



Oil & Gas Authority

Secretary of State for Business, Energy
and Industrial Strategy
1 Victoria Street
London
SW1H 0ET

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Tom Wheeler
4th Floor
21 Bloomsbury Street
London, WC1B 3HF
T: +44 (0)7766 558891
E: tom.wheeler@ogauthority.co.uk
www.oga.gov.uk

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Dear Secretary of State,

Following recent seismic events caused by Cuadrilla's operations at their Preston New Road site, including the 2.9ML event on 26 August 2019, I write to provide an update on activity at the site and the status of Cuadrilla's Hydraulic Fracture Plan (HFP). I would also like to inform you of the OGA's thoughts on the status of scientific understanding in this area, including our summary of the findings from the studies analysing data from the PNR1Z well, commissioned in February. I enclose a copy of our short summary of those studies, for your information. The reports themselves will be available on our website shortly.

Before beginning, and to put this update in context, I can report that, from a resource perspective, results from both Cuadrilla's operations in the Fylde and from the IGas well drilled earlier this year in Nottinghamshire, have been encouraging, indicating that Bowland shales in England may contain a substantial gas reserve. I note that, despite a recent study by the BGS and the University of Nottingham, reported as dramatically reducing shale gas potential in England, the BGS have retained their central estimate of c.1329 trillion cubic feet of gas in place. That said, it remains the OGA's view that there is insufficient data to provide a reliable estimate of potential commercial recovery from these resources, not least because one key determinant of that is the impacts of, and risks associated with, the operations needed to recover that gas, to which I shall now turn.

You will be aware of the seismic events induced by hydraulic fracturing at PNR2, the largest of which was 2.9ML. These were within the range of seismicity known to be possible and the small number of properties reported to have suffered minor damage was in line with expectations for events of those magnitudes. However, a number of events occurred more than two days after fracturing had been paused and were



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larger than expected, based on the assumptions and given the mitigations described in Cuadrilla's HFP. The OGA therefore immediately extended the suspension of fracturing at the site and informed Cuadrilla that the suspension would remain in place until they had demonstrated, to the OGA's satisfaction, that their HFP remained appropriate to manage the risk of induced seismicity.

Since operations were suspended, the OGA has held several meetings with Cuadrilla, both at a technical and senior level and I have met Cuadrilla's Chief Executive and Chairman. In those meetings, the OGA has outlined its main concerns, including the apparent presence of potentially large faults not identifiable from 3D seismic surveys, uncertainty as to the maximum magnitude, frequency and timing of seismic events triggered on those unidentified faults and the continuing effectiveness of monitoring and timely identification of fault interactions and operational approaches to avoid triggering activity on them.

We understand that Cuadrilla concluded it was unlikely that they could produce the data and analysis necessary to satisfy the OGA of the appropriateness of their HFP before their planning permission expires at the end of November, and therefore took the decision to demobilise the hydraulic fracturing equipment at the site, which they have now done. Cuadrilla are currently flow testing the well and we look forward to the seeing the results of that test. While we do not expect testing to trigger any further notable seismicity we continue to carefully monitor operations.

We consider our approach to be in line with current government policy aims: that the controls in place should minimise disturbance and the risk of damage. As you know, this policy is set out in the Department of Energy and Climate Change December 2012 Written Ministerial Statement.

Separately, we have recently concluded a set of studies analysing data from the PNR1Z well, the first to be hydraulically fractured at the Preston New Road site and we have shared the results of those studies with your officials. While not conclusive, these results cast further doubt on the adequacy of some of the assumptions and mitigations underlying Cuadrilla's HFP and the approach to minimising disturbance and the risk of damage from future hydraulic fracturing operations at other sites in England. The OGA now intends to test and improve the interim findings of the PNR1Z studies by incorporating the new data from PNR2 and will aim for this work to be completed early in the New Year. While this further work using the PNR2 data is worthwhile, it is unlikely to radically alter the findings from the PNR1Z data and the limited scope of these planned studies will not address the concerns that the OGA put to Cuadrilla following the 2.9M_L seismic event.



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One particular concern that we do not expect to be resolved by this further work is that the current studies do not provide a robust estimate of the magnitude range and frequency of seismic events that could be induced by hydraulic fracturing in the Fylde. If such an estimate is to be arrived at, the OGA believes that a comprehensive geomechanical study would be needed to establish why the Fylde is prone to induced seismicity, together with an assessment of the magnitude range and frequency of seismic events that could be expected if hydraulic fracturing were to proceed there or more generally, in other parts of England. A second concern is the approach to real-time mitigation, currently delivered through the deliberately precautionary TLS. The TLS was effective at halting operations quickly, thereby reducing the potential for disturbance and damage, but it is notable that the large events at PNR-2 occurred more than two days after injection was halted. Work would therefore be needed to identify mechanisms to improve these controls if hydraulic fracturing were to proceed. Resolving these concerns presents a formidable technical challenge, with some aspects being at the forefront of scientific research in this field and would not be completed quickly.

In the light of the gaps in scientific understanding, until further geomechanical study provides clarity we will not be able to evaluate with confidence whether a proposal to resume hydraulic fracturing in the Fylde, or whether a HFP proposing to start operations elsewhere, would meet the government's policy aims.

If you were to ask the OGA to undertake this study, we would need to have an early conversation with your officials, geotechnical experts and the industry to discuss options, including scope, timing, costs and funding. In parallel to that work, it would be necessary for operating companies to undertake similar detailed and site-specific work to support any proposals to start hydraulic fracturing operations.

I trust that you have found this update helpful. Of course, I would be very happy to follow-up on any questions that you or your officials have.

Yours sincerely,

Tom Wheeler
Director of Regulation