BLACK THUNDER COAL MINE AND LOS ALAMOS NATIONAL LABORATORY EXPERIMENTAL STUDY OF SEISMIC ENERGY GENERATED BY LARGE SCALE MINE BLASTING

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In an attempt to better understand the impact that large mining shots will have on verifying compliance with the international, worldwide, Comprehensive Test Ban Treaty (CTBT, no nuclear explosion tests), a series of seismic and videographic experiments has been conducted during the past two years at the Black Thunder Coal Mine. Personnel from the mine and Los Alamos National Laboratory have cooperated closely to design and perform experiments to produce results with mutual benefit to both organizations. This paper will summarize our activities, highlighting the unique results of each. Topics which were covered in these experiments include:

1) Synthesis of seismic, videographic, acoustic, and computer modeling data to improve understanding of shot performance and phenomenology;

2) Development of computer generated visualizations of observed blasting techniques;

3) Documentation of azimuthal variations in radiation of seismic energy from overburden casting shots (See companion paper by Pearson *et al* this issue);

4) Identification of, as yet unexplained, out of sequence, simultaneous detonation in some shots using seismic and videographic techniques;

5) Comparison of local (0.1 to 15 kilometer range) and regional (100 to 2000 kilometer range) seismic measurements leading to determination of the relationship between local and regional seismic amplitude to explosive yield for overburden cast, coal bulking and single fired explosions (See companion paper by Stump *et al* this

issue); and

6) Determination of the types of mining shots triggering the prototype International Monitoring System for the CTBT (See companion paper by Stump *et al* this issue).