UNIVERSITY OF MICHIGAN

The road ends for the Ford reactor

Lack of "significant external funding" sealed the fate of U-M's Materials Test Reactor in 2000, when the administration decided to close it.

THE UNIVERSITY OF Michigan (U-M) on July 3 pulled the plug on the Ford Nuclear Reactor after deciding that its annual operating costs were too high. The reactor, a 2-MWt swimming pool–type Materials Test Reactor, was built in 1955 with funds donated by the Ford Motor Company. The reactor is located on the university's North Campus, in Ann Arbor, Mich.

The decision to close the reactor was made by U-M's administration, although the school's nuclear engineering department and others had fought to keep it open. The administration had argued that U-M had been paying for 75 percent of the reactor's operating costs, even though university research was conducted there only 25 percent of the time. Meanwhile, the administration noted, federal and private sources provided only a quarter of the reactor's funding while occupying 75 percent of its time.

Its fate was sealed back in 2000 when the administration decided it would close the reactor "in the absence of significant external funding," according to David Wehe, a professor of nuclear engineering and radiological sciences at U-M.

Wehe told *Nuclear News* on July 10 that U-M earlier this year had been offered $1 million annually through the Department of Energy's Innovations in Nuclear Infrastructure and Education program to continue reactor operations, but the school turned it down, wanting $2 million per year instead. In fact, he said, U-M "would have been happy to accept that [$2 million] and continue the reactor into the indefinite future."

In wanting $2 million, U-M would have split the money by targeting $1 million for reactor operations and the other $1 million for opening the reactor up to what Wehe termed as "new science." The new science would have encompassed having "a positron beam installed" at the reactor, he said, "and there would have been materials science facilities built up . . . so we could have done work in radioactive waste management. There would have been new radiochemistry facilities, laboratories, and equipment installed. There would have been a lot of new science enabled by that $1-million-per-year new science award."

In the end, U-M wasn't willing to accept only $1 million each year, and so the decision was made to close the reactor down.

Before its shutdown, the reactor was a "24-hours-a-day, seven-days-a-week, three-shifts-around-the-clock" operation, Wehe said. With its closing, 17 people are being put out of work, although most will be able to find gainful employment elsewhere in the nuclear industry, he observed.

Ford reactor: University of Michigan's 2-MWt swimming pool–type Materials Test Reactor was closed for good on July 3. (Source: University of Michigan)

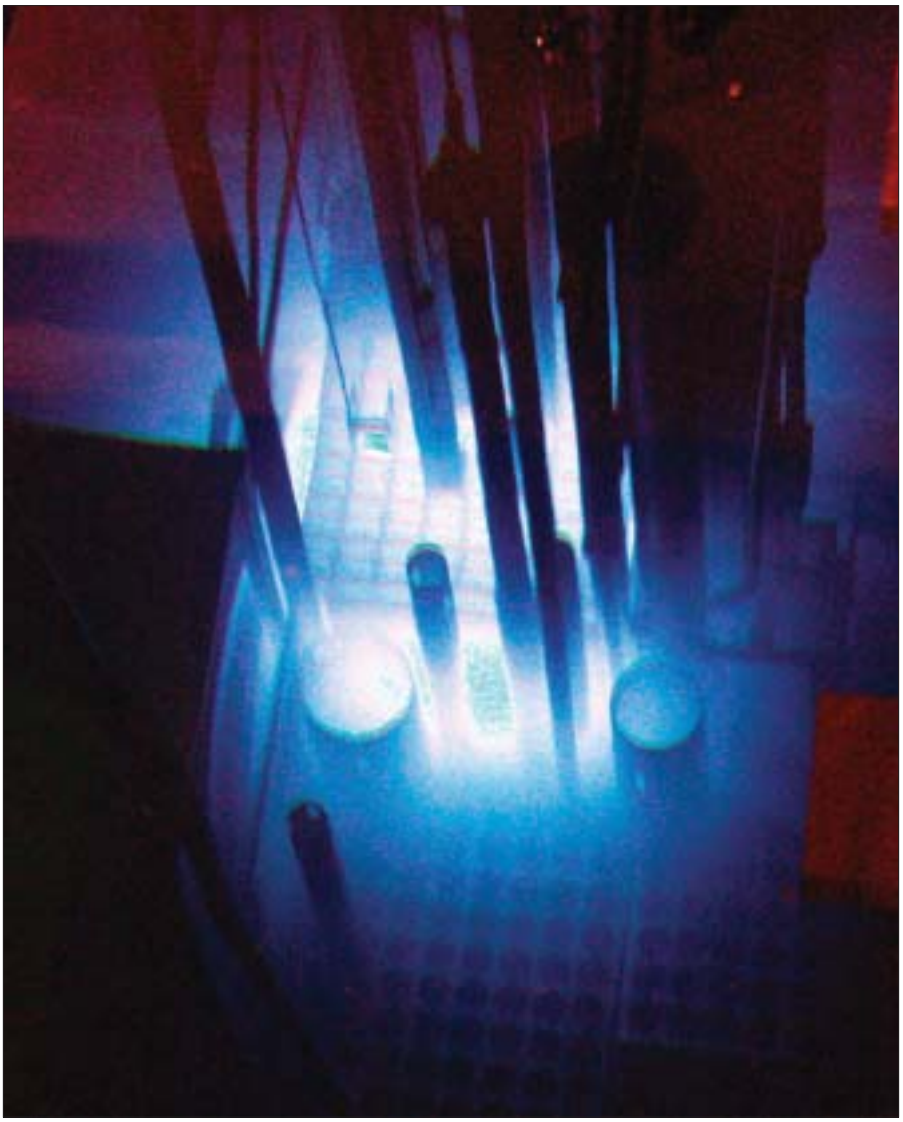
The reactor will now be prepared for decommissioning, and a plan for that job will be submitted to the Nuclear Regulatory Commission. The reactor's fuel will be shipped out to a repository "as fast as we can, because that will loosen the security requirements on the facility itself," Wehe said.

While the reactor's closing will be a loss for U-M's Nuclear Engineering Department, only 25 percent of that program is fission related, according to Wehe. Still, he said, it's "going to have an impact on that 25 percent" because the reactor has been "sort of a cornerstone, a flag, that's been nice to have when students come in to see what's going on in nuclear engineering. To show them the blue glow and say, 'See, it works, nuclear power is alive and well, and it's 25 feet down [in the open pool] and you can see it.' So, we're going to miss that," he said.

As for U-M's ability to perform nuclear research, the loss will be felt less because the reactor had not been used much in recent times, he said. Only a few research classes were using the reactor, said Wehe, who nonetheless admitted "we're not sure how we're going to give students that hands-on experience without having a reactor here."

The heyday of the reactor was during the late 1960s to mid-70s, according to Wehe. During that time, neutron scattering was prominent and a lot of the early work in neutron elastic and neutron inelastic scattering was done on the reactor. "Neutron time-of-flight was used to do neutron scattering experiments on glasses and crystals, in which researchers looked at atomic structure," he said. "They would look at things like helicopter blades to see what the crystalline lattice looked like under various different types of heat treatments, to try and make the helicopter blades stronger so they would last longer."

Wehe added that the first phonons, which are inelastic vibrations of lattices, were seen at the Ford reactor on a triple axis spectrometer. "This probably was one of the



epicenters of the world for doing neutron scattering research," said Wehe, a professor at U-M since 1986.

But then that research moved on, and the heyday was gone because newer and more powerful research reactors were being built. "Scientists would travel to the larger machines to get experiments done and be able to see the effects they couldn't see on the 2-MW machine," he said.

At first, the smaller reactors were still used for conducting "pre-experiments" by researchers before they would move on to the larger machines. But eventually, Wehe said, "these larger machines became so user-friendly you didn't need to do a pre-experiment, and off you could go to the national laboratories or international scattering centers at Grenoble [in France], for instance."

The smaller reactors didn't go away, however. "They were being used for training of nuclear reactor operators," he said. "That was during a time before plant simulators were particularly powerful, so the operators would actually do training on the small research reactors and get their checkouts." But then, too, nuclear power plants started building their own simulators so that operators could be trained in-house. Again the small research reactors became less useful.

A particular feather in the cap for the Ford reactor happened in the late 1970s–early 1980s, when it was picked as the demonstration plant for low-enriched fuel use. At the time, high-enriched uranium (HEU) fuel (weapons-grade uranium) was used in research reactors. The U.S. State Department, however, decided "it was probably not a good thing to have HEU on university campuses," said Wehe. The State Department asked why the reactors couldn't run on LEU, and so U-M became the test site for aluminide fuel. "This was the place that did that testing, and now the entire world is moving over to this low-enriched fuel," he said. The testing was conducted under a program called Reduced Enrichment for Research and Test Reactors (RERTR), which is still ongoing through the DOE's Argonne National Laboratory.

Hewe mused that had the Ford reactor continued operations, it probably would have been a test site for other types of fuels. "Not the silicides," he said, "but for the next generation of research reactor fuel, which would be a molybdenum fuel."—*Rick Michal*