• Who we are
• Perceived Barriers to Development
• Economic Impact of Development
• UK company headquartered in Lichfield, Staffordshire
• Formed in 2007 as a privately held exploration and production company
• Currently drilling our third shale well in the UK
• Currently have over 6500 km² licensed in UK, Netherlands, and Poland with applications pending in other European countries
• Vertically integrated with own drilling, fracturing, testing services
Perceived Barriers to Development

- Lack of Equipment
- Population Density
- Perception of Untested Technology
- Environmental Impact
- Public Confidence
- Not Enough Gas to Warrant Development
 Issue: Lack of Equipment for Development

• Drillmec HH rig, manufactured in Italy
• Frac Fleet to European specs manufactured primarily in Canada
• Service Rig to European spec manufactured in Canada
• Testing Equipment to European specs manufactured in Canada and UK
• Manufacturing time was about one and one half years
• Having our own equipment allows more economical operations on exploration wells due to reduced standby time and better control of operations
• If field goes into development the service providers will increase the supply of equipment
Issue: Population Density

• Well spacing with multi-well pads reduces footprint
• Modern rigs are quiet and low profile
• Our rig meets night time sound requirements at 250 metres with no additional sound walls
Cuadrilla Preese Hall-1 Well, Lancashire, UK
Critics tend to show low spacing, single well developments
Even if allowed this would not be economically justifiable
Reality is multi-well pads, several kilometres apart
Issue: Fracturing is Perceived as “New Untested” Technology

• Over the last 60 years, more than one million U.S. wells have been hydraulically fractured
• Fracturing has been commercial in the UK since the mid-’80’s
• Large, hi-rate, multi-stage slickwater jobs were common in the ‘80s and ‘90s
• The Environmental Protection Agency, Ground Water Protection Council and Interstate Oil and Gas Compact Commission have all examined the process and found it to be safe
One of my first fracs, Ohio 1981
Multi-stage slickwater

Multi-stage, gelled water frac, Cheshire, UK 1992
Issue: Environmental Impact

• Surface protection
  • Sealed location
  • No in ground pits – steel tanks
  • Closed loop drilling
  • Pre-drilling testing of water
  • Continuous ground gas monitoring around site

• Well Design
  • Follow best practice well design with surface, intermediate and production casings
  • Good well design is the same for conventional and shale wells
  • Follows stringent European guidelines

• Public Confidence
  • We support full fluid disclosure and post fluids used on our website
  • All chemicals are reviewed and approved by the environmental or relevant agency
  • Support open policy with local community
  • Over one hundred site tours for government officials, local residents and environmental groups
Issue: Environmental Impact

• Water Usage
  • Less than coal or nuclear per BTU
  • Recycling is economic due to high disposal costs and haulage fees

• Green flowbacks
  • High water volume separator to maximise flow to flare and minimise methane to the atmosphere
  • High volume also maximises gas separation from water due to increased time in the separator
  • We want the gas to go to sales so minimise all venting and flaring
### Actual chemical usage from Preese Hall-1 well

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Supplier</th>
<th>Supplier Chemical Name</th>
<th>Purpose</th>
<th>Country of Origin</th>
<th>Components Listed on MSDS</th>
<th>Total Volume</th>
<th>Volume Unit</th>
<th>MSDS Component Weight % of Chemical</th>
<th>Volume of Component in Well meters³</th>
<th>Volume of Total Volume Injected</th>
<th>Concentration %</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Water</td>
<td>United Utilities</td>
<td>Water</td>
<td>Carry sand, open fractures</td>
<td>UK</td>
<td></td>
<td>8,399.2</td>
<td>meters³</td>
<td></td>
<td>8399.20</td>
<td>97.93%</td>
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<tr>
<td>Congleton Sand</td>
<td>Sibelco UK</td>
<td>HST-80</td>
<td>Prop open fractures</td>
<td>UK</td>
<td></td>
<td>108.1</td>
<td>metric ton</td>
<td>100%</td>
<td>40.53</td>
<td>0.473%</td>
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<td></td>
</tr>
<tr>
<td>Chelford Sand</td>
<td>Sibelco UK</td>
<td>CH-52</td>
<td>Prop open fractures</td>
<td>UK</td>
<td></td>
<td>354.6</td>
<td>metric ton</td>
<td>100%</td>
<td>132.94</td>
<td>1.550%</td>
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<td></td>
</tr>
<tr>
<td>Friction Reducer</td>
<td>CESI Chemical</td>
<td>FR-40</td>
<td>Reduce pressure required to pump down pipe</td>
<td>Netherlands</td>
<td>Polyacrylamide Emulsion in Hydrocarbon Oil</td>
<td>3.7</td>
<td>meters³</td>
<td>100%</td>
<td>3.68</td>
<td>0.043%</td>
<td></td>
<td>This product does not contain any reportable hazardous components as defined in 29 CFR 1910.1200</td>
</tr>
<tr>
<td>Chem Tracer</td>
<td>Spectrachem</td>
<td>Chem Tracer</td>
<td>Identify frac water in flowback</td>
<td>USA</td>
<td>Water</td>
<td>4,252</td>
<td>grams</td>
<td>90%</td>
<td>0.00383</td>
<td>0.000004%</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sodium Salt</td>
<td>10%</td>
<td>grams</td>
<td>10%</td>
<td>0.00043</td>
<td>0.000005%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Multiple strings of casing protect aquifers before penetrating hydrocarbon zones**

**Ground gas monitor**
High volume flowback separator and steel tanks

Site construction showing impermeable membrane draining to sump, some areas require pavement with drains to sump
Issue: Not Enough Resource

• 200 tcf estimated Gas in Place in Bowland Basin alone
• This is Gas in Place – NOT a recoverable resource figure
• Information from two Cuadrilla wells plus three older wells that penetrated the shale
• Core and cutting analysis
• 2D seismic
• We are confident in this number
The UK PEDL 165 licence representing the Bowland Basin, shown with a topographical map overlain by the 2D seismic database in blue, equals a total area of 1200 Km².
Economic Impact of Development in One License Block

• Independent study of UK project by Regeneris Consulting
  • Median Case of forty ten well pads over 9 years
    • Employment impacts peak at 5,600 full time equivalent jobs
    • Drilling program runs to 2021
    • Impacts peak 2016 to 2019
  • Estimated tax revenue in the 6-7 billion Euro range
Enclosed Flare from UK’s First Shale Well