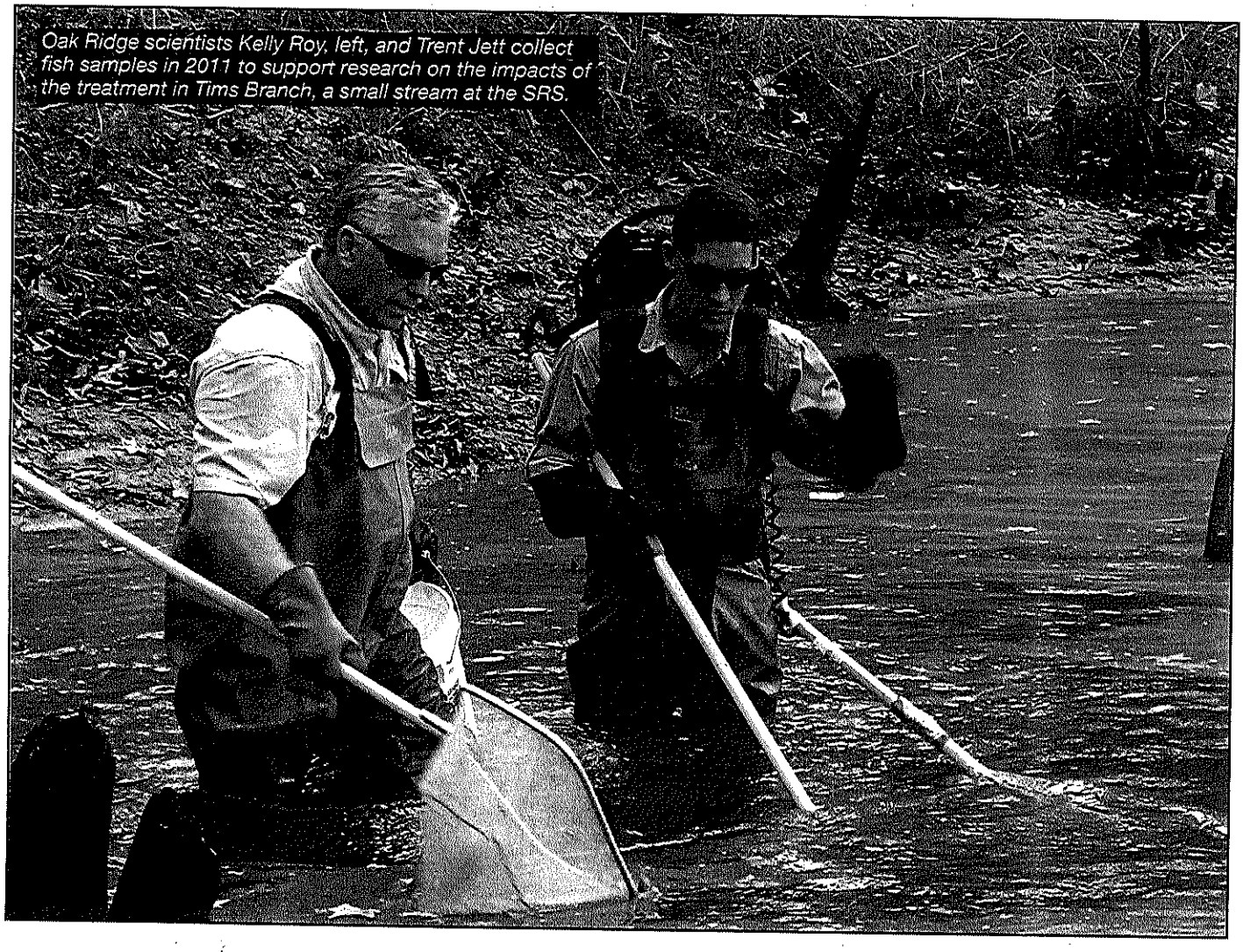


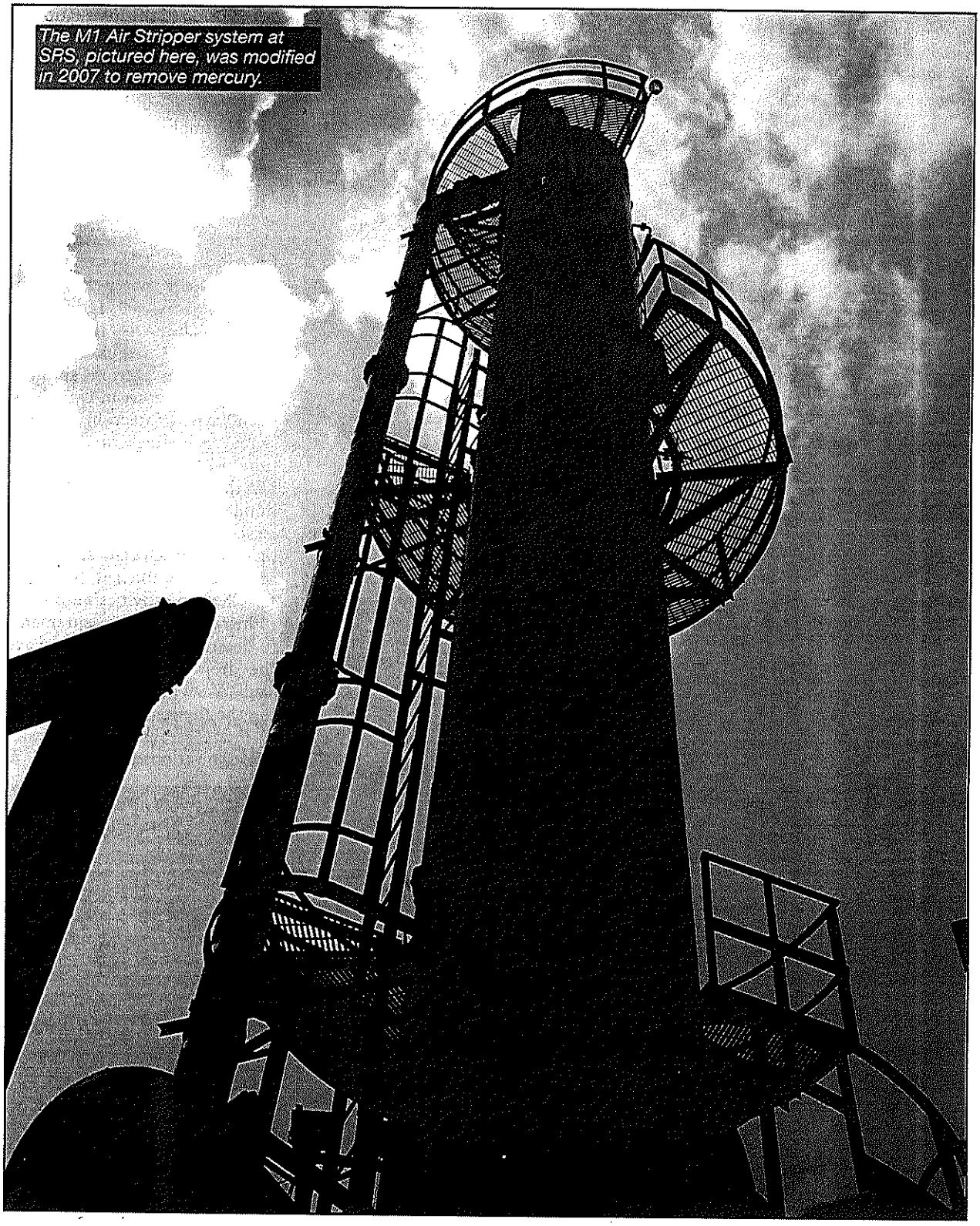
Oak Ridge scientists Kelly Roy, left, and Trent Jett collect fish samples in 2011 to support research on the impacts of the treatment in Tims Branch, a small stream at the SRS.

Innovative Mercury Treatment Benefits Stream, Fish

Mercury in the treated water in Tims Branch at the Savannah River Site has been reduced more than 95 percent, achieving water quality limits that focus on lowering mercury levels in fish to protect people and fisheries.

A team of scientists is working at the Savannah River Site (SRS) to evaluate the impact of an innovative, inexpensive treatment system that removes mercury from water. In this treatment, the mercury is pulled from the water through a reaction with stannous chloride, a form of tin, and air stripping, a technology in which volatile contaminants are removed from water and partitioned into air. This system has been in full-scale operation in M Area at SRS since November 2007. Dennis Jackson, a Savannah River National Laboratory (SRNL) engineer who supported the laboratory research, noted that "the M Area treatment system has operated continuously, successfully, and safely since startup, meeting our regulatory commitments." Mercury in the treated water has been reduced more than 95 percent, achieving water quality limits that focus on lowering mercury levels in fish to protect people and fisheries.

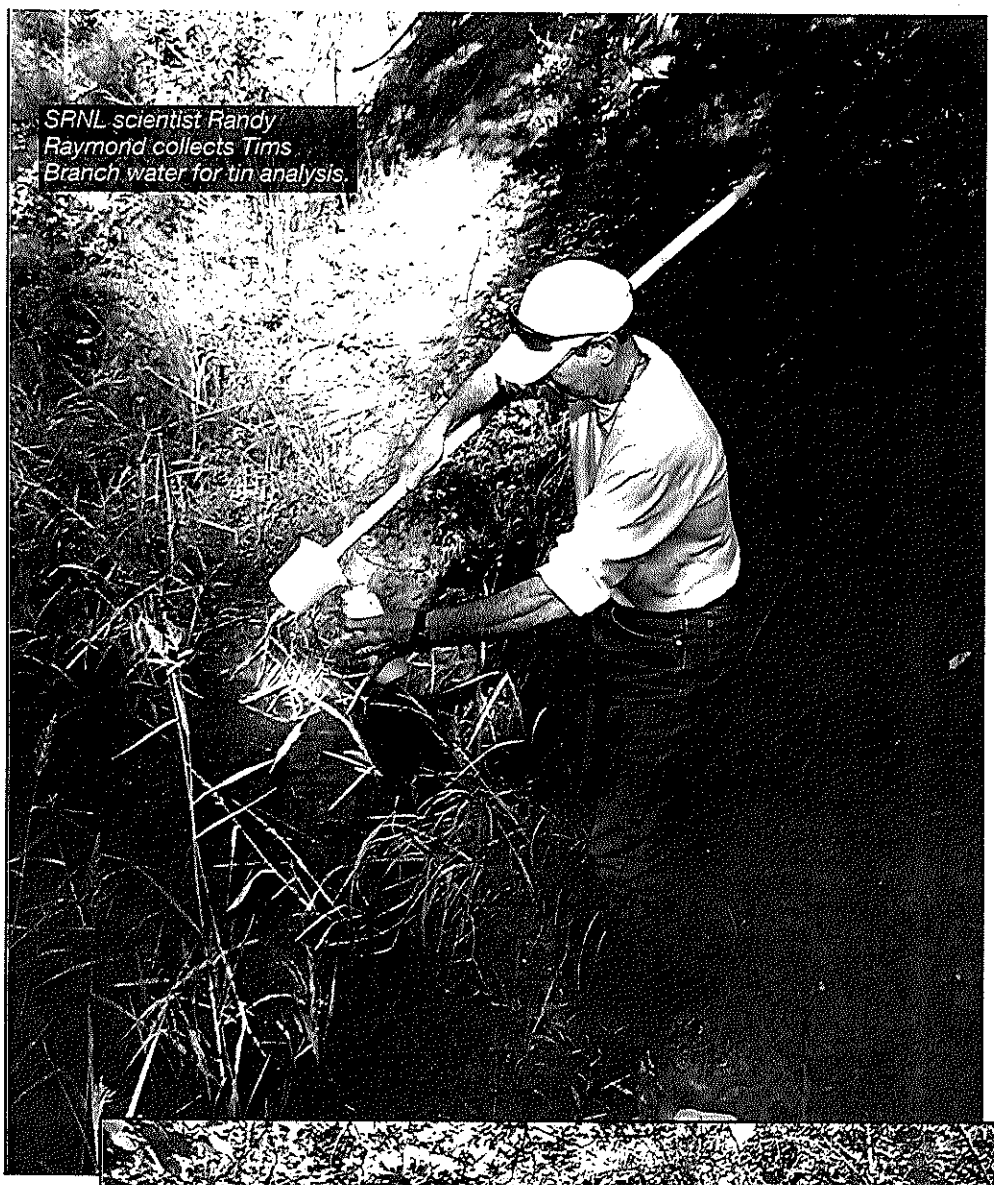
The U.S. Department of Energy's Office of Environmental Management (EM) sponsored a 2010 study of the downstream impacts of the first several years of mercury



The M1 Air Stripper system at SRS, pictured here, was modified in 2007 to remove mercury.

treatment in Tims Branch, a small SRS stream that receives the treated water. Researchers from SRNL, the University of Georgia's Savannah River Ecology Laboratory (SREL), and Oak Ridge National Laboratory (ORNL), along with a student from Florida International University, worked on the effort. "This project is a unique example of the power of EM applied research and demonstrates the value of the collaboration of multiple organizations that offer different skills and perspectives," EM Office of Soil and Groundwater Remediation Director Kurt Gerdes said.

Because mercury bioaccumulates, or, builds up in aquatic food chains, the researchers focused on mercury concentrations in the different compartments of the aquatic system, including water, sediment, biofilm, invertebrates, and fish. The team is also monitoring tin, which is released to the ecosystem as part of the mercury treatment. All of the results are compared to those from samples col-



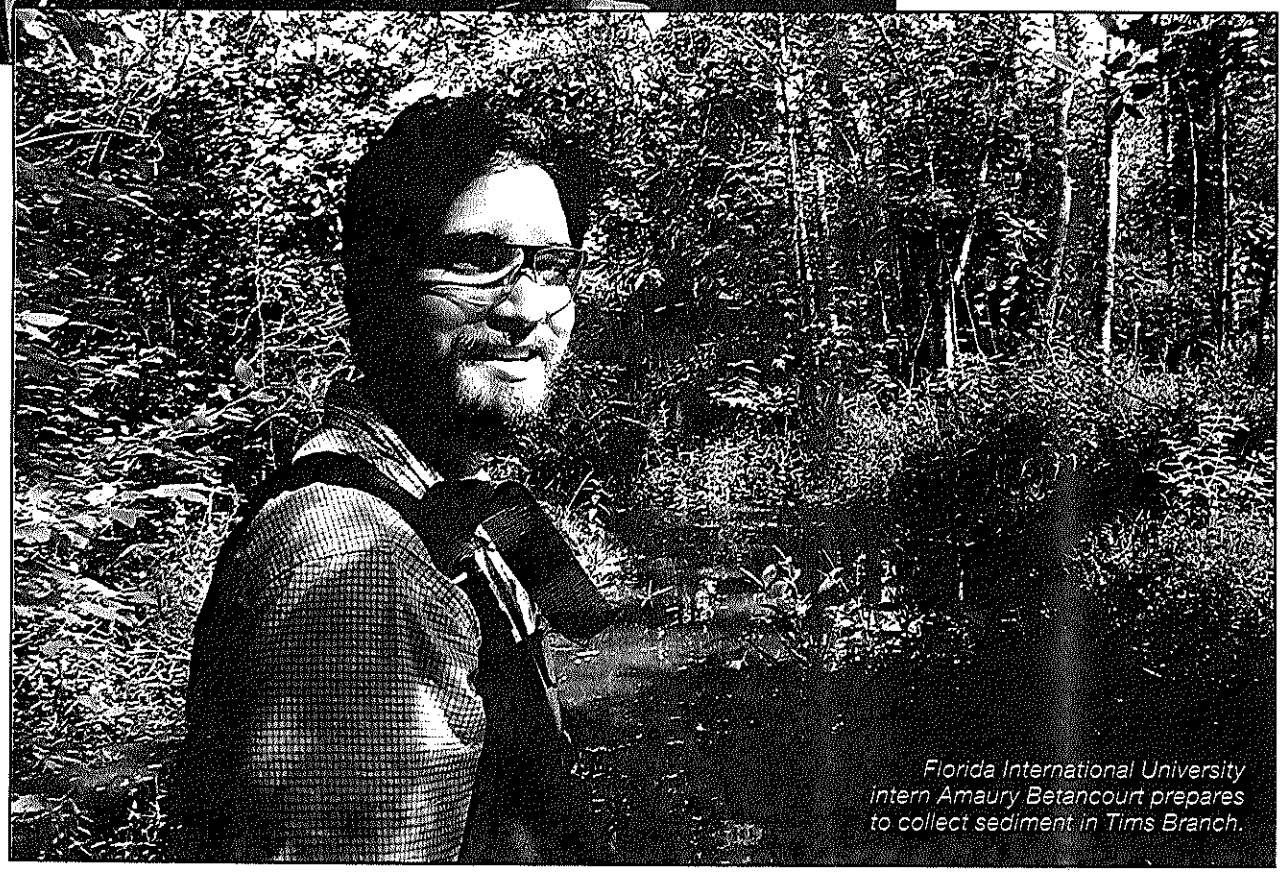
SRNL scientist Randy Raymond collects Tims Branch water for tin analysis.

lected prior to the installation of the treatment system.

Results show that mercury concentrations in fish have decreased significantly at all downstream sampling locations. "Mercury levels in a key fish species in Tims Branch—redfin pickerel—decreased approximately 72 percent in the pond just below the outfall," SRNL scientist Brian Looney said.

Data from Larry Bryan, of SREL, and Teresa Mathews, of ORNL, indicate that the mercury levels in redfin pickerel fillets have decreased from about 5 times the levels set in U.S. Environmental Protection Agency (EPA) guidelines to about 1.5 times EPA guidelines during the first three years of operation. Preliminary data show that the released tin is in the form of inert tin oxide particles and should not accumulate in the fish.

"Cleanup activities need to be followed up with measurements to determine whether they have the desired outcome," Gerdes said. "We will continue monitoring the inputs of this effort and facilitate technology transfer through various forums." ■



Florida International University intern Amaury Betancourt prepares to collect sediment in Tims Branch.