Vivian

Instructor Name

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Project 2: Fracking

The oil and gas industry saw decades of expansion, partly due to innovative advances in drilling technology and in transporting, extracting and delivering its products. Among these innovative techniques, hydraulic fracturing or fracking rose to much prominence. The process involves using large amounts of sand and water, combining them with chemicals at high pressure to produce rock formations that can then fracture the material that surrounds oil and gas reserves, allowing it to be extracted even when wells have conventionally dried up. However, the process has been a subject of controversy owing to the adverse impacts the extraction process has on the soil and water of the region, the atmosphere and the environment.

The process of hydraulic fracturing is a fairly uncomplicated process for drilling and extracting natural gas, however, there are serious risks involved. The process involves identifying rocks likely to enclose natural gas that was trapped millions of years ago within silt and sand that later transformed into rocks. Yet, even as the fracking process extracts useful hydrocarbons from these rocks, the process has a subject of substantial controversy to the extent that nearly two-thirds of media reports associated with fracking portray it in a negative light (Groat and Grimshaw). The controversy mostly relates to air pollution, drinking water contamination, and lack of regulation in the selection of wells.

One of the most commonly cited and obvious benefit of fracking is energy security, however, in the long term, it has the potential to impede energy security. Currently, there is a scientific consensus over the fact that fossil fuels adversely impact the planet’s environment and ecologic future. Thus, something that has been developed as a low-cost technology to drive energy independence may end up creating an environmental and economic turmoil. It is no surprise to see countries that pursue fracking often miss their targets to reduce carbon emissions since the main chemical extracted from the process is methane. Methane is significantly stronger than carbon dioxide in terms of its greenhouse ability, while about 4% of the extracted gas escapes into the atmosphere. Consequently, the release of methane significantly impacts the air quality of the regions that surround fracking sites (Howarth). The problem worsens as there is little regulation to restrict the selection of fracking sites, while emissions from these sites substantially contribute to climate change that, in turn, is leading to rising sea levels, mass migrations, impact agriculture and lead to unpredictable weather patterns (Magill). Thus, any short-term benefit fracking could bring in terms of energy security could eventually lead to global instability in the long term from the effects of climate change. Moreover, the leakage of methane gas has been found to be responsible in various cases of explosions. In one instance, an entire house exploded as a result of methane gas mixing with the water supply of the residential area after leaking from the nearby fracking site. The underground pathways created by the process forged a passageway for the gas to mix with the water supply (Lustgarten).

Much of the risks that follow fracking do not manifest themselves during the extraction process or occur from the presence of gaseous rocks that are fracked. A number of problems occur because of a lack of consistency in the nature of chemicals extracted from the process, which makes evaluating their overall impact even more difficult especially when drilling companies are allowed not to disclose the chemical make-up of the extracted gas. There have been PR campaigns by companies that provide assurances that the chemicals used or extracted from the fracking process are non-toxic mostly, while only a minute quantity of hazardous chemicals are only used; however, these minute quantities can often reach millions of gallons (Lustgarten). Thus, even when the overall proportion of such chemicals is considerably less, the overall quantity is large enough to cause tens of thousands of gallons of hazardous chemicals pumped into deep formations. According to the EPA, prolonged exposure to these chemicals can lead to significant organ damage, including kidney, lungs, brain, and blood diseases, while the adverse effects of a number of chemicals used in the process still remain unknown (EPA). Even minute amounts of contact with drinking water can significantly contaminate it and contribute to these damaging effects.

The most significant environmental impact of fracking is groundwater contamination which can occur as a result of chemicals used in the fracking process leaking into the nearby or adjacent water tables and thus reach drinking wells. In the U.S., fracking is suspected to be a factor in drinking water contamination in the states of Texas, Pennsylvania, Colorado, West Virginia, and Arkansas, wherein residents have often reported changes in water quantity as well as quality after fracking operations began (Lustgarten). Contamination can not only occur from the drilling process but also from surface-chemical spills that cause hazardous chemicals to escape into the water table. There have been numerous reports of benzene and other chemicals found in springs, streams and water wells which may have been caused by leaky tanks, accidental spills, or waste pits. According to Lustgarten, nearly 1500 instances of chemical spills have been reported during fracking operations between 2003 and 2008, out of which 48 of those instances could be responsible for water contamination. In other instances, the extracted methane gas from the fracking process, which is usually forced upwards from several thousand feet below due to the pressure created by hydraulic fracking, would travel from a series of cracks to reach the groundwater reservoirs and eventually the local area’s tap water (Lustgarten). The methane from the tap water is enough to cause an entire house to ignite.

However, there are a number of other considerations to be made when devising a stance over the controversial process. Since fracking has been introduced, it brought about a dramatic change in fossil fuel prices. In 2013, the reduction in price is estimated to be nearly 47% lower than what the price was projected to be without fracking. The resulting savings are nearly $13 billion between 2007-2013 which continue to increase as fracked oil production increases (Dews). The usual criticism is dismissed by some researchers who report no evidence of groundwater contamination being linked to fracking. The main problems associated with the fracking process are common to conventional oil and gas drilling, and contamination can be attributed to the mishandling of wastewater or above-ground spills possible due to shale gas drilling instead of fracking (ABA). Although some of these justifications can seem very convenient, because they are widely purported by fracking companies, yet a closer look at the claims is still warranted.

Technological advances in fracking techniques and the drilling process has made the extraction process of natural gas easier from sites previously thought to have been inaccessible. It is thus argued that the advances in fracking technology allow extractions from areas that have impermeable rock spanning thousands of feet between any aquifers and fossil fuel pay zones, thus there is no significant chance of fracking chemicals or gas to migrate to the aquifers from the fracking location. There have been competing studies in this regard which conclude different results, however, some recent studies along with reports from a U.S government task force reveals that if the fracking fluid is properly injected, then the possibility of it reaching drinking water is remote (Darrah).

In addition, the extraction of natural gas has several economic benefits. The ability to extract gas from a well or source has created a gold rush effect for oil companies since gas can now be extracted from several thousand feet below and has provided local drilling companies space to work independently from large foreign oil corporations. In turn, this has reduced oil dependence from countries such as Iran, Venezuela, and Saudi Arabia. Furthermore, it has led to domestic economic stimulation creating thousands of jobs on a regular basis, providing annual incomes of more than $40,000 (Dews). Since many fracking locations are within remote or rural areas, the local population welcomes the economic stimulation which comes with the process. There is still a potential to create thousands of jobs if full-scale drilling commences in major states such as New York and Pennsylvania. Additionally, as the domestic oil and shale gas production increases, the overall fuel prices have been significantly reduced and provided fuel security to the U.S. for more than a century in the future (Dews). In turn, electricity could be produced at half the rate of emission which can then replace hydrocarbon fuels for transport and other uses.

An overall analysis of the arguments reveals that a concern for environmental impact is admitted by both opponents and proponents to varying degrees. A notable condition admitted by proponents is that the fluid must be ‘properly injected’ in order to avoid the risk of contamination. However, fracking fluids still require to be transported and disposed of besides injection and leakage at any point in the operations, even if the injecting process is adequate, could cause adverse environmental impacts to the people living in the surrounding region of the site. Whether the contamination or pollutants could be attributed to the fracturing process itself or other associated steps, fracking itself would be blamed in case of contamination. Furthermore, in 2013, nearly 15 million residents were known to live within a mile of a fracking site, a figure that may have increased over the years (Valentine). Thus, the proximity of an otherwise risky production process to different communities makes it imperative to address even the slightest concerns instead of rejecting them as usual consequences of hydrocarbon production. A number of indirect causes, such as leakage or improper waste management, may cause hazardous chemicals to release into the air or into the water table wherein even minute quantities can cause significant damage. If incidents continue to be reported, then this can lead to heavy regulation and thus impede any positive effects that fracking could provide in terms of energy security.

To conclude, the process of fracking admittedly has a number of benefits, yet, its potential to impact climate change and introduce hazardous chemicals into the air and water of adjacent regions cannot be ignored. Moreover, the cheap availability of hydrocarbon-based fuels as a result of fracking could delay the switch to renewable energy by several decades. The increased uncertainty and political volatility that comes as a long-term consequence of fracking could also impact energy security. Upon weighing and examining all the different factors, it can be admitted that fracking could very well be a false economy, wherein the direct and indirect risks associated with the process can override the benefits. The safety and health of the people overrides short-term benefits to their economy. The risks of hazardous and carcinogenic chemicals that may leak in any part of the operations, and thereby contaminate the air and groundwater surrounding the fracking site are valid concerns that require to be addressed before the technology is further proliferated. Moreover, because its certain benefits have merit as well as carry the potential to particular energy issues facing the world today, more research needs to be diverted in making the drilling process safer, without the use of hazardous chemicals, in order to prevent contaminations, explosions, and leakages. The stability of the U.S. economy must not be built over the safety and wellbeing of its people.

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