



# Coal Seam Gas Water Management Policy

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Prepared by: Energy Resources, Department of Environment and Heritage Protection

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## Explanatory statement

### Background

The coal seams from which the coal seam gas (CSG) is obtained contain both water and natural gas—consisting primarily of methane—which is bonded to the coal. For CSG to be released, the water must be pumped from the coal seams to reduce pressure—thereby releasing gas that is bonded to the coal. A well is constructed to enable installation of a pump which is required to lower the water pressure. The released gas then travels to the surface via the well.

The water that is pumped from the coal seams to the surface is referred to as CSG water in this policy. CSG water is also known as 'produced' or 'associated' water.

The quality of CSG water quality varies greatly, however it is generally rich in salts and other minerals.

The amount of CSG water produced over the life of a project is known as the 'water production profile'. This profile is linked to: the volume of water in the coal seams; the permeability of the coal seam; and the rate and volume of gas production. The rate at which CSG water is produced is generally the highest in the early stages of a well's productive life and declines over time.

The volume of CSG water produced at each well and across a CSG project will change over time. Because of this, the management of CSG water is likely to require a number of approaches or solutions working together. These management solutions may vary through the life of the operation, and will often be different between geographical areas because of the differing geological characteristics of the coal seams, the proximity of the extraction site to available beneficial uses, the qualities and characteristics of the surrounding environment, and the quality of the CSG water.

It is important that CSG operators are strategic and proactive in their management of CSG water so that impacts on the environment are avoided and managed, and to ensure the water is used in a way that reflects its value as a resource. Wherever possible, CSG water should be used and managed in a way that is of benefit to the community, and reduces impacts on the environment.

As the exploration stage of an operation produces minimal CSG water, the primary focus of the policy is on production activities—all activities after exploration, appraisal and piloting activities.

The government aims to provide certainty for industry but in return expects high-quality social and environmental outcomes. This requires a sensible balance that can be best achieved via an ongoing and collaborative interaction between government, CSG operators and the community.

### Role of the policy and other legislation

The role of this policy is to:

- clearly state the government's position on the management and use of CSG water
- guide CSG operators in managing CSG water under their environmental authority
- ensure community understanding about the government's preferred approach to managing CSG water.

Rights to extract gas and produced water are provided under the *Petroleum and Gas (Production and Safety) Act 2004 (P&G Act)* and the *Petroleum Act 1923*. The impacts of the extraction of CSG water on groundwater supplies are managed under the *Water Act 2000 (Water Act)*, and the environmental management of CSG operations, including the management of CSG water, is dealt with under the *Environmental Protection Act 1994 (EP Act)*.

Other legislation that may control the use of CSG water, depending upon how it is to be managed and used, includes:

- The *Water Supply (Safety and Reliability) Act 2008 (Water Supply Act)*—where operators undertake a water supply service such as supplying treated CSG water for the purposes of a municipal drinking water supply
- The *Waste Reduction and Recycling Act 2011*—for authorising particular and general beneficial uses of CSG water and what would otherwise be CSG-related wastes.

This policy deals primarily with the management and use of CSG water under the EP Act, and does not vary

the requirements of the Water Act such as a CSG operator's 'make good' obligations. The policy does, however, encourage CSG operators to consider the feasibility of using CSG water to meet these obligations as part of developing their CSG water management strategies and plans.

## **Relationship to the CSG Water Management Policy 2010**

This policy supersedes the Coal Seam Gas Water Management Policy 2010, and is effective after approval by the Minister for Environment and Heritage Protection.

The government recognises that CSG companies have existing CSG water management practices that are approved under the EP Act and that are in accordance with the previous Coal Seam Gas Water Management Policy 2010. These authorised CSG water management practices, except the use of evaporation dams, will be permitted to continue for the life of any environmental authority, unless it is demonstrated that the water management solutions have resulted, or may result, in environmental harm or that CSG water measurable criteria have not been met. CSG water measurable criteria are developed during the environmental application and approval process under the EP Act.

This policy should also not be used to prevent future amendments to authorised CSG water management practices that are consistent with the intent of the existing approvals related to CSG water management.

In all but exceptional circumstances, evaporation dams have been banned as a management option for CSG water. Existing CSG operators are required to continue the decommissioning or conversion of any remaining evaporation dams. Any implications for evaporation dams outlined in the Coal Seam Gas Water Management Policy 2010 remain as is under this policy.

## **Future government actions**

This policy sets out the government's position on the management of CSG water. To streamline the implementation of CSG water management policy, the government will:

- establish water quality standards to ensure that CSG water that is of a suitable quality (or has been treated to a suitable quality) is not a regulated waste, and give effect to this through amendment of the *Environmental Protection Regulation 2008*
- undertake a review of the Water Supply Act to ensure that regulatory requirements are not duplicated—particularly where public health interests are appropriately protected under the Waste Act and the EP Act
- provide clearer guidance around 'fit-for-purpose' standards for using CSG water in irrigation schemes
- engage industry and community stakeholders to consider ways to more effectively use existing statutory consultation processes in determining CSG water management options.

The government has also introduced temporary emission licenses in response to the Flood Commission of Inquiry. Temporary emission licenses were designed to licence emission releases in response to an applicable event (which includes in response to an emergency). This will also include the emergency release of CSG water.

## 1.0 Purpose of the policy

This policy supersedes the Coal Seam Gas Water Management Policy 2010<sup>1</sup>, and was approved by the Minister for Environment and Heritage Protection in December 2012.

### 1.1 Objective of the policy

The objective of the policy is to encourage the beneficial use of CSG water in a way that protects the environment and maximises its productive use as a valuable resource.

The objective of the policy is achieved when CSG water and saline waste is managed consistently with the prioritisation hierarchies (below), and the management criteria (sections 3 and 4).

#### Prioritisation hierarchy for managing and using CSG water

In achieving the objective of the policy, the management and use of CSG water should be consistent with the following management hierarchy. It is intended that adopting this hierarchy will facilitate compliance with the government's objective for the management of CSG water.

**Priority 1** – CSG water is used for a purpose that is beneficial to one or more of the following: the environment, existing or new water users, and existing or new water-dependent industries.

**Priority 2** – After feasible beneficial use options have been considered, treating and disposing CSG water in a way that firstly avoids, and then minimises and mitigates, impacts on environmental values.

This policy focuses on the management and use of CSG water under the EP Act, and does not vary the requirements of the Water Act, such as 'making good' any relevant impacts that may result from a CSG operation on bores. However, measures under the Water Act may require the provision of water to mitigate impacts. CSG operators should consider the feasibility of using CSG water to meet those obligations.

#### Prioritisation hierarchy for managing saline waste

The treatment of CSG water using desalination technologies results in brine and, ultimately, salt residues that must be appropriately managed. The concentration and composition of salts depends on the characteristics of the CSG water and the treatment process.

In resolving the management of brine and salt as part of the management of CSG water, operators must demonstrate that priority 1, outlined below, has been fully considered and determined not to be feasible prior to considering priority 2.

**Priority 1** – Brine or salt residues are treated to create useable products wherever feasible.

**Priority 2** – After assessing the feasibility of treating the brine or solid salt residues to create useable and saleable products, disposing of the brine and salt residues in accordance with strict standards that protect the environment.

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<sup>1</sup> The section of this policy, 'Relationship to the CSG Water Management Policy 2010' explains in more detail the effect of the current policy on the previous CSG Water Management Policy.

## 2.0 Strategically managing CSG water

In managing CSG water as a resource, it is essential that CSG operators account for, and plan for the management and use of, the total volumes of CSG water expected for the life of the project. It is also necessary to ensure that trends in the volume of water being produced are observed and analysed, and the success of management solutions are measured.

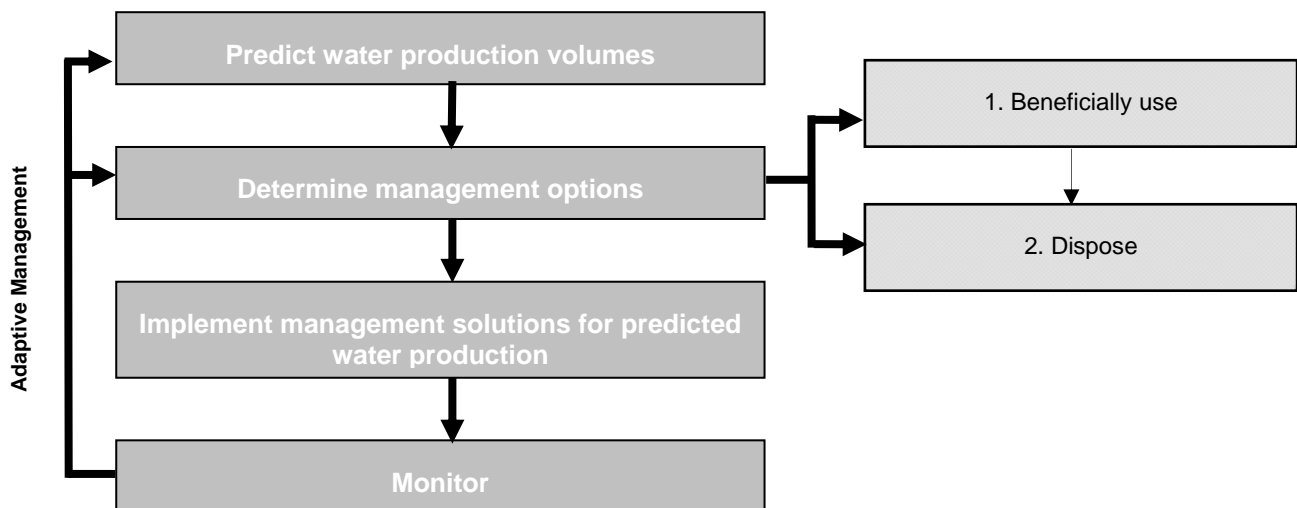
CSG operators are also required to undertake public notification during the application process for an environmental authority for all production activities, including consultation on the CSG water management and use options.

Over the life of a project, there may need to be changes to the management strategies for the CSG water (e.g. where more water is being produced than initially forecast). It is important however that this occurs in a strategic and proactive way that is consistent with the objectives, hierarchy and management criteria in this policy.

Where it becomes clear that the plan for the management and use of CSG water will no longer cater for the total volume of water being produced, the operator must take steps as soon as practical to get approval for amending the approach for the management and use of CSG water. Proposals of this type will generally involve further public notification under the EP Act.

Figure 1 demonstrates the way that CSG water should be strategically managed to achieve the purpose of this policy.

**Figure 1 – Strategically Managing Coal Seam Gas Water**



### 3.0 CSG water management criteria

Table 1 has been developed to assist CSG operators, and the administering authority for the EP Act, to determine responsible management solutions for managing CSG water that satisfy the objective of this policy.

The table outlines management considerations for a range of water management options. It then provides an overview of the management considerations the government expects CSG operators, and the administering authority for the EP Act, to have taken into account when determining the CSG water management and use options that best achieve the objective of this policy.

**Table 1 – CSG water management options**

Management options	Management principles	Management criteria
<p>Beneficially use for one or more of the following: the environment, existing or new water users, and existing or new water-dependent industries.</p>	<p>Water is a fundamental resource that underpins the prosperity and wellbeing of all Queenslanders. It also shapes and defines the state’s unique environment. Wherever feasible, CSG water should be beneficially used.</p> <p>Beneficial use of CSG water may include things like:</p> <ul style="list-style-type: none"> <li>• injection into depleted aquifers for recharge purposes</li> <li>• substitution for an existing water entitlement</li> <li>• supplementary water for existing irrigation schemes</li> <li>• new irrigation use, with a focus on sustainable irrigation projects</li> <li>• livestock watering</li> <li>• urban and industrial water supplies</li> <li>• coal washing and dust suppression</li> <li>• release to the environment in a manner that improves local environmental values.</li> </ul> <p>CSG water is considered a waste under the EP Act. Where the waste is used on petroleum tenure as part of the authorised petroleum activities, the use can be approved under the environmental authority.</p> <p>Off tenure use of water may require a beneficial use approval, as well as any other relevant approvals under other legislation, for example an operational works approval under the <i>Sustainable Planning Act 2009</i>.</p>	<p>In determining the most appropriate beneficial use of CSG water, CSG operators should:</p> <ul style="list-style-type: none"> <li>• determine the current water production profile, and the future trend of water production of the CSG operation</li> <li>• conduct a needs analysis of local water users. This should also be included as part of existing legislated consultation processes under the EP Act.</li> <li>• assess the feasibility of beneficially using CSG water to meet local water user needs, and, where feasible, preference those options that use the water most efficiently, including minimising transmission losses, and are:                         <ul style="list-style-type: none"> <li>○ firstly – closest to the region of extraction</li> <li>○ secondly – provide water to existing water users in the region of extraction</li> <li>○ thirdly – provide water to new water dependent industries or users in the region of extraction.</li> </ul> </li> </ul> <p>These considerations, and determinations, about the proposed management options should be included in the water management plan that has been developed by CSG operators for the purpose of an application under the EP Act.</p>



<p>Disposing to watercourses</p>	<p>Disposal to watercourses will only be considered for residual portions of CSG water where there is no feasible beneficial use, and disposal options will not adversely affect environmental values.</p>	<p>Disposing CSG water to streams will only be considered appropriate where:</p> <ul style="list-style-type: none"> <li>• there are no feasible options for beneficially using CSG water, or</li> <li>• the disposal is as a contingency measure to support the beneficial use of CSG water in high rainfall events, and</li> <li>• environmental values will be protected despite the discharge.</li> </ul> <p>Protecting the environmental values will be determined by assessment against:</p> <ul style="list-style-type: none"> <li>• any relevant local water quality guidelines</li> <li>• the <i>Environmental Protection (Water) Policy 2009</i>, and the National Water Quality Management Strategy</li> <li>• the water quality and characteristics of the receiving environment (e.g. flow regimes, riparian structure etc.)</li> </ul> <p>Using disposal as a contingency measure will only be considered acceptable where users of the CSG water will not be able to accept the total volume of this water because of the rainfall event.</p>
<p>Disposal of CSG water to evaporation dams</p>	<p>Evaporation dams are being phased out as an approved water disposal method in CSG production operations, and will only be approved in exceptional circumstances.</p>	<p>Evaporation dams will only be considered for a new CSG operation where the operator can demonstrate that:</p> <ul style="list-style-type: none"> <li>• the evaporation dam is for the purpose of CSG water produced during exploration or production testing; or</li> <li>• based on an assessment of best practice environmental management, that there is no feasible alternative to CSG evaporation dam for managing CSG water.</li> </ul>

## 4.0 Salt management criteria

Table 2 has been developed to assist CSG operators, and the administering authority for the EP Act, to undertake strategic planning to determine responsible management and use solutions for salt residue that satisfy the objective of this policy.

The table outlines management principles and criteria for salt residue management options. The table then provides an overview of the management principles and criteria the government expects CSG operators, and the administering authority for the EP Act, to have taken into account when determining the salt management options that best achieve the objective of this policy.

**Table 2 – Salt and brine waste management options**

Management options	Management principles	Management criteria
Treatment to create useable and saleable products	<p>Brine or salt residues can be treated to create saleable products, for example soda ash, and commercial salt.</p> <p>Using brine or salt residues to create saleable products may be authorised through the conditions of the environmental authority or through a beneficial use approval if it is to be undertaken outside the area of the petroleum tenure.</p>	<p>In determining the feasibility of treating brine or salt residues to create useable/saleable products operators must:</p> <ul style="list-style-type: none"> <li>• Identify potential uses for salt</li> <li>• undertake a feasibility assessment of potential uses of salt. This assessment should account for: <ul style="list-style-type: none"> <li>○ the period of time and volume of salt that would be available for use</li> <li>○ the cost of treating the salt to ensure it is at an appropriate standard for use.</li> </ul> </li> </ul>
Disposal of brine and salt	<p>The disposal of brine and salt must only be considered after a feasibility assessment has determined that there are no reasonable options to minimise the volume of waste for disposal.</p> <p>There are a range of options for the disposal of salt including:</p> <ul style="list-style-type: none"> <li>• injecting brine underground</li> <li>• disposing to a regulated waste facility.</li> </ul>	<p>After doing everything feasible to minimise the volume of waste for disposal, the operator must:</p> <ul style="list-style-type: none"> <li>• convert the waste to a solid product wherever feasible</li> <li>• undertake a comprehensive risk assessment to ensure that salt does not contaminate or harm the environment, including consideration of potential natural disasters (e.g. flooding)</li> <li>• dispose brine and salt away from sensitive receiving environments (this should be informed by local planning schemes and regional plans), including residential areas and good quality agricultural land.</li> </ul>

## 5.0 Glossary

**Best practice environmental management** has the meaning given to it under section 21 of the *Environmental Protection Act 1994*.

**Bore** means a water bore to which Chapter 3 of the Water Act 2000 (Water Act) applies (see section 363 of the Water Act).

**Brine** means saline water with a total dissolved solid concentration greater than 40,000 milligrams per litre.

**CSG Environmental Management Plan** means an environmental management plan required under section 310D of the EP Act including information in relation to the management of CSG water as prescribed under subsection 5.

**CSG evaporation dam** is defined as any impoundment, enclosure or structure that is designed to be used to hold CSG water for evaporation or would result in greater evaporative loss than the quantity of water being actively processed/treated.

**CSG water** means groundwater that is necessarily or unavoidably brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas. CSG water is a waste as defined under section 13 of the EP Act.

**CSG water measurable criteria** means the management criteria required by section 310D 5 (e) of the EP Act.

**Evaporation** means to concentrate fluid by the removal of water in the gaseous phase by natural or artificial means.

**Feasible** means that the benefits outweigh the costs—having considered a number of factors including environmental, economic and social issues.

**Monitoring**, in relation to monitoring the impact of an activity on the receiving environment, includes analysing, assessing, examining, inspecting, measuring, modelling or reporting any of the following:

- the quantity, quality, characteristics, timing and variability of the release of the contaminant
- the effectiveness of control measures
- characteristics of, and impact on, the receiving environment
- the effectiveness of remedial or rehabilitation measures.

**Release** of a contaminant into the environment, includes:

- to deposit, release, emit or disturb the contaminant
- to cause or allow the contaminant to be deposited, released, emitted or disturbed
- to allow the contaminant to escape
- to fail to prevent the contaminant from escaping.

**Watercourse** has the meaning provided in section 5 of the Water Act and includes the bed and banks and any other element of a river, creek or stream confining or containing water.

**Temporary emission licence** has the meaning given to it under section 357B (1) of the EP Act.

**Treated CSG water** means CSG water that has undergone a process to remove or reduce contaminants to make the water suitable for a desired end use.