

General Beneficial Use Approval—

Irrigation of Associated Water (including coal seam gas water)



Prepared by: Energy Regulation and Implementation, Department of Environment and Heritage Protection

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First published in 2013. This is version two of the General Beneficial Use Approval—Irrigation of Associated Water (including coal seam gas water) and includes amendments to the approval period.

April 2014

Explanatory statement

This notice of general approval for irrigation of associated water was issued in accordance with section 163 of the *Waste Reduction and Recycling Act 2011* (Waste Act) on 13 December 2013 by the Department of Environment and Heritage Protection.

Criteria under section 164 of the Waste Act were considered in deciding whether to grant this general approval. The conditions in this approval seek to ensure that the beneficial use of associated water carries no greater risk than what is acceptable for any other irrigation project.

Specifically, the conditions in this approval seek to ensure that:

1. soil structure, stability and productive capacity is maintained
2. toxic effects do not result
3. there is a genuine benefit to the user through maintained or improved yields.

Legislative framework

Waste is defined in the *Environmental Protection Act 1994* (EP Act) as including anything that is left over, or an unwanted by-product, from an industrial, commercial or domestic activity. Under the EP Act, there are a range of requirements that are placed on the management of various waste types.

Under the *Waste Reduction and Recycling Act 2011*, a waste can be approved for use as a resource if the department considers that it has a beneficial use other than disposal. If a waste is approved as a resource, it is no longer considered a waste for the purposes of the EP Act as described in s. 13.

There are two types of approvals of a resource for beneficial use—general and specific. A general beneficial use approval (BUA) has clear standards which, if complied with, do not require individual assessment by the department. Anyone can operate under this type of approval provided they comply with the conditions of the approval.

A specific BUA requires an individual assessment and only applies following approval by the department.



Associated water (including coal seam gas water)

Petroleum and gas operators have the right to take associated water under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923* as a necessary activity in the process of extracting petroleum and gas. This is because water is a by-product and is not used directly in the gas extraction process. The majority of associated water extracted as a result of petroleum and gas activities is a result of coal seam gas (CSG) activities.

The coal seams from which the 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 quality of CSG water quality varies greatly, however it is generally rich in salts and other minerals. Where properly managed (and treated where necessary) CSG water can be reused in a range of different ways, including irrigation. The Coal Seam Gas Water (CSG) Management Policy 2012 sets out the Queensland Government's framework for the management of CSG water. 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”.

This approval supports the objective of the CSG Water Management Policy 2012, by clearly stating what standards need to be met where associated water is to be used for irrigation purposes. Where these standards are complied

with, no specific approval is required by the department. Importantly, however, just because the conditions of this approval can be met, does not mean that irrigation of CSG water is always the best use with respect to the government's overall objective.

How this general BUA works

This notice of general approval states the conditions that must be met for the irrigation of associated water. Where these conditions cannot be met, an application for a specific BUA must be made.

These conditions apply to both the producer (scheme operator as relevant) and user, as explicitly stated in the approval. The approval has four parts:

1. General conditions
2. Standard water quality conditions
3. Variation to standard water quality conditions
4. General monitoring and operating conditions.

Some terms used in this document are outlined in the definitions section of this document. In addition, Appendix 2 defines the requirements for relevant suitably qualified persons.

This notice of general approval, if complied with, approves that associated water is a resource and not a waste for the purpose of irrigation. However, the approval does not mean that the user of associated water does not need to carefully consider its ongoing use as a resource.

As with any irrigation project, it is important that users of a water resource carefully consider issues like: hydraulically overloading a natural system; degrading soil structures; or, allowing excess water to run-off into surrounding waterways and streams.

In using associated water, it is important that the user is aware of their general environmental duty under section 319 of the EP Act.

More information is available on the department's website www.ehp.qld.gov.au.

Irrigation projects under previous general BUA

This notice of general approval replaces the standards for 'irrigation and general purposes' under the statutory notice, Decision to Approve a Resource for Beneficial Use—Associated Water (previous notice).

Any person operating under the previous notice prior to the commencement of this notice of approval can continue to operate under the previous notice provided that:

1. the person provides notification to the administering authority that they intend to continue operation under the previous notice no more than three months after the commencement of this notice
2. the person can demonstrate to the administering authority that the resource was being used under the previous notice prior to the commencement of this general BUA.

Conditions of approval

1. General conditions

1. This approval applies to the resource where:
 - a. the producer or scheme operator supplies the resource directly¹ to the user; and
 - b. the user beneficially uses the resource for the purpose of irrigation.
2. This approval only applies where the producer or scheme operator provides the administering authority:
 - a. contact details including the name and address of the user;
 - b. contact details including the name and address of the producer or scheme operator;
 - c. a statement from the user and producer (or scheme operator if relevant) of their intention to operate under this approval; and
 - d. the destination of the resource by real property description.
3. The producer of the resource or scheme operator must cease release of the resource upon becoming aware that the water quality does not meet the water quality parameters at or before the point of supply. The producer must also notify the administering authority upon becoming aware that the water quality does not meet the water quality parameters.
4. The user of the resource must not use the resource, where not using it for the purpose of irrigation.
5. Despite condition 3 and 4, the use of the resource may recommence where the cause for not complying with the condition has been identified and resolved.

2. Standard water quality conditions

6. Unless otherwise agreed to in writing², the producer is responsible for ensuring that the associated water meets the following water quality parameters at the point of supply:
 - a. electrical conductivity (EC) of $<950\mu\text{s}/\text{cm}^3$ as a 95th percentile over a one-year period;
 - b. sodium adsorption ratio (SAR) of:
 - i. 6 or less for heavy soils as a 95th percentile over a one-year period; or
 - ii. 12 or less for light soils as a 95th percentile over a one-year period;
 - c. pH within the 6.0-8.5⁴ accounting for atmospheric equilibration as a 95th percentile over a one-year period.
 - d. heavy metals do not exceed the values prescribed in Appendix 1⁵.
7. Monitoring for condition 6 must include, at a minimum:
 - a. fortnightly sampling for SAR, pH and EC; and
 - b. initially monthly for other parameters, and then six-monthly after three consecutive detects which are less than 50 per cent of the water quality parameters in Appendix 1.

3. Variation to standard water quality conditions

8. Despite condition 6, where a water quality parameter cannot be met in condition 6, a report is provided to the administering authority about the associated water prior to operating under the approval which:
 - a. states the extent to which the water quality does not meet condition 6;

1 Direct supply does not include supply via a stream, river, weir or any natural water course.

2 Written agreement must be between the producer (or scheme operator) and user.

3 Table 4.2.4 of ANZECC Guidelines.

4 Table 4.2.1 of ANZECC Guidelines.

5 Table 4.2.10 of ANZECC Guidelines.

- b. states a varied water quality parameter (for the parameter not met in condition 6) which has been determined in accordance with the assessment procedure outlined in Table 1, and:
- i. ensures that soil structure, stability and productive capacity⁶ can be maintained or improved;
 - ii. ensures that toxic effects to crops do not result; and
 - iii. ensures that yields and produce quality are maintained or improved.
9. The report provided in condition 8 must:
- a. include a water monitoring plan⁷ to ensure that the varied water quality parameter achieves the outcomes listed in condition 8b over the life of the project;
 - b. be certified by an independent⁸ and relevant suitably qualified person/s listed in Appendix 2.
10. Where the water quality parameters cannot be met in condition 6, the water must be used in accordance with the certified 'varied water quality parameters' in condition 8 and the water monitoring plan in condition 9.

Table 1: Assessment procedures for water quality parameters

Water quality parameter	Assessment procedure
electrical conductivity	Salinity Management Handbook, with reference to Chapter 11; and/or
sodium adsorption ratio	Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapter 4 and Volume 3 Chapter 9.
pH	The assessment should consider: <ul style="list-style-type: none"> • soil properties within the root zone to be irrigated (e.g. clay content, cation exchange capacity, exchangeable sodium percentage) • water quality of the proposed resource (e.g. salinity, sodicity) • climate conditions (e.g. rainfall) • leaching fractions • average root zone salinity (calculated) • crop salt tolerance (e.g. impact threshold and yield decline) • management practices and objectives (e.g. irrigation application rate, amelioration techniques) • broader landscape issues (e.g. land use, depth to groundwater) • any additional modelling and tests undertaken to support the varied water quality parameters.
heavy metals	Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapters 3 and 4 and Volume 3 Chapter 9. The assessment should aim to derive site specific trigger values (e.g. cumulative contaminant loading limit) based on the methodology provided in the above mentioned procedure.

4. General monitoring and operating conditions

11. All plant and equipment necessary for complying with this approval must be installed, maintained and operated in proper and effective condition.
12. All monitoring is undertaken by a suitably qualified person.
13. As relevant to the sampling being undertaken, monitoring and sampling must be carried out in accordance with the following documents:
- a. for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009 – *Environmental Protection (Water) Policy 2009*

⁶ Productive capacity refers to the range of crops suitable for the local area.

⁷ The water monitoring plan must clearly state who is responsible for monitoring obligations.

⁸ Independent is someone who is not the producer, user or scheme operator, or someone related to or employed by them.

- b. for groundwater sampling, the Australian Government's Groundwater Sampling and Analysis – A Field Guide (2009:27 GeoCat #6890.1)
 - c. for soil, the Guidelines for Surveying Soil and Land Resources, 2nd edition (McKenzie et al. 2008), and/or the Australian Soil and Land Survey Handbook, 3rd edition (National Committee on Soil and Terrain, 2009).
14. All laboratory analyses and tests are undertaken by a laboratory that has National Association of Testing Authorities (NATA) accreditation for such analyses and tests, except where authorised in writing by the administering authority.
15. Notwithstanding condition 14, where there are no NATA-accredited laboratories available to test for a specific analyte or substance, then duplicate samples must be sent to separate laboratories for independent testing or evaluation.
16. Despite condition 14 and 15, in-line monitoring equipment is appropriate for pH and EC measurements where they are operated in accordance with condition 11.
17. All plans, procedures, reports and monitoring results must be kept on record for a minimum of five years.

Approval Period

This approval takes effect from **24 April 2014** and remains in force for a period of five (5) years until **24 April 2019**.

Definitions

ANZECC Guidelines refers to: ANZECC 2000, Australian Water Quality Guidelines for Fresh and Marine Waters, Australian and New Zealand Environment and Conservation Council, Kingston.

associated water means underground water taken or interfered with, if the taking or interference happens during the course of, or results from, the carrying out of another authorised activity under a petroleum authority, such as a petroleum well, and includes waters also known as produced formation water. The term includes all contaminants suspended or dissolved within the water.

beneficial use includes reusing or recycling a resource.

certified means a statutory declaration by a suitably qualified person or suitably qualified third party accompanying the written document stating:

- the person's qualifications and experience relevant to the function
- that the person has not knowingly included false, misleading or incomplete information in the document
- that the person has not knowingly failed to reveal any relevant information or document to the chief executive
- that the document addresses the relevant matters for the function and is factually correct
- that the opinions expressed in the document are honestly and reasonably held.

general approval means an approval of a stated type of resource, of which anyone can have the benefit.

heavy soil is any soil which has a clay content greater than 35 per cent.

light soil is any soil which has a clay content equal to or less than 35 per cent

measures includes plant, equipment, physical objects, monitoring, procedures, actions, directions and competency.

producer means the holder of the petroleum authority on which petroleum production is authorised.

resource means associated water for which a beneficial use has been approved.

scheme operator means the person holding the resource for supply to the user.

Sodium adsorption ratio (SAR) means $\text{Na}^+/\sqrt{((\text{Ca}^{2+}+\text{Mg}^{2+})/2)}$ as stated by US Salinity Laboratory Staff 1954, *Diagnosis and improvement of saline and alkali soils*. Agric Handbook No 60, USDA, US Govt Printing Office, Washington DC.

suitably qualified person means a person who has qualifications, training, skills and experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

independent suitably qualified person means a person who has the training, skills or experience as listed in Appendix 2.

user means a person who has entered into a written agreement with a producer or scheme operator to use associated water, produced on a petroleum authority on which petroleum production is authorised, for a stated use. The user may include the holder of a relevant environmental authority.

waters includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, artificial watercourse, bed and bank of any watercourse, water contained within dams that is not associated water, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.

Appendix 1—Quality parameters for heavy metals and metalloids

Element	Short-term trigger value in irrigation water (short-term use —up to 20 years)
	(mg/L)
Aluminium	20
Arsenic	2.0
Boron	Refer to table 9.2.18 of ANZECC
Cadmium	0.05
Chromium	1
Cobalt	0.1
Copper	5
Fluoride	2
Iron	10
Lithium	2.5
Lead	5
Manganese	10
Mercury	0.002
Molybdenum	0.05
Nickel	2
Zinc	5

Appendix 2—Relevant suitably qualified person

Issue	Relevant suitably qualified person	
electrical conductivity	<p>A person that is a Certified Professional Soil Scientist—stage 2 or 3 with experience in:</p> <ul style="list-style-type: none"> • assessing or studying the effects of the chemistry of irrigation water on the chemical/physical properties of soil profiles; • irrigation and water management; and • the design of monitoring strategies and the conduct of sampling programs. <p>or</p> <p>A person that is an ‘AgCredited’ member of the Australian Institute of Agricultural Science and Technology with at least five years’ experience in:</p> <ul style="list-style-type: none"> • assessing or studying the effects of the chemistry of irrigation water on the chemical/physical properties of soil profiles; • irrigation and water management; and • the design of monitoring strategies and the conduct of sampling programs. <p>or</p> <p>A person that has a tertiary qualification in Environmental Science, Soil Science, Agricultural Science, or Agronomy and has at least five years’ experience in:</p> <ul style="list-style-type: none"> • assessing or studying the effects of the chemistry of irrigation water on the chemical/physical properties of soil profiles; • irrigation and water management; and • the design of monitoring strategies and the conduct of sampling programs. 	
sodium adsorption ratio		
pH		
heavy metals	<p>A person that has a tertiary qualification in Chemistry, Environmental Science, Soil Science, or Agronomy and has at least five years’ experience in:</p> <ul style="list-style-type: none"> • undertaking eco-toxicology assessments • the design of monitoring strategies and the conduct of sampling programs 	