

Generic

1. What type of energy is being extracted?

Some wells contain shale gas, whilst others contain oil. It depends on the rock formation below the well bore. Harlequin 3 sits above the Namurian and Westfalian sands, which are thought to bear oil.

The oil we believe to be beneath Harlequin 3 is a type of light crude oil which, with standard refining techniques, can be converted in to different grades for use in a wide range of domestic and industrial processes (such as fuelling school boilers, or powering motor cars).

Hydraulic Fracturing (“fracking”) is not required to extract oil and a conventional well.

2. How deep will the vertical drilling be?

Typically in the east midlands oil-bearing sands are between around 800m and 1200m. To put this in context, the area’s coal mines were typically at 400m and its aquifers are at 250m.

3. Will you be drilling horizontally under my house?

No. The Harlequin 3 well bore will drill vertically into the oil reservoir and pressure will drive the oil up the well bore.

4. What does a completed well look like and do they cause environmental damage?

A completed well isn’t much to look at. There may be up to half a dozen thin pipes protruding from the ground up to a height of about five feet. They run into some tanking and there are a few small, ancillary buildings and power units. As such, they are relatively unobtrusive and almost inaudible.

The well head does not cause any environmental damage and the well pad on which it sits is carefully constructed so that, should there be any accidental spillage, any flow-off is captured for treatment and does not enter surface of sub-surface water.

5. What is the lifespan of one well?

We believe that Harlequin 3 will produce oil for ten years. Once the well ceases to be viable it will be closed and the site restored to its original use – in this case, arable land.

6. How long will production last and what happens to the site when you finish?

Same as above and in addition – As part of the planning process, Hutton Energy must outline how the site will be restored once production ceases. In this case, the site will be dismantled and restored to its former use, i.e. arable farmland.

7. How long does it take to drill a typical site?

This will depend on the number of wells from a single well pad, the depth to which they go and whether any horizontal drilling is undertaken (more usual in the case of shale gas). For our Harlequin 3 site we expect this to take around four weeks.

8. Won't this contribute towards climate change?

Like any method of recovering fossil fuels, drilling for oil will have some environmental impact. However, this is very tightly controlled under a range of permits that we need prior to drilling commencing and the oversight of bodies such as the Health & Safety Executive, the Environment Agency, Department of Energy & Climate Change and Nottinghamshire County Council is designed to ensure continuous adherence to best practice throughout the drilling and extraction period. The UK is acknowledged as having the toughest on-shore environmental compliance regime in the world.

9. Why should I support this?

On-shore oil and gas could provide a sustainable energy source whilst the UK switches to a low-carbon economy.

Extracting our native energy sources will help reduce our reliance on imported energy, often from countries with more lax environmental regulations than ours, whilst boosting our balance of payments position and tax receipts. It will help us develop a strong, on-shore economy using British labour and a British supply chain and could provide energy independence in an era of uncertainty.

10. Why do this when it's unlikely to change energy prices anyway?

Whilst a well of the size of Harlequin 3 would never change energy prices on its own, it will contribute towards a position where the UK can re-secure the energy independence it enjoyed for many years thanks to North Sea oil and gas. A thriving onshore energy industry will help diversify Britain's energy mix and ease the UK's reliance on imports.

11. What safety precautions do you take?

Both conventional drilling of the type we will deploy at Harlequin 3 and fracturing ('fracking') are long-established drill techniques supported by a highly experienced and skilled workforce. The UK Government believes that the health, safety and environmental risks associated with both these drilling methods can be effectively managed if sufficiently regulated. The UK has one of the strictest regulatory regimes in the world and we drill our wells to the highest standards set out by the Environment Agency, the Health & Safety Executive and the Department of Energy and Climate Change.

Whilst the on-shore and offshore industries are regulated by these same bodies, additional regulations including the Shale Gas Guidelines have been introduced to ensure onshore operators operate to these best practices when it comes to drilling and hydraulically fracturing for shale gas and oil.

12. Who regulates you?

The UK Government believes that the health, safety and environmental risks associated with onshore drilling can be effectively managed if sufficiently regulated. The UK has one of the strictest regulatory regimes in the world. This includes regulation from the Department of Energy and Climate Change, Minerals Planning Authorities, the Environmental Agency and the Health and Safety Executive. Other bodies such as the Hazardous Substances Authorities also need to consent to work being carried out.

13. Are the regulations tougher here than in the United States?

Yes. In the USA each state has its own set of rules and regulations but the UK industry is much more heavily regulated. In the UK we are strictly regulated and need to adhere to the Department of Energy and Climate Change, Minerals Planning Authorities, Environmental Agency and the Health and Safety Executive. Other bodies such as the Hazardous Substances Authorities also need to consent to work being carried out. Examples of on-shore drilling in the United States are not reliable guides at all to what will happen in the UK as the industry operates under a wholly different (and more relaxed) regulatory regime than here.

14. Are you removing all the water you use on site?

Yes, any wastewater will be removed and taken to a water treatment plant.

15. How many lorries (road movements) per week are needed to bring and remove water?

This is dependent on the length of the drill – both in time terms and actual metreage drilled. For Harlequin 3 we anticipate between 20 – 30 additional truck movements to deliver the drill rig and roughly the same number of movements leaving the site after the four week drill period.

We anticipate 2-3 trucks a day to supply consumables needed during drilling and, if the site moves to production phase, then a further couple of trucks a day. In the context of the busy A52 which the site borders, this represents only a fractional increase in traffic lode.

16. Are you drilling through the water table and what impact could this have?

Yes, in order to reach the energy-bearing rock we would need to drill through the water table. The well bore is carefully constructed using five concentric rings of steel and concrete to ensure that subsequent drill fluids and flowback cannot escape into the water table. The bore's integrity is constantly monitored and any early signs of stress immediately acted upon before they may become an issue. Monitoring is regulated by various authorities including the Environment Agency, DECC and the HSE.

17. Is there a possibility that liquid might leak into the water table?

Well construction requires installing multiple layers of protective steel casing and cement which is designed to protect fresh water aquifers. This is regulated by various authorities including the Environment Agency, DECC and the HSE. The aquifers are also separated from the energy-bearing

rock by thousands of metres of impermeable rock. More than two million wells of the type we propose have been drilled across the world without issue and the skills and technology are commonplace and proven. Our wells are monitored around the clock to identify early signs of possible stress and preventive measures taken immediately. We inform the regulators of any such concerns.

18. Have there been any cases where produced water has leaked into the water table?

The link between fracking and contamination of water supplies remains unproven. The steel casing and cement used to seal the borehole, and which run to the full length of the well, are of critical importance to prevent leakages and protect the aquifer. Regulation is in place to ensure the long-term integrity of the wells. At our Harlequin 3 drill site, the distance between the water table and the oil-bearing sand formations is at least 1,200 feet.

19. What is the impact of improperly treated water on crops and local wildlife?

There should be no contamination of local water supplies so this shouldn't have an impact. The site will be monitored throughout its lifecycle, which will include collection of data and analysis of soil, ground gas, ground water and air samples to ensure the protection of the environment and immediate surroundings.

Contrary to the common perception regarding “fracking” as being the key threat posed to groundwater, in fact the well construction is the most important aspect of ensuring that the freshwater aquifers are isolated and protected from wellbore fluids. The well design and construction process is conducted in accordance with Industry best practice and guidelines, independent third party scrutiny and a regulatory regime that is considered a global exemplar and presided over by DECC, HSE and the Environment Agency. Onshore well integrity in Britain follows the same stringent guidelines as for the offshore industry.

20. Is there an impact on biodiversity due to land clearance?

An Environmental Impact Assessment is carried out before each planning application. Hutton Energy makes every effort to work with the necessary agencies to ensure any flora and fauna is protected from our activity.

Environmental studies were undertaken in 2014. These studies included:

- Ground water protection
- Surface water protection
- Dust management
- Artificial lighting impact
- Landscaping and restoration
- Noise attenuation
- Protection of breeding birds
- Protection of Dependent Leverets
- Protection of Great Crested Newts

- Protection of Water Vole

Baseline studies will be commissioned prior to drilling commencing and the results of these studies will be made available.

21. How much noise does the operation make during the production phase?

A noise assessment was carried out by an independent surveyor in June 2014, comparing noise emissions from existing background noise levels to proposed operations.

The background noise generated by the A52 at peak times is likely to exceed the noise generated during our operations. The typical background noise level at a producing well is ca. 39 – 43 dB which is less noisy than the traffic on the A52.

At all stages of operations, Hutton will use best practice standards to maintain noise levels in accordance to the National Planning Policy Framework.

During the drilling phase, we try to keep noise levels to a minimum with equipment such as generators and compressors all housed in boxes onsite to reduce noise.

The production phase is relatively quiet and will cause little disturbance on an ongoing basis.

22. What about noise from trucks, drilling and excavation?

Our studies tell us that at virtually all times of the night and day our operations will fall well within the statutory noise limits that form part of our permit. These limits measure what can be heard within expanding radia. We have identified a small area where our noise levels may marginally exceed the guidelines and have agreed mitigation factors to dampen the noise and bring it within guidelines.

We try to keep noise levels to a minimum where we can, with equipment such as generators and compressors all coming in boxes to reduce noise.

23. What are the traffic implications during production?

The main traffic burden occurs during rig construction and then drilling, which will last around 6 weeks in total at Harlequin 3. Once a site is in production, just 2 HGVs per day will need to go on site.

24. Are you releasing any nasties into the air?

There are no pollutants released into the air and as a responsible operator we ensure air quality is monitored throughout the exploratory period. Air quality is tested before site construction, during site construction and continuously throughout the lifecycle of the well. Ensuring air quality is tested

prior to any development of a site will mean that we have a 'normal' baseline with which we can monitor any changes.

25. If you have a gas leak, what are the implications and is it hazardous to local people?

Any leak of gas from a well is identified by an automated system immediately which means we can shut off an operation almost instantaneously.

26. What impact will this have on house prices?

Oil and gas has been extracted on-shore in the UK for decades. Indeed, there are many such wells located close to neighbouring communities in Nottinghamshire as well as in areas of outstanding natural beauty. We are not aware of the influence, positive or negative, such sites have had on house prices and no research has proven a causal link one way or another.

Interestingly, western Europe's largest operational on-shore oil field is less than half a mile from Sandbanks in Poole Harbour, which has Europe's third most expensive property (based on price per square foot).

27. Do on-shore wells cause subsidence?

There are no documented cases of on-shore wells, either at the exploration or production stage, causing subsidence. Energy extraction of this type does not remove large quantities of rock from underground (by comparison with coal mining where subsidence does occur).

Change to shale rock with the extraction of gas is expected to be almost zero, so compaction and resultant subsidence would not be expected. Prior to commercial production being approved however, analysis of rock samples is conducted to confirm this for the geology of a particular site identified.

28. Will gas or oil escape in the test drill?

No

29. Is there a risk of fire or explosion?

With any oil and gas well or any other industrial activity, there is always the potential for risk. The UK however has one of the toughest regulatory environments for onshore oil and gas development in the world.

On-shore well integrity in Britain follows the same stringent guidelines as for the off-shore industry.

The drilling programme will be completed in accordance with industry best practice and all applicable regulatory requirements, set out by the Department of Energy and Climate Change (DECC), the Environment Agency and the Health and Safety Executive.

30. I have seen images of fire coming out of taps. Could that happen?

A recent extensive investigation by the BBC identified that there was no scientifically proven link between on-shore drilling for gas and flammable tap water, concluding instead that the phenomenon was best explained by the presence of sub-surface methane leaking into the water table. Methane is created by rotting vegetation and is a universal natural phenomenon.

31. Are nuclear isotopes released as part of the drilling process?

There are naturally occurring radioactive materials found underground. Brine co-produced and brought to the surface along with the oil and gas sometimes contains naturally occurring radioactive materials (NORM). This is monitored throughout the drilling process and there are strict rules regarding its treatment and disposal. It is common to unearth NORMs and the skills and resources are widely available to deal with them, whilst the regulatory regime is proven and safe. Any disposal of NORM can only be done with a permit from the Environment Agency. The readings are normally lower than that found in granite – the most common building material in most of western Cornwall.