ABSTRACT. Let L be a Galois extension of K, finite field extensions of $\mathbb{Q}_p$, p odd, with Galois group cyclic of order p^2. There are p distinct K-Hopf algebras A_d, $d = 0, \ldots, p-1$, which act on L and make L into a Hopf Galois extension of K. We describe these actions. Let R be the valuation ring of K. We describe a collection of R-Hopf orders E_v in A_d, and find criteria on E_v for E_v to be the associated order in A_d of the valuation ring S of some L. We find criteria on an extension L/K for S to be E_v-Hopf Galois over R for some E_v, and show that if S is E_v-Hopf Galois over R for some E_v, then the associated order $\mathcal{A}_d$ of S in A_d is Hopf, and hence S is $\mathcal{A}_d$-free, for all d. Finally we parametrize the extensions L/K whose ramification numbers are $\equiv -1 \pmod{p^2}$ and determine the density of the parameters of those L/K for which the associated order of S in KG is Hopf.