Australia's National Science Agency

GREENHOUSE GASES AND AIR QUALITY

GISERA | Gas Industry Social and Environmental Research Alliance

Methane contributions from holding ponds

This project will investigate the potential contribution of Queensland's coal seam gas (CSG) holding ponds to methane emissions.

CSG operations involve the production of water from coal seams which is stored in large holding ponds prior to treatment and beneficial re-use. Currently there are gaps in our knowledge about emissions from industrial waterbodies such as holding ponds. It is possible that CSG holding ponds contribute to greenhouse gas emissions.

This could be through direct operations, mobilising dissolved organic and inorganic carbon, microbial activity, and other chemical responses.

Locating and mitigating sources of any unintended releases of methane are important for addressing community concerns around methane emissions from onshore gas production.

Key points

- There is currently little information available on emissions from industrial waterbodies.
- This project is a desktop study that will use existing data to reduce the knowledge gap about methane emissions from CSG holding ponds.
- The work addresses known community concerns about air quality and greenhouse gas emissions.
- The study will be used to inform future data collection and methods for measuring methane emissions.
- New information gained from this report will contribute to improved accuracy in the Australian Government's National Greenhouse Gas Inventory.

Photo: CSG holding pond

This research is being conducted through CSIRO's Gas Industry Social and Environmental Research Alliance (GISERA).

It will provide a thorough evaluation of the potential for Queensland's CSG holding ponds to emit methane, including how that may vary over time, and what controls could be put in place.

As there are limited data on emissions from CSG holding ponds, the project will also seek to evaluate quantified information from natural water bodies such as lakes, ponds and pools.

This desktop study will inform future data collection approaches and preferred methods for accurately quantifying methane emissions from water holding ponds in Queensland.

The Australian context

Much of the research around methane has taken place in the United States, where there is a renewed focus on methane emissions in light of the US Methane Emissions Reduction Action Plan (2021).

Work conducted by CSIRO's GISERA in Queensland and New South Wales has consistently shown that Australian measurements of methane emissions are far lower than equivalent measurements in the US.

This is due in part to Australia's newer infrastructure and more robust environmental regulation at state level.

However, water holding ponds and natural aquatic bodies have not gone through the same thorough investigation that other facilities have been subject to – to date only one methane survey of a CSG holding pond in Queensland has been documented.

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

Addressing community concerns

There are ongoing community concerns about methane emissions from onshore natural gas production.

Surveys conducted by CSIRO's GISERA in Australia over several years have revealed that greenhouse gas emissions and air quality consistently rank highly as issues of concern.

There has also been an intensifying international focus on methane emissions, as the global community comes to terms with the actions required to address climate change and achieve net zero emissions by 2050.

That means it is important to accurately account for, locate and mitigate the sources of any unintended releases of methane.

This project will reduce uncertainty around the potential contributions to emissions from CSG holding ponds and help address any ongoing concerns.

Closing the knowledge gap

Methane emissions processes can be highly variable, uncertain and difficult to measure.

In the case of water holding ponds, there has historically been very little published information – leading to significant gaps in our knowledge and understanding.

This project will improve understanding of the contribution of potential methane emissions from holding ponds – relative to other aspects of CSG activities and also in context of the scale of methane release from natural water bodies.

Focusing on CSG holding ponds and aquatic systems in Queensland, researchers will conduct a detailed desktop study on the methane contributions from holding ponds. This will include:

- Collating and analysing company and publicly available data on methane emissions from CSG holding ponds.
- Reviewing and synthesising current and emerging data on the GHG emissions of natural aquatic systems such as lakes and ponds.
- Identifying appropriate tools and methodologies to quantify emissions.
- Exploring how emissions could potentially be managed or mitigated through additives and treatments.

Informing future research

A major part of this GISERA desktop study is identifying knowledge gaps, and it is likely that on completion of the project there will be a number of potential opportunities for further research to address those gaps.

A key outcome from the study is development of an emissions monitoring strategy for CSG water holding ponds, including sampling protocols and analytical methods.

A second outcome is to design field surveys to obtain information on controls that have the potential to control or reduce emissions over time.

The controls include but are not limited to daily and seasonal operational approaches, water chemistry, residual hydrocarbons, particulate materials and microbiological controls.

More information

Find out more about the project
methane contributions from holding ponds

Read about
GISERA projects in Queensland

RO plant and holding pond

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B&M | 22-00379