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Dear Mr Perigo

Planning Applications for Temporary Shale Gas Exploration at Preston New Road and Roseacre Wood, Lancashire (LCC/2014/0096, LCC/2014/0097, LCC/2014/0101 and LCC/2014/0102)

We note that on 5th September 2014 Friends of the Earth (FoE) wrote to Lancashire County Council with comments on the above planning applications. For the items which we considered were material to the planning application, we responded to clarify how these items had been addressed within the Environmental Statement (ES) and the Planning Statement submitted with the planning applications (Arup correspondence dated 30th September 2014).

Subsequently FoE have submitted, on 19th December 2014, a further letter related to the planning applications. This letter principally reiterates the views of FoE set out in their earlier letter. Having reviewed FoE's letter of 19th December 2014, we believe that our response of 30th September 2014 fully addresses the issues raised and we make no further comment.

In their letter of 19th December, FoE attached a report by Alan Watson, Public Interest Consultants entitled "Review of the Waste Related Aspects of the Cuadrilla Lancashire Planning Applications". For completeness, on the following pages we provide a response to the "key concerns" raised in this report.

Should you have any questions or require any further clarification, please do not hesitate to contact me.

Yours sincerely

Mark Smith
Associate Director

Response to document “Review of Waste Related Aspects of the Cuadrilla Lancashire Planning Applications for Friends of the Earth” by Alan Watson C.Eng, Public Interest Consultants

Reference	
<i>Summary: Key Concern 1</i>	<i>There are a significant number of papers, reports and communications which have been relied upon for data in the preparation of the Environmental Statements but which have not been included in application. As these documents are not even publically available this is considered to be a breach of the Town and Country Planning (EIA) Regulations 2011.</i>
<i>Response</i>	
<p>Under the EIA Regulations, an “Environmental Statement” must be submitted by the applicant for any EIA development. This is defined as <i>"a statement —</i></p> <p style="padding-left: 40px;"><i>(a) that includes such of the information referred to in Part I of Schedule 4 as is reasonably required to assess the environmental effects of the development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile, but</i></p> <p style="padding-left: 40px;"><i>(b) that includes at least the information referred to in Part II of Schedule 4."</i></p> <p>The adequacy of an Environmental Statement provided by an applicant is predominantly a matter for the planning authority's judgement¹.</p> <p>The following documents have been queried in the Watson report:</p> <ol style="list-style-type: none"> 1. Waste Management Plan 2. Cuadrilla (2014) 4 Wells Combined – With Reuse- Rev 5 3. Cuadrilla (2014) Comments 01/02/2014 (ES Vol 1 Ref 370) 4. Cuadrilla (2014) Comment on 11 March 2014 (ES Vol 1 Ref 373) 5. Studsvik (2014) Waste Capacity Assessment Draft 4 6. Studsvik (2014) Email from Studsvik to Cuadrilla 19/03/2014 7. GMI Geomechanics Services. (2011). Wellbore failure analysis and geomechanical modelling in the Bowland Shales, Blackpool, UK. GMI. Report for Cuadrilla. (RW ES Vol 1 Ref 317) <p>Document 1 (The Waste Management Plan) is publicly available as part of the Environmental Permit applications to the Environment Agency (EA) for the Preston New Road and Roseacre Wood sites. The Waste Management Plan for the Preston New Road site is available from: https://consult.environment-agency.gov.uk/portal/npsapp/cuadrilla/cuadrilla_bowland_limited_1?pointId=2973944</p> <p>The Waste Management Plan for the Roseacre Wood site is available from : https://consult.environment-agency.gov.uk/portal/npsapp/cuadrilla_1/cuadrilla_elswick_limited_1?pointId=2988911</p> <p>The EA granted the permits for both sites on 16 January & 6th February 2015.</p> <p>With reference to Documents 2-7, it is considered that the ES presents the relevant data from these sources to enable the assessment of the potential environmental impacts to be assessed</p> <p>Cuadrilla (the Applicant) has provided information as requested by LCC to clarify issues raised in the ES and would be happy to provide further information, including relevant extracts from reference documents if requested to assist LCC in their assessment of the applications.</p>	

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<p>¹ Sullivan J in R v Rochdale Metropolitan Borough Council, ex p Tew, held that the underlying objective of environmental impact assessment (that decisions be taken "in full knowledge" of a project's likely significant effects) still left scope for the LPA to exercise its discretion and judgment: "<u>That is not to suggest that full knowledge requires an environmental statement to contain every conceivable scrap of environmental information about a particular project.</u> The directive and the assessment regulations require likely significant effects to be assessed. It will be for the local planning authority to decide whether a particular effect is significant"</p>	
<p><i>Summary:</i> <i>Key</i> <i>Concern 2</i></p>	<p><i>The applications and environmental statements do not contain a breakdown showing the usage of water and the production of the flowback fluid over time. This is a significant omission which is particularly important in relation to the limited national capacity for storage and treatment of flowback fluids and the potential for the two applications to be generating flowback fluids concurrently.</i></p>
<p><i>Response</i></p> <p>The ES does present details of the usage of water for each of the different stages of the project (see ES Chapter 19 and ES Appendices B & S). For the hydraulic fracturing operation, the total water demand per well, water demand for 4 wells combined and the maximum water demand per day is reported. The assessments present the worst case scenario in terms of mains water consumption. The daily demand figures allow the capacity of infrastructure to be assessed. The total water demand figure allows the impact on water resources to be assessed.</p> <p>The ES (chapter 17 and Appendix B) presents the flowback fluid production estimating that 40% of the total injected hydraulic fracturing fluid will return as flowback fluid during the initial flow testing phase. Appendix B reports on the proportion of this flowback fluid that will be reused to make up part of the fracturing fluid for the subsequent fracturing stage. The remaining flowback fluid produced would be stored temporarily on site before being tankered off site for treatment and disposal at a licenced wastewater treatment works.</p> <p>The rate at which flowback fluid would be removed from site for specialist treatment has been assessed using the maximum weekly volume produced by the Project. The peak weekly volume produced onsite has been compared to the baseline capacity at the specialist treatment facilities as detailed in section 17.6 of the ES.</p> <p>The storage capacity on site provides a buffering capacity to manage flowback production. The provided storage volume has been calculated to ensure that the rate of flowback fluid production does not exceed the weekly treatment capacity.</p> <p>Section 17.8.5.3 of the ES describes the steps Cuadrilla will take to manage flowback fluid to ensure that volumes of fluid removed from site for treatment will not exceed the available treatment capacity.</p> <p>In their Decision Document supporting the waste management permits, the EA have also addressed concerns regarding the availability of treatment capacity and state "<i>We are satisfied that there is currently adequate capacity to treat and/or dispose of the waste generated by the permitted activity</i>" (EA, Decision Document, Annex 1, B, Response to Friends of the Earth).</p> <p>The response to Key Concern 12 below addresses the query regarding concurrent operations.</p>	

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<p><i>Summary:</i> <i>Key Concerns 3 & 4</i></p>	<p><i>The applications claim that the hydraulic fracturing fluid would consist only of water, silica sand, polyacrylamide friction reducer and, as a contingency, hydrochloric acid. There should be no objection from the applicant to conditions being attached to any permission restricting the fracking fluids to these compositions. This would be consistent with the assessment of impacts via the Environmental Assessment process.</i></p> <p><i>It also needs to be clarified why the Environmental Permit application makes provision for a much wider range of additives to the fracking fluid. If the Environmental Statement is inaccurate in describing the composition of the potential fracking fluid it should be corrected before any determination of the application.</i></p>
<p><i>Response</i></p>	<p>The report from Mr Watson correctly notes that the hydraulic fracturing fluid will consist of water, silica sand proppant, polyacrylamide friction reducer and as a contingency hydrochloric acid. It will also will consist of re-used flowback fluid. Polyacrylamide has been assessed by the EA as non-hazardous to groundwater.</p> <p>The polluting potential associated with drilling muds and proposed additives is separately assessed in Chapter 11 of the ES.</p> <p>The Environmental Permit application identifies the constituents of both the fracturing fluid <u>and</u> the drilling muds, it does not make provision for a wider range of additives to the fracking fluid”. The ES and environmental permit applications are consistent.</p>
<p><i>Summary:</i> <i>Key Concern 5</i></p>	<p><i>The lack of provision for on-site treatment of flowback fluid as part of the application and this is likely to reduce the potential for re-use of flowback to the fluids from the earliest stage of flowback when contamination levels are at their lowest levels. This adds significant uncertainty to the quantity of flowback fluid which may be suitable for re-use and thus to the total volumes of flowback which will ultimately require offsite disposal.</i></p>
<p><i>Response</i></p>	<p>Section 4.5 of the Preston New Road/Roseacre Wood Waste Management Plan provides the details of the ability to re-use flowback fluid. The Waste Management Plan is publicly available as part of the Environmental Permit applications submitted to the EA.</p> <p>The EA issued the environmental permits for the proposed shale gas exploration sites on 16th January & 6th February 2015. The environmental permit documentation including the Waste Management Plan for the Preston New Road site is available from: https://consult.environment-agency.gov.uk/portal/npsapp/cuadrilla/cuadrilla_bowland_limited_1?pointId=2973944</p> <p>The documentation for the Roseacre Wood site is available from : https://consult.environment-agency.gov.uk/portal/npsapp/cuadrilla_1/cuadrilla_elswick_limited_1?pointId=2988911</p>

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<i>Summary: Key Concern 6</i>	<i>The data provided in the ES for the levels of contamination in the flowback fluid differ from those in the Environmental Permit. This needs to be clarified and the ES should be consistent with the EP for this data.</i>
<i>Response</i> The data presented in Appendix K, Table K11 of the ES (which reports on the likely levels of contamination in the flowback fluid based on results of the Preese Hall exploration well) is consistent with the data presented in the Preston New Road/Roseacre Wood Waste Management Plan, Appendix B 'List of Natural Minerals in Flowback Fluid' (please see Environmental Permit application documents).	
<i>Summary: Key Concern 7</i>	<i>The potential treatment sites for flowback fluid are not disclosed but it can be deduced from the assessment of the releases to sewer that the Castle Environmental site in Stoke on Trent is treatment site A and the FCC Knothrop site is assessment site B.</i>
<i>Response</i> The names of the flowback fluid treatment facilities have not been identified in the ES as this is commercially confidential. Following the submission of the ES a third treatment site has become available to Cuadrilla in the North of England. This has increased the amount of available treatment capacity for the flowback fluid. In addition Cuadrilla is currently discussing potential treatment opportunities with another water treatment operator in the region who is applying for environmental permits to treat flowback fluid containing NORM. Should these permits be granted, this will provide even greater treatment capacity close to the proposed exploration sites.	
<i>Summary: Key Concern 8</i>	<i>The FCC Knothrop site has a total physical capacity of only 600 tonnes/week which is insufficient capacity to treat the flowback water from even one application. It is therefore essential that the Castle Environmental site is used. The application acknowledges that there are other users of this site but does not quantify the capacity available. This is a serious omission as each application alone requires 65% of the combined capacity of the two treatment facilities.</i>
<i>Response</i> The statement made by Mr Watson is incorrect. The permit for the FCC Knothrop facility establishes a treatment capacity of 300 tonnes/m ³ per day or 2,100 tonnes/m ³ per week. The combined demand for treatment of flowback fluid has been set out and assessed in the ES. As identified in the response to Key Concern 7 above, an additional treatment facility has recently been licensed and a further facility is in the process of applying for licences. This provides additional capacity in the region to treat flowback fluid containing NORM.	

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<p><i>Summary:</i> Key Concern 9</p>	<p><i>It is not clear from the application that the “early discussion” with the treatment site operators expected by the Government has taken place. If there had then there should have been evidence from the operators of the sites that capacity would be available to the applicants. At the moment there is no evidence of guaranteed treatment capacity being available for even one operation.</i></p>
<p><i>Response</i></p> <p>It is confirmed that discussions have been held with treatment site operators in order to assess the availability and impact of treatment of wastes from the proposed operation. These discussions have informed preparation of both the ES and the Environmental Permits.</p> <p>As identified in the response to Key Concern 7 above, there are likely to be a range of treatment sites which may be used by the Applicant and contracts with the selected treatment sites will only be entered into following the grant of planning permission and prior to fracturing operations commencing.</p>	
<p><i>Summary:</i> Key Concern 10</p>	<p><i>The Planning Authority needs to be sure, for example, that there were no other fracking sites or other major users which are either currently using, or plan to use, the limited treatment capacity available. The information to assess this is not included in the application.</i></p>
<p><i>Response</i></p> <p>Appendix T of the ES identifies the other developments that have been considered for the assessment of cumulative impacts.</p> <p>As identified in the responses to Key Concerns 7 and 9 above, the Applicant has discussed the treatment availability with a number of treatment facilities and has identified in the ES that there is adequate treatment capacity to meet the forecast demand for wastewater treatment. The Applicant will enter into contracts with treatment facilities following the grant of planning permission and prior to any fracturing operations commencing which shall ensure sufficient treatment capacity is available.</p> <p>We also highlight that mitigation measures have been proposed to manage the quantities of flowback fluid that may be generated (see section 17.5.8.3 of the ES).</p> <p>In their Decision Document supporting the waste management permits, the EA have also addressed concerns regarding the availability of treatment capacity and state “<i>We are satisfied that there currently adequate capacity to treat and/or dispose of the waste generated by the permitted activity</i>” (EA, Decision Document, Annex 1, B, Response to Friends of the Earth).</p>	
<p><i>Summary:</i> Key Concern 11</p>	<p><i>The capacity assessment is based on a relatively low level of flowback fluid generation (40%). Furthermore if the flowback fluid could not be re-used or less of it could be re-used) this would further increase the need for treatment. The capacity of treatment sites in the UK is already a recognised problem and treatment demand for NORM waste is projected to increase. If the flowback fluid levels approached those of some other wells the entire national treatment capacity would be completely overwhelmed.</i></p>
<p><i>Response</i></p> <p>It is estimated that 10-40% of the injection volume will return to the surface as flowback fluid. This is based on industry knowledge of similar dry shales. This issue has been</p>	

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	<p>reviewed by the EA in their determination of the Mining Waste Permit and the EA was satisfied that Cuadrilla has used appropriate information to design the proposals and that there are sufficient controls in place to ensure that flowback is controlled, treated and disposed of appropriately.</p> <p>The Applicant will enter into contracts with treatment facilities following grant of planning permission and prior to fracturing operations commencing which shall ensure sufficient treatment capacity is available.</p> <p>Section 17.8.5.3 of the ES (Preston New Road ES paragraph 378 / Roseacre Wood ES paragraph 373) describes the steps Cuadrilla would take if higher flowback fluid production was experienced to ensure the quantity of flowback fluid requiring treatment does not exceed the available treatment capacity. These steps would comprise:</p> <ul style="list-style-type: none"> • Provision of additional on-site tank capacity to temporarily store flowback fluids so that off-site disposal does not exceed the treatment rate agreed with the relevant treatment works; • Consideration of shutting off the well for a short period (i.e. temporary suspension of flowback production) to allow flows off-site to be controlled to within the available treatment capacity; and • Consideration of amendments to hydraulic fracturing operations to reduce flowback volumes e.g. reduced number of hydraulic fracturing stages, smaller volumes etc.
<p><i>Summary:</i> <i>Key Concern 12</i></p>	<p><i>It is claimed that the combined waste from the two operations requires only an extra 3% of the combined treatment capacity – representing an additional 12 m3/day of flowback fluid from the second Cuadrilla site. No explanation has been given for this remarkably low contribution nor how the operations have been staggered to reduce the combined impact to this level.</i></p>
	<p><i>Response</i></p> <p>The programme contained in Appendix A of the ES identifies how the operations at the Preston New Road and Roseacre Wood sites will be staggered in order to mitigate their cumulative effects.</p> <p>Following fracturing of a well, initial flowback production rates are higher but rapidly decline over the following days. The provision of temporary storage capacity at each exploration site buffers against these high flows, allowing the waste water to be transported from site at a more controlled rate. By staggering fracturing operations at the two sites – as described in the programme - the peak production rates of flowback fluid will not coincide and therefore the cumulative and interactive effects of the operations on the available wastewater treatment capacity can be effectively managed.</p> <p>As set out in the responses to Key Concern 2 and 11 above, mitigation measures have been proposed to manage production rates of flowback fluid.</p>

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<p><i>Summary:</i> Key Concern 12</p>	<p><i>It seems likely one reason the treatment sites were not disclosed is the significant distance that any flowback fluids have to be carried for disposal. Castle Environmental is a return trip of approximately 160 miles from the application sites and FCC Knostrop is a return trip of about 170 miles from the proposed site. Therefore the total tanker mileage associated with the shipping of flowback water to treatment centres equates to approximately 235,000 miles per application with a total milage of c.470,000 miles.</i></p>
<p><i>Response</i></p>	<p>The names of the flowback fluid treatment facilities have not been identified in the ES as this is commercially confidential.</p> <p>The Greenhouse Gas chapter of the ES considered the impact of CO2 emissions associated with transport of flowback water.</p>
<p><i>Summary:</i> Key Concern 13</p>	<p><i>The application and Environmental Statement should therefore have addressed the human health and environmental risks associated with any TENORM (technologically enhanced NORM) generation and management on the application sites.</i></p>
<p><i>Response</i></p>	<p>TENORM has been considered at the site. As noted in the ES, due to the relatively short term nature of the operations it is highly unlikely that any significant scale will build up inside equipment. The Radioactive Substances Regulation (RSR) environmental permit application BAT statement provides details of the quantity of scale and associated radionuclides. In addition Radon gas has also been considered as part of the RSR permit application.</p> <p>The environmental permit documentation for the Preston New Road site is available from: https://consult.environment-agency.gov.uk/portal/npsapp/cuadrilla/cuadrilla_bowland_limited_1?pointId=2973944</p> <p>The documentation for the Roseacre Wood site is available from : https://consult.environment-agency.gov.uk/portal/npsapp/cuadrilla_1/cuadrilla_elswick_limited_1?pointId=2988911</p>
<p><i>Summary:</i> Key Concern 14</p>	<p><i>The accumulating evidence from the technical and scientific literature is that between 3.4 to more than 12% of unconventional wells suffer wellbore failures and that for fracking wells that has been a 1.6- to 2.7-fold higher risk in un-conventional wells. The long-term risks of wellbore failure are seriously under-estimated by the applicants and should be assessed before any permission is given.</i></p>
<p><i>Response</i></p>	<p>Groundwater protection and well integrity are considered in detail in ES Chapter 11 and the associated technical appendix (App K).</p> <p>The papers referred to by Mr Watson are all discussed in Appendix K, except for Ingraffea (2014) which was published following the ES submission. Having reviewed this paper, the ES conclusions remain unchanged. The “accumulating evidence” referred to by Mr Watson make no distinction between well barrier failure and well integrity failure. A well</p>

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	<p>barrier failure is defined as a failure in one or more barriers in a multi-barrier system which does not result in release of contaminants to the environment. In contrast well integrity failure is a failure of all barriers that enables leaking into the surrounding environment. Therefore the numbers quoted are misleading as they do not indicate occurrence of adverse environmental impact.</p> <p>The proposed wells include verified barriers that provide multiple layers of protection isolating the well bore from the surrounding environment.</p> <p>The Health and Safety Executive (which has Regulatory responsibility for well design) has scrutinised the ES Chapter 11 and are satisfied with the proposed well design.</p>