BLAST DESIGN RULES OF THUMB

(Given: Hole depth, Rock type, and Distance to structure)

HOLE DIAMETER (d) = hole depth (H) divided by 5 to 10.

$$d(in) = H(ft) / 5 \text{ to } H(ft) / 10 \qquad \text{(Typically H/7)}$$

BURDEN (B) = 2 to 3 times the diameter.

$$B(ft) = 2 \text{ X } d(in) \text{ to } 3 \text{ X } d(in) \qquad \text{(Typically 2.5 X d)}$$

SPACING (S) = 1 to 2 times the burden.

$$S(ft) = 1 \text{ X } B(ft) \text{ to } 2 \text{ X } B(ft) \qquad \text{(Typically 1.5 X B)}$$

STEMMING (T) = 0.5 to 1.0 times the burden.

$$T(ft) = 0.5 \text{ X } B(ft) \text{ to } 1.0 \text{ X } B(ft) \qquad \text{(Typically 0.7 X B)}$$

POWDER COLUMN (PC) = hole depth minus stemming (T), backfill (F) and decking (T_d)

$$PC(ft) = H(ft) - T(ft) - F(ft) - T_d(ft)$$

LOADING DENSITY (LD) = 0.3405 times the explosive density times the hole diameter squared.

$$LD(lb/ft) = 0.3405 \text{ X density(gm/cc) X } d^2(in) \qquad \text{(or Mfg design guide)}$$

CHARGE WEIGHT (CW) = powder column times the loading density.

$$CW(lb) = PC(ft) \text{ X } LD(lb/ft)$$

POWDER FACTOR (PF) = powder per hole divided by rock volume per hole.

$$PF(lb/yd^3) = CW(lb) / (B(ft) \text{ X } S(ft) \text{ X } H(ft) / 27)$$

SCALED DISTANCE (SD_2) = Distance to structure divided by square root of the charge weight.

$$SD_2(ft/lb^{1/2}) = distance(ft) / CW^{1/2}(lb^{1/2}) \qquad \text{(Greater than 55)}$$

PEAK PARTICLE VELOCITY (PPV) = 119 or 438 times scaled distance to the -1.52 power.

$$PPV(in/s) = 438 \text{ X } (SD_2)^{-1.52} \qquad \text{(Compliance)}$$
$$PPV(in/s) = 119 \text{ X } (SD_2)^{-1.52} \qquad \text{(Expected)}$$