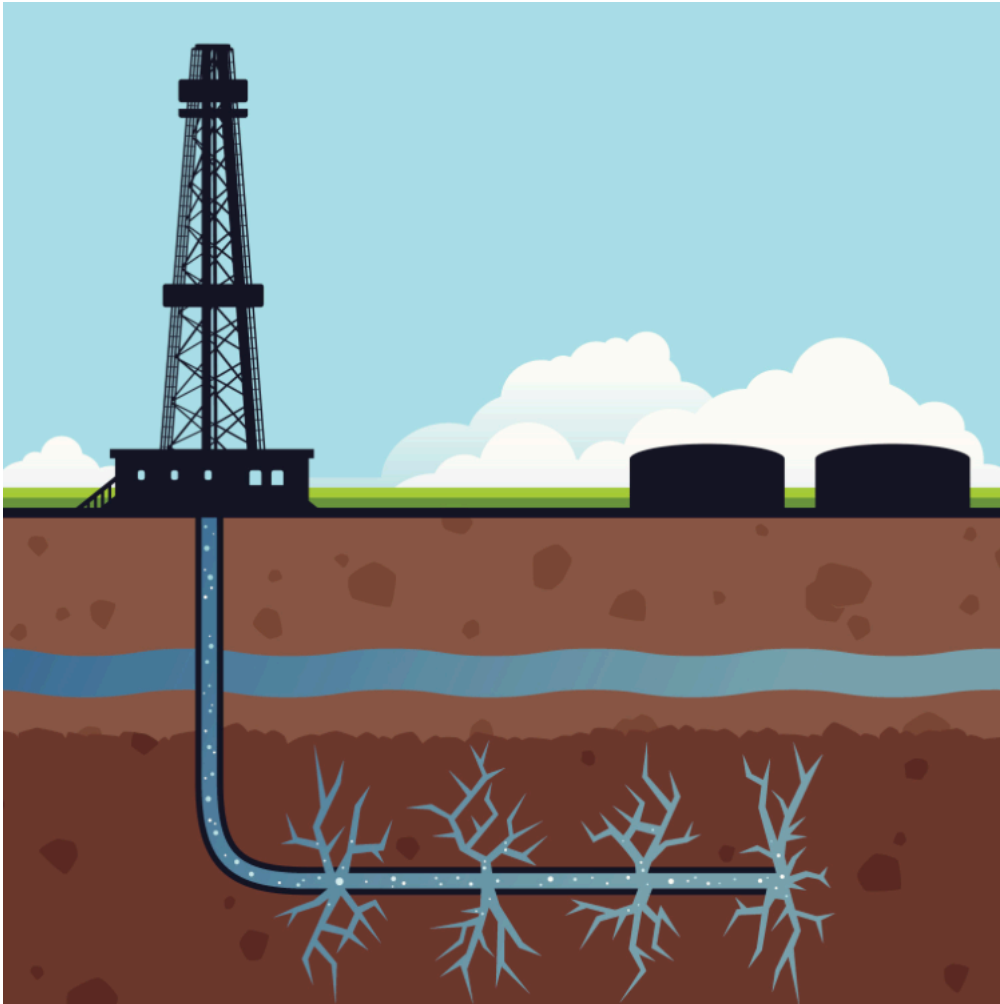


Fracking



SPSE Reading & Writing Test

Question: *Making reference to the points made in texts 1,2,3 outline the situation and problem(s), summarise the solutions suggested and evaluate their effectiveness. Write between 400-600 words.*

Teacher's Notes

Reading & Writing Text - SPSE

Time: 1:30 – 2:00 hours

Level: *****/[B2/C1]

Lesson Plan

Aim: to develop the students' ability to read three academic texts and highlight key points connected to background, problems, solutions and evaluation. Then to write a 400-600 word SPSE text around those key points using paraphrasing and referencing skills.

1. Lead in

- What is fracking? Brainstorm the topic and associated vocabulary.
- Associated vocabulary: *oil & gas, shale gas, drilling, wells, high pressure water, rock, fracking chemicals, contamination, pollution (pollutants), waste water, treatment plants, underground water aquifers, hazardous, carcinogenic, etc...*

2. SPSE Revision

- Remind students about what is a SPSE essay.
- Go here: <https://www.academic-englishuk.com/spse> (Models / Language).

3. Question

Making reference to the points made in texts 1,2,3 outline the situation and problem(s), summarise the solutions suggested and evaluate their effectiveness. Write between 400-600 words.

4. Outline

Ask students to use the outline to take notes around the texts and then use that outline to write the SPSE essay.

5. Time

Depends on the level of students (high-level students – 1:30 hours / lower level 2:00 hours) or as an exam 2:00 hours.

6. Feedback

Give students the answer outline & modal answer and/or take in and mark.

Use error correction code: <https://www.academic-englishuk.com/error-correction>.

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Fracking – extracting natural gas

Text 1 by Wilson and Rakenberg (2018)

Fracking is the technique of drilling on land to extract oil and gas from underground reservoirs and wells. The hydraulic fracturing process, [REDACTED]. Water, sand and chemicals (Benzene, Toluene, Zylene and Ethylbenzene) are injected into the rock at high pressure which allows the gas to flow out to the head of the well. The process can be carried out vertically or, more commonly, by drilling horizontally to the rock layer. The term fracking refers [REDACTED] (see figure 1).

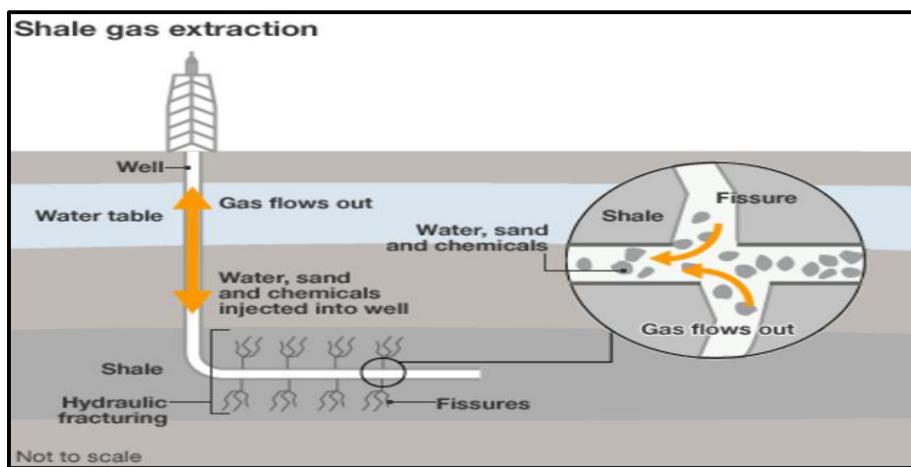


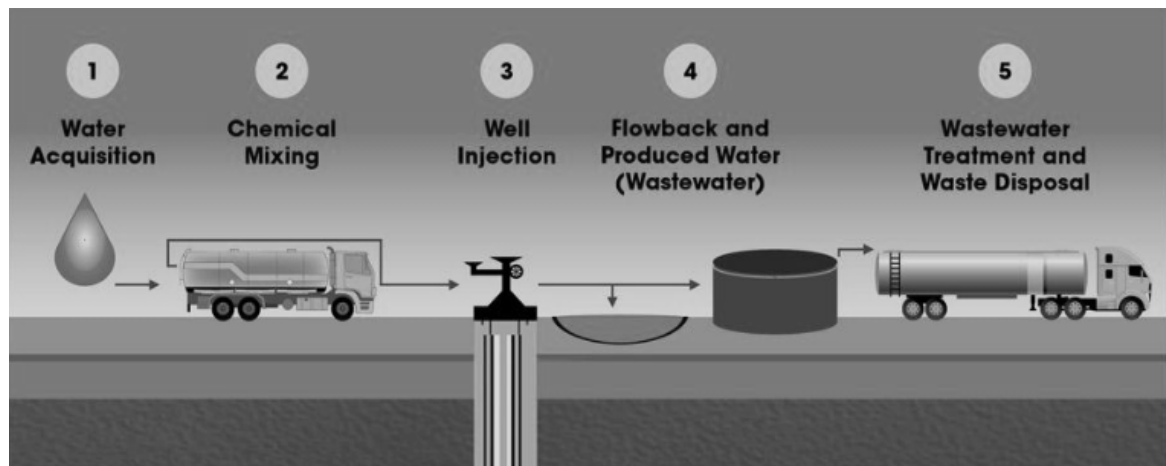
Figure 1
The Fracking Process

The most widespread concern is the water contamination of underground aquifers due to the hydraulic fracturing process and chemicals used in shale gas extraction; however, the most significant risk is [REDACTED]. Indeed, this week a North Eastern Pennsylvania fracking company reportedly suffered a blowout, spilling thousands of gallons of fracking fluid water on the surrounding ground, due to human error (BBC, 2016).

House Energy and Commerce Committee (2015), [REDACTED] fracking chemicals (a single frack job uses 5 million gallons of water, containing thousands of gallons of fracking chemicals). It is being suggested that stricter limitations are needed on the use of such chemicals, tougher regulations and control of hazardous waste and harsher penalties (million dollar fines) for polluting ecosystems. Although, how this can be done [REDACTED] the long-term effects of fracking pollutants on the environment and also regulating fracking company spillages.

Text 2 by US Environment Agency (2018)

Another long-term problem with shale gas drilling is wastewater (see figure 2). A single fracking process can return to surface as much [REDACTED] [REDACTED] used to release the shale gas. In certain wells, where the geology permits, like Colorado and Texas, that [REDACTED]. This is often regulated by the federal government but some geographical areas the geology or strata is permeable, meaning that the fracking liquid will leach into the environment. This results in a serious problem and the waste [REDACTED] [REDACTED]. The *New York Times* (2017) has reported that water-treatment plants are struggling to deal with the amount and hazardousness of fracking waste water. In fact, the industry may not have that option available much longer as earlier this week [REDACTED] [REDACTED] to dispose of it.



[Figure 2 - The water process]

Text 3 by Peterson (2017)

Shale gas drilling is going to continue given the sheer amount of gas waiting to be tapped; however, there needs to be ways to clean and filter fracking fluid at the well site. General Electric (GE) may have a solution. The company [REDACTED] [REDACTED] fracking on site, rather than trucking the water to a treatment plant. Water is a huge issue for fracking and with the mobile evaporator [REDACTED] [REDACTED] in a significant fashion (see figure 3). You end up with water that can be used for recycling.

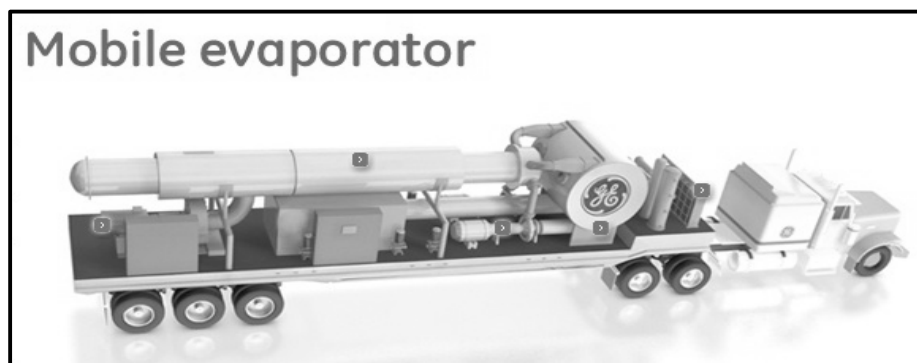


Figure 3: The evaporator

The evaporator, which can be mounted on a truck and driven to any well site, can process about 50 gallons a minute, and it is especially [REDACTED] [REDACTED], where the water tends to come back with a high degree of dissolved geological solids. In theory, it should push drilling companies to take better care of the water they use and produce.

GE's technology is not [REDACTED] associated with shale gas drilling and one question that has not been answered clearly is what will happen to the waste hazardous chemicals once separated. At this moment, these waste chemical [REDACTED] for disposal. Overall, it is important to remember that fossil fuel extraction, like just about any other business can get cleaner, greener and more efficient. It often needs policy and commitment from regulators to make it happen.

Outline Plan

Situation	
Problem	Solution
Evaluation	
Conclusion	

SPSE Outline Answers

<p>Situation</p> <p>Process – Shale Gas / fossil fuels</p> <p>Fracking – drilling / hydraulic [redacted] / high water pressure with chemicals extract gas from rocks.</p> <p>Associated problems with [redacted] waste water and content of hazardous fracking chemicals.</p> <p>Outline</p>	
<p>Problems</p> <p>Fracking Fluid Water – hazardous & carcinogenic – include Benzene, Toluene, Zylene and Ethylbenzene & [redacted] of water per frack (Wilson and Rakenberg (2016).</p> <p><u>Problem 1:</u> Blow out / [redacted] pollution (Wilson and Rakenberg, 2016). Example Pennsylvania / [redacted] million gallons of contamination (House Energy and Commerce Committee (2015).</p> <p><u>Problem 2:</u> Waste water – permeable / porous geology = water [redacted] can't treat it (US Environmental Agency, 2018)</p>	<p>Solutions</p> <p><u>Solution:</u> limitation / control / regulation / higher fines (Wilson and Rakenberg, 2016).</p> <p><u>Solution:</u> Store water underground or [redacted] – mobile truck (Peterson, 2012) treats water on site. 50 gallons a minute processing (Peterson (2017).</p>
<p>Evaluation</p> <p>Policy, limitations [redacted] and penalty needs more development in implementation. / lacks evidence & research. Difficult to [redacted] (Wilson and Rakenberg, 2016).</p> <p>The Evaporator is not the [redacted] (a complete solution) but could encourage frackers to take more responsibility. Questionable about what happens to waste chemicals / storage is not a solution (Peterson (2017).</p> <p>[redacted] error is a cause of blowouts (Wilson and Rakenberg, 2016).</p>	
<p>Conclusion</p> <p>Overall, it need [redacted] and commitment.</p>	

Model Essay

Extracting natural gas from deep underground wells is done through a process called Fracking. It is a relatively new concept often referred to as Shale Gas extraction. [REDACTED] [REDACTED] water consisting of a range of chemicals that fractures the rock releasing the shale gas contained in it. There are a number of associated risks with fracking because each frack can [REDACTED]. This essay will highlight the key problems associate with fracking, suggest possible solutions to these problems and then evaluate their effectiveness.

The main key problem is using and disposing of the fracking fluid water. This water contains a number of hazardous substances such as Benzene, Toluene, Zylene and Ethylbenzene, which are carcinogenic to the environment. [REDACTED] [REDACTED]. Wilson & Rakenberg (2016) state that the most serious danger is blowouts through human error, with fourteen fracking companies this year reporting that they have experienced these accidents. These are surface explosions at the [REDACTED] [REDACTED]. In fact, over 866 gallons of contaminated fracking liquid has polluted environment already this year (House Energy and Commerce Committee, 2015). One solution that has been suggested by Wilson & Rakenberg (2016) is better control, regulation and high fining systems to create improved responsibility and awareness of such accidents. Although this could be quite effective, [REDACTED] fracking pollutants affect the environment and how fracking companies can be monitored and regulated.

Another key problem associated with the contaminated waste water is its disposal. The US Environmental Agency (2016) notes that some fracking [REDACTED] [REDACTED] but areas where the geology is porous and permeable this cannot be done. Therefore, the waste water needs to be taken off site to be processed through water treatment plants but these plants are unable to cope to with the hazardous fracking chemicals within the water (The New York Times, 2017). Peterson (2017) puts forward a [REDACTED] [REDACTED]. This is a mobile waste water processing machine that can be placed on a truck which is capable of processing 50 gallons of fracking liquid a minute, offering a viable solution to processing and recycling water on site. The evaporator works well in principle but is not the perfect solution due to the questionable fact of how to dispose of the toxic chemical separated from the waste water. [REDACTED] [REDACTED].

Overall, fracking offers new avenues to extract gas and this meets the ever increasing energy demands of the future. There are a number of key environmental pollution problems but with governmental [REDACTED]. The biggest concern and perhaps the most difficult to eliminate is human error but with improved safety protocols and higher fining systems this is something that can be reduced.

[Words 531]