Why “25”? and Y-12 mercury losses

Recently I learned something new regarding the “shortcut names” or code names for uranium-235 and plutonium-239. It seems the codes used to discuss these elements were derived from the last digits of the number “92,” the atomic number for uranium and the isotope “235“ to cause uranium-235 to be referred to as “25” and the last number of “94,” the atomic number for plutonium and the isotope “239,” to cause plutonium-239 to be referred to as “49.”

I wondered about this when answering the question, “Why was ‘Y-12’ used to designate the Y-12 site?” My standard answer is that the “Y-12” is meaningless and that is why it was used. It is not the gridlines on a map or anything else that can be tied to what was being done at that location. And that is specifically why it was chosen, as was “X-10” chosen for the original name for the Oak Ridge National Laboratory and “S-50” chosen for the Thermal Diffusion Plant. However, the “K-25” might have stood for Kellex Corporation and “25” being the shortcut name for uranium-235.

Not until a group of Nuclear Weapons Interns toured Y-12 did I learn the actual rationale behind the “25” for uranium-235. It pleased me to learn the background of the story I have told to so many.

Now let’s look at the mercury losses at Y-12. During the eight years of Y-12’s intensive lithium-6 separation effort using the huge COLEX processes in Building 9201-4 and 9201-5, there were substantial losses of mercury. The process relied upon large quantities of mercury, literally millions of pounds, to be mixed in with the lithium to chemically separate the lithium 6.

President Eisenhower authorized Y-12 to use a significant portion of the mercury from the National Stockpile for the COLEX process from 1955 to 1963. This was done secretly to avoid impact on the world markets for mercury. Such a huge amount of mercury being procured would have clearly communicated to the Soviets what was being done at Y-12.

The COLEX process installed in Buildings 9201-4 and 9201-5 was the primary method used at Y-12 to separate lithium-6 and over the eight years of operation produced a large supply of lithium-6, much of which remained at Y-12. The large quantities of mercury required in the COLEX process contributed to mercury losses from Y-12’s supply because of spills or failures in the process operations.

The East Fork of Popular Creek has its origin in Bear Creek Valley right near the middle of Y-12. These spills found their way to the creek and migrated downstream. The stream runs from Y-12 through Pine Ridge and then through the city of Oak Ridge.

In 1983, the *Y-12 Mercury Task Force* was formed to investigate the use of mercury at Y-12 during the 1950s and early 1960s. This investigation followed the May 17, 1983 publication of an unclassified version of *Mercury Inventory at Y-12 Plant, 1950 through 1977*. The release of this report generated an enormous amount of media attention and resulting public concern regarding the effects of mercury toxicity and the adverse impact of the mercury losses from Y-12 on the environment.

The study also reviewed the worker health hazards associated with the COLEX process and found that Y-12 had recognized the hazard of mercury vapor associated with the heavy use of large quantities of mercury in the two buildings and had taken steps to reduce or mitigate the hazard substantially by 1956. The greatest exposures were experienced during the first two years of operation as the needed process controls were being determined and implemented.

Air sampling demonstrated the levels of mercury vapors were held to a minimum through huge exhaust fans to remove the vapor. The workers were further protected by the wearing of respirators. However, spills continued throughout the years the process operated and even into the years after operations ceased and the task of removing the COLEX process equipment from Building 9201-5. The COLEX equipment remains in Building 9201-4 today.

As a result of the concerns raised because of the mercury losses at Y-12, during the mid 1980’s an effort was made to dig up the contaminated soil along the creek running through the city and to return that soil

to Y-12 where it was buried. The highest levels of mercury concentration were found to be several inches beneath the ground and thus were not perceived to be an immediate threat to the population.

However, signs were placed along the stream to “avoid wading, swimming or fishing in these waters” and the stream remains posted as such today.