

## **Y-12 continues missions while focusing on environment**

At the same time that new environmental concerns were surfacing at Y-12 in the 1970's and 1980's the need to increase the amount of secondaries being built was growing steadily. From the late 1940's through the 1950's, 1960's and into the 1970's, Y-12 had grown from a fledgling post Manhattan Project site that had eight large empty buildings with potentially only one building on the site doing actual production to a site where every single building was filled with advanced machine tools or other state-of-the-art and beyond equipment.

Y-12 had come from the low point in December 1946, which saw all calutrons except the four in Building 9731 and those in Building 9204-3 (Beta 3) shut down, and even those in Beta 3 were soon shut down as well. They could not compete with the efficiency of separation provided by the now fully functioning gaseous diffusion process at K-25. New gaseous diffusion process buildings were also being added there to increase the output of enriched uranium for nuclear power plants as well as nuclear weapons.

From this low point after the war ended and with the rise in tensions created by the Cold War, Y-12 was constantly asked to produce more secondaries. Nuclear weapons testing required special test units to be built at Y-12 that were designed at the western weapons laboratories of first Los Alamos National Laboratory and then Lawrence Livermore National Laboratory, established in 1952. Nuclear testing continued until 1992, so Y-12's workload for those devices continued for many years.

The separation of Lithium 6 to support the newly developed thermonuclear weapons also created an urgent situation whereby the scientific and technical staff at Y-12 was encouraged to quickly create a full-scale production process to separate that needed material. This has been called the "second Manhattan Project" effort by Oak Ridge City Historian, Bill Wilcox, who retired as the Technical Director for both Y-12 and K-25. Bill saw this massive and unprecedented effort firsthand.

The three processes attempted were column exchange (COLEX), electrical exchange (ELEX) and organic exchange (OREX). Of these, COLEX became the process that functioned most effectively. Building 9201-4 (Alpha 4) was the building where the process ran the longest, operating from 1955 to 1963.

It was during this time that a major environmental problem that is still with us today was first created. Mercury was used as a part of the COLEX and ELEX processes. Spills and other problems associated with handling extremely large quantities of mercury in industrial processes resulted in contamination of the East Fork Poplar Creek that has its headwaters midway of the Y-12 site.

Many and continuing efforts to address these early discharges of mercury have resulted over the years, from digging up the soil where the mercury had gotten off the site to creating treatment facilities where the mercury is still being found on site. Extensive new process improvements over the years and increased knowledge and awareness of environmental hazards have created organizations, processes, procedures and ever-increasing scrutiny of all activities whereby environmental issues might be present.

Yet at the same time, the weapons production continued to be accomplished as our nation required it to be done. As each new weapon system was developed, specialized machine tools and necessary forming, casting and rolling equipment and eventually highly automated machining centers were added.

From the first use of the Manhattan Project structures on site by both the Oak Ridge National Laboratory with research facilities being established in the Biology Complex (Building 9207, 9210, 9211 and support buildings) to Building 9201-2 (Alpha 2), Building 9201-3 (Alpha 3), Building 9204-1 (Beta 1), Building 9204-3 (Beta 3) and Building 9731 to the construction of new buildings for weapons production, the Y-12 site grew steadily.

Building 9215 was added in 1959, Building 9204-2E (extension) was added in 1969, Building 9201-5W (west) in 1967 and Building 9201-5N (North) was added in 1972. As these new buildings became available, new and more modern equipment was installed in each of them. Close relationships were developed between the technical staff at Y-12 and many machine tool vendors. The state-of-the-art in machining was being pushed by Y-12's design requirements.

Much the same thing was happening with health, safety and environmental concerns as Y-12 staff began to address the various potentially hazardous chemicals and toxic materials required to do the highly specialized work of nuclear weapons component manufacturing. Among the new organizations that were created several were specifically intended to address issues coming from the increased awareness of the hazards in the workplace at Y-12.

Health, Safety and Environmental Accountability organizations were created to assist the production and maintenance organizations identify and address hazardous situations. New procedures were created and practices were altered as needed to conform to the standards being identified.

Over the years these organizations have evolved, and at Y-12 the primary organization working these issues is the Environment, Safety and Health organization. They still assist the operating and maintenance groups perform to the required ES&H standards.

The ES&H staff works closely with each function to ensure the safety and health of our workers, and the protection of public health and safety are paramount in all we do. Protection of the environment, prevention of pollution, compliance with requirements and continually improving the environment results from the knowledge gained from years of experience with environmental issues at Y-12.

The evolution of both the highly precise machining capabilities and the highly sensitive environment, safety and health culture allows Y-12 to function as the nation's Center of Excellence for Uranium and to continue the mission of supporting the nuclear weapons needs of the nation while assisting in curbing the spread of unprotected nuclear materials anywhere in the world.

The 1990's, 2000's and 2010's were and continue to be exciting times at Y-12. The 1990's brought some pivotal decisions, shut down operations in the entire facility for the first time ever, and led to a transition from an experience-based operation to a highly structured procedural-based operation. Change has been ever present at Y-12.

Missions expanded and buildings were demolished while new buildings were erected. Y-12 has undergone the most change since the Manhattan Project during these past several years. The "Can Do" attitude can be seen as a constant and applies to everything we do.