COST BENEFIT ANALYSIS OF FRACKING IN NORTH CAROLINA

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ABSTRACT

In order to evaluate whether hydraulic fracturing is a worthwhile endeavor to undertake in the state of North Carolina, an analysis of the potential benefits it could provide the state were compared with the potential costs and harms it would cause. Hydraulic Fracturing otherwise known as Fracking, is a new process that uses water, sand and chemicals to force natural gas out of pockets in rock formations of shale and coal formed by river deposits created in the Triassic era, in which microbes were trapped and created methane through methanogenesis. This process would be used to extract the natural gas in the deep river basin, which consists of 785,000 acres of land with gas to extract. Under investigation, while it would be very beneficial if gas companies came to develop this resource, the chances of this happening while the state can still maximize their profits are very small, and this is not helped by the current lull in natural gas profits. In addition the chances of companies not injuring the environment in any fashion under North Carolina's current loose regulations are very small, especially since our water table and the gas intercept frequently. In conclusion this is not the right time for the state of North Carolina to endorse fracking due to the fact that the potential costs far outweigh the benefits.

The purpose of this study was to determine whether the benefits of facilitating hydraulic fracturing for natural gas in the state of North Carolina would out weight the definite and potential costs. The process of hydraulic fracturing, more commonly known as fracking, is under severe scrutiny currently due to its recent emergence into common mining and drilling practice. There are obvious risks that come from any drilling practice and fracking is no exception, however safety measures can be taken in any endeavor as well, and if the overall gains that the state would reap, especially the economic ones, are great enough then they would outweigh these risks.

Fracking is a recently developed practice used to extract Natural gas from pockets of rock in the earth that would be otherwise incredibly difficult and dangerous to access. The process involves drilling a normal oil style well into the ground to whatever depth the natural gas may be found at. In the natural gas pocket of North Carolina, this depth would usually be at least 2100 feet below the surface and can sink as far low as 6000 feet below the surface. Once well has been drilled to the correct depth the well is actually drilled horizontally into the rock. This is a better process because it allows the well to better access pockets of gas in layered or sedimentary rocks like the shale beds natural gas is so common in. At this point in the mining process pores are drilled into the well and the fracturing solution is pumped in at incredible pressures. This solution consists of 98 to 99.5% water and sand, with the rest being chemicals used to prevent excessive abrasion to the well itself, kill off microbes in the well and to maintain the proper viscosity of the solution. As the solution is forces through the pores in the well it seeps into micro-fractures in the rock and forces them open and erodes them as well, eventually creating passages through the rock for the natural gas to be able to pass through and then be collected out of the well. Once the holes to the natural gas are made the solution is just pumped into the holes

and forces the gas out until eventually as the natural gas that could be extracted from that areas has been replaces with the fracturing solution. The pores are then sealed and the well extended to a different region.

Current natural gas reserves tend to be from river bed formations created in the Triassic periods. The rock has mostly been covered by thousands of feet of dirt and rock above it, but before it is submerged it is exposed to methanogenic microbes, which are then sealed into pockets of the rock and begin producing carbon dioxide and methane through an anoxic process known as methanogenesis.

These microbes involved are classified as archaea and like most archaea are incredibly hardy to the point of being able to sustainable reproduce in anoxic conditions. Methanogenesis is a process that converts coal of any quality into highly pressurized pockets of natural gas in rock. The ideal beds for natural gas in our state were formed in the Triassic period. This is however, a very common process and even happens in much younger formations that still are largely coal, as can be seen in the coal mines found along the east coast, when coal tunnels frequently have issues with the rock seeping methane, because there are pockets of gas that are still tiny, because there has not been in much time for the gas pockets to grow and combine together.

In North Carolina there is one major basin that formed. It is the remnants of the Deep River that created a major formation across a line of counties in the middle of the state. These counties include: Granville, Durham, orange, wake, Chatham, Lee, Moore, Montgomery Richmond, Anson, and Union. After running through these counties it runs through South Carolina. Overall in the State of North Carolina it is estimated that there are about 785, 000 acres

of beds that have natural gas to extract, all of which normally maintains a width of 150 to 540 feet and has a max thickness of 800.

RESULTS AND DISCUSSION

Based on effects of exploratory well drilled in the Sanford Sub-Basin and on has results from other wells especially in New York on the Marcellus Shale many possible results could come of facilitating fracking in North Carolina, and not all of them are good.

Obviously there would be good effects on the economy from this, namely the increased GDP that would come from the mining jobs and the large corporations who would be setting up operations in this state. Due to the most rich portions of the shale being around Lee and Chatham counties, these are the two individual counties that would stand to gain the most from supporting fracking, although the State as a whole would have much to gain as well. On the whole there would be major economic effects from this, the State would have its GDP improved by 292 million by the end of the year 2019. In addition the Sanford Sub-basin alone would have 387 brand new sustained jobs. This does not include how many other sustained jobs would be created by the rest of the deep river basin. That number does not include the trickledown effect caused by an influx of people that have money to spend. Overall the areas that the oil wells are in would have a surge of new economic activity that would be very healthy for that part of the state. The only problem with this is the possibility that the whole cycle refuses to start and the State of North Carolina is forced to pay for almost everything itself, which would not be ideal, and the state would no longer be making a profit.

The reason this plan might backfire stems from the fact that natural gas is currently very cheap and readily available. This is part of the reason that Natural Gas is the “Fuel of Choice” for

power companies currently, this unfortunately means that the Gas companies are not making as much in profits as they would prefer to and instead they are stockpiling as much as they can and waiting until the price goes back up at a later point in time. Without major incentives that would cut deeply into North Carolina's possible profits Natural Gas companies will not make any kind of move to develop in our state, since they would have to go through the whole process of buying mineral rights from current owners of land in the state, setting up completely new facilities in order to mine and process the natural gas, as well as put together whatever trucking lines or pipelines to ship it where the need to. In Addition since the drilling companies do not as much extra money to expand as they normally it is very unlikely that they would fund the construction of new housing for their workers, which is another necessary element to properly growing the economy of an area. In the northern states drilling companies also entered into agreements with the states to help maintain the roads they were using since the large trucks that ship the gas were wearing them away quickly, and in this natural gas lull most companies would be very reluctant to enter into agreements of this nature.

Finally to top it all off our current bonding system is sub-par to that found in other states. It only covers the shutting down and abandonment of wells below the surface. It offers no support to companies in terms of restoring the environment above the wells, which requires plenty of work too. A lack of funding