

# Coal Seam Gas (CSG) Brine Management—Development of an Action Plan

## Introduction

This document provides background and context regarding an investigation being undertaken by the Queensland Department of Environment and Science (DES) into the development of a potential long-term management solution for brine generated from coal seam gas (CSG) activities.

The potential for the development of an unconventional gas industry in Queensland was first identified in the 1990s. Queensland's unconventional gas reserves are now considered to be the largest source of natural gas in eastern Australia. One of the challenges now being faced is how saline waste generated during the production of CSG, will be managed in the long-term.

The department will be working in collaboration with the Australian Petroleum Production and Exploration Association (APPEA) and its members, along with industry, landholder and environmental groups to develop an action plan for the long-term management of saline waste.

## Background

Groundwater extracted as part of the CSG production process in Queensland varies in quality but is generally saline. Queensland Government policy is that CSG water should be beneficially used if feasible. More than 90% of water generated from CSG activities in Queensland is treated and made available for a range of beneficial uses including for example irrigation, livestock watering and in construction activities, according to information provided by APPEA. The most common treatment system used is reverse osmosis.

Treating CSG water using reverse osmosis technologies results in a highly saline waste stream (brine) that must be appropriately managed as it is generally unsuitable for release to the environment. Brine is currently being stored on an interim basis in dedicated storage ponds until a long-term disposal strategy is adopted.

A number of potential approaches to address the long-term management of brine have been investigated over the past decade but an industry wide solution has not yet been adopted.

To resolve the issue, the former Minister requested in March 2017 that the department in collaboration with APPEA, the peak body for Australia's oil and gas industry, worked to develop a report to identify industry-wide solutions for the long-term management of brine generated from CSG activities.

## Reports

### APPEA Report

In December 2018, APPEA provided a report to the department titled 'Queensland Gas: end-to-end water use, supply and management' (APPEA Report).

The APPEA Report gives an overview of a number of feasibility studies that have been undertaken by industry operators individually or in collaboration with other industry operators. These feasibility studies examined the viability of the identified options through a range of potential risks and impacts such as environmental, economic, safety, technical, regulatory and social factors.

The report summarises the findings of the following options examined by the studies:

- selective salt recovery
- injection
- ocean outfall
- encapsulation.

In summary, selective salt recovery was determined infeasible due to a lack of suitable technology at a commercial scale, high upfront and lifecycle costs, significant energy consumption requirements and low excess demand in the current market.

Brine injection was determined infeasible as a suitable target formation sufficient to meet environmental protection objectives was unable to be identified.



Ocean outfall disposal was determined technically feasible however is cost prohibitive and presents logistical complications due to the geographical spread of operations.

The report concluded that the most viable industry-wide option for brine management at this time is the crystallisation and disposal of salt in purpose-built facilities.

### University of Queensland review

The department sought an independent review of the conclusions of the APPEA report by the University of Queensland Centre for Natural Gas (UQ).

UQ was requested to determine if all practicable options for brine management had been considered and provide comment on the feasibility of the identified options and conclusions. Additional advice was also sought on whether there were other practical options warranting further investigation that may not have been addressed by industry feasibility studies and any associated environmental, economic and social risks and benefits.

UQ provided the department with a number of conclusions and recommendations in the report titled Independent Review 'Brine and salt management (Section 6, Queensland Gas: end-to-end water use, supply and management)', dated 10 February 2020.

A summary of the key conclusions and recommendations is below:

- Industry has reviewed all reasonable brine disposal options. No new options have emerged to make original investigation irrelevant or provide new avenues for investigation.
- Identified barriers to the implementation of selective salt recovery, ocean outfall and brine injection have been considered realistically.
- Disposal of crystallised salt in purpose-built SEFs is the most viable industry-wide option at this time.
- [If encapsulation is adopted] DES should develop guidance with respect to regulatory requirements during SEF construction, operation and management beyond the lifetime of the CSG industry. This should consider public reporting processes and residual risk management.
- Continued research and analysis of options for the long-term management of brine should be undertaken by DES and industry.

### Next steps

The department will be working with key stakeholder groups to progress consideration of a long-term solution for CSG brine. This includes working towards drafting an action plan over the next 12 months.

Key external stakeholders include representatives from industry, conservation and agriculture sectors and well as landholder groups.

The draft Action Plan is anticipated to consist of a number of brief sections that outline topics and outcomes for an industry-wide brine management approach. The Action Plan may address topics such as the proposed approach to brine management, regulatory requirements, environmental authority conditions, assessment framework, compliance activities and future activities.

Stakeholders will have a number of opportunities to review materials, participate in workshops (virtual and/or face-to-face) and make submissions.

### Further information

Further information on CSG management is available on the Queensland Government Business Queensland website at [www.business.qld.gov.au](http://www.business.qld.gov.au).

Copies of the APPEA and UQ review reports, and the department's Coal Seam Gas Water Management Policy 2012 (ESR/2016/2381) are also available on the departments website at [www.environment.des.qld.gov.au](http://www.environment.des.qld.gov.au).

For additional information regarding this work please contact the department's Regional and Regulation Support team at [RRS.Consultation@des.qld.gov.au](mailto:RRS.Consultation@des.qld.gov.au).

### Human Rights Act 2019 compatibility

Queensland Government departments and public service employees must comply with the requirements of the *Human Rights Act 2019* (HR Act). This means any act, decision or statutory provision, must be compatible with human rights obligations. More information about the HR Act can be found here: [Human rights | Your rights, crime and the law | Queensland Government](http://www.qld.gov.au/law/your-rights/human-rights) (<https://www.qld.gov.au/law/your-rights/human-rights>).