UKOOG United Kingdom Onshore Oil and Gas

The UK voice for onshore oil and gas exploration

Operational Perspective: Managing Environmental Risks Associated with Unconventional Oil and Gas Exploration and Production

Examining the Environmental & Hydrogeological Impacts of Shale Gas Exploration & Production

THURSDAY 29th January 2015

Steve Thompsett
UKOOG – Executive Director

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Agenda

1. About UKOOG
   - Onshore Oil and Gas - A very brief history!
   - Driving Industry Best Practice
2. Operating in sensitive areas & managing the environment
3. Establishing Transparency
   a. Environmental Baselines
   b. Well Integrity – A Key Issue!
   c. Integrated Water Management
   d. Challenges and Benefits

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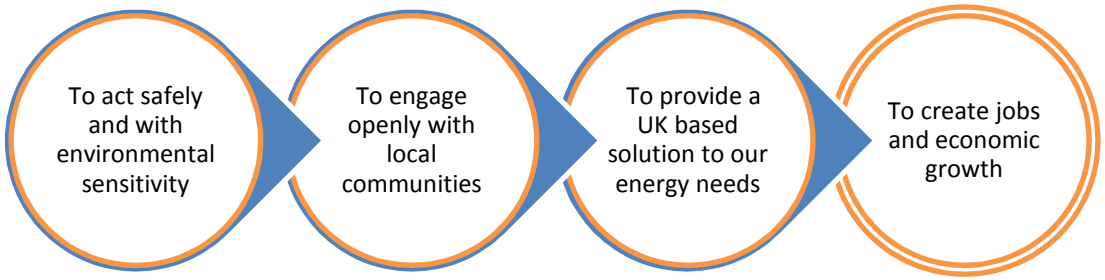
About UKOOG

- Enhance the profile of the whole onshore industry (both conventional and unconventional);
- Promote better and more open dialogue with key stakeholders;
- Deliver industry-wide initiatives and programmes;
- Ensure the highest possible standards in safety, environmental management and operations.



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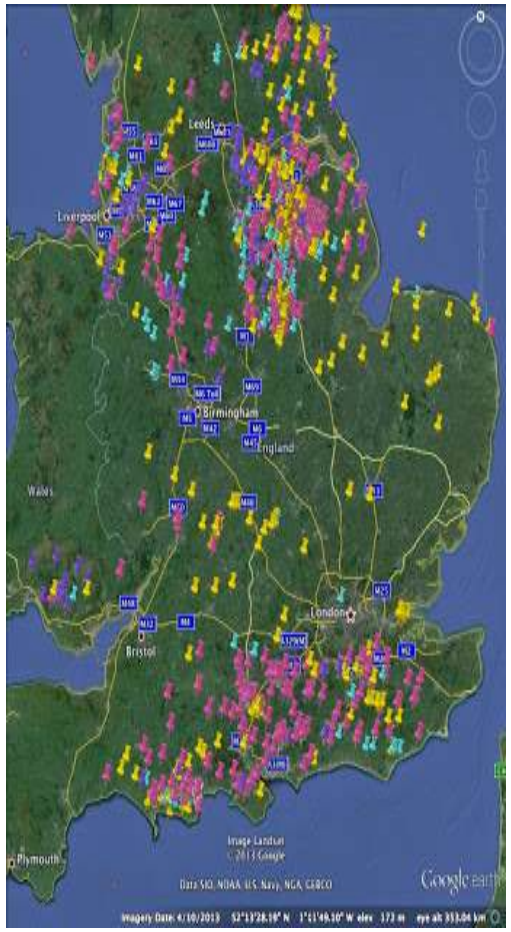
UK Onshore – building on history



- Long history
- >2100 wells drilled
- Largest onshore oilfield in Western Europe
- c120 sites in c30 fields
- Current oil & gas prod- c25,000
  (barrels of oil equivalent per day)
- BGS - Shales
  - Bowland estimates gas in place of 1,300 tcf
  - Weald oil in place of 4.4 billion barrels
  - Central Belt of Scotland estimates: gas in place of 80 tcf & oil in place 6 billion barrels

50-year-old fracking site that makes a mockery of the Balcombe zealots: It's next to a nature reserve - and has fracked enough gas and oil to power 21,000 homes every day... with no complaints from locals

- There has been fracking near Beckingham Marshes since 1963
- The site employs 35 people and pumps 300 barrels of oil a day
- Locals say there have been no environmental problems from the site

By ADAM LUSHER and WAYNE FRANCIS

PUBLISHED: 22:05, 15 August 2013 | UPDATED: 22:05, 15 August 2013

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The beautiful expanse of grassland on the RSPB's Beckingham Marshes reserve is exactly the kind of environment antifracking protesters are so determined to protect.

During their 'Solidarity Sunday' today in the West Sussex village of Balcombe, thousands of eco-warriors will tell the world that fracking – the process of pumping water into underground wells to 'fracture' the rock and force out oil and gas – should be banned to avoid 'industrialising' the countryside.

In fact there has been fracking here in Nottinghamshire since 1963, the last time in 1989. One well has been fracked four times.

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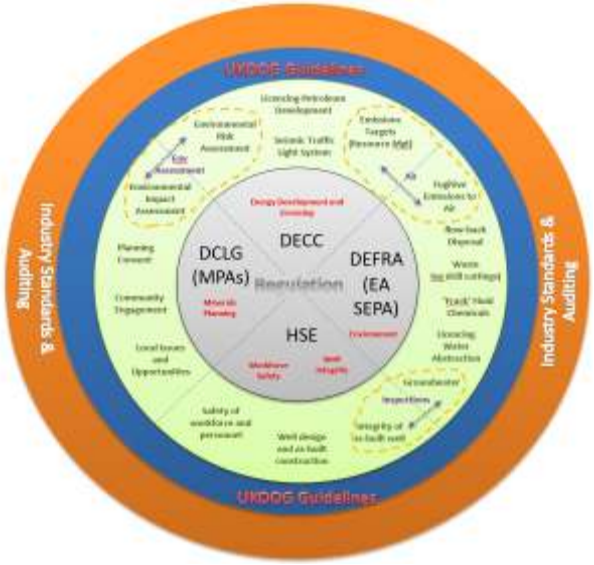
UKOOG – Environment – Driving Best Practice



Environment *(Example)*

- Adherence to 17 EU Directives through 8/9 permits
- All sites involving hydraulic fracturing
  - Early stage environmental risk assessment (ERA)
  - Environmental impact assessment (EIA)
- Public disclosure of Fracture Fluid Composition
- Public disclosure of Flow-back Fluids
- Public disclosure of water sourcing and use/re-use
- Monitoring system before, during and after operations

- UKOOG Well Guidelines 'Jan 13' – driving consistently applied best practice
- Establishment of BAT (Best Available Techniques)
- Environmental Baselines Guidelines - Commitment to Disclosure and Transparency
- Setting industry standards

Operating in sensitive areas? – Good Experience

The onshore industry has a long established track record of developing oil and gas fields in sensitive areas, examples include:

- Site located in the South Downs National Park
- In the middle of a golf course
- In the middle of housing developments
- Adjacent to a local school
- Europe's largest onshore field- Wytch Farm- is located in and around the highly sensitive Poole Harbour area
- Pad drilling will help reduce the environmental impact

Referring to the "industrialisation of the north!" …

"A two-hectare site could potentially support a 10-well pad and a production phase of 100 such pads would require just 200 hectares, or two square kilometres"
(**Source: IOD Report April 2013**)

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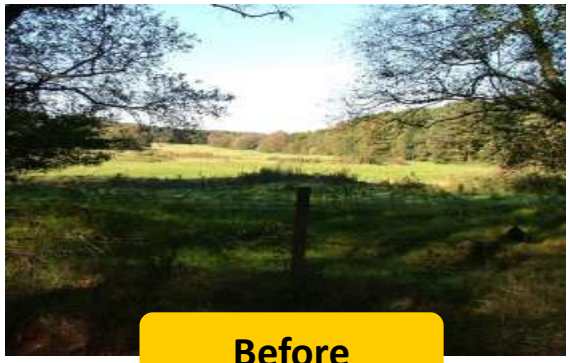
Managing the environment



Before

During

After

- A critical element in any operation is returning the environment to its original contours and biodiversity
- Operating with minimal impact – regulatory regimes in place are significantly robust to ensure risks are mitigated
- A measured approach to site development – minimising land-take and disturbance
- No ‘one size fits all’ methodology

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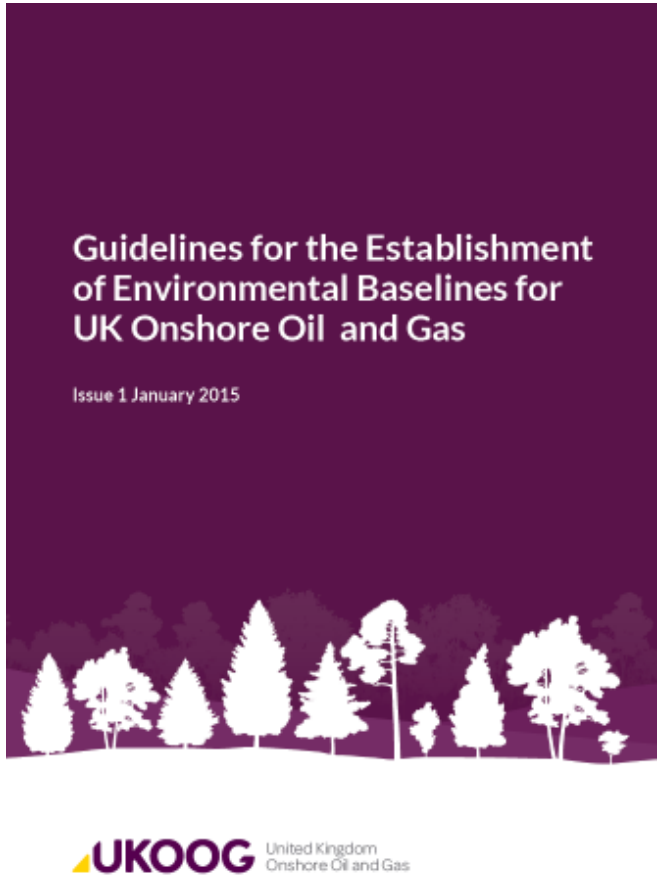
Establishing Transparency

Establishing Environmental Baselines
A number of Drivers!

- Building the Social Licence to Operate
- Supporting Permitting & Consenting
- Laying Foundations - Culture of Transparency and Disclosure
- Facilitating the Reinstatement of sites
- Managing Politics!
- Addressing Future Challenges

UKOOG – Baselines Guidelines



Context

- Risk Based – Science led
- Conceptual Site Model
- Source – Pathway - Receptor
- Draws on Best Practice from other sectors
- Avoid a 'blanket approaches'
- Covers all Onshore Oil and Gas
- Covers Exploration and Production
- Aimed for 12 pages – got 25!

Receptors

In Scope –

- Soil, Air, Groundwater, Surface water, Ground Gases, NORM and Ecology

Outside Scope –

- Nuisance (Dust, Noise etc)

Baseline Guidance - Published on 7th January 2015 | **Decommissioning 'Technical Assessment' current underway**

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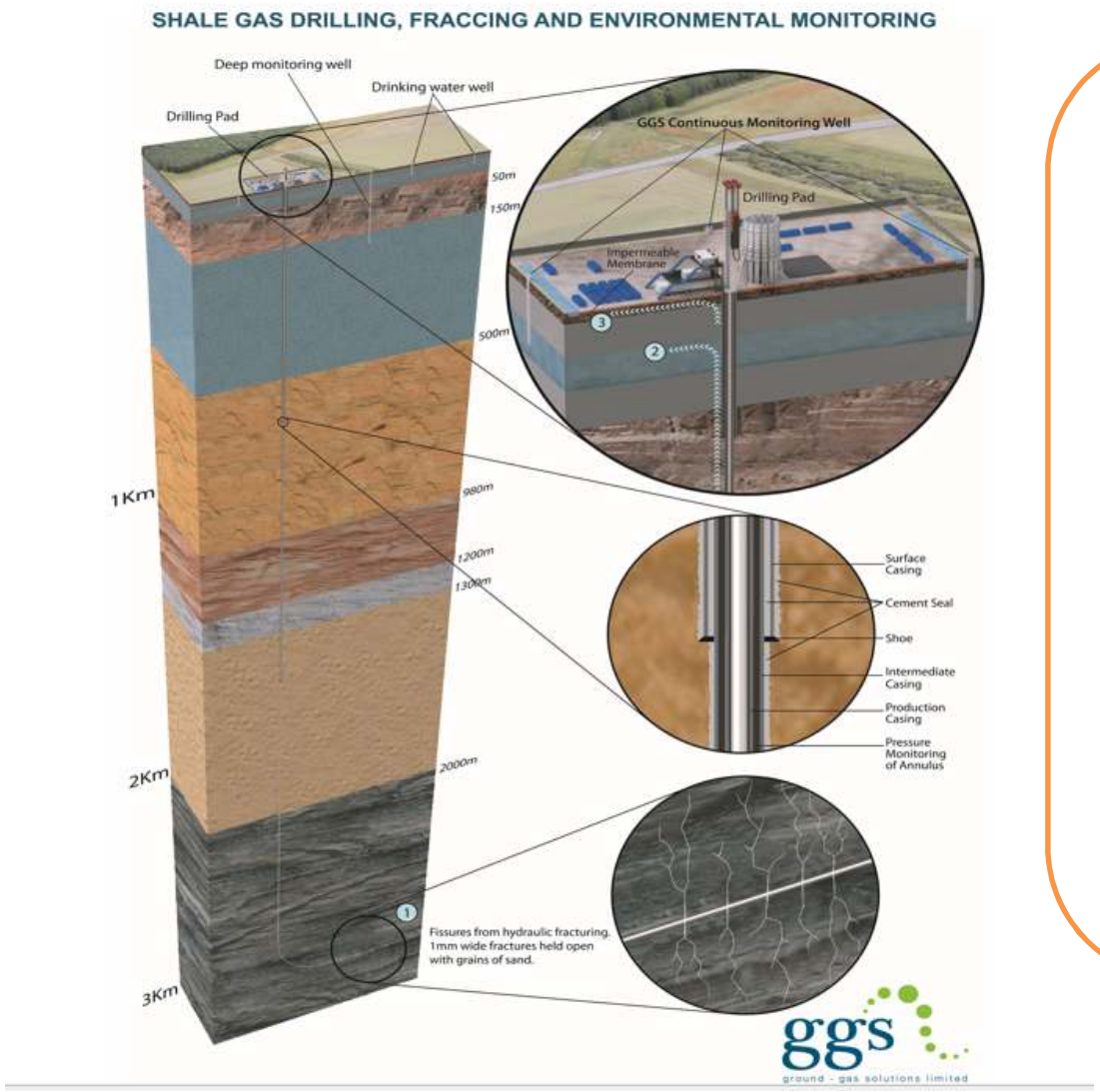
Well Integrity is Key in Protecting the Environment



Key elements:

- Good well design
- Effective cementing (CBL)
- Pressure testing
- Good Operational Management and Maintenance
- Making data available to 3rd parties
- Inspection at key stages – proportionate to risk

- Must recognise that well integrity consists of a number of elements
- How much transparency is needed?

Where water fits in!

Onshore O&G – Demand/Supply Chain

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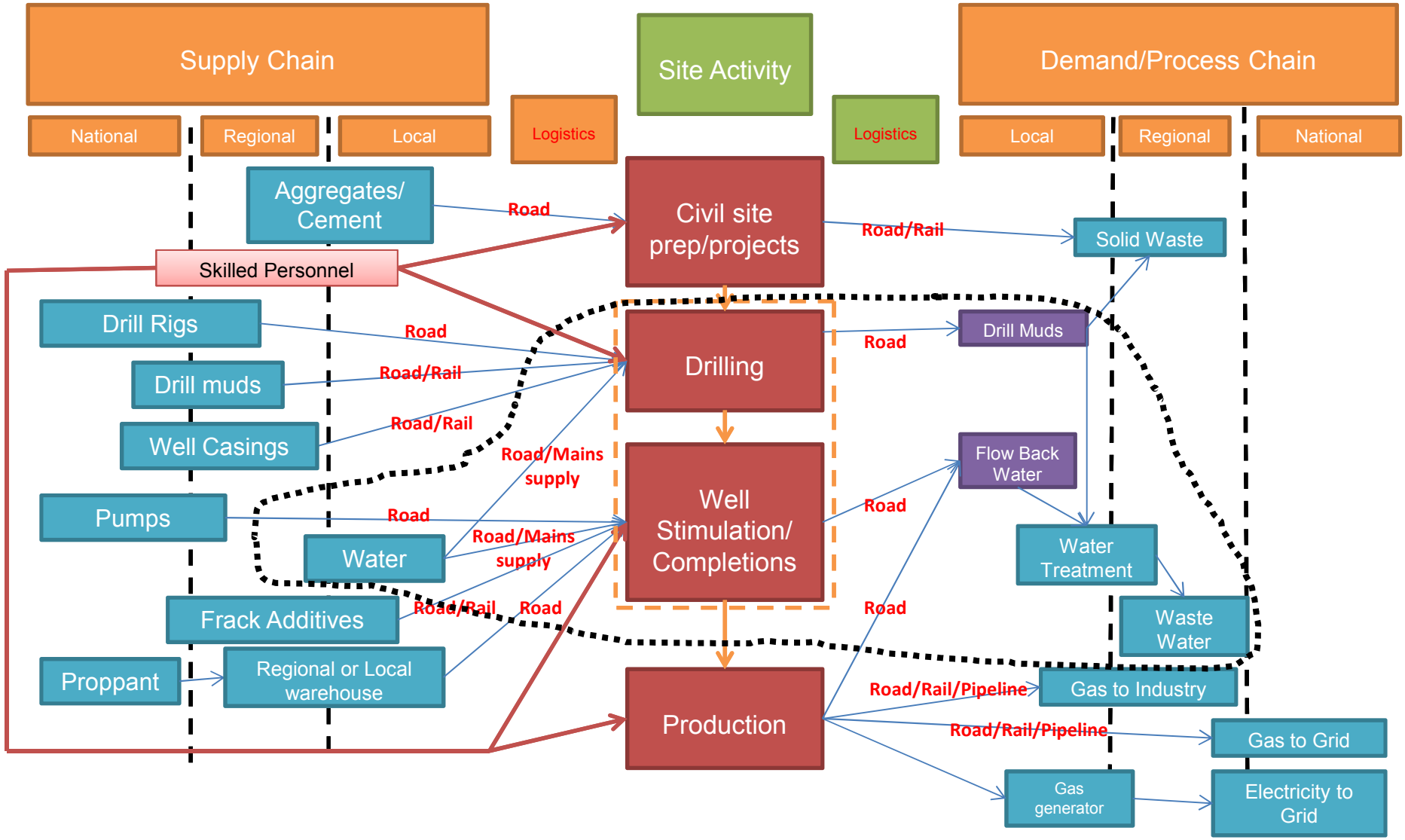
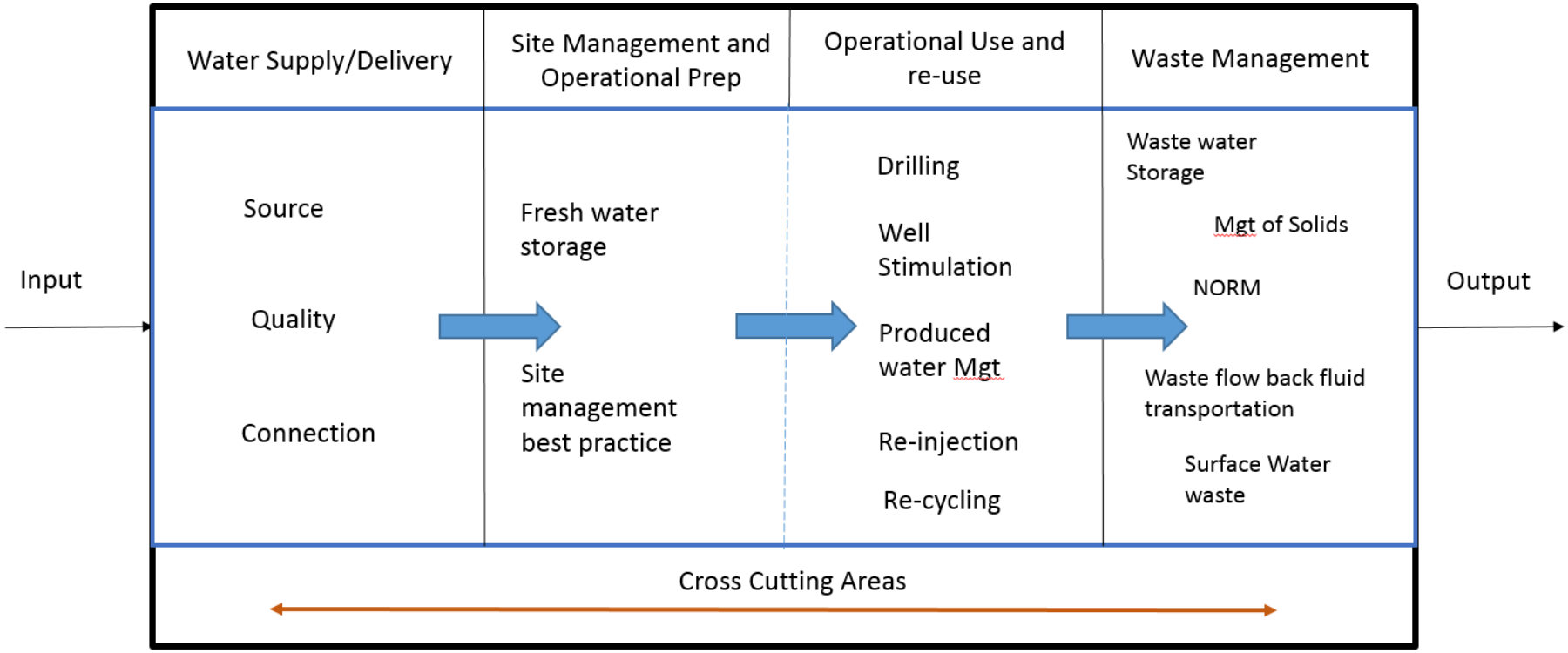


Integrated Water Management – Inputs & Outputs



- Analysis Suites - Monitoring
- Best Available Techniques – All areas
- Drawing on International Experiences
- Innovation – eg Waste water as a resource for the industry

What is the Industry Doing?

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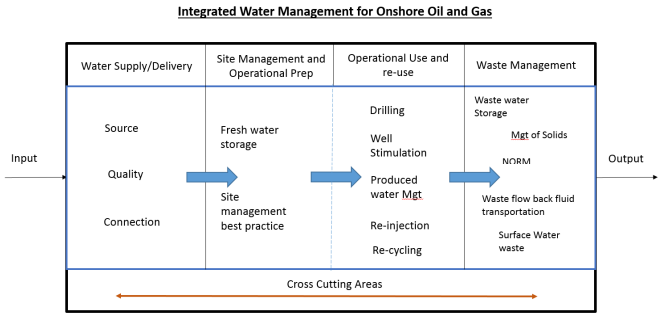
Environment and Process Safety Working Group initiative

Current Position

- Discussion Paper circulated – Autumn 14
- Initial meeting hosted – early December 14
- Terms of Reference established
- Sub-groups to be identified and 6 month plan formulated

Governance

- UKOOG led Steering Board: 3 times a year
  - O&G Operators
  - Academics
  - O&G Supply Chain
  - Water and O&G 'Technical' Experts
  - Water Industry



Priorities

- Cross-cutting quick wins – eg analysis suites, BAT for Monitoring …
- 'Sectoral' groups to be established – networks/leadership
  - 1. Supply; 2. Site Mgt; 3. Operational Use and Re-use; 4. Waste Management
- Task and Finish activities by 'sectoral' area

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Challenges and Benefits

- **Transparency is Critical in Establishing the Social Licence**
  - Environment Data - Baselines through to Permit Relinquishment
  - Data on Well Design and Management
  - Management of Water as a Resource
- **We must determine just how much Information should be publically available? (Interpretation of data is a major challenge)**
- **A 'One Stop Shop' or a 'Shop Window' approach!**
- **Bringing 'Independent Monitoring' into the debate**
  - Lancashire Monitoring - BGS
- Enhanced research programme - groundwater, regional air quality, seismicity and ground movements will be independently monitored at two proposed hydraulic fracturing sites in Lancashire. This will be carried out by a UK consortium led by the BGS with university partners (Birmingham, Bristol, Liverpool, Loughborough and Manchester).