A look back at *Union Carbide's first 20 Years in Nuclear Energy [The Oak Ridge National Laboratory* continued*]*

Note: Union Carbide Nuclear Division, which started out as Carbide and Carbon Chemicals Company, operated the Atomic Energy Commission/Energy Research and Development Administration/Department of Energy sites in Oak Ridge, Paducah, KY, and Portsmouth, OH, until 1984, some 40 years.

The articles in this series are 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 that were 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.

This section covers the milestones Oak Ridge National Laboratory accomplished during the first 20 years of Union Carbide's role in nuclear energy:

"OAK RIDGE NATIONAL LABORATORY MILESTONES"

"February 1, 1943 – Construction of a plutonium production pilot plant started near Knoxville under the code name of Clinton Laboratories, to be operated by the University of Chicago as part of the Metallurgical Project.

"November 4, 1943 – Graphite Reactor operated successfully. This was the world's first reactor to produce plutonium.

"December, 1943 – Chemical processing operations started to separate plutonium from uranium.

"December 30, 1943 – First milligram quantities of purified plutonium shipped from Clinton Laboratories to University of Chicago for research.

"August, 1944 – Pilot plant demonstration of plutonium production processes completed and final process design report for Hanford issued.

"January, 1945 – Emphasis of work at Clinton Laboratories shifted from pilot plant operation to research on other problems connected with development of nuclear energy.

"June, 1945 – All original objectives of Clinton Laboratories successfully accomplished.

"July 1, 1945 – Monsanto Chemical Company became operating contractor for Clinton Laboratories.

"August 2, 1946 – First radioisotope shipment made [a small quantity of carbon-14 delivered to the Barnard Free Skin and Cancer Hospital in St. Louis].

"January 1, 1947 – Atomic Energy Commission took over operations from Manhattan District.

"March, 1948 – Carbide accepted operating contract, and name was changed to Oak Ridge National Laboratory.

"1948 – Construction started on permanent research facilities. $2 million radioisotope production facilities completed.

"1949 – Homogeneous reactor development reactivated. Aircraft reactor development work initiated. A new pool-type research reactor was developed, constructed and placed in operation as the second reactor on the site. This was the first of the "swimming pool" type of research reactors now in wide use.

"1950 – Research division and some physical facilities of Y-12 became part of ORNL. Oak Ridge School of Reactor Technology opened. Metal Recovery Plant built for processing irradiated reactor fuel.

"1951 – Full scale model of the Materials Testing Reactor (MTR) converted to a third operating reactor, the Low Intensity Testing Reactor (LITR).

"1952 – MTR, largely designed by ORNL placed in operation at Arco, Idaho.

"1953 – Homogeneous Reactor Experiment (HRE) became the second reactor to produce electricity. High Voltage Laboratory constructed for physics research with Van de Graaff accelerators.

"1954 – Aircraft Reactor Experiment operated successfully with all components at bright red heat. HRE dismantled and construction of HRE-2 started. Tower Shielding Reactor built for aircraft shielding research.

"1955 – An operating swimming pool reactor and building were designed and constructed in five months, and exhibited at the Atoms for Peace Conference in Geneva, Switzerland.

"1956 – Thermonuclear fusion research expanded to develop a promising new approach to achieving a controlled reaction by injection of high energy ions into plasma – the Direct Current Experiment, referred to as DCX.

"1957 – From an ORNL concept, an Army Package Power Reactor was designed and constructed at Ft. Belvoir, VA.

"1958 – A new 30 megawatt research reactor (ORR) was completed. The Fission Products Development Laboratory was constructed. ORNL coordinated the fusion exhibit at the Second Conference on Peaceful Uses of Atomic Energy, and the Laboratory exhibited a working model of the DCX.

"1959 – Major construction program initiated to provide new research facilities, including the Central Research Laboratory additions, the Metals and Ceramics Laboratory, the High Radiation Level Examination Laboratory, and major renovations to the facilities used by ORNL at Y-12.

"1960 – Construction began on a new cyclotron of advanced design, the Oak Ridge Relativistic Isochronous Cyclotron (ORIC), and on a 10-Mev Van de Graff charged particle accelerator for physics research.

"1961 – ORNL established as AEC center for production of transuranium elements not existing in nature. Construction of a High Flux Isotope Reactor and transuranium elements processing laboratory planned. Construction also begun on a special unshielded reactor for the bio physics research on radiation effects, and on a Molten Salt Reactor Experiment to test non-aqueous fluid fuel systems for producing electricity.

"1962 – Additions completed to the Central Research Laboratory, and a new Metals and Ceramics Laboratory constructed. AEC established ORNL as the Isotopes Development Center. The Bare Reactor Experiment, Nevada (BREN) was conducted by ORNL, using the unshielded health physics reactor mounted atop a 1,500-foot tower to simulate nuclear weapons explosions in the air."

The report summarized the laboratory's role as, "Emphasis on peaceful applications of nuclear energy increased under the Atomic Energy Commission, which was organized in 1946. The Clinton Laboratories, which had been a pilot plant for research and development on plutonium production, became, in 1948, the Oak Ridge National Laboratory; a vigorous program of fundamental research, radioisotopes production, and nuclear power development was undertaken at the enlarged laboratory. Union Carbide became the operating contractor in March, 1948."

Next we will look at the history and milestones of Y-12.