Tidal radii of remote globular clusters ($R_{GC} \geq 35$ kpc) are used to provide constraints of the mass profile of the Milky Way galaxy that are independent of kinematic data. The available data are consistent with the profile of an isothermal sphere with circular velocity $V_c = 220 \pm 40$ km/s in the radial range $35$ kpc $\leq R_{GC} \leq 100$ kpc, in good agreement with all recent estimates. The more robust constraint at large distances from the galactic center is provided by NGC 2419, yielding an enclosed mass of $1.3^{+2.9}_{-1.0} \times 10^{12} M$ at $R_{GC} \approx 90$ kpc.