Y-12 Work for Others – a historical perspective, part 1

Over the years at Y-12, the Work for Others program has cycled up and down. The first such effort I can find a record of was the Nuclear Energy for the Propulsion of Aircraft (NEPA) project started by the Army Air Force, the precursor of the United States Air Force, created on September 18, 1947.

This program lasted from May, 1946 until May, 1951. The NEPA program was replaced by a new term for the same effort. It was called the Aircraft Nuclear Propulsion (ANP) program. The ANP program lasted until 1957 when it was cut severely, and finally in 1961 the whole effort was cancelled.

The first Work for Others program I find evidence of was the separation of hafnium from zirconium to obtain pure zirconium to use as cladding in the fuel for the United States Navy's emerging nuclear reactors on their ships. Admiral Rickover, then a Captain, had attended the Reactor School at Clinton Laboratories in 1946 and proceeded to create the nuclear navy. Y-12's Work for Others program supported that initiative.

Y-12 has continued to supply the highly enriched uranium fuel for all the U. S. Navy nuclear powered ships. This relationship has led to other work for the navy, including the Seawolf Submarine's propulsor.

While I have been able to learn some of the history of Work for Others at Y-12, I have had the nagging feeling for some time that there was a huge amount of that work, with significant successes, that I was unable to locate. And then I got an email from Dennis Miller, who is currently working in that area. He had attached a document written by Paul Sooter.

I grew excited at the thought of what I had just been given. I was away from my office at the time and had to wait several days to fully appreciate the depth and detail of the material Paul had written.

Paul has worked in the Y-12 National Security Complex's Work for Others program for a number of years. He has taken the time to provide some key historical details of the Work for Others program, primarily since the 1980s. I hope you appreciate the work he has done as much as I do. What a great find for a historian!

Paul wrote: "Most projects involved a collaborative effort between the Y-12 National Security Complex (Y-12), the Oak Ridge National Laboratory (ORNL), and occasionally the Oak Ridge Gaseous Diffusion Plant (now East Tennessee Technology Park)."

"In the early '80's ORNL was funded by the US Navy to provide prototype hardware and software associated with data acquisition for acoustics data. Previously ORNL had developed technologies for use in nuclear reactor systems that were applicable to Navy needs. During one visit, Navy personnel toured manufacturing facilities and became interested in the computer numerical control (CNC) machining and inspection capabilities available within the Oak Ridge complex.

"At this time the US Navy's primary source for submarine propellers, the Philadelphia Naval Ship Yard (later Navy Foundry and Propeller Center – NFPC), was machining propellers with 4-axis mills and inspecting the finished product with templates and height stands. .As of 4 October 2000 NFPC was still using 4-axis mills for propeller machining although improved inspection techniques have been introduced on a limited basis.

“As a result of the Navy’s interest, Y-12 was asked to manufacture a test component to determine whether the facilities would be acceptable for manufacturing scale model hardware associated with a new type of submarine propulsion system. Y-12 manufacturing facilities cast a ¼ scale surface ship propeller blade in H1 Foundry, machined the blade using computer numerical controlled equipment, and inspected the blade using a coordinate measuring machine. Based on the successful completion of this test Oak Ridge became part of the US Navy’s team to develop the USS Seawolf Class Submarine (SSN-21) propulsor.

“From 1984 to 1994 Oak Ridge facilities completed design and manufacture for approximately ¼ scale model propeller assemblies for the Seawolf Program. Nine different design concepts were produced based on hydrodynamic and acoustic information provided by the Naval Surface Warfare Center – Carderock Division.

“In parallel with the scale model propulsor work, the US Navy was attempting to procure, from private industry, the prototype full scale Seawolf propulsor. After several attempted procurements were unsuccessful, a request was made in 1989 for Oak Ridge to produce the prototype unit. This prototype unit was delivered to General Dynamics – Electric Boat Division’s assembly facility in Groton, CT in December 1993. Oak Ridge continued to manufacture additional Seawolf class components through 2000 for SSN-22 and SSN-23.

“In 1992, Oak Ridge began work on scale model hardware for the USS Virginia Class Submarine (SSN-774). Six sets of hardware were designed and manufactured between 1992 and 2000. Oak Ridge designed and manufactured the “duty prop” for the 1/3 scale model autonomous submarine to be used in SSN-774 scale model hardware testing at the Acoustic Research Detachment, with hardware shipment in 2000.

“In addition to scale model hardware production, Oak Ridge has supported the SSN-774 full scale propulsor manufacturing program. Since 1992 Oak Ridge personnel have participated in the SSN-774 integrated product team for development of manufacturing processes and continue to participate in monthly SSN-774 manufacturing meetings.”

What a great review of Y-12 Work for Others projects, thanks to Paul Sooter. Next we will look at more projects that have come to Y-12 over the years because of the reputation built by the early successes.