

## **Y-12 builds capacity to meet nuclear testing schedule —**

**Or: Increasing capacity to meet nuclear testing schedule (title as it appeared in *The Oak Ridger*)**

The continuing high volume schedule demands of the nuclear testing program of the 1950's through September 23, 1992, required Y-12 management to purchase and install a huge amount of specialized machinery. It was routine to install redundant machining capability to assure the demanding schedule would always be met. The question was never, "can we meet the schedule?" Rather it was "What will be required to assure we can meet the schedule?"

This procurement trend continued well into the Cold War years and even through the 1980's when Y-12's production capability exceeded that of the Soviet Union thus contributing to the winning of the Cold War. A secret to the success of Y-12 over the years has been the ability to foresee the capacity requirements and to build ahead to assure essential items would be available when needed.

The testing of nuclear weapons to learn more about their capabilities brought a tremendous amount of work to Y-12. These tests required substantial support from Y-12. The test apparatus was essentially a uniquely designed thermonuclear test device, none of them were the same—all were unique designs.

To keep pace with the seemingly ever increasing demand for test units, Y-12 added several primary manufacturing capabilities such as, casting, pressing, rolling, heat treating and other primary metal working capabilities. The expansion was primarily located in the Area 5 portion of the site, but gradually expanded in the late 1960's into other buildings west of Area 5.

As early as 1953 the casting and machining of uranium was in full swing and extremely tight tolerances were being routinely accomplished. Soon the state-of-the-art available machines were not able to provide the accuracy required by Y-12. These template controlled machines were replaced with numerical controlled machines, the first being a template grinder.

It was at this point that Y-12 took the lead in all industry regarding tight tolerances in cutting metal. Y-12 has remained on the literal cutting edge of metal machining technology ever since, and remains so today with such machines as the Gantry Mill where the optimum cutting speed and depth of cut is being examined and new standards for fast and accurate machining are being set.

Among the most unusual additions to Y-12 during these early years of expanding capability was the addition in October, 1953, of a unique isostatic pressing facility. This pressure vessel was actually the breech of a 16-inch naval gun and had the capability of handling pressures up to 40,000 pounds per square inch.

The H-1 Foundry was installed and casting operations expanded significantly. Entire machine shops were being installed as were other basic machining and metal working facilities. Y-12 was fast becoming the uranium machining and nuclear weapon component manufacturing giant it was destined to be after World War II and because of the Cold War.

Building 9401-3, the third steam plant built at Y-12, was completed in December, 1955. This steam plant was a four boiler coal fired plant and replaced two smaller steam plants (9401-1 and 9401-2) located on opposite ends of the site. In July, 1956, the steam plant boilers were connected to natural gas providing a dual fuel source for the boilers.

During the Cold War's peak years at Y-12 during the 1980's when 8,000 people worked around the clock in Y-12's uranium processing buildings, this steam plant served all buildings and kept pace with demand for process steam as well as heating and humidity control requirements. While it is nearing the end of its useful life now, the steam plant has served Y-12 well for some 54 years and is soon to be replaced with a smaller natural gas plant located very near the first steam plant.

Building 9215 was completed in November, 1956, and was a tremendously important addition to Y-12's metal preparation and machining operations. The limited space in Building 9212 and some adjacent buildings had long since been taken and that location had literally run out of space for expansion.

Building 9212 has been one of Y-12's busiest and most crowded areas of the site and has held a significant role in Y-12's primary uranium mission. By adding Building 9215, the metal preparation work space was expanded considerably. New functions were being added as needed and this new space allowed for much needed expansion.

The primary rolling mill, a 66-inch reversing rolling mill capable of 4.5 million pounds of force was purchased and installed late in 1957. This stiff mill was complimented by a 42-inch finishing mill installed in 1958, and a 42-inch cluster mill for foil and sheet rolling. These mills became workhorses for metal preparation operations.

A 7,500 ton hydraulic press was installed in Building 9204-4 (Beta 4) in October, 1959, after the ELEX (Electrical Exchange) process for separating Lithium 6 proved to be inadequate and was dismantled and removed. Several very large vertical milling machines were installed in the high bay of Beta 4 where previously calutrons had been installed and later the ELEX process.

Today, Building 9204-4 (Beta 4) is being cleaned out in preparation for demolition by one of the American Recovery and Reinvestment Act funded projects, as is Building 9201-5 (Alpha 5), another facility that saw a lot of use during the Cold War. Although now excess to Y-12's mission needs, these huge buildings have seen a tremendous amount of change and have contributed to Y-12's missions over the years.