

Y-12, submarines, work for others and AVLIS

Y-12 was also involved in submarine related work in the 1970s and 1980s along with the K-25 effort that shaped a quarter-scale model for the United States Navy. Thanks to Tom Smith, longtime manager at Y-12 who was involved in many of the work for others efforts that I have been writing about, some additional information about those early work for others efforts can be added to what is being learned.

Tom said, "I was thinking back to submarine involvement here at the Oak Ridge sites and your story talked about the early model at K-25..., I got to thinking back about that time frame and remembered work Y-12 did in the early to mid-70s with David Taylor Research Center on a submarine 'buoy winch.'"

Tom continued, "Y-12 did fabrication [for the submarine winch] and some of our personnel went out on the sub for testing." Tom went on to say that those two early projects spawned further submarine model fabrication, the Seawolf propulsor, and other associated work for Y-12, ORNL and K-25.

Tom mentioned other work such as the Advanced Amphibious Assault Vehicle fabrication, F-22 component fabrication work, Wind Tunnel models for DTRC, ship paint removal applications, reverse engineering for NAVSEA (Naval Sea Systems Command), Instrumentation for Bureau of Engraving and Printing (Quality Assurance for paper currency), instrumentation and testing on military tanks (at Camp Pendleton), work on carrier jet blast deflector, hospital in a box, and many others. Wow, what a list.

The history of work for others efforts at Oak Ridge over the years has had a positive impact on a majority of the fields of science and much of industry. A special organization known as "Data Systems Research and Development" within Martin Marietta Energy Systems funneled much of the work for others to Oak Ridge.

There was so much work that a group was formed within Y-12 Engineering known as, "Central Engineering Services/Work For Others" to manage the engineering aspects of the work. Tom served for a time as the head of this organization.

In the exchange of information with Tom, he mentioned another project that included work done at Y-12 that has not been mentioned, the Atomic Vapor Laser Isotope Separation process.

Tom noted that, "Y-12 started out enriching uranium using big magnets." Of course his reference here is to the huge magnets used in the Alpha Calutrons. Three of those very large magnets are located in Building 9731, the first building completed at Y-12 and the "Pilot Plant" for the Y-12 Electromagnetic Separation Plant. This building is on the tour route for visitors to Y-12 and is a featured stop on the Secret City Festival Tours of Y-12.

Building 9731 also is intended to become part of the Manhattan Project National Historical Park, when the legislation is passed. The three cities included in that national park, Los Alamos, NM; Hanford, WA; and Oak Ridge are beginning to work more closely together regarding heritage tourism. The approaching 70th anniversary of the creation of the Manhattan Project (August 13, 1942) is being noted by special events at both Los Alamos and Hanford. These events are being used to inform the public regarding the national park bills before congress.

Oak Ridge was selected on September 19, 1942, so a special event is being planned for that day to inform people regarding the national park bills, as was done in the other two cities. The Manhattan

Project National Historical Park bill has been through the committee review process and is now ready for the full House of Representatives to vote on it. The Senate bill is still in committee at this time.

Tom noted that AVLIS was also a uranium enrichment process that used big magnets. In the mid-1970s Lawrence Livermore National Laboratory started working with Y-12 to develop the AVLIS process.

The ALVIS process used melted and vaporized uranium subjected to a laser beam that ionizes the uranium. The resulting charged particles are captured as molten metal. Lawrence Livermore National Laboratory was the process developer, and the Y-12 Development Division had the early lead on design for the industrial-sized process and built at least three systems. These systems were tested in Building 9202.

Tom said, "In the mid 1980s the AVLIS division moved to the old barrier plant (K-1037) at the K-25 site where the Material Handling Demonstration System was built. The AVLIS process competed with (and won) two other advanced enrichment processes (also with heavy Oak Ridge involvement).

"These systems were the Molecular Laser Isotope Separation process with Los Alamos National Laboratory, and the Plasma Separation Process with TRW. In 1984 and 1985 there was a runoff between AVLIS and Gas Centrifuge with AVLIS being selected."

At the time of this competition, several things had happened that resulted in the nuclear power industry struggling to stay viable. When nuclear power began to lose favor, the anticipated demand for enriched uranium plummeted. As early as March 28, 1979, the Three Mile Island nuclear power plant accident had occurred. This changed the face of nuclear power drastically over the next several years. In 1987, K-25 shut down the gaseous diffusion processes there.

The AVLIS program was eventually shut down, and Gas Centrifuge technology was chosen by the United States Enrichment Corporation as their primary method for enriching uranium. However, even that technology did not continue in use when the nuclear power industry stalled.

Lately there has been a resurgence of Gas Centrifuge technology. USEC has announced plans to build an American centrifuge plant in Piketon, Ohio, which will produce enriched uranium for nuclear fuel. Large scale separation of uranium was first done at Y-12 using Calutrons, and this history will be included in the Manhattan Project National Historical Park if the legislation passes congress.