

Operations start and shipments begin

Y-12's formal operational start date of record is January 27, 1944. George Robinson, in *The Oak Ridge Story*, tells us that on that date, "a select group of Manhattan [Engineer] District personnel and officials of Stone and Webster and the Tennessee Eastman Corporation...witnessed the epochal first 'run' of uranium 235 on a mass basis by the electromagnetic method."

Even this first successful production run had its share of frustrating problems. Robinson continues, "The run was marred by the discovery of foreign matter in certain pipes which had to be immaculately clean for successful operations, but the ingenuity of engineers and technical personnel quickly solved the problems." This was typical of the kind of problems encountered during the attempts to start up the calutrons.

The first shipment of uranium 235 (200 grams of 12% enrichment) from Y-12 in March, 1944, proved that the electromagnetic separation plant was capable of doing what was required for Los Alamos to begin testing and experimenting with this scarce material in more than mere laboratory quantities. They were still working to learn just how much uranium 235 would be needed to create a critical mass and thus an atomic bomb.

The first successful shipment from Y-12 served also to demonstrate that the concept of a production factory was basically in place. The process included the full sequence of events required to take uranium ore and process the material to the final special end product of uranium 235 suitable for shipment by courier.

A most unusual method was used to transport this extremely valuable material. It was carefully packaged in a small room in the center of Building 9733-1. Then the material was placed in gold-lined nickel containers about the size of coffee cups. Two of these containers were placed in a briefcase size container and the container strapped to an Army Lieutenant's arm. He was dressed in a suit to look like a salesman and along with a couple of other Army personnel also dressed as salesmen, was driven to Knoxville where he boarded a passenger train to Chicago.

At Chicago, the courier transferred his case to yet another Army Lieutenant also dressed as a salesman who took the material on to Los Alamos. A new set of escorts were assigned to this new courier and the original group returned to Oak Ridge by way of Knoxville.

In *The New World*, by Richard G. Hewlett and Oscar E. Anderson Jr., the following description is provided regarding the transportation of uranium-235 from Y-12 to Los Alamos.

"Transporting the precious material to Los Alamos involved all the melodrama of an undercover operation.

"Since air travel seemed too risky, the Army shipped the product by rail. The containers of uranium tetrafluoride were placed in special luggage. At 10:30 a.m. on specified days, armed couriers wearing civilian clothes took the shipments to Knoxville in an unmarked Chevrolet sedan with Tennessee license plates. At 12:50 p.m., the couriers left for Chicago in a private compartment aboard the 'Southland.'

"Arriving in Chicago the next morning, the Oak Ridge couriers were met by Chicago couriers who boarded the Santa Fe 'Chief' for the long ride west. The next day at 2:10 p.m., a car from Los Alamos met the train at Lamy, a way station in the New Mexico desert. There was some danger that conductors, porters, and station attendants might come to recognize the couriers no matter how hard they tried to make themselves inconspicuous, but train transportation was cheap and relatively safe."

That "special luggage" mentioned in the book was a briefcase-type container with two coffee-cup-sized gold-lined nickel containers. The "briefcase" was strapped to the arm of an Army lieutenant who was dressed to look like a salesman.

This method of shipment kept folks in Knoxville asking, "What's going on over there at Y-12?" They saw trainload after trainload of building materials going to Oak Ridge, but they never saw anything being shipped out because they did not expect the product to be shipped in something as small as a briefcase.

Here's another story that shows the value placed on the uranium 235. The entire Y-12 production of U-235 prior to the dropping of the bomb Little Boy passed through room 22 of Building 9733-1. At one time, there were bars on the windows and a guard was posted outside the door to protect the output of Y-12's calutrons. The material was processed in one kilogram batches.

Twenty-four karat gold trays weighing about four pounds were used to process the material. The first batches were ground by hand using a mortar and pestle made of nickel. After the grinding operations, the workers had to check under their fingernails to be sure the material had not accumulated there.

The coffee-cup-size nickel cylinders used to transport the U-235 were made by a group in the Y-12 shops headed by Jack Case, Y-12 plant manager from 1967 to 1982 and namesake of the Jack Case Center. They were gold plated in Slack's Plating Shop in Knoxville. Johnsson was driven to Knoxville to deliver and pick up the cylinders by one of Y-12's Motor Pool drivers (a Mrs. Justice).

The filled cylinders were delivered to Captain Lloyd Zumwalt, who was located in an office two blocks from Building 9733-1. When the captain found out they were walking with cylinders containing U-235, he instructed those delivering it to, "Call for a car. If you got run over it would be a mess to dig up the ground to recover the uranium but in a car it would be all in one place."

Y-12's very specialized role in the Manhattan Project required unusual methods and new untried technology. The electromagnetic separation plant was a huge gamble taken by General Groves, but as we will see in future installments of this history of Y-12, it was but one of many unique and highly successful endeavors that resulted in key support to our nation and even some of the most significant contributions to the health and welfare of the world.

Next we will look at the rapid expansion of Y-12 after the first successful shipment of uranium 235. We will also see the continued resolution of numerous problem areas as the young plant gets its feet on the ground.