W4-6-2 Determining pressure and temperature 2

Determine an expression for the pressure of a system for which the fundamental relation is: $U = U(S, V) = \left(\frac{\nu_o \theta}{R^2}\right) \frac{S^3}{NV}$, in which ν_o, θ, N and R are constants.
Tip: remember that you know that:

$$\left(\frac{\partial U}{\partial V}\right)_S = -P \tag{1}$$

$U = \left(\frac{\nu_o \theta}{R^2}\right) \frac{S^3}{NV} = C\frac{S^3}{V}$, where $C = \frac{\nu_o \theta}{NR^2}$ is a constant.
Write $U = (S, V)$ as the total differential: $dU = \left(\frac{\partial U}{\partial S}\right)_V dS + \left(\frac{\partial U}{\partial V}\right)_S dV$.
It is known that:

$$\left(\frac{\partial U}{\partial V}\right)_S = -P \tag{2}$$

This differential can be determined for the function:

$$\left(\frac{\partial U}{\partial V}\right)_S = \frac{\partial}{\partial V}\left(\frac{CS^3}{V}\right) = \frac{-CS^3}{NV^2} = -P \qquad \Rightarrow \qquad P = \frac{\nu_o \theta}{R^2}\frac{S^3}{NV^2} \tag{3}$$