Search for pair production of doubly charged Higgs bosons in the $H^{++}H^{--} \rightarrow \tau^+\tau^+\tau^-\tau^-$ final state at D0 LOUISE SUTER, University of Manchester, D0 COLLABORATION — The first search at a hadron collider for pair production of doubly charged Higgs bosons decaying into a $\tau^+\tau^+\tau^-\tau^-$ final state is presented. The search was performed in $p\bar{p}$ collisions at a center-of-mass energy of 1.96 TeV with an integrated luminosity of 6.2 fb$^{-1}$ as collected by the D0 experiment at the Fermilab Tevatron Collider during Run IIb. The results are used to set 95% C.L. upper limits on the doubly charged Higgs production cross section.