First-hand recollections of the first self-sustaining chain reaction

August 8 2012, by Michael Hess

Just seventy years ago, nuclear power, which generates 20 percent of the electricity in the United States, was just a theory. Scientists weren't entirely sure they could safely create a self-sustaining nuclear reaction, let alone build a nuclear reactor.

On paper, renowned physicists Enrico Fermi and Leo Szilard figured out that if they shot a uranium-235 atom with a neutron, the atom would become unstable and break apart explosively, firing neutrons into surrounding Uranium-235 atoms, which then become unstable, and so on.

Fermi figured they could dampen that reaction enough to avoid a catastrophic runaway reaction, but still achieve a self-sustaining nuclear reaction, thus unleashing the power of the atom. The famous experiment at Chicago Pile 1 proved this theory and ushered science into a new era.

Starting in November 1942, a team lead by Fermi built an unseemly structure in a converted squash court under an abandoned football field on the University of Chicago campus. Essentially a stack of 380 tons of graphite blocks and uranium slugs shrouded by a wooden frame, the Chicago Pile 1 was literally the world's first nuclear reactor.

Experiments started at 9:45 a.m. on Dec. 2, 1942. On the floor of the converted squash court, Fermi instructed the scientist manning the control rod, a cadmium-covered wooden pole, how far to withdraw the pole from the center of the pile. At 3:25 p.m., Fermi's instrumentation lit

up. They had achieved criticality – and proved that they could safely generate energy by splitting the atom.

The reaction lasted for 23 minutes before they shut it down. When the instruments fell silent, one of the researchers brought out a bottle of wine he had been saving for their success. The group of 50 scientists drank to their accomplishment in near silence.

Two of the men who worked and celebrated with Fermi, Szilard, and the other scientists in that room that day, Harold Agnew and Warren Nyer, are still alive today. In this new video above, they recall the details of that momentous day.

Provided by US Department of Energy