Due to the great affinity of Min-K 1301 for water vapor and the extensive procedure required to drive off the binder, a study was conducted early in the program to evaluate other insulations. Replacement insulations, which represented a technical improvement over Min-K 1301 in several categories, were selected. Min-K 1999 was selected as the molded module insulation and Min-K 2002 was selected as the load bearing insulation for end discs and rings. Fabrication of Min-K 1999 module insulation was unsatisfactory due to consistent breakage during handling. Because of this, the replacement program was discontinued.

The diagnostic disassembly of RTG S/N 37 suggested installation of a getter in the generator (see Section VI). A ring configuration one at each end of the heat shield was selected for RTG's S/N 41 through S/N 53.

Each getter consists of a ring of reactor grade zirconium pressed and sintered in the form of a ring to 70 to 80% density. The ring has a 3.062 inch inside diameter, a 3.5 inch outside diameter, and is 0.562 inch high. The zirconium is contained in a two piece housing fabricated of palladium. The container wall thickness is 0.012 inch.

The SNAP 19/Pioneer RTG is filled with an inert gas to inhibit sublimation of the thermoelectric materials and to permit satisfactory operating temperatures of heat source components. A gas mixture of 75% helium 25% argon was the initial fill of all RTG's. This mixture represents a compromise which offers low heat source temperatures, low ΔT across cold end hardware, and reasonable parasitic heat loss through the Min-K insulation.

6. Outgassing Tool

All RTG's are outgassed prior to the fueling operation. Outgassing removes unwanted entrapped gases from within the generator, e.g., oxygen and water vapor, so that when the final gas change is accomplished, the fill gas is nearly contaminant free. RTG's S/N 37 through S/N 40 were outgassed by the evacuation and backfill method. Subsequent to diagnostic disassembly of S/N 37, an improved method of generator outgassing was developed which consists of continuous evacuation of the RTG up to a hot junction temperature of 600°F and a continuous helium purge from 600°F to 1050°F. RTG's S/N 41 through S/N 53 were outgassed using the evacuation and purge method.