34. $V = 4000 = \frac{4}{3}\pi r^3 + \pi r^2 h$

$$h = \frac{4000}{\pi r^2} - \frac{4}{3}r$$

Let k = cost per square foot of the surface area of the sides, then $2k$ = cost per square foot of the hemispherical ends.

$$C = 2k\left(4\pi r^2\right) + k\left(2\pi rh\right) = k\left[8\pi r^2 + 2\pi r\left(\frac{4000}{\pi r^2} - \frac{4}{3}r\right)\right] = k\left[\frac{16}{3}\pi r^2 + \frac{8000}{r}\right]$$

$$\frac{dC}{dr} = k\left[\frac{32}{3}\pi r - \frac{8000}{r^2}\right] = 0 \text{ when } r = \sqrt[3]{\frac{750}{\pi}} \approx 6.204 \text{ ft and } h \approx 24.814 \text{ ft.}$$

By the Second Derivative Test, you have $\frac{d^2C}{dr^2} = k\left[\frac{32}{3}\pi + \frac{12{,}000}{r^3}\right] > 0$ when $r = \sqrt[3]{\frac{750}{\pi}}$.

The cost is minimum when $r = \sqrt[3]{\frac{750}{\pi}}$ ft and $h \approx 24.814$ ft.