



## SITE CONTAMINATION

### Overview fact sheet

# Appreciating the legacy of site contamination enables residents, industry and governments to manage it collectively.

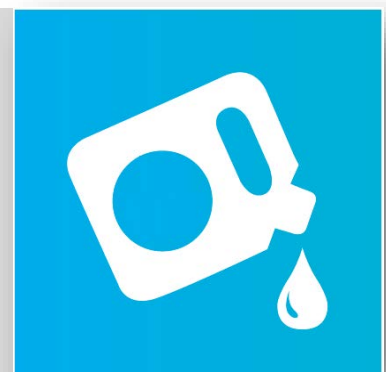
Issued 8 December 2016

Site contamination exists in most urbanised areas in the world. South Australia is no exception, particularly suburbs on or near former industrial land. As recently as the 1980s, chemicals used by industry were simply tipped down drains and poured onto soil to evaporate. There was a lack of awareness about the long term impacts this could have – and laws were not in place to prevent it from happening.

Today these practices are contrary to both current legislation and community expectations of good environmental practice. Dealing with the legacy of site contamination is a challenging issue for regulators worldwide. For example, assessment of the nature and extent of contamination on complex sites can continue for several years or more before enough is known to attempt to remediate.

Like all industrialised cities, Adelaide and South Australian regional centres have contaminated sites that are the direct result of historical practices involving:

- petrols, oils, solvents, degreasers and other substances used in manufacturing
- industrial sites such as gasworks, drycleaners, timber preservation and tanneries
- agricultural chemicals, weedicides and pesticides/termiticides
- waste products such as ash, which were often buried



The Environment Protection Authority (EPA) is working to effectively manage site contamination across South Australia as part of the State Government's strategic priority to deal with long-term environmental and health impacts of historic pollution. Scientific understanding and technologies to assess and remediate site contamination are constantly improving. The EPA continues to work with other regulators in Australia and overseas to improve knowledge and expertise in managing legacy contamination.

South Australia has a proud manufacturing history and some chemical disposal and handling practices that were considered appropriate at the time are no longer acceptable by today's standards. Certain contaminants left behind by previous activities can cause health problems if humans are exposed to high enough concentrations over a period of time.

### Did you know?

Australia has an estimated 160,000 contaminated sites. In South Australia, the EPA holds information on almost 2,200 sites that have been listed on the Public Register. England has around 320,000 contaminated sites and in 2013, the United States EPA reported monitoring more than 530,000 sites, with clean-up costs running into the hundreds of billions. In industrialised cities worldwide these figures will continue to grow, as demand grows for land previously used by industry to be remediated and used for housing.



## Who is responsible for site contamination?

### The polluter pays

Responsibility for site contamination is assigned according to the '**polluter pays**' principle – this means that the original polluter is liable for any clean-up and associated costs caused on and off the source site, regardless of when it was caused.

Site contamination is often historical in nature, and the original polluter may no longer exist or be able to be identified. In these cases liability can pass to the current site owner.

Under the *Environment Protection Act 1993*, known or suspected groundwater contamination must be reported to the EPA. The EPA can require assessment and if necessary remediation, which means to treat, contain, remove or manage the contamination. In most cases, the original polluter or past/current site owner must undertake or fund this work, including a communication and engagement program to keep affected communities informed.

The EPA administers and enforces the Act to ensure responsible parties undertake this work appropriately. It also makes information on contaminated sites available to the public.

Pollution of groundwater has been an offence since 1995, when the Act came into operation. Where there is sufficient evidence, the EPA can prosecute, which can sometimes be difficult because it is often the result of previous industrial activity that may have occurred a long time ago.

Understanding the timing of the contamination and identifying the polluter is therefore not always possible, and in some cases companies identified as polluters in the past no longer exist.

## Buyer beware

Investigating and cleaning up contaminated sites can be expensive. Prospective land purchasers should be aware of the risk of potential contamination and carry out careful, thorough pre-purchase enquiries (due diligence).

When buying, selling or leasing property, you and/or your real estate agent should search published contaminated sites information as part of any routine due diligence enquiry.

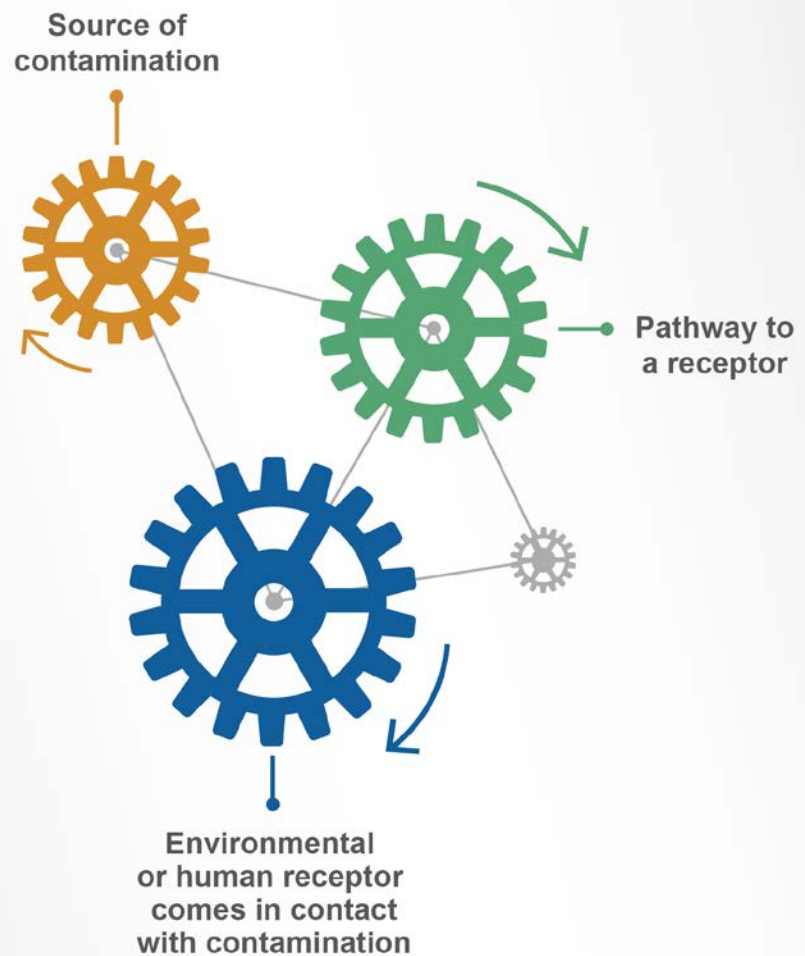
## When can site contamination become a problem?

**Site contamination is not always a problem. In order for site contamination to become a problem for people, there needs to be:**

1. a source (for example contaminated groundwater in a bore),
2. a pathway (extracting that water with a pump) and
3. a receptor (a person then ingesting or coming into contact with that water).

**Whether there is a risk to human health also depends on:**

- the types of chemicals found,
- the concentrations of the chemicals
- where they are found, and
- how a person is exposed.



Chemicals behave differently, so while some chemicals may require many years of exposure before posing a health risk, others may present a more immediate risk.

The good news is that site contamination can usually be managed. Because every situation is different, tailored solutions to protect current and future residents are required.

These are developed based on factors including the nature of contamination, land use, groundwater movement, housing types and geological conditions.

# Understanding exposure pathways

Treating or removing the source of contamination, pathway or receptor can drastically reduce its environmental impact and protect the community against unsafe exposure.

## Managing contaminated groundwater

Groundwater contamination is usually a long-term environmental legacy. Chemicals found in groundwater across metropolitan Adelaide can include volatile organic compounds (petroleum hydrocarbons, chlorinated hydrocarbons and other organic compounds), pesticides, polycyclic aromatic hydrocarbons and nitrates. The presence of these chemicals can present a risk to human health.

Water from domestic bores can be a valuable resource as it can contribute significantly in meeting your water needs. But most domestic bores obtain water from shallow, unconfined aquifers (less than 30 metres deep). Water from these aquifers is not protected by thick layers of solid and clays and is susceptible to chemical and microbiological contamination. Poor quality and polluted groundwater can seriously threaten the health and viability of communities, agricultural operations and the environment. Once polluted, aquifers are very difficult to restore – and for this reason it is an offence to pollute an aquifer.

### Is bore water safe to use?

Bore water can be safe to use provided it is tested regularly and testing confirms that it is safe. Test bore water, especially from shallow aquifers, before drinking (including washing, food preparation, cooking, making ice or watering edible plants), bathing, filling a pool, pumping through a sprinkler or topping up a rainwater tank.

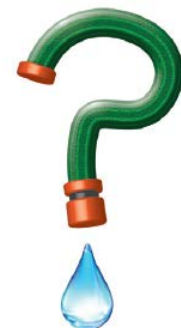
Water sourced from deeper confined aquifers (50 metres or more) with intact casing and a well-head protected from contamination by surface run-off is generally of higher quality. Testing can inform you as to which aquifer you are using if you are unsure. Whilst private users aren't legally required to do so, SA Health advises to test bore water regularly and ensure it is safe for its intended use.

Preventing extraction of contaminated groundwater is necessary to protect human health and also to prevent the spread of contamination. This can also be caused by drawing water towards a property if the groundwater is being extracted from a bore.

The Australian Water Quality Centre can test residential bore water and further information is available on ph 1300 653 366 or visit [www.awqc.com.au](http://www.awqc.com.au) and follow the links to 'Our Services', then 'Analytical and Field Services' and 'Bore and Rail Water Testing'. If you require any assistance interpreting the results, please call the EPA on ph 8204 2004 or visit [www.epa.sa.gov.au/bores](http://www.epa.sa.gov.au/bores) for further information.

**Mains water and water from rainwater tanks are not affected by this contamination and home grown fruit and vegetables are safe to consume, provided they are not being watered with contaminated bore water.**

**BORE  
WATER  
WHAT'S BENEATH  
THE SURFACE**



## Minimising the potential for exposure to contamination

To minimise the potential for exposure to contamination, the EPA considers whether it is appropriate to implement institutional controls in certain circumstances. These are non-engineered instruments such as administrative and legal controls that prohibit or restrict extraction of groundwater. The EPA explores these controls where it is satisfied that action is necessary to prevent actual or potential harm to human health or safety.

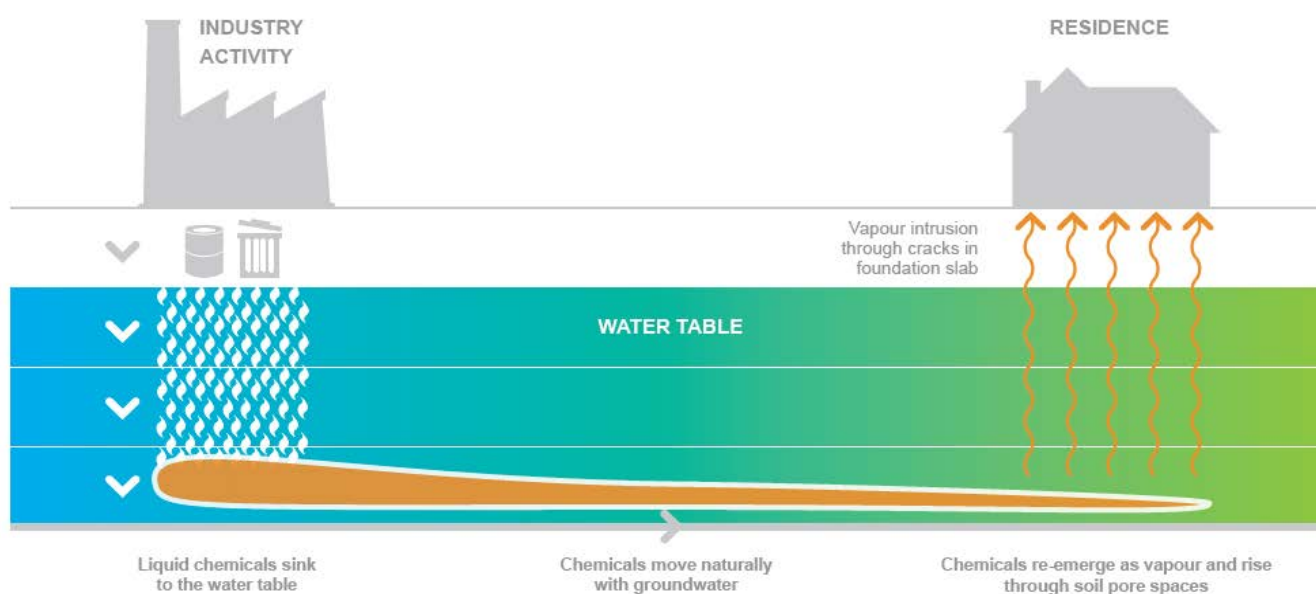
The community in the area then has the responsibility not to use the groundwater, for example if notified by the EPA not to use your groundwater for any purpose, or if a Groundwater Prohibition Area (GPA) has been established. This is essential to protect public health and safety as using the groundwater can also spread the contamination to other areas.

The EPA investigates and engages with the affected community to determine the best way to protect residents from groundwater contamination and minimise any other impacts. If you are living in a GPA and using bore water you should stop immediately and familiarise yourself with the restrictions, which can include being issued with a fine. **To find out if you are living in an area where there is a formal groundwater restriction – or a recommendation not to use your groundwater, please visit [www.epa.sa.gov.au](http://www.epa.sa.gov.au) and follow the links to 'Site Contamination' then 'Assessment Areas'.**

## Managing soil vapour intrusion

The science and understanding of vapour intrusion has significantly increased over the last few years. It has long been understood that some chemicals can be transported in groundwater for thousands of metres. More recently it has been discovered that they can also be found in the air spaces between soil particles as vapour. Chemicals including petrols and solvents like trichloroethene (TCE), dichloroethene and vinyl chloride, are termed 'volatile'. When volatile chemicals are present close to residential properties, they can intrude into homes through small pathways, such as cracks in foundations or floorboards – this is called 'vapour intrusion'.

In the rare instance that a home is affected by soil vapour intrusion, the EPA works with responsible parties to assist residents to manage any health risk. For example, residents can take a number of simple and practical precautions to increase the flow of fresh air from outside to inside or below a house (such as opening doors and windows, clearing blockages away from exterior vents and installing additional ventilation points). Sealing skirting gaps can prevent vapour from rising from below the house and where there is significant vapour intrusion an active mitigation system can be installed.



## EPA working together with SA Health

The EPA works together with SA Health to make science-based assessments on the potential for human health risks associated with the existence of groundwater contamination. Both agencies are committed to using national guidance documents, planning agreed approaches to sites and sharing information. When necessary, the EPA seeks expert advice from the Scientific Services Branch of SA Health (tel: 8226 7100) in order to determine the potential health risk.

SA Health has developed an indoor air level response range for the chemical trichloroethene (TCE). This provides a consistent response for the EPA, environmental consultants and auditors, when TCE is found or predicted to be found in residential homes through soil vapour intrusion as described above. This response uses a conservative approach to protect the most vulnerable members of the community, and was developed and independently reviewed by national and international experts.

SA Health also provides advice on the assessment of other environmental contaminants that may be harmful to human health, and advises the EPA of the likely effects on impacted communities. Both agencies regularly review international scientific literature to ensure the most up to date assessments are made in regards to the health impact on the community.

## Responsibility to report contamination

Preventing extraction of contaminated groundwater is necessary to protect human health and also to prevent the spread of contamination. If groundwater contamination is discovered, it is a legal requirement under the Environment Protection Act 1993 to notify the EPA. Notifying the EPA also enables residents, industry and government to protect current and future generations from contamination caused by historical industrial practices – and ensures responsible parties take action to clean-up contaminated sites.

If you are or become aware of groundwater contamination, please immediately write to the Manager, Site Contamination Branch, by email: [EPASiteContam@sa.gov.au](mailto:EPASiteContam@sa.gov.au) or post: GPO Box 2607 Adelaide SA 5001. The EPA records all notifications on a Public Register. The responsible party (or the EPA) also advises the affected community if a risk to public health is confirmed.

### Did you know?

The EPA's vision is to work towards a clean, healthy and valued environment that supports social and economic wellbeing for all South Australians now and into the future. Site remediation can generate both public and private benefits, by releasing previously contaminated land and allowing urban regeneration. In the United States, studies indicate that this has resulted in significant economic, environmental and social benefits – from new jobs to increases in property values in the broader community.

The South Australian EPA's work can also be considered in the context of the positive impacts on business in terms of supporting green jobs – such as environmental contractors, trades, consultants, and site contamination auditors, all of who can be involved in remediation and mitigation activities.

This work keeps South Australia at the forefront of the nation in dealing with legacy contamination and realising the economic opportunities it can create. Regenerated sites such as Bowden, St Clair, and Tonsley wouldn't be possible without comprehensive site contamination work overseen and regulated by the EPA.

# Assessing and prioritising contaminated sites

It may be impractical and prohibitively expensive to clean up groundwater to the level needed to restore it to its original condition. For example, a sponge contaminated with oil and then squeezed and cleaned will still present with residual oil and not be suitable for use as a sponge.

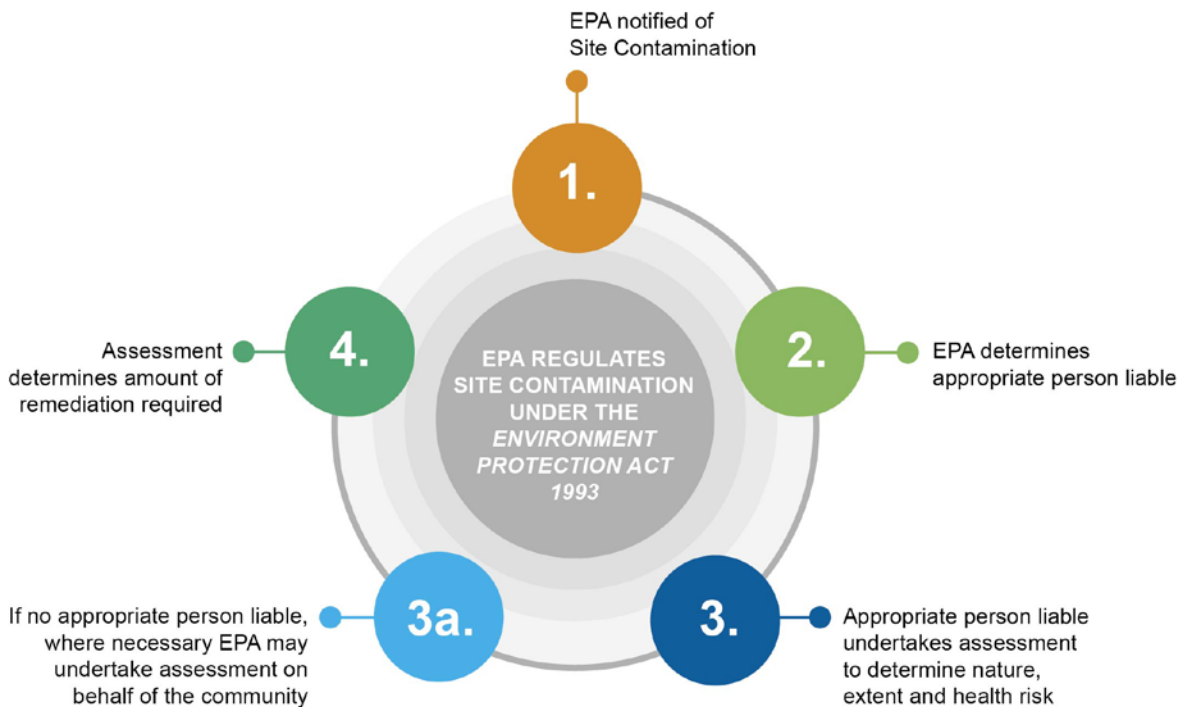
In the environment, the EPA may accept that groundwater has been remediated as much as possible and that, subject to appropriate ongoing management or restriction on its use, further clean-up is not required.

## Risk-based approach

The EPA takes a risk-based approach for the assessment and remediation of groundwater contamination to ensure the protection of human health and the environment.

This allows for a site to be remediated to a level that matches the future intended land use, for example industrial, commercial or high density residential use.

While it is not economically feasible to remediate every contaminated site, the EPA prioritises sites that are contaminated to an extent they present a significant public health or ecological risk.



# Orphan sites - \$7.8 million invested over four years

In 2016, the South Australian Government committed to an investment of \$7.8 million over four years for the EPA to manage a number of legacy orphan sites. This funding commitment recognises the importance the Government places on dealing with the issue of historical contamination.

An 'orphan' site is a term used to describe a situation where the original polluter no longer exists, cannot be found or identified, or is unable to carry out or pay the costs of the assessment or remediation that is required. This funding commitment means that the EPA can now undertake assessment work where it can demonstrate there is a significant public health risk. The EPA will also engage with the affected community.

## What information is available to the public?

The EPA records all notifications of site contamination on a Public Register.

The EPA is making existing information about site contamination easier to find. You can search the Site Contamination Index online, which lists notifications of site contamination affecting groundwater received by the EPA since 1 July 2009.

Further information on a site can then be obtained from the EPA by calling 8204 2004 or 1800 623 445 (free call for country users) or [epa.publicregister@epa.sa.gov.au](mailto:epa.publicregister@epa.sa.gov.au) and quote the EPA notification number and suburb.

There is no charge for providing copies of documents associated with sites listed on the Index.



### FURTHER INFORMATION

For **further information** on site contamination please contact:

Site Contamination Branch  
Environment Protection Authority  
GPO Box 2607  
Adelaide SA 5001

Telephone:  
(08) 8204 2004  
Freecall (country): 1800 729 175

Email:  
[EPASiteContam@sa.gov.au](mailto:EPASiteContam@sa.gov.au)

Website:  
[www.epa.sa.gov.au](http://www.epa.sa.gov.au)

For **health related information** on site contamination please contact:

Scientific Services Branch,  
Public Health Services, SA Health  
11 Hindmarsh Square  
Adelaide SA 5000

Telephone:  
(08) 8226 7100

Email:  
[public.health@health.sa.gov.au](mailto:public.health@health.sa.gov.au)

Website:  
[www.sahealth.sa.gov.au](http://www.sahealth.sa.gov.au)

