Generalized $\beta$-transformations are the class of piecewise continuous interval maps given by taking the $\beta$-transformation $x \mapsto \beta x \pmod{1}$, where $\beta > 1$, and replacing some of the branches with branches of constant negative slope. If the orbit of 1 is finite, then the map is Markov, and we call the map a PCF (post-critically finite) generalized $\beta$-transformation. We would like to describe the set of $\beta$ for which these maps can be PCF. We know that $\beta$ (which is the exponential of the entropy of the map) must be an algebraic number. Our main result is that the Galois conjugates of such $\beta$ have modulus less than 2. This extends an analysis of Solomyak for the case of $\beta$-transformations, who obtained a sharp bound of the golden mean in that setting. (Received January 24, 2014)