ably.[1] One might, therefore, achieve a good measure of shim control (to compensate for fuel burnup and experiment loadings) by varying the amount of moderator in the cavity; a rapid withdrawal of this moderator provides a scramming capability. Secondly, it is estimated that k will decrease when the fuel region is drawn inward away from the reflector wall. Thus, a useful amount of Δk might be obtained by starting up a reactor with a gap between core and reflector and then varying this gap as the occasion demands.

The example discussed here should illustrate the basic potentialities of the cavity test reactor. As mentioned earlier, the test cavity in a thermal reactor may be as small as $\sim$½ meter in diameter. Neutronically speaking, there is no upper bound on the cavity size. Considerations of plant investment and engineering scale would probably dictate the maximum dimension. Detailed engineering design may be expected to compromise some of the niceties indicated here. However, it is felt that the assumption of bareness beyond the reflector, the flat flux in the active core, the long regeneration times, and the unique control possibilities without large neutron consumption may provide sufficient latitude to partially off-set adversities imposed by engineering realism. Also, while the illustration assumes MTR core technology, higher temperature cores [e.g., employing LMFR solutions as proposed by Chernick (*3*)] provide room for substantial flux increases in the long range.

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[1] This statement is based on qualitative considerations which indicate that "in cavity" thermal sources are more effective than the external thermal sources in raising the system multiplication constant.

Measurement of the Density of Liquid Rubidium

Density measurements were made on liquid rubidium and the results are represented by the equation

$$\rho(\text{g/cc}) = 1.52 - 0.00054\ (T - 39°\text{C})$$

where T is the liquid temperature in °C. Data were taken from the melting point, 39°C, to about 400°C; however, the equation should hold to the boiling point, 688°C. An error analysis indicated that the values reported here are within 1½% of the true values. The liquid density value of 1.52 g/cc obtained at the melting point substantiates to 3% the value of 1.475 g/cc predicted earlier (*1*).

The determination was made using the buoyancy principle for a solid suspended in a liquid. The system consisted chiefly of an analytical balance from one arm of which a plummet was suspended in the molten rubidium by a 3-mil tungsten wire. The plummets and capsule containing the melt were machined from nickel. The furnace temperature

was controlled by a chromel-alumel thermocouple. Liquid temperatures were measured with two chromel-alumel thermocouples and a potentiometer.

The entire system was enclosed in a dry box in which an atmosphere of argon was maintained. The argon used was passed over copper filings heated to 800°C to remove traces of oxygen and through a cold trap to remove water vapor. A chemical analysis of a sample of the rubidium used indicated an assay of at least 99.5%.

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