Groves arrived on December 15 and shut the racetrack down. The coils were sent to Allis-Chalmers with hope that they could be cleaned without being dismantled entirely, while measures were taken to prevent recurrence of the shorting problem. The second Alpha track now bore the weight of the electromagnetic effort. In spite of precautions aimed at correcting the electrical and oil-related problems that had shut down the first racetrack, the second Alpha fared little better when it started up in mid-January 1944. While all tanks operated at least for short periods, performance was sporadic and maintenance could not keep up with electrical failures and defective parts. Like its predecessor, Alpha 2 was a maintenance nightmare.

Alpha 2 produced about 200 grams of twelve-percent uranium-235 by the end of February, enough to send samples to Los Alamos and feed the first Beta unit but not enough to satisfy estimates of weapon requirements. The first four Alpha tracks did not operate together until April, a full four months late. While maintenance improved, output was well under previous expectations. The opening of the Beta building on March 11 led to further disappointment. Beam resolution was so unsatisfactory that complete redesign was required. To make matters worse, word spread that the K-25 gaseous diffusion process was in deep trouble because of its ongoing barrier crisis. K-25 had been counted upon to provide uranium enriched enough to serve as feed material for Beta. Now it would be producing such slight enrichment that the Alpha tracks would have to process K-25's material, requiring extensive redesign and retooling of tanks, doors, and liners, particularly in units that would be wired to run as hot, rather than as cold, electrical sources.[34]

Reworking the Racetracks

It became clear to Groves that he would have to find a way for a combination of isotope separation processes to produce enough fissionable material for bombs. This meant making changes in the racetracks so that they could process the slightly enriched material produced by K-25. He then concentrated on further expansion of the electromagnetic facilities. Lawrence, seconded by Oppenheimer, believed that four more racetracks should be built to accompany the nine already finished or under construction. Groves agreed with this approach, though he was not sure that the additional racetracks could be built in time.

As K-25 stock continued to drop and plutonium prospects remained uncertain, Lawrence lobbied yet again for further expansion of Y-12, arguing that it provided the only possible avenue to a bomb by 1945. His plan was to convert all tanks to multiple beams and to build two more racetracks. By this time even the British had given up on gaseous diffusion and urged acceptance of Lawrence's plan.

Time was running out, and an element of desperation crept into decisions made at a meeting on July 4, 1944. Groves met with the Oak Ridge contractors to consider proposals Lawrence had prepared after assessing once again the resources and abilities of the Radiation Laboratory. There was to be no change in the completed racetracks; there simply was not enough time. Some improvements were to be made in the racetracks then under construction. In the most important decision made at the meeting, Lawrence was to throw all he had into a completely new type of calutron that would use a thirty-beam source. Technical support would come from both Westinghouse and General Electric, which would cease work on four-beam development. It was a gamble in a high-stakes game, but sticking with the Alpha and Beta racetracks might have been an even greater gamble.

The K-25 Gaseous Diffusion Plant

Eleven miles southwest of Oak Ridge on the Clinch River was the site of the K-25 gaseous diffusion plant upon which so much hope had rested when it was authorized in late 1942. Championed by the British and placed first by the Lewis committee, gaseous diffusion seemed to be based on sound theory but had not yet produced samples of enriched uranium-235.

At Oak Ridge, on a relatively flat area of about 5,000 acres, site preparation for the K-25 powerplant began in June. Throughout the summer, contractors contended with primitive roads as they shipped in the materials needed to build what became the world's largest steam electric plant. In September work began on the cascade building, plans for which had changed dramatically since the spring. Now there were to be fifty four-story buildings (2,000,000 square feet) in a U-shape measuring half a mile by 1,000 feet. Innovative foundation techniques were required to avoid setting thousands of concrete piers to support load-bearing walls.

Since it was eleven miles from the headquarters at Oak Ridge, the K-25 site developed into a satellite