

Seismic Activity and what's Behind It

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A couple of thoughts on the issue of seismic. Dawson has been doing seismic here in NE PA and the southern tier of NY for the last couple of years. They did a 3-D shoot this spring that included my farm as well. Interesting to watch it done. Very little surface disruption and they seem to be good about fixing issues landowners have afterwards. The explosive charges they use for 3-D are generally small (1/4 to 1/2 stick of dynamite) and 20 feet in the ground. Bryan Swistock raised the question earlier about the 20 foot deep holes drilled over the landscape and whether that presents a problem with surface water to the groundwater table. Would depend on the geology of the area it appears, but normally not an issue. With 2-D shoots they normally stick to the public roadways with permits from Penn DOT or the appropriate township. The trucks run in a series of 3 or sometimes four with the related ground crews for cabling and traffic control. Vibrations they create are rumored to break underground lines and wells but my experience standing near them taking pictures is that you can't detect the vibrations underfoot 30 feet away from the truck when it is working.

Companies doing seismic normally are under contract to one or more energy companies to conduct the study. It is very expensive and can run into the low millions for a multi-square mile 3-D shoot. This is not a random activity. Seismic companies sometimes will do the studies independent of an energy company with the hope of selling the very valuable information on the open market to one or more companies. Energy companies will sometimes pay for seismic, then decide against an area, and later sell the seismic information to another energy company with a different point of view on the potential geology. Because the information has cost to derive and value to sell, it is not given freely to landowners even if their land was included. It would be very difficult to understand except to a trained geologist. It is not placed in the public domain due to the companies having paid for the information.

So why all the seismic activity in PA. Energy companies with large Marcellus acreage are looking at the best places to exploit the shale and retrieve the natural gas at the lowest cost to produce. They are looking for shale thickness, geologic faulting, and confining layers of other types of rock as well. And they are also looking for other shale targets. Much has been spoken about the Marcellus because that is what is driving the economics and what will get the infrastructure built in many parts of PA. But there are other shales and the Trenton Black River formation in areas. Although they might not have been commercially viable in the past, they could become so with new pipelines, compressor stations, and water facilities built nearby based on Marcellus economics. The confining layers are important for drillers to know because that is what contains the frac energy during that part of the process. Faulting is generally seen as a negative because it commonly allows the frac energy to be lost without breaking the target shale rock. And lastly, energy companies are looking for a way to get rid of all the waste water created in the fracturing process without hauling it long distances and treating it. Both are very expensive and quite frankly create much of the additional truck traffic we are already starting to see. Seismic can potentially discover PA geology to allow deep well injection of the waste water and several of the companies are intensely working on this issue, some are even now leasing acreage they feel is promising.

What is a reasonable price to charge to allow seismic done on a property? That can be a tough question. Rates are in the \$5/acre range in PA, with some in other states rising to \$25/acre. An attorney that has been working on much of this advises the use of addendums to protect your unique interests and also suggests a limit on the time to conduct the study vs. open ended agreements. Many existing leases already allow seismic testing. If you don't allow seismic, it creates a hole in the map. Companies don't like holes and won't likely be back to fill them at a later date due to the cost. If the hole is small enough it doesn't really matter because the map will still give an overall picture with enough data for a company to make a decision on where or where not to drill and where to place the well pad. If you do allow the seismic, your parcel will have data on it for future consideration. If your goal is a gas well, you probably want to be in the seismic shoot. But what if they do the seismic and they find geologic conditions, i.e.

major faulting, which is problematic for drilling? They will likely not be interested in continuing work in your area and move on to other more promising areas. The value of your lease could diminish greatly or drop to zero. If they do the seismic, especially 3-D, and come back to you for leasing, it is likely you are in a sweet spot or at least one with a higher probability of commercial success. Your opportunity to negotiate better lease terms and value could rise. Always remember that although hundreds of thousands of acres have been leased, not all will be drilled on. Seismic will determine largely in the end, who is in the game and who isn't.

