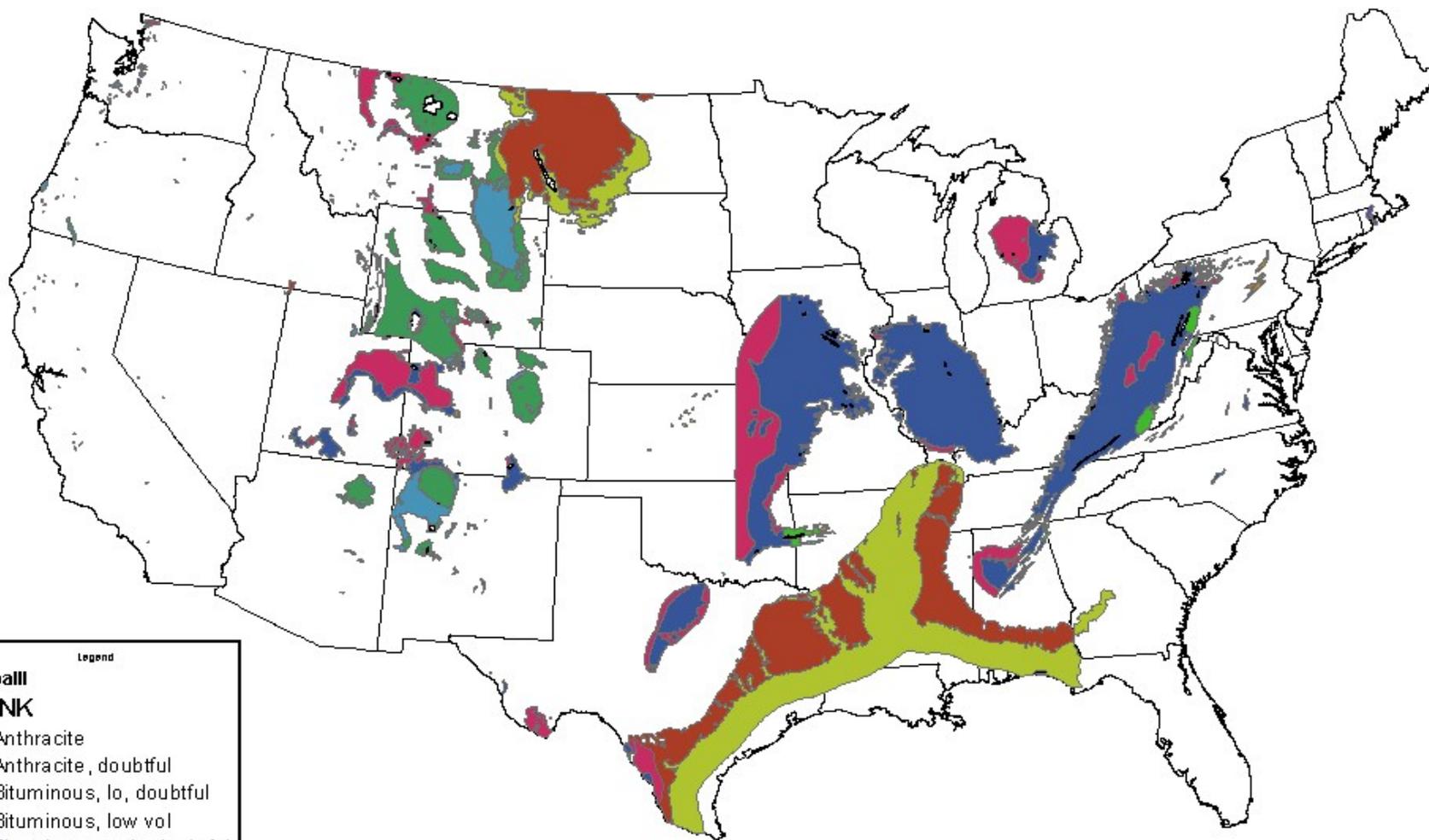


Complete Narrative

- Coal is mined across the United States on a daily basis and thousands of blasts are detonated to remove the rock above the coal. Certified blasters are responsible for conducting these operations safely. Blasters must evaluate the site specific conditions and put the explosives in the ground so that most of the energy is used breaking rock. Unfortunately some of the energy escapes the mine sites in the form of ground and air vibrations. As this energy arrives at nearby houses the occupants may be startled or become fearful of damage. Sometimes flyrock occurs. As a result, complaints may be filed with the regulatory authorities, who must in turn evaluate the validity of the complaint. The inspector's role is to evaluate the blasting records and site conditions to resolve the complaint or evaluate compliance. The Blast Log Evaluation Program will help the inspector gauge the overall "wellness" of the recordkeeping. If the records are good, positive statements about the blasting operation can be made. If the records are bad or unusual site conditions exist, the inspector can take the appropriate regulatory action or the blaster may modify the blasting operations to minimize impacts. The Blast Log Evaluation Program will boost the inspector's ability to review recordkeeping, provide a permanent record of the review and enhance compliance with the rules. Better compliance with the rules will result fewer complaints and better relationships with people living near coal mines.



Coal Mining States



Legend

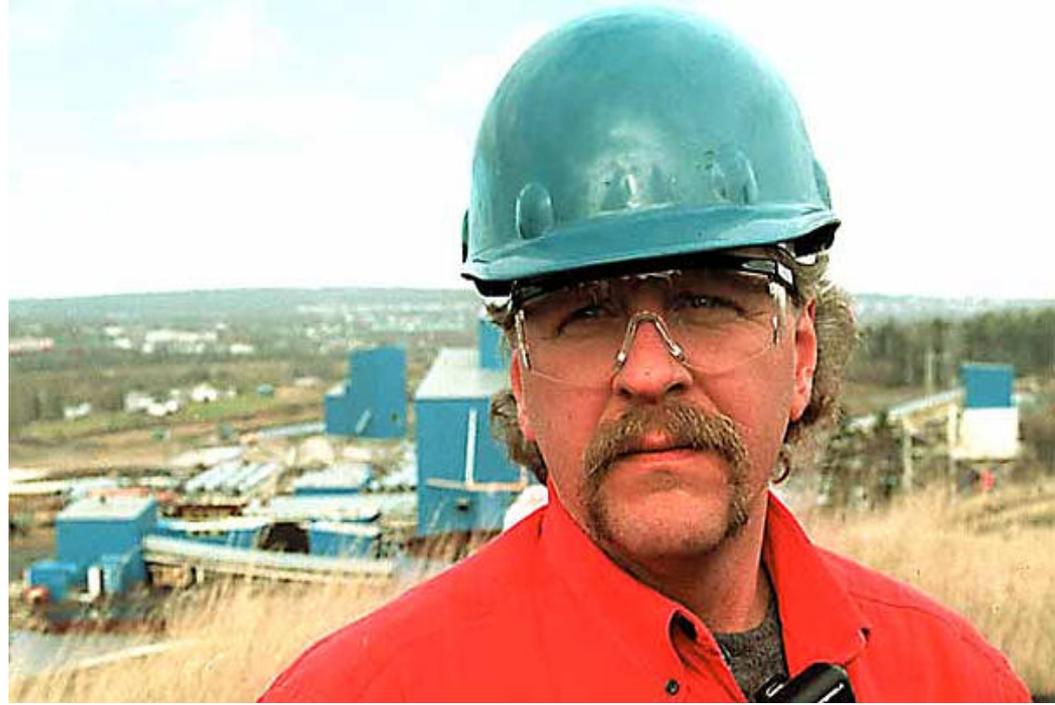
uscoalll
RANK

- Anthracite
- Anthracite, doubtful
- Bituminous, lo, doubtful
- Bituminous, low vol
- Bituminous, m-h, doubtful
- Bituminous, med to hi vol
- Lignite
- Lignite, doubtful
- No coal
- Sub-bitumin, doubtful
- Sub-bituminous

State	2003 Production	2002 Production (Tons)
Total	1,071,753	1,094,283
WY	376,270	373,161
WV	139,711	150,078
KY	112,680	124,142



Certified Blasters





Geology



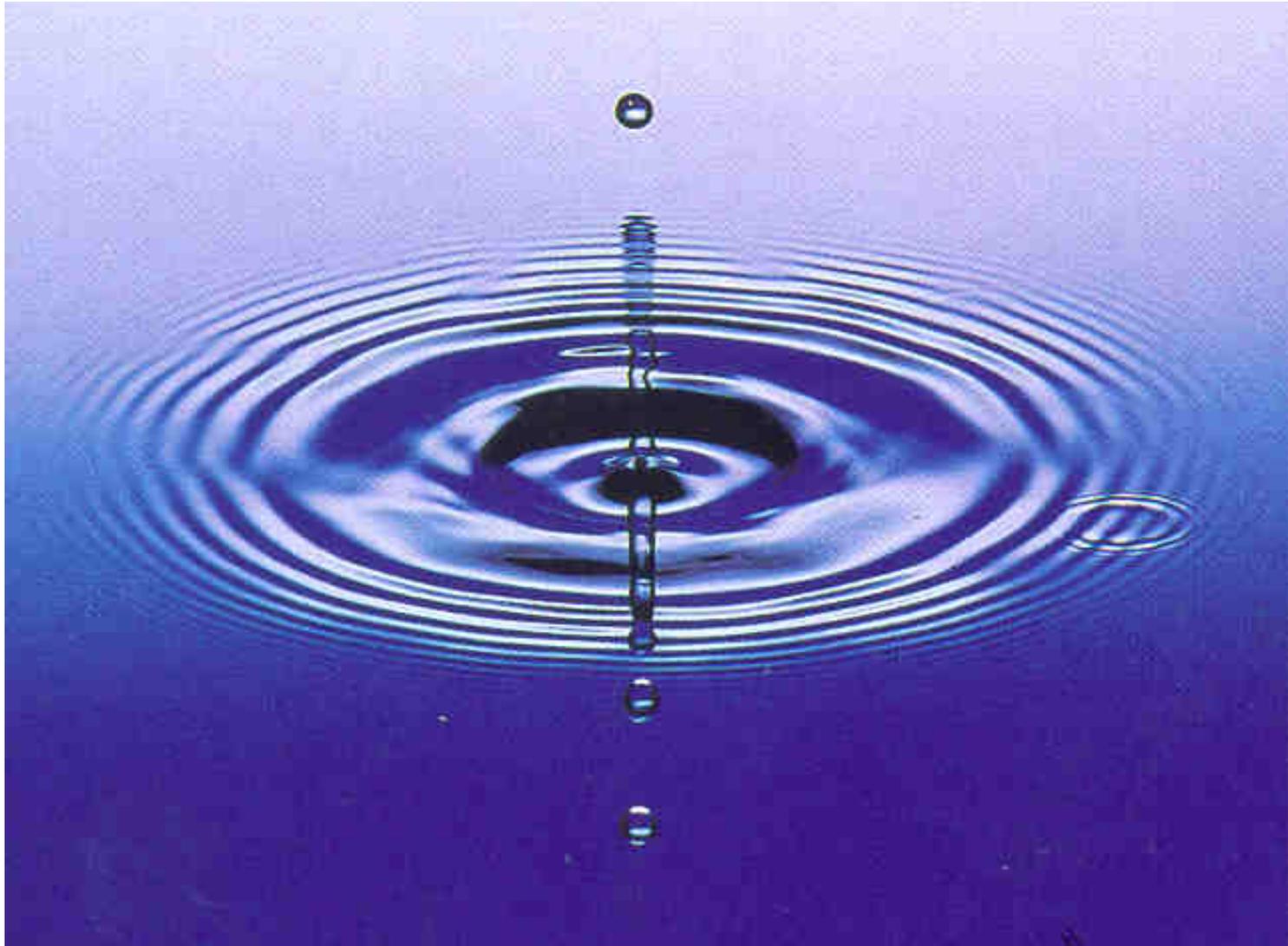
Explosives



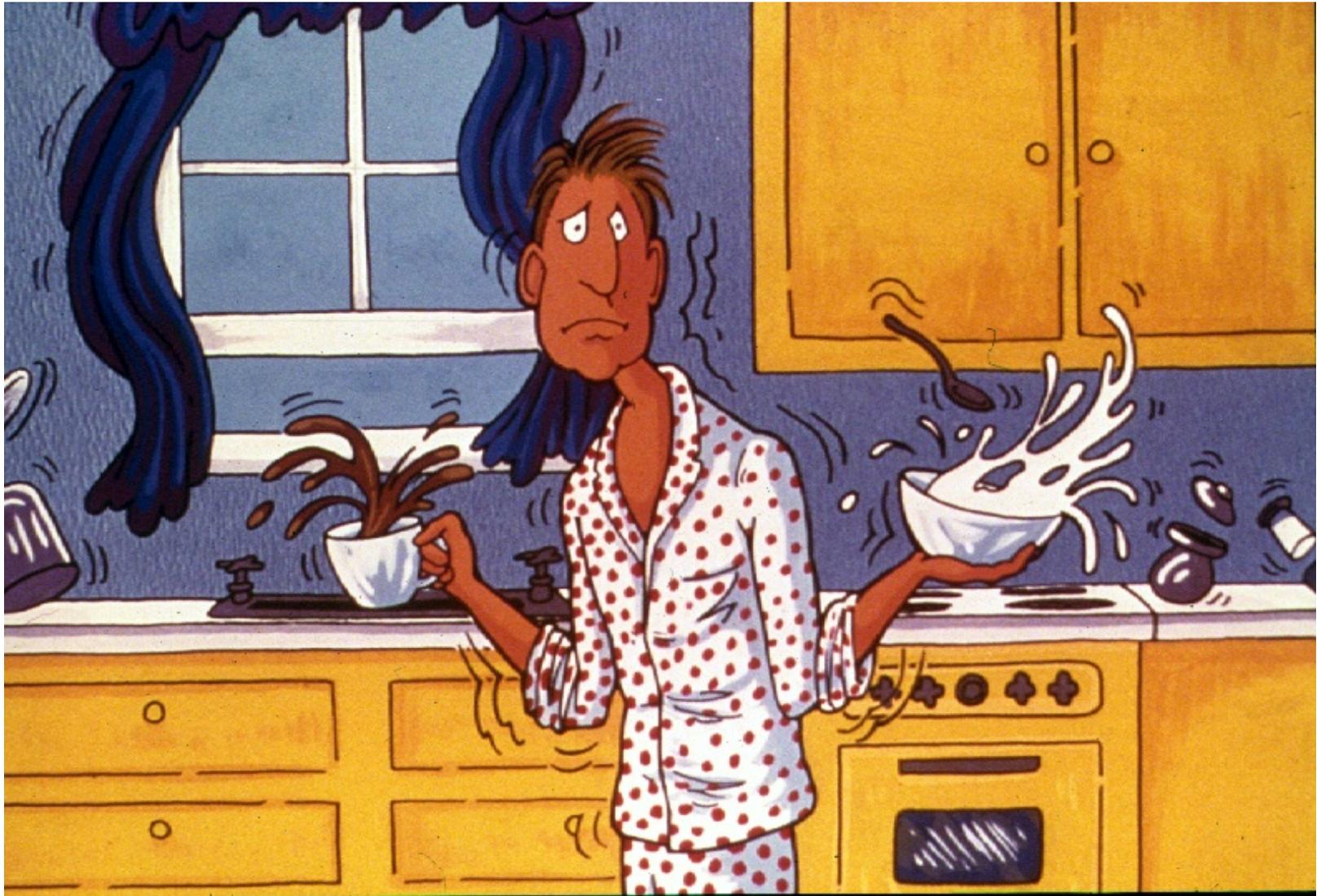
Detonation



Vibrations



Houses Vibrate



Flyrock Property Damage



Complaints



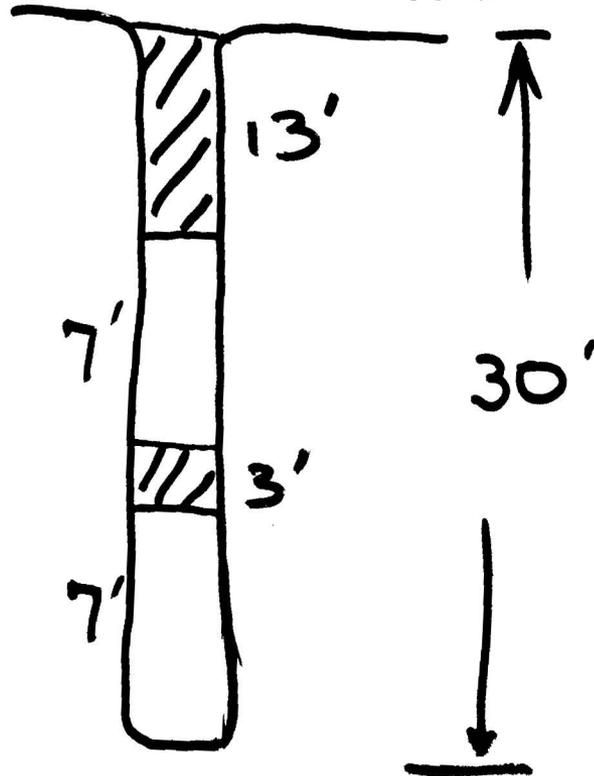
Inspector's Role



EXPLOSIVES / HOLE

$$\begin{aligned}LD &= 0.34 (d)^2 \times \rho \\ &= 0.34 (6.75)^2 \times 0.92 \\ &= \underline{14.6 \text{ lb/ft}}\end{aligned}$$

$$CW = 14' \times 14.6 = \underline{\underline{\underline{205 \text{ lb}}}}$$



Coal Mine Blasting Records



AUSTIN POWDER COMPANY BLAST REPORT



DATE: ____/____/____
MO DA YR

AM PM

SHOT NO. _____ TIME OF BLAST _____ LOCATION _____

COMPANY (PERMITTEE) _____ LOCAL ON AT PLANT/PIT _____

PERMIT NO. _____ WEATHER: CLOUDY CLEAR

TYPE OF TERRAIN: HILLY FLAT

WIND DIRECTION: (Circle One)
(N) (NE) (E) (SE)
(S) (SW) (W) (NW)

VELOCITY _____ /MPH TEMPERATURE _____ /DEGREES F

NEAREST PROTECTED STRUCTURE: _____

NAME OF STRUCTURE AND/OR TYPE _____ DISTANCE _____ /FT.

DIRECTION/BEARING _____ (IN OHIO, DIRECTION MUST BE STATED IN DEGREES)

OR COMPASS POINT (Circle) (N) (NE) (E) (SE) (S) (SW) (W) (NW)

METHOD USED: MEASURED UGHD MAP TOPC MAP OTHER: _____

TYPE OF MATERIAL BLASTED _____ HOLE DIAMETER _____ AVE. DEPTH OF WATER _____

NO. OF HOLES _____ NO. OF ROWS _____ BURDEN _____

SPACING _____ DEPTH _____ FACE HEIGHT _____ RACK FILL DEPTH _____

SUB-DRILLING _____ LENGTH OF STEMMING _____ TYPE OF STEMMING _____

WERE BLASTING MATS USED: YES NO IF YES, TYPE USED: _____

EXPLOSIVES _____ TOTAL QUANTITY _____

MANUFACTURER _____

TYPE OF PRIMER _____

TOTAL WEIGHT OF EXPLOSIVES (INCLUDE PRIMERS) _____

TYPE OF INITIATION SYSTEM: ELECTRIC NON ELECTRIC

MANUFACTURER _____

MANUFACTURER _____

DELAY DETONATORS USED (TYPE) _____

INITIATION METHOD: SEQUENTIAL MACHINE/TIME SETTING _____

CD-45C _____ OHMS resistance each series or circuit, and total circuit resistance _____

CD-40C _____

OTHER (NAME) _____

CIRCLE SCALE DISTANCE USED: $W = (D/50)^2$ $W = (D/85)^2$

$W = (D/55)^2$ $W = (D/7)^2$

LEGAL WEIGHT OF EXPLOSIVES PER DELAY _____

CHECK YOUR STATE & LOCAL REGULATIONS FOR PROPER SCALE DISTANCE.

WEIGHT OF EXPLOSIVES PER HOLE _____ (SIGNIFICANT VARIATIONS SHOULD BE EXPLAINED)

MAX. NO. OF HOLES WITHIN RMS PERIOD _____ ON BACK AND IDENTIFIED IN SKETCH.)

MAX. WT. OF EXPLOSIVES WITHIN RMS PERIOD _____ ACTUAL S/D _____

TOTAL NO. OF TONS PRODUCED _____ OR TOTAL CUBIC YARDS PRODUCED _____

TOTAL POWDER FACTOR: LBS/CUBIC YARD _____

TONS/FT _____ TONS/CUBIC YARD _____

CHECK HERE IF BLAST OCCURRED AT A TIME OTHER THAN THE SCHEDULED TIME

EXPLAIN WHY IN THE COMMENT SECTION.

CHECK HERE IF A MISFIRE OCCURRED. IF MISFIRE OCCURRED, EXPLAIN PROCEDURE

USED TO ELIMINATE THE HAZARD. PLEASE USE COMMENT SECTION.

SEISMOGRAPH DATA: DATE OF SEISMOGRAPH _____ TIME OF SEISMOGRAPH READING _____ AM PM

TYPE OF INSTRUMENT _____ SENSITIVITY _____

CALIBRATION SIGNAL OR DATE OF CALIBRATION _____

LOCATION: DISTANCE FROM BLAST & LOCATION _____

DIRECTION FROM BLAST (N) (NE) (E) (SE) (S) (SW) (W) (NW) _____

SEISMIC DATA T _____ V _____ L _____ DR _____

DIGITAL READOUT: YES NO

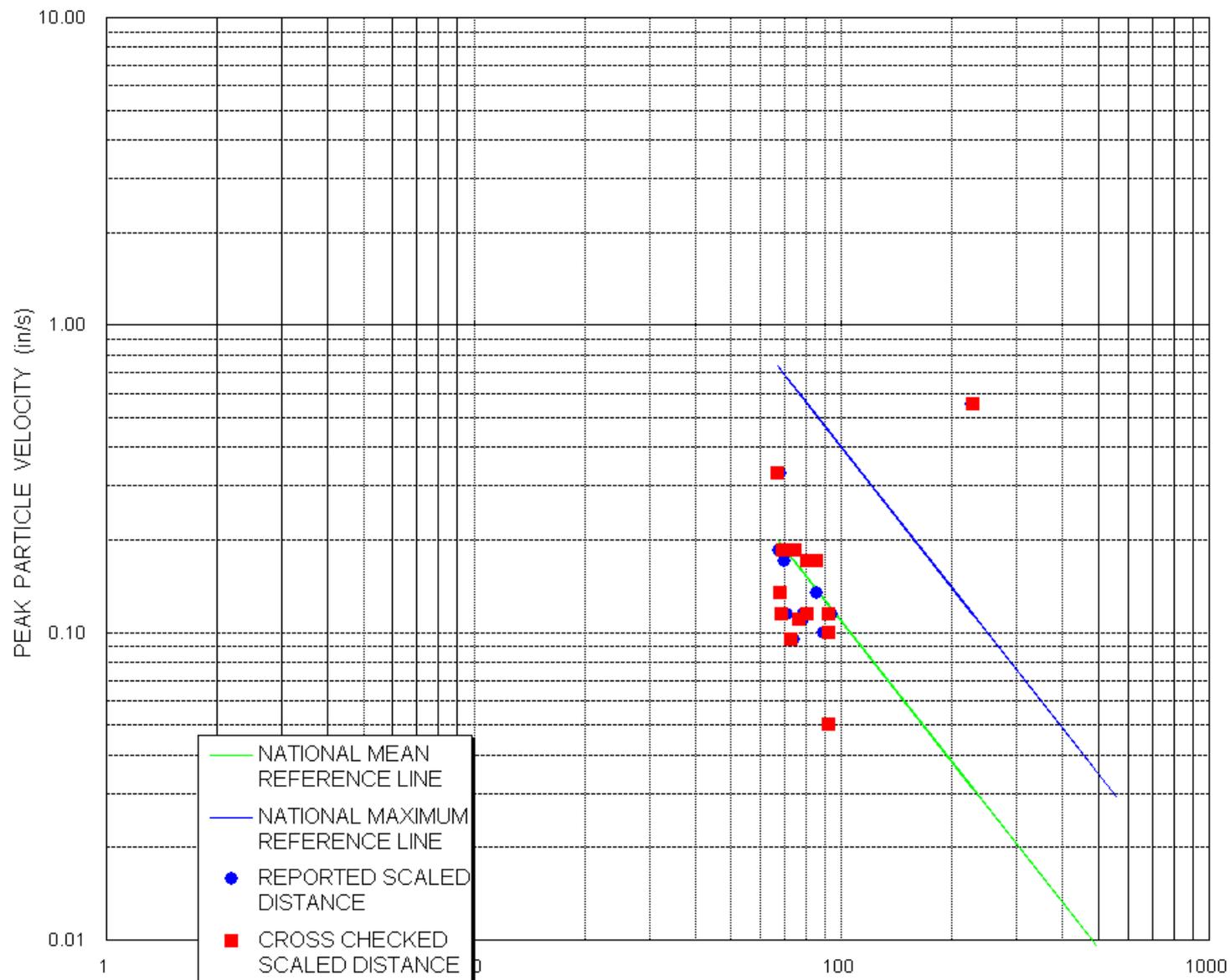
NAME OF PERSON TAKING SEISMIC READING _____ FIRM _____

NAME OF PERSON OR FIRM ANALYZING RECORD _____

ATTACH SEISMIC RECORD IF AVAILABLE



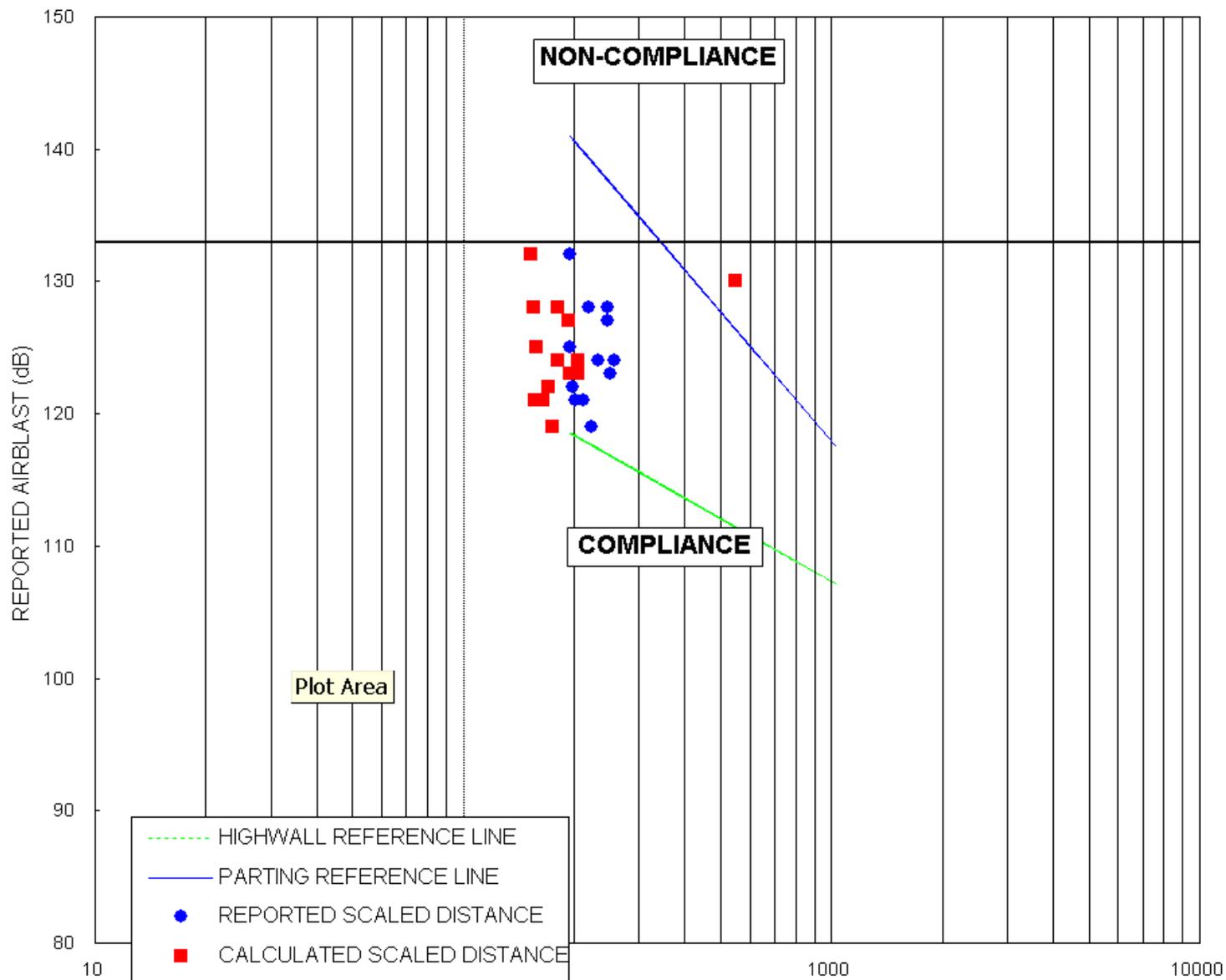
SCALED DISTANCE VS PARTICLE VELOCITY



- NATIONAL MEAN REFERENCE LINE
- NATIONAL MAXIMUM REFERENCE LINE
- REPORTED SCALED DISTANCE
- CROSS CHECKED SCALED DISTANCE



AIRBLAST ANALYSIS



Permanent Documentation

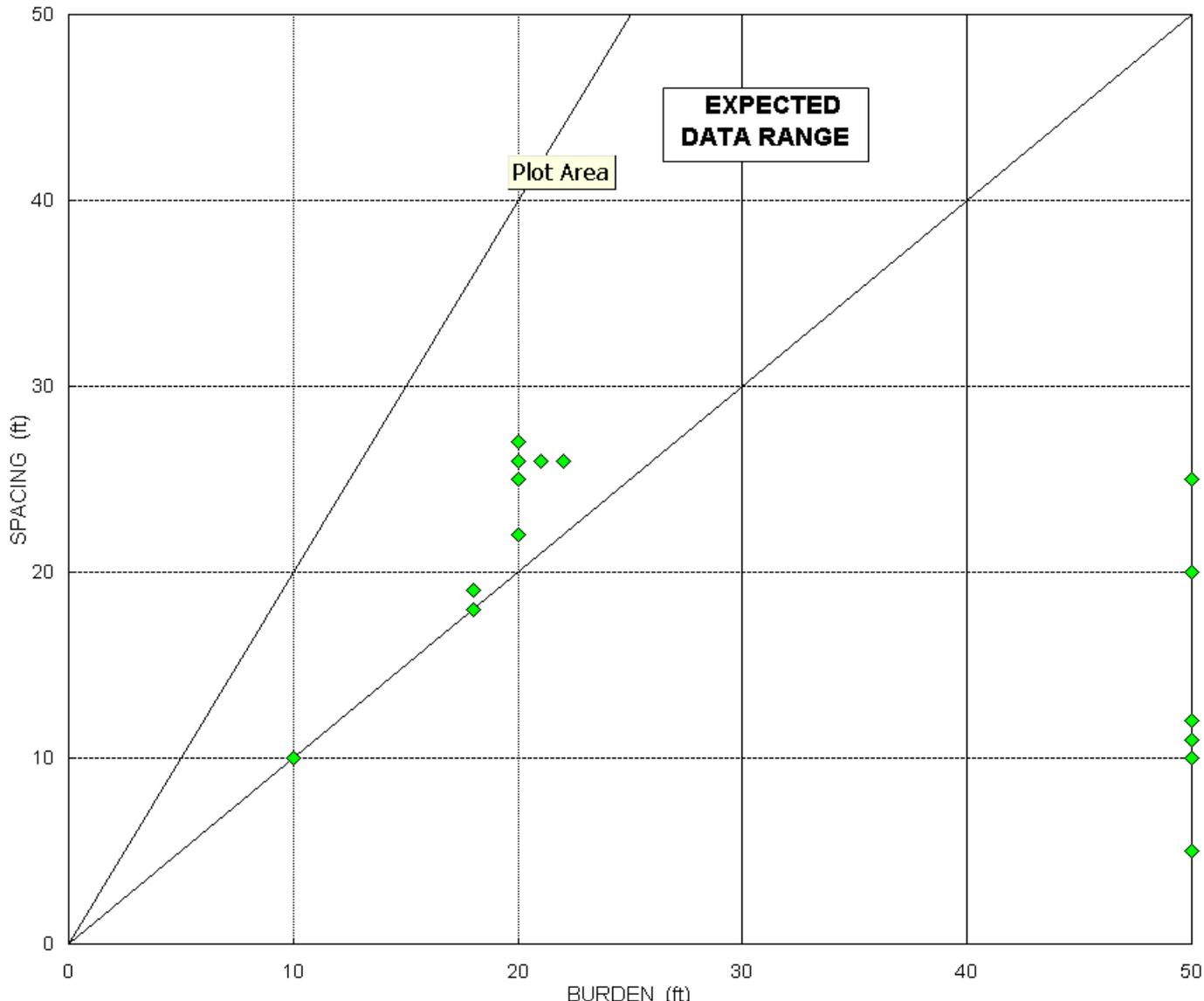


Blast Log Evaluation Program (BLEP)

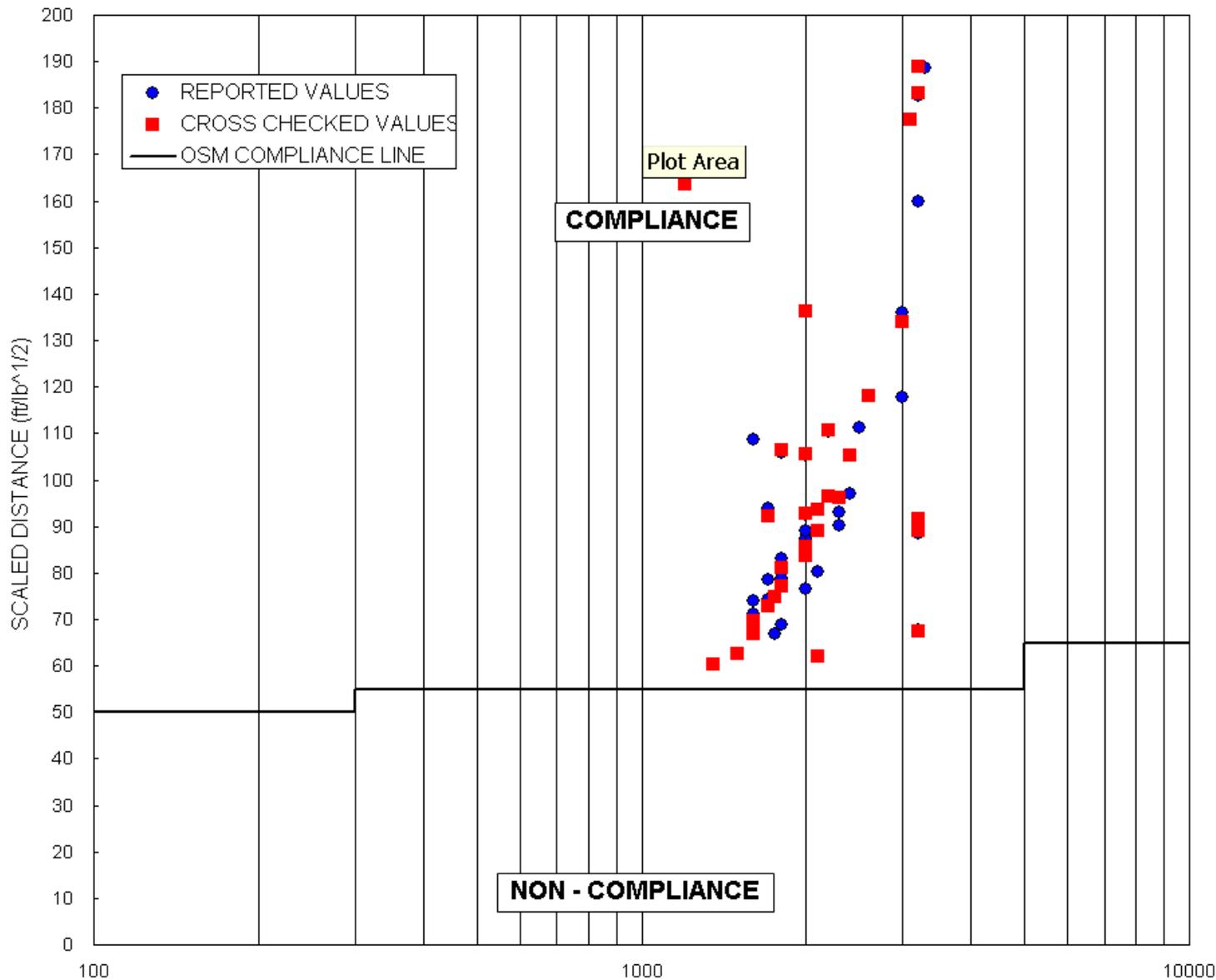


Extras....

BURDEN / SPACING COMPARISON



COMPLIANCE WITH SCALED DISTANCE



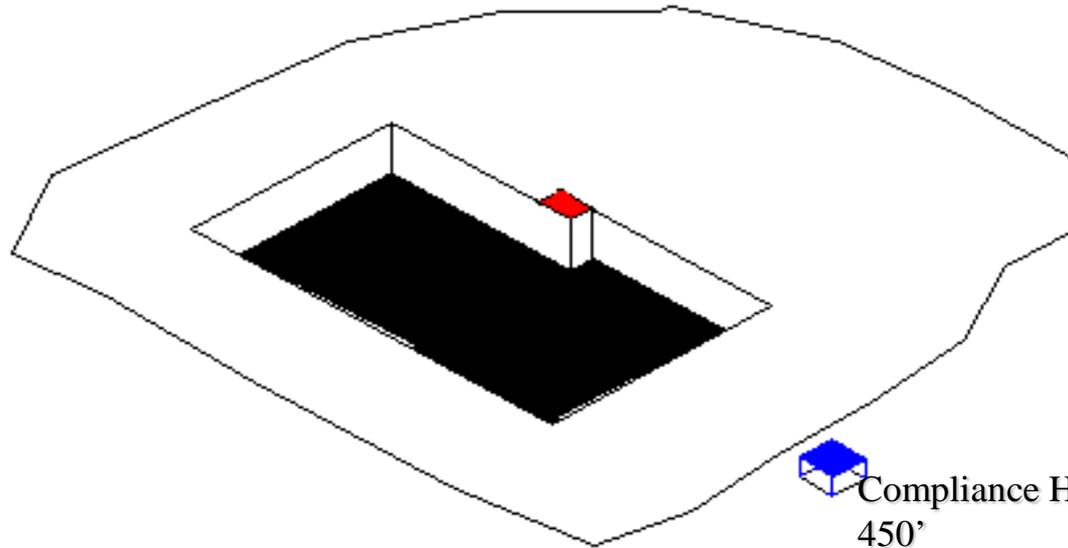


Spatial Relationships

Complaint House 2,
1500'



Complaint House,
550'



Compliance House,
450'



**** SAFEGUARD SEISMIC UNIT 2000DK ****

SN: 2243

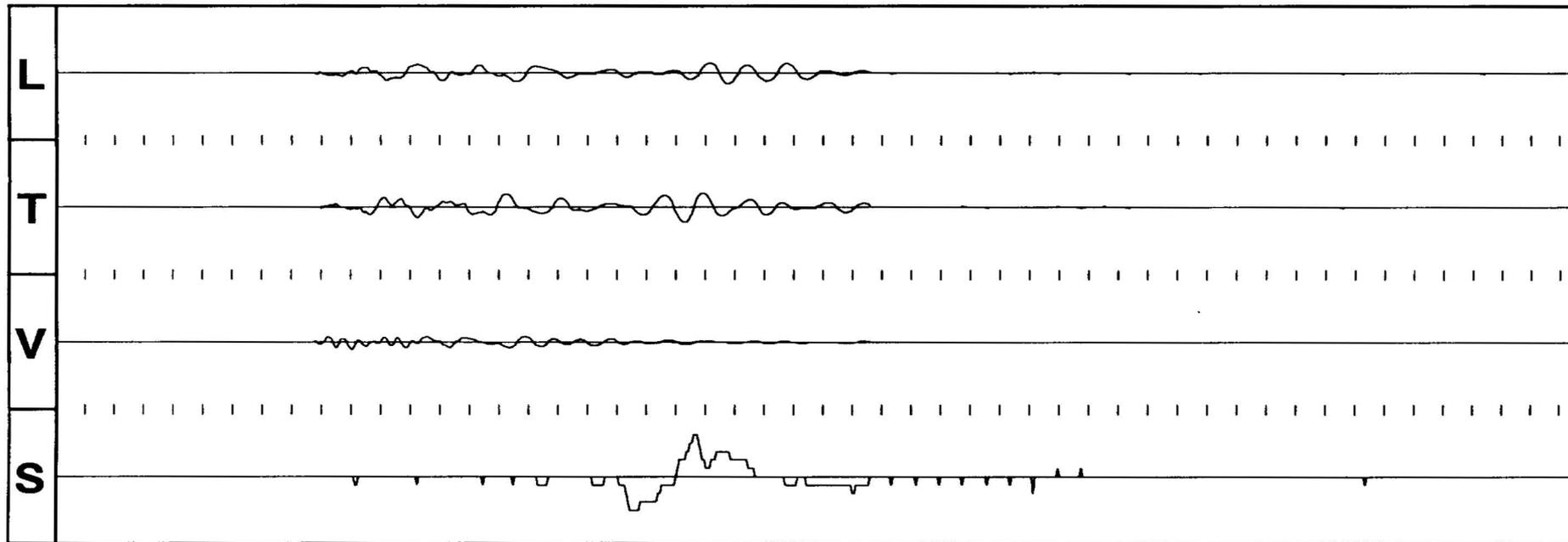
DATE: 09/12/95 TIME: 15:18:06
Event: 009 Recording Time: 10
Client: ROBERTSON
Operation: BUCKEYE IND. MINING CO.
SSU Location: ROBERTSON YARD
Distance to blast: 1385
Operator: M.MANN/ODNR
Comments:
Trigger Level: .05 IN/SEC

Summary

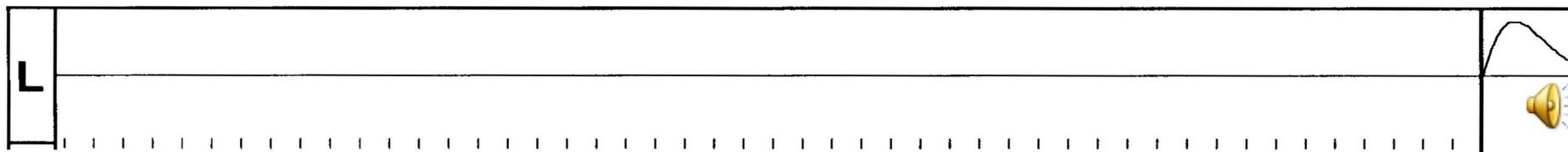
	L	T	V
PPV (in/sec)	0.10	0.14	0.07
PD (in x.001)	2.39	2.97	1.38
PPA (g)	.02	.02	.02
FREQ (Hz)	8.0	7.6	16.6
RESULTANT PPV (in/sec):		0.15	
PEAK AIR PRESSURE: (dB)		114	
(psi)		0.00145	

VELOCITY WAVEFORM GRAPH SCALE
TIME = 100 MSEC PER MARK
SEISMIC = +/- .64 IN/SEC
SOUND = +/- 0.00232 PSI

SHAKETABLE CALIBRATED: 06/20/95
By GeoSonics, Inc.
Box 779, Warrendale, PA 15095 U.S.A.
TEL: 412.934.2900 FAX: 412.934.2999



CAL



Blasting Seismographs

