ENVIRONMENT PROTECTION AUTHORITY

National Pollutant Inventory

South Australia summary report 2007–08

EPA South Australia

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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.

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Abbreviations

NPI	National Pollutant Inventory
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
EPA	South Australian Environment Protection Authority
ANZSIC	Australian and New Zealand Standard Industrial Classification
SA	South Australia

1 Introduction

Every year the South Australian Environment Protection Authority (EPA) provides a summary of the National Pollutant Inventory (NPI) in South Australia.

This summary report for the 2007−08 reporting year is an overview of the areas of focus for the NPI program. It discusses:

- industry emissions
- reporting transfers
- NPI and the new EPA licence fee structure
- estimating emissions for quarries

The NPI is a publicly accessible internet database <www.npi.gov.au>that provides information on pollutants emitted to the air, land and water environments across Australia. Since 1998 many industrial and commercial facilities that trip NPI reporting thresholds have estimated and reported their annual pollutant emissions. Diffuse emissions from sources such as motor vehicles are less frequently estimated by government agencies.

When interpreting NPI data it is important to understand how the NPI works, including common causes of data variation and factors that contribute to the emissions. Industrial facilities around Australia estimate their emissions by a variety of methods: mass balance, engineering calculations, direct measurement (monitoring) and emission factors. Each reporting facility is required to calculate their emissions annually. Two factors: **real changes** (such as process changes) and **estimation changes** (such as variation in the calculation method) influence the NPI calculation.

Real changes can be both process changes such as changing raw materials, manufacturing a new product, installing new equipment or improving emission reduction techniques or production levels.

Estimation changes can be due to changing the method of calculation, improvements to the accuracy of calculations, emission factor accuracy, the inclusion of new sources of emission, variability in monitoring data and number of samples taken per year.

As the NPI program matures so does data consistency. Emission factors are regularly updated and new sources of emissions are included to reflect current practices. Alterations to emission factors can lead to a change in emissions across an entire industry sector.

Acknowledgments

The SA NPI Team would like to acknowledge the members of the NPI Implementation Working Group for their interpretation of the emissions vs transfer case study. We would also like to acknowledge the members of the EPA Regulatory Reform and Performance Branch and the NPI Operational Committee for their contributions to and review of the report.

2 Industry emissions

Types of industries reporting

For the 2007−08 reporting period, the EPA received 442 NPI reports from industry which is a 9% increase from the 407 reports received in 2006−07. This increase in new reporting facilities is largely due to previous work targeting non-reporting facilities, concentrating on EPA-licensed facilities that are likely to exceed NPI thresholds. The EPA will continue to investigate non-reporting facilities in 2008−09.

In 2007−08, reports were submitted from a range of Australian and New Zealand Standard Industrial Classification (ANZSIC)1 industry sectors as shown in Figure 1.

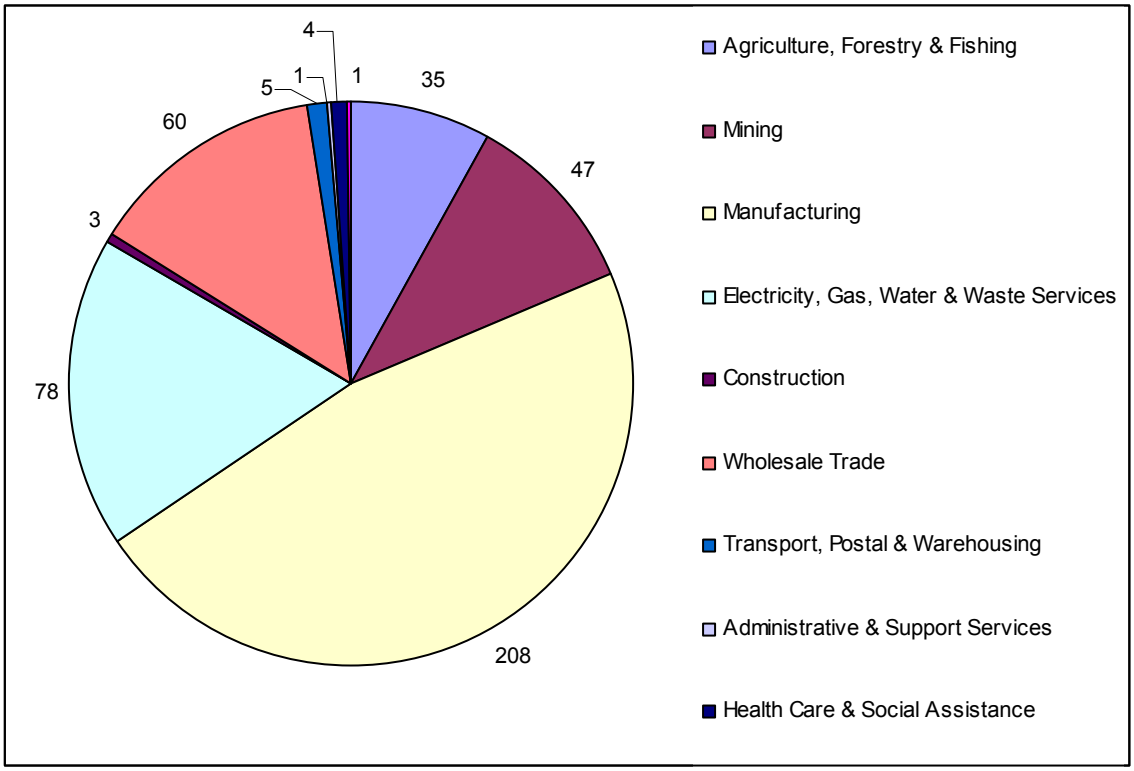

Figure 1 Proportions of ANZSIC industry sectors reporting to the NPI (as number of facilities per sector)

The number of facilities reporting across industry codes has remained relatively stable for the past few years. There has been an increase in reports from the agriculture sector similar to last year's increase, due to the identification of new reporters in the beef and cattle feed lot, and meat manufacturing industries. There has also been an increase in facilities reporting to the manufacturing industry which is attributed in part to wineries that fell below threshold last year but have had to report this year due to an increase in production.

[1] For more information on ANZSIC industry sectors, go to <www.npi.gov.au/reporting/industry/anzsic-code-list.html>.

Relative contribution of substances reported

While there are 93 substances included in the NPI, some substances are released in larger quantities than others. Figure 2 shows which substances are amongst the largest contributors to the overall pollutant load in South Australia. As highlighted in this figure, carbon monoxide, oxides of nitrogen and sulfur dioxide are the largest contributors to the total pollutant load in South Australia, contributing 77% and 82% in the 2006−07 and 2007−08 reporting years respectively. These percentages are relative to the total pollutant load in kg.

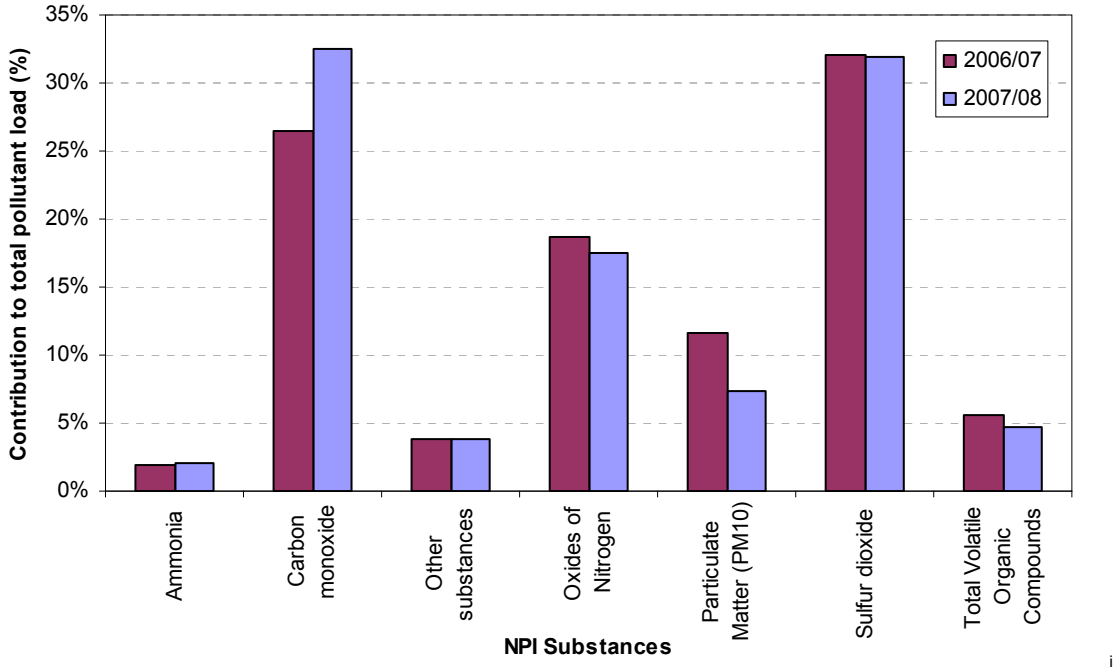

Figure 2 **Relative percentage contributions of NPI substances to the total pollutant load in South Australia in the 2006−07 and 2007−08 reporting years**

3 Case study: total volatile organic compounds

When interpreting NPI data it is important to have an understanding of the pollutants—what they are, where they come from and their effects. This section provides a case study on one of the NPI substances—total volatile organic compounds (TVOCs).

TVOCs are an important NPI pollutant because there are a large number of different sources contributing to the TVOC emissions in Australia and they can have significant impacts on human health and the environment.

Defining TVOCs

TVOCs are a grouping of a wider range of organic chemical compounds to simplify reporting when these are present in ambient air or emissions. The NPI definition of a VOC or volatile organic compounds is any chemical compound based on carbon chains or rings with a vapour pressure greater than 2 mm of mercury (0.27 kPa) at 25°C. Examples of VOCs include ethanol, acetone and benzene. A full list can be found in the NPI Guide.

These compounds may contain hydrogen, oxygen, nitrogen and other elements, but specifically excluded are methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides and carbonate salts. At normal temperatures, such compounds are likely to be present as a vapour or a gas.

An update to the Online Reporting System now allows easy identification of substances that are classified as VOCs. On the emission data screen an information panel underneath each substance will state ‘VOC’ for all substances defined as a VOC by the definition above.

Health and environmental effects of VOCs

The health effects depend on the specific composition of the VOCs present, their concentration and the length of exposure. General effects of exposure to VOCs include: irritation to the eyes, nose and throat; headaches; loss of coordination; nausea; and damage to the liver, kidney and central nervous system. Some VOCs can cause cancer in animals, and some are suspected or are known to cause cancer in humans. Build up of VOCs in indoor environments have been associated with 'sick building syndrome'.

TVOCs are a known causative agent of photochemical smog. Other environmental effects depend on the composition of the VOCs, the concentration and length of exposure. Some VOCs can have serious effects on animals and plants. Effects may also occur due to secondary impacts, such as the impacts of smog. In liquid form TVOCs may also impact on water and soil.

Sources of TVOC emissions

TVOCs are produced from a wide range of industrial, domestic, commercial and natural processes. Significant sources are processes producing or using solvents, paints or use of chemicals.

Major point sources of TVOCs in Australian cities are petrol refining, fuel storage and the manufacturing industry including: industrial machinery, vehicles and transport equipment; iron, steel and other metals; chemical products; wood products; plastic products; paper products; cement, lime and plaster products; ceramic products; oil, fat, petroleum and coal products; glass products; leather products; textiles and woven fabrics; electrical equipment and appliances; and food preparation.

Figures 3 shows the top emission sources of TVOCs in South Australia with industry data from 2007–08 and diffuse data from 2002–03. The main source of TVOCs in SA is from motor vehicles which contribute to 34% of all emissions.

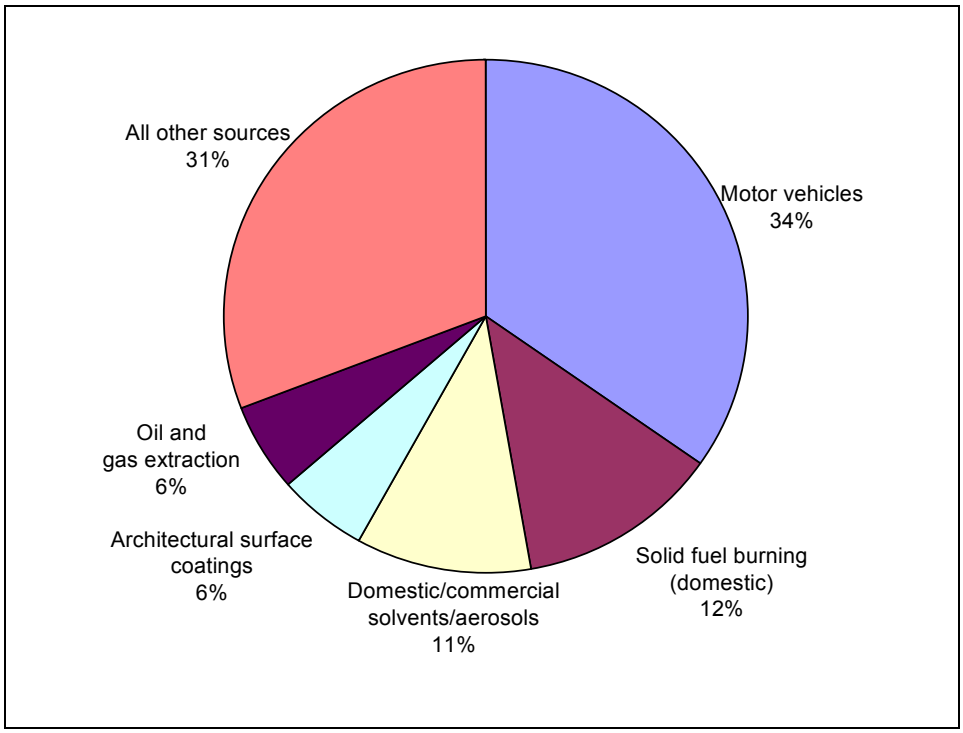

Figure 3 Top TVOC emission sources in SA

Ways in which TVOC emissions can be reduced

Industrial facilities can reduce TVOC emissions by using and maintaining pollution control equipment. Motor vehicles are the major contributor of TVOC emissions in SA. These emissions can be reduced by using more fuel efficient cars, using cars less and adopting alternative transport methods such as walking, bike riding and public transport.

4 Reporting of transfers

A transfer, by definition in the NPI National Environment Protection Measure (NEPM), is the 'transport or movement, on-site or off-site, of substances to a mandatory reporting transfer destination or a voluntary reporting transfer destination'. However transfers do not include 'the transport or movement of substances contained in overburden, waste rock, uncontaminated soil, uncontaminated sediment, rock removed in construction or road building, or soil used for the capping of landfills' (NEPC 2008). As of the 2008 calendar year reporting period, both mandatory and voluntary waste transfer reporting provisions have come into effect.

It is now mandatory for reporters to include transfers containing NPI substances to:

- long-term containment facilities such as landfill, tailings storage facilities, underground injection or purpose-built storage structures
- a destination to be destroyed
- an off-site sewerage system
- an off-site facility which leads to one of the above mentioned destinations.

Reporters can also voluntarily report transfers containing NPI substances for:

- reuse
- recycling
- reprocessing
- purification (wholly or partially)
- immobilisation
- remediation
- energy recovery.

Further information on transfers can be found in the *Transfers Information Booklet* which is available on the NPI website <www.npi.gov.au/publications/pubs/transfers-information.pdf>. This booklet also contains a guide for specific industries on whether certain waste streams are emissions or transfers. The NPI Guide has also been updated and includes a section explaining what transfers are <www.npi.gov.au/publications/pubs/npiguide.pdf>.

Report templates for both online and paper reporting have been amended to accommodate transfer data. Assistance with reporting transfers can be requested from the SA NPI Team.

Emissions versus transfers—a case study

With the reporting of transfers now a mandatory requirement, it is important to assess each waste stream carefully to ensure that transfers and emissions are correctly reported. However, this can sometimes prove to be difficult, especially within complex systems. This is highlighted by the following case study.

Facility 1 is a medium-to-large facility that operates, among other processes, a cooling tower and a reverse osmosis plant. The effluent from the reverse osmosis plant is discharged into an on-site stormwater pipe where it is then discharged into an on-site man-made wetland. The blow-down from the cooling tower is also discharged into the wetland via a separate on-site stormwater pipe. Facility 1 monitors the quality of the discharge from both stormwater pipes at their entry point into the man-made wetland.

A neighbouring facility (Facility 2) also operates a cooling tower and the blow-down from this is discharged into Facility 1's man-made wetland. The water quality of this discharge stream is also monitored at its entry point into the wetland. The settled solids in the man-made wetland are periodically removed by Facility 1.

Once at capacity, the man-made wetland overflows to a natural wetland on Facility 1's premises, which then overflows into a nearby water body. Facility 1 monitors the final water quality as it enters into the natural wetland. Both the man-made and natural wetlands are rarely dry. A map highlighting this is seen in Figure 5.

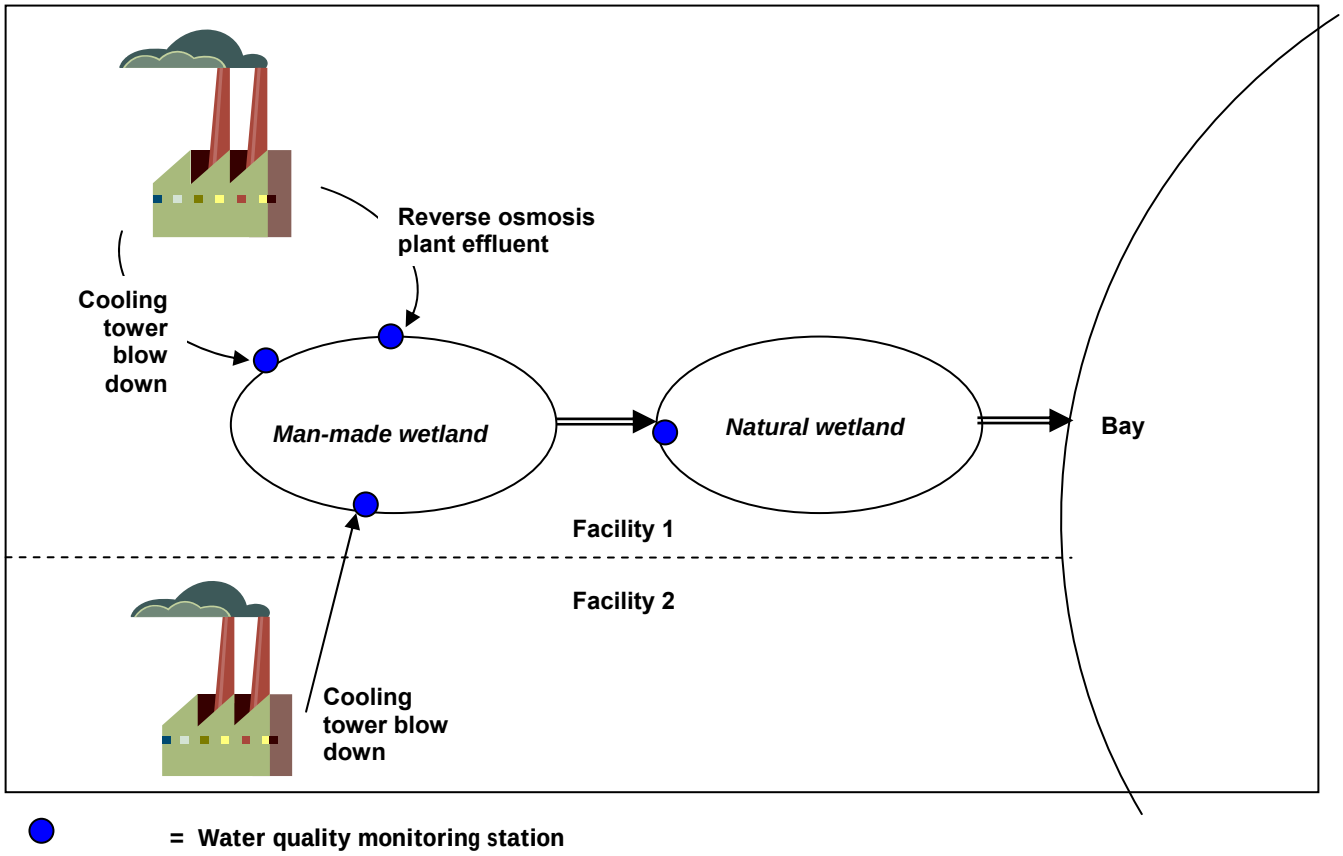

Figure 4 Map highlighting the movement of waste streams from Facility 1 and Facility 2

Based on this information and the interpretation of the NEPM, the man-made wetland is considered pollution control equipment as it was built for the purpose of improving the water quality and is maintained through intermittent cleaning.

Facility 1 would therefore report emissions to water from the overflow of the man-made wetland into the natural wetland. They would also report the settled solids removed from the man-made wetland going to landfill as a mandatory transfer.

Facility 2 would report a voluntary transfer of substances going to the man-made wetland, as the wetland will partially purify the discharge stream.

5 NPI and the new EPA licence fee system

On 1 July 2008, the EPA introduced a new licence fee system. Reviewing the earlier structure and its resulting changes came about in 2000 after the Environment, Resources and Development Committee of Parliament recommended that a larger proportion of licence fees should be based on the amount and type of pollutants discharged to the environment. In view of this, the state government decided to extend the use of load-based licensing.

The previous licence fee structure used by the EPA was dependent on the levels of production by the licensee and emissions to the marine environment. The new fee structure is a 'user pays' and 'polluter pays' system, with a minimum flat administration fee (<1% of total fee), an environment management component (~60% of total fee) and a resource efficiency component (~40%).

While the administration and environment management fees apply to all licences, the resource efficiency fee only applies when the amount of certain pollutants discharged is above threshold levels (Tables 1 and 2). The resource efficiency fee also applies to the above threshold discharge of low salinity waste water to marine environments.

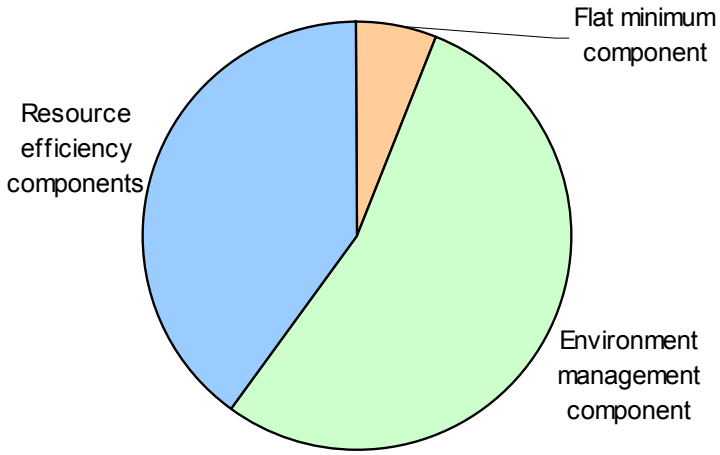

Figure 5 Breakdown of the new licence fee structure

The NPI is a pivotal part of calculating license fees through this new structure. NPI data, submitted to the EPA annually, can be used to estimate the resource efficiency fee part of the overall licence fee. The licensee can however choose not to use submitted NPI data to calculate this part of the fee if alternative emission data is supplied and approved. You will be asked your preference by the EPA each year. Substances that are included in calculating licence fees but are not reportable to the NPI are monitored and reported to a licence coordinator.

Further information on the new licence fee structure can be found at <www.epa.sa.gov.au/licensees/licence_fee_system>.

Table 1 Resource efficiency fee structure to air

Pollutant	Fee Units	Location of assessable site	Zone weighting	Threshold
Sulfur dioxide	1	All areas	1	10,000 kg
Nitrogen oxides	1	Adelaide airshed	2	10,000 kg
		Other areas	1	
Particulates	10	Mount Gambier airshed	2	1,000 kg
		In the case of red dust particulates—Whyalla airshed	4	
		Other areas	1	
Volatile organic compounds	10	Adelaide airshed	1.5	1,000 kg
		Areas outside the Adelaide airshed that are within a council area	1	
		Other areas	0.5	
Lead	100	Port Pirie airshed	15	100 kg
		Other areas	1	

Table 2 Resource efficiency fee structure to water

Pollutant	Fee Units	Location of assessable site	Zone weighting	Threshold
Heat	1	All waters of the state	1	10 MW
Suspended solids	10	Metropolitan coastal waters	2	1,000 kg
		All other waters of the state	1	
Nitrogen (total) NPI	10	Port River region or metropolitan coastal waters	3	1,000 kg
		All other waters of the state	1	
Phosphorus (total) NPI	10	Port River region	2	1,000 kg
		All other waters of the State	1	
Organic matter (as BOD5)	10	Lake Bonney (South East)	2	1,000 kg
		All other waters of the state	1	

Pollutant	Fee Units	Location of assessable site	Zone weighting	Threshold
Zinc NPI	10	Upper Spencer Gulf	2	1,000 kg
		All other waters of the state	1	
Copper & Lead NPI	100	Upper Spencer Gulf	2	100 kg
		All other waters of the state	1	

6 Estimating emissions from quarries

Estimating emissions for NPI for extractive industries such as quarries can be a reasonably complex process as it requires the use of several emission estimation technique manuals. In an effort to get some consistency in estimations across the industry as well as to simplify the estimation process, the SA NPI team has developed an easy-to-use estimation tool.

The estimation tool, which is on a Microsoft Excel© spreadsheet, covers emissions calculated using the following NPI emission estimation technique manuals:

- explosive detonation and firing ranges
- mining
- mining and processing of non-metallic minerals.

Emissions from fuel storage, combustion engines and combustion in boilers are calculated independently to the spreadsheet using the online reporting system calculation tools. The emissions from all of these tools are then summed together to be entered into the report.

A workshop for members of the quarry industry was held to demonstrate the new emissions estimation tool. The session also provided information and training on the new EPA licence structure and how it would affect the industry sector, potential changes to licence conditions being considered by EPA and how to use the online reporting system.

The workshop was attended by members from various facilities within the industry sector and based on feedback collected on the day, the workshop was deemed to be a success.

While no further industry specific workshops have been planned, requests for similar sessions for other industries can be made to the SA NPI team.

For further information on or a copy of the quarry NPI emission estimation tool, contact the SA NPI team.

7 More information

The NPI website

The NPI database and website <www.npi.gov.au> is the primary location for obtaining information relating to the NPI. All emission data used in this report can be obtained from the NPI database. The website also contains information on reporting to the NPI, calculating emissions, searching the database and details of the NPI substances and their chemical properties.

The SA EPA website

The SA EPA website <www.epa.sa.gov.au/npi> contains NPI information specific to South Australia including publications such as previous annual summary reports and an Interpretive Guide. The guide contains information of industry vs aggregate data, important tips on interpreting the data, and common errors that result in misinterpretation.

The SA NPI team

If you have any queries in relation to this document or the NPI in general, the SA NPI team can be contacted via email <npi@epa.sa.gov.au> or phone on 8204 9095.

8 References

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