



COMMUNITY & DEVELOPMENT SERVICES

215 Comanche Street/P.O. Box 7 ~ Kiowa, CO 80117

303.621.3136

SEISMIC TESTING FAQS

1) What is a seismic test?

It is a way to obtain an image of rock formations below the Earth's surface. Seismic uses reflective technology similar to that of sonar used in mapping the ocean floor but in this case it maps the various rock formations below the Earth's surface.

2) What is seismic data?

Seismic data is an image of the earth below the surface of the ground. Seismic data shows different rock formations as layers of reflectors. Different rock types and the fluids in the rocks cause seismic reflection events. Seismic data is collected in the field, processed in a computer center, and interpreted by a geophysicist.

There is 2, 3, and 4 dimensional seismic data (2D, 3D, 4D) being collected around the world at this time. 2D seismic shows a single slice of the earth. 3D seismic shows a volume of earth. 4D seismic shows a 3D volume at different times in the life of an oil and/or gas field. 3D seismic is the primary choice of data collection today for oil and gas exploration.

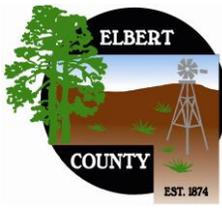
3) How is seismic data collected?

The "Reflection Seismic Method" is a geophysical technique used to map in 2D or 3D, an image of the earth's subsurface. Reflection Seismic is used by Oil & Gas, Coal Seam Gas, Minerals and Coal Exploration and Production companies to develop a clear understanding of subsurface rock structure and other geologic properties.



Land Seismic Exploration Technique
"The Reflection Seismic Method"

Sound waves are sent into the ground using an energy source such as vibrators, air guns or dynamite. The sound waves pass through the earth and are reflected off of, and transmitted through, the rock layers. (think of sonar, an MRI, or a cat scan) A seismic crew goes into the field and collects the data.



COMMUNITY & DEVELOPMENT SERVICES

215 Comanche Street/P.O. Box 7 ~ Kiowa, CO 80117

303.621.3136

4) When is seismic data collected?

Seismic data is collected when the environmental requirements and weather conditions permit. This can be during the day or night. Usually, it is done when there is the least cultural (people) activity. In the countryside acquisition is usually during the day. In the more densely populated areas it may be while most people are sleeping.

5) How much does it cost to collect seismic data?

The cost of acquisition depends on permit costs, crew costs, and other equipment costs. Currently, it costs around \$85,000 per square mile to acquire 3D seismic data. The Oil and Gas Company that requests the acquisition spends at least \$1M, and possibly over \$40M, before they see any of the results. The mineral owner pays nothing.

6) Why is seismic testing important to oil & gas production?

Seismic data allows scientist to identify the rock formations that have the characteristics required to hold oil & gas. By using this technology scientist are able to increase the likelihood of drilling a successful oil & gas well and able to reduce the industry footprint.

7) How do I give permission to a company that wants to collect seismic information on my property?

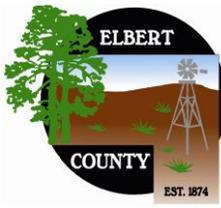
You will be contacted by a permit agent prior to any activity on the surface of your land. Read the permit carefully. Make it clear what your expectations are for the use of the surface of your land. Put any special requirements in the permit, (i.e. gate entry, locks, call 1st, etc.) You can mention to them that they also need to acquire a county permit for seismic testing.

8) Is this permit a contract or a lease?

A seismic permit is not a binding contract or an oil & gas lease. It is simply written permission to conduct seismic testing on, across and below your property.

9) Will the seismic permit allow a company to drill an oil & gas well on my property?

No, a seismic permit is simply temporary written permission from the landowner allowing seismic testing across your property and should not be confused with an oil & gas lease or seismic option agreement.



COMMUNITY & DEVELOPMENT SERVICES

215 Comanche Street/P.O. Box 7 ~ Kiowa, CO 80117

303.621.3136

10) How will seismic testing benefit me as a mineral owner?

Seismic testing can help to discover and develop those resources that otherwise could not be accessed. This could result in monetary compensation in the form of royalty payments to the mineral owner.

11) What activities will take place on my property?

Not every property is affected in the same way. It depends on the test design and other variables but the activities may include:

- surveying and mapping proposed seismic lines, energy points and access routes
- clearing vegetation for safe access along seismic lines and/or to and from energy points
- placing surface markers along seismic lines, at energy points and along access routes
- placement of energy source points
- laying out temporary cables and introducing recordable sound waves
- recording sound wave vibrations as they reflect back to the surface

12) How will this affect my ranching/farming operations?

Conducting seismic and farming operations simultaneously can be challenging but we have found that good communication and planning will minimize any inconvenience. Usually the seismic crew will have one or more liaisons working with the landowners and crews to make concessions for one another's operations.