

## **14,700 tons of silver at Y-12**

The reason for the silver being used as electrical conductors for the calutron magnets was because of a shortage of copper during the war. As you will recall, Gen. Groves sent Col. Nichols to arrange for the purchase of as much uranium ore as could be found. Well, Col. Nichols was also the person sent to borrow a very large amount of silver.

Early in the Manhattan Project it was realized that a large quantity of electrical conductors would be needed for the huge industrial project being planned. With the decision, influenced by E. O. Lawrence and Jim Conant, to build enough calutrons for 100 grams per day separation of uranium 235 instead of just a 100 gram plant, the scope of the project had grown significantly. Y-12 was the first of the three sites cleared and also the calutrons were the first equipment to be fabricated.

The war caused many shortages, gas rationing, food and supplies, but the one shortage that could most severely affect the project was the shortage of copper. To prevent that from happening, Col. Nichols arranged for the loan of 14,700 tons of silver from the U. S. Treasury to the Y-12 Plant.

The first meeting to discuss the loan of the silver that I have found was described by Col. Nichols in his book "The Road to Trinity" as happening on Aug. 3, 1942. He states, "As a result, on Aug. 3, I visited Assistant Secretary of the Treasury Daniel Bell. He explained the procedure for transferring the silver and asked, 'How much do you need?' I replied, 'Six thousand tons.' 'How many troy ounces is that?' he asked. In fact I did not know how to convert tons to troy ounces, and neither did he. A little impatient, I responded, 'I don't know how many troy ounces we need but I know I need six thousand tons - that is a definite quantity. What difference does it make how we express the quantity?' He replied rather indignantly, 'Young man, you may think of silver in tons, but the Treasury will always think of silver in troy ounces.'

At least one follow up meeting took place where Capt. Robert Miller and Col. Alan Johnson accompanied Col. Nichols as the principle Manhattan Project representatives. The group traveled to the Treasury's West Point Bullion Depository to finalize the specific, yet quite simple, details for the loan of such a large amount of silver.

The first shipment of silver bullion in October 1942 went from the West Point Bullion Depository to the Defense Plant Corporation at Carteret, N.J. where the silver bars were reformed as cylindrical billets. Then the silver traveled secretly across New Jersey to the Phelps Dodge copper plant at Bayway, N.J. where the billets were rolled into strips 5/8 of an inch thick, 3 inches wide and 40 feet long. The strips then traveled to Milwaukee, where the Allis Chalmers Company wound them with wooden insulation around giant steel spools and encased them in another steel unit. The completed 19-square-foot units were then shipped to Y-12.

Y-12 workers carefully drilled holes in the bars so they could be assembled together. This drilling was done over paper to catch the expensive silver. No silver was lost or stolen from Y-12 even though the silver was kept locked in a chain linked fenced area just south of Building 9720-6. The last of the silver was not returned to the Treasury at its West Point Depository until June 1, 1970. Less than thirty-six-thousandths of one percent of the more than 14,700 tons of silver was missing. Col. Nichols recalled being required to account to the Treasury on a monthly basis for all the silver at Y-12 and his book is the source of the above number stating the small amount of the overall loss of silver.

The silver was used as electrical conductors for the electromagnetic separation calutrons. Once the war was over and the separation of uranium 235 was taken over by the gaseous diffusion process at K-25, the calutrons were removed from Y-12 and the silver returned to the treasury. The remaining Beta 3 Calutrons at Y-12 use copper conductors, as do the four calutron magnets located in Building 9731, however the silver was used in the calutrons located in Building 9731 until 1970.

These four calutrons in Building 9731 were used to separate isotopes of elements other than uranium, as was the west racetrack in Building 9204-3 (Beta 3) later on. When the uranium 235 mission was trans-

ferred to K-25, the first element to be separated at Y-12 other than uranium was copper. The first run was logged on November 16, 1945 on the "XBX" or Beta calutrons in Building 9731.

The medical radioisotope program, that is today world-renowned and used for diagnosis and treatment of many diseases, had its genesis right here in Y-12 at the Building 9731 and Building 9204-3 Beta calutrons. There will be much more said about this most important development at Y-12 later in this series.

Next we will examine the difficulties Y-12 experienced when the first calutron racetracks were powered up. They did not work! This caused a major perturbation throughout the whole Manhattan Project. Remember, they were in a race with Germany, or so they thought. A major setback like this was a terrible blow to all involved. General Groves must have reacted strongly.