

## THERMAL SIMULATION OF BLOWOFF PRIOR TO SHOCK ARRIVALH

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Variations in nuclear blast waveforms from atmospheric tests in the 1950's led to the concept of non-ideal air blast (NIAB) phenomena. The best understanding is that the nuclear thermal pulse, interacting with the ground surface before shock arrival, creates a "thermal layer" where high air temperature, smoke, dust and steam affect shock/blast wave velocities and thermodynamics. Experiments fielded to measure these NIAB phenomena during the nuclear test series were generally limited in scope and frequently not fully analyzed due to complicating circumstances. Renewed interest in non-ideal air blast phenomena has generated a requirement for nuclear thermal pulse simulation due to the ban on atmospheric nuclear tests.

Science Applications, Incorporated (SAI) has been investigating techniques to simulate and measure thermal layers over soil surfaces for the last five years. Simulation of the nuclear thermal pulse has been attempted through mechanical shuttering of the intense radiation available at solar furnaces. Experiments incorporating specially designed and fabricated apparatus have been fielded at the 35 Kw White Sands Missile Range furnace, the 400 Kw Advanced Component Test Facility (Atlanta, Georgia) and the 1000 Kw Centre National Pour Recherche Scientifique CNRS) furnace in France. Fluxes on soil surfaces as high as 50 Cal/cm<sup>2</sup>sec (210W/m<sup>2</sup>) have been produced and fluences have reached over 300 cal /cm<sup>2</sup> (1250 j/cm<sup>2</sup>).

Instrumentation has been developed and incorporated to measure flux, fluence, air temperature, optical extinction coefficients, mass loss,particle size distributions and sonic velocities in the thermal layer. The most recent test series was completed in September 1980, and results of data analysis will be available for the meeting.