Abstract Submitted
for the SHOCK09 Meeting of
The American Physical Society

Reactive Burn Modelling at Temperature Extremes Using CREST NICHOLAS WHITWORTH, AWE Aldermaston — The CREST reactive burn model uses entropy-dependent reaction rates to simulate behaviour in plastic bonded explosives. A CREST model for the TATB-based explosive PBX 9502, described at the last conference, was shown to be able to predict a range of shock initiation and detonation data at ambient temperature. However, it is well known that the behaviour of PBX 9502 varies significantly with initial temperature. Modelling the change in response that occurs upon heating or cooling the explosive, without having to modify the equation of state (EOS) and reaction rate parameters, is a significant challenge for reactive burn models. An important feature of CREST is that the initial state of the explosive can be incorporated without having to change the reference EOS or reaction rate model. In this paper, CREST is applied to PBX 9502 shock initiation data at temperature extremes. It is shown that the model can account for the variation in shock sensitivity with initial temperature using one set of parameters.

Nicholas Whitworth
AWE Aldermaston

Date submitted: 19 Feb 2009 Electronic form version 1.4