UNLEY ASSESSMENT AREA

Key messages

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Why is the EPA undertaking assessment works in Unley now?

On behalf of the SA government, the EPA manages the legacy of existing contaminated orphan sites. An orphan site is 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.

The EPA has developed a prioritised works programme to investigate sites where it holds enough information to warrant further investigation into whether there is a potential human health risk. The EPA is aware of site contamination in the Unley area resulting from historic industrial and chemical disposal and handling practices.

When groundwater contamination happens near residential properties, these chemicals can potentially enter into homes in vapour form. The information provided historically is incomplete and a number of data gaps have been identified by the EPA.

At this time it is not known who caused the site contamination. As a result the area is deemed to be an orphan site and the EPA will, on behalf of the community, assess the potential for a human health risk. In order to determine whether soil vapour intrusion is occurring in the Unley assessment area, works to gather more data will assist the EPA in its understanding of the soil vapour composition, and whether any additional assessment works are required. Works are being undertaken in road verges and are not required to be on private properties.

What triggered the EPA assessment?

Assessment of a site under audit adjacent to the EPA assessment area previously identified 49,000 micrograms per cubic metre ($\mu g/m^3$) of TCE in shallow soil vapour and the auditor notified the EPA of a potential significant hazardous circumstance. This was remediated by the responsible party at the time, and follow up testing identified significantly reduced TCE in shallow soil vapour.

The notification however, indicated there may be an up gradient offsite source. The EPA understands that the same historical activities were likely to have been undertaken elsewhere in the assessment area. The reports held were undertaken over the last decade and the EPA identified a number of data gaps because they were completed prior to soil vapour being considered together with groundwater. The EPA is undertaking the works to gather more data to understand the composition of the soil vapour, and whether any additional assessment works are required.

How does this compare to Clovelly Park?

In Clovelly Park, the EPA was notified that levels of trichloroethene (TCE) had been measured in indoor air that were above levels that SA Health consider acceptable according to the Indoor air level response range (TCE). The EPA does not hold any information that indoor air in Unley is affected by soil vapour intrusion. The works are part of a programme to obtain further information, as the historical information held by the EPA was completed before this was widely considered as an exposure pathway.

When did the EPA find out about this and why has it not acted until now?

The EPA was notified by an auditor that there may be a potential site of groundwater contamination in 2013. The EPA holds information on almost 2,200 sites that have been listed on the Public Register. 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. While it is not economically feasible to remediate every contaminated site, the EPA prioritises sites that have the potential to present a health or ecological risk and Unley is next on the EPA's prioritised works programme to undertake further investigations.

Are people going to be evacuated?

In the rare instance that a home is affected by soil vapour intrusion, the EPA works with residents to manage any potential 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.

What information does the EPA hold in regards to Unley?

The EPA holds a number of site contamination assessment reports for several sites between Charles Lane and Mary Street at Unley. The area comprises a mix of commercial, industrial and residential land. Site contamination is believed to come from historical industrial land uses such as refrigeration manufacturing, furniture manufacturing, cabinet making, boot making and a drapery.

South Australia has a proud manufacturing history and some chemical disposal and handling practices in these industries, that were considered appropriate at the time, are no longer acceptable by today's environmental standards. Certain chemicals found in groundwater can cause health problems if people are exposed to high enough concentrations over long periods of time.

The majority of the historic reports held by the EPA were completed at a time where soil vapour was not broadly considered however, and after a review of historic files the EPA has determined that it is necessary to undertake further investigations to ensure there is no potential human health risk from vapour intrusion.

What do the works entail?

The installation of 22 small temporary bores containing soil vapour samplers will commence in late May and be in place for approximately 10 days.

The bores will be installed with a hand auger and covered with a temporary plastic lid. They will take around 45 minutes at each location and then after 10 days the sampler is removed and the bore is refilled with soil.

When will the results from the Unley test area be available?

Results are expected to be analysed and communicated to residents by July 2017.

Are home grown vegetables safe to eat?

Contaminated groundwater generally does not contaminate the soil above it. Provided you are not watering your home grown vegetables with contaminated bore water, they are safe to consume. Most of the time roots don't go down as far as the groundwater, but even in instances where they do – such as grape vines in times of drought – there is no evidence of fruit having absorbed the chemicals of concern.

Is bore water safe to use?

Bore water (groundwater) in this area is contaminated and should not be used for any purpose, 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. 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 and follow the links to 'Our Services', then 'Analytical and Field Services' and 'Bore and Rain Water Testing'.

Can I use my bore if I'm only watering lawns?

The EPA recommends that bore water in this area not be used for any purpose. Coming into contact with groundwater through the skin has the potential for dermal exposure to contamination. For commercial owners there is an additional occupational health and safety factor to consider, as is the case for bores that are used to water public spaces. Extracting groundwater near a contaminated site can also have the effect of drawing the contamination further towards your property and others.

Where are Adelaide's groundwater contamination hotspots?

Site contamination exists in most urbanised areas in the world. South Australia is no exception, particularly suburbs on or near current or former industrial land. As recently as the 1980s, chemicals used by industry were simply tipped down drains and poured onto soil to evaporate.

Groundwater contamination is usually a long-term environmental legacy. Chemicals found in groundwater across metropolitan Adelaide include volatile organic compounds (petroleum hydrocarbons, chlorinated hydrocarbons and other organic compounds), pesticides, polycyclic aromatic hydrocarbons and nitrates.

What is the EPA doing about it?

Once polluted, aquifers can be very difficult to restore. Under the *Environment Protection Act 1993*, known or suspected groundwater contamination must be reported to the EPA. The EPA can require the liable party to undertake 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.

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. 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.

And what if there is no liable party?

Sometimes identifying the polluter is difficult because it is often the result of previous industrial activity or activities 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.

An 'orphan' site is a term used to describe a situation where the original polluter no longer exists, cannot be determined or is unable to carry out or pay the costs of the assessment or remediation that is required. 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 existing contaminated orphan sites. This funding commitment recognises the importance the Government places on dealing with the issue of historical contamination.

How many orphan sites is the EPA currently assessing?

The EPA is currently undertaking works at orphan sites in:

- Beverley
- South Eastern Edwardstown
- Hendon
- Glenelg East
- Unley
- Thebarton

What about when groundwater causes soil 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.

What if the EPA finds soil vapour intrusion exists in Unley?

The purpose of the works at Unley are to determine whether soil vapour intrusion exists, and if so what further assessment works need to be undertaken. These works might include sampling on private properties closer to residential buildings, possible soil vapour sampling, indoor air sampling and crawl space or sub-slab sampling. All works on private properties will require the permission of the landowner to do so.

What assistance will the government provide is soil vapour intrusion is detected?

Cabinet has endorsed an *Exceptional Circumstances Policy for Management of Orphan Sites that also Present an Unmanaged Public Health Risk (the Policy).*

The Policy applies to private properties, both residential and commercial that are affected by site contamination that was unknown at the time the properties were acquired, and are contaminated to an extent that presents a significant public health risk.

Where effective mitigation requires an engineered solution with installation of equipment at an individual property, such as where there is vapour intrusion from TCE, the owner may apply for assistance from the State Government to install a vapour intrusion mitigation system. Written agreement with individual owners will be required to consent to the works, contribute to the cost, and maintain installed equipment or other building improvements.

The Policy does not apply to public land, land subject to development, or where there is no significant health risk.

What can be done to neutralise the contamination?

Chlorinated hydrocarbons are incredibly difficult to remediate. They are also very persistent in the environment. There are some technologies that are successful in treating source zones - for example bioremediation, oxidation, thermal, excavation, and pump and treat at the surface. Whilst this can deal with the source zone it has limited impact on reducing the off-site contaminated groundwater plume size and associated risk.

World-wide research to date has failed to deliver any technology that can effectively and efficiently reduce large scale contaminated groundwater plumes. The most confounding issue is the ability of any technology to deliver a treatment into the aquifer at the exact depth where the chlorinated hydrocarbons are located and for it to have an effect. Typically the radius of influence, or the distance from the injection or extraction point, is a few metres. In addition chlorinated hydrocarbons are heavier than water. Finding where they lie within the aquifer can be extremely difficult. This lowers the effectiveness of any technology applied to the remediation of contaminated groundwater plumes. Generally, source zone remediation will be required by EPAs, with the risk associated with offsite impacts managed / treated / monitored on a case by case basis.

There are typically two risks - the first is use of contaminated groundwater, which is managed through groundwater restriction or prohibition. The other risk is vapour intrusion into buildings and assessment is undertaken to quantify the extent of this risk. If necessary, to prevent vapour intrusion there are a few effective solutions such as vapour barriers, sub-slab depressurisation and soil vapour extraction that can be used to manage this risk. These are generally effective world-wide.