

# Refraction Seismics - Applications and Case Studies

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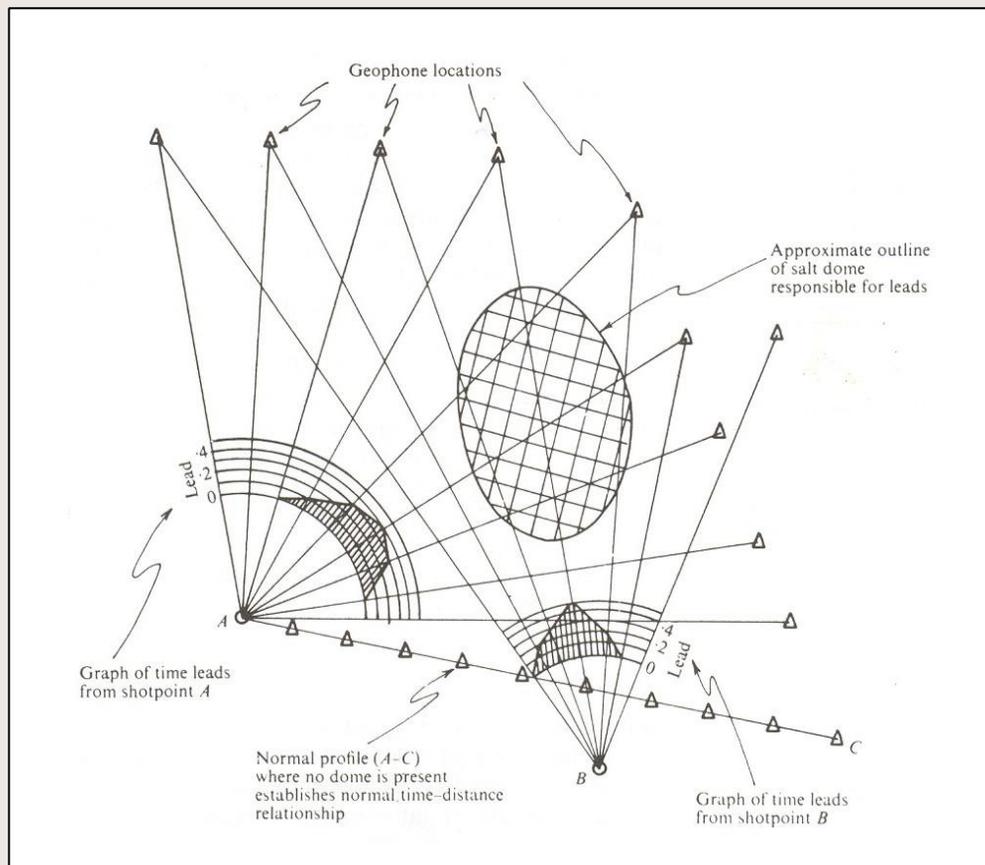
- Location of a salt dome
- Permitting a waste disposal site (Lankston, 1990)
- Study of rock rippability

- Reading:

- › Reynolds, Section 5.5

# Locating salt domes

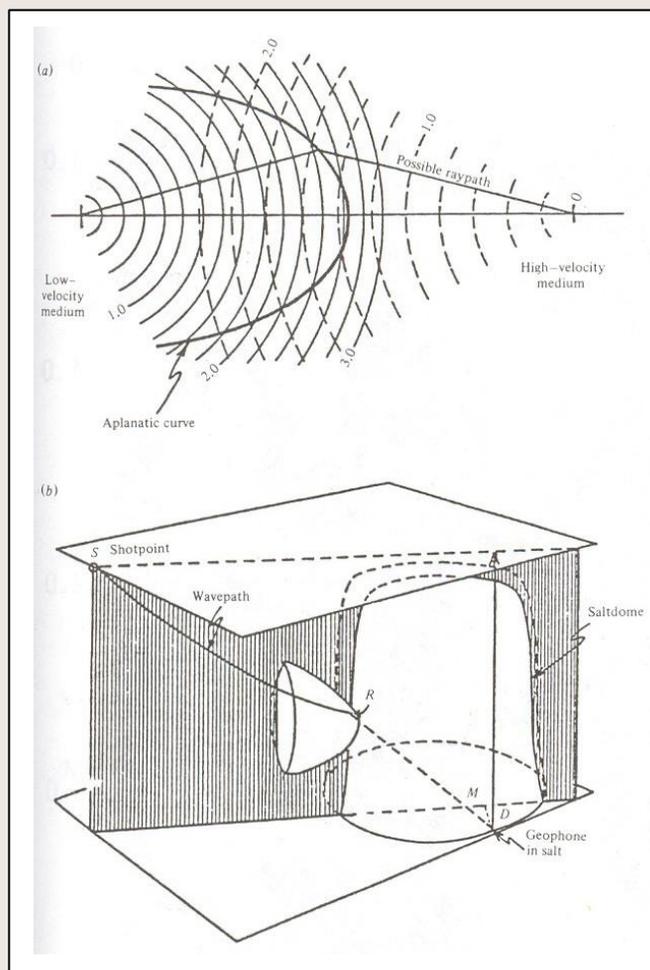
- Salt has a very high velocity (~5 km/s) compared to the surrounding sediments (~3-4 km/s)
  - ◆ Therefore, it can be identified by *travel-time advances* (called '*leads*') for rays propagating through it;
  - ◆ Performed in *broadside* shooting.
  - ◆ Not for accurate delineation of salt dome edges.



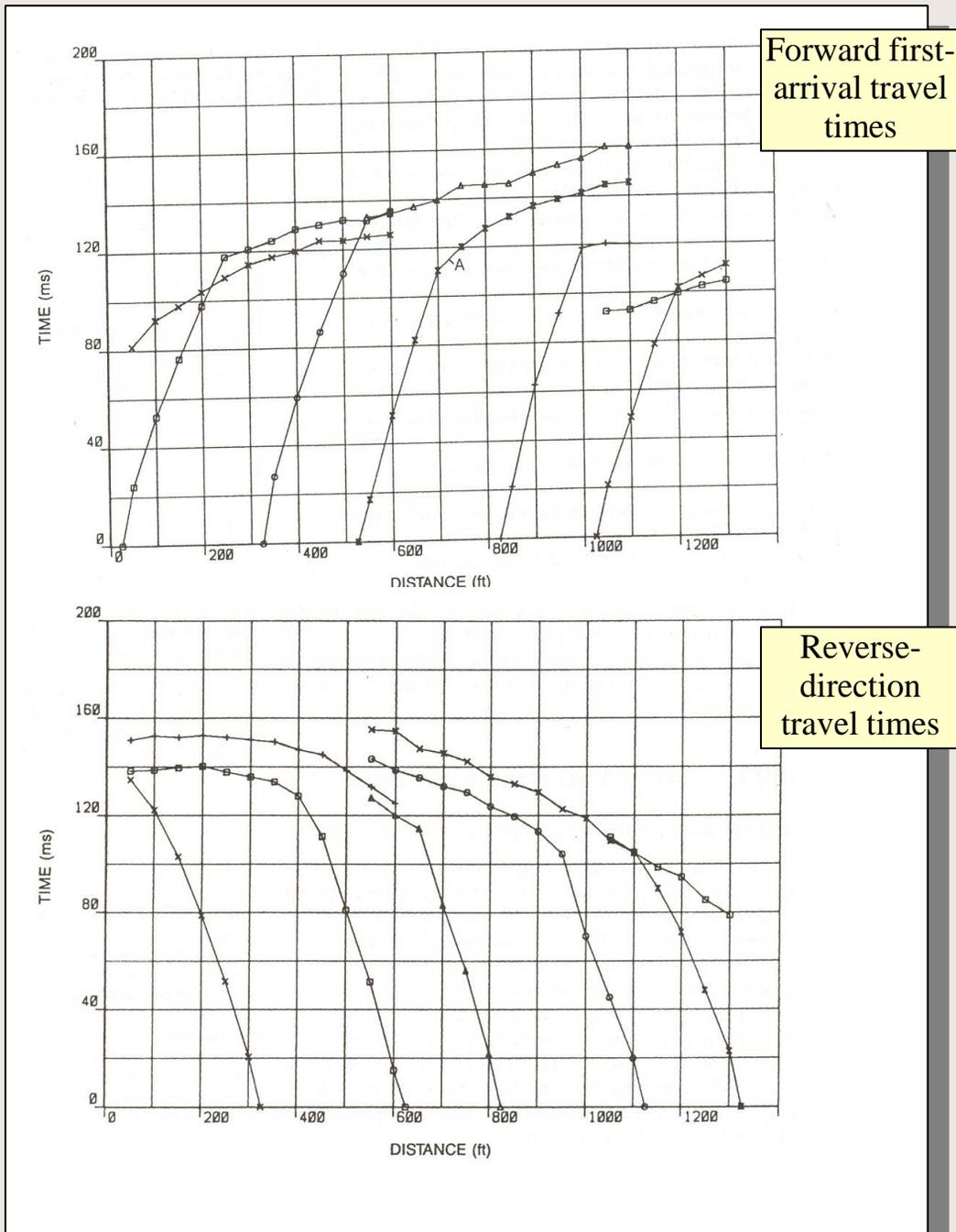
# Delineating edges of salt domes

## “salt proximity study”

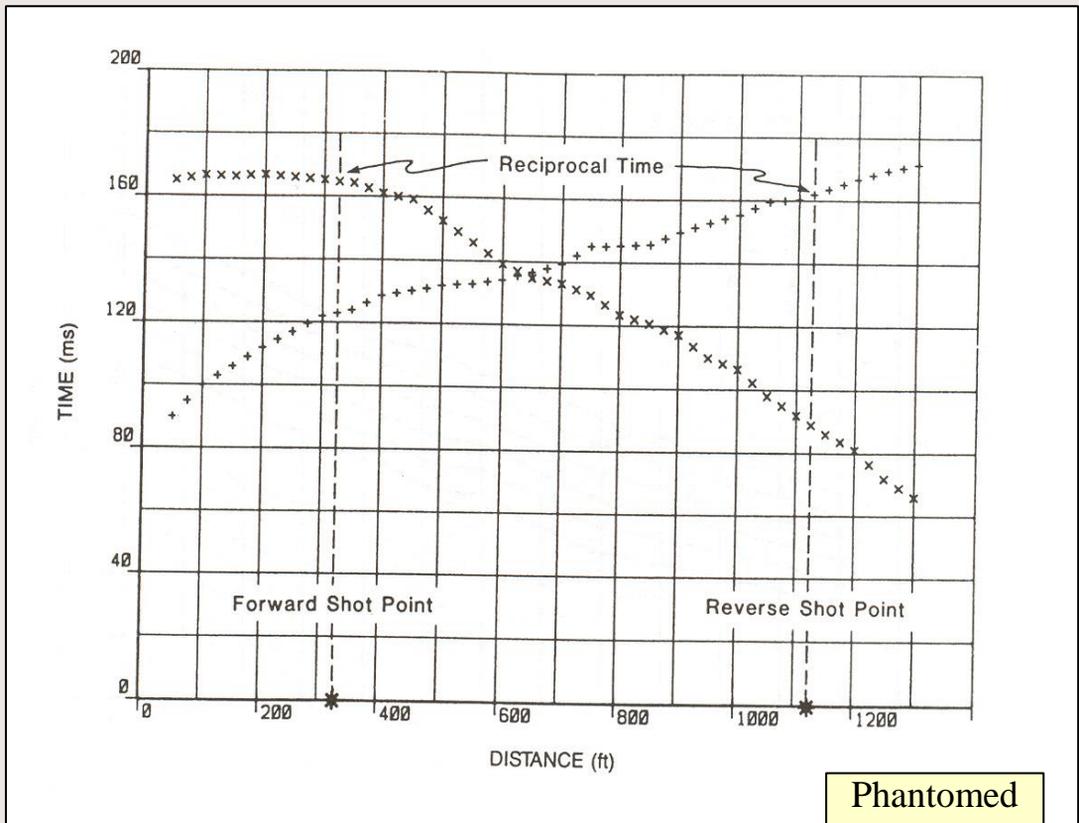
- By placing a geophone in a borehole within the salt dome, its edges can be delineated by firing around it and measuring the first-arrival travel times through it (Gardner, 1949)
  - This method is a predecessor of today's travel-time tomography.



# Refraction survey on a proposed waste disposal site (Lankston, 1990), recorded travel times



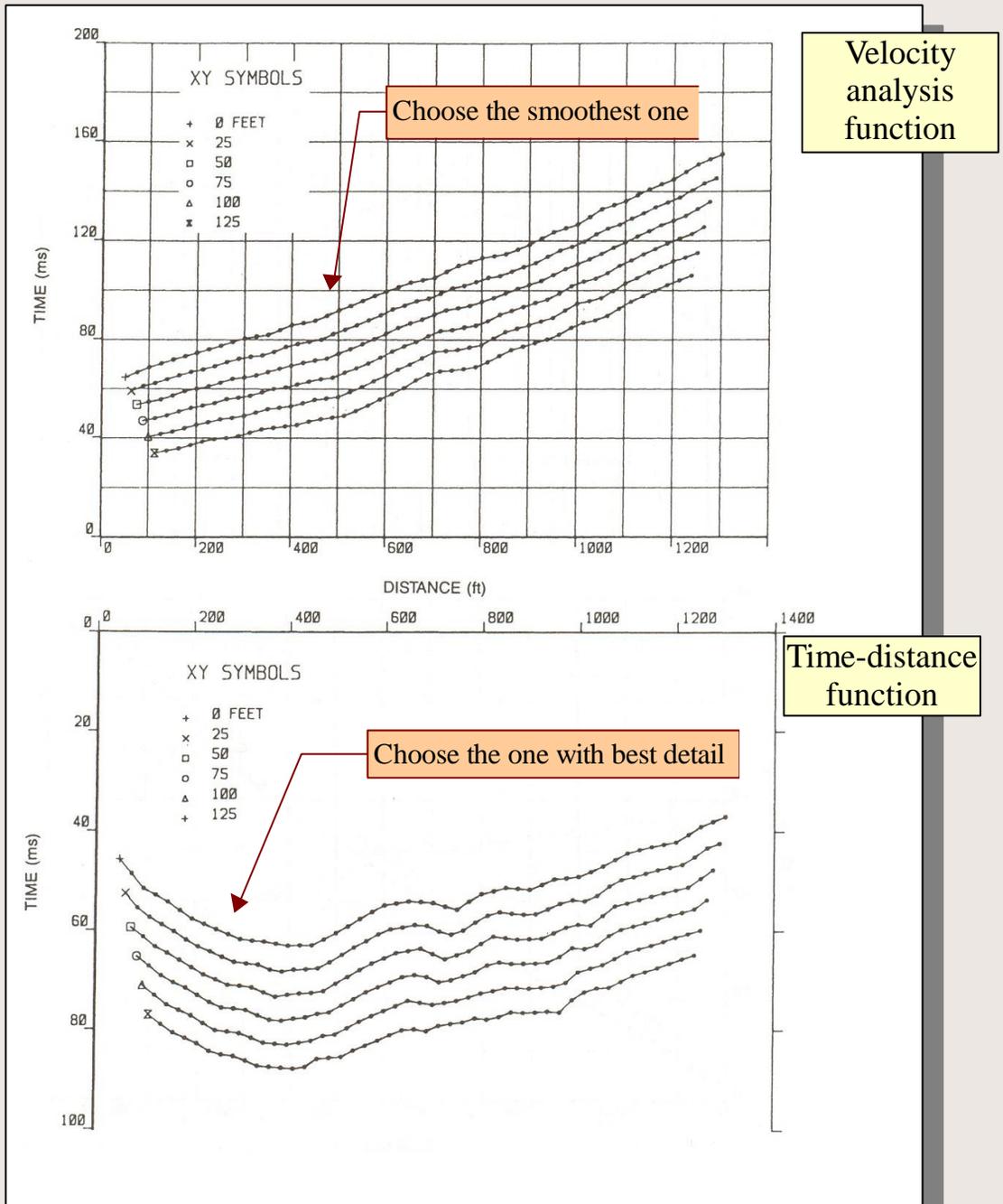
# Refraction survey on a proposed waste disposal site (Lankston, 1990)



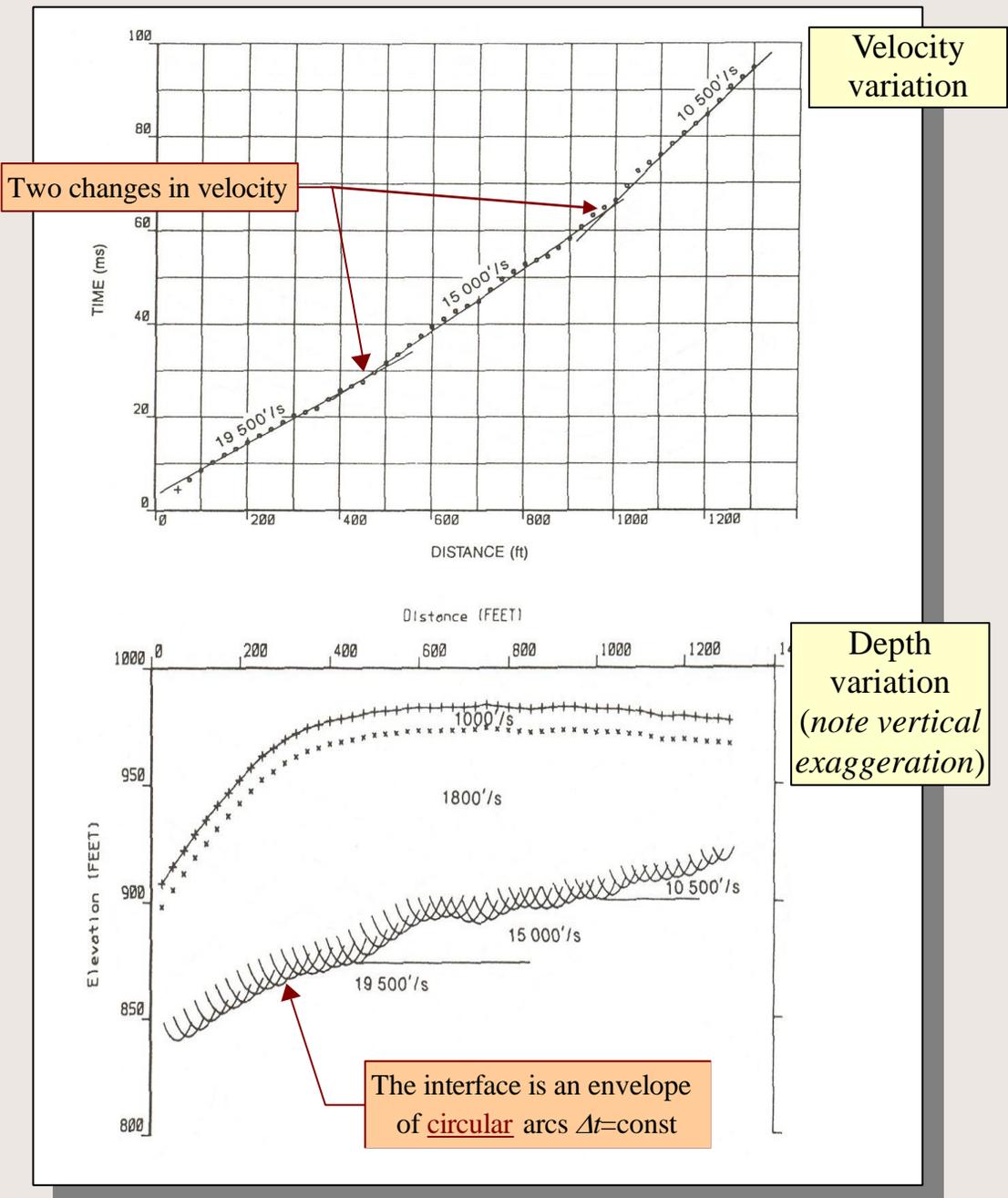
Phantomed forward- and reverse-direction first-arrival travel times

# Refraction survey on a proposed waste disposal site

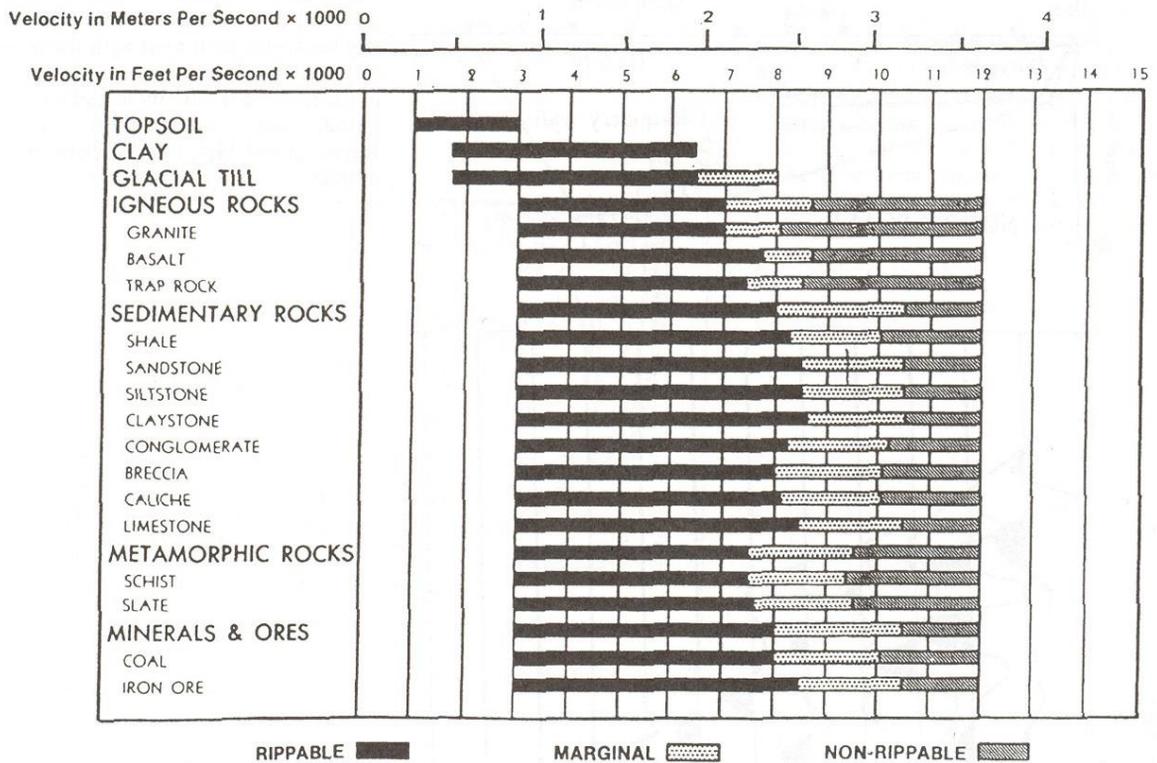
(Lankston, 1990), **velocity analysis**



# Refraction survey over a proposed waste disposal site (Lankston, 1990), results



# Rock Rippability



*Caterpillar Tractor Company*