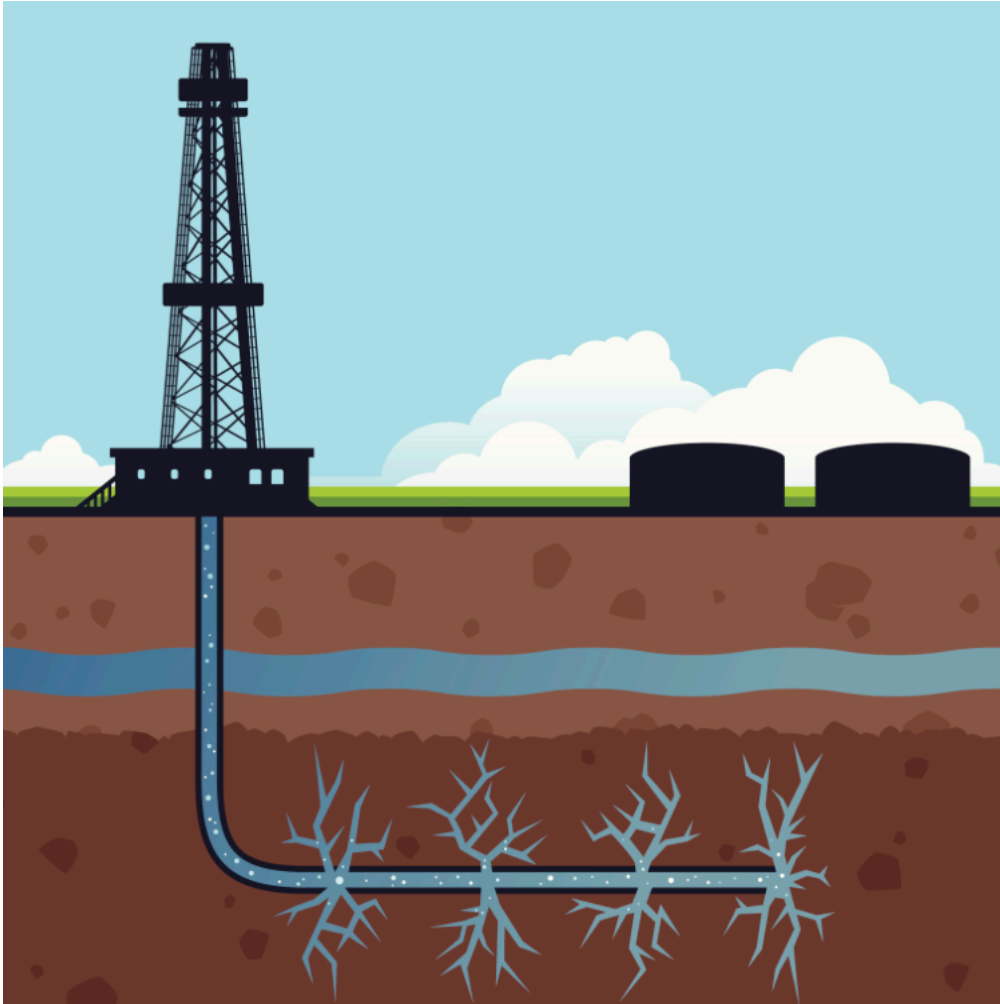


Fracking



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 Test - 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. Students then use the key points to write a 400-600 word SPSE essay using summarising, paraphrasing and referencing skills.

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.*

SPSE Revision

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

Task

1. Students read **essay question** and check understanding.

Essay 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.

3. Distribute **SPSE essay outline** & the **three texts**.
4. Students take notes on the **three texts** using the **SPSE essay outline**.
5. Students write essay from their outlines. Allow 1.30 – 2.00 hours.
6. Feedback: Either distribute **SPSE essay outline answers** & **model essay** for students to check themselves or take in and mark. Use error correction code:
<https://www.academic-englishuk.com/error-correction>

Scaffolding/differentiation

- Students compare with **SPSE essay outline answers** before writing the essay.
- Key phrases sheet to support students with SPSE language at the back of this book.

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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 [redacted] to as shale gas extraction, uses a high-pressure water mixture directed at the rock below the ground to release the gas inside. Water, sand and chemicals ([redacted]) injected into the rock at a 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 to how the rock is 'fractured' apart by the high pressure mixture (see figure 1).

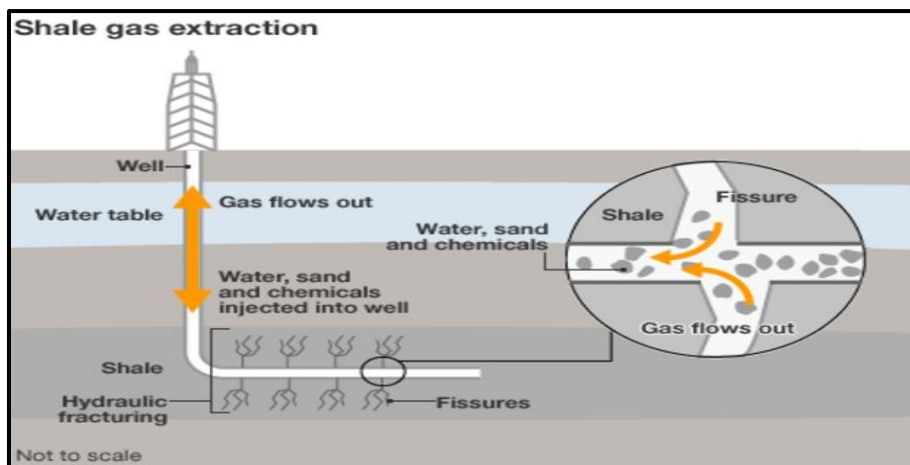


Figure 1:
The Fracking Process.

The most widespread concern is the water contamination of underground aquifers due to the hydraulic fracturing process and chemicals [redacted], the most significant risk is the waste water disposal on the surface surrounding the well. Indeed, this week a North [redacted] spilling thousands of gallons of fracking fluid water on the surrounding ground. This was due to human error (BBC, 2016).

House Energy and Commerce Committee (2015), [redacted] of the country's most active hydraulic fracturing companies had reported blowouts spilling over 866 million [redacted] (frack job uses 5 million gallons of water, containing thousands of gallons of fracking chemicals). It is being suggested that stricter limitations are [redacted] hazardous waste and harsher penalties (million dollar fines) for polluting ecosystems, although how this can be done is still [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 as [REDACTED] solids, radioactive elements and the hazardous chemicals used to release the shale gas. In certain wells, [REDACTED], that water can usually be disposed of by injecting it back into deep wells. This is often regulated by the federal government but in some geographical areas the geology or [REDACTED] will leach into the environment. This results in a serious problem and the waste water must be [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 [REDACTED] longer as earlier this week Pennsylvania authorities called on fracking gas companies to stop sending waste to treatment plants as they are not equipped to dispose of it.

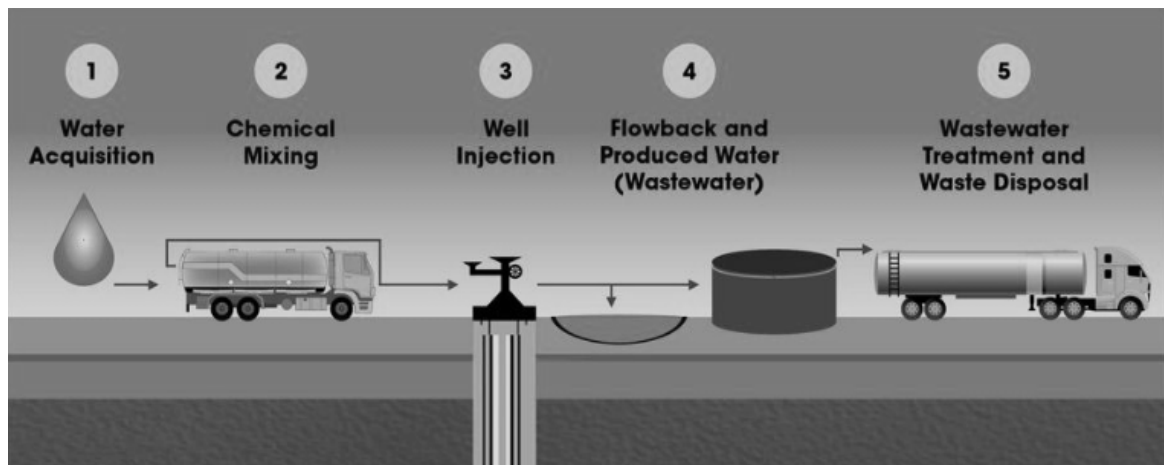


Figure 2: The water process.

Text 3 by Peterson (2017)

Shale gas drilling is going to continue given the sheer amount of gas waiting to be tapped; however, there [REDACTED]. General Electric (GE) may have a solution. The company has developed a mobile evaporator designed to help drillers recycle waste water [REDACTED] trucking the water to a treatment plant. Water is a huge issue for fracking and with the mobile evaporator you can separate out the contaminants [REDACTED] (see figure 3). You end up with water that can be used for recycling.

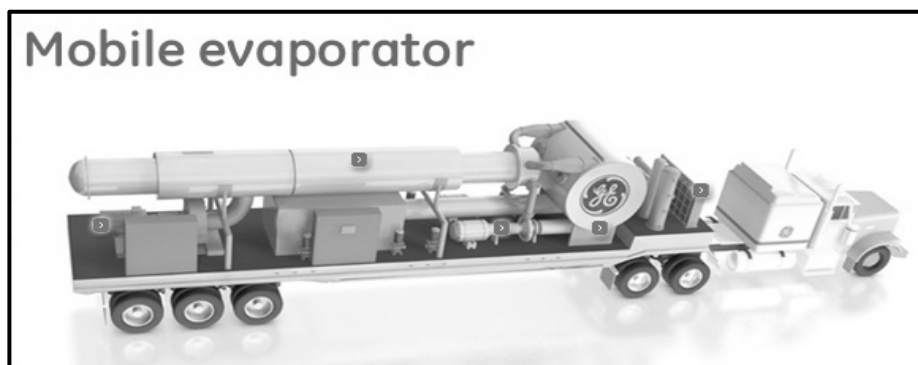


Figure 3: The evaporator.

The evaporator, which can be mounted on a [REDACTED] gallons a minute, and it is especially useful for porous sites where the water tends to come back with [REDACTED], it should push drilling companies to take better care of the water they use and produce.

GE's technology is not a [REDACTED] associated with shale gas drilling and one question that has not been answered clearly is what will happen to the waste [REDACTED] At this moment, these waste chemical contaminants are being stored awaiting a viable option for disposal. Overall, it is important to remember that fossil fuel extraction, [REDACTED], 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

Situation

Process – Shale gas & fossil fuels.

Fracking – drilling, [redacted] with chemicals that extract gas from rocks.

Associated problems with accidents (blowouts), [redacted] fracking chemicals.

Outline

Problems

Fracking Fluid Water – hazardous & carcinogenic – include [redacted] Zylene and Ethylbenzene & 5 million gallons of water per frack (Wilson and Rakenberg (2016).

Problem 1: Blow out & [redacted] (Wilson and Rakenberg, 2016).

Example Pennsylvania, [redacted] million gallons of contamination (House Energy and Commerce Committee (2015).

Problem 2: Waste water – permeable / porous geology = water [redacted] it (US Environmental Agency, 2018).

Solutions

Solution: Limitation, [redacted] higher fines (Wilson and Rakenberg, 2016).

Solution: Store water underground or use [redacted] (Peterson, 2012) treats water on site processing 50 gallons a minute (Peterson (2017).

Evaluation

Policy, limitations, [redacted]. Lacks evidence & research. Difficult to regulate (Wilson and Rakenberg, 2016).

The Evaporator is not [redacted] encourage frackers to take more responsibility. Questionable about what happens to waste chemicals & storage is not a solution (Peterson (2017).

Human [redacted] (Wilson and Rakenberg, 2016).

Conclusion

Overall, it needs [redacted] commitment.

Model Essay

Extracting natural gas from deep underground wells is done through a process called fracking. It is a relatively [REDACTED]. It is a process of drilling wells on land and injecting these wells with high pressure water consisting of a range of chemicals that fractures the rock releasing the shale [REDACTED] with fracking because each frack can create over 5 million gallons of waste water mixed with toxic chemicals. This essay will highlight the key problems associate with fracking, suggest possible solutions [REDACTED] effectiveness.

The main key problem is using and disposing of the fracking fluid water. This water contains a number of hazardous substances such [REDACTED], which are carcinogenic to the environment. If mismanaged these chemicals can pollute ground water [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. [REDACTED] that cause the spillage of thousands of gallons of fracking water into the surrounding environment [REDACTED] of contaminated fracking liquid has polluted the environment already this year (House Energy and Commerce Committee, 2015). One solution that has been suggested by Wilson & Rakenberg (2016) is [REDACTED] systems to create improved responsibility and awareness of such accidents. Although this could be quite [REDACTED] in how 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 [REDACTED] the water back into wells but in areas where the geology is porous and permeable this cannot be done. Therefore, the [REDACTED] 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) [REDACTED] contaminated water which is the use of an Evaporator. 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, [REDACTED] 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 [REDACTED]. This does not seem to have a viable solution yet.

Overall, fracking offers new avenues to extract gas and this meets the ever increasing energy demands of the future. [REDACTED] problems but with governmental regulation and policy these can be overcome. The biggest concern and perhaps the most difficult to [REDACTED] safety protocols and higher fining systems this is something that can be reduced.

[Words 531]

SPSE Language Phrases

Key phrases for writing an SPSE essay

Situation

Follows the conventions of an introduction

(general > specific > definition > situation > outline)

Outline: This essay will discuss two problems, propose possible solutions and evaluate the effectiveness of these solutions.

Problems

Adjective: central / main / major / common / immediate / serious / significant.

Verbs: associate / raise / consider / discuss / address / resolve / discuss.

- *The most significant problem is...*
- *... poses / presents an immediate problem because...*
- *Another possible issue is ...*

Cause & effect language

Leads to / results in / gives rise to / as a consequence / owing to / because of / as a result.

Cause and effect phrases

This suggests / ... Is linked to / associated with / connected to ... / ...may be affected by...

Solution

Adjective: long-term / short-term / proposed / effective / comprehensive / possible / practical / feasible / cost-effective / workable / realistic.

Verbs: propose / put forward / suggest / adopt / provide.

- *One possible solution would be to.... / One way of solving the problem is...*
- *One practical approach could be to...*

Evaluation [Show both positive effects and negatives]

- *Implementation of these solutions would ... However, ...*
- *Although these solutions provide..., there are a number of limitations. The first one is...*
- *Overall, these solutions offer a range of ..., but it needs to be highlighted that...*

Conclusion [Make a decision]

In conclusion / to sum up / to conclude.

If clause: if these solutions are implemented, then this would ...