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Fracking: Evaporation Pools

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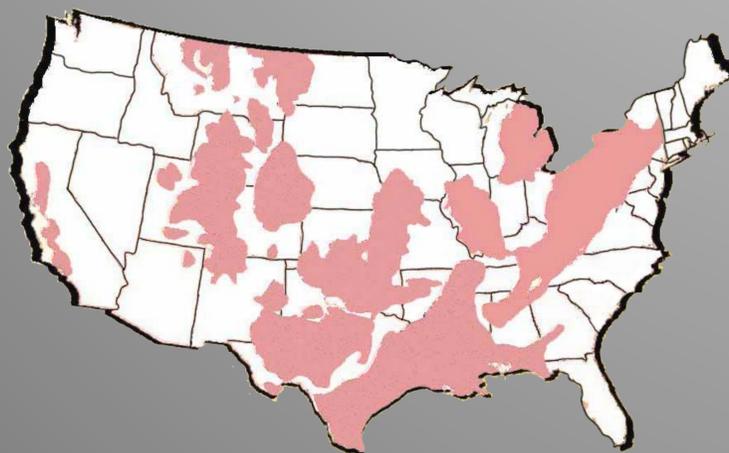
Abstract

Our goal was to make hydraulic fracturing for natural gas a cleaner process. Fracking provides an important energy source for the United States, however it is commonly associated with a variety of environmental problems. We focused on how recovered fracking fluids are handled and contained after the fracking process is complete. We compared currently used open loop fluid systems to closed loop systems and evaluated their benefits and consequences. We determined that closed loop systems are more beneficial than open loop systems because they cost less and have fewer environmental impacts.

Background

Fracking is the process of recovering natural gas trapped by shale rock by injecting fluids (water, chemicals, proppant) at high pressure into horizontal wells. After a well is fracked, the recovered fluid must be disposed of. Currently, the majority of fracturing companies use open loop systems. The fluid is put into an evaporation pit with the intent of evaporating as much as possible before it is hauled away for processing.

Alternatively, some parts of the country with scarce amounts of water use closed loop systems. Closed loop systems are essentially fluid holding tanks that hold the water and chemicals until trucked away for processing.



Open Loop

- **Evaporation Pits**

Goal is to evaporate as much fluid before hauling away for treatment.

- **Cost**

\$447,000 to construct
\$104,000 to breakdown
\$551,000 Total

-Less fluid to truck and process

- **Environmental**

- Evaporates chemicals into air
- Affects the air quality
- Chemicals can leak through lining
- Requires more land



Closed Loop

- **Storage Tanks**

Goal is to eliminate all contact between fluid and ground, and prevent leaks and reduce air pollution

- **Cost**

\$267,000 to construct
\$ 3,000 to breakdown
\$270,000 Total

-More fluid to truck and process

- **Environmental**

- No evaporation
- Does not affect air quality
- Reduced leaking chance
- Requires less land



Conclusion/Findings

In conclusion, our comparison shows that closed loop systems are cheaper and have less environmental impacts than open loop systems. Closed loop systems cost approximately \$281,000 less, prevent evaporation, and reduce risk of leaking. Closed loop systems also require less land and allow companies to reuse more of the fracking fluid to save water. If fracking companies were to implement closed loop systems instead of open loop systems, fracking could become a more economic and sustainable way to extract natural gas.

One unanswered question is the amount of trucks used with either system. There was no consistent data regarding the amount of trucks used for transporting water or construction each system. More research and information needs to be completed before conclusions can be made.

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