This paper considers the effect of least squares procedures for nearly unstable linear time series with strongly dependent innovations. Under a general framework and appropriate scaling, it is shown that ordinary least squares procedures converge to functionals of fractional Ornstein-Uhlenbeck processes. We use fractional integrated noise as an example to illustrate the important ideas. In this case, the functionals bear only formal analogy to those in the classical framework with uncorrelated innovations, with Wiener processes being replaced by fractional Brownian motions. It is also shown that limit theorems for the functionals involve nonstandard scaling and nonstandard limiting distributions. Results of this paper shed light on the asymptotic behavior of nearly unstable long-memory processes.