

californium on a platinum-irridium wire, and then doubly encapsulating the wire in platinum-irridium.

The californium for the first needle was purified by H. P. Holcomb of SRL (Figure 7) in August, 1965, from 0.82 microgram produced during one of the irradiations to obtain  $^{244}\text{Cm}$ . Later, in October, 1966, Holcomb extracted and purified 14 micrograms of  $^{252}\text{Cf}$  (including 6 grams of high purity material for medical work). This material was extracted from some glove box High Efficiency Air Filters that the SRL had obtained from Lawrence Radiation Laboratory in Berkeley, California.

In July 1966, dosimetry studies were started at SRL by C. N. Wright, A. R. Boulogne, W. C. Reinig, and A. G. Evans. This work was published in "Radiology" in August 1967.

In September 1966, the medical program was outlined for the Atomic Energy Commission's Division of Biology and Medicine. This division was brought into the picture at the request of Frank P. Baranowski who was Director of the Division of Production for the AEC at the time (Figure 8). Frank Baranowski was a prime mover in the californium program while he held that position.

To ensure that production capability would be compatible with the long-term demand for  $^{252}\text{Cf}$ , the AEC's Division of Production began a market evaluation program. This program involved the lending of test quantities of encapsulated californium sources to potential users, and seeking their advice on the amount of californium that might be required over the long haul. The market evaluation program was under the direction of a group of people at SRL who published the findings of these studies in reports called "Californium-252 Progress." Twenty-two reports were issued beginning with number 1, dated October 1969, and continuing to number 22, dated May 1978. The cover of the original report had a graphic design representing tracks of fission fragments from the spontaneous fission of  $^{252}\text{Cf}$  (Figure 9). Neutrons accompany the fission fragments, but are not visible. The tracks were made by depositing a particle of  $^{252}\text{Cf}_2\text{O}_3$  on a glass microscope slide, allowing the fission fragments to strike the glass, and subsequently developing the tracks by etching the glass in hydrofluoric acid. Members of the market evaluation group who were major contributors over the years included Du Pont employees W. C. Reinig, P. H. Permar, and W. R. Cornman, and AEC employees E. S. Goldberg and W. B. Wilson.

In December 1966, Dr. Harold L. Atkins of Brookhaven National Laboratory, one of the first investigators in the medical application business visited SRL. Dr. Atkins did a lot of preliminary work on dosimetry, relative biological effectiveness, and skin tolerance. Pigs were used in the