

# OKLAHOMA GEOLOGICAL SURVEY

ENERGY CENTER BLDG.-ROOM N-131-100 EAST BOYD STREET • NORMAN, OKLAHOMA 73019 • (405)-325-3031 • FAX: (405)-325-7069

July 10, 1995

State Representative Charles Key  
Oklahoma

Dear Representative Key:

Attached you will find a schematic illustration of the seismograms recorded on the day of the OKC explosion (4-19-95). Initially, the relationship between these signals was not clearly understood. Thanks to the excellent data recorded by the U.S. Geological Survey, I think that I can give a preliminary interpretation of the signals recorded on the day of the blast.

The attached figure shows two high amplitude arrivals at the Omniplex Museum. The first signal to arrive is likely to be a type of wave called a p-wave which traveled through the ground to the Omniplex. Since the amplitude of p-waves is usually small compared to the later arriving S-waves and Rayleigh waves, the high amplitude signal which saturated the Omniplex for 10 seconds on the day of the blast can be interpreted to be the result of S-waves, Rayleigh waves and other waves traveling through the ground. After approximately 5-6 seconds, another high amplitude signal arrived at the Omniplex acting to saturate the seismometer. This signal appears to be an air blast. An air blast is a pressure wave which travels through the air at the speed of sound. When the pressure from the air blast is large enough, the air pressure pushes on the ground in such a way as to cause a seismometer to read a signal.

Identification of the second signal as an air blast and the first signal as shear, Rayleigh and other waves is an important step in the interpretation of the signals. Based upon the signals recorded during the demolition, the duration of the "ground wave" at the Omniplex is an approximate measure of the length of time of the seismic activity at the Murrah Building (10 seconds or less). The duration of the air blast is a measure of the length of time the air explosion was active. This means that the last 5 seconds (or less) of ground motion did not have an air blast associated it. ~~at the Omniplex~~

Time (Seconds) →

Omniplex  
Seismogram  
4-19-95

Approx. 10 secs

Approx. 5 secs

P-wave  
arrival

High intensity ground  
motion (seismometer  
pen movement above  
scale)...interpreted to  
be S-wave + Rayleigh  
wave+ other arrivals

High intensity ground  
motion (seismometer  
pen movement above  
scale)...interpreted to  
be an air-blast signal.

Approx. 4000 feet/sec

Approx. 2850 feet/sec

Station FNO (Norman)  
4-19-95

Amplitudes Scaled For Ease Of Viewing