breeder concepts using the thorium cycle, namely, the Molten Salt Breeder Reactor (MSBR) under investigation at Oak Ridge National Laboratory and the Light Water Breeder Reactor (LWBR) being investigated under Admiral Rickover's direction. In addition, considerable interest exists, both here and abroad, in the development of the Gas Cooled Fast Breeder Reactor (GCFBR), which employs the uranium cycle. I might note here that some 43 U.S. utilities have joined with the reactor manufacturer, Gulf General Atomic Incorporated, in pursuing this breeder concept.

I should also mention one other concept, the High Temperature Gas Cooled Reactor (HTGR), which like the MSBR and the LWBR employs the thorium cycle. Although not a breeder, the HTGR offers substantial improvement in fuel utilization, reduced sensitivity to rising ore costs, and reduced thermal discharge because of its high thermal efficiency. A prototype plant based on this concept, Peach Bottom Atomic Power Station, Unit I, has been in operation in Pennsylvania since 1967, and a 330-MW(e) prototype, Fort St. Vrain Nuclear Generating Station, is under construction in Colorado. Gulf General Atomic Incorporated, the reactor manufacturer, is currently marketing an 1100-MW(e) HTGR plant.

Having discussed these alternative efforts, I should point out that the direction we have taken was importantly influenced by the earlier decisions to proceed with development of the light-water reactors and, later, their large-scale acceptance by the utility industry. These light-water reactors operate on the uranium cycle, and, although they are not breeders, they do produce plutonium in significant quantities. The projected operation of about 150,000 MW(e) of predominantly light-water reactor plants by 1980 will result in the production of many thousands of kilograms (literally tons) of plutonium, which can support the large-scale introduction of fast breeders beginning in the 1980's. Of course, much of this ^{239}Pu can and will be recycled to the light-water reactors as a substitute for ^{235}U, but we know that it should be economically more valuable as breeder fuel than as recycle fuel for the water reactors.

The utilities will have options as to how they will use this material—whether to use it in light-water reactors, in breeders, or in both, depending on the characteristics of the plants in their system and other considerations. In any event, this man-made plutonium fuel will be a highly valuable resource with a vast domestic and worldwide potential.