From the First Law, a mol of fluid undergoes a mechanically reversible process in a closed system:

$$dU = dQ - dW = dQ - PdV \qquad (1)$$

One of the fundamental relationships arising from the first law is

$$H = U + PV \qquad (2)$$

Differentiating:

$$dH = dU + PdV + VdP \qquad (3)$$

Substituting (1) in (3) to eliminate dU:

$$dH = dQ - \cancel{PdV} + \cancel{PdV} + VdP$$

$$dH = dQ + VdP$$

$$dQ = dH - VdP \qquad (4)$$

Assuming an ideal gas: $dH = C_p dT$

and: $V = RT/P$

$$dQ = C_p dT - \frac{RT}{P} dP \qquad \times \frac{1}{T}$$

$$\frac{dQ}{T} = C_p \frac{dT}{T} - R \frac{dP}{P}$$

From the 2nd Law. ($dS = dQ/T$)

$$dS = C_p \frac{dT}{T} - R \frac{dP}{P}$$

Integrating from state 0 to 1:

$$\int_{S_0}^{S_1} dS = \int_{T_0}^{T_1} C_p \frac{dT}{T} - R \int_{P_0}^{P_1} \frac{dP}{P}$$

At a constant pressure condition, the last term in the rhs vanishes:

$$S_1 - S_0 = C_p \ln\left(\frac{T_1}{T_0}\right)$$

$$\boxed{S_1 = S_0 + C_p \ln\left(\frac{T_1}{T_0}\right)}$$

$$C_p = \left(\frac{\partial H}{\partial T}\right)_p$$

$$dH = C_p \, dT$$

integrating from $H_0 (T = T_0)$ to $H_1 (T = T_1)$

$$\int_{H_0}^{H_1} dH = C_p \int_{T_0}^{T_1} dT$$

(assuming C_p is constant)

$$H_1 - H_0 = C_p (T_1 - T_0)$$

$$\boxed{H_1 = H_0 + C_p (T_1 - T_0)}$$