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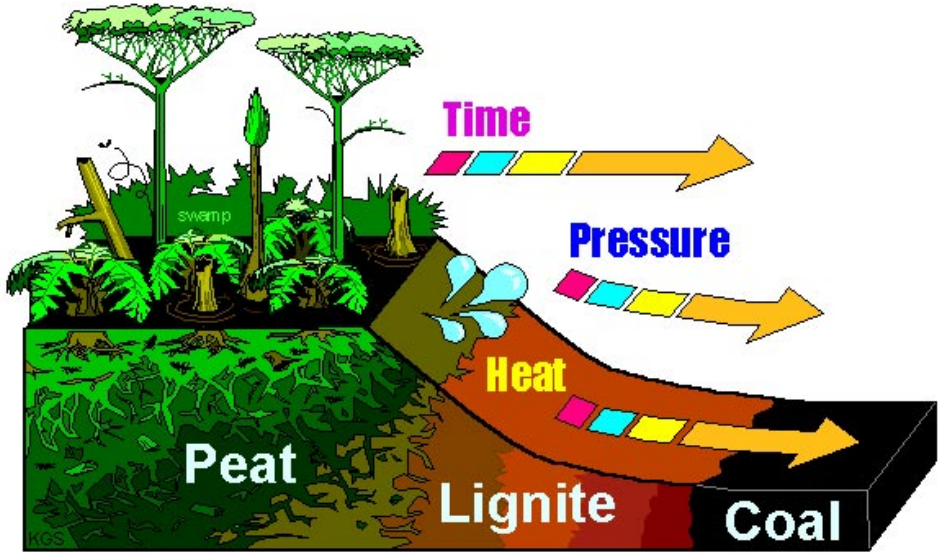
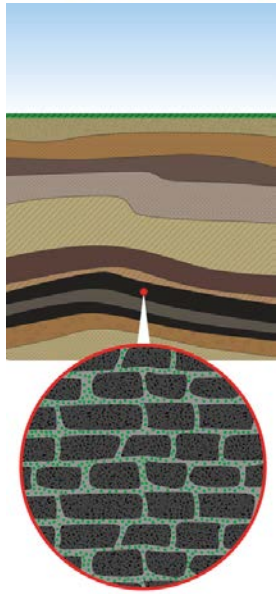
Community Information Evening Narrabri

January 22 2013

What is coal seam gas?

- Coal seam gas is natural gas formed by the same processes that produce coal
- Over millions of years, plant matter becomes peat and eventually is buried and hardens to become coal
- Gas and water are also formed during this process as the coal is buried and heated
- The gas is held onto the surfaces of the coal by pressure
- When the water is pumped out, the pressure decreases and the gas flows
- The coal seams targeted for CSG in the Narrabri area are generally located 600-1000m below the surface





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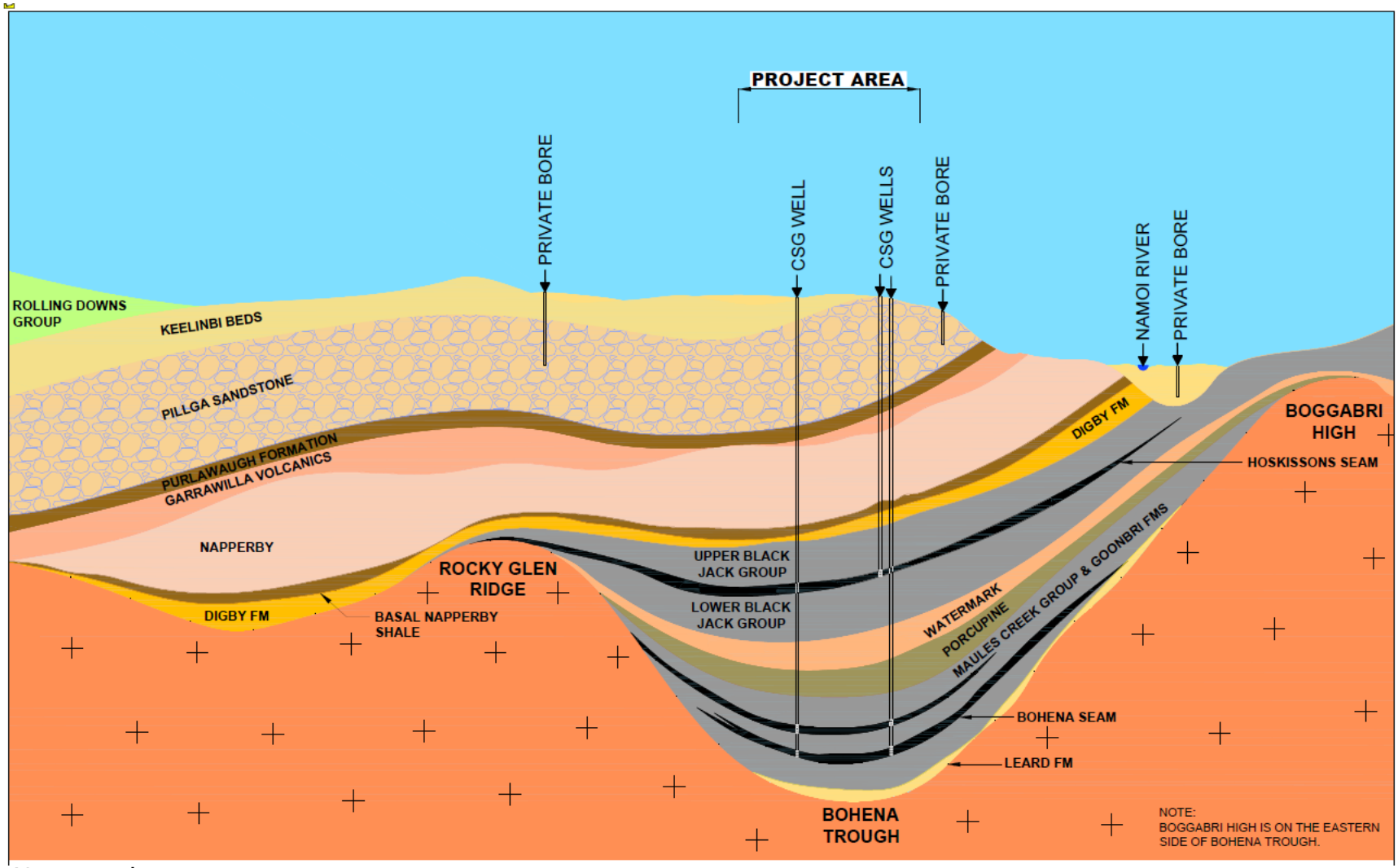
Where is it found – Narrabri area



Not to scale

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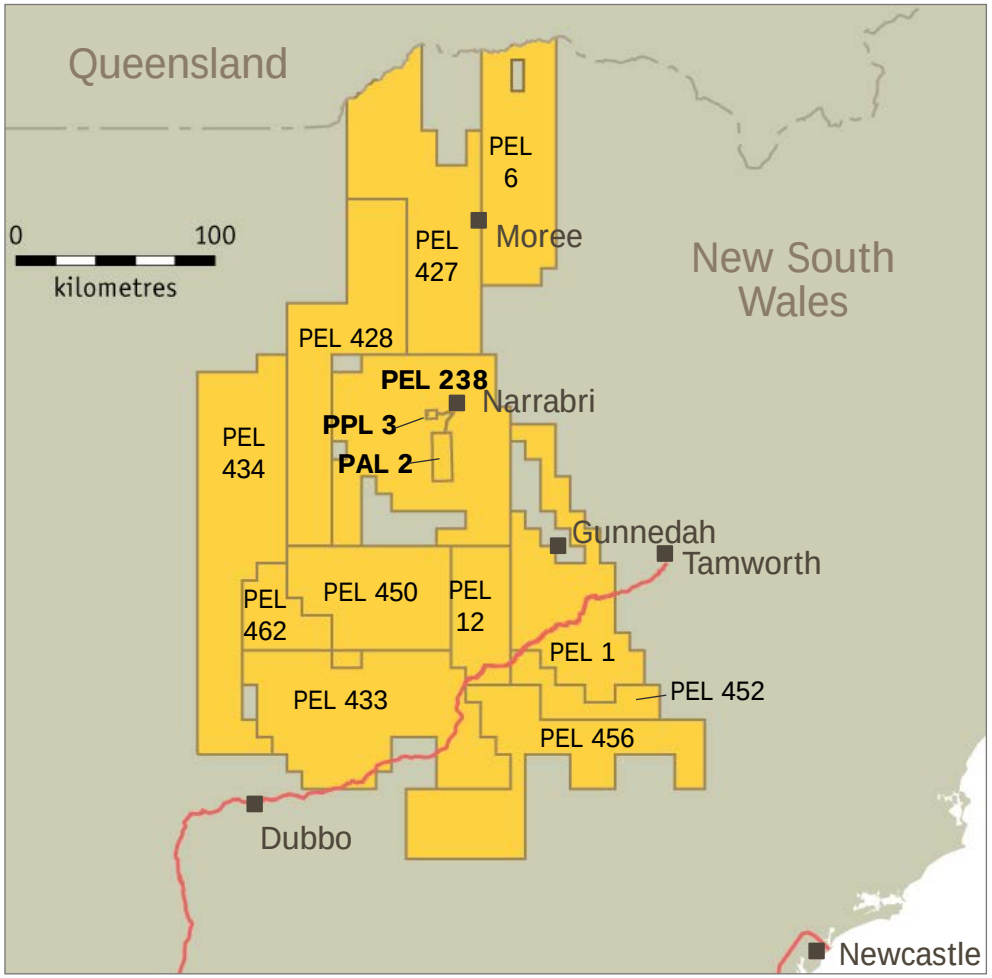
Upcoming Exploration

Six month work program - Narrabri area

Jan 2013	PAL 2 PEL 238	1 workover 1 well decommissioned
Feb 2013	PAL 2 PAL 2 PEL 1	1 workover 2 decommissions 1 workover
Mar 2013	PEL 238	1 corehole 3 decommissions 1 workover
Apr 2013	PEL 238	1 corehole 2 decommissions 2 workovers
May 2013	PEL 238 PEL 238 PPL 3	2 coreholes 2 decommissions 3 decommissions
Jun 2013	PEL 238 PPL 3	1 workover 4 decommissions

As at January 20th 2013



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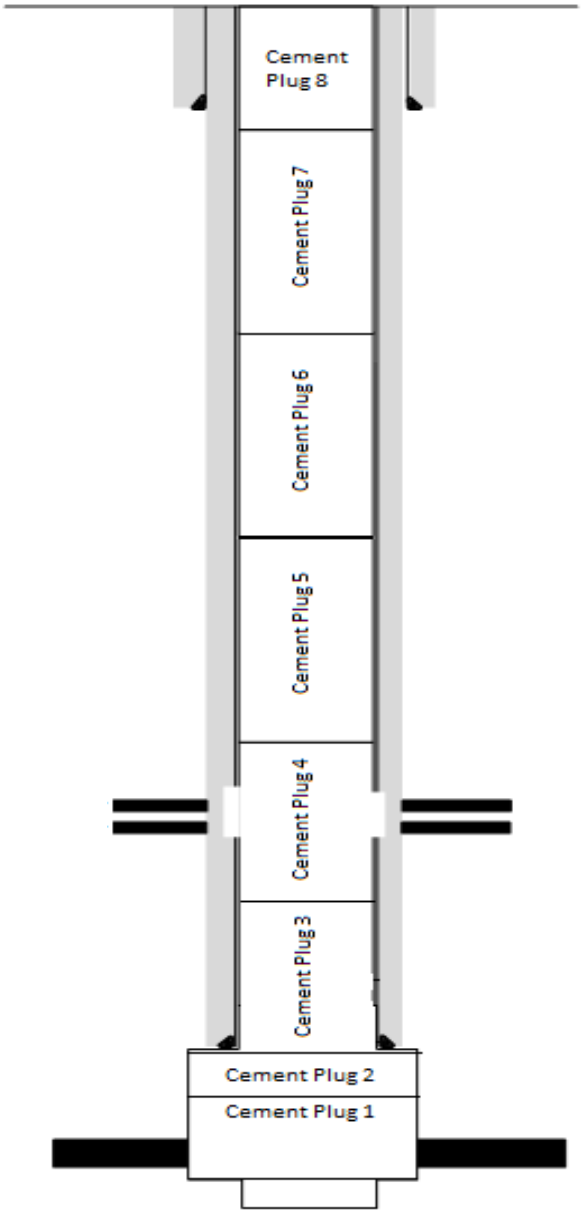
Proposed upcoming work program

- Decommissioning of wells (PA or plug and abandonment) – Bibblewindi 1 and 2 and workover of Bibblewindi 12 and 13
- Exploration in the Narrabri area restarting:
  - Seismic surveys - in the Pilliga area
  - Core hole drilling - Bibblewindi 30, Dewhurst 8A
  - Pilot wells – Dewhurst 22,23,24,25,26,27,28,29
  - Kiandool – Two aquifer monitoring bores, plus a core hole
  - Managed Aquifer Recharge surveying along the Bohena Creek
  - Surveying and review of flowlines in and around the Pilliga and also the Bibblewindi to Wilga Park flowline.

The process of decommissioning (PA)



- An abandonment includes filling the entire wellbore from bottom to surface with cement in cement 'plug' stages
- All hole 'plugs' are left to set and tagged to confirm placement before the next one is pumped
- Once a cement 'plug' top is inside casing, it is left to set and tagged to confirm placement and pressure tested to confirm isolation
- Cement 'plugs' are then pumped one by one to surface
- The process of filling the well from bottom to surface is a requirement set by the NSW regulators and is more stringent then Australian offshore standards

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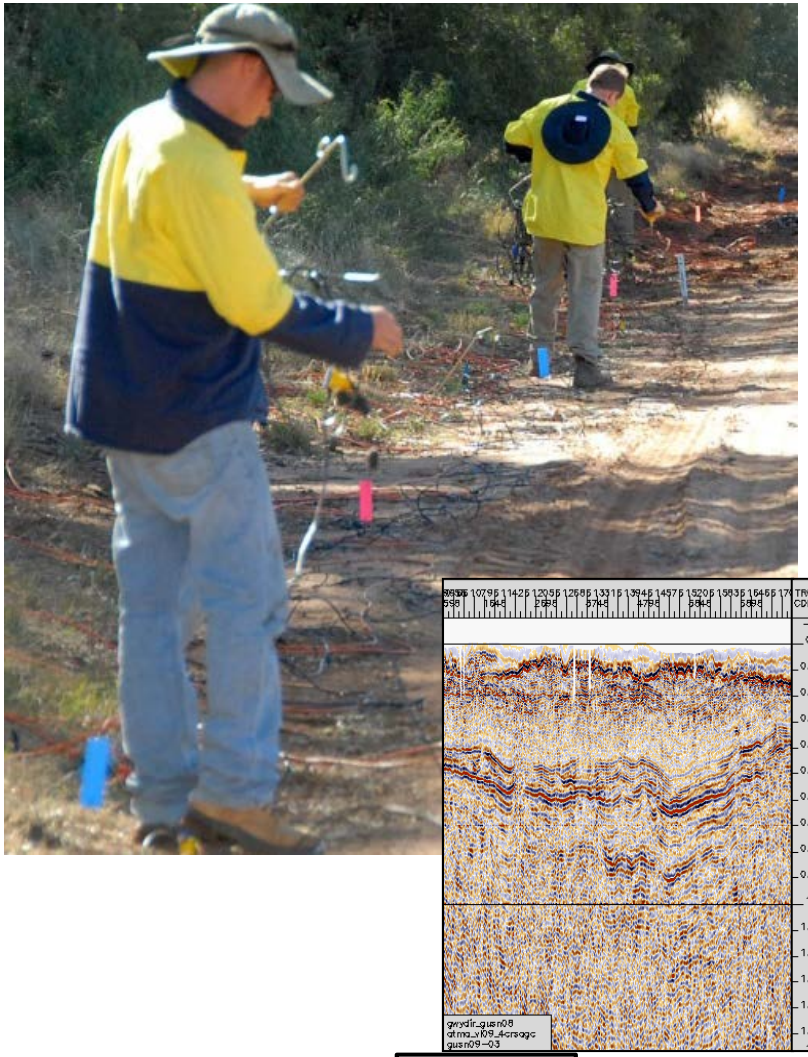
Seismic surveys

- To be carried out in and around the Pilliga
- Specially equipped seismic vehicles drive through an area
- Soundwave equipment records and images the geological formations below the surface
- Where possible the surveys are conducted along roads or fence lines
- Disturbance is minimal
- Landholders need to agree to access before a survey could be carried out on their land
- Results are interpreted by geophysicists



Seismic data

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Seismic surveys

A seismic survey underway

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Core holes

- Core holes are drilled to investigate:
  - the depth of the coal seams
  - gas content
  - gas composition
  - how easily gas will flow
- Drilling takes between two and six weeks
- No water or gas is produced
- The core hole is then sealed with cement
- Core hole site rehabilitated

Rehabilitated core hole site

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Core holes

- A steel pipe (surface conductor) is inserted into the shallow sediments
- It is cemented into place
- Another steel pipe (surface casing) is then run inside the first pipe, through the shallow aquifers
- It is cemented in place to protect the aquifers
- A core sample is extracted
- The sample is only about 6 cm in diameter but hundreds of metres in length
- The core hole is then sealed with cement and the site rehabilitated

Cross section of surface conductor and surface casing cemented in place

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Pilot or appraisal wells

- Pilot wells are drilled to:
  - Measure flow rates of gas and water
  - Analyse the composition of gas and water
  - Test the commercial viability of producing gas
- Shallow aquifer monitoring bores (SAMBs) can be put in place to monitor groundwater before any pumping from coal seams begins
- Drilling a pilot well takes a couple of weeks, then the rig leaves the site. A pilot can consist of one single well or up to 6 or more wells
- Surface facilities are constructed and underground flow lines for gas and water are put in place
- A pilot well typically operates for three to eighteen months

Pilot or appraisal wells

Bibblewindi West 25 pilot well near Narrabri

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Pilot or appraisal wells

Pilot well at Kahlua near Gunnedah

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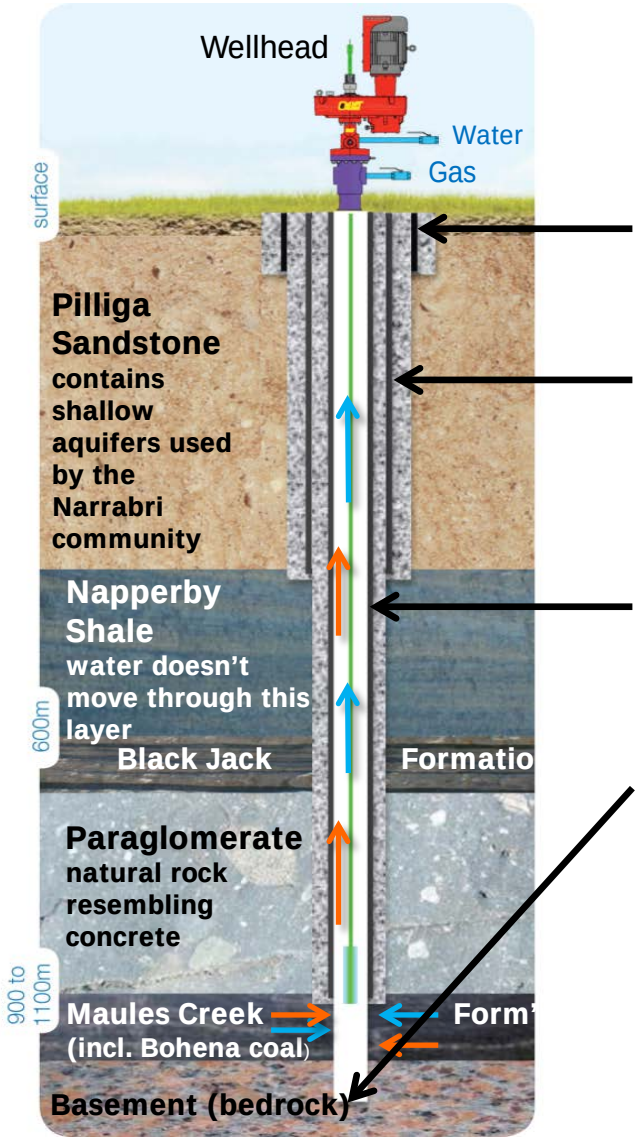
How we extract the gas



Wellbore design, construction and operations are heavily regulated in Australia

- A steel pipe (surface conductor) is inserted into the surface layers and cemented in place to give stability
- A second steel pipe (surface casing) is run inside the initial pipe and down through and beyond the aquifers. It is cemented into place to protect the aquifers
- A third steel pipe (production casing) is then run inside the surface casing from the surface down into the coal seam and is cemented in place
- The well is then drilled through the casings and past the coal seam into the rock below the coal seam (basement)
- Water and gas flow from the coal seam into the well
- A pump is inserted into the well to pump water and gas to the surface. It is driven by a motor in the wellhead on the surface

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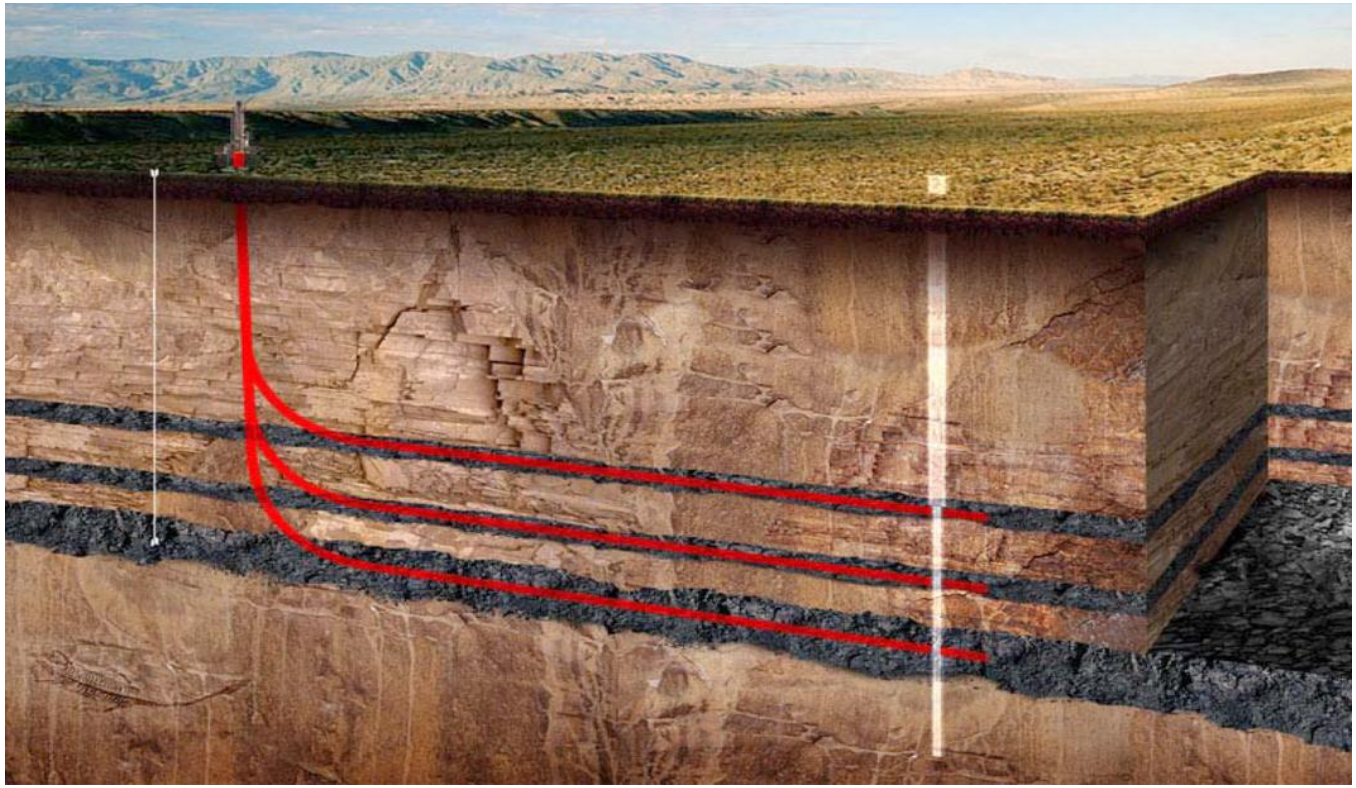
Lateral drilling

- Exploration has shown the natural fractures in the coal in the Narrabri area make it suited to lateral drilling
- Lateral drilling accesses more of the coal seam by drilling horizontally



More than one coal seam targeted from one set of surface facilities

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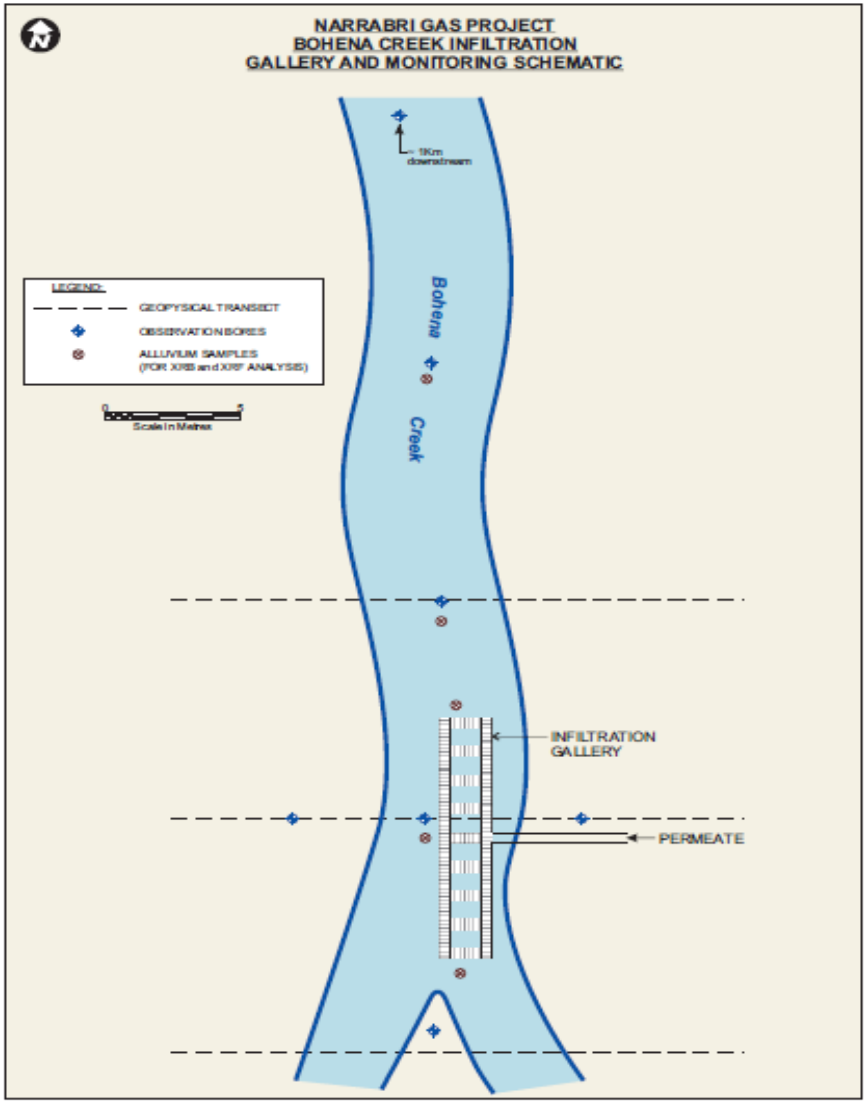
Example MAR scheme



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Comments or questions?

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