The Case for a 500m (or greater) buffer between residences and drill pads.

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The Relevant Policies

As argued in my statements to the EIP, all issues in relation to fracking should be determined in accordance with the NPPF and not in accordance with the Minster's Written Statement of September 2015 which has less weight than the NPPF.

I will not waste my time setting out at length all the relevant policies in the NPPF. Suffice to say that the combined effect of all the relevant policies would seem to be to impose a qualification for all development that residential amenities, health, the intrinsic character of the countryside etc. should be protected.

My authority for this statement includes NPPF paras: 17 (bullet points 4,5,7); 28 (bullet point 3); 109; 115;116; 123 and 125.

This is carried forward in the Minerals Section of the NPPF, para 143 (bullet point 6) which says that planning applications will be assessed so as to ensure permitted operations do not have unacceptable adverse impacts on the natural and historic environment or human health, including from noise, dust, visual intrusion, traffic…….mining subsidence, increased flood risk, impacts on the flow and quantity of surface and ground water and migration of contamination from the site, and take into account the cumulative effects of multiple impacts from individual sites and/or a number of sites in a locality."

Similar issues are the concern of para 144 (bullet point 3).

The question is, therefore, whether residential amenities would be adversely affected by siting a fracking drill pad within 500 m of any dwelling and whether or not there would be unacceptable impacts on human health from noise, dust, visual intrusion, traffic etc.

The process

The draft minerals plan (para. 5.134) envisages each drill pad to be about 2 hectares in area. This is twice the size of the exploratory drill pad at KM8. Firstly, Para 5.134 of the draft JWMP envisages many drill pads for unconventional hydrocarbon and gas extraction, each with an area of two hectares and para 5.137 envisages a density of drill pads of 10 to 100 square kilometres, which approximates to them being spaced at a density of one to every one and a half to two miles, if evenly spaced.

John Dewar of Third Energy told a House of Commons Committee on 19th March 2015: “Bearing in mind we have nine existing sites in and around the area, some in Ebberston Moor and the Vale of Pickering, we do not foresee the need for more than ten more sites. And how many wells we would put on those sites – depending on the size of the site, it could be 10 or 20, and if it was a bigger site, it could be 20 to 50”.

INEOS CEO Jim Ratcliffe (a billionaire who pays no tax in the UK) was quoted thus in the Liverpool Echo:

"Under Mr Ratcliffe’s plans, a typical six mile, by six mile parcel of land with up to 200 wells on it could generate nearly £400m for land owners and communities over the average 15-20-year lifetime of a production site. He estimates it could be worth a total of £2.5bn in payments."

- http://www.liverpoolecho.co.uk/news/business/ineos-chlor-owner-jim-ratcliffe-7846401

High Volume Hydraulic Fracturing is a process where gas has to be forced out of the rock. In order to maximise the exploitation of gas extraction there have to be multiple bores or wells (some sharing the same well head). The process depends on the pumping of fluid under extreme pressure into fractures created by explosives. There is a limit to the effectiveness of the process and it is understood that the range up to which the pressurised fluid can viably be effective is approximately one and a half to two miles. I think this was confirmed by Ken Cronin at the hearing of 13th March 2018.

Fracking is an active or aggressive process: it is not a matter of just drilling a hole and waiting for the gas to rise from a natural reservoir: the gas has to be forced out of the rock by explosives. It is understood that each lateral bore can expect to be fracked 45 times – about once every 200 feet on every lateral.

So, let us consider the impact of a single drill pad on residential amenity.

Noise

We have to consider what a dwelling would have to put up with from one drill pad:

Continual drilling – it takes about 100 days to complete the drilling of a 1.5 km bore or well. If this is correct and there is potential for 50 wells on the drill pad, this equates to 15 years of continuous drilling. Once drilling starts on any well, it has to continue day and night. The drill rig could be anything between 35m and 60m in height. These rigs generate tremendous noise and at night they are lit up like Christmas trees.

Conventional gas wells can continue to produce gas for 20 years or more – depending on the size of the natural reservoir. Fracked wells only produce commercial quantities of gas for 1-3 years. So, in order to keep the gas flowing, it will be necessary to keep

drilling more and more wells and /or refracking existing wells over and over again until the gasin the area around the drill pad is exhausted.

The process does not end with the drilling. The site has to be provided with massive infrastructure on a scale far in excess of that of KM8. KM8 was designed for a single well, which was to be fractured at five separate places. Even so, it was necessary to bring on site massive infrastructure, including multiple compressors and pumps, multiple generators, and much other noisy equipment.

The mineral planning authority did not require much in the way of noise insulation for the drilling of the new well at KM8. Consequently the drilling could be heard from quite a long way away – much further than 500m. As a parish councillor, I received complaints from local people who asked me to do something about it: I was powerless and the drilling went on continuously day and night for several months.

The Mineral Planning Authority did require extensive noise reduction works when the application to frack the drilled well was being dealt with. This is for the fracking process which takes place after drilling a well has been completed. The works required are those shown in the photographs I have sent as exhibits with my main statements. This noise reduction barrier has been removed and will be put back when and if Third Energy gets consent from the Secretary of State to implement their planning permission. Clearly the noise likely to be generated by the fracking operation would have to be considerable to merit such enormous sound barriers.

Risks from Fugitive Emissions

One must also consider the risks posed to a dwelling by toxic emissions. In this respect it is important to appreciate that not every toxic chemical is classified as "hazardous" by HSE or the Environment Agency.

Some years ago I was invited to inspect the site of KM8. At that time the existing conventional well was functioning, and we were shown the new well-head which had recently been completed. Those of us who were driving diesel powered vehicles were allowed to drive our cars into the site, Those who had petrol engines were not – because of safety considerations. This shows the dangers posed by methane and other gases released from the conventional well – particularly if it escapes and flows over the ground. I believe in one case in the USA there was an explosion and people living within two miles of a well head were ordered to evacuate their homes.
I understand that fugitive emissions are common at drilling pads, and it is obvious that for safety reasons alone, drill pads should not be situated near dwellings.

Different gases have different molecular weights or vapour density. The main component of shale gas is Methane. Methane is lighter than air but has a vapour density (VD) of 0.6 (air = 1), which compares with hydrogen which has a vapour density of 0.1. Methane can mix with air and can be dangerous in high concentrations, It does not always disperse or rise into the atmosphere quickly. However, shale gas also contains smaller quantities of other gases, such as ethane (VD more than 1), propane (VD 1.6), butane (VD 2.0), ethane (VD more than 1), hexane (VD 3.0), hydrogen sulphide (VD 1.2), and heptane and pentane which are heavier than air.

These can gather in hollows or low areas and can take a long time to disperse. Most of these gases are flammable and some (eg hydrogen sulphide) are poisonous.

According to various studies (see Frackfree Ryedale Website – Fracking myths – Myth 8) upwards of 10% of methane is lost to the atmosphere during exploration and production. One therefore has to assume that an equivalent amount of the other gases is also lost at the same time.

There has to be flaring – as flaring is a safety feature which gas wells are required to have.

Clearly, it cannot be in the interest of residential amenity to have a drill pad which can give off fugitive emissions of this kind within a short distance of one's house. 500m would seem to me to be far too close, bearing in mind the dangers.

HGV movements

Third Energy's planning application to frack KM8 stated they expected that there would be 600 HGV movements in and out of the site. This was for only 5 fracks at a site where water could be piped in and gas piped out of the site. Imagine the number of HGV movements in and out of a site which is in full commercial production and which has no pipeline for water or gas, with 45 fracks on 10 – 50 laterals. Imagine the millions of cubic meters of water mixed with noxious or toxic chemicals to be pumped under high pressure underground.

On a strict calculation, a single drill pad with 10 laterals could generate 54,000 HGV movements, and one with 50 laterals could generate as much as 271,000 HGV movements or 1,800 per annum (assuming a pad life of 15 years), and then bear in mind that this is for the fracking process alone and that drilling operations will require many more HGV movements.

Seismicity

North Yorkshire has many geological features which relate to multiple fault lines. Classic examples of major faults include the Craven Fault between Ingleton and Settle, and Sutton Bank at the Western extremity of the North York Moors. The White Horse can be seen for miles from the flat plain in Hambleton District which is at the foot of the North York Moors. There is clear evidence of glacial action at the Hole of Horcombe and other places in the North York Moors, but the Moors and the Howardian Hills AONB rise above the Vale, suggesting that the Vale itself may be a geological "rift valley". I understand the geological map of the area shows multiple minor fault lines in the rock.

10,000 years ago the Vale of Pickering was a lake. Subsequently the River Derwent changed direction and the lake became marsh land. So much of the soil in the Vale has a composition similar to silt. Houses are literally built on sand.

The combination of the use of explosives and compressors can cause minor earthquakes, such as at Preece Hall in Lancashire. These may be so small that they hardly register on the Richter Scale, but even small shock waves, when repeated

endlessly as the rock is fracked and re-fracked again and again can weaken house foundations – particularly those of houses built on silty soil within the Vale.

Seismic shocks happen when the ground moves. These movements may be so small as to be unable to be detected except by very delicate instruments. However, an earth movement down or along a fault line in the rocks can open up cracks and fissures where fracking fluids and gases can migrate. Further, such slight movements could cause fractures in the borehole pipe and its concrete casing. Indeed I fear this could happen in any case, with or without any movement of the rock, as a consequence of the stress imposed on the bore-pipe and its casing by the force of the injection of fluids from surface compressors and pumps.

This is a serious issue, as ma'am, you will appreciate from the debate which has taken place at this EIP between INEOS and Sirius, the Potash mine company. As I understand, there are potash deposits below the main water table under the North York Moors, and Sirius are afraid that fluid from fracking operations will migrate into the potash mineral deposits and contaminate them, I was not present when the debate took place, but I believe the fear was that fracking fluid and/or gases could migrate from the drill shaft as well as from cracks and fissures in the rock. I believe there was a discussion as to whether these concerns could be resolved by a safeguarding zone between the relevant potash deposits and and INEOS proposed fracking operations, and that Sirius contend that a 500m safeguarding zone is not sufficient to protect their potash deposits from contamination.

It is difficult to understand why the proposed 500m mineral safeguarding zone should be treated any differently from a 500m residential buffer. Clearly there are two issues: the one relating to the impact of earth movement on building foundations and the second relating to contamination.

As regards contamination, many farms depend for water on artesian wells which take water from the water table immediately below their land. If there is a risk of contamination of sub-surface minerals as a result of seismicity opening up cracks and fissures in the rock for fracking fluids and gases, then there must be a similar risk of contamination of water in the water table. The oil and gas industry say this risk is covered by encasing the pipe in concrete many times thicker where the pipe passes through the water table than the casing round the rest of the bore-pipe. However, clearly this will not be sufficient if a 500m safeguarding zone would be required for protecting mineral deposits in a similar area. Further, if gas escapes through fissures and cracks in the rock at any depth as a result of seismic shocks caused by fracking operations, this is just as likely to rise through the rock strata and leak into the atmosphere above, and the closer a house or building to the drill pad, the greater the danger of explosions etc. in or near the house. In this case the thickness of the concrete casing of the bore-pipe will do little to minimise the risk.

As regards the impact of seismic shocks on house foundations, clearly if there is a risk of fissures and cracks opening in the rock, the effect of the communication of the shock through intervening rock and other strata is bound to have an effect on foundations. If mineral deposits can be protected by a 500m safeguarding or buffer zone, then so should the foundations of houses.

Conclusion

In these circumstances, I cannot see how the relevant policies in the NPPFcan be satisfied without there being a residential buffer zone. I believe 500m is not enough to protect residential amenity.

The developers will say that the proposed residential buffer zone will sterilise gas extraction by fracking in the whole county. I disagree.

What they are asking residents to accept is that they should be allowed to carry on their business and make a profit out of it, while residents see house values fall. This is in effect a direct transfer of value from residents to the industry, which to my mind is an outrage. It is legalised theft – there is no other way to describe it - because none of the legislation or government circulars give residents any right of compensation for what is, in effect, planning blight.

If the industry fears sterilisation of the gas field, the remedy is in their own hands. All they have to do is to offer residents full market value and purchase properties which are in the buffer zone.