

## **-Domain Source Function (TDSF) for Nuclear and Chemical Explosions: Analysis Around Nevada National Security Site (NNSS)**

Displacement spectra from explosion accelerograms within a few kilometers (<3.5 km) of shot points indicate that the spectral level increases gradually from the  $f_c$  towards the zero frequency. In this paper, we present a time-domain expression (TDSF) which has two deformation terms: “static” and “dynamic”, supporting this observation. For  $f < f_c$ , the static contribution dominates the dynamic contribution and leads to the gradual increase. For low-yield explosions,  $f_c$  is high; this effect is more pronounced. For  $f > f_c$ , the “dynamic” term contributions dominate and decay approximately as  $f^{-2}$ . For seismic waves propagating from the elastic boundary  $R_{el}$  to large distances, these two wavefields are affected identically by attenuation and spreading. Hence, the corrected spectra should exhibit these spectral features. P-wave explosion seismogram analysis indicates a likely presence of this effect and provides evidence of a yield equivalence by a factor of 2 between the nuclear and chemical explosions. By convolving the proposed TDSF with  $[\exp(-C/R_{el}) H(t)]$ , where  $C$  is the material velocity at the shot point, one can calculate the RDP at  $R_{el}$  of the source. We use this proposed RDP to investigate the influence of yield and depth of burial (DOB) on the spectral overshoot and  $f_c$  of explosion sources.

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