$$c\frac{\partial T}{\partial t} = \nabla \cdot (\frac{1}{\rho}\nabla T) + W_{\text{int}}$$

$$c\frac{\partial T}{\partial t} = \frac{1}{r}\frac{\partial}{\partial r}\left(\frac{r}{\rho}\frac{\partial T}{\partial r}\right) + \frac{1}{r^2}\frac{\partial}{\partial \phi}\left(\frac{1}{\rho}\frac{\partial T}{\partial \phi}\right) + W_{\text{int}}$$

$$P = RI^2$$

$$R = \frac{l\rho_{elec}}{A}$$

$$W_{int} = \frac{P}{V_{cable}}$$

(This assume the entire volume of the cable is heated equally. I don't know how accurate this is. Maybe heating should be more concentrated around the core.)

$$W_{int} = \frac{I^2 R}{lA}$$

$$W_{int} = I^2\frac{\rho_{elec}}{A^2}$$

Assuming no dissipation of heat for a time period of Δt, we find:

$$c\frac{\Delta T}{\Delta t} = W_{int}$$

$$c\frac{\Delta T}{\Delta t} = I^2\frac{\rho_{elec}}{A^2}$$

$$\Delta T = I^2\frac{\rho_{elec}}{A^2 c}\Delta t$$

Reasonable values for ρ_{elec}, A and c:

$$\rho_{elec} = \rho_{copper} = 1.68 \times 10^{-8}\,\Omega\,\mathrm{m}$$

$$c = c_{copper} = 3.45\,\mathrm{J\,cm^{-3}\,K^{-1}}$$

$$A = 250\,\mathrm{mm}^2$$

Proposed model:

$$T_{cable} = I^2\frac{\rho_{elec}}{A^2 c}\Delta t + T_{ground}$$

This assumes no dissipation of heat from the cable for the duration of Δt and instant dissipation of all heat after. Therefor this model will only be accurate for sufficiently small Δt and I.
Furthermore, it is probably more accurate to take the average of the previous and current measurement of I. This essentially assumes a linear change per time interval.
For now we take Δt the time between consecutive measurements in seconds and

$$\frac{\rho_{elec}}{A^2 c} = \frac{1.68 \times 10^{-8}}{(2.50 \times 10^{-4})^2 \cdot 3.45 \times 10^6} \approx 7.79 \times 10^{-8}$$

However, since this value is very low, I fear the model may not be viable. Perhaps assuming all heat dissipates will allow no significant changes in temperature to occur, as ΔT will always be very small for one timestep.