

PAS Local Planning Authority Workshops

Planning Applications for Shale Gas & Oil

Wednesday 16th March 10am to 4.30pm, Manchester

Friday 18th March 10am to 4.30pm, Leeds

Wednesday 23rd d 10am to 4.30pm, London

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Onshore oil and gas

Role of OGA with other regulators

New Licensing

Regulating seismicity

Hydraulic Fracture Plan

UK Onshore Oil and Gas

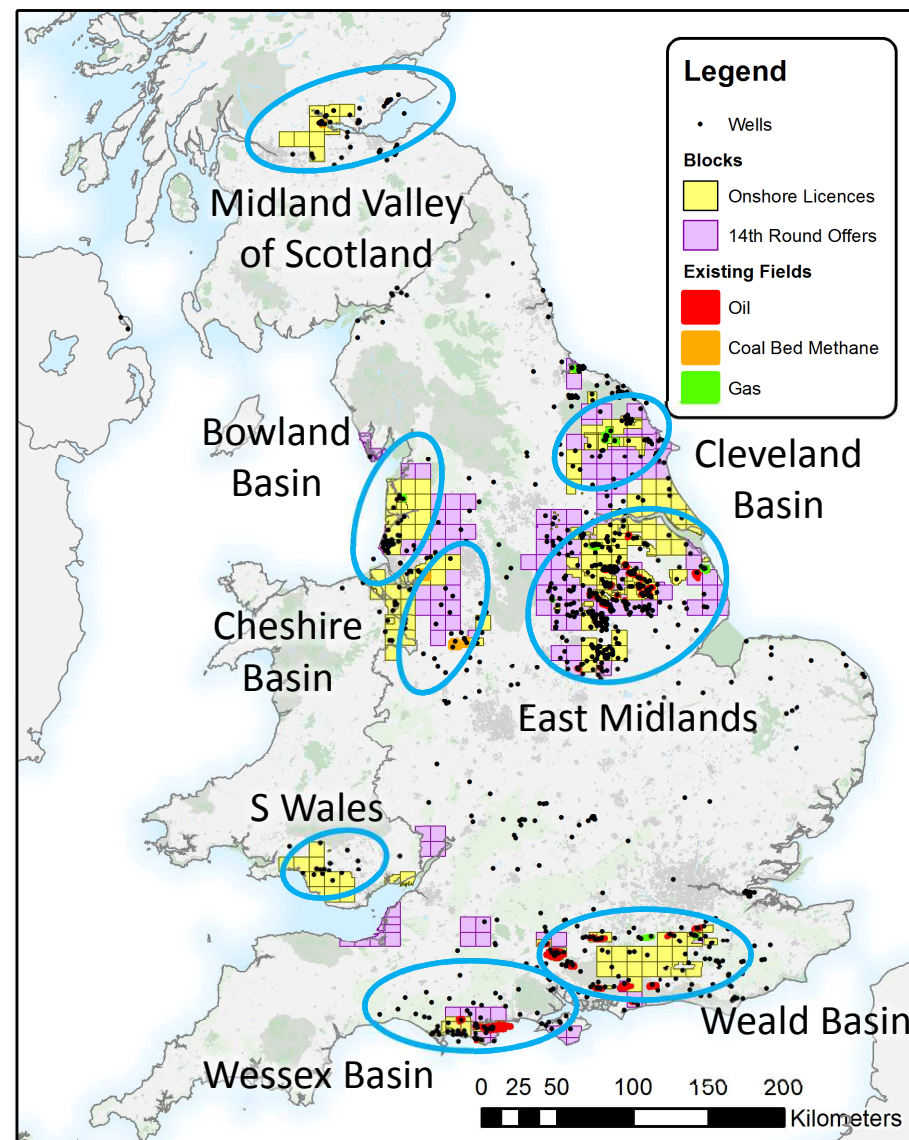
Over 2,100 wells drilled

Producing fields

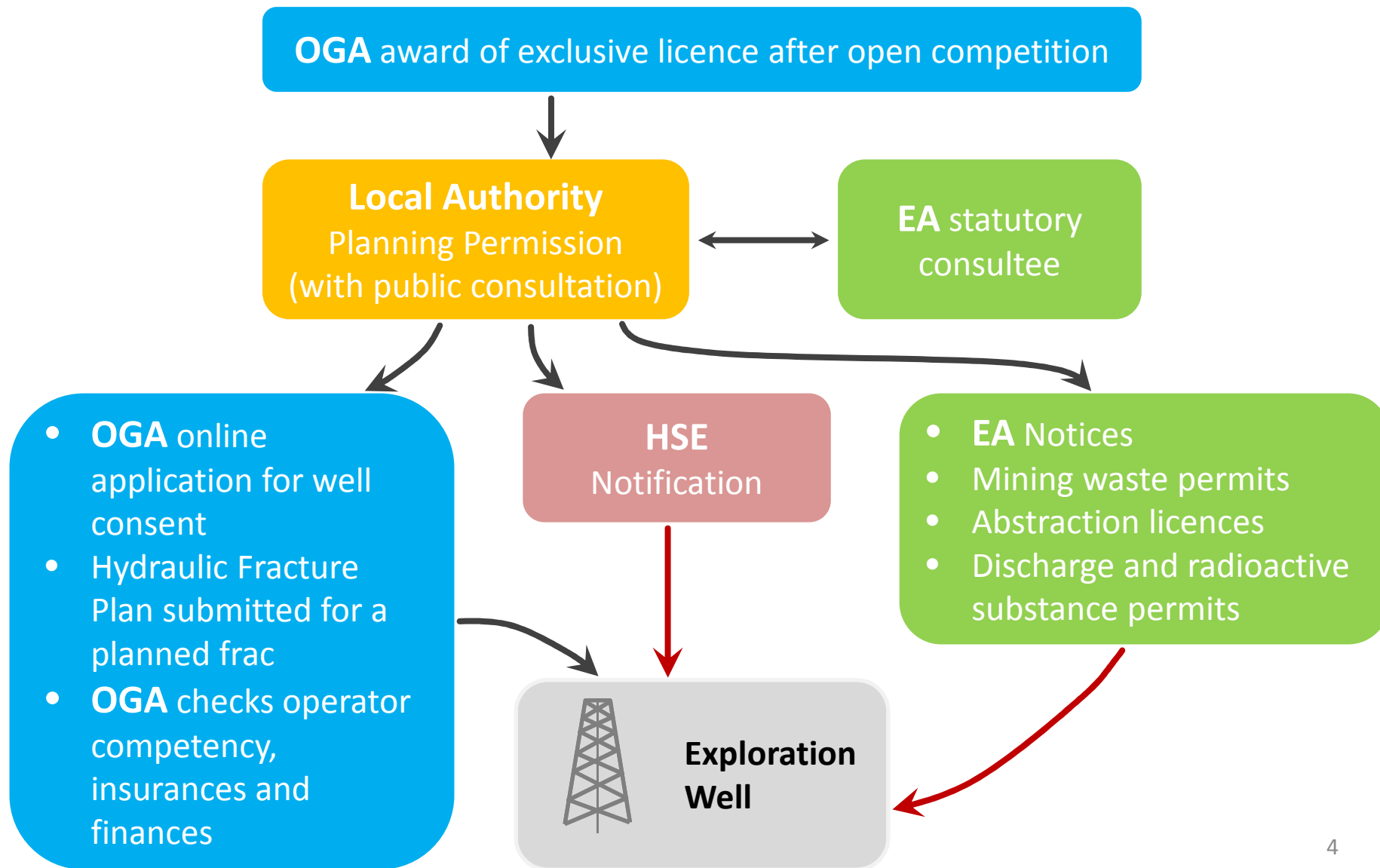
- 30 Oil fields
- 8 Gas fields
- 2 Coalbed Methane fields

2014 Onshore Production

- 943,400 cubic meters oil
- 47 million cubic meters gas



Regulatory Regime in England



Petroleum Exploration and Development Licence (PEDL)

- A PEDL grants exclusive rights “**to search and bore for and get petroleum**” in all the various stages of oil and gas exploration, appraisal; production and eventually abandonment of the wells.
- **Licences do not give permission for operations**, only grant exclusivity to licensees within a defined area.
- Drilling, fracking or production require local planning permission, Access agreement(s) with relevant landowner(s), Environment Agency permits, HSE scrutiny and DECC well consent before any operations can commence
- PEDL licence covers conventional oil and gas, tight gas, coalbed methane (CBM), mine vent gas, oil shale and **shale gas**. A PEDL licence does not allow for underground coal gasification (UCG) or CO2 sequestration.

Licence Rounds

- To apply for a licence, the applicant submits information and later is interviewed by an expert panel who consider the **Geotechnical Analysis** and their proposed **Work Programme**, the minimum amount of work that the Applicant must carry out if the licence is not to expire at the end of its Initial Term. Their technical analysis and work programme are assessed against a published marks scheme.
- Only companies with the necessary **Operator Competency** and **Environmental Sensitivity** are considered for award. OGA must also be confident that any company that receives a licence will continue in sound financial health for the foreseeable future (**Financial Viability**) and has adequate **Financial Capacity** to cover its share of the proposed Work Programme.



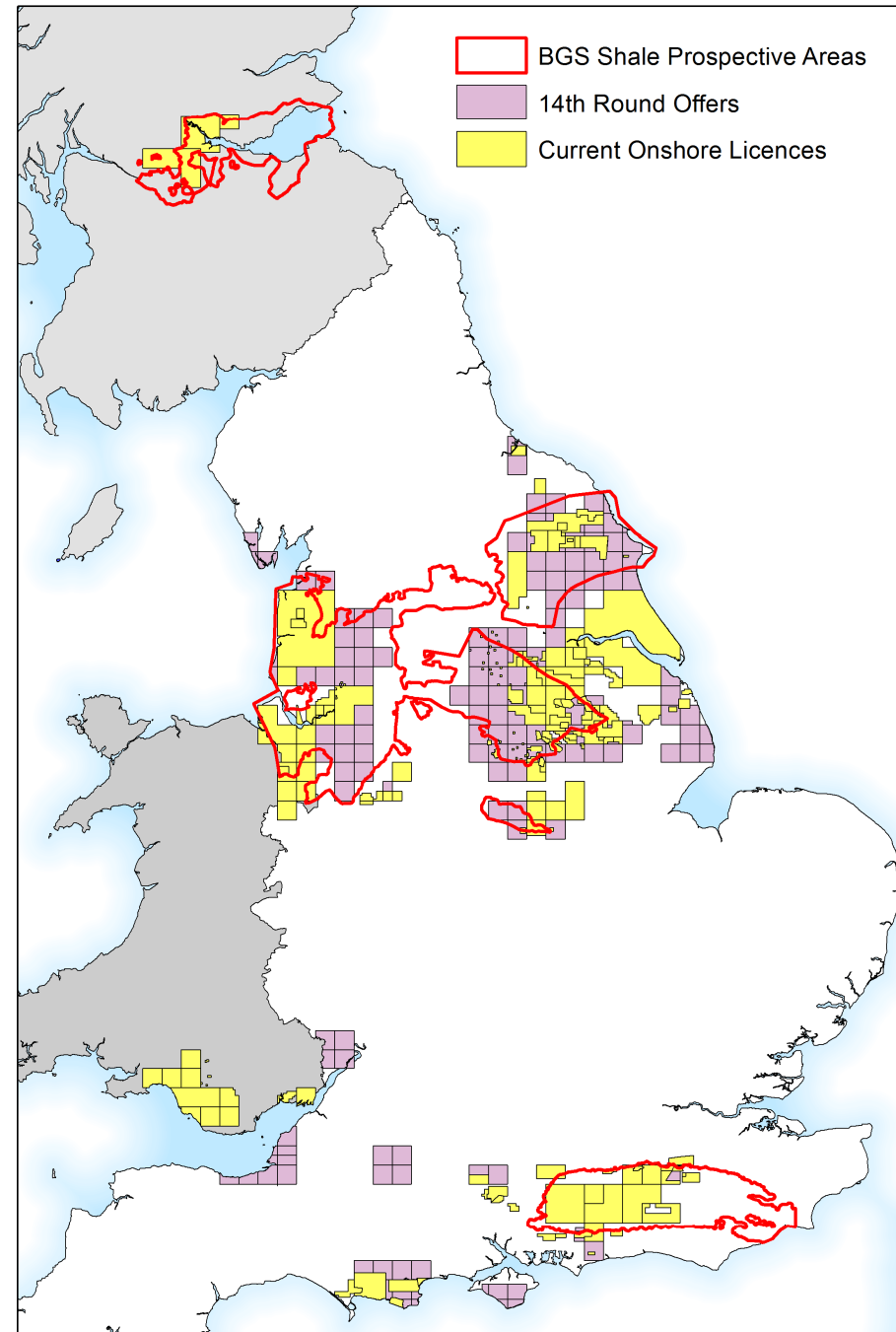
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14th Round

Total Work Programme:

- 58 Drill or Drop wells
- 40 Firm vertical wells
- 14 Firm hydraulically fractured horizontal wells
- Over 2,100 km of 2D
- Over 2,000 km² of 3D

No offers in Scotland or Wales





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Existing and 14th Round Offers

Third Energy

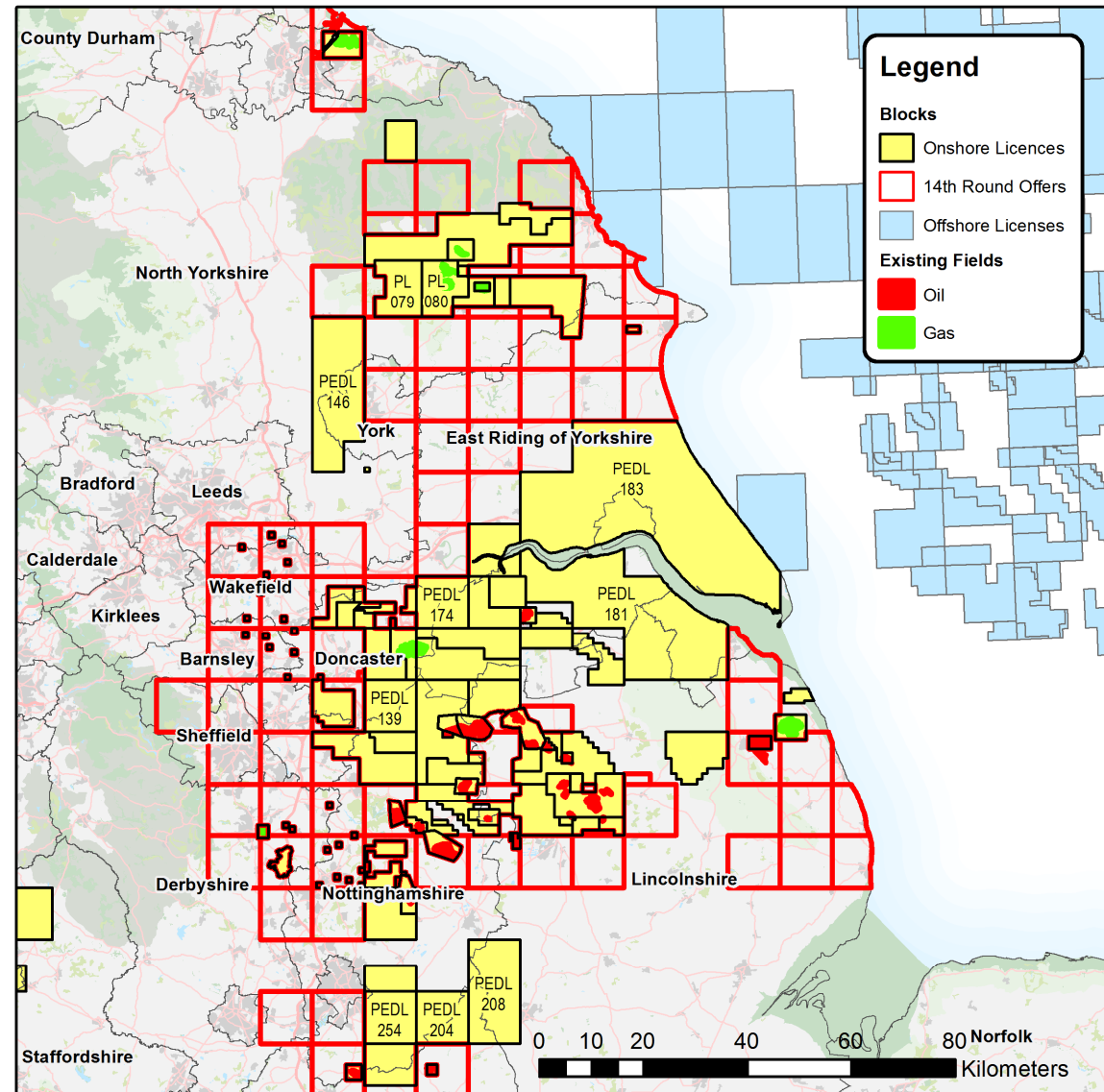
- Kirby Misperton (PL80)
- Application to frac existing KM8 well

IGas

- Misson (PEDL140)
- Application for vertical well + deviated well

14th Round Offers

- 29 Firm wells bid
- 2D and 3D seismic





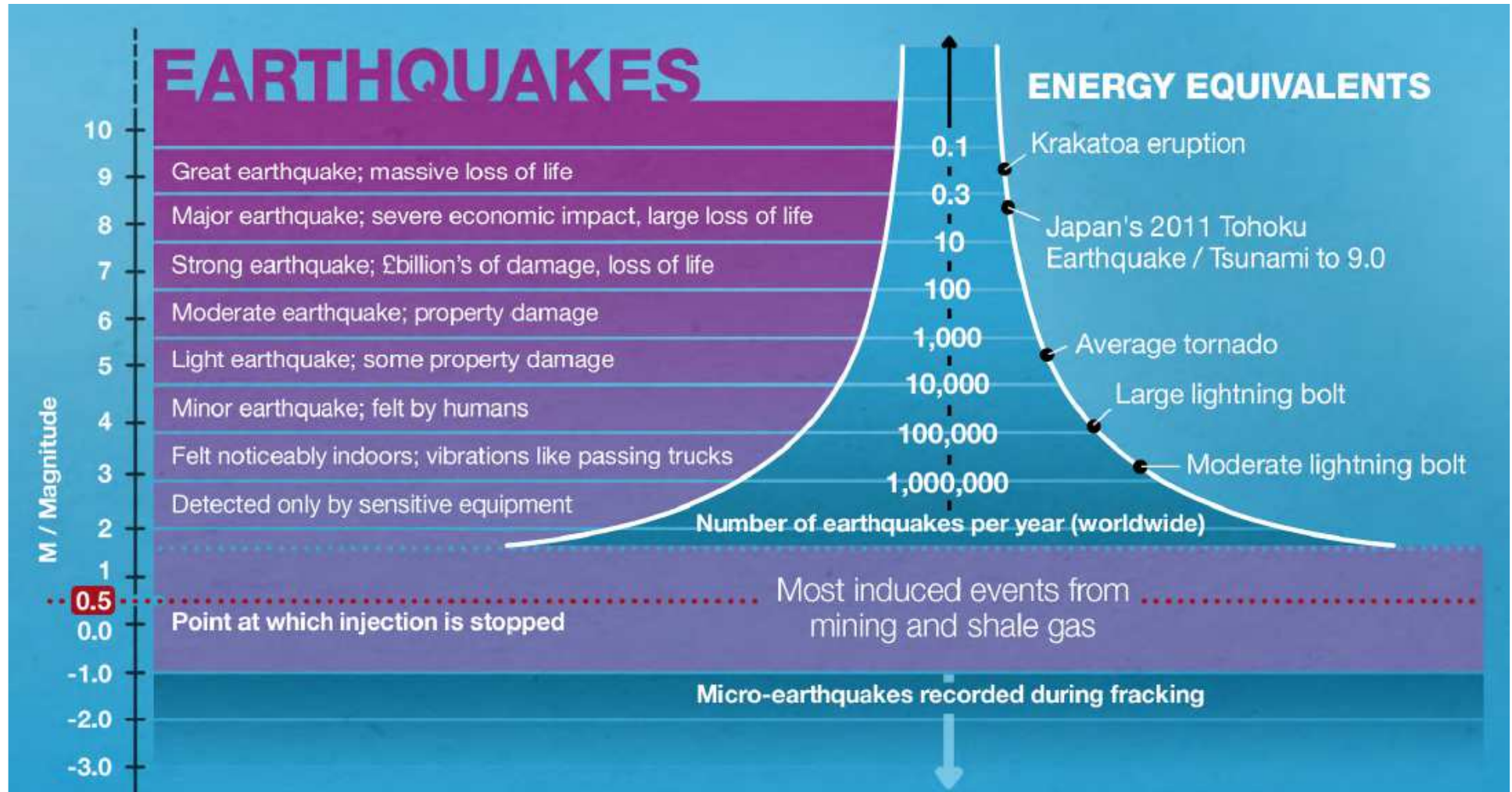
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Frac-induced seismicity and the Hydraulic Fracture Plan (HFP)



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Richter Earthquake Magnitude



log scale – a whole number increase represents a tenfold increase in measured amplitude

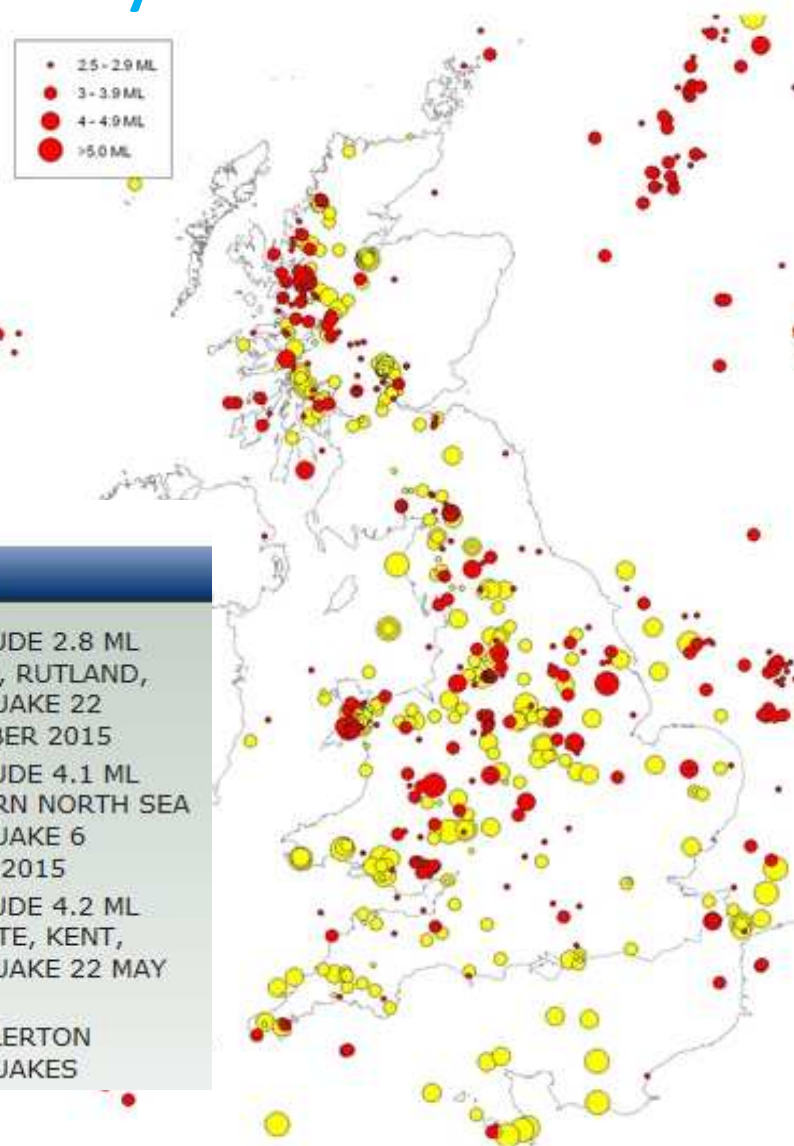


Historical seismicity in Britain

Date	Depth	Mag	Region
2008/02/27	17.8	5.2	MARKET RASEN,LINCS
2007/04/28	5.3	4.3	FOLKESTONE,KENT
2002/09/22	14.0	4.7	DUDLEY,W MIDLANDS
2001/10/28	14.4	4.1	MELTON MOWBRAY,LEICS
2000/09/23	14.4	4.2	WARWICK,WARWICKSHIRE
1999/03/04	19.0	4.0	ARRAN,STRATHCLYDE
1994/02/15	7.3	4.0	NORWICH,NORFOLK
1990/04/02	14.1	5.1	BISHOP'S CASTLE,SHROPS
1986/09/29	23.3	4.1	OBAN,STRATHCLYDE
1984/08/18	21.0	4.3	LLEYN PENIN,NW WALES
1984/07/29	21.2	4.0	LLEYN PENIN,NW WALES
1984/07/19	20.7	5.4	LLEYN PENIN,NW WALES
1979/12/26	4.5	4.7	LONGTOWN,CUMBRIA
1976/11/03	2	4.5	WIDNES
1975/11/27	11	4.1	KINTAIL
1974/08/10	22	4.4	KINTAIL

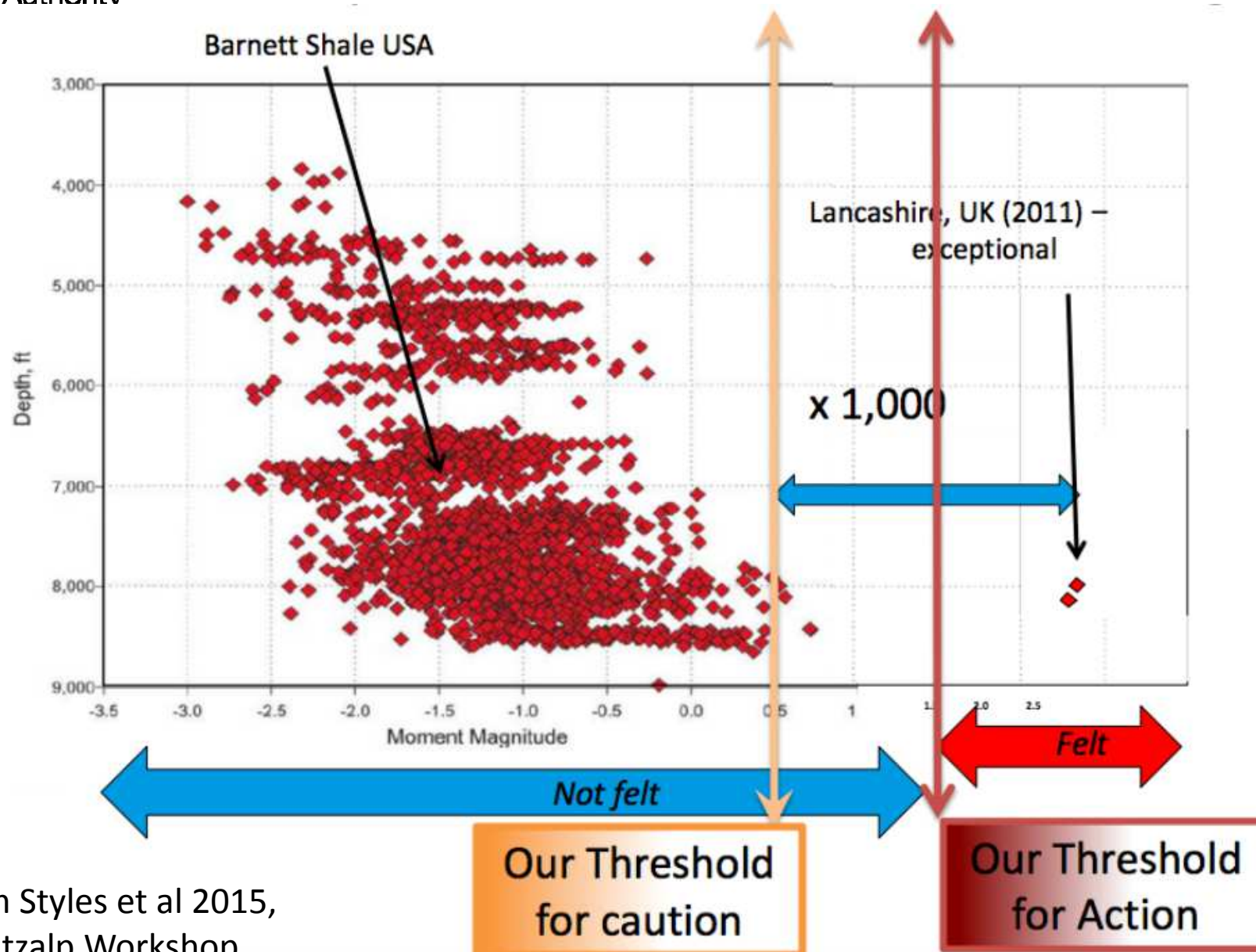
Latest News

- MAGNITUDE 2.8 ML OAKHAM, RUTLAND, EARTHQUAKE 22 SEPTEMBER 2015
- MAGNITUDE 4.1 ML SOUTHERN NORTH SEA EARTHQUAKE 6 AUGUST 2015
- MAGNITUDE 4.2 ML RAMSGATE, KENT, EARTHQUAKE 22 MAY 2015
- NEW OLLERTON EARTHQUAKES





Frac-induced seismicity

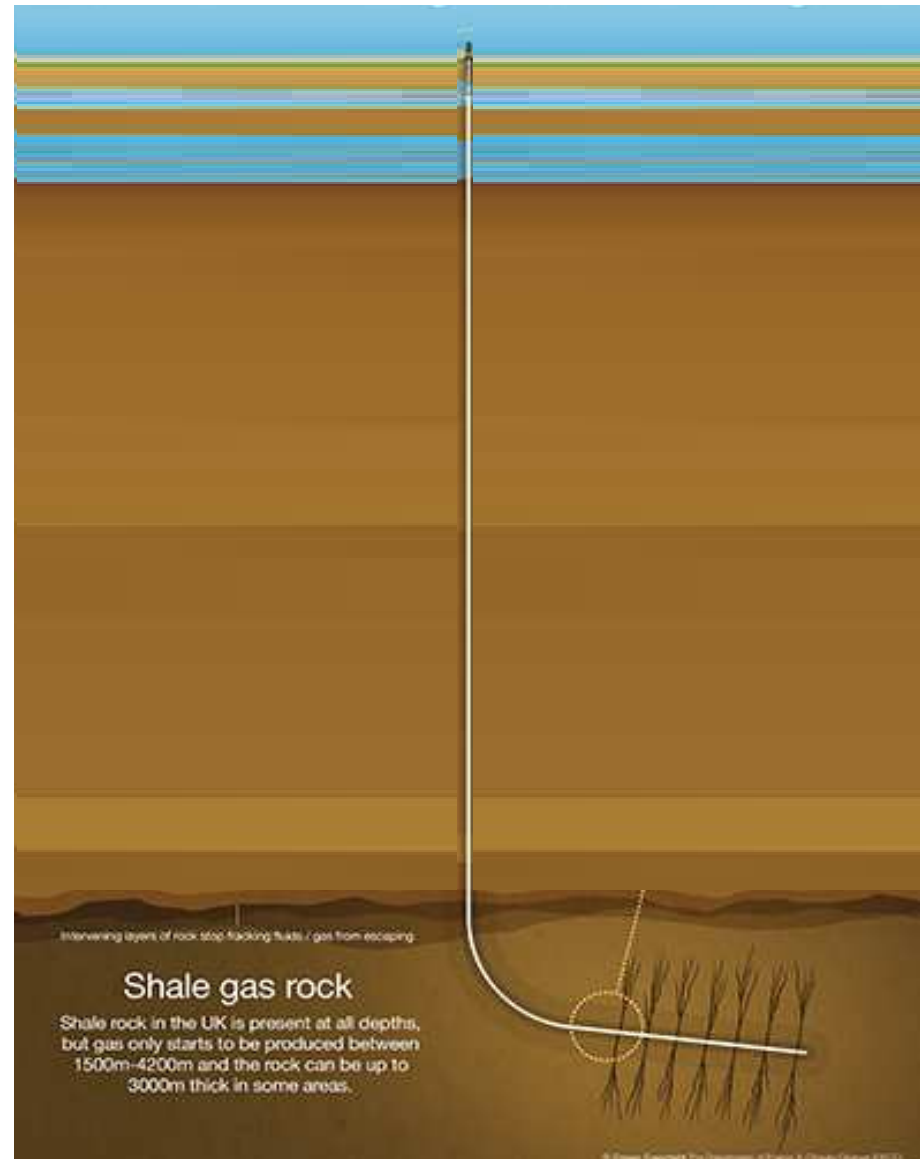


From Styles et al 2015,
Schatzalp Workshop



Hydraulic Fracture Plan

- 1) A depth structure map showing **mapped faults** near the well and along the well path, with a summary assessment of faulting and formation stresses in the area and the risk that operations could reactivate existing faults.
- 2) Information on the local background seismicity and assessment of the risk of induced seismicity.
- 3) Summary of the **planned operation**, including perforation stages, pumping pressures and volumes and predicted extent at each stage.

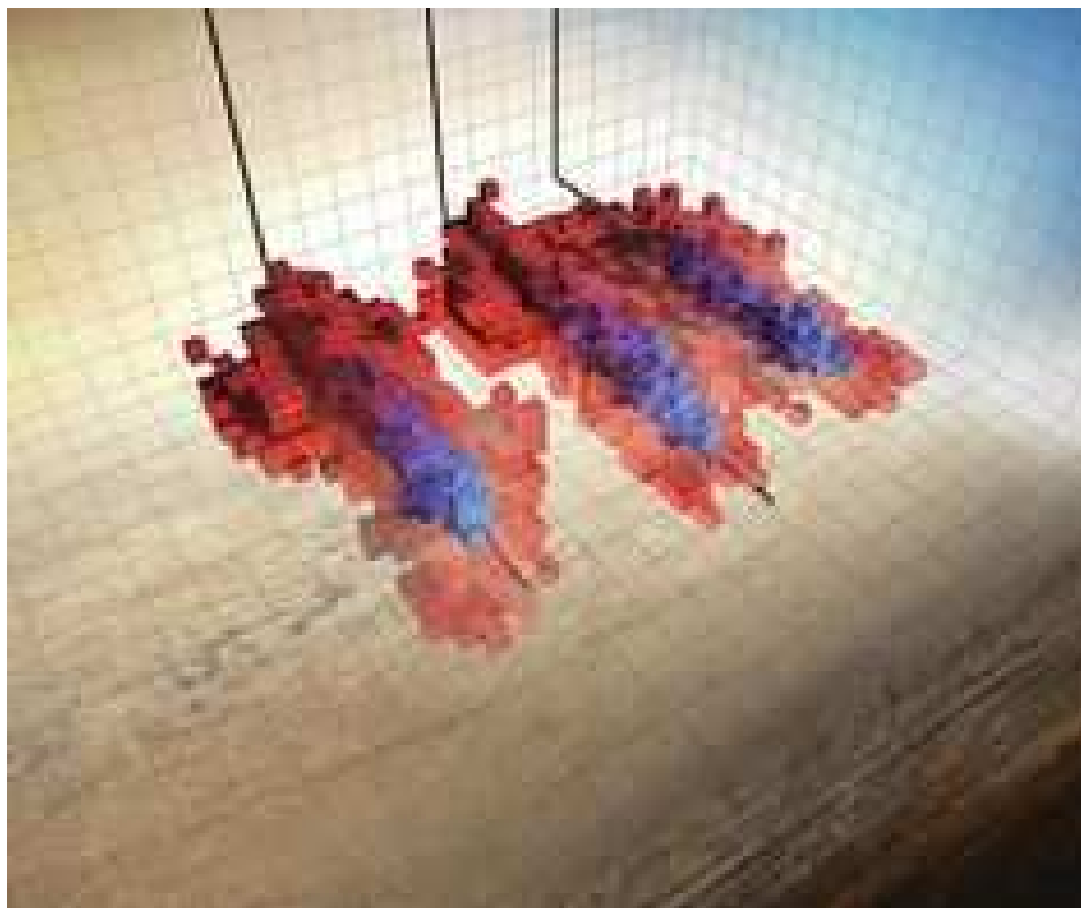


Not to scale



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Stimulated Rock Volume

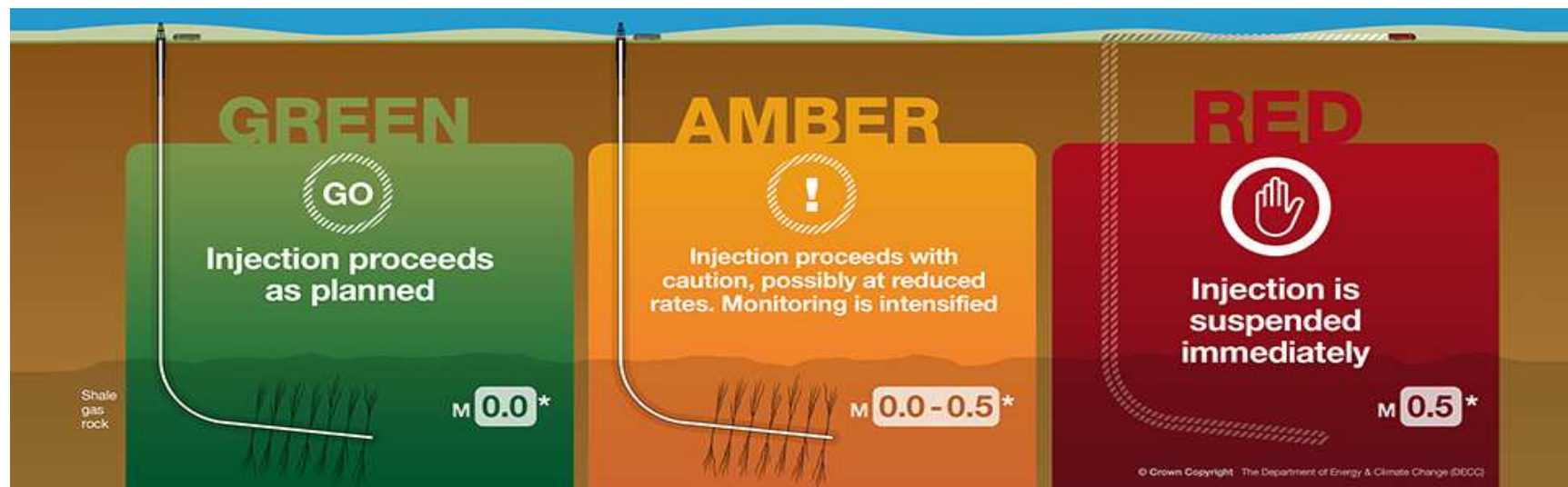


4) Proposed method for monitoring fracture height to **identify where the fractures are** within the target formation and ensure that they are not near the EA permitted boundary



Hydraulic Fracture Plan

5) A description of proposed **real-time traffic light scheme** for seismicity



- Long history of onshore oil and gas
- OGA role
- PEDL award only grants exclusivity no consent
- Hydraulic Fracture Plan
- Reduce risk of induced seismic events using Traffic Light System



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Thanks!