Alvin Trivelpiece: Making ORNL a better place

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Carolyn Krause concludes her look back at Alvin Trivelpiece who was the Oak Ridge National Laboratory from 1989 to 2000, or 11 years. This makes him the director who had the third longest tenure of his leadership. Ahead of Trivelpiece in length of tenure was Herman Postma with 14 years and Alvin Weinberg with 18 years. Thom Mason, the present director of the laboratory, is already the director with the fourth longest tenure with seven years.

Carolyn draws on an oral history interview by Steve Stow. Enjoy the rest of the story about Alvin Trivelpiece.

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When Alvin Trivelpiece became director of Oak Ridge National Laboratory on Jan. 1, 1989, his goal was "to leave the place better off than I found it."

"What brought you to Oak Ridge?" asked Steve Stow, who interviewed Trivelpiece on April 5, 2003, as part of ORNL's oral history project. "United Airlines," Trivelpiece joked.

He noted that his compensation as director of the Department of Energy's Office of Energy Research and then executive officer of the American Association for the Advancement of Science had not improved his financial status in the Washington, D.C. area. The duties of the ORNL job, he added, "were more consistent with my background and training."

The wealth of experience he gained from his work for the federal government included knowledge about scientific facilities and funding realities. While at the Department of Energy in the 1980's, he planned numerous major facilities to house state-of-the-art X-ray, electron and neutron sources for the national laboratories to keep them viable.

Trivelpiece's greatest contributions to ORNL were to secure a new neutron science anchor facility, ensuring the lab's survival, and to turn it into a world-class computing center for research.

Under DOE's facility revitalization plan, ORNL was designated to receive the "next" neutron science facility, which was then the Advanced Neutron Source research reactor.

Although the White House supported the ANS and included it in the President's budget, the Senate voted it down because of the demise of DOE's planned Superconducting Super Collider. An angry but influential Senator Bennett Johnston, whose state of Louisiana was home to entities that would have built components for the SSC, vowed that "if DOE won't build a Super Collider, they won't get to build anything else," according to Trivelpiece.

A State Department official argued that the ANS should be redesigned to use low-enriched, not highly enriched, uranium. The reason: the United States had advocated that other countries not use HEU in their research reactors for fear it could be diverted for use in atomic bombs.

Trivelpiece told Stow that using fuel low in fissionable uranium-235 and high in uranium-238 would make the ANS a plutonium breeder, violating U.S. policy, and a less useful tool for neutron research.

A White House source suggested to ORNL Director Trivelpiece that he consider replacing the ANS research reactor in the President's budget request with an accelerator-based Spallation Neutron Source, even though ORNL's expertise in accelerators was much less than that of Argonne and Los Alamos national labs. The source gave Trivelpiece two hours to provide an answer.
After talking it over with ANS Director Bill Appleton, Trivelpiece replied in the affirmative and decided to use ANS seed money for starting an SNS study. "Because of my previous experiences as director of the Office of Energy Research," he said, "I'd come to believe that projects like this are going to be better served if several national laboratories work simultaneously on it."

His idea worked, generating funding and nationwide political support. Lawrence Berkeley National Laboratory contributed an ion source for the linear accelerator; Los Alamos National Laboratory, the linear

accelerator with radiofrequency cavities; Thomas Jefferson National Accelerator Facility, superconducting magnets; and Brookhaven National Laboratory, "magnets that turned beams around corners," he said. ORNL assembled the components, including newly designed research instruments for characterizing physical and biological materials using neutrons.

Building the SNS, Trivelpiece added, marked "the first time for DOE that a major project had extensive participation by multiple national laboratories and that the labs were brought together in a way to build a facility and participate in it. The SNS has now become kind of a standard by which people think things ought to get done in the future."

Trivelpiece's contribution to strengthening ORNL's computer science capabilities dates back to 1973 when he was working for the Atomic Energy Commission. "I was responsible for the research program for thermonuclear fusion," he said. "Fusion did not have a strong theory program, and it certainly didn't have a strong computational base. So I asked a colleague to study the role of computing in controlled thermonuclear fusion."

The result was a large Cray computer at the new Magnetic Fusion Computation Center at Lawrence Livermore National Laboratory in California. Using their own computers, researchers at fusion labs all over the U.S. could send their experimental data to Livermore for comparison with the predicted results of theory. The data was transmitted over cables with large bandwidths.

"To some extent it was almost the beginning of the Internet," Trivelpiece said, referring to 1981 when he returned to Washington to work for DOE. "People were using computers for communication by email as much as for scientific computing."

At ORNL Trivelpiece observed what he had seen before at DOE – that ORNL was "behind the power curve as computational sciences began to advance" as the third pillar of science, complementing experiment and theory. He worried that ORNL scientific personnel regarded computational sciences "as second-class citizens."

He knew that computational scientists elsewhere had already built a model of a star 10 times the mass of the sun. They demonstrated that, during its collapse, the virtual star produced a neutrino wind that blew the mantle off the star, creating a supernova. Supernovas are exploding stars that produced and disseminated the elements responsible for life on the earth.

"I firmly believed that Oak Ridge was not going to prosper and advance unless it climbed to the top of the computational science game," he said. "I managed to recruit Ed Oliver, who through some combination of miracles brought to ORNL an Intel Paragon 150 that briefly was the fastest computer in the world." Since then ORNL has hosted several supercomputers that have been the most powerful in the world for open scientific research.

Trivelpiece left ORNL in March 2000 because DOE selected UT-Battelle to replace Lockheed Martin Energy Systems as laboratory contractor. Most people agree that he left ORNL in better shape than he found it.

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Thank you Carolyn for yet another insightful display of the value of the Center for Oak Ridge Oral History to convey our history straight from the people who created it. As we look at ORNL today and realize that not only have they recently again held the enviable position of having the world's fastest and most powerful supercomputer until China recently overtook them, but ORNL is now poised to soon leap ahead of China by an appreciable amount and likely will sustain the recognition of having the world's most powerful supercomputer for the foreseeable future! Trivelpiece saw the value or this leadership role in scientific computing in the 1990's.

But credit must also be given to UT-Battelle and the series of directors since April, 2000, Bill Madia, Jeff Wadsworth and now Thom Mason. They have lead a tremendous transformation of the laboratory along

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with the steady and unassuming behind the scenes leadership of Jeff Smith, the Deputy Director of Operations at ORNL.

Jeff has led a $350 million campus modernization project and also serves as president of the UT-Battelle Development Corporation, an entity established to develop privately constructed facilities at ORNL, according to the ORNL website. Together they have brought the laboratory from the potential Alvin Trivelpiece saw in the 1990's to the reality today of being DOE's largest and most diverse national laboratory.

ORNL also has the world record setting pulsed neutron source, the Spallation Neutron Source, and has a lead role in the International Thermonuclear Experimental Reactor (ITER) fusion research project located in France. By the way, ITER is also Latin for "The Way" or "The Road." This is ultimately the energy source of the future!

We in Oak Ridge can take much pride in the accomplishments of UT-Battelle and ORNL.

TITAN computer – soon to be the world's most powerful supercomputer (again) and expected to hold that place for some time into the future

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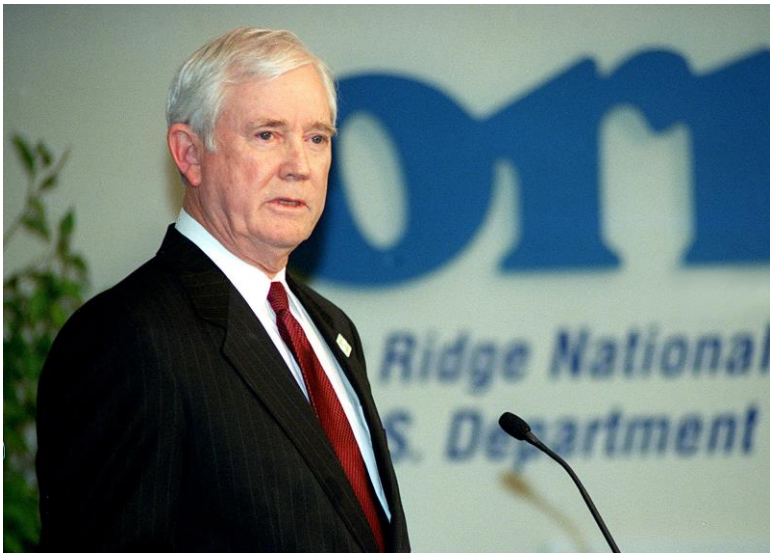
Clyde Hopkins, Lockheed Martin Energy Systems, Inc., President, Alvin Trivelpiece, Director Oak Ridge National Laboratory and previous ORNL director, Herman Postma



Alvin Trivelpiece shown speaking in support of his vision for the laboratory