



GROUND AND SURFACE WATERS

GISERA | Gas Industry Social and Environmental Research Alliance

Analysis of dust near coal seam gas sites in the Surat Basin, Queensland, to assess potential for respirable crystalline silica

Understanding the potential presence and distribution of respirable crystalline silica from dust samples nearby coal seam gas (CSG) operations in Queensland.

Airborne dust can be generated at all stages of CSG operations. This dust may include respirable crystalline silica (RCS), a chemical which has human health impacts and potentially derived from disturbance of soil or use of proppant (silica sand) in natural gas operations.

While there is no current evidence of an issue with RCS, CSIRO's Gas Industry Social and Environmental Research Alliance (GISERA) is undertaking a study which will assess the hazard level associated with RCS in the Surat Basin area.

Key points

- The Surat Basin in QLD hosts the largest CSG fields in Australia.
- Local communities have concerns about potential health impacts of CSG, including the impacts of dust.
- This study aims to assess the potential health risks of one chemical in dust: respirable crystalline silica (RCS).
- CSG operations could alter the amount of RCS in dust through drilling or the use of silica-containing materials. If less than 10 µm diameter, RCS can enter the human respiratory system and penetrate deep into the lungs.
- While there is no evidence of concerning exposure levels in the study area, there is a lack of available data on the composition of dust in the region.
- CSIRO researchers will sample dust from areas within and away from CSG fields, test the dust's composition (focusing on RCS), and share results with the public.

Research objectives

In a [previous study](#) to identify any chemicals of concern from CSG activities, CSIRO researchers found that RCS was present in small amounts in a number of drilling and hydraulic fracturing additives.

There was no direct pathway to the community for RCS from the use of these additives in day to day CSG activities.

However, this research did not rule out a pathway for accumulation of RCS over time through produced water gathering systems.

To see if this could be an issue, CSIRO researchers are looking at the background levels of RCS already in the environment at the study site. Crystalline silica, or quartz, is a naturally occurring mineral and is a common component in soil.

The resulting baseline information on the amount of RCS in the environment will allow us to assess whether CSG activities could make a difference to the levels of RCS in the study area over time.

The Surat Basin, southern Queensland

South-east Queensland hosts the largest CSG producing fields in Australia; the number of wells in Queensland is expected to reach 22,000 by 2050.

The Surat Basin is one of two key reservoirs in south-east Queensland, and is the focus area for this study.



Crystalline silica and CSG operations

Crystalline silica in the form of quartz is one of the most abundant minerals in the Earth's crust.

The general population can be exposed to RCS through dust. RCS dust particles are those particles capable of entering the human respiratory system and penetrating deep into the lungs. RCS particles are less than 10 µm (0.01 mm) in diameter ('PM10'). RCS can be toxic to humans.

There is a possibility that CSG operations may alter the amount of RCS in dust through CSG generation production, through drilling or through the use of silica-containing materials. It is possible that RCS from these sources could accumulate in sediments in water treatment infrastructure, which could be released as dust as the sediment ponds dry out.

While there is no existing evidence that exposure levels to the public in the study area are of any concern, the lack of available data warrants further investigation.

Building on existing research

Researchers will draw on existing GISERA research which will provide information on ambient concentrations, dust composition and sources of airborne particulate matter.

This study builds on several [GISERA studies](#) into potential human health impacts from CSG activities.



Project methods and outcomes

To establish whether or not there is a potential hazard to CSG workers and local communities, researchers will establish the degree of exposure to air-borne RCS. (The health risks associated with RCS are well-documented.)

First, CSIRO researchers will collect samples of dust from areas adjacent to CSG operations.

At the same time, they will collect samples from areas outside of CSG operations (control sites).

Samples will be collected from several representative locations in the region, over a period of 12 - 15 months to capture seasonal variation. Researchers may also analyse samples collected by local landholders. In total, we expect to generate around 75-90 samples.

Researchers will then use elemental and microscopic methods to:

- Determine the composition of dust by size.
- Determine seasonal variations and weather impacts.
- Compare the results from CSG sites to control sites.

The results from all parts of the study will be compared with national and international standards (where they exist) for environmental exposure to RCS in dust.

All results will be shared with the community. The study will synthesise and summarise the findings into a report that is will be available on [GISERA's web site](#).

More information

Read more [about this project](#).

Read about other [GISERA projects in Queensland](#).

Further information | 1300 363 400 | gisera@gisera.org.au | gisera.csiro.au

GISERA is a collaboration between CSIRO, Commonwealth and state governments and industry established to undertake publicly-reported independent research. The purpose of GISERA is to provide quality assured scientific research and information to communities living in gas development regions focusing on social and environmental topics including: groundwater and surface water, greenhouse gas emissions, biodiversity, land management, the marine environment, and socio-economic impacts. The governance structure for GISERA is designed to provide for and protect research independence and transparency of research.