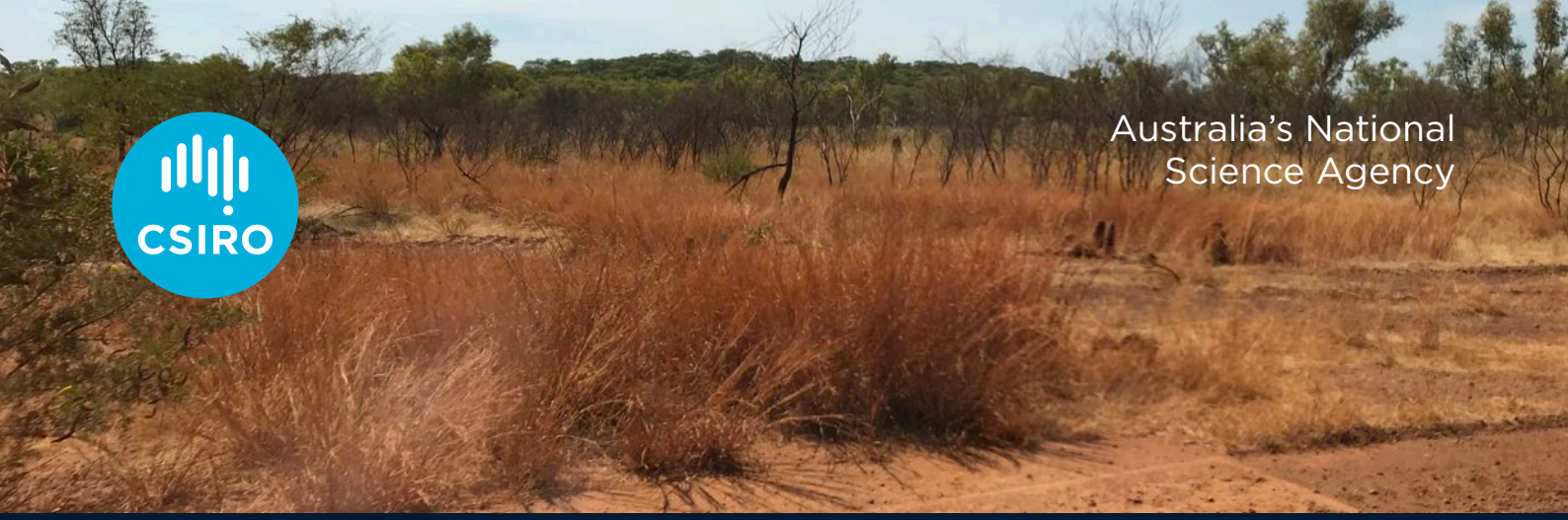

Australia's National Science Agency

SURFACE AND GROUNDWATER

GISERA | Gas Industry Social and Environmental Research Alliance

Improved approaches to long-term monitoring of decommissioned onshore gas wells

This research investigated options for long-term monitoring of well integrity in decommissioned onshore gas wells in the Northern Territory.

Key points

- Onshore gas wells that reach the end of productive life are decommissioned and sealed with cement.
- Decommissioned wells with compromised cement or well casing integrity are potential sources of methane emissions or aquifer contamination.
- Concern over the potential for decommissioned wells to leak (failed well integrity leading to movement of fluids along or into/out of the well) has been raised by community groups and other stakeholders.
- This research project investigated options for long-term monitoring of well integrity in decommissioned onshore gas wells in the Northern Territory, including exploration and production wells.
- Research results identified the most effective monitoring approach currently available for fully decommissioned wells required direct monitoring immediately above the well at the surface using methane gas detection equipment, supported by indirect methane monitoring at the well pad scale.
- Researchers also found that confirming the integrity of wells at the time of decommissioning is the best means of reducing long-term post-decommissioning risk.

The project included assessment of well decommissioning practices and monitoring techniques and technology, in the context of Northern Territory regulatory requirements. Research results help develop long-term well monitoring techniques and approaches that support best practice in onshore gas well decommissioning activities in the Northern Territory.

Effective well decommissioning practices help ensure protection of groundwater and surface waterways.

CSIRO | Australian Government Department of Industry, Science, Energy and Resources | Queensland Government | NSW Government | Supported by Government of South Australia | Northern Territory Government | Australia Pacific LNG | QGC | origin | Santos

Well decommissioning

At the end of their design life, petroleum wells are removed from service and decommissioned.

Decommissioning (also referred to as abandonment) is the point where a well is permanently sealed (plugged) and all surface infrastructure is removed.

The goal of decommissioning the well is to ensure the integrity of the well in perpetuity, effectively re-establishing the natural barriers formed by the impermeable rock layers that were drilled through to reach the resource during the well construction phase.

Concern over the potential for decommissioned wells to leak (failed well integrity leading to movement of fluids along or into/out of the well) has been raised by community groups and other stakeholders.

Risk assessment

A key component of this research was an assessment of well integrity risks post-decommissioning for wells in the Northern Territory.

This qualitative risk assessment allowed the critical parameters that contribute to well integrity risk in decommissioned wells to be determined so that appropriate monitoring approaches can be considered.

Research identified two broad objectives for well integrity monitoring for decommissioned wells:

- monitor the well barrier components to confirm that they are meeting their performance criteria and are not degrading, and
- monitor for the consequences of breaches of well integrity that have led to a release of fluids from the well.

Research results

Research results identified the most effective monitoring approach currently available for fully decommissioned wells is direct monitoring immediately above the well at the surface using methane gas detection equipment, supported by indirect methane monitoring at the well pad scale.

If well barrier integrity issues were to occur, the buoyancy and mobility of methane means this is the most likely hydrocarbon to move to the surface.

The availability of reliable, robust and sensitive methane detectors that can be used in the field should allow leaks that reach the surface to be identified.

In addition, researchers found that confirming the integrity of wells at the time of decommissioning is the best way to reduce long-term post-decommissioning risk.

Researchers also found that emerging technologies have the potential to improve the performance of both decommissioning and remediation techniques.

This research program is part of a suite of GISERA studies being undertaken in the Northern Territory. Evidence-based scientific analysis provided by this research assists the community, government and industry to make informed resource development management decisions.

NT Code of Practice

In line with the Hydraulic Fracturing Inquiry recommendation 5.1 the Northern Territory Government has introduced a new Code of Practice for Onshore Petroleum Activities in the Northern Territory.

In addition to other operational activities, the code sets out requirements for managing well integrity throughout a well's lifecycle, including specific requirements for decommissioning.

A rusted steel sign marks the location of an abandoned well.

More information

Read the final report

Find out more about this project

Learn about other GISERA research in the Northern Territory

Read the Hydraulic Fracturing Inquiry final report and the Code of Practice

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