

Mission to Ukraine

Robot from multiagency collaboration helps deal with Chernobyl's lingering aftermath

When Joe Herndon was told what the Russian inscription on the monument read, at first he thought it was another instance of official hyperbole.

"To those that saved the world."

It's placed on a statue of firefighters located in the city of Chernobyl. The monument is dedicated to those military and civilian firefighters who were killed, or died from, fighting the 1986 fire at the nearby nuclear power complex's infamous reactor number four.

Herndon, the Robotics and Process Systems Division's director, has made several trips to Ukraine to coordinate a program to deliver a remotely operated vehicle—a robot—that can inspect areas inside the enclosed and highly contaminated reactor building that are too dangerous for people to go into.

The vehicle, called Pioneer, is the product of a collaboration between U.S. government agencies, universities and private-sector firms to help the former Soviet nation deal with the aftermath of the world's worst nuclear accident. Pioneer can also help them learn more, scientifically speaking, about conditions inside the shell previously known as the



This memorial in Chernobyl honors the firefighters who died fighting the fire in the aftermath of the 1986 nuclear accident. ORNL's Joe Herndon led a project to deploy robotic equipment at the Ukraine site.

"sarcophagus"; now known as the "shelter." The shelter is a concrete structure that contains the remains of the burned-out Chernobyl reactor.

"About 100 people work at the shelter," Herndon says. "The idea was to develop a robot to map areas where people can't go, and get data in unknown areas where radiation is too high, even by their standards."

The Ukrainians, Herndon says, accept higher

doses of radiation on the job than do their U.S. counterparts. But even they have their limits.

ORNL was not among the original collaborators on the Pioneer project. The Lawrence Livermore and Pacific Northwest national labs helped design and build the robot along with Carnegie Mellon University, NASA's Jet Propulsion and Ames laboratories and Redzone, a private company that provided some of the robotic equipment used in ORNL's Gunitite tank remediation project.

However, DOE sponsors had much riding on the success of this complex multiorganizational collaboration, especially in that it also involved successfully dealing with counterparts in Ukraine.

They asked ORNL's Herndon and the Robotics and Process Systems Division to coordinate Pioneer's deployment and demonstration.

"I think they saw the Gunitite project and other complex robotics deployment projects RPSD has led—where we have brought together a number of partners—and realized that was the sort of experience the Pioneer

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Letters of offer issued as transition winds way to April 1

ORNL employees received letters of offer from UT-Battelle starting March 3, as the transition of contractors from LMER to UT-Battelle entered its final month.

Most employees were hand-delivered the letters of offer containing each employee's designated title, salary and supervisor as of April 1, when the change goes into effect. The letter is probably the most immediate effect that the transition activities will have on most employees. Transition to the new contractor is virtually automatic for all but a few "key" personnel—mainly top managers.

Meanwhile, the new leadership team members have been busy familiarizing themselves with the workings of ORNL. They observed an emergency management exercise last month, shuttling from the Lab Shift Superintendent's Office to the exercise's incident scene to the Technical

Support Center and finally to the bustling Emergency Operations Center located at ETPP.

Kelly Beierschmitt, who will direct ESH&Q, reviewed the applicable programs and noted that ORNL staff he has encountered in ORNL programs are "more competent and experienced" than any he has worked with at other facilities. He did, however, express surprise at the number of Laboratory policies and said that UT-Battelle would work on clarifying the



On April 1, even the swans . . .

difference between broad Lab policies and items that are more appropriate as procedures.

Herb Debban, who'll oversee Lab facilities and operations, took a quick tour of the Swan Pond on March 1. Chemical and Analytical Sciences Division researcher Alicia Compere and the Computing, Information and Networking Division's Peggy Tinnel, two of a confederation of volunteers who look after ORNL's swans, introduced Debban to the Lab's most noted fowl and demonstrated their care and feeding. The old mainstays and last spring's brood of cygnets now compose a flotilla of big birds, who greeted Debban up close and personal.

UT-Battelle has stressed community outreach—in fact, the company will designate about \$6.3 million over five years to those types of activities locally. Of that sum,

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Ukraine

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project demanded," he says.

Herndon and Dennis Haley, a section head in RPSD, set to work toward both an intense training program and a cold demonstration program, as well as a demonstration to dignitaries and world press last May. The demonstration showcased how U.S. and Ukraine scientists and engineers are working together on the Chernobyl problem.

One of Herndon and Haley's problems was learning the different ways and customs of their Ukrainian counterparts, which Herndon says was no big deal, and also dealing with the other kind of Ukrainian customs.

"We arrived to set up Pioneer, which had been sitting in crates for three months in Ukrainian customs. That's a story in itself. But we put together a team to assemble the robot, train the Ukrainians how to operate and how to take and track data.

"The Ukrainians don't have a lot, but they find ways to maintain an optimism that is remarkable."

"Pioneer is on a tracked chassis designed to go into areas that are rubble-strewn and otherwise hazardous.

We trained the workers there in actually operating the system in such an unstructured environment."

Photos Herndon brought back indicate they had fun in the process. Pioneer comes equipped with a manipulator arm that can use tools, lay sensors and measure. NASA contributed a 3-D mapping system based on the Mars Pathfinder mission, which provides

models of the wrecked facility's interior. A core drill, also a carryover from interplanetary missions, provides information on how much the radiation inside has degraded the concrete.

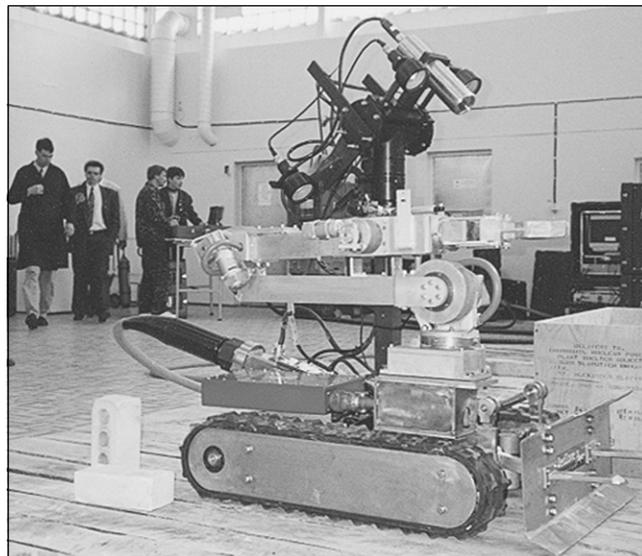
The Chernobyl Nuclear Power Plant staff have not completely determined which longer-term missions Pioneer will support. "The robot may become quite contaminated when used inside the shelter," he says. In addition to mapping in the shelter, operational support to the power plant and decontamination and decommissioning tasks are possible.

Although much of the difficulty in coordinating the project was in overcoming the language and cultural barriers, Herndon came away with a good impression of the Ukrainian staff. That new nation, Herndon says, is going through the same economic trauma as the rest of the former Soviet bloc, with the added and protracted burden of the radioactive mess on its hands.

"The Ukrainians don't have a lot, but they don't have a sour attitude about it," he says. "They seem to make do, and they find ways to maintain an optimism that is remarkable."

After learning more about what happened at the Chernobyl accident, he also came away with a better appreciation for the stark monument in the city.

"More than 30 firefighters died from the effects of fighting the fire. The four reactors of the Chernobyl complex are all connected, and the number three reactor, which still operates,



Ukrainian operators in training (below) took a liking to the freshly uncrated Pioneer remotely operated vehicle (above).

is immediately adjacent to the one that caught fire," Herndon says.

"The accident made whole regions uninhabitable and spread contamination over significant areas of Eastern Europe. What if the fire had spread to all four of the connected reactors?

"To those that saved the world' is probably not a bad inscription."—B.C. [ornl](#)



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Curtis Boles

The Plant and Equipment Division's Bob McDaniel is an electrician in the High Flux Isotope Reactor area. He lives in Kingston.

Transition

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roughly one-half will be earmarked for economic development activities and one-third will go toward education projects.

Plans to move existing ORNL programs, including about 400 employees, from Y-12 are also being discussed at the transition team's "Winter Palace" headquarters at Building 2001. Lease options are being explored, as is the opportunity to build new facilities for ORNL programs currently located at Y-12.

Finally, on the subject of building, ESH&Q's Beierschmitt noted that avoiding hazardous traffic conditions associated with construction of the Spallation Neutron Source and UT-Battelle's efforts to replace or upgrade several ORNL facilities will require careful planning.

On that last note, no matter who the contractor is, keep safety in mind when going from place to place.—B.C. [ornl](#)

Lab Notes

Distinguished Scientists form council

The UT/ORNL Distinguished Scientists, a collaboration between ORNL and the University of Tennessee that has existed since 1984, last month became an official advisory body for the Lab. Dr. Gerald Mahan, who was the first distinguished scientist and is thus senior member of the current dozen, and Al Trivelpiece signed a charter that establishes the ORNL Distinguished Scientist Council.

The council, says the charter, will advise ORNL on matters pertaining to the Lab's scientific well-being, foster interactions with outside academic and industrial institutions and contribute to science education efforts.

Mahan says that through the years the Laboratory has brought the researchers on board and has then recommended them to the university for the distinguished scientist program. He says the council is looking forward to enhancing its role with ORNL.

Members of the council are Mahan, Peter Cummings, Jack Dongarra, Georges Guiochon, Robert Hatcher, David Joy, Joseph Macek, Ward Plummer, Robert Uhrig, Jack Weitsman, David White and Bernard Wunderlich.



ORNL Director Al Trivelpiece (left), the Office of Science and University Relations' Linda Cain and ORNL/UT Distinguished Fellow Gerald Mahan shake on the fellows' charter.

Lab honors Vandy's Hamilton

ORNL and, especially, the Physics Division honored one of its most prolific

supporters on February 23 when it named Vanderbilt University's Joe Hamilton as the first Visiting Distinguished Laboratory Fellow. The Joint Institute for Heavy Ion Research (buildings 6007 and 6008) was Hamilton's idea, and he has brought in millions of dollars of non-DOE funding for

physics research at the Laboratory.

"I saw the need for a joint institute when I served on the national policy board for the Holifield facility," Hamilton said. "I convinced my chancellor at Vanderbilt to put up \$100,000. (ORNL's) Alex Zucker raised another \$312,000."

Hamilton said officials were at first skeptical of the joint institute.

"They said, 'You don't think we're gonna let you build that Hamilton Hilton out there, do you?'"

But Hamilton, whose powers of persuasion must border on the supernatural, helped make the joint institute a reality and played major roles in obtaining funds for the University Ion Separator at Oak Ridge while organizing the UNISOR/UNIRIB consortium of universities and for the Recoil Mass Spectrometer.

Hamilton's connections to ORNL came early. He was a graduate student alongside the late Russell Robinson of the Physics Division, who led the early drive to convert the Holifield to a radioactive ion beam facility. Hamilton helped garner support for that project as well.

The outstanding success of the Joint Institute for Heavy Ion Research, said Physics Division Director Fred Bertrand, made it much easier to obtain state support for the Joint Institute for Neutron Sciences at the Spallation Neutron Source.

"Joe has been phenomenal in his support of the Physics Division," said Bertrand. "He is the epitome of university-lab research. Our division owes much to Joe, and he is extremely deserving of the honor the Laboratory has bestowed on him."

Gresalfi "goes the distance" for MS

Michael Gresalfi, a strategic planner and business developer for ORNL, has long been a supporter in the battle against multiple sclerosis, including participating in fundraising bike

rides in the Washington, D.C. area, where he's based. Last year he raised \$10,000 for MS research.

"Every year I've increased my circle of friends and contributors," says Gresalfi. Lockheed Martin has been an annual supporter of MS events locally.

This year Gresalfi's sights are set a bit higher. He and friend Nick Irons, an athlete whose feats for MS have included swimming the Mississippi River—longways—are planning a bike ride across the country and back, with a \$3 million goal of funds to raise for MS research.

Irons will ride the entire circular 10,000-mile route. Gresalfi's somewhat more modest plans, along with helping the Irons family organize the tour, are to traverse the state of Montana this July. Both Irons and Gresalfi are motivated by the plight of friends and loved ones who have been stricken with the disease, which attacks the myelin sheathing of the nerves, causing a host of symptoms.

The "Going the Distance" bike tour, which has attracted network television coverage, will feature celebrity relays and participation by politicians and other newsmakers. Find out more at www.goingthedistance.net.

With six you get superconducting

The five-lab family that makes up the Spallation Neutron Source project is adding a sixth member. Thomas Jefferson National Accelerator Facility is joining the effort to lend its expertise and experience in superconducting linear accelerators.

The SNS linac will be a combination of conducting and superconducting radio-frequency cavities that accelerate the beam of negative hydrogen ions. Although Los Alamos National Laboratory is responsible for the linac as a whole, Jefferson Lab will be responsible for the superconducting cavities, one of three types of acceleration used in the linac.

SNS's other lab partners with ORNL are Argonne, Brookhaven and Berkeley.



Hamilton



Michael Gresalfi had this bike custom made so his daughter, Kristen, who has cerebral palsy, can ride with him on this summer's tour.

AWT's legacy

A 'de-mystified' institution of knowledge, a bright future

BY AL EKKEBUS

Al Trivelpiece has guided ORNL from the appearance of the Tiger Teams to the groundbreaking for the Spallation Neutron Source. More than a decade ago, Al came to ORNL from the American Association for the Advancement of Science, where he had been executive director for about two years. He went to the AAAS after spending almost six years as the director of DOE's Office of Energy Research.

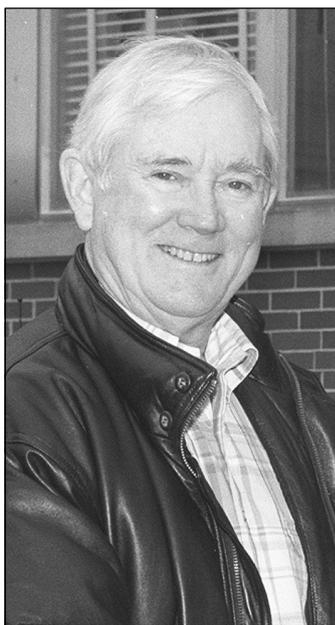
He had been a federal employee, a university professor, a flight instructor and a journeyman electrician, and he had worked in industry. This breadth of experience was the beginning of a trend for directors of DOE's multiprogram science labs.

Al had been to ORNL many times before, when Herman Postma was Lab director. Al had also visited here during his earlier days with the Atomic Energy Commission's Fusion Energy program. Oak Ridge and the sunny South would be different from Washington, D.C. After all, when Postma recruited him, Herman said there was "a slower pace of life here in Oak Ridge," and that Al "might have an opportunity to maybe get back into research."

The changes at ORNL since 1989 mirror those throughout DOE. There are now six major local DOE contractors instead of just one. Programmatic and operational emphases have changed. Tiger Teams led to the proliferation of DOE orders, later reconsidered under Necessary and Sufficient, which led to Work Smart Standards and now to ISMS. ORNL's contractor changed from Martin Marietta Energy Systems to Lockheed Martin Energy Systems to Lockheed Martin Energy Research. Soon it will become UT-Battelle.

ORNL has been a test bed for several DOE programs at laboratories. The results have changed the way we do business. Back in the late 1980s, ORNL was the first multiprogram laboratory to be placed on an award fee. At one time it was determined that 95 percent of ORNL's award fee was based on its ES&H performance and not science. This process was a forerunner of the currently used "critical outcomes" agreement between each laboratory and its DOE Operations Office.

Technology transfer was promoted, then tempered with concerns of corporate welfare. Still, our tech-transfer record is comparable with those of the largest DOE labs even though we are much smaller. An ORNL



Al Trivelpiece on LMER's first day, Jan. 1, 1996.

Cooperative Research and Development Agreement signed in September 1994 was celebrated as DOE's 1000th CRADA; ORNL now has about 300 CRADAs, with combined investments by DOE and the industrial partner exceeding \$300 million. More than 20 CRADAs have been signed annually for the last several years, even though there are no longer any DOE funds specifically designated for them.

We continue to win more than our share of R&D 100 Awards, now at 104. Our six winners of Presidential Early Careers Awards for Science and Technology exceed those won by any university or nonfederal institution. Since January 1989, ORNL authors have had about 13,000 articles published in refereed journals and ORNL inventors have received over 400 patents.

After Tiger Teams, audits and assessments were becoming more frequent, averaging almost one per day. Responding to findings was expensive. As overhead expenditures rapidly increased in the early 1990s, the overhead rate was projected to approach 53%. Increases in overhead to pay for safety fixes led to calls to slash overhead to improve our ability to compete with other research performers. Al began Project 45, trying to bring the overhead rate down to that level. He got research division directors to actively participate in overhead budget discussions and determine overhead budget levels, a process that continues today.

Cost cutting was continued under Secretary O'Leary's Strategic Alignment Initiative when she committed DOE to save \$14 billion over five years. In addition to a one-year wage freeze, ORNL's share was \$90 million in savings or cost avoidances, which was achieved in about three years (our current total after four years is \$116 million). ORNL's overhead expenses have steadily decreased since then.

Environment, safety and health have been important to Al. The first two of his eight operational imperatives focus on these areas. Long before DOE had a name for it, Al championed integrating safety into every ORNL activity. His vision—that excellence in research required excellence in ES&H—gave ORNL an advantage in implementing Integrated Safety Management. He has long recognized, and supported, the approach that ES&H is conducted best when it is part of every staff member's job, rather than an

'Science is a way of life for me'

Al Trivelpiece has been quoted or has written for the Lab's employee newsletters on many occasions. Here are some excerpts from *ORNL Reporter* and its predecessor publication, *Lab Notes*:

March 1992: On his expectations in taking the director's job: "Almost all of them were wrong. First, I assumed that my knowledge of theoretical and experimental physics would be of some use."

April 1992: "Contrary to popular belief, the energy crisis hasn't gone away. The problem of producing and using energy in economical, environmentally acceptable ways is still with us."

November 1995: "An informed staff is an ingredient of a healthy institution. Staff members who support each other in spirit can produce amazing science."

January 1996: "It's a truism that if you write a proposal, somebody might not give you money, but if you don't write a proposal, they are sure as heck not going to give you money."

January 1996: "We need to have communities around us understand what we do, because if somebody asks them if they care if ORNL closes down and they say they have no idea what we do, we're dead meat."

May 1996: "I do not believe that such a focus on management performance (vs scientific excellence) was the proper way to operate this national laboratory, or any national laboratory."

June 1996, *Ethics*: "We are in the knowledge business; knowledge that others must be able to trust, knowledge that future generations will depend on, and knowledge that lives will depend on. We have an obligation to ensure that the knowledge that we produce is correct."

October 1996, *On the Value of Time*: "We need to respect the value of other people's time. If I had to identify one thing that causes people to comment about the bad aspects of bureaucracy, it is that the 'system' has contempt for the value of 'my time.'"

March 1999: "The thing most interesting about this Laboratory is the incredible diversity in the things it does. . . . There's not much in the world of science and technology that doesn't go on somewhere in this Laboratory."

March 1999: "Science is a way of life for me. I've made a living at it for over 40 years."

“audited in” function. This is a lesson learned when Al was a journeyman electrician, and this background has served ORNL well. His assignment of like-minded leaders to ORNL’s ISM steering committee guaranteed a successful program.

The Laboratory’s community involvement greatly increased in the 1990s. ORNL hosted its first Community Day in 1995, and Family Days and Take Your Child to Work Days have been held to increase the community’s awareness of ORNL. ORNL has participated in the East Tennessee summits and now manages the American Museum of Science and Energy, publicizing DOE accomplishments to a wide audience. ORNL’s successful exhibit in the Legislative Plaza in Nashville in 1999 prompted many members of Tennessee’s General Assembly and their staff to become more familiar with ORNL’s activities.

Several consistent thoughts characterize Al’s tenure as Lab director. Among them, the nation must have confidence in ORNL’s scientific ability, a flagship facility is important for ORNL’s survival, it is imperative that ORNL recruit and retain terrific talent, and partnering with other institutions will yield greater success than going it alone. Under Al’s leadership, ORNL is the first (and only) national laboratory to emphasize scientific ethics. Al began the ORNL postdoctoral fellowship program that has grown to more than 200 participants. Collaboration with regional institutions has increased; examples include the Joint Institutes with the University of Tennessee, the Tennessee Mouse Genome Consortium and the National Transportation Research Center.

Al made many trips to Washington. That is where the money comes from and that is where the people who determine funding levels for ORNL’s R&D activities are. He testified over a dozen times in formal Congressional hearings. He knows the workings of both the legislative and executive branches.

Al realized the need to “de-mystify” ORNL and familiarize local and state government officials with ORNL’s role in the national research agenda and what that means to our friends and neighbors in Tennessee. He has hosted breakfasts at ORNL for city and county government leaders, as well as tours of ORNL by area “leadership” classes. Al has also served as co-chair of the Tennessee Science and Technology Advisory Council, which advises the Governor and the Commissioner of Economic and Community Development on a full range of science and technology issues.

Al’s efforts in the state were recognized on February 16 when he received accolades from both houses of the Tennessee General Assembly. Their proclamations thanked him for his service to his profession, to ORNL and to the state of Tennessee. His ears rang with standing ovations.

I was privileged to accompany Al to Nashville that day along with other members of his staff and witness this historic event. His

efforts to promote the benefits of science and technology to the region and the state were recognized in a way that is not typical for directors of DOE laboratories. Because of Al, many Tennesseans have come to realize the economic benefits provided by ORNL and other knowledge-based institutions. These institutions are now regarded as economic powerhouses important to the state’s future.

His hard work was key to another recent event in which eight tents covered 300 people on a hilltop two miles from the nearest paved road, two days after a deer hunt. On that

December morning, they watched Vice President Al Gore; Energy Secretary Bill Richardson; Gov. Don Sundquist; Sen. Bill Frist; Reps. Jimmy Duncan, Bart Gordon and Zach Wamp; and other leaders break ground for the Spallation Neutron Source

Al steps down as director on March 31. I wish him the same bright future he has worked to secure for ORNL. *Vaya con Dios.*

Al Ekkebus has served as assistant to the director for the past decade. [ornl](#)

Genung: In a word, leadership

Richard Genung is a quiet sort of individual who slips in and out of rooms without a lot of bustle or fanfare. But ORNL’s deputy director has made an impact on the Laboratory. He became deputy director more than three years ago in the midst of one of the Lab’s most tumultuous periods of change, and in the ensuing time many things at the Lab are being done differently.

One of his most noteworthy ideas was Leadership ORNL. Al Trivelpiece credits Genung with promoting a leadership course, similar to civic leadership programs, for ORNL research and support staff members who will likely steer the Lab through the coming years.

The LORNL program includes a series of seminars that envelop all aspects of the Lab, from support functions such as business operations and legal counsel to its widely varied areas of research. Staff members who haven’t been exposed to the workings and challenges of other organizations and scientific disciplines come away from the program with a broader view of the Lab.



Richard Genung

The course also includes a weeklong off-site meeting that explores how members of institutions as complex as ORNL can affect change within the organization.

Finally, each leadership class, with Genung’s encouragement, chooses a need or issue as a project. Subjects tackled so far by alumni, who belong to the ORNL Leadership Action Consortium, or ORLAC, have included program management, ES&H issues and communications.

Dan Ingersoll and Kathy Yuracko have been two active LORNL graduates.

“The greatest thing LORNL offers is a network of people throughout the Laboratory who help each other achieve their goals,” says Yuracko, of the Life Sciences Division. “I have drawn upon this network for help in making contacts with new sponsors; to identify research collaborators; and for advice on administrative, financial and contractual issues.

“Equally important, the network of LORNL graduates has been a source of rejuvenation for me, because it brings together wonderful people who are committed to leadership and who want to work together to improve the Laboratory.”

Ingersoll, of the Computational Physics and Engineering Division, says the program Genung fostered has provided him with both inspiration and, through ORLAC, the means to effect change.

“Besides providing volumes of useful information about activities throughout the Lab, the LORNL course gave me the best opportunity I’ve had in my 22 years at ORNL to interact with other peers and with senior management.

“With senior management’s support, and especially with the personal commitment of Richard Genung, ORLAC gives us middle-management folks a chance to tackle real and current issues around the Lab in nontraditional ways. The ORLAC environment encourages us to think out-of-the-box and experiment with leadership solutions, something that I find especially fun.”

Ingersoll and Yuracko are two of the 234 Lab staff members who have enrolled in Leadership ORNL. (Of those, 80 have completed all of the Lab sessions and the offsite). Many, like Ingersoll and Yuracko, are staying involved through ORLAC.

It is that class of potential leaders, armed with a broader vision of the Laboratory and a belief in its future that is based on experience and knowledge, that could very well be Richard Genung’s most lasting legacy as ORNL’s deputy director.—B.C.

Talking about the atom

1960s radio series gave a Year-2000 prognosis of peaceful uses of nuclear energy

A public relations relic surfaced on a Y-12 shelf recently. It's a set of a dozen roughly 10-minute radio programs recorded and packaged in three long-playing record albums.

Titled *Let's Talk About the Atom*, the radio interviews, produced by Argonne National Laboratory's public information office for the Atomic Energy Commission, reveal some insights on ideas for peaceful uses of atomic energy in the late 1960s. Although undated (materials such as these should always carry a date), the subjects and some comments appear to place the material at about 1967–68. (For instance, one segment describes the upcoming "National Accelerator Facility" in Batavia, Ill., which ultimately became Fermilab. Ground was broken for Fermilab in December 1968.)

Programs such as these were once distributed on vinyl. The format, however, isn't the only feature that renders them a bit dated. Each segment begins with a corny fanfare. And the announcer's bold statement that "...men of science are searching for and finding new ways of applying the tiny atom..." reveals that attitudes about more than atomic energy have changed over the years.

But the science is for the most part solid. ORNL is represented in two segments. In one, Norman Anderson describes one of the Lab's most famous and widely used inventions, the Zonal Centrifuge, used to purify flu vaccines. Anderson, then director of the Molecular Anatomy program, developed the device as an outgrowth of atomic research. It's cited here as a shining example of atoms for peace.

The Lab's then-director, now *emeritus*, Alvin Weinberg, stars in another segment as he describes the vision of an agro-industrial complex that would "make the deserts bloom" with seawater purified using nuclear energy, a project pioneered by ORNL.

Desert energy centers, he says, could purify seawater, provide energy to industrial centers and make fertilizers for wastelands. In the course of the interview, Weinberg qualifies his idea by noting the expense of the nuclear projects. In fact, in a few years cost would help quash the idea. Weinberg, however, would soon spur research into an abundant desert energy resource by conceiving the Solar Energy Research Center, which became the National Renewable Energy Laboratory.

Anderson and Weinberg's visions are actually two of several practical ideas described in the interviews. Other segments

describe evaluating artworks with neutron analysis and the use of radiation in cancer treatment.

But other segments describe less feasible ideas such as Plowshares, a project to create underground oil and gas reservoirs, excavate harbors and create mountain passes with the "peaceful use of nuclear explosives." And yet another, "The Atomic Powered Heart," envisions an artificial heart powered by plutonium-238. That device never reached the shelves.

During the next decade the hopes and dreams of the atomic energy community would be dashed by the public's growing uneasiness over safety. From the late 1940s to the early 1970s, however, the sky was the limit on what the scientists and the public thought nuclear energy could do for humankind.

Most telling is the final segment—an interview with then-AEC chairman, the late Glenn Seaborg, titled "The Atom and the Year 2000."

How did he do as a prognosticator? In the program, Seaborg refers, in a cultural sense, to the "binding force of the atom."

"The need for an exchange of information and scientists' visits between nations have brought the scientific community closer together," he says.

But events would dampen Atomic-Age optimism. Seaborg predicted that by 2000 most new power generation plants would be nuclear. One benefit, he noted, would be a "quite dramatic" reduction of air pollution, particularly if electric vehicles came along by then.

Events at Three-Mile Island and Chernobyl helped dash those dreams. We find ourselves still dealing with the problems of air pollution and dependence on foreign oil. Seaborg conceded even then that the transportation sector would remain tied to oil.

Seaborg was optimistic over the possibilities of desert agriculture using desalinated seawater. Such technologies would help developing nations enter the economic mainstream "without the agony of the Industrial Revolution" that Western nations experienced, he thought. In a few years, however, the rising cost of nuclear power plants and less water-hungry strains of grain

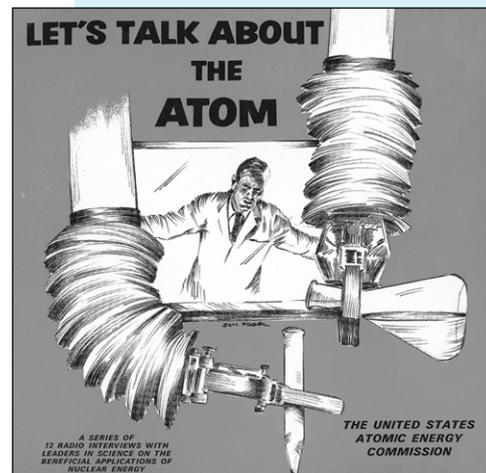
took the shine off of atomic-aided agriculture.

Seaborg had by then written off the nuclear airplane owing to "safety and weight factors" but envisioned nuclear-powered ships and satellites and other innovations "which we conservative scientists are probably too unimaginative to foresee today."

Seaborg was exactly, if indirectly, right about that: No one in the late 1960s could have imagined the impact that innovations



ORNL Director Emeritus Alvin Weinberg (left) and the late Glenn Seaborg talked about the atom and the future on a 1960s radio series.



such as microprocessors, or the Internet, would have on science and the world. The Internet, developed initially over communications concerns in a nuclear war scenario, has indeed "bound" the world together, and no sector more than scientists. Sure enough, in the year 2000 the channels of collaboration between nations are as open as they have ever been. Whether through threat or promise, that has been a legacy of the Atomic Age.

It almost makes one wish Seaborg's predictions were more accurate in general. He may have been simply ahead of his time, even more than he thought.—B.C. [ornl](#)

Retiree happenings

by Virginia Donahoe, Retirees' Association president, 576-1786

TaiChi

Our Tai Chi exercise for those over 65 continues to draw new members. The Monday and Wednesday advanced classes are held at the Tai Chi headquarters on the corner of Outer Drive and Ogden Circle with instructor Wallace Gambill. A class for beginners is starting on the same days and at the same time at the Oak Ridge Senior Center on Emory Valley Road. Don McGee will train the newcomers. He is an outstanding instructor.

Golf

Don Matlock will soon announce a meeting to discuss the upcoming golf season and how to develop someone who could compete with Tiger Woods (Tiger's advantage is youth; ours is years of experience).

Bowling

The Oak Ridge Bowling Center on Illinois Avenue is where the senior league, consisting of 22 teams, plays at 1 p.m. on Mondays.

ORNL people

Karen Downer has been named director of the Office of Environmental Protection, a post she's been filling for almost a year.

Craig Little, head of the Grand Junction Office of the Life Sciences Division's Assessment Technology section, has been elected to the Health Physics Society's board of directors for a three-year term.

Sherry Wright of the Energy Division's Center for Energy and Environmental Analysis has again won the Liaison Office of the Year trophy for the International Greenhouse Gas Emission-Reducing Technology Information Exchange, or GREENTIE. She won the award last year and has won three of

Travel

Travel has always been one of the favorite activities sponsored by our own retirees' organization and friends. Our copy of the first U.S. Travels brochure, from 1982, shows the first trip was a bus ride to Crossville Playhouse and lunch, costing \$19. This year, on March 25, a bus trip to the Barter Theater and lunch is \$57. That's still a deal. Call our office if you want a travel brochure that includes a trip you hope to take.

Our addresses

If you would, mail items you want included in our next issue of Retiree Happenings to:

Post Office Box 6254
Oak Ridge, Tennessee 37830

or to:

220 West Vanderbilt Drive
Oak Ridge, Tennessee 37830

the past four years. The GREENTIE directory, the principal information system for U.S. clean energy technologies, saw a 113 percent increase in use from last year.

Dad James of the Plant and Equipment Division won the ORNL Committee for African American History Month's barbecue sauce contest. More than 100 voted. When asked if he would share the recipe for his "Big Daddy's Sauce," Dad said, "It's a family secret. I can't let it go."

The Computing, Information and Networking Division's annual awards recently included "beyond the call" winners **Angie Wampler**, for electronic publishing support to the Spallation Neutron Source project, and the team of **Warren Everett, Chuck Fisher, Dave Giles, Russ Hand, John Long, Don Maxwell, Jim Simmons, Suzanne Willoughby** and **Greg Winfree**, for volunteering their time in preparation for Y2K. Outstanding customer service awards went to **Jim Simmons** (networking), **Judy Benton** (electronic publishing) and **Nancy Getsi** (Web applications). **Peggy Tinnel** received the cornerstone award; **Peggy Brown** and **Walter Dykas** received outstanding initiative awards. **Rick Phillips** received the technical achievement award for his programming solutions. Finally, the outstanding team award went to **Charlie Horak** and **Angie Wampler** for their publishing support to the SNS project.

Service Anniversaries

March 2000

40+ years: Helen R. Atchley, Laboratory and Program Management; James W. Dennis, Laboratory Logistical Services

40 years: Gerald D. Alton, Physics

35 years: Robert K. Williams, Metals and Ceramics

30 years: Jesse C. Copeland, Laboratory Logistical Services; Charles C. Coutant, Environmental Sciences; Kenny W. Dougherty and Gregory D. Guymon, Plant and Equipment

25 years: Richard L. Battiste, Engineering Technology; Russell N. Borum and Bennie L. Goodman, Chemical Technology; Jeff C. Brewster, Laboratory Logistical Services; Kenneth R. Davis, Leslie D. Foust, Jerry C. Griffith and Douglas W. Smith, Plant and Equipment; Marilyn S. Hendricks, Environmental Sciences; John G. McCarter, Instrumentation and Controls-Technical Support Section; John O. Richardson and Donald A. Spong, Fusion Energy; Jacquelyn M. Smith, Procurement; Elaine G. Thompson, Energy

20 years: Angela F. Beach, Mary L. Bible and Rita L. Thearp, Engineering Technology; Mark A. Floyd, Bruce Owen and Robert M. Watkins, Office of Safety and Health Protection; Greg R. Gruzalski, Executive Offices; William E. Hill, Research Reactors; Linda J. Jennings and Lana K. McDonald, Environmental Sciences; Gene W. Joe, Office of Science and Technology Partnerships; Cheng-Yu L. Ma, Chemical and Analytical Sciences; Janice M. Rankin, Office of Nuclear Safety; Janie R. Ross, Office of Laboratory Protection; Charles A. Smith, Instrumentation and Controls-Technical Support Section; Cynthia C. Southmayd, Computing, Information and Networking; Edward A. Vineyard and Betty A. Walker, Energy; Mark E. Whitley, Physics; Jonathan Woodward, Chemical Technology

Deaths

Howard McLain, who worked in the Energy Division's Buildings Technology Center, died January 30. Howard was noted for his exceptional expertise in the areas of applied heat transfer and fluid flow and was a principal designer of the High Flux Isotope Reactor's cooling core. He lived in Knoxville and had 44 years of service.

Retirements

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

Betty Wood, a finance officer in the Business Operations Division, has retired with 20 years of service. She lives in Kingston.



Wood

ORNL, Southwire achieve superconducting milestone

ORNL helped the Southwire Company set technological history February 18 when the cable manufacturing company energized an electrical power cable utilizing superconductivity.

Secretary of Energy Bill Richardson moved three switches to convert the Southwire plant from a conventional power feeder to superconducting power feed. Three facilities at the 2,000-employee Carrollton, Ga., plant now receive electricity through a high-temperature superconductor (HTS) power system that was built and tested with the assistance of ORNL's Superconductivity for Electric Systems program.

"We would not be where we are today without the valuable support of this project from Oak Ridge," said Jerry Hesterlee, vice president of Southwire. "The folks from Oak Ridge and Southwire have worked closely for many years to get to this point."

Southwire is the only U.S. company to have a superconducting cable that has been tested in a real-world industrial setting.

Superconductors can transmit electricity through cables with virtually no energy losses to resistance. The power system uses liquid nitrogen at 70–80 Kelvin. Superconducting wires can carry up to 100 times more electric current than conventional copper or aluminum wires of the same cross-sectional area. With the world's current power demand expected to double by 2030, superconductivity is expected to play a key role in power distribution and use in the next 30 years. Southwire projects the world market for HTS materials will be about \$30 billion by the year 2020.

"This power source is an important breakthrough following boldly in the spirit of Thomas Edison," Secretary Richardson said.

Roy Richards Jr., Southwire's chief executive officer, lauded ORNL's efforts.

"They have brought the real horsepower and creativity," Richards said. "Their scientists have done a fine job for us. This technology will lead the world. This is the first lap in a long race of working with superconductivity, and we hope the folks at Oak Ridge will continue to work with us."

ORNL's contribution included the work of three divisions—Fusion, Life Sciences and Energy. ORNL and Southwire formed a cooperative research and development agreement in 1995 and began testing prototype cables one to five meters long.

"They (Southwire) built the cables and we tested them," said John Stovall, ORNL's project manager for superconducting cable. "We worked together to develop the new technology."

The Fusion Energy Division developed the HTS cables and terminations and performed high-current and high voltage tests on the prototype five-meter cables at an ORNL test facility. The Life Sciences Division conducted high-voltage tests of the cable dielectric.

"You have to have electrical insulation that will work at cryogenic temperatures in liquid nitrogen at high pressure and at high voltage," said Life Science's Isidor Sauers, who worked on the project. "We used Southwire's Cryoflex tape insulation for the testing."

Mike Gouge of Fusion Energy noted that the prototype cable for the Southwire facility was developed at the Fusion Energy Division facilities at the Y-12 Site. Southwire employees in the superconductivity area trained at Oak Ridge while ORNL personnel helped with 30-meter cable system testing and commissioning at Carrollton.



John Stovall, left, of Energy Division, provides Bob Bellenger, middle, and Darrell Piatt of Alabama Power a tour of the control room of Southwire's superconductivity cable test site in Carrollton, Ga.

"It has been a pleasure working with a results-oriented company," said Bob Hawsey, manager of ORNL's Superconductivity program. "Southwire made development of superconducting cable knowledge a high priority from day one."

Argonne National Laboratory also participated in the project. Industry partners included Intermagnetics General Corp and EURUS Technologies. Electrical utility partners were Southern Company, Georgia Transmission Corp. and Southern California Edison.

Richardson praised the partnership effort. "Public-private partnerships are where the future is," the secretary said. "They are good for the environment and the economy, and they create jobs."—Fred Strohl ORNL

ornl reporter

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