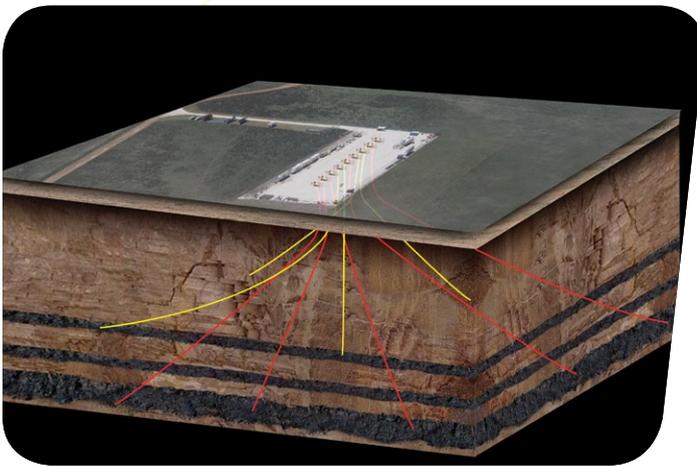


Coexistence on intensively farmed land: deviated drilling and multi-well pads

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Deviated drilling involves drilling multiple, deviated wells from one surface location resulting in a 'multi-well pad'.



What is deviated drilling?

Multiple deviated wells are drilled from one surface location, with up to eight wells on one pad, covering up to 110m x 200m during construction.

To construct a 'deviated well', the surface section is firstly drilled from ground level to a depth of between 50 and 120 metres. This section is cased with steel casing and cemented to the surface. A special angled drill bit is then inserted and is able to be 'steered' away from the other wells on the same pad. The deviated section of the well can reach coal seams to a vertical depth of around 600m and can extend to a horizontal length of up to 800m away from the well pad. This enables us to target all of the coals without impacting the agricultural land directly above.

Arrow is the only company successfully using deviated wells on multi-well pads to reduce its infrastructure footprint.

Multi-well pads to minimise footprint

The benefits of deviated drilling and multi-well pads include a smaller over-all footprint (between 25-50 per cent of a traditional vertical well field design), including:

- up to eight wells located on one pad with a construction size of up to 110 m x 200m, instead of eight separate well pads of 110m x 100m
- greater distance between pads (up to 2.4km)
- less gathering pipelines and access required
- our presence (infrastructure and access by staff) is concentrated within a smaller area
- well pads can be located in paddock corners and less productive areas for a better fit with farming practices.

What is Intensively Farmed Land?

Intensively Farmed Land (IFL) is a term Arrow uses to describe a subset of the Queensland Government's Strategic Cropping Area (SCA) as defined under the Regional Planning Interests Act 2014.

IFL refers to land actively being used for broad acre cropping, using either dry land or irrigated farming practices and having been altered to suit those cropping purposes – for example laser levelled, irrigation channels and existing dams, typically on black soil.



Where can we use multi-well pads?

Arrow has committed to multi-well pads and deviated wells on IFL, where geology allows.

Multi-well pads are preferred where the deepest coals are greater than 450m in depth. This allows the specialised drilling equipment to effectively target these coals.

In shallower coals (less than 450m), vertical wells are used, with surface spacing from between 0.8 to 1.5km (or greater).

Arrow anticipates around 30% of the Surat Gas Project will be deviated wells on multi-well pads.

Well integrity

Arrow adheres to the strict requirements outlined in the code of practice for the construction and abandonment of coal seam gas wells and petroleum wells. In Queensland, this is overseen by the Petroleum and Gas Inspectorate of the Department of Natural Resources, Mines and Energy (DNRME).

The well design and construction of a gas well is critical for ensuring well integrity and is therefore a staged process. It is broken into several parts in recognition of the different formations that are drilled through on the way to the target depth.

The expected life of a well pad from production to abandonment is approximately 20 years. Monitoring and maintenance is required to preserve the condition of the well and its equipment for the entirety of its useful life.

Arrow Energy's Well Integrity Management Systems (AEWIMS) and associated documents for subsurface assets, aim to ensure that wells meet operational availability objectives and well integrity goals for the full life cycle of the well.



We demonstrate coexistence, in collaboration with our landholders, in three ways:

1. pre-development design work to minimise our footprint
2. best practice construction management to minimise our impact during drilling and construction
3. best practice operational management to minimise our impact on farm productivity.

About Arrow Energy

Arrow Energy is an integrated energy company. We explore and develop gas fields, produce and sell coal seam gas (CSG) and generate electricity.

Arrow has been safely and sustainably developing CSG since 2000 and supplying it commercially since 2004.

The company is working to meet demand for cleaner burning fuels through gas supply.

Arrow is owned by Shell and PetroChina (50/50).

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