



Government of **Western Australia**
Department of **Health**

Contaminated Sites Ground and Surface Water Chemical Screening Guidelines

December 2014

These guidelines apply to the reporting, evaluation and management of chemicals in ground and surface water for suspected or known contaminated sites. They should be used in conjunction with the Contaminated Sites Act 2003, Contaminated Sites Regulations 2006 and the associated Contaminated Sites Guidelines published by the Department of Environment Regulation

Introduction

Managing chemical contamination in groundwater is important because of water's use for a variety of purposes, including its potential use as a potable water source.

This document is primarily intended to provide information and advice on the Department of Health's (DoH) approach to establishing chemical water guideline values for the classification, assessment and management of contaminated sites. This approach has been incorporated into the *Assessment and Management of Contaminated Sites: Contaminated Sites Guidelines* (Department of Environment Regulation, 2015). The Contaminated Sites Guidelines must be referred to when assessing and remediating contaminated sites within Western Australia.

Consideration has been given to the protection of public health where exposure to water that contains chemical contaminants may occur and, where necessary, the aesthetic acceptability of the water, such as odour, protection of plant life and corrosion where these requirements are necessary for the proposed end use (eg. irrigation, cleaning, recreational use).

In accordance with existing Department of Health policy⁽¹⁾ untreated ground water can only be used if it is tested and confirmed to be suitable for the proposed use. Potential uses of groundwater may include:

- drinking, food preparation, cooking
- bathing, swimming or filling of swimming pools and wading pools
- irrigation of gardens, including the growing of vegetables
- flushing toilets and washing vehicles or clothes.

Established Guidelines

The *National Environment Protection (Assessment of Site Contamination) Measure 1999, amended in 2013*, (NEPM) provides the framework for risk-based assessment of groundwater that has been affected, or may have been affected, by site contamination. The NEPM aims to minimise the risk of adverse human health and environmental impacts arising from contaminated groundwater and to ensure that the quality of groundwater is appropriate for its environmental values.

The NEPM provides groundwater investigation levels (GILs) for risk-based assessment of ground water levels. The GILs define acceptable water quality for various contaminants at the point of use. Levels above GILs require further assessment.

Additional national guidelines are referenced within the NEPM and are available for further information, including:

- Australian Drinking Water Guidelines 2011 (ADWG)⁽²⁾
- Australian Water Quality Guidelines 2000 (AWQG)⁽³⁾
- Guidelines for Managing Risk in Recreational Waters 2008 (GMRRW)⁽⁴⁾

The use of these guidelines within Western Australia is described within the Contaminated Sites Guidelines (DER, 2015).

Potable Use

Potable water is defined as water intended primarily for human consumption, either directly from the water supply, or indirectly in beverages, ice or foods prepared with water. Potable water is also required for food preparation (eg. washing dishes, washing fruit and vegetables). Potable water is also normally used for some domestic purposes such as bathing and showering, filling wading pools and washing clothes.

Groundwater used for any of these potable uses must comply with the ADWG health and aesthetic guideline values.

Where the contaminants of concern are not listed in the ADWG the DoH must be consulted to identify an acceptable guideline level.

Exemptions can be made where a site specific assessment is completed that considers both the potential adverse effects of the contaminants of potential concern, aesthetic issues and the likely end use. In some circumstances it may be possible, in consultation with DoH, to apply the non-potable use guidelines or other site specific level.

Where there is any uncertainty, advice should be sought from the DoH regarding specific contaminants and application of potable or non-potable use guidelines for likely end uses.

Non-Potable Use Guidelines

Non-potable uses may include irrigation of gardens, parks and reserves, growing vegetables, flushing toilets or washing vehicles and the recreational use of surface water.

In general, the Department of Health adopts the NEPM GILs and recommends a default screening level for non-potable water uses that is ten times the corresponding ADWG health-related guideline value. This approach is consistent with the World Health Organisation⁽⁵⁾ and GMRRW⁽⁴⁾ to establish standards for recreational water use. However, there are important exemptions to this approach as outlined below.

Odorous Chemicals

Odour, in particular, may be a detrimental effect for many groundwater non-potable uses. Therefore, for the following pungent chemicals, the ADWG aesthetic guideline value will be directly applied, even where it is lower than the health-related guideline:

- chlorobenzene
- 1,2-diclorobenzene
- 1,3-diclorobenzene
- 1,4-diclorobenzene
- Ethylbenzene
- hydrogen sulphide
- styrene
- toluene
- 1,2,3 trichlorobenzene
- 1,2,4 trichlorobenzene
- 1,3,5 trichlorobenzene
- xylene.

Chemicals with no health guideline level

In circumstances where a chemical does not have an ADWG health-related guideline value but has been provided with an aesthetic guideline, the aesthetic guideline will be directly applied. The ADWG aesthetic guideline value will not be routinely adjusted as aesthetic issues have the potential to affect the proposed non-potable end use (eg. corrosive effects, death of sensitive plant life, unpleasant odours) and site specific management is likely to be required.

Where the assessment and management process indicates that risks to human health or the environment are insignificant or adequately managed, the DoH may, in consultation with DER, approve a site specific level, including adjusted aesthetic values.

Methyl Tertiary Butyl Ether (MTBE)

MTBE is not currently listed in the ADWG. An interim screening level of 0.02 mg/L will apply to MTBE, which is based on the threshold that odour can be detected.

Pesticides

The Australian Pesticides and Veterinary Medicines Authority (APVMA) is responsible for the assessment and registration of pesticides and labelling prior to sale and use in Australia. The use of pesticides within Western Australia is subject to regulation (*Health (Pesticides) Regulations 2011*). Used correctly and in accordance with label and material safety data sheet directions pesticides will not normally be detected in groundwater above their analytical limits.

Any detection of pesticides in groundwater suggests inappropriate use, illegal disposal, spills or dumping. Whenever pesticides are detected, the DoH may require an investigation to ensure regulatory controls are in place, beyond the *Contaminated Sites Act 2003* requirements.

Therefore, the **DoH must be notified of any measurable levels of pesticides in groundwater (above analytical limits of detection).**

The ADWG provides guideline values for pesticides in drinking water. The term 'pesticides' includes agricultural chemicals such as insecticides, herbicides, nematicides, rodenticides and miticides. The health-related guideline values within the ADWG are derived from the acceptable daily intake (ADI)⁽⁶⁾ and are set at about 10 per cent of the ADI for an adult weight of 70 kg and a daily water consumption of 2 litres. These values are conservative, and include a range of safety factors.

The DoH recommends a non-potable use guideline of ten times the ADWG health-related guideline value for pesticides.

In Western Australia, the DoH has derived health-related guideline values, in the same manner as those included within the ADWG, for the following pesticides. The derived value is multiplied by a factor of ten to provide the non-potable use guideline.

Pesticide	Non-Potable Use Guideline (mg/L)
Bifenthrin	0.35
Fluazifop-p-butyl	0.1
Flumetsulam	35
Flutriafol	0.3
Quizalofop-p-ethyl	0.4
Tebuconazole	1
Triadimenol	2

Summary

- ◆ *The ADWG health-related and aesthetic guideline values apply for potable water uses. The Department of Health adopts the NEPM GILs.*
- ◆ *Non-potable use guidelines apply, which are generally ten times the health-related guideline value, or the unadjusted aesthetic guideline value, as set out in the National Health and Medical Research Council Australian Drinking Water Guidelines (ADWG, 2011) or latest edition.*
- ◆ *For the pungent chemicals listed in this document, the ADWG aesthetic guideline will apply.*
- ◆ *For chemicals without a health-related guideline value, the aesthetic guideline will apply.*
- ◆ *An interim screening level of 0.02 mg/L will apply to methyl tertiary butyl ether.*
- ◆ *The non-potable use guidelines for pesticides are ten times the derived health-related value.*
- ◆ *The DoH is to be notified when pesticides are detected in groundwater above the analytical limit of detection/reporting.*

References

1. Department of Health *Using Bore Water Safely* (2008)
<http://www.public.health.wa.gov.au/cproot/1804/2/Using%20Bore%20Water%20Safely%2008a26.pdf>
2. National Health and Medical Research Council and Natural Resource Management Ministerial Council *Australian Drinking Water Guidelines* (2011)
3. ANZECC & ARMCANZ *Australian water quality guidelines for fresh and marine water* (2000)
4. National Health and Medical Research Council and Natural Resource Management Ministerial Council *Guidelines for Managing Risks in Recreational Water* (2008)
<http://www.nhmrc.gov.au/publications/synopses/eh38.htm>
5. World Health Organisation *Guidelines for Safe Recreational Water Environments -Volume 1, Coastal and Freshwaters* (2003) http://www.who.int/water_sanitation_health/bathing/srwe1/en/
6. Office of Chemical Safety *Acceptable Daily Intakes for Agricultural and Veterinary Chemicals* <http://www.health.gov.au/internet/main/publishing.nsf/Content/ocs-adi-list.htm> (Current as of 31 December 2013)



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