

A look back at *Union Carbide's 20 Years in Nuclear Energy [The Nuclear Age]*

This series of articles is taken from a publication produced by Union Carbide Nuclear Division in the early 1960s which provides some insights into technological advances and substantial manufacturing accomplishments made in Oak Ridge just 20 years after the Manhattan Project came to East Tennessee. Tim Gawne of Oak Ridge National Laboratory provided the publication to me when he found a copy in the ORNL Library archives.

The milestones of the publication give highlights of the intervening years.

The publication covers all sites in Oak Ridge and to give a fuller picture of the total scope of accomplishments, I will include the Milestones from each of the three sites and a historical summary from each site as well.

This historical document gives insights at a level of detail not often found in documents available to the public, but is written to inform while keeping the necessary information protected. Remember the United States was entering the middle stages of the Cold War. This report was written in 1962. It was a time of fast transitions, and many new ideas were being implemented for the first time. New information was coming into common knowledge and technical achievements were rapidly advancing.

Let's take a look at the details in the report.

The opening page is titled, "**THE NUCLEAR AGE BORN OF NECESSITY.**"

The report begins as follows: "In January of 1942, soon after the beginning of World War II, Columbia University scientists made the first small-scale separation of uranium isotopes by the gaseous diffusion process with a small apparatus." The photograph in the report is of the small apparatus now on display at the American Museum of Science and Energy that is captioned in the report as "the first separation of uranium isotopes by gaseous diffusion was accomplished in this apparatus, and led to construction of the Oak Ridge Gaseous Diffusion Plant."

The report continues, "The analyses, showing that separation had been accomplished, were performed at the University of Minnesota. This long-distance collaboration proved that uranium isotopes could be separated by diffusion."

"Within a year, under the stimulus of an all-out war, scientists at Columbia and other universities had enough information on gaseous diffusion to show that production of large quantities of separated uranium-235 might be possible. At that time, Carbide and Carbon Chemicals Company was called in. On January 18, 1943, a contract to operate a gaseous diffusion plant and to provide engineering and research help was signed by James A. Rafferty for Carbide and Lt. Col. K. D. Nichols for the Manhattan Engineer District.

"The scope of this contract has been expanded many times by the U.S. Atomic Energy Commission and Union Carbide. Carbide now operates, for the Commission, gaseous diffusion plants at Oak Ridge and Paducah, The Y-12 Plant, and the Oak Ridge National Laboratory. The productive relationship between Carbide and the Commission has always been one of mutual respect and full cooperation.

"Union Carbide was brought into the atomic energy program because of the wide diversity of its interest in chemical and metallurgical fields, and because of its interest in nuclear energy applications. The construction of a reactor and nuclear energy research center at Sterling Forest near Tuxedo, New York, reflects this interest."

Inserted here in the report are two photographs, the first a 1948 photograph of the K-25 site and a second photograph showing the small gaseous diffusion apparatus. Another photograph of K-25 is included that was taken in 1962 showing the site in full production.

The caption for the photograph of K-25 in the report states, "The Oak Ridge Gaseous Diffusion Plant was a first in every sense, and its design, involving many acres of barrier, was based on a small piece less than two square inches in area. Even this practical foundation soon disappeared when it became known that the material used in the first filter could never be employed in the main plant. One of the great contributions made by Union Carbide during the design and construction period was in connection with the development of a satisfactory barrier, and with the cooperation of a large number of firms, mass production was achieved in ten months after manufacture was started (Lt. Gen. L. R. Groves in *Now It Can Be Told*, p. 118)."

In following articles we will look at the history and milestones of the Gaseous Diffusion Plants, the Oak Ridge National Laboratory and the Y-12 Plant as they were in 1962 with a glance backward from there to the previous 20 years.