Abstract Submitted for the SHOCK09 Meeting of The American Physical Society

Comparison of Line-Imaging VISAR Inferences of Spalled Sample Distension with Metallographic Analysis of Recovered Samples

M.D. FURNISH, Sandia National Laboratories, G.T. GRAY III, J.F. BINGERT, Los Alamos National Laboratory — Using a line-imaging VISAR to infer the position (x) and time (t) dependent distension of a spalling sample requires two assumptions: (1) a calculated velocity surface \( v_{\text{no spall}}(x,t) \) for the no-spall case to compare with the observed \( v_{\text{observed}}(x,t) \) surface, and (2) a lack of significant wave processing by the near-surface microstructure. We have designed and are conducting a matrix of experiments to evaluate these assumptions. In each experiment, we use a line-imaging VISAR to measure the velocity history of carefully characterized tantalum or copper samples taken to an incipient spall condition. The pre-shot characterization included spatially resolved mapping of grain locations and orientations by electron backscatter diffraction (EBSD). These samples are then soft-recovered and sectioned along the same line as monitored by the line-imaging VISAR.

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy’s National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Date submitted: 24 Feb 2009

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