1037-35-84 **C. Y. Chan** and **R. Boonklurb*** (rxb1828@louisiana.edu), Department of Mathematics, University of Louisiana at Lafayette, Lafayette, LA 70504-1010. *Beyond quenching for a singular semilinear parabolic problem.*

Let $f(u)$ be twice continuously differentiable in $[0, c)$ for some constant c such that $f(0) > 0$, $f' > 0$, $f'' \geq 0$, and $\lim_{u \to c^-} f(u) = \infty$. Also, let $\chi(S)$ be the characteristic function of the set S, and R and T be real numbers such that $R > 0$ and $T \leq \infty$. This article studies the following problem:

$$r^{n-1} u_t - \left(r^{n-1} u_r\right)_r = r^{n-1} f(u) \chi(\{u < c\}) \text{ in } (0, R) \times (0, T),$$
$$u(r, 0) = 0 \text{ for } 0 \leq r \leq R, \; u_r(0, t) = 0 = u(R, t) \text{ for } 0 < t < T.$$

Existence of a weak solution is discussed. For any R larger than the critical value so that quenching occurs, it is shown that if $\int_0^c f(u)\, du < \infty$, then as t tends to infinity, all solutions tend to the unique steady-state solution. (Received January 23, 2008)