Y-12 and the National Park Service study, part 2
Or: Manhattan Project: No substitute for the real thing (title as it appeared in *The Oak Ridger)*

Let's continue with the details of the National Park Service's and the Atomic Heritage Foundation's visit to Y-12 during the last week of January, 2010. The group visited Building 9204-3, Beta 3 Calutrons, as well as Building 9731, the pilot facility and the first building completed on the site. They indicated that they found both facilities fascinating.

In addition to visiting the Beta 3 calutron race track, the demonstration of how a calutron works, the Alpha Calutron sending and receiving units which are the single remaining such artifacts of Alpha Calutrons, the East Control Room, the telephone switchboard and the single remaining manifold for Alpha Calutrons, Building 9731 provided additional insight for those on the tour. It is the orginal Y-12 source of the first separation of an element other than uranium using a calutron.

Chris Keim, was the scientist who noticed some stray elements being included in the uranium being separated and had the original thought that you can separate anything in a calutron, not just uranium. So, he began experimenting and on November 16, 1945, he separated the Cu63 isotope of copper, the first such variation on this equipment built exclusively to separate uranium for the world's first atomic bomb ever used in warfare – Little Boy.

When the National Park Service representatives understood that they were looking at the actual magnets from the calutrons that were used to produce the genesis of the medical isotope program they encouraged us to assure Building 9731 is preserved and made accessible to visitors. I told them we were in the process of cleaning the building to enable it to be used for some special tours soon and that the future plans called for Building 9731 and the calutron magnets to be preserved as a major elment in the interpretation of Y-12's history along with Building 9204-3 (Beta 3) and possibly the Medical Building.

Some recently published information helps to appreciate the magnitude of this impressive element of the Manhattan Project that immediately after the war ended went on to achieve such astounding results. A recent article in *The Medical* News on January 28, 2010, cited the *Society of Nuclear Medicine* as the source of information that Technetium-99 the decay product of Molybdenum-99 is a critical medical isotope used in more than 16 million diagnostic medical tests annually in the U.S. for the early detection of cancer, heart disease, thyroid disease and other serious conditions.

While Molybdenum-99 is not currently obtained from calutrons, the program started by Chris Keim at the end of World War II in Y-12's Building 9731 has led to the discovery of greater and greater uses for radioisotopes. It is important to retain the origin of that history. The huge and impressive magnets are the sole remaining elements of that historic era, the origin of the separation of stable isotopes. Keim and his crew actually began the effort to separate ALL the elements in the Periodic Table and over the years did just that.

The program begun by Chris Keim in 1945 was transferred to the newly forming Oak Ridge National Laboratory as Y-12 continued to shut down all other calutrons and it looked as if the end was near for all work at Y-12. Efforts were underway to hold on to the isotope separation program by moving responsibility from Y-12 to the laboratory.

Eventually both buildings 9731 and 9204-3 were transferred from Y-12's to ORNL's responsibility. Beta 3 continued to separate stable isotopes until 1998. It remains in standby today as the nation's sole capability to separate some 140 isotopes that can only be separated using calutrons. It is still the responsibility of the Oak Ridge National Laboratory even though it is located at Y-12 and they no longer use the facility. They are retaining the standby condition.

Recent efforts to determine who should ultimately be responsible for this historic facility are underway. Regardless of the outcome of the decision, the integrity of the historic calutrons is intended to be retained. As I have said before, there is NO SUBSTITUTE for the real thing when it comes to making the Manhattan Project history come alive.

These calutrons and the control room that looks just like it did in 1945 are powerful teaching aids. They are the sole remaining example of what 22,000 people did to help win that awful war. Even if they did not understand the theory, they knew how to operate the equipment and did so enthusiastically, knowing they were helping bring the war to an end.

The Stable Isotope Separation program in Building 9731 was so important that the silver used in the huge calutron magnets was not returned to the Treasury department until 1970 when the huge magnets were finally shut down and removed to have the silver windings replaced with copper ones. To remove the Alpha Calutron magnets, the center portion of the south wall of the building had to be removed. The tiles remain a slightly different shade of color even today and can readily be seen as having been replaced.

Building 9731 was transferred back to Y-12's responsibility in the late 1970's when the calutrons there were no longer needed to support the Stable Isotope Separation efforts being carried out in Beta 3. It has had varied uses over the years and is intended to be preserved for historic purposes.

It is amazing to realize that the exact same science and the exact same equipment that separated the uranium for Little Boy, the world's first atomic bomb used in warfare, also separated the stable isotopes that were then sent to The Graphite Reactor to be made radioactive and become the world's first radioisotopes of nuclear medicine. Wow, that is a story that MUST be understood by future generations!

The Manhattan Project was not just about the atomic bomb, it was the seminal event of the 20th Century that preceded literally thousands of scientific and technical advancements beneficial to mankind the world over. From nuclear energy to the integrated circuit, from atomic bombs to medical isotopes, the Manhattan Project's calutrons have been the historical first ever equipment to bring the world these new achievements.

The story of the Manhattan Project is one that is well deserving of national park status with all the accruements of our nation's premier history story telling capability. We are convinced the National Park Service will come to the same conclusion.

As evidenced by discussion with the representatives of the National Park Service after the tour on Monday, two public meetings on Tuesday and a workshop on Wednesday, I believe they left with a much greater appreciation for Oak Ridge's role in the historic project. They plan to hold meetings at the two remaining sites being considered for National Park status and will then finalize their report by April 2010.