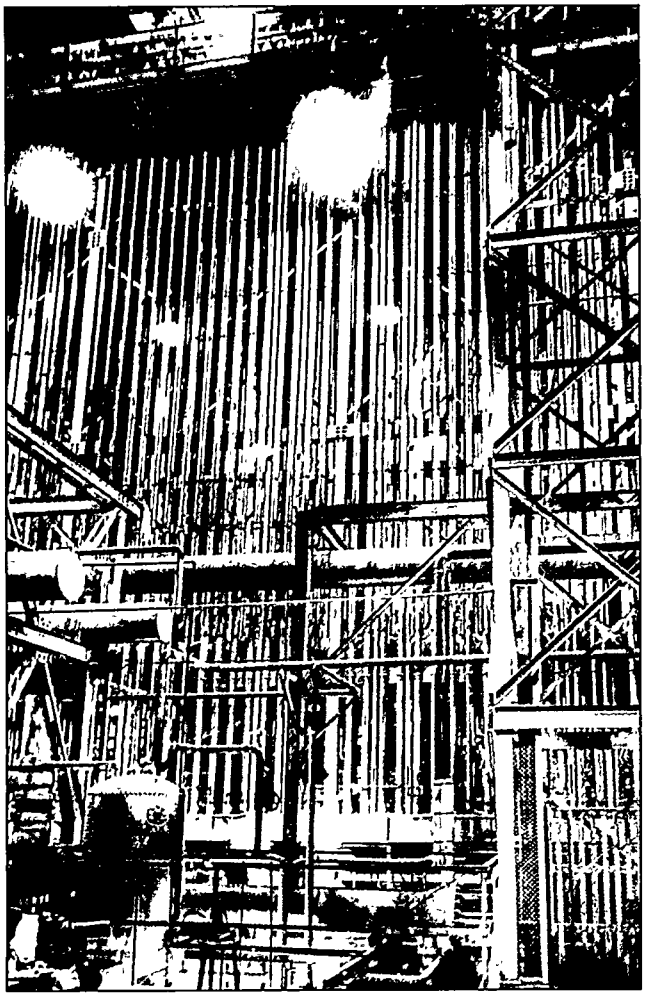
Progress at Oak Ridge

During winter 1944-45 there was substantial progress at Oak Ridge, thanks to improved performance in each of the production facilities and Nichols's work in coordinating a complicated feed schedule that maximized output of enriched uranium by utilizing the electromagnetic, thermal diffusion, and gaseous diffusion processes in tandem. Nine Alpha and three Beta racetracks were operational and, while not producing up to design potential, were becoming significantly more reliable because of maintenance improvements and chemical refinements introduced by Tennessee Eastman. The S-50 thermal diffusion plant being built by the H. K. Ferguson Company was almost complete and was producing small amounts of enriched material in the finished racks, and the K-25 gaseous diffusion plant, complete with barriers, was undergoing final leak tests. By March 1945, Union Carbide had worked out most of the kinks in K-25 and had started recycling uranium hexafluoride through the system. S-50 was finished at the same time that the Y-12 racetracks were demonstrating increased efficiency. The Beta calutrons at the electromagnetic plant were producing weapon-grade uranium-235 using feed from the modified Alpha racetracks and the small output from the gaseous diffusion and thermal diffusion facilities. Oak Ridge was now sending enough enriched uranium-235 to Los Alamos to meet experimental needs. To increase production, Groves proposed an additional gaseous diffusion plant (K-27) for low-level enrichment and a fourth Beta track for high-level enrichment, both to be completed by February 1946, in time to contribute to the war against Japan, which many thought would not conclude before summer 1946.



Section of S-50 Liquid Thermal Diffusion Plant at Clinton. Reprinted from Richard G. Hewlett and Oscar E. Anderson, Jr., *The New World, 1939-1946,* Volume I of *A History of the United States Atomic Energy Commission* (University Park: Pennsylvania State University Press, 1962).

Hanford's Role

With the abandonment of the plutonium gun bomb in July 1944, planning at Hanford became more complicated. Pile 100-B was almost complete, as was the first chemical separation plant, while pile D was at the halfway point. Pile F was not yet under construction. If implosion devices using plutonium could be developed at Los Alamos, the three piles would probably produce enough plutonium for the weapons required, but as yet no one was sure of the amount needed.

Pile Operation

Excitement mounted at Hanford as the date for pile start-up approached. Fermi placed the first slug in pile 100-B on September 13, 1944. Final checks on the pile had been uneventful. The scientists could only hope they were accurate, since once the pile was operational the intense radioactivity would make maintenance of many components impossible. Loading slugs and taking measurements took two weeks. From just after midnight until approximately 3:00 a.m. on September 27, the pile ran without incident at a power level higher than any previous chain reaction (though only at a fraction of design capacity). The operators were elated, but their excitement turned to astonishment when the power