

Union Carbide's 20 years in nuclear energy, part 2

We will continue with the second part of the Y-12 portion of the 1962 publication, *Union Carbide's 20 years in nuclear energy*, which was provided to me by Tim Gawne of the Oak Ridge National Laboratory's Technical Library. A list of significant milestones from Y-12's history proves to be quite interesting.

The list is amazingly simple, yet quite profound for its documentation of accomplishments that were substantial advances in machining, manufacturing and measuring products from uranium and other unusual materials.

The following is taken from the end of the Y-12 section of the publication.

Some Y-12 Plant Milestones:

"1941–1942 – Scientists at University of California Radiation Laboratory, Berkeley, began development of a magnetic separator which would function on the principle of the mass spectrograph, and would separate U-235 from natural uranium in appreciable quantities. By autumn 1942, the rate at which U-235 was separated at UCRL, justified authorization of construction of the Electromagnetic Separation Plant at Y-12.

"1943–1946 – Ground was broken for the first building in the Y-12 area on February 1, 1943. Chemical operations for magnetic separation for charge preparation began in October, 1943. The first production building went into operation on January 27, 1944, and conversion of high-enriched uranium-235 to UF (Uranium Fluoride), began in November 1944. Ultimately, Y-12 employed 22,000 operating personnel and was the first plant to produce large quantities of enriched U-235. Uranium recovery began in January, 1945. On September 22, 1945, all electromagnetic separators used to produce low-level enriched U-235 were shut down, since the K-25 gaseous diffusion plant was supplying a sufficient amount of partially enriched feed for the product-level electromagnetic separators.

"1946 – All magnetic separators were discontinued December 23, 1946, as production units.

"1947 – Carbide Carbon Chemical Company replaced Tennessee Eastman Corporation as the operating contractor of Y-12 on May 4, 1947. Enriched uranium 235 produced by the gaseous diffusion process was reduced to metal and fabricated at Y-12 in accordance with the Atomic Energy Commissions' requirements.

"1948 – Machining of enriched uranium on a small scale was started early in the year.

"1950 – Hafnium-free zirconium production was started in January 1950, for use in the Naval Reactor program. The casting and machining of uranium-aluminum alloy and the first large-scale precision machining of beryllium began.

"1953 – Additional uranium casting facilities and another uranium machining shop were installed and completed by fall. A hydraulic pressing facility was installed in October 1953.

"1954 – An expansion of the enhanced uranium salvage facility was completed early in 1954. Installation of equipment for a new method of UF₆ reduction was completed during the second quarter of 1954.

"1955 – Installation of additional uranium casting facilities was completed early in 1955. (Note: while not listed at the time because of the need for secrecy, Lithium separation production using the COLEX (column exchange) process began in Buildings 9201-4 and 9201-5 – Ray)

"1956 – An accelerated program of providing technical information and assistance to industry interested in uranium salvage and recovery operations began.

“1957 – Installation of a Primary Rolling Mill and further pressing facilities for fabricating uranium were completed during the third quarter of 1957.

“1958 – Installation of a heavy machine shop for uranium fabrication was completed in the first quarter of 1958. A second rolling mill for uranium processing was installed late in 1958.

“1959 – Development and special fabrication service in pressing and machining of tungsten was provided for the benefit of the missile program. The Atomic Energy Commission announced public sale of highly-enriched lithium-7.

“1960–1962 – Specialized development and preproduction fuel element fabrication for the nuclear-powered rocket (Rover) program was started in August 1960. The Atomic Energy Commission authorized Y-12 to provide specialized fabrication service for a missile nose cone in February 1962. During this period, there was continued operation of a plant developed at Y-12 for large-scale separation of lithium isotopes.

That concludes the listing of milestones in the publication, *Union Carbide’s 20 years in nuclear energy*.

I hope you found that historical document enlightening as I did. The report contains facts about Y-12’s history that demonstrate the value brought to the nation by the facility over the years.

It is interesting to note the single sentence at the end of the 1960–1962 mentioning lithium isotope separation. Readers are reminded that 1962 was in the midst of the Cold War and that the separation of lithium-6 for the thermonuclear weapon or hydrogen bomb was a sensitive topic with all information closely held to protect our nation’s secret program to build nuclear weapons that were capable of greater yield while keeping the size of the weapon small.

Y-12 had been asked in the early 1950’s to find a way to separate lithium isotopes to capture the lithium-6. It has been called “the second Manhattan Project” by some who were here at Y-12 during the push to design, test and deploy an industrial process to separate huge quantities of lithium-6. Y-12 again came through for the nation and succeeded within a few years to create a stockpile of lithium-6 that is still being drawn upon today when the nation requires this specialized material.

Next we will explore an event that occurred in September 2–3, 1967, when Y-12 held an Open House.