



## Groundwater modelling, monitoring and mitigation



### Australia Pacific LNG Project

Australia Pacific LNG is the leading coal seam gas (CSG) producer in the Queensland natural gas industry. The joint venture between Origin, ConocoPhillips and Sinopec is currently undertaking a major CSG to liquefied natural gas (LNG) project that will supply natural gas to both the domestic and international markets. The Australia Pacific LNG Project involves developing CSG fields in the Surat and Bowen Basins, construction of a 520 km pipeline and a new LNG facility on Curtis Island, off shore from Gladstone.

CSG is a cleaner and greener alternative to many currently used fossil fuels, such as coal and petroleum. Power stations fired by CSG emit around half the greenhouse gases of coal-fired electricity generation and use only a fraction of the water. CSG is emerging as a preferred transition energy source as the world develops its renewable energy capacity. The CSG industry is set to provide Queensland and Australia with huge economic benefits.

Coal seam gas production relies on the extraction of water in coal seams to depressurise the coal measures allowing natural gas to be extracted.

Some groups in the community have expressed concern that the depressurisation of the coal seams will lead to impacts on groundwater levels or water quality in Great Artesian Basin (GAB) aquifers that are used for water supply.

All existing research and experience in producing CSG over the past 10 years plus in-depth knowledge of GAB aquifers and computer modelling show that CSG production is likely to have negligible impacts on the most commonly used water supply aquifers. While some minor localised effects may occur, these are manageable and not considered large enough to cause concern.

Australia Pacific LNG is committed to minimising the impacts of CSG production on the environment. An extensive groundwater monitoring program has been designed that will operate throughout the entire duration of production operations. The information collected from ongoing monitoring will be compared with computer modelling to ensure any changes measured are in line with predictions.



commences in their area. This data, combined with historical records, will provide invaluable information to landholders, government and Australia Pacific LNG. It will help to determine any pre-existing conditions, and provide a baseline to compare with future monitoring results.

Australia Pacific LNG has also investigated a number of landholder concerns relating to groundwater level declines or other effects noted in their water bores. A number of these concerns have also been independently investigated by the Queensland Department of Environment and Resource Management, and to date none of these concerns have been found to relate to CSG activities.



Installation of one of Australia Pacific LNG's many new monitoring bores

Australia Pacific LNG will continue to closely monitor groundwater as a matter of course throughout the lifespan of production operations, continuously adapting and improving the monitoring network.

### Collaborative approach to monitoring

Australia Pacific LNG is working with government, landholders and other CSG operators in the region to develop a consistent approach to regional and cumulative effects groundwater monitoring.

Australia Pacific LNG is also working with the government to develop a publicly accessible database which will contain easy to understand groundwater level and quality monitoring data. With this information landholders in the Surat and Bowen Basins will be better informed than ever before about groundwater in their region.

### Committed to 'make good' on any impacts

If CSG-related impacts on groundwater (above government set trigger levels) are predicted or detected, Australia Pacific LNG will



Measuring water levels in a monitoring bore

respond immediately to mitigate these impacts and 'make good' as required by the Water Act.

CSG operators are required to pro-actively 'make good' on impacts predicted by Queensland Water Commission groundwater modelling and monitoring up to three years in advance. This means that 'make good' requirements must be assessed and negotiated with potentially impacted landholders well before any actual impacts are felt.

'Making good' means undertaking activity to counteract or offset any impacts. Australia Pacific LNG will consult with stakeholders to determine the best strategies to 'make good' in the impacted area. Decisions on the appropriate course of action will be made on a case by case basis.



'Make good' arrangements must be made with landholders if negative impacts on bore capacity are predicted



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'Make good' actions could include:

- Increasing the depth of landholder bores,
- Sinking new bores for the impacted landholder,
- Lowering, modifying or replacing pumping equipment,
- Reinjecting water into the aquifer used by the landholder to increase aquifer pressure (re injection trials are currently in progress to determine the feasibility of this option),
- Supplying treated CSG water to supplement landholder supplies, or
- Alternate compensation.

## Adaptive Environmental Management

The Queensland State Government has taken the approach of adaptive environmental management with regard to the CSG to LNG industry. This acknowledges that there are some unknowns with regard to groundwater behaviour and allows for changes to be made to processes to accommodate new understandings. It also allows for best practice environmental management to be implemented as new technology becomes available.

This adaptive framework is being used to ensure environmental values and groundwater resources are protected and managed into the future.

To date industry-wide modelling has been very conservative, and is likely to be over-predicting any drawdown effects. As a result the government has placed very stringent environmental monitoring and management conditions as part of project approvals. These conditions are likely to change as more accurate information becomes available.

The Australia Pacific LNG Project will be developed gradually in stages and there are large areas within the Project's tenements that are not planned to be developed for more than ten years. This will mean that any lessons learned in the initial stages of production will improve the processes for subsequent stages of development.

Early monitoring results will be widely shared, and based on these observations future groundwater monitoring and management actions will be developed collaboratively with the government and the community.

## Summary

- All existing research and experience in producing CSG over the past 10 years, plus in-depth knowledge of GAB aquifers and computer modelling show that CSG production is unlikely to have significant impacts on the most commonly used water supply aquifers. While some minor localised effects may occur, the predicted impacts are clearly manageable and not considered large enough to cause concern.
- Australia Pacific LNG has formulated an extensive groundwater monitoring program that will operate throughout the entire duration of production operations. Modelling is used as a tool to assist in the planning of future groundwater management. Decisions about groundwater management will be guided by modelling, but any action taken will be based on actual monitoring results.
- CSG operators are required to pro-actively 'make good' on impacts predicted by Queensland Water Commission groundwater modelling and monitoring up to three years in advance. This means that 'make good' requirements must be assessed and negotiated with potentially impacted landholders well before any actual impacts are felt.
- The Queensland State Government has taken the approach of adaptive environmental management which allows for best practice management techniques to be implemented as new technology becomes available. This adaptive framework is being used to ensure environmental values and groundwater resources are protected and managed into the future.

## Got a question about Australia Pacific LNG?

For enquiries about the gas fields or pipeline call 1800 526 369 or email [contact@aplng.com.au](mailto:contact@aplng.com.au)

For enquiries about the Gladstone operations and LNG facility call 1300 776 205 or email [aplng.gladstone@conocophillips.com](mailto:aplng.gladstone@conocophillips.com)

Or visit our website at [www.aplng.com.au](http://www.aplng.com.au)