amounts through the neutron irradiation of plutonium.[8] The curium was produced in smaller amounts by the irradiation of americium with neutrons.[8,9] Each step required the use of tedious chemical separations.

Since the isotope Cm^{242} has an alpha-decay half-life of about 160 days, its intense radioactivity presented a major difficulty. The microgram amounts of curium available for the alpha-particle bombardments emit alpha-particles at the rate of approximately 10^{11} disintegrations per minute. This high level of radioactivity necessitated not only the design and development of advanced techniques and equipment for its safe handling[7] but also made it necessary to attain enormous separation factors of the order of 10^6 in the isolation of an expected 10^3 to 10^4 atoms of the new element from the target material in order to permit the detection of its expected radioactivity, amounting to less than 10^3 disintegrations per minute. Furthermore, this high degree of separation had to be carried out in good yield in a short length of time. In order to provide the greatest sensitivity of detection and thus a possibility of observing the radioactivity of the new element, it was clearly necessary to predict accurately the nuclear properties, including the half-life and radiation characteristics of the isotopes of element 98, so that the experiments could be properly designed. Only then could the optimum period of the bombardment, time of chemical separations and optimum adjustments for the measurement of the radioactivity be established. Likewise, it was necessary to predict the chemical properties of the new element so that its rapid separation from the target material, Cm^{242}, and other isotopes produced by bombardment could be made. An erroneous prediction of any of these properties would have meant unsuccessful experiments.

---

[8]Ghiorso, James, Morgan, and Seaborg, Phys. Rev. 78, 472 (1950).

[9]Seaborg, James, and Morgan, National Nuclear Energy Series, Plutonium Project Record, Vol. 14B, "The Transuranium Elements: Research Papers," Paper No. 22.1 (McGraw-Hill Book Co., Inc., New York, 1949).