Radcliffe on Trent Supplementary Questions

Table of Contents

Community Advisory Board

How has the CAB been assembled?

Rather than choosing CAB members ourselves, we have appointed Curtins Consulting to manage the process of assembling a CAB and act as the Secretary for the Group. Curtins approached the local parish council, county council, key residents' associations, Nottinghamshire Police and the local church to suggest representatives from their groups, along with other key local stakeholders. At a parish council meeting residents interested in joining the board were asked to provide their details. The CAB was also advertised on the parish council website.

The Chair of the CAB is not a resident of Radcliffe. How can the Chair therefore truly reflect the feelings and concerns of Radcliffe residents?

We felt that Councillor Kay Cutts would be a good and appropriate person to chair the CAB meeting. Although not a resident, as the head of the Conservative group we felt she'd be experienced in reviewing the views of a community and handling meetings. Cllr Cutts has, of course, been elected by the residents of Radcliffe to serve their interests.

Timeline

Once started, how long will it take Hutton Energy to establish whether extraction is feasible? Please share timeline of events.

See Gantt chart below. For this purpose, Month 1 represents the beginning of our project, not January.

NB – The "Spud Date" is the date we begin drilling.

Harlequin 3 Proposed Well Plan

Activity	Month 1	2	3	4	5	6	7	8	9	10	11	12
Finalise well design												
Select and Engage Contractors												
Tender Services (drilling etc)												
Decision on Service Providers												
Complete and submit drilling and associated permits (HSE/DECC)												
Lock in drilling date												
Order long lead items												
Mobilise equipment to site (2 weeks prior to spud date)												
Spud Date (+/- with rig availability)												
Drilling and logging												
Demob from site												
Analyse results												
Decide to test or not									Y/N			
Design and procure testing services									Y			
Flow test - 5-30 days												
Analyse results												
Commercial or Not												Y/N
Submit Production Permit												Y

On site activity Analysis Preparation and permitting

Use of Chemicals

Will you provide full disclosure of chemicals?

You can find a full list of chemicals we will be using in our Environmental Permits. The document can be downloaded here: http://www.huttonengage.com/our-work-in-radcliffe-on-trent/permits/

All chemicals used will be accepted and approved by the applicable regulator, if any independent studies are commissioned then that will be a decision made by the individual or organisation requesting such a study.

Furthermore, the UK oil and gas industry has committed to the full public disclosure of drilling fluid. UKOOG produced the following guidelines, which Hutton has adopted into its own operations plans:

"Operators will disclose, either on their own websites and/or the UKOOG website, www.ukoog.org.uk, the chemical additives of drilling fluids on a well-by-well basis. Information for fluid disclosure will include:

a. Any EA/SEPA authorisations for fluids and their status as hazardous/non-hazardous substances.
b. Material Safety Data Sheets information.
c. Volumes of fracturing fluid, including proppant, base carrier fluid and chemical additives.
d. The trade name of each additive and its general purpose in the process.
e. Maximum concentrations in percent by mass of each chemical additive."

Hydrochloric Acid – What is HCL used for in the drilling process and how much?

Acidizing is one of the oldest technologies in the oil and gas industry. For our purposes, we will be using two types of acid treatments: wellbore acidizing and matrix acidizing.

Acidizing is a wash of the wellbore to remove scale on the pipe surface, corrosion products such as rust, acid-soluble debris from drilling, completion, stimulation or production treating, or other acid-soluble particles. This is essentially the same treatment that we use when we descale household equipment, such as kettles

Other chemicals used? List all and quantities anticipated to be used.

Any other chemicals will be included in our full well plan, which will be available to the public.

Which chemicals are effectively left in the ground or will be "lost in use"?

Everything injected into a well during drilling comes out of it and is re-used until the well is completed. We have no intention of leaving any chemicals in the ground during drilling operations.

Radioactive Material

Depleted uranium. Is the drill bit or any other drilling components made from this substance? Is there a regulated radioactive standard for it? Where does the material come from?

Firstly, we should make it clear that no radioactive material is used in the extraction of oil and gas in the UK. There are no components of our drilling operations which are made from depleted uranium.

Water that is used in drilling can return to the surface containing Naturally Occurring Radioactive Material, known as NORM. These radioactive substances exist in all natural forms including soils, rocks, water and in air. They are also found in foods such as bananas and Brazil nuts.

NORM may be present in waste from a large range of activities including drilling, quarries, and mining industries such as coal and potash.

As a result there is a comprehensive regulatory regime for managing NORM; compliance with this regime ensures that any public health impact is minimised.

In the UK, an environmental permit is required for accumulating, disposing of or receiving naturally occurring radioactive material (NORM) wastes that exceed very low concentrations. The Radioactive Substances act of 1993 and Environmental Permitting (England and Wales) Regulations 2010 and the Radioactive Substances Exemption (Scotland) Order 2011 provide regulation for the management of NORM.

Drilling Operations

What is a vertical incline well?

Directional drilling is the ability to steer the direction of the well during drilling. It can include a minor variation of a few percent (vertical incline well) up to an eventual 90° turn (horizontal well).

Why is this type of drill suitable to Harlequin-3?

For conventional wells directional drilling is often used when the surface location of the pad cannot be located directly above the target reservoir for practical reasons. In the case of H-3, directional drilling will be used to direct the drilling activity so it hits the target reservoir.

Will the other permitted well bores be the same process if and when drilled?

Once we have analysed the results from H-3, we will have a better picture of the target reservoir and will be able to determine if directional drilling is required for any further wells.

How drill bits many do you expect to use? What happens when they break?

Based on our current drilling programme, we expect to use four bits. If one breaks, it will be replaced by a new one. If it breaks in the hole, we are able to recover it using a “fishing tool” and bring it back up to the surface.

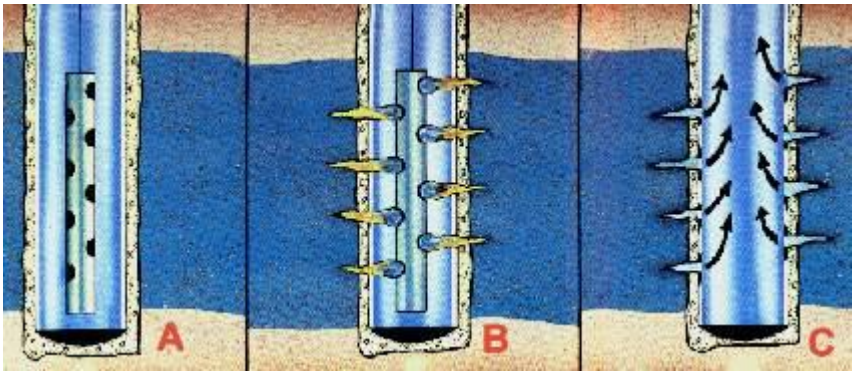
Do you use explosive charges? What are these made up of?

Once the well is drilled down to the target depth, a perforation is required in order to create a connection between the well and the rock which is holding the oil and gas. A special tool, called a perforating gun, is lowered to the rock layer. This perforating gun is then fired, creating holes in the well casing and into the targeted rock. These perforating holes connect the rock holding the oil and gas and the well bore.

Since these perforations are only a few inches long and performed deep underground, the perforating process is unnoticeable on the surface.

The small charges which will be deployed as part of the perforation process have the same equivalent power as a shotgun.

Perforating gun with six charges

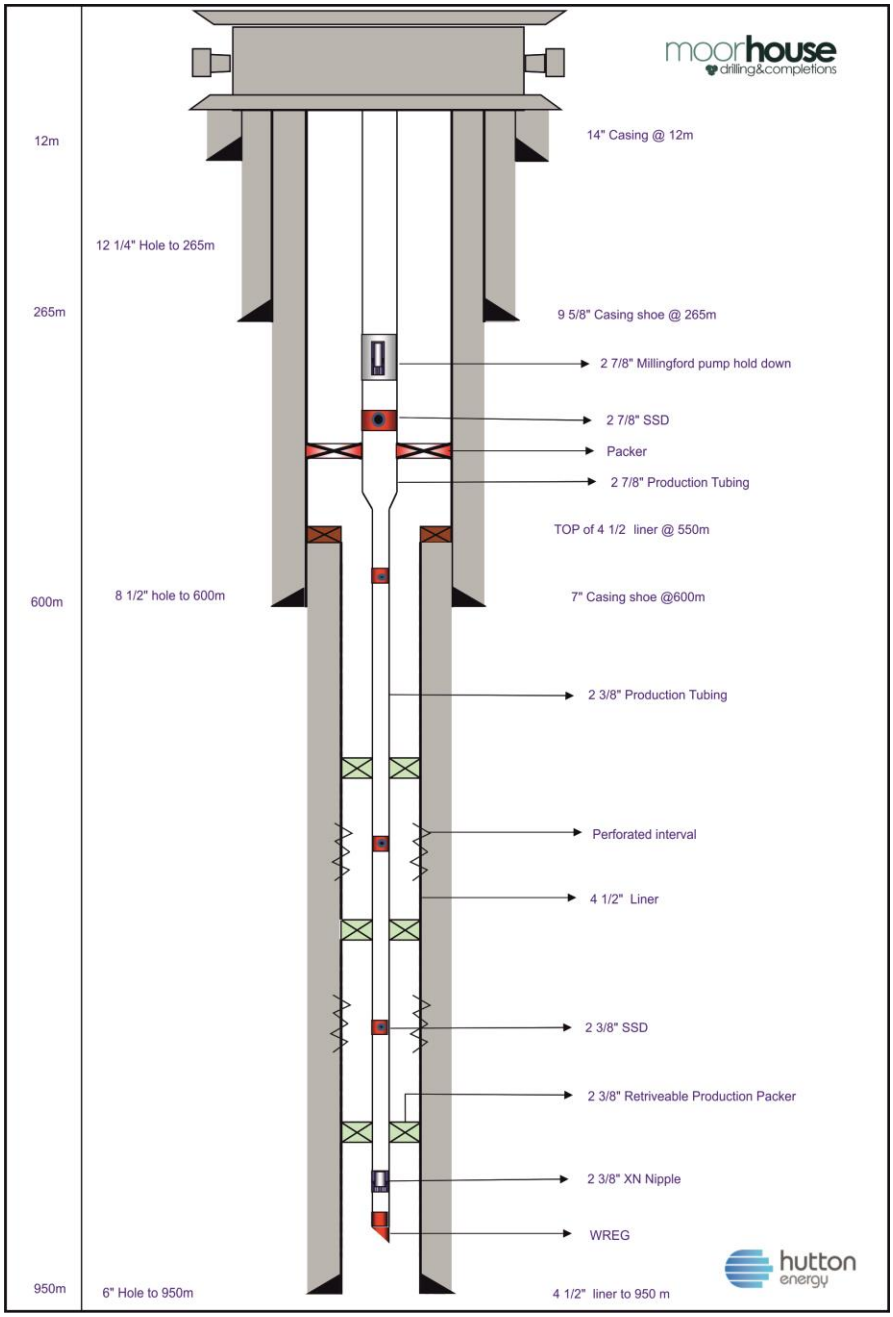


Perforations creating a connection between the wellbore and the reservoir rock.

What material is used for the casing and also the perforating sections?

This is a schematic of the cement and steel casing which will be used in H-3. A detailed list of materials and their components can be found in our Environmental Permits. You can download the documents here:

http://www.huttonengage.com/our-work-in-radcliffe-on-trent/permits/



How much fracturing will be required?

Perforations are required to create a connection between the wellbore and the rock, they do not fracture the rock.

Air Quality

When drilling commences it is expected that independent monitoring of air emissions, Radon, Methane etc should be a permanent fixture throughout the process. Yes/No?

We will acquire a baseline air quality survey in advance, and then continue to monitor emissions throughout the drilling operation. Monitoring will be managed by an independent group who work to accreditation and, in the case of air quality sample analysis, the lab is UKAS registered.

Residents should also be able to access the data collected from the monitoring immediately. How long will it take to make this information available to residents?

We can make the results available for public view and we will consult with the CAB how best to distribute this information.

Would Hutton provide such equipment for residents in close proximity to use?

In the first instance we do not plan to expand its monitoring outside the immediate area of the drill site. We will continue discussions with the CAB and service providers and determine if this position needs to change.

What are Volatile Organic Compounds?

Volatile Organic Compounds (VOCs) are organic chemicals that easily vaporise at room temperature. They are called organic because they contain carbon in their molecular structures. VOCs include a very wide range of individual substances, both man-made and naturally occurring.

Radon gas is not mentioned at all in any of the EA documents. Is there any data regarding the prospect of this outside of not expecting to find it?

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.

Public Health England (PHE), an executive agency of the Department of Health, released a comprehensive study of the public health impacts of gas extraction. They concluded that it is unlikely that properly regulated activities, especially a small-scale single exploratory well, would lead to any significant increase in public exposure from outdoor radon levels or indoor levels in nearby homes.

Why is the flare at ground level? If it was elevated, wouldn't it allow more accurate monitoring of the gases being released?

Any flaring will take place in an enclosed flame chamber and must be conducted at ground level due to the structure of the chamber. There is no technical reason why an elevated flare would impact the efficient of the monitoring process.

Example of an enclosed flare chamber.

What is the calculation method used to monitor and report levels of gas/fugitive emissions?

The Environment Agency has created threshold levels for air emissions and air quality, against which we can measure the levels during our operations.

Air Monitoring. Guidance suggests reporting one month from flare commencement. Is this continuous up to a beyond a monthly report or a snapshot taken monthly? How often are readings taken? Are the readings taken from the diverted gas before it reaches the flare? How are the levels measured?

An independent, accredited group will acquire a baseline air quality survey in advance. During the drilling operations, monitoring will be continuous and any changes will be measured against the baseline. We do not expect to encounter gas in H-3, but if we do, the readings will be taken before it reaches the enclosed flame chamber and during the flaring process.

Site Location

Why is the drill site so close to the A52?

When selecting a drill site for a conventional well the following is considered:

I. The site must enable the drilling activity to hit the drilling target/reservoir. In the case of H3 this is the top of the structure (as opposed to flank or bottom).
II. The site must minimise the impact to the environment and local communities.
III. The site must be accessible for the proposed drilling equipment and potential equipment used to transport the oil in a success case.

The Harlequin-3 well site meets all of the above criteria.

If drilling has taken place previously (as has been said) in that position on the site what are the implications for well integrity?

The previous well (H1) was drilled approximately 100m from the H3 well pad in 1953. The well was plugged and abandoned by BP and is now part of the existing field. See picture below.

Wells are designed for the specific geology and purpose with appropriate reviews and approvals in order to maintain the integrity of the rock formation. Well casing, the steel pipe cemented into the ground at various stages during the drilling of a well, provides the primary layer of protection between the oil and gas being produced and the rock formations transected by the well. A typical well includes multiple layers of casing and cement, each designed with a specific purpose.

Planning Permission. Why Well 3 first? Has ground been cut before? The Newton Energy planning Statement says it has not? Why difference of opinion?

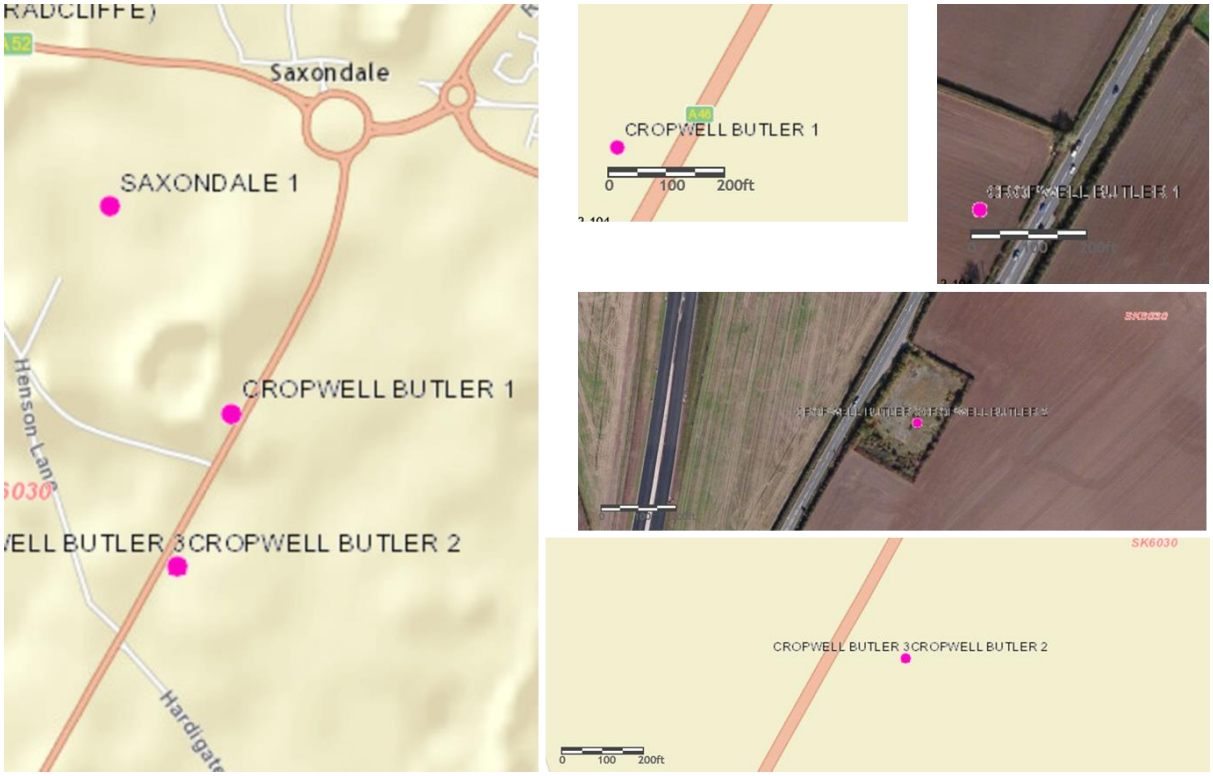
The planning and EA permit gives approval for two wells to be drilled on the existing site. The proposed well is only named Harlequin 3 because there have been previous wells drilled in the immediate area already named H1 (as mentioned above) and Harlequin 2. No ground has been cut at the H3 site.

How many wells have been drilled 30m or less from major motorways/roads or towns?

Unfortunately it is impossible to give an exact answer for this question, as onshore drilling has been taking place for many years in the UK. There are dozens of pre-war wells drilled in what looks like town or roads, but it's impossible to tell if those roads or housing developments were present in that time period.

However, after a brief search, we were able to find over 30 wells from all around the UK which were drilled post-1970 near towns and motorways. (Full list available upon request).

Locally, there are three historic wells in the Radcliffe-upon-Trent area drilled near A-roads. Cropwell Butler-1 was drilled in 1958 and Cropwell Butler-2 in 1984.



Geology

Coal Bed Methane (CBM). Could there be any possibility of CBM on the site? If there was, would Hutton try to extract it? How would that be done?

We have no interest in Coal Bed Methane and do not believe that there is any possibility for CBM production on H3.

House Prices

Who is responsible for any depreciation of property values as a result of this? Who is responsible for any after effects which lead to a financial penalty to those who live close by?

Oil and gas has been extracted safely onshore in the UK for decades. Indeed, there are many such wells located close to neighbouring communities across the country as well as in areas of outstanding natural beauty. Locally, there are two producing oil wells in the village of Long Clawson.

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 onshore oil field is less than 800 yards from Sandbanks in Poole Harbour, which has Europe's third most expensive property (based on price per square foot).

The Royal Institute of Chartered Surveyors have said they are keeping a "watching brief" on this issue and will provide an update with any further information that emerges.

Risk Assessments

In the event of an explosion or spillage of any sort, who is responsible?

We and all of our contractors are required to take out comprehensive insurance prior to drilling any well. This is required by the statutory authorities as well as UKOOG best practise guidelines. Insurance must be maintained until the well is plugged and abandoned.

Regulations enforced by the Health and Safety Executive require an independent well examiner to assess the design, construction and maintenance of the well. The examiner's task is to review the proposed and actual well operations to check that the well is designed and constructed, and is maintained, so that in so far as is reasonably practicable, there can be no unplanned escape of fluids from the well, and risks to the health and safety of persons are as low as is reasonably practicable.

The HSE may also send its inspectors to check on well operations.

With regard to responsibility for monitoring of well integrity after operations have ceased, the well remains the responsibility of the operator whilst it continues to hold the relevant petroleum license. When the license comes to an end, ownership of the well transfers back to the Government, via the Department of Energy and Climate Change (DECC). DECC will from then on be the party responsible for ensuring the well's continued integrity.

Water Pollution

Is there any risk to water quality?

There will be no impact to water quality over time as long as the regulations that are in place are properly adhered to. After production, wells must be properly decommissioned with cement plugs and/or mechanical barriers in the wellbore to eliminate the pathway to the surface or freshwater sources.

According to the Chartered Institute for Water and Environmental Management, restoring a pad will require suitable decommissioning materials for the entire length of the well and appropriate techniques to provide assurance that cross contamination of different aquifers (particularly in the long term) will be prevented.

UKOOG, the industry body, recommends using a completed borehole log (a record of the actual geology of the exploration borehole as drilled), rather than a prediction of the geological layers. This enables a better design of the decommissioning phase to protect the groundwater environment.

Professor Richard Selley from Imperial College London said: "So long as the robust regulations mentioned above are policed, there should be no change in water quality. For instance concern has been expressed about contaminating the chalk aquifer in southern England. For over 30 years over 200 wells have been drilled through the chalk to penetrate deeper petroleum producing horizons without contaminating the chalk aquifer."

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There has been a change in legislation around amounts of water required in fracking. Although this is a conventional well, what exactly are the unconventional methods being used? Please explain the difference and if "mini" fracking is used.

The general term "fracking" was originally associated with pumping high volumes of fluid, under high pressure, into shale (and other) formations. In recent times some people have used it as a term to describe the injection of any substance into a well, irrelevant of either volume or pressure. In order to better clarify the term "Fracking", the EU, and more recently the UK, have defined the minimum levels of fluid and pressure. For any activity to be classified as high-volume hydraulic fracturing, it must involve the injection of 1000 metres^3 or more of water per fracturing stage or 10,000 metres^3 or more of water during the entire fracturing process into a well.*

Directional drilling and the injection of small volumes of fluid are not unconventional, as they have been going on for a long time here in the UK. Wytch Farm, in Southern England, once held the world record for the longest horizontal well. Completed by BP in 1997, the well was horizontally drilled to a distance of 10.1km. Since the 1980s, approximately 200 onshore UK wells have utilised fluid injection, in both the petroleum and geothermal industries.

As above, we will be using directional drilling to create a small deviation of only a few degrees in order to reach our target reservoir.

Once the H-3 well is drilled and logged, we will identify areas we believe contain commercial levels of hydrocarbons. We will then design a testing programme, which will involve perforating the well to give us access to the target formations. Depending on which formations these are we may need to inject low volumes of fluid (composition may vary with each formation) to improve the subsequent flow of hydrocarbons to the well bore.

*(*UK Infrastructure Act 2015, PART 6 – ENERGY, Section 50.4B* and *EU Commission Recommendation 2014/70/EU, Section 2.a)*

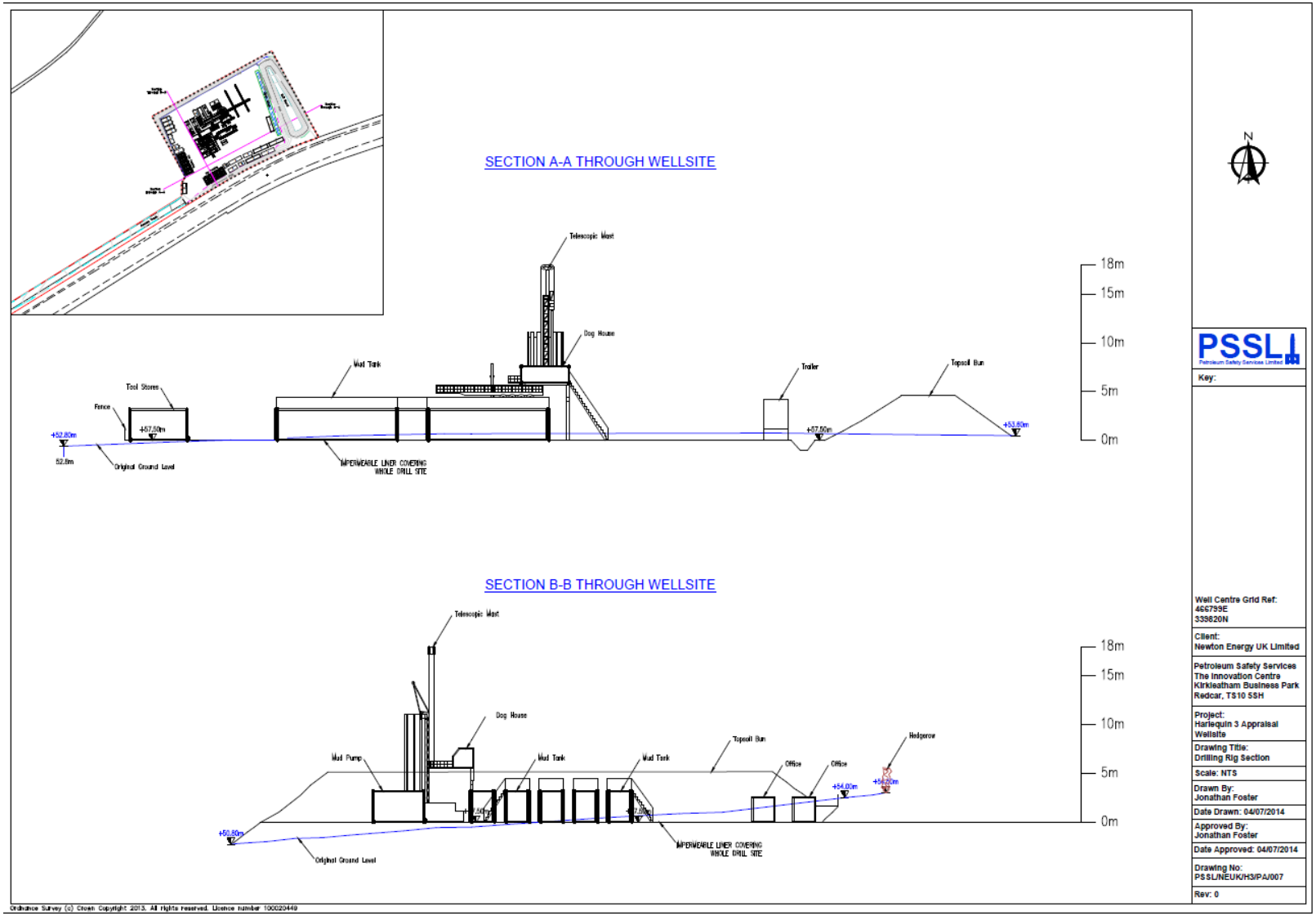
Safety

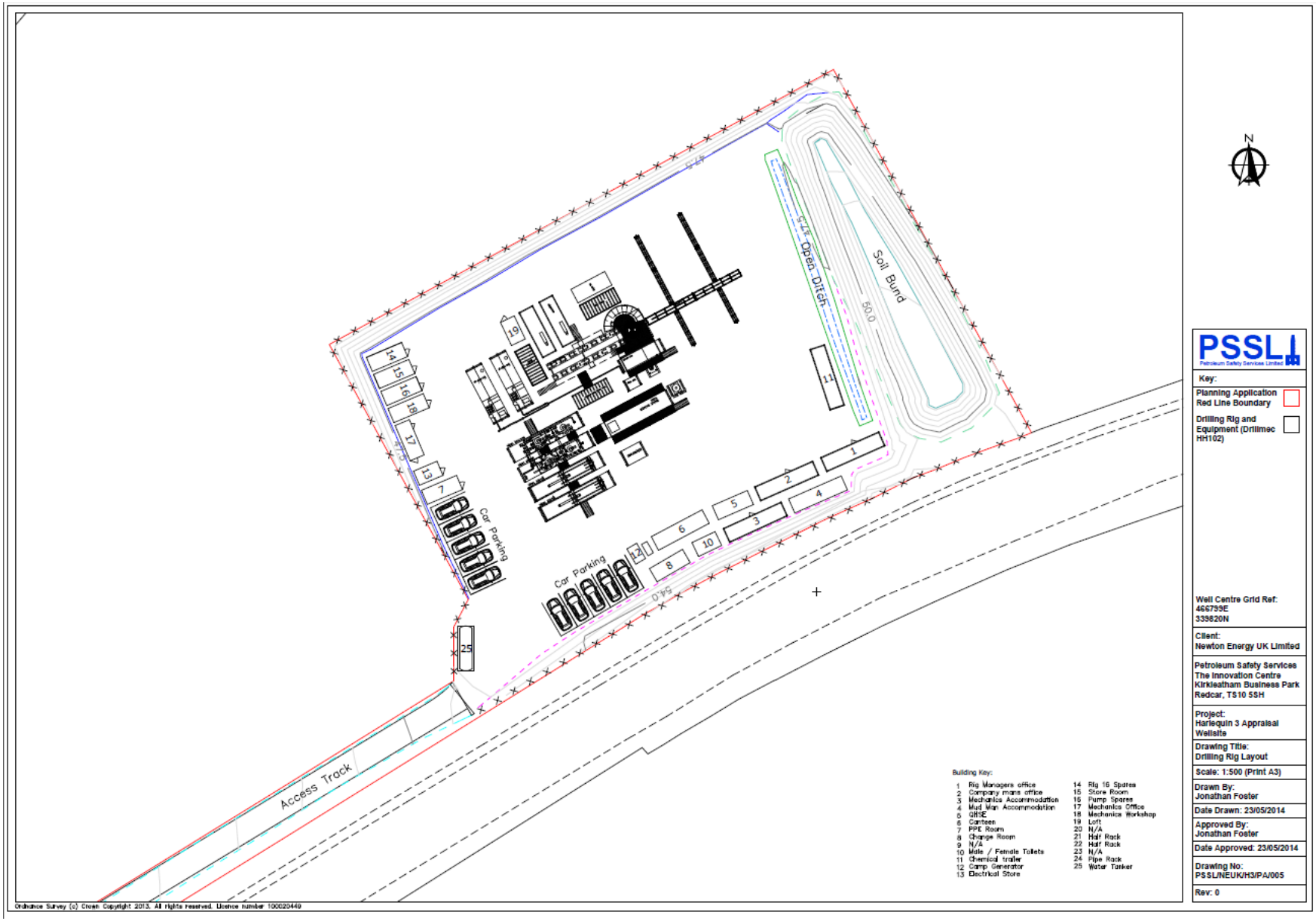
How safe are your operations?

The UK has one of the best health and safety records in the world and is seen as a world leader in the regulation of the petroleum industry.

The conventional drilling of the type we will deploy at H3 is a long-established technique supported by a highly experienced and skilled workforce. It is impossible to ever confirm any activity in life as "100% safe." however the UK Government believes that the health, safety and environmental risks associated with 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 and Safety Executive and the Department of Energy and Climate Change. Reducing risks to a minimum is exactly how other industries are regulated.

Drilling Rig Layout

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Car Parking
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3 Mechanics Accommodation
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6 Canteen
7 PPE Room
8 Change Room
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10 Male / Female Toilets
11 Chemical trailer
12 Comp. Generator
13 Electrical Store
14 Rig 16 Spares
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