$$U(\mathbf{r},t) = -\frac{\hbar^2}{2m}\frac{\nabla^2 A(\mathbf{r},t)}{A(\mathbf{r},t)} = -\frac{\hbar^2}{2m}\frac{\nabla^2 |\psi(\mathbf{r},t)|}{|\psi(\mathbf{r},t)|}$$