Stability Modeling of DIII-D Discharges with Transport Barriers\textsuperscript{1} L.L. LAO, J.R. FERRON, Y.R. LIN-LIU, E.J. STRAIT, A.D. TURNBULL, T.S. TAYLOR, General Atomics, M. MURAKAMI, Oak Ridge National Laboratory — The stability of DIII–D discharges with transport barriers is systematically studied by modeling the pressure profiles using a hyperbolic tangent representation with various radii, widths, and amplitudes. The $q$ profiles are modeled using a spline representation with varying $q(0)$, $q_{\text{min}}$, and $\rho_{q_{\text{min}}}$. The equilibria are computed using the EFIT and the TOQ codes based on the parameters from a strongly shaped high triangularity DIII–D long pulse high performance discharge. Stability against the ideal low $n = 1$ and 2 modes is evaluated using the GATO code with a conducting wall at 1.5 $a$. The results show that the stability improves with increasing transport barrier width and radius but varies weakly with $q(0)$. When the transport barriers are L–mode like and have narrow widths in the plasma core, the stability is limited by the $n = 1$ mode. When they are H–mode like and have large widths extending toward the edge, the stability is limited by the $n = 2$ mode.\textsuperscript{1}Work supported by U.S. DOE Contracts DE-AC03-99ER54463 and DE-AC05-96OR22464.