APPENDIX I

HEAT CAPACITY OF MIXTURE

Equation (31) of Reference (7) gives

$$C_{VM} = - T(\partial V/\partial P)_{SM} (dP/dT)^2 \qquad (1)$$

where $(\partial V/\partial P)_{SM}$ is the slope of an equilibrium adiabat in the mixed phase region. Equation (16) of the same reference gives

$$(\partial V/\partial P)_{SM} = dV_1/dP - (dS_1/dT)(dT/dP)^2$$
$$- (V - V_1)(dT/dP)^2 \, d^2P/dT^2 \, . \qquad (2)$$

Using the identities

$$T \, dS_1/dT = C_{V1} + T(\partial P/\partial T)_{V1} \, dV_1/dT$$

and

$$dV_1/dT = (\partial V_1/\partial T)_P + (\partial V_1/\partial P)_T \, dP/dT \, ,$$

Equations (1) and (2) can be transformed to yield

$$C_{VM} = C_{V1} - T(\partial P/\partial V_1)_T \, (dV_1/dT)^2 + T(V-V_1) \, d^2P/dT^2 \qquad (3)$$

The first two terms of Equation (3) correspond to Equation (85) of Reference (38). The third term may be important if the state point is not near the boundary of phase I.