RAYS OF HOPE A patient is prepared for treatment with a beam of charged particles tailored to deposit most of its destructive energy within a malignant tumor. The tumor's proximity to critical neurological structures makes this form of therapy especially suitable.

therapy, or BNCT, a nonradioactive boron-labeled compound is administered that accumulates predominantly in the tumor, which is then irradiated with neutrons. The neutrons cause the boron atoms to fission, releasing energy that destroys the tumor cells. This kind of highly localized cell surgery was conceived in the thirties and tried clinically in the fifties, with inconsistent results. Following further refinements, however, clinical trials resumed in 1994 at Brookhaven and at MIT, in association with nearby medical schools and hospitals.

❧

Human health has always been at the heart of biological research within the energy agencies, and it has thus been the central subject of the last two chapters. But from the earliest days of the AEC, at a time dominated by anxiety about radioactive fallout, environmental and ecological studies, too, have been a natural part of the picture. Next, then, a short history of environmental research —research born of worries about the fate of wind-blown products of nuclear blasts and sustained today by a much wider concern about the global effects, and lasting impact, of energy production and use.

1976 Scientists from Brookhaven, led by Alfred Wolf, synthesized 2-deoxy-2-fluoro-D-glucose (FDG) labeled with the positron emitter fluorine-18. This tracer was then used by a team from the University of Pennsylvania and the NIH to obtain the first images of energy metabolism in the human brain, an early step in a revolution in brain imaging using PET.

1987 At UCLA patients carrying the Huntington's disease gene were identified with PET about five years before damage from this abnormal gene could be identified by symptoms, behavior tests, CT, or MRI.

1994 Phase I clinical trials using boron neutron capture therapy to treat glioblastoma multiforme began at Brookhaven, in collaboration with the Beth-Israel Medical Center, New York.

1997 The Regional Neuroimaging Center was launched at Brookhaven, jointly funded by OBER and the National Institute on Drug Abuse. It will use state-of-the-art medical imaging technologies such as PET, SPECT, and MRI to study the biochemical roots of drug abuse and addiction in an effort to develop more effective treatments.