped beating and he was not breathing. Jim called 911.

Because he had been trained in cardiopulmonary resuscitation, or CPR, Jim began chest compressions and mouth-to-mouth airflow in the hope of restoring his brother's heartbeat and breathing. His heroic efforts failed. Tragically, Frank died.

CPR has been successful in restarting the hearts of people who have been electrically shocked, badly injured, or frozen, but in few instances has CPR revived victims of cardiac arrest. More than 250,000 people die from cardiac arrest each year in the United States. Yet CPR, despite its high failure rate, is used by physicians and rescue workers to preserve blood flow during cardiac arrest. If the mechanisms of blood flow in the body during CPR were better understood, it might be possible to improve CPR techniques and save more lives of victims of cardiac arrest.

At least that's the hope of Eunok Jung, a postdoctoral fellow in ORNL's Computational Mathematics Group in the Computer Science and Mathematics Division. She recently made a scientific discovery using computational simulation that is relevant to CPR. She conducted a computational experiment using a two-dimensional model of a rigid doughnut-shaped tube in which one section is replaced with a flexible membrane. Earlier laboratory experiments with this fluid-filled device, which has no valves, showed that periodic squeezing of the membrane caused a flow in one direction.

Jung discovered that changing the frequency of squeezing affects not only the amount of flow but also its direction. She verified this computational finding with a physical apparatus. "I found that you can reverse the flow of fluid simply by varying the frequency of squeezing," she says. If during CPR the heart valves remain open, then Jung's results suggest that the rate of chest compression may partly determine whether CPR saves a life.

Jung's experiment took advantage of her Ph.D. thesis advisor's "immersed boundary method" for modeling the fluid dynamics of the heart. Her advisor is Dr. Charles Peskin, one of the world's leading experts on heart modeling who works at

New York University's Courant Institute.

Whether Jung's finding is important to CPR may depend on which theory about the heart is correct. The cardiac compression theory says that during CPR the heart works as an active pump. The thoracic compression theory argues that during CPR the heart is a passive conduit that allows blood to flow, as a result of periodic squeezing and pressure differences between the external and internal thoracic compartments, through the cardiac valves that remain open (valveless pumping). Recent imaging data obtained by a cardiac physician in Korea suggest that the valves of the heart remain open during CPR in some instances. "These results," Jung says,

Proposals hit home; Lab shares in awards

It's been a good month for proposals. ORNL teams scored in several submissions.

ORNL was awarded more than \$250,000 from the DOE Laboratory Technology Research Program for proposals submitted in response to a call for rapid access project proposals. The call was issued to all 10 Office of Science laboratories; ORNL received more than half the allotted funds.

The proposals were for funding to support laboratory staff participating in research partnerships with private industry, including cooperative R&D agreements, technology maturation projects, personnel exchanges and technical assistance.

"The fact that ORNL proposals were awarded approximately half of the total funding available to support projects at all 10 Office of Science Labs is a tribute to the high quality of the ORNL proposals and researchers," says Terry Payne, ORNL LTR program manager.

ORNL also submitted three of 13 winning Nuclear Energy Research Initiative proposals, including a lead role in one of them. The DOE Office of Nuclear Energy, Science and Technology announced the winners recently. Gordon Michaels, who leads ORNL's Nuclear Technology Programs, says, "This was a very respectable performance by ORNL in a highly competitive solicitation. ORNL now has a total of nine NERI projects—six for which we are the lead organization and three for which we are team members."

Gordon credits Randy Hudson, Energy Division, for coordinating the ORNL proposal process.

Finally, ORNL has made the short list for a national nanoscale science research center. DOE's Office of Basic Energy Sciences announced in late May that ORNL's proposal for a Nanophase Materials Sciences Center will be among three recommended for construction funding in FY 03. The proposed center would adjoin the Spallation Neutron Source. [ornl](#)

"imply that the heart is acting at least partly as a passive conduit."

To better understand blood flow in the heart during CPR and valveless pumping in general, Jung



proposes to computationally simulate the heart as a pump, as a passive conduit, and as a combination of both. She will write partial and ordinary differential equations to create three-dimensional heart models coupled with a lumped parameter model (ordinary differential equations) of the circulation that can be solved using ORNL's supercomputers. Her results could get at the heart of how to modify CPR techniques to save victims of cardiac arrest.—Carolyn Krause [ornl](#)

Service Anniversaries

July 2001

44 years: Sydney J. Ball, Instrumentation & Controls Division

42 years: Al E. Williams, SNS Experimental Facilities Division

41 years: J.W. McKeever, Engineering Technology Division

35 years: David G. Cottrell, Computing, Information and Networking Division; B.R. Herrell, Plant and Equipment Division

25 years: Susan C. Burt, Chester D. McCowan, Gerald E. Stooksbury and Harold Kuziak Jr., Plant and Equipment Division; Jerome E. Dobson, Computational Physics and Engineering Division; Richard J. Brannon, Technical Support Mgmt. Systems Section, Instrumentation and Controls; D.A. Carpenter, Life Sciences Division; Eddie H. McBay and Ed Hagaman, Chemical & Analytical Sciences Division; James W. Blazier II, Research Reactors Division; Timothy D. Welch, Chemical Technology Division; Vivian M. Baylor, National Security Directorate; Anthony L. Wright, Engineering Technology Division

20 years: Robert L. Miller and Rodney D. Williams, Energy Division; Mark E Mathews, Research Reactors Division; Harold D. Brown Jr., Plant and Equipment Division; Billie W. Noe, Logistical Services Division; Terry D. Scoggins, Computing, Information, and Networking; Stanton W. Hadley, Energy Division; Martha B. Goolsby, Communications & Community Outreach; Carl C. Waggoner, Chemical Technology Division

Retirements

To arrange for a portrait, call Deborah Barnes, 576-0470

Bill DeRossett, of the Laboratory Protection Division, retired at the end of June with 24 years of service. Bill has specialized in emergency preparedness operations. He lives in Kingston.



DeRossett

West Point instructor hopes his summer at ORNL will lead cadets to the Laboratory

U.S. Army Capt. Kraig Sheetz is swapping his fatigues for civilian garb this summer. A physics instructor at the U.S. Military Academy in West Point, N.Y., he normally spends his summer months whipping cadets into shape through demanding military exercises. But this summer he is representing the Academy at ORNL, working alongside Dick Davis in the National Security Directorate.

“When I found out that I didn’t have cadet training duty for the summer, I immediately sent my application out to all of the national labs,” Kraig says. “I was surprised when ORNL contacted me. West Point has a tradition of research collaboration with other labs such as Livermore, Argonne and Los Alamos, but this is the first time we have worked with ORNL.”

Kraig hopes to promote this burgeoning relationship by encouraging cadets to apply for summer research positions at ORNL, increasing their opportunities for exposure to real-world situations. “We want to try and whet some of our young scientists’ appetites,” Kraig says, “and the more we can get them down here to get their hands on things, the better.” The rigorous programs at West Point are designed to prepare cadets for the challenges of a military career; thus their theoretical education is heavily supplemented with practical applications.

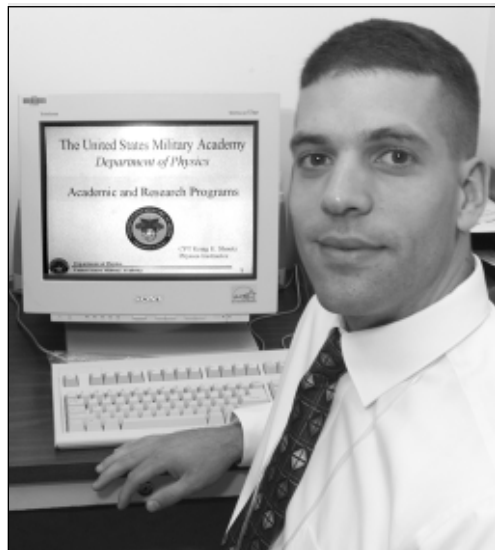
Before he became an instructor at West Point, Kraig did work in applied physics and signals intelligence, where he gained plenty of field experience, including an Arctic tour and a stint in Kuwait.

He did his thesis work in mine detection, using seismic sonar equipment to detect buried mines in a slightly less rugged environment—the beach in Monterey, Calif.

Kraig is using his combination of military and scientific know-how to support ORNL investigators in areas such as directed-energy weapons research and development. At a presentation in mid-June, Kraig highlighted some of the research interests of his colleagues at West Point—many of which corresponded to ongoing projects here at ORNL.

Kraig plans to return to West Point and spread the

word about the numerous opportunities for collaboration in practical research projects. “At West Point, my days are primarily spent preparing lessons, laboratories and classroom demonstrations,” Kraig says. “Here, I get the chance to step back from the academics for a while and get a taste of current research initiatives in the physics and engineering community.”—*Jason Gorss* [oml](#)



Curtis Boles

Capt. Kraig Sheetz, summering at ORNL, brought some on-line presentations with him from West Point.

Abraham

Continued from page 1

behind the fence,” which he said attracted little notice when it sprang up in the early 1940s.

“But it led to victory for the Allies in World War II and victory in the Cold War. Both would have come at a far greater price,” he said.

“But for you, supercomputing would be purchased abroad. We would be in the 55th year of the Cold War. Experiments at X-10 helped unlock the secrets of the nuclear age. It’s become clear to me that issues today are no less important than in the past—as uncharted and complex.”

Earlier, at the BTC, the Secretary said that California’s power problems were not headed east, and “they won’t if we carry out the President’s energy plan.” That plan calls for a broad strategy of increased power generation, including distributed generation and more research in energy conservation technologies.

After the deed signing ceremony that may well prove historic, Abraham shook hands with a bevy of audience members on his way out of Wigner Auditorium. He concluded the fast-paced visit with a tour of the Spallation Neutron Source site.—*B.C.* [oml](#)



Jim Richmond

Jeff Christian (right) demonstrates the Cooling, Heating and Power Lab’s microturbine to the Secretary.

oml reporter

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