

## Construction of Building 9201-1 (Alpha 1) – part 2

Even while Building 9201-1 (Alpha 1) was being constructed, the first experimental Alpha unit (XAX) in Building 9731 successfully operated, after a week of start up efforts, on August 17, 1943. Y-12 was on its way to success! Lawrence as well as all others involved in the planning, including General Groves, was watching with eager anticipation to see this first success in Tennessee. Now they felt sure the correct decisions had been made regarding electromagnetic separation.

General Groves held an all day meeting in Berkley on September 2, 1943. Here he reviewed the options Lawrence had suggested for enlarging Y-12. He reviewed Lawrence's changes made to the fifth Alpha racetrack and also what was being recommended for future Alpha units. He reviewed the early designs for the Beta calutrons and the test units being planned.

However, the most significant decision made at that meeting was to move ahead with the Alpha II calutrons in two new buildings, the largest two buildings to be constructed at the site. These two buildings, Alpha 4 and Alpha 5, would contain two racetracks of ninety-six calutrons each. The magnets would be arranged in a rectangular shape rather than the troublesome oval shape. All the calutrons would face the same side of the magnet rather than both sides as in the earlier design.

Activity continued to shift throughout the summer of 1943 from Berkley to Oak Ridge. The huge magnets began arriving from Allis-Chalmers. Other parts were arriving daily. The target start up date was now November 1, 1943.

General Groves, in his book, *Now it can be told*, said, "The work on the first racetrack was well underway before the structure for the opposite end of the building was finished. The moment the overhead cranes were set and the concrete roof poured, we started to unload and place the heavy magnets." Such was the push to make haste.

As early as late October, 1943, when the first magnet coils in Building 9201-1 were tested, signs of trouble were being seen. The resistance of the coils to ground was far less than expected. Other problems plagued the start up. Electrical components failed, vacuum tanks leaked, welds failed allowing cooling oil to spill on the floor.

Stress was high among the workers, managers, engineers and scientists alike. They were attempting to do something that had never been done before and had now missed the already rescheduled start up date of November 1, 1943. All knew the expectation was to have calutrons fully operational by now. Weeks went by with hardly a steady beam on any calutron.

Magnets shorted out, mistakes were made in operational adjustments, failure loomed imminent, frustration grew. Yet, nothing could be done but admit the problems and seek solutions.

So, early in December, 1943, the first racetrack of Alpha calutrons was shut down and a few of the failed magnet coils opened for inspection. What was found to be the cause of the failures was rust and other sediment in the cooling oil.

On December 15, 1943, General Groves himself came to Building 9201-1 to personally see what the problem was with the magnets. He looked at the open magnet coils, saw the evidence of rust and debris in the cooling oil and immediately determined to send the magnets back to Allis-Chalmers. He ordered this to be done at once. Don't you know that was a strained meeting. The magnets were cleaned, unwound and rewound with wider spacing. The design of new magnets was modified to include the wider spacing.

Groves then set about assuring the next racetrack to be started up would not meet the same fate as the first. He stated in *Now it can be told*, "To me, all this seemed entirely inexcusable, for we should have made certain that nothing like this would ever happen." He also noted that he learned that Lawrence had had similar problems with one of his cyclotrons. That must have irritated him as well.

The decisions made to prevent a repeat failure on the second and third racetracks which were already partially installed included thoroughly cleaning the cooling oil piping and installing oil filters on the system. A special pickling plant was built and all installed piping was taken out and cleaned of all rust.

By January 15, 1944, the calutrons in Alpha 2 (Building 9201-2) were started up. Within a week all calutrons had proven to be operational. However, many electrical failures continued to occur, other equipment failed as well, maintenance crews got behind because of the heavy workload, even a dead mouse was found in one vacuum tank that just would not pump down. Each failure that required the vacuum to be broken for repairs then took up to 30 hours to pump back down.

The few calutrons that were working were doing so well that Lawrence was again sure that he was right about Y-12's ability to produce sufficient uranium 235. Working with the operating calutrons, the Berkeley scientists were able to produce some 200 grams of material enriched to approximately 12 percent by the end of February, 1943.

Our own Bill Wilcox was the young chemist who had the responsibility for one step in the process of chemically preparing this small quantity of uranium 235 to assure its purity. He tells an intriguing story of how he left a glass container resting inside a stainless steel container with the glass container's rim resting on the rim of the metal container just so.

Bill placed the arrangement in a furnace and left for the night. That night the heat expanded the metal container and the glass container with the uranium 235 dropped down inside the metal one. After the furnace timed out and when the metal cooled, the stainless steel container contracted and broke the glass container...making a mess of the precious material.

Bill says that when he came to work the next day, one of his coworkers told him his department boss was looking for him and that he was really mad. Bill went to his direct supervisor to learn what was wrong. Bill says he got a real chewing out and was told to stay hid for a few days until the big boss got over this mistake.

The material was shipped to Los Alamos in early March, 1944. Y-12 had separated and shipped its first uranium 235!

Caption: Completed Alpha 1 calutron racetrack