

Dr. Googin and his early days at Y-12, part 6

Last week we concluded by noting Dr. John Googin's huge impact on world changing events as well as briefly mentioning his family life and community involvement. There will be more on those two aspects of his life in coming installments. However, for now, let's continue with his Y-12 experience during the very important early start up activities of the electromagnetic separation operations at Y-12 known as the Calutrons (**California University Cyclotrons**).

These huge machines were just being installed in Y-12 when John Googin arrived in Building 9202! He mentions this in his *Manhattan Project Autobiography*, "In the early weeks of 1944, Alpha-1 (9201-1) in Y-12, was being put on line as the first uranium isotope separation production process in the world. It did not really go too well."

John went on to say, "What had been a field by a stream in a poor valley a year and a half before was now the center of a major industrial empire. The first of the buildings using a process, that many were saying would never work, was being placed in operation with great difficulty. The crew finally had to admit that the plant in its "as built" shape would not work because of electrical problems."

He further outlined the problem by saying, "It soon became apparent that much of the equipment connected to the cooling system for the units and the magnets would have to be disconnected and the whole system systematically cleaned. The contamination in the systems would not allow the needed high voltages and stable currents."

Then he concluded this review of Y-12's first Calutron installation by saying, "This was completed in another month and the building was restarted to continue in operation successfully until it was shut down in September 1945 after Hiroshima."

These were Alpha Calutrons and were about 20 feet tall. They were huge machines, and they filled five major buildings before the war ended. There were also four equally large buildings that were constructed to hold the Beta Calutrons. The Beta units were approximately half the size of the Alpha units.

When John arrived in May 1944, the trauma of the start-up of the first building was behind the Y-12 folks, but there were still several hurdles to get over. The construction was hurriedly being completed on several large buildings at once. Equipment was being installed even before the buildings were completed.

Decisions were being made to increase capacity even before the exact known production capabilities were understood. They just knew more would be needed.

John's first job was a process development chemist in the Bulk Treatment Department in Building 9202! His first task was to determine how to handle the process throughput necessary to maintain sufficient feed material (uranium tetrachloride) for the ever growing number of Calutrons being installed in the large production buildings.

There were plans for expanding the Bulk Treatment by adding an addition to Building 9202, but it was not scheduled for completion until 1945. Only the foundation was laid when John arrived. So that expansion would not help meet the immediate requirements.

The Calutrons in the Alpha buildings were using much more feed than had been expected. The existing arrangement in Building 9202 just would not have the capacity needed.

John goes into great detail in his autobiography to describe the chemical process that existed in Building 9202 at the time of his coming to work there. He explicitly defines each step and explains what size containers and specific materials were used. Because of the corrosive nature of much of the chemical process, glass and stainless steel were used extensively. He noted that parts of the plant made of 304-stainless steel were corroding away at the welds.

He said, "One of the first jobs was to set up corrosion tests of samples of welded stainless steels, to find out which of the commercially available ones would be best for replacement of the one originally used, and for the new facilities. It soon became apparent that the carbide precipitates in the heat affected zone of the welds was a large part of the problem, and that the low carbon version of 316 was the obvious choice above 321 or 347 for the future stainless steel applications."

The Bulk Treatment facility was located in what became commonly known in later years as the "foundry" portion of Building 9202. His "impromptu laboratory" was located on a storage balcony that overlooked the operating floor from the top of the highest reactor floor.

John said, "All the heat of the summer and the process rose up to there. There was the row of half a dozen of the high-speed centrifuges just below the lab floor that roared day and night. The dryer-calciner system kept hot air rising toward the roof." Can't you imagine the environment John worked in? Again, his description conveys a vivid picture of his laboratory.

Next we will continue John's efforts to learn how the systems at Y-12 worked and how he might personally help to increase production necessary to feed the ever-increasing number of Calutrons. It was truly a race against time to get enough uranium 235 for a bomb. And you will recall that John actually was one of the few who knew exactly what was being done at Y-12.