Abstract Submitted
for the SHOCK07 Meeting of
The American Physical Society

Burn Propagation in a PBX 9501 Thermal Explosion BRYAN HENSON, LAURA SMILOWITZ, JERRY ROMERO, Chemistry Division, LANL, BLAINE ASAY, MARY SANDSTROM, DE Division, LANL, PRAD COLLABORATION — We have measured burn velocities in a series of radially heated PBX 9501 thermal explosion experiments. Burn fronts have been imaged in these experiments using proton radiography. The velocities observed imply a convective burn front moving at approximately 200m/s. A compendium of burn velocities verses pressure show two distinct burn mechanisms: convection and conduction. The 200m/s velocity places the PBX 9501 radial thermal explosion experiment in the convective regime with an implied pressure on the order of 1 Gpa. The density evolution observed shows that HE continues to be consumed behind the convective front. The HE consumption follows the approximate radial symmetry of the heating profile. A hypothesis for the material consumption is made based on the implied pressures and material state. Implications for incorporating PBX 9501 thermal ignition and burn into larger scale models are discussed.

Bryan Henson
Chemistry Division, LANL

Date submitted: 23 Mar 2007 Electronic form version 1.4