

white blood corpuscle counts taken of those doing the separation. In addition, the separation job was rotated among members of Seaborg's section.

Part of the hydration water from the uranium nitrate hexahydrate settled out to the bottom of the funnel, and with it came the plutonium, together with many of the fission products. We separated the water phase and saved it, and dumped the ether phase (with most of the uranium) into 5-gallon carboys, and let somebody else take care of that.

But we still had to handle the water phase; since the separation factor of the ether extraction was only 90% (that is, 90% of the uranium went into the ether phase), we still had 10% left. While each separatory funnel didn't yield much water phase, all the many separations yielded quite a bit of solution and a lot of uranium, I suppose something on the order of 20 pounds, still too much for desk top chemistry. So we had to start over again to separate the plutonium from a quantity of uranium.

We didn't know any other way of doing it as efficiently, so we had to do another ether extraction. Since this meant starting with uranium nitrate hexahydrate crystals, we had to evaporate the water solution. Here again, we had to do it on a big scale. We didn't have hoods, but we did have an unknown benefactor who had left us big evaporating dishes about 24 to 30 inches in diameter. Then we found that there was a little open roof area outside the attic. It was August and balmy, so we just set up some hot plates on a table on the roof and started evaporating. This was as good as a hood since the wind blew away the fumes.

But we did have one serious problem. We had to know when to stop evaporating. The solution temperature was around 80 to 90 degrees centigrade, but we couldn't get the uranium nitrate hexahydrate crystals until we allowed the whole solution to cool. This was tedious because the entire mass had to be vigorously stirred as the solution cooled and the crystals settled out. If we allowed it to cool after having evaporated too much water we would get a lower hydrate than the hexahydrate, and this wouldn't dissolve in the ether. If we left too much water in the solution, then the crystals would come out, but they would be wet and we would get too large a water phase in the ether extraction. This would carry too much uranium with the plutonium. We didn't have the time or the facilities to do an accurate calibration of the necessary density, but we discovered empirically a method that worked as well. Little porcelain pieces from a small smashed evaporating dish were being used as boiling stones. We found that if we lifted