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Dynamics of an Overdriven Nitromethane Initiation System E. H. HÁROZ, P. J. RAE, C. L. ARMSTRONG, E. V. BACA, C. CAMPBELL, J. A. GUNDERSON, M. HOLMES, I. LOPEZ-PULLIAM, L. D. VAUGHAN, P. M. DICKSON, M-6: Explosive Applications & Special Projects, Los Alamos National Laboratory — For upcoming large-scale HE experiments, an initiation system is needed to ensure uniform and simultaneous burn. To that end, we developed an initiation system based on nitromethane. Initial, small-scale tests characterized the response of the nitromethane in the proposed cylindrical initiator geometry, indicating robust detonation under a variety of conditions such as a plane wave lenses & cylinders of PBX 9501 into a flyer plate or direct-drive. Detonation velocity, as measured by piezoelectric pin time-of-arrival measurements along the length and at bottom of vessel, shows an overdriven response. All cases show a detonation velocity faster than the literature value of 7.3 km s^{-1} for nitromethane, with the fastest velocity occurring for the 8-detonator, 8" cylinder case with a velocity = 7.7 km s^{-1}. Streak camera imaging characterized the curvature of the shock front as it arrived at the bottom of the vessel via spark gap. A final test of the initiator system looked at the expansion of the initiator vessel walls via PDV, showing velocities up to 3.5 km s^{-1}. Finally, our initiator was placed inside a secondary vessel containing 1000 lbs of nitromethane. High-speed photography & pin data indicate complete symmetrical burn of the secondary nitromethane.

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