

## **Y-12 sets the pace in precision machining —**

**Or: Establishing the pace for precision machining (title used by *The Oak Ridger*)**

Beginning in the very early years of Y-12's history, precision machining has played a strong and leadership role in the mission of machining uranium and other special materials for the most crucial elements in nuclear weapons. Every secondary stage for every nuclear weapon the nation has ever built and all nuclear tests the nation has executed were manufactured at Y-12.

As you will recall, Y-12 first separated the uranium 235 for Little Boy, then K-25 came online in March, 1945 and by the end of 1946 the gaseous diffusion process could produce the uranium 235 much more economically than could Y-12's electromagnetic separation calutrons. By December 1946, all the calutrons at Y-12 except for those in Building 9204-3 and Building 9731 were shut down.

Thus the first mission for Y-12, producing the uranium 235 for Little Boy, ended and almost immediately the next mission of machining uranium began. The first two nuclear weapons, Little Boy and Fat Man, as well as the "Gadget" test exploded at Trinity were manufactured at Los Alamos. Only the uranium came from Y-12.

March, 1948 saw the first nuclear weapons parts manufactured at Y-12. Production of nuclear weapons "secondaries," that part of the nuclear weapon that contains the special nuclear materials, has been the primary mission of Y-12 ever since. Storage of reclaimed materials from dismantled weapons has grown into a major mission with the results of the Strategic Arms Reduction Treaties.

With the mission to fabricate nuclear weapons components that was moved from Los Alamos to Y-12 came the need to procure machine tools adequate to the task. From the beginning, the machining requirements called for close tolerances. Even those early weapons components, essentially duplicates of Fat Man, still required substantial machining capability be created in Y-12.

By 1950, machining of unique and new alloy materials that combined uranium with a number of other materials was commonplace. The advances in machining were fast being developed at Y-12. The demand for more unique materials in each new design of the nuclear weapons required Y-12 to continually experiment with new techniques and advanced machines.

In December, 1951, the Plant Laboratory moved from Building 9212 Headhouse to the location it still occupies today, Building 9995. The laboratory has been a mainstay for supporting Y-12 production efforts throughout its existence.

In January, 1952, a new Elza 1 electrical switchyard was completed. The electrical supply for Y-12 has been provided through multiple feeds since the earliest days when the calutrons required uninterrupted power.

In 1953, uranium casting facilities and another complete machine shop were added as well as a hydraulic press facility that was completed in October, 1953. All this was being done around Building 9212 as additional wings and even other buildings were being added to that complex. It was likely that this is the time frame for the identification of this area as "Area 5," but I am still unable to confirm that.

Building 9705 was located atop the hill north of the long-time administration building, 9704-2 and located where the courtyard of the Jack Case Center is today. This building was used as the Atomic

Energy Commission Patrol headquarters when it was first formed in 1947. It was sometime during 1953 that this building burned.

It was also in 1953 that the three white concrete “checking stations” or guard houses were taken out of service and the fences and gates relocated to the physical boundaries of the three main sites, K-25 (Gaseous Diffusion Plant,) Y-12 (Y-12 National Security Complex) and X-10 (Oak Ridge National Laboratory). These structures were built in late 1948 in preparation for the opening of the public road gates to Oak Ridge on March 19, 1949. So, they were only used from 1949 to 1953.

During 1953 at Y-12 a large variety of “spindle lathes” and various size milling machines were brought into these newly created machine shops. Furnaces were installed and the foundry operations expanded considerably. All of Y-12 was growing and expanding

Twenty six nuclear weapons tests were conducted in 1951 and 1952. The first thermonuclear weapon (Mike) was tested on October 31, 1952. King, the largest fission device ever exploded by the United States , at 500 Kilotons, was tested on November 15, 1952.

There were eleven nuclear tests in 1953, six in 1954 and eighteen in 1955. The expanding capacity needed to meet the nuclear testing schedule required new equipment and specialized machine tools be built and purchased expressly for Y-12’s unique needs. This led to Y-12 being a strong leader in the machine tool evolution as many of the special requirements for nuclear weapons machining resulted in improvements in the machine tools available to private industry.

It was in this atmosphere that the request for Y-12 to separate Lithium 6 came and the challenge was readily accepted. As has been said, it was a “heady” time for Y-12. So many new and different things were being accomplished. While the COLEX (Column Exchange) process separated the nation’s need for Lithium 6, from 1955 to 1963, so thermonuclear weapons with increasing yield could be built, other portions of Y-12 were working on the machining of uranium and other needed materials.