## James C. Little was there

(As published in The Oak Ridger's Historically Speaking column the week of February 21, 2022)

Dr. James C. Little, Jr. contacted me to learn about his Dad's work at Y-12 in the 1960's. This is not uncommon as I often get such contacts. However, this one came with a offer to provide materials from Y-12 to the Y-12 History Center. So, I contacted Eve Whittenburg, Historian at Y-12, and made the connection to transfer the materials. I also asked James to write what he knew about his dad and his involvement in the Manhattan Project.

Here is what he knows about his dad. He is looking for more information about the Environmental Control Engineering department at Y-12.

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My Daddy, JAMES LITTLE, was central to the protection of America during World War II. Mom told us of the trip to BOSTON that they both went on early 1943 while Grandmother Little in Lincolnton kept me, age 6 months.

For the next two months the Army negotiated over the final design. While all involved could see possible improvements, there simply was not enough time to incorporate every suggested modification.

Y-12 design was finalized at a March 17 meeting in Paton. There was one major modification - the inclusion of a second stage of the electromagnetic process. The purpose of this second stage was to take the enriched uranium 235 derived from several runs of the first stage and use it as the "feed material" for a second stage of racetracks containing tanks approximately half the size of those in the first. Daddy was in on that.

And Daddy told me about going under Stagg stadium in Chicago and seeing the reactor.

The X-10 Graphite Reactor was the first reactor built after the successful experimental "Chicago Pile I" under Stagg Field grandstand at the University of Chicago. (So, it is the world's first full-scale production nuclear reactor, and it is in Oak Ridge! – Ray)

On December 2, 1942, using a lattice of graphite blocks and uranium rods, Enrico Fermi proved that a nuclear chain reaction could be controlled. Scientists knew that it would only be a matter of time before the energy of the atom could be harnessed for a bomb.

The Chicago Pile-1 (CP-1) was the world's first artificial nuclear reactor

The reactor was assembled in November 1942, by a team that included Fermi, <u>Leo Szilard</u> (who had previously <u>formulated an idea</u> for <u>non-fission chain reaction</u>), <u>Leona Woods</u>, <u>Herbert L. Anderson</u>, <u>Walter</u> <u>Zinn</u>, <u>Martin D. Whitaker</u>, and <u>George Weil</u>.

The reactor used natural uranium. This required a very large amount of material to reach criticality, along with graphite used as a <u>neutron moderator</u>. The reactor contained 45,000 <u>ultra-pure graphite</u> blocks weighing 360 <u>short tons</u> (330 <u>tonnes</u>), and was fueled by 5.4 short tons (4.9 tonnes) of <u>uranium</u> metal and 45 short tons (41 tonnes) of <u>uranium oxide</u>.

Unlike most subsequent nuclear reactors, it had no radiation shielding nor cooling system as it operated at very low power – about one-half watt.

The pursuit for a reactor had been touched off by concern that <u>Nazi Germany</u> had a substantial scientific lead. The success of the STAGG FIELD Chicago Pile-1 provided the first vivid demonstration of the feasibility of the military use of nuclear energy by the Allies, and the reality of the danger that Nazi Germany could succeed in producing nuclear weapons.

My Daddy, James Little Sr., was there. James Little Jr. MD

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James C. Little was involved in the Manhattan Project and likely worked to design laboratories that were environmentally superior in the 1960's. If anyone can help James Little, Jr. to understand more about what his father did at Y-12 he would appreciate it.



James C. Little showing the design of a radiation laboratory