1054-53-112   **Jeffrey S Case*** (`casej@math.ucsb.edu`), Department of Mathematics, University of California, Santa Barbara, CA 93106. *On the non-existence of quasi-Einstein metrics.*

We study complete Riemannian manifolds satisfying the equation $\mathrm{Ric} + \nabla^2 f - \frac{1}{m} df \otimes df = 0$ by studying the associated PDE $\Delta_f f + \mu e^{-2f/m} = 0$ for $\mu \leq 0$. By developing a gradient estimate for f, we show there are no nonconstant solutions. We then apply this result to show that there are no Ricci flat warped product metrics with Einstein fibers with scalar curvature. We also show that one can "take the limit" $m \to \infty$ and get that for nontrivial steady Ricci solitons, $R + |\nabla f|^2$ is a positive constant. (Received September 09, 2009)