

Y-12 makes first radical changes

As emphasized last week, Y-12 underwent significant change almost immediately after World War II ended. The other sites in Oak Ridge also saw radical change. As soon as K-25's gaseous diffusion process came on line Y-12's future as an electromagnetic separation plant for uranium 235 was questionable.

First the S-50 Thermal Diffusion Plant was shut down as K-25 began to supply higher enrichment feed material than the thermal diffusion process could provide. The K-25 output was fed to the Y-12 Beta calutrons and these units continued to see vast improvement all through the remainder of 1945.

New production records were set each month as the design of the last two Beta tracks took full advantage of earlier experience and produced greater output. These last two tracks were installed in Building 9204-4, completed in 1945, which was the last major building to be constructed at Y-12 to house calutrons.

Throughout 1946, K-25 kept increasing the enrichment it was capable of producing alone and Y-12 kept using the feed material from K-25 to produce more and more uranium 235. However, in December 1946, Y-12's calutrons stopped production of uranium 235 because K-25 was able to supply the uranium 235 at the needed weapons grade of enrichment, and at much less cost.

After Christmas, 1946, Y-12's workforce was reduced drastically. Many people left Oak Ridge at this time. A workforce that peaked at 22,000 was reduced to less than 10 percent of that peak employment. Y-12's future was definitely in question.

There were only two bright spots at Y-12. One was the stable isotope program in Building 9731 and the other the remaining operational calutrons in Building 9204-3 (Beta 3). The rest of Y-12 was considered surplus equipment and was being dismantled. The loaned silver was being recovered. The largest portion of the small remaining workforce was dedicated to dismantlement of the calutrons.

The Stable Isotope Program, having been started by Chris Keim on November 16, 1945 when he decided to separate the first isotope other than uranium, that being copper (Cu63) isotope, had an interesting beginning. It was in Building 9731 that Keim made the discovery of other elements showing up at various points inside the vacuum chamber of the calutrons. From that observance, he knew that he could alter the operating parameters such that isotopes of other elements might be separated.

Just a few individuals working together without much funding at all were able to salvage equipment, materials, spare parts and other needed items. Letters were exchanged, innovative Y-12 technical supervisors and managers took the initiative to do what was needed to create and sustain the capability to separate isotopes at Y-12.

Leon Love, Chris Keim and George Banic were three key individuals in this unusual "bottoms up" effort that continues to reap benefits even today. They had help from others, of course, and not the least of which was the help of Clarence Larson and Eugene Wigner. Larson supported them from a management perspective in all they did and Wigner wrote the Manhattan Engineer District citing the potential importance of stable isotopes.

The letter from Wigner to A. V. Peterson of the Manhattan Engineer District stated, "...In our opinion the work now being done at the Y-12 Plant is and promises to continue to be scientifically one of the most important projects now underway in the country. We should have, as the very basis of future work in nuclear physics and chemistry, knowledge of the various cross sections of pure stable isotopes."

"Eventually separated isotopes of the elements may provide invaluable raw material for the production by pile or other irradiation of radioisotopes of value in science, medicine and industry. Since we believe that the stable isotope program at Y-12 is today scientifically more important and soon will be more important on every count than the uranium isotope separation, we wish that great emphasis could be placed on it."

Peterson's reply said, "As you no doubt are aware the District has held discussions, in line with the comments made in your letter, and...you will be glad to know that Dr. Clarence Larson has been placed in charge of the overall stable isotopes program at Y-12. Both he and Dr. Keim, who supervises the electromagnetic phase, are enthusiastic about the program and will promote it as fully as possible."

These letters resulted from meetings held in early 1946 between the Electromagnetic Process Improvement staff of the laboratory (later to be Oak Ridge National Laboratory) and Dr. Paul W. McDaniel, who was deeply responsible for initiating the stable isotope separation effort. The result was the dedication of Building 9731 to the stable isotope separation program.

Love states that the Oak Ridge Electromagnetic Isotope Separations Program evolved from a facility considered obsolete and scheduled to be scrapped to the world's foremost supplier of purified, highly enriched isotopes. During the period 1946 – 1974, the program generated over 250 stable and radioactive nuclides ranging from mass 6 to 248. These numbers do not reflect the stable isotopes separated from 1974 – 1998 at Beta 3.

The transition from an all out war time effort to produce uranium 235 to a peace time program of enriching all isotopes of all elements was a highly successful transition. However, there were some unusual practices that helped it along.

As these few key individuals in Y-12, the laboratory (which you will recall was the Graphite Reactor during war time) and McDaniel of the Manhattan Engineer District, began this second phase of Y-12's mission, some rather interesting and odd procurement actions took place. Remember all this took place while Y-12 was being dismantled!

It was apparent to Love, Keim and Banic that much of the equipment items unique to electromagnetic separators would soon disappear if they did not do something to intervene. Yet, they were not funded to purchase needed equipment. So, they devised a plan and got the support of the people dismantling the calutrons in the eight other major buildings.

Not only did they want to save enough equipment items to maintain operations in Building 9731, they already knew they would need to expand into Beta 3 and would need all the spare equipment they could retain. They even became known as "making it difficult" to dismantle Y-12's calutrons.

They also did not have any way to purchase items known to be needed in future years. So, their solution was to obtain the needed materials and equipment from the surplus by obtaining a "loan" of the item or purchase it at salvage prices and store it in warehouses at Y-12.

Everyone dismantling Y-12 was sympathetic to the needs of the stable isotope program as they too wanted to see the electromagnetic separation process continue at Y-12. One example was a need for ionization gage tubes. Rather than order new ones, several were recorded as "lost," slipped across a fence between storage areas and thus the procurement cancelled.

When the mishandling of these surplus items was discovered later, a deal was worked out whereby a good supply of the surplus gages were retained. The proper paperwork was also completed to justify the action.

Next week we will look at other major changes taking place at Y-12 in the late 1940s.