are being evaluated for this application include rhenium-188-perrhenate and the rhenium-188-MAG3 agent (MAG3 = mercaptoacetyltriglycine) and both these chemical species are rapidly excreted *via* the urinary bladder in the unlikely event of balloon rupture.

The ORNL High Flux Isotope Reactor (HFIR)

Research reactors represent important facilities for production of a wide spectrum of radioisotopes for various therapeutic applications. The *HFIR* is located at the Oak Ridge National Laboratory (*ORNL*) in Oak Ridge, Tennessee, and has the highest steady-state thermal neutron flux and the highest power density available in the world (Figures 1 and 2). The *HFIR* was originally designed for the production of transuranium radioisotopes, primarily californium-252 and today is a major resource for nuclear medicine research, and permits the production of very large amounts of high specific activity radioisotopes which cannot be produced at many other sites (Table 1). The *HFIR* began operation in 1965 and is currently operating at a maximum power of 85 MW with a maximal thermal flux, 2-3 x 10^{15} neutrons cm^2/sec and resonance/epithermal ratios of 25/1 to 40/1 in the Hydraulic Tube (*HT*) facility. The current cycle length is 22-24 days and the *HFIR* currently operates about ten cycles per year. The *HFIR* has significant target versatility, with 35 target positions in the high flux trap region (Figures 1 and 2), with one channel housing the hydraulic tube facility which contains sufficient space for a linear array of nine target tubes. The availability of the *HT* facility in the high flux core position permits the insertion and removal of targets at any time during the operating cycle, allowing great flexibility in production schedules. The Beryllium reflector region also has a number of irradiation positions with large volume which are accessible during reactor refueling.

Because of the importance of having the *HT* positions available for short term irradiations and the practical importance of increasing the target size (mass), the outer Peripheral Target Positions (*PTP*), which are located in the outer edge of the target bundle (Figures 2-4), are currently being modified to accept long target containers (Figure 3), each of which will house eight individual *HT* target tubes. Since there are six *PTP* positions, the maximum number of *HT* size targets housed in the *PTP* positions will total 48, which represents over a five-fold increase from the nine *HT* targets which can currently be irradiated. Since the *PTP* targets can only be accessed during refueling when the top of the reactor vessel is removed, these positions are only suitable for longer term, multi-cycle irradiations. The use of *HT* targets in the *PTP* tubes is an important