

## Odour reduction on Le Fevre Peninsula

Updated February 2012

*EPA 881/12: The Environment Protection Authority has been working with a number of licensed facilities on the Le Fevre Peninsula to reduce nuisance odour. This information sheet describes the background to the issue and the work currently in progress to address odour concern from the community.*

### Introduction

In response to community concern, the Environment Protection Authority (EPA) has investigated potential sources of nuisance odour on the Le Fevre Peninsula. A number of facilities have been identified as potential sources of odour, including the major fuel storage terminals, and bitumen processing and blending plants.

### Odour complaints

Odour complaints occur when individuals consider the odour to be unacceptable and are sufficiently annoyed by it to take action. As well as an individual's sensitivity, there are five factors that influence odour complaints:

- frequency of occurrence
- intensity
- duration of exposure
- offensiveness
- location of the odour source.

The offensiveness of an odour is very subjective and relates closely to an odour's hedonic tone—the degree to which an odour is perceived as pleasant or unpleasant.

Odour offensiveness is also related to its character—what the odour smells like. Character allows one to distinguish between different odours. For example, ammonia gas has a pungent and irritating smell. The character of an odour may also change with dilution. For these reasons, odour offensiveness is difficult to quantify; however, the other four factors are quantifiable and can be built into a regulatory guideline.

### Legislation

The principal legislation dealing with odour in South Australia is the *Environment Protection Act 1993* (the EP Act). In particular, section 25 imposes the general environmental duty on all persons undertaking an activity that may emit odour to take all reasonable and practicable measures to prevent or minimise any resulting environmental harm. In addition, causing an odour may constitute environmental nuisance, an offence under section 82 of the EP Act.

## Subject odour

The odours of concern raised by members of the community on Le Fevre Peninsula have typically been identified as a strong petroleum-type odour, often described as diesel, bitumen or petrol.

The odours have been identified by the EPA as volatile organic compounds (VOCs), which are organic chemical compounds with high enough vapour pressures under normal conditions to significantly vaporise and enter the atmosphere. The odours occur particularly as air is expelled from storage tanks and trucks as they are filled with fuel and/or bitumen products.

## EPA odour requirements<sup>1</sup>

The overall objectives in the management of potentially odorous industries or facilities are to:

- minimise odour emissions and their impacts
- ensure that the industry or facility does not expose neighbouring land users to an unacceptable level of odorous emission
- ensure that the industry operates in such a manner that the odour emissions are managed within the accepted criteria
- apply principles of ongoing risk evaluation and management, given the evolving understanding of odours and their potential health effects.

Unfortunately, there are no instrument-based methods that can measure an odour response in the same way as the human nose. Dynamic olfactometry, as it is known, is the basis of odour management and is the method approved by the EPA.

Dynamic olfactometry is the measurement of odour by presenting a sample of odorous air to an independent panel, in a range of dilutions, and seeking responses from the panelists on whether they can detect the odour. The correlations between the known dilution ratios and the panelists' responses are then used to calculate the number of dilutions of the original sample required to achieve the odour threshold.

The units for odour measurement using dynamic olfactometry are 'odour units' (OU).

Facilities on the Le Fevre Peninsula are required to comply with the population-based odour criteria of two odour units at their boundary.

## Addressing the odours of concern

The EPA has worked closely with all facilities identified as potential odour sources on the Le Fevre Peninsula.

Each of the facilities has developed an Environment Improvement Program (EIP) to improve odour management from their site. The facilities are required to implement their EIPs as part of their EPA licence conditions.

Management methods being employed include the installation of floating roofs on fuel storage tanks to minimise odour release during filling, the installation of vapour recovery units during truck tanker filling and the installation of VOCs oxidising technology at the main bitumen storage facility.

The EPA expects that odour on the Le Fevre Peninsula will be considerably reduced following finalisation of the work detailed in the fuel and bitumen facility EIPs.

The management methods being employed by the facilities are further described.

---

<sup>1</sup> For further information regarding measurement of odour, please refer to *Odour assessment using odour source modelling* (EPA 2007) <[www.epa.sa.gov.au/pdfs/guide\\_odour.pdf](http://www.epa.sa.gov.au/pdfs/guide_odour.pdf)>.

## Floating roof tanks

A floating roof tank usually comprises a cylindrical tank with a roof that floats on the surface of the stored liquid. The roof rises and falls with the liquid level in the tank. As there is no vapour space in a floating roof tank (except for very low liquid level situations), this eliminates breathing losses and greatly reduces the evaporative loss of the stored liquid, including odorous VOCs.

All fuel storage facilities have committed to the installation of floating roof tanks on all potentially odorous fuel storage tanks, with this work due to be finalised in 2012. Once finalised, all facilities are expected to achieve the 2-OU criteria at their boundary.

## Vapour recovery units

Vapour recovery units (VRUs) target those vapours displaced when trucks or tankers are filled. There are a number of methods by which to recover vapours generated during filling procedures. The most popular method amongst facilities on the Le Fevre Peninsula has been Activated Carbon Adsorption (ACA).

ACA uses two or more beds of activated carbon which over time become saturated with VOCs as vapours are passed through them. Multiple beds of activated carbon are used to ensure that one remains operational at all times. Once the activated carbon reaches full saturation point, it requires replacement or regeneration. One method of regeneration is pressure swing regeneration. This involves periodically cycling the carbon beds between adsorption and desorption.

Fuel storage facilities on the Le Fevre Peninsula have all installed VRUs in accordance with their approved EIPs. Verification monitoring and modelling has shown these units have been effective in dramatically reducing VOC emissions.

## VOC oxidation

Oxidation of VOCs involves subjecting the compounds to significant heat at specific residence times in a combustion furnace, in order to convert the VOCs to carbon dioxide and water. A catalyst is often used to reduce the temperature required for VOC destruction.

The main bitumen storage facility on the Le Fevre Peninsula has installed a thermal oxidiser to manage VOCs generated during filling of the main storage tanks. Verification monitoring and modelling has shown this facility now achieves the 2OU criteria at the boundary.

## Disclaimer

This publication is a guide only and does not necessarily provide adequate information in relation to every situation. This publication seeks to explain your possible obligations in a helpful and accessible way. In doing so, however, some detail may not be captured. It is important, therefore, that you seek information from the EPA itself regarding your possible obligations and, where appropriate, that you seek your own legal advice.

## Further information

### **Legislation**

Legislation may be viewed on the Internet at: <[www.legislation.sa.gov.au](http://www.legislation.sa.gov.au)>

Copies of legislation are available for purchase from:

Service SA Government Legislation Outlet  
Adelaide Service SA Centre  
108 North Terrace  
Adelaide SA 5000

Telephone: 13 23 24  
Facsimile: (08) 8204 1909  
Website: <[shop.service.sa.gov.au](http://shop.service.sa.gov.au)>

### **For general information please contact:**

Environment Protection Authority  
GPO Box 2607  
Adelaide SA 5001

Telephone: (08) 8204 2004  
Facsimile: (08) 8124 4670  
Freecall (country): 1800 623 445  
Website: <[www.epa.sa.gov.au](http://www.epa.sa.gov.au)>  
Email: <[epainfo@epa.sa.gov.au](mailto:epainfo@epa.sa.gov.au)>

---