

Red Gate Woods: History's First Radioactive Dust Bin

By Kevin Kamps, *Beyond Nuclear*

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After seeing the site on a horseback ride with his wife and friends in the spring of 1942, U. of Chicago physicist A.H. Compton decided that a forested hill, 25 miles southwest of the Loop, was both near enough to, and far enough from, Chicago to serve as an ideal place for top secret, and potentially high-risk, Manhattan Project experiments. The aim was to beat Nazi Germany and Imperial Japan to the atomic bomb. Specifically, he planned for Enrico Fermi to build the world's first atomic "pile" (or reactor) at the spot he dubbed "Argonne" (after a bloody World War I Allied victory over German forces in France, in which 300,000 soldiers perished). However, due to a labor strike and other delays, the site was not ready by the time Fermi had assembled enough graphite moderator and fissile uranium for a critical mass.

But Fermi persuaded Compton the reactor could be operated safely enough at the U. of Chicago itself, in Hyde Park. As recounted by Harold Henderson in a 1987 *Chicago Reader* article ("Here Lies the World's First Nuke")¹, Compton wrote in his 1956 memoir, *Atomic Quest*:

"According to Fermi's calculations, which I carefully checked . . . it should take some minutes for the reaction to double its power. If this proved correct, there would be ample time for adjustments, and the reaction would be under full control. The only reason for doubt was that some new, unforeseen phenomenon might develop under the conditions of release of nuclear energy of such vastly greater power than anyone had previously handled. We were relying for safety on only a marginal fraction [less than 1 percent] of all the neutrons. Might perhaps some unknown process appear that would multiply the neutrons more abundantly [causing the chain reaction to continue out of control]? This we doubted; but as a precaution we would permit the reaction to grow only very slowly. . . . We would also take whatever other precautions we could think of, even though these might appear superfluous. . . . We did not see how a true nuclear explosion, such as that of an atomic bomb, could possibly occur. But the amount of potentially radio-active material present in the pile would be enormous [by 1942 standards] and anything that would cause excessive ionizing radiation in such a location would be intolerable."

Henderson concluded that Compton added, without conscious irony, "The outcome of the experiment might thus greatly affect the city."

So Fermi and his team of 49 scientists assembled what became known as CP-1 (for Chicago Pile) in an abandoned squash court under the Stagg Field football stadium at the U. of Chicago. CP-1 achieved a self-sustaining chain reaction, lasting 28 minutes long, on December 2, 1942, beginning at 3:25 p.m. local time.

A sigh of relief issued from the "suicide squad"² of three young scientists atop the pile, poised to pour cadmium onto the nuclear chain reaction -- as well as from the Safety Control Rod Axe Man (an origin of the term SCRAM, still used today³), standing ready to chop through a rope, looped over a pulley, holding a control rod designed to insert into the core -- if the experiment went out of control.



Official historians of the U.S. Atomic Energy Commission (AEC) later noted, with an oddly gleeful tone, that the “gamble” represented “a possibly catastrophic experiment in one of the most densely populated areas of the nation!”⁴

Perhaps sensing the grave military implications and historic portent, Fermi’s assembled team of dozens of scientists drank a spontaneous toast to their “scientific achievement” – *in complete silence*.⁵

Compton chose a most ironic, impromptu code to communicate Fermi’s successful self-sustaining chain reaction to James Conant, chairman of the National Defense Resource Committee:

Compton: The Italian navigator has landed in the New World.

Conant: How were the natives?

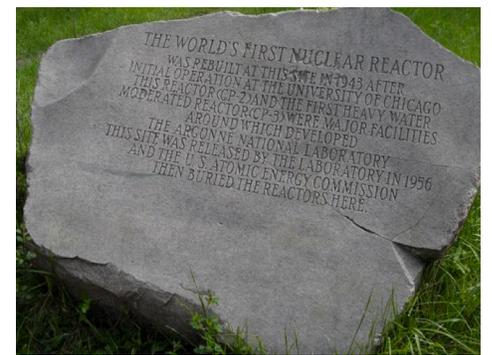
Compton: Very friendly.

(The Dene Indigenous People of Great Bear Lake, North West Territory, had already been exploited, and unknowingly been exposed to hazardous radioactivity, by the Canadian company Eldorado, in order to transport uranium ores, as early as 1931.⁶ By 1942, Eldorado’s uranium ores began to be utilized by the Manhattan Project.⁷)

In July, 1945, the Manhattan Project raced to test and use its expensive “gadgets,” as the opening shot across the bow of the Soviet Union in the nuclear arms race and Cold War to come, despite Nazi Germany already having been defeated, and Japan’s Emperor’s extension of peace feelers, as the U.S. Navy strangled the island nation in a complete blockade, as the U.S. fire-bombed Japan at will.⁸

CP-1 wouldn’t be Fermi’s last such nuclear gamble. Shortly before the experimental plutonium bomb blast code named “Trinity” at Alamogordo Bombing and Gunnery Range in the Jornada del Muerto Valley: “...Fermi was willing to bet anyone that the test would wipe out all life on Earth, with special odds on the mere destruction of the entire State of New Mexico!”⁹ Although the Earth’s atmosphere did not catch fire, the radioactive fallout did drift over the Mescalero Apache Indian Reservation not far away, making indigenous peoples, as well as White ranchers, the first Downwinders in history.

Even though the Argonne National Lab would relocate in 1947 to its current home, across the Des Plaines River in Du Page County,¹⁰ the Cook County Forest Preserve near 95th and Archer -- Compton’s original “Argonne Forest Lab” site -- was not to be spared. In February, 1943, Fermi dismantled his squash court CP-1, and reassembled it as CP-2 at Red Gate Woods. A number of additional reactors were built there over the next decade. Eventually, these prototype reactors would simply be buried in situ, toppled into deep holes dug adjacent to them and simply covered with dirt.



At the top of the hill at Red Gate Woods, a clearing with a granite boulder has the following message engraved in the stone: *"The world's first nuclear reactor was rebuilt at this site in 1943 after initial operation at the University of Chicago. This reactor (CP-2) and the first heavy water moderated reactor (CP-3) were major facilities around which developed the Argonne National Laboratory. This site was released by the laboratory in 1956, and the U.S. Atomic Energy Commission then buried the reactors here."*

By “released by the laboratory,” they mean returned to the Palos Division of the Forest Preserve District of Cook County, Illinois. Hiking and bicycling paths, as well as picnic grounds, would later be established. Most visitors would remain unaware of the radioactive contamination dating back to the 1940s and 1950s.

“Miscellaneous” radioactively contaminated waste dumping began immediately at Red Gate Woods in 1943. For several years, little to no containerization was used (cardboard ice cream cartons sealed with tape, glass jars with screw top lids for the most intensely radioactive wastes, or nothing at all), wastes were dumped into open pits, and no records were kept. Ultimately, around 1,400 55-gallon drums worth of such radioactive wastes were simply abandoned in place, the dumpsites simply covered with dirt and seeded with grass. After 7 years, this “Plot M” (M for Miscellaneous, as in wastes?!) was capped with an inverted concrete box, measuring 1 foot thick, with side walls extending down 8 feet, and covered with 2.5 feet of dirt on top. Plot M is marked with a simple stone marker which reads: *"Caution -- do not dig. Buried in this area is radioactive material, from nuclear research conducted here 1943-1949. Burial area is marked by six corner markers 100 feet from this center point. There is no danger to visitors. --U.S. Department of Energy, 1978."*



Even though steel bin containers were eventually used, and shipped out West, radioactive spills onto the ground occurred at Red Gate Woods. The irradiated nuclear fuel was reportedly shipped off for reprocessing, storage, and/or disposal elsewhere.

As reported by the 1987 *Chicago Reader* article, environmental monitoring tests were few and far between over several decades. For the first 25 years, soil samples were all that was taken – surface uranium contamination, likely from spills, was detected. Other radioactive hazards detected in soil have included: plutonium, cesium-137, cobalt-60, antimony-125, europium-155, and strontium-90.

When it dawned on Department of Energy officials that water sampling was also in order, they were shocked by the results. In 1975, the highest concentration of tritium in a public water supply in the entire State of Illinois, 14,000 picocuries/liter, was documented in a picnic area well at Red Gate Woods, downstream from the radioactive waste dump. A State Department of Public Health official recommended the well be padlocked closed.

But by the mid-1980s, the worst tritium contamination documented was found in surface waters, specifically an intermittent stream that drains the site. Whereas no elevated tritium levels were found upstream, contamination measuring 1 million pCi/L (50 times the U.S. Environmental Protection Agency (EPA) Safe Drinking Water Act (SDWA) limit of 20,000 pCi/L) has been detected next to the site, and 2 million pCi/L (100 times in excess of EPA SDWA limits) downstream. In addition, Sr-90 and Pu-239 have been detected in surface waters and sediments, Cs-137 in sediment, and U and Neptunium-237 in surface waters. The stream drains into the old Illinois and Michigan Canal on the west side of Archer Avenue, then into the Illinois River system and downstate.

