Abstract Submitted
for the DFD16 Meeting of
The American Physical Society

The Utility of Gas Gun Experiments in Developing Equations of State EMILY PITTMAN, CARL HAGELBERG, SCOTT RAMSEY, Los Alamos National Laboratory — Gas gun experiments have the potential to investigate material properties in various well defined shock conditions, making them a valuable research tool for the development of equations of state (EOS) and material response under shock loading. Gas guns have the ability to create shocks for loading to pressures ranging from MPa to GPa. A variety of diagnostics techniques can be used to gather data from gas gun experiments; resulting data from these experiments is applicable to many fields of study. The focus of this set of experiments is the development of data on the Hugoniot for the overdriven products EOS of PBX 9501 to extend data from which current computational EOS models draw. This series of shots was conducted by M-9 using the two-stage gas-guns at LANL and aimed to gather data within the 30-120 GPa pressure regime. The experiment was replicated using FLAG, a Langrangian multiphysics code, using a one-dimensional setup which employs the Wescott Stewart Davis (WSD) reactive burn model. Prior to this series, data did not extend into this higher range, so the new data allowed for the model to be re-evaluated. A comparison of the results to the experimental data reveals that the model is a good fit to the data below 40 GPa. However, the model did not fall within the error bars for pressures above this region. This is an indication that the material models or burn model could be modified to better match the data.

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Date submitted: 28 Jul 2016 Electronic form version 1.4