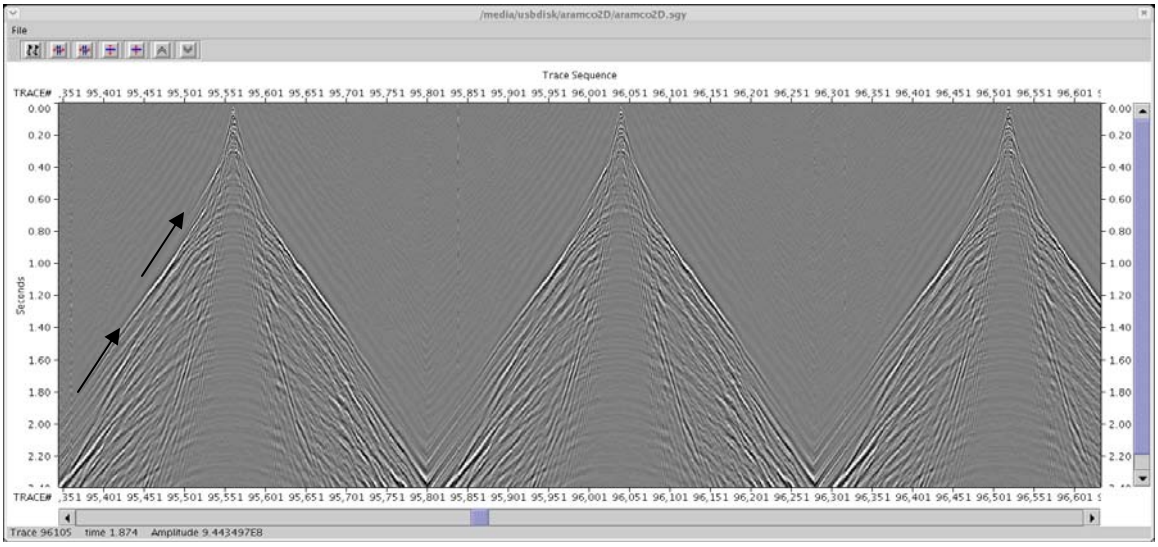
Project 6

An Integrated Near-Surface Imaging Approach for Dealing with Hidden Layers

This project involves processing a 2D dataset from Saudi Aramco with several near-surface imaging methods, including delay-time, traveltime tomography, and waveform tomography.

It is observed from shot gathers that the near-surface structures include a low-velocity layer. First-arrival traveltime tomography can help resolve the top velocity layer, and delay-time solution can help to reconstruct the lower refractor with average velocities above. Using the above results we could build an initial model with a low-velocity imbedded, and then we could perform waveform tomography to resolve the correct near-surface structures.

Data Offered:
Aramco2d.sgy
sgy.map (header map file)



Top arrow points to the direct arrival with limited offsets.
Bottom arrow points to delayed refractions from a deeper refractor. The refractions are delayed because of a low-velocity layer above the refractor.

1) Pick the first arrivals, run traveltime tomography
2) Pick the later refractions, run delay-time
3) Build a model that combines both, and then run waveform tomography

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