ECONOMICS AND INDUSTRY STANDING COMMITTEE

RECOVERY AND RECYCLING OF USED OIL IN WESTERN AUSTRALIA

ISSUES PAPER

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in the 37th Parliament

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Economics and Industry Standing Committee

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RECOVERY AND RECYCLING OF USED OIL IN WESTERN AUSTRALIA

ISSUES PAPER

Report No. 8

Presented by:
Hon R.C. Kucera, MLA
Laid on the Table of the Legislative Assembly
on 29 November 2007

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COMMITTEE'S FUNCTIONS AND POWERS

The functions of the Committee are to review and report to the Assembly on: -

(a) the outcomes and administration of the departments within the Committee's portfolio responsibilities;

(b) annual reports of government departments laid on the Table of the House;

(c) the adequacy of legislation and regulations within its jurisdiction; and

(d) any matters referred to it by the assembly including a bill, motion, petition, vote or expenditure, other financial matter, report or paper.

At the commencement of each Parliament and as often thereafter as the Speaker considers necessary, the Speaker will determine and table a schedule showing the portfolio responsibilities for each committee. Annual report of government departments and authorities tabled in the Assembly will stand referred to the relevant committee for any inquiry the committee may make.

Whenever a committee receives or determines for itself fresh or amended terms of reference, the committee will forward them to each standing and select committee of the Assembly and Joint Committee of the Assembly and Council. The Speaker will announce them to the Assembly at the next opportunity and arrange for them to be placed on the notice boards of the Assembly.

TERMS OF REFERENCE

As part of its general oversight role with respect to a number of its allocated portfolio responsibilities, the Economics and Industry Standing Committee conducted preliminary inquiries into issues concerning the recovery and recycling of used oil in Western Australia.

In particular, the Committee investigated:

(a) the development of the current stockpile of waste oil due to the collapse of pre-existing markets;

(b) the processes of converting waste oil to used oil;

(c) the options for recycling and/or re-refining used oil into marketable commodities; and

(d) the options for developing used oil commodity markets in Western Australia.

CHAIR'S FOREWORD

This issues paper resulted from approaches to Members of the Economics and Industry Standing Committee from various stakeholders, in particular the motor trade industry and local government, seeking a long-term solution to the vexed question of the growing glut of used lubrication oil (lube oil) throughout Western Australia. The overarching role of the Committee is to oversight many of the areas that constitute the collection, processing and marketing of this material within the government departments that comprise the Committee portfolio.

Preliminary investigation through a series of briefings certainly indicates a current problem with a burgeoning stockpile of used oil. This has been caused by a doubling in usage by the resource sector and motor vehicle trade over the past five years, and a failure in a market that, until two years ago, was annually disposing of some 60% of this material.

Briefings also revealed that a number of short- and medium-term solutions are currently being investigated. There are plans and proposals underway that, if successful, could provide the long-term solutions that the community will inevitable demand.

In addition, the Department of Environment and Conservation (DEC) is developing a raft of legislation that will assist in terms of waste control generally.

The issue is not confined to Western Australia; neither are the long-term answers. Eventually it is an issue that will need to be tackled as a partnership between federal, state and local governments, and the various industry stakeholders, all of whom make up the facets of the ultimate solution.

The Committee sought briefings and information on the:

- extent of the problem, including the cause of both the current glut of used lubricants and the collapse of the pre-existing markets;
- processes necessary for the conversion of waste oil into marketable commodities;
- options for recycling and/or re-refining used oil; and
- options currently available, or those that should be investigated, for developing a range of markets for used oil products.

The Committee found that according to 2005-2006 statistics Western Australia uses 522 megalitres (ML) of lubricant oil annually. This amount has doubled in the past five years, the vast majority imported in the form of 'virgin' oil from overseas refineries.

In latter years, due to the collapse of the main market for used oil, namely its use as a fuel source, Western Australia has amassed an enormous stockpile of used lubricants at recognised storage facilities, local waste disposal sites and throughout industry generally. A more worrying aspect is

the deficit between oil that is sold and the amount collected each year. It is estimated that some 10 ML is unaccounted for annually.

This position is reflected right across the nation and has been recognised by all tiers of government. Nationally, in recognition of the need to dispose of used oil, the federal government has in place an industry stewardship programme that imposes a levy per litre on suppliers. The stewardship fund is then distributed to the various stakeholders by way of graduated subsidy to encourage collection, treatment and marketing of resultant products.

The levy has been very effective in setting up collection processes. However, it has been less successful in encouraging alternate processing, and almost noneffective at creating new markets for waste oil products.

The nation-wide volume of used oil is growing sufficiently to support a number of proposals that were advanced to the Committee. These include short-term solutions such as seeking overseas markets for fuel oil. However, the long-term solutions lie in re-refining for lube oil, and creating new markets such as bituminous products for road making.

For instance some 750,000 tonnes of bitumen products are imported annually into Australia for use by all levels of government on road building and maintenance. Current specifications preclude the use of used oil as a bituminous base, and rather than seek a set of standards that would encourage refining of used oil for this purpose, it appears to have simply been put into the 'too hard basket'.

Establishing long-term, viable solutions will need much greater government support, and a refocussing of the Product Stewardship for Oil (PSO) Program to facilitate new industries and new products. The Committee found a public appetite for increased contributions. In fact, many retail repair and maintenance shops, as well as local governments, are now charging an increased collection levy over and above the federal levy imposed at point of sale. This practice is not regulated.

There is some excellent research being undertaken and there are clear, but as yet undeveloped, solutions proposed that would not only deal with the overall glut of used oil, but would dramatically cut the amount of imported 'virgin' lube oils at a time when the spectre of 'Peak Oil' looms.

The key challenge is to bring all of these proposals together into a single, coordinated nation-wide approach, whilst being mindful of the unique difficulties at a state level. Furthermore, all solutions rely very heavily on a linking between point of sale of virgin product, collection, re-refining and marketing of new product.

Currently these links are tenuous, and should one of the 'dominos' fall there is a real danger that these proposed solutions may fail. In the meantime, all of the key stakeholders who provided information are obviously committed to both the short-term sale of fuel oil overseas, and the introduction of long-term programmes.

Used lube oil has the potential to become an extreme environmental hazard. The solutions do exist, but it is imperative that government at all levels support the establishment of a seamless, circular process of use, re-refining and reuse of lube oil products.

The Committee wishes to express its thanks to all stakeholders who gave freely of their time and resources. This paper is designed to highlight that there are many organisations working on long-term, permanent solutions. It is vital that we re-enforce the need to support their efforts. Toward this end, it is the intention of the Committee to revisit this issue one year hence to examine what progress has been made.

I would like to thank the Members of the Committee for their support and for their individual and collective efforts in undertaking these preliminary investigations. On behalf of the Committee, I would also like to thank our Principal Research Officer, Dr Loraine Abernethie, and Research Officer, Mr Peter Frantom, for their assistance in the preparation of this paper.

HON. R.C. KUCERA, APM JP MLA
CHAIR

ABBREVIATIONS AND ACRONYMS

AATSE	Australian Academy of Technological Sciences and Engineering
ABARE	Australian Bureau of Agricultural and Resource Economics
ACG	Allen Consulting Group
ACS	Australian Customs Service
AIP	Australian Institute of Petroleum
ALGA	Australian Local Government Association
ANZEC	Australia and New Zealand Environment Council
ATO	Australian Taxation Office
Basel Convention	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
BP	BP Refinery (Kwinana) Pty Ltd
CONCAWE	European Oil Company Organisation for Environment, Health and Safety
DEC	Department of Environment and Conservation
DEWR	Department of the Environment and Water Resources
DISR	Department of Industry, Science and Resources
DITR	Department of Industry, Tourism and Resources
DOCEP	Department of Consumer and Employment Protection
DOTARS	Department of Transport and Regional Services
EPR	Extended Producer Responsibility
KL	Kilolitres
LOREX	Lube Oil Re-refining and Exchange Pty Ltd
Meinhardt	Meinhardt Infrastructure and Environment Group
ML	Megalitres
MRWA	Main Roads Western Australia
MTAWA	Motor Trade Association of Western Australia (Inc)
Nationwide Oil	Nationwide Oil Pty Ltd

NEPM	National Environment Protection Measure
NUOMAC	National Used Oil Material Advisory Council
OIYLE	Oil in Your Local Environment
PSAs	Product Stewardship Agreements
PSO	Product Stewardship for Oil
PSO Act	*Product Stewardship (Oil) Act 2000 (Cwlth)*
SOR	Southern Oil Refinery
TAF	Transition Assistance Fund
Transpacific	Transpacific Industries Group Inc.
USEPA	United States Environmental Protection Agency
WARR	Waste Avoidance and Resource Recovery Bill 2006

EXECUTIVE SUMMARY

The collection and disposal of so-called waste or used oil received increasing attention in Western Australia during 2007, with much attention focusing on the enormous stockpile of waste oil in storage tanks in North Fremantle and Kwinana. This situation has been exacerbated by the decline of the market for waste oil as burner fuel in power generation. Concern was also raised regarding the possibility of the stockpile leading to inappropriate methods of disposing of the oil, such as illegal dumping. Given this concern, the Economics and Industry Standing Committee decided to undertake preliminary research to better understand the key issues and thus develop more refined terms of reference should a formal Inquiry be undertaken. The Committee's initial investigations revealed that a number of discussions were taking place between various interested parties with a view to solving the used oil crisis in the state. Therefore, the Committee considers that a formal Inquiry would not prove beneficial at this stage. Rather, the Committee decided to prepare this discussion paper to help raise awareness of the issues involved and to stimulate discussion on the subject. The Committee will also maintain a watching brief on used oil recovery and recycling in Western Australia.

This paper deals primarily with lubricating oils, which are petroleum-based oils processed from virgin oil and blended with a multiplicity of additives to produce lubricants of various qualities and characteristics to suit dedicated purposes. Australian Bureau of Agricultural and Resource Economics (ABARE) statistics reveal that the consumption of lubricants in Western Australia has increased from 266 megalitres (ML) in 2000-01 to 522ML in 2005-06. It is reasonable to suggest that the strength of the Western Australian economy is a significant factor in this growth in lubricant consumption, and as the economy increases in strength so, too, will the consumption of lubricating oil continue to grow.

It is important to note that oil does not wear out or degrade. While throughout its use lubricant certainly gathers contaminants such as carbon and metal filings, this oil retains calorific and economic value. It remains a material that is available for recycling to remove wear materials and additives which, in turn, allows the oil to be used as industrial burner fuel and hydraulic oil, or to be blended with other oil or re-refined into new lubricating oil. Therefore, the term 'waste oil' is a misnomer, and oil that is no longer new is more appropriately referred to as used oil.

Not all the oil being used is available for recycling and/or re-refining. Some is necessarily consumed during use, either directly, for example, through combustion, or indirectly through minor leaks and spills during its applied process. Oil is also lost at other points in the supply chain such as in storage, handling, transport and maintenance. Of the total amount of used oil generated, only a relatively small proportion is collected for recycling and a significant quantity of used oil remains unaccounted for or lost. Evidence suggests that the majority of this unaccounted for used oil is potentially recoverable.

While Western Australia has increasing quantities of used oil, partly as a direct result of the strong resources sector, there has been a significant decline in existing markets for recycled used oil. This decline is the result of several factors including:

- the change from burner oil to natural gas for electricity generation;
- the closure of the calcining plant in Kalgoorlie;
- the unsuitability of used oil in the burner fuel market; and
- resistance to using used oil in cement plants in Western Australia.

At the time of writing this paper, the current markets for Western Australian used oil consist mainly in exporting the oil to Singapore and Christmas Island for use as burner fuel.

Australia and Western Australia are not alone in facing problems concerning the collection, disposal and/or recycling of used oil. This is a problem faced by many countries, and one that has been met with various responses and government initiatives. In Australia, in 2001, the federal government instituted the Product Stewardship for Oil (PSO) Program to encourage the collection and recycling of used oil. The PSO, implemented under the auspices of the *Product Stewardship (Oil) Act 2000 (Cwlth)* (*PSO Act*), operates through a system of benefit and levy rates designed to promote product stewardship. The levy is applied to imported and domestically produced oil and is paid by importers and producers. The benefit is paid to recyclers of used oil to help make recycling more financially attractive. There is a scale of benefit rate depending upon the category of oil produced by the recycling process, with re-refined base oil for use as a lubricant receiving the highest rate of 50 cents per litre.

The PSO Program also provided for the funding of projects that aimed to address more fundamental barriers to recycling, such as the lack of adequate infrastructure. This funding was provided through the Transition Assistance Fund (TAF). Almost all of the TAF money went to establishing used oil collection facilities. Both the *PSO Act* and the TAF have been reviewed by independent consultants who noted the growth of strong local government support for the development of centralised used oil collection facilities, the high number of recyclers involved in the program, and the large financial investment in lube-to-lube recycling equipment as examples of the Program's success. However, the review of both the *PSO Act* and TAF expressed concerns regarding the lack of data in some areas and variations in data provided by a range of sources. The review of the *PSO Act* found that the rate of benefits paid is problematic, particularly as they are skewed towards lube-to-lube recycling at the expense of other options. The *PSO Act* review provided several reform options for the Program, and these are shown in Chapter 2 of this paper.

To better grasp the issues and challenges involved in recycling used oil it is necessary to understand the conversion of so-called waste oil into used oil. To this end, Chapter 3 provides discussion on the volume of used oil available for recovery in Australia. Because of the lack of accurate or reliable data on the Western Australian situation, the Committee, through the application of a set of generation factors to the total volume of oil sales, has speculated on the volume of used oil available for recovery in Western Australia. While it is difficult to determine a precise figure, it is estimated that 10ML of used oil is unaccounted for in this state each year.

The process of converting waste oil into used oil begins with the collection of the oil from the various sites at which it is held. Due to the success of the TAF in this regard, this is often from local government collection facilities. In Western Australia, as at June 2006, there were 71 such

sites across the state. Some used oil is also collected direct from the point of use, for example, from mine sites or motor vehicle repair shops. Regardless of whether it is from a local collection facility or from point of use, collection is carried out by commercial collectors and/or recyclers of used oil who transport it to reprocessors, recyclers and re-refiners for converting the waste product into usable commodities. There are two main collection companies in Western Australia and until recently these had collected oil free of charge. Recently, though, a collection charge has been instituted.

Following collection the oil is stored until a market is found or it is sent for recycling. Because of the decline of the burner fuel market in Western Australia, in combination with increased collection facilities, there has been an enormous increase in the quantity of oil to be stored and a critical lack of storage space available. This resulted in the two major oil companies ceasing collection for some months, which necessarily impacted upon the collection points' capacity to maintain oil collections. This, in turn, led to concerns about inappropriate disposal of the excess quantities of used oil.

Because of the contaminants found in used oil and the chemical properties of the oil itself, there are a number of processes of varying complexity available to recycle and/or re-refine the oil. This issue is discussed in Chapter 4, with attention focussed on the technology employed at existing facilities in Wagga Wagga and Rutherford. Plans and proposals to develop facilities in the Hunter Valley, New South Wales, and in Picton, Western Australia, are also discussed in this chapter.

While the Committee congratulates those in the public and private sectors who are working towards a long-term viable solution to the problem of used oil in the state, and notes the significant progress made over the course of this year, it also notes that there are a number of challenges that remain.

First, it is important that accurate data is generated to provide a clearer picture of the used oil circumstances that exist in Western Australia. The lack of accurate information on the volumes of oil sold, collected, used and unaccounted for will impact upon the state's ability to develop a viable long-term market for used oil.

Second, a very small quantity of oil, used or otherwise, has the capacity to pollute a large amount of land or water. Unless all oil is disposed of appropriately there is a significant risk of environmental damage and harm to human health. Used oil has the potential to become hazardous waste. Furthermore, because the recycling and/or re-refining process, by definition, removes contaminants and wear materials from the used oil, the process necessarily produces a by-product or residue. The characteristics of the residue will reflect those of the used oil being processed and the particular stage at which the residue is produced. The higher the quality of residue the more marketable it is and/or the easier it is to find a safe and appropriate method of disposal. Some residue is suitable for use as burner fuel. However, this does not apply to all used oil residue. There is some evidence to suggest that it may be suitable for incorporation into asphaltic material, but this is still subject to testing.

Third, the shipment of used oil offshore presents significant risk of environmental damage. Shipments must also comply with the Basel Convention. These issues are also addressed in Chapter 5.

Fourth, the problems associated with the collection, storage and recycling/re-refining of used oil also raise issues concerning extended producer responsibility (EPR). In Western Australia the Waste Avoidance and Resource Recovery Bill 2006 (WARR), which is currently before the Parliament of Western Australia, provides for voluntary product stewardship agreements (PSAs) for priority wastes to help producers and consumers share the responsibility for dealing with waste. However, there is concern over the definition of priority waste and whether this will be sufficient to the task of implementing EPR.

Fifth, as previously noted, recycling used oil necessarily produces a residue. This residue is left at the floor or bottom on the tank and is generally referred to as 'bottoms'. Bottoms can take various forms, depending on their fluidity. Bottoms are the most noxious of the end products of the recycling/re-refining processes and are, therefore, the most difficult to dispose of safely and effectively. One possible solution suggested is to incorporate bottoms into the bitumen used on the state's roads. Currently, specifications for bitumen for use on roads are based on the properties of bitumen refined from crude oil, and Main Roads Western Australia (MRWA) has no direct experience in using bitumen that incorporates used oil residue. However, the possibility of using used oil residue as a bitumen supplement has been proposed by oil recyclers and presented as a way to appropriately dispose of the residue. A test plant to produce bituminous product from waste oil is planned for construction in Fremantle, with commissioning expected to be in 2008. MRWA has been appointed to the Steering Group for the project primarily to provide technical input. The use of used oil residue in bitumen production remains a contentious issue in terms of its unknown qualities, and extensive testing is required by both MRWA and industry to establish whether used oil residue can be successfully utilised as a supplement in bitumen production.

Finally, while the PSO Program is an excellent concept and has achieved significant success, particularly in connection with used oil collection, there are several factors that reduce its effectiveness in encouraging used oil recovery and recycling in Australia. There are concerns surrounding the ability of the benefit rate to encourage investment in recycling facilities and its potential to encourage producers of oil to take up their extended producer responsibilities. These issues are discussed in the final section of Chapter 5.

Given the strength of the Western Australian economy and the increasing volume of oil that will be consumed to maintain this growth, it is vital that the initiatives currently being developed and considered are supported and monitored to ensure that the state does not experience a recurrence of the used oil glut that occurred earlier this year.

MINISTERIAL COMMENT

The Economics and Industry Standing Committee invites comment from the Minister for the Environment, the Minister for Planning and Infrastructure, the Minister for Resources; Industry and Enterprise, and the Minister for Local Government on the issues raised in this report.

CHAPTER 1 INTRODUCTION

1.1 The Committee

The Economics and Industry Standing Committee was appointed on 7 April 2005. Pursuant to Legislative Assembly Standing Order 287(3), the portfolio responsibilities of the Committee are: Energy; Consumer and Employment Protection; Science; Agriculture and Forestry; Fisheries; Water Resources; Housing and Works; Heritage; Planning and Infrastructure; State Development; Land Information; Tourism; Small Business; Racing and Gaming; Regional Development; and The Regional Development portfolios of the Midwest and Wheatbelt; the Kimberley, Pilbara and Great Southern.

On 15 August 2007 the Committee met to consider areas of particular interest for potential inquiries. To assist its decision-making, the Committee determined to undertake preliminary research on a number of topics from its portfolio areas of responsibility. One of the issues considered by the Committee is that of used oil recovery and recycling in Western Australia.[1] Before proceeding with a formal Inquiry, however, the Committee decided to develop an issues paper on the subject to develop awareness of, and stimulate discussion about, the subject. In this way, the Committee aimed to gain a more in-depth understanding of the key issues and thus develop more refined terms of reference should a formal Inquiry be initiated.

The Committee received a series of briefings from state agencies and other identified key stakeholders. Although briefings to the Committee are not transcribed and made publicly available, a list of those who provided the briefings can be found in Appendix One. This discussion paper is based upon the information gathered in these briefings as well as data generated through research based on a number of primary and secondary documentary sources.

1.2 Background

The disposal of so-called 'waste' oil is an issue that recently has received increased attention and publicity in Western Australia. For example, in July 2007 Channel 7's *Today Tonight* ran a story called *The Black Curse* concerning the stockpile of used motor oil. In this programme, the stockpile was referred to as 'a ticking time bomb'.[2] In the May/June edition of *Motor Western Australia*, Natalie Sharp discussed a used oil glut and argues that 'the volume of stockpiled used oil has reached crisis point'.[3] Peter Fitzpatrick's Executive Comment in this same issue labelled waste oil collection in the state 'a shambles' and suggests that 'motor industry businesses in Western Australia, and ... many other areas such as the resources sector, are currently awash with

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1 This report is concerned with petroleum based oil and excludes other types of non-petroleum based oils such as vegetable oils, cooking oils and food oils.

2 'The Black Curse', *Today Tonight*, Channel 7, 10 July 2007.

3 Sharp, Natalie, 'The Used Oil Crisis. Where to for the Future?' *Motor Western Australia*, vol. 72, no. 3, May/June 2007, p4.

waste vehicle oil'.[4] On 6 September 2007 a grievance was raised to the Minister for the Environment in the Western Australian Legislative Assembly concerning 'an issue that is perhaps becoming more pertinent to Western Australians in light of the current economic boom and increased activity in the resources sector'.[5] In response, the Minister for the Environment, the Hon. D.A. Templeman, stated that 'a number of members have raised this issue with me and with the Department of Environment and Conservation (DEC), and it has been raised also with other members of Parliament by various key interest groups and stakeholders throughout Western Australia'.[6]

1.3 Petroleum-Based Virgin Oils to Used Oil Stockpile - The Pathway

Petroleum-based oils, which range in levels of viscosity, are processed from virgin oil and blended to produce a multiplicity of products designed for particular applications. This process also includes the incorporation of additives to enhance performance.[7] According to a Meinhardt Infrastructure and Environment Group report (Meinhardt report), such additives include:

- detergents/dispersants (to prevent build-up of sludge);
- foam inhibitors;
- modifiers (for extreme pressure, anti-wear and/or friction);
- oxidation inhibitors;
- pour point depressants (to prevent formation of wax crystals);
- rust and corrosion inhibitors; and
- viscosity index improvers (to facilitate flow of oil).[8]

The main uses for petroleum based oils in Australia are:

- ***Automotive:*** *Motor vehicles utilise oil in a range of applications, including engine crankshaft lubrication, gearbox lubrication and hydraulic fluids for brake systems.*

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4 Fitzpatrick, Peter, 'Waste Oil Collection a Shambles', Executive Comment, *Motor Western Australia*, vol. 72, no. 3, May/June 2007, p2.

5 Mr B.S. Wyatt, Western Australia, Legislative Assembly, *Parliamentary Debates* (Hansard), 6 September 2007, p4945.

6 Hon. D.A. Templeman, Minister for the Environment, Western Australia, Legislative Assembly, *Parliamentary Debates* (Hansard), 6 September 2007, p4946.

7 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p2.1-2. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

8 ibid., p2.2.

- ***Industrial:*** *Any industrial process using fixed equipment with moving parts will utilise oil, however engineering industries with metal cutting and finishing activities will be large users of oils.*

- ***Marine, Aviation and Railway****: Used for engine applications, hydraulic systems and other uses.*

- ***Other:*** *Small amounts are used in a range of other applications (e.g. electrical equipment such as transformers and capacitors).*[9]

Each year, as the following Tables 1.1 and 1.2 illustrate, millions of litres of petroleum products are consumed in Australia and Western Australia. Since 2000-01 the quantity of lubricant products consumed in Australia has increased from 2,250 megalitres (ML) to 2,867ML, an increase of 27.42%. In Western Australia the increase has been much more marked, rising from 266ML to 522ML, an increase of 96% over the six year period. A significant proportion of this increase in lubricant products consumed in Western Australia occurred in the 2004-05 to 2005-06 period in which consumption increased by 130ML, a 33.16% increase in one year. Western Australia has also experienced an increase in automotive gasoline consumption (69%) for the 2000-01 to 2005-06 period that far exceeds the national increase (9.6%). This increase is largely due to the rise in Western Australia of LPG automotive gasoline which rose from 397ML in 2004-05 to stand at 1,869ML in 2005-06.[10]

It is not unreasonable to suggest that much of the increase in the consumption of petroleum products in Western Australia is a result of the strength of the economy in the state, particularly the resources sector, together with the resultant increase in population to meet the growing demand for labour.

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9 ibid., p2.2.

10 Australian Bureau of Agricultural and Resource Economics, 'Australian Consumption of Petroleum Products - megalitres', July 2007. Available at: http://www.abareconomics.com/interactive/energy/excel/table_k_updates_o7.xls. Accessed on 5 October 2007.

Table 1.1: Australian Consumption of Petroleum Products - megalitres

Year	Automotive Gasoline[1]	Aviation Fuel[2]	Kerosene	Diesel[3]	Lubricants[4]	Bitumen	Other Products[5]	Total Petroleum Products[6]
2000-01	22,911	5,419	29	13,416	2,250	716	3,375	48,162
2001-02	22,678	4,700	75	14,188	2,332	755	2,486	47,150
2002-03	23,078	4,340	24	13,906	1,992	671	4,234	48,020
2003-04	24,130	4,419	22	14,578	2,084	742	5,058	50,630
2004-05	23,243	4,895	12	16,485	2,732	811	2,246	50,107
2005-06	25,109	5,510	27	16,681	2,867	805	2,391	53,043

[1]Includes LPG as petrochemical feedstock, leaded and unleaded. [2]Includes aviation gasoline and turbine fuel. [3]Includes automotive diesel oil and industrial diesel fuel. [4]Includes greases and fuel oils. [5]Includes heating oil and crude oil used as fuel, naptha, refinery fuel sold, solvents, petroleum coke and specialty feedstocks. [6]Excludes refinery fuel used in refineries and losses.
Adapted from ABARE data.[11]

Table 1.2: Western Australian Consumption of Petroleum Products - megalitres

Year	Automotive Gasoline[1]	Aviation Fuel[2]	Kerosene	Diesel[3]	Lubricants[4]	Bitumen	Other Products[5]	Total Petroleum Products[6]
2000-01	2,216	521	3	2,746	266	96	365	6,212
2001-02	2,232	429	4	2,773	334	84	551	6,406
2002-03	2,267	414	3	2,721	247	71	869	6,591
2003-04	2,299	406	3	2,815	313	69	871	6,775
2004-05	2,314	452	0	3,444	392	87	71	6,759
2005-06	3,760	715	3	3,101	522	100	88	8,288

[1]Includes LPG as petrochemical feedstock, leaded and unleaded. [2]Includes aviation gasoline and turbine fuel. [3]Includes automotive diesel oil and industrial diesel fuel. [4]Includes greases and fuel oils. [5]Includes heating oil and crude oil used as fuel, naptha, refinery fuel sold, solvents, petroleum coke and specialty feedstocks. [6]Excludes refinery fuel used in refineries and losses.
Adapted from ABARE data.[12]

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11 Australian Bureau of Agricultural and Resource Economics, 'Australian Consumption of Petroleum Products - megalitres', July 2007. Available at: http://www.abareconomics.com/interactive/energy/excel/table_k_updates_o7.xls. Accessed on 5 October 2007.

12 ibid.

Oil that has been through its dedicated application process is often referred to as waste oil. While contaminants such as carbon and metal filings, as well as those from fuel, water and microbial activity, enter the oil throughout its use, to refer to such oil as 'waste' is a misnomer - oil does not degrade; it remains a commodity with both calorific and economic value. Rather than becoming 'waste' this oil is simply 'used' oil and is available for recovery and recycling.[13] Recycling and/or re-refining used oil to remove 'wear materials, dirt/soot and the additive materials that were originally added to the base oils'[14] allows used oil to be 'used as an industrial burner fuel, hydraulic oil, incorporated into other products or re-refined back into new lubricating oil'.[15]

This paper is concerned primarily with lubricant oils as it is the current stockpile of used lubricant oils that has been raised as the issue. The volume of oil sold in the Australian lubricants market less the volume consumed during use equals the volume of used oil generated. Consumption, here, refers to direct forms of use such as combustion as well as indirect forms such as minor leaks and spills that occur during its application process.[16] Oil is consumed in business and industry, on farms, at mine sites, in marine environments and in urban areas and, therefore, these are necessarily the sites at which used oil is generated.

While, as noted, oil consumption can be direct or indirect in the form of spills and leaks at the point of consumption, these points are not the only sites of oil loss as this can occur at each point in the supply chain.[17] Storage, handling, retailing, transport, system failure, maintenance practices, and collection and reprocessing all provide points at which some oil loss may occur.[18] For example, it is estimated that 'the plastic bottles used for the majority of small packs may absorb approximately 2% of the product, and that a further 3% to 4% of product forms an oily sheen that cannot be drained from the container'.[19]

Of the used oil generated in Australia only a proportion is collected for recycling and a significant quantity remains unaccounted for. The majority of this unaccounted for used oil is potentially recoverable while a relatively small amount, estimated at 20%, cannot be recovered. The Meinhardt report uses the following figure to illustrate the used oil pathway for lubricants (based on data for 2000).

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13 Department of the Environment and Water Resources, 'Recycling Used Oil - Why?', nd. Available at: http://www.oilrecycling.gov.au/factsheet-1.html. Accessed on 22 October 2007; Mr Mark Glover, LOREX Investments Pty Ltd, Electronic Mail, 19.10.07.

14 Mr Mark Glover, LOREX Investments Pty Ltd, Electronic Mail, 19 October 2007.

15 Department of the Environment and Water Resources, 'Recycling Used Oil - Why?', nd. Available at: http://www.oilrecycling.gov.au/factsheet-1.html. Accessed on 22 October 2007.

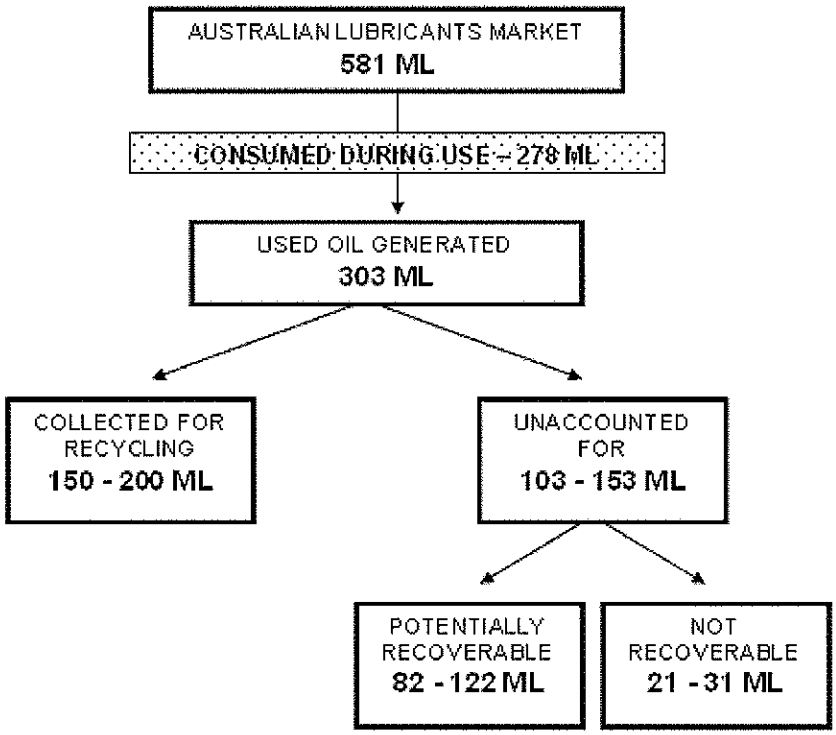
16 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p4.1. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

17 ibid., p4.9.

18 ibid., p4.9.

19 ibid., p4.9.

Used Oil Pathway[20]



1.4 Used Oil Market Failure

A corollary of Western Australia's strengthening economy is an increased usage of lubrication products. This, in turn, has led to an increase in the volume of used oil, presumably both collected and uncollected. Indeed, Nationwide Oil Pty Ltd (Nationwide Oil) suggests that the problem of used oil in the state has increased as a direct result of the mining boom and this has been a major factor in the development of the current glut of used oil.[21]

While it seems that Western Australia has increasing supplies of used oil, information provided to the Committee indicates a significant decline in the pre-existing markets for used oil. Traditionally, used oil has been utilised as burner fuel. However, as Wren Oil noted in November 2002, Western Australia has experienced 'rapidly declining energy markets'.[22] Nationwide Oil advised that the decline in the Western Australian market for fuel oil has been clear since the mid

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20 ibid., p8.2. This figure is based on the Australian lubricants market in 2000.

21 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

22 Mr Fred Wren, Wren Oil, Letter to the Sustainability Policy Unit, Department of Premier and Cabinet, Perth, 27 November 2002.

1980s.[23] The Western Australian Minister for the Environment, the Hon. David Templeman, also suggests that 'the traditional waste oil markets in Western Australia are diminishing'.[24]

This decline has been the result of several major changes in energy demand and consumption in the state. First, there has been a switch to using natural gas for electricity generation as this is considered to be more cost effective than fuel oil particularly since the construction of the Dampier to Bunbury natural gas pipeline.[25] At one point Western Power was the largest user of used oil in the state, consuming approximately 6 to 7 million litres of recycled oil per annum in its electricity generation plants at Esperance, Broome and Derby.[26] This market no longer exists.

Second, approximately 9 million litres of processed used oil was consumed in Loongana Lime Pty Ltd's kilns used to manufacture lime in the company's Kalgoorlie calcining plant. This plant closed in mid-2006.[27] The Western Australian market for recycled burner fuel oil is now very small with Kalgoorlie Nickel Smelter being the main user of this fuel.[28]

Third, the fuel oil market in Western Australia does not accept re-refined oil.[29] Used oil leaves deposits and build-up on fuel injector guns, a situation that necessitates maintenance shutdowns at regular three-day intervals. Therefore, given the high costs associated with these shutdowns, Verve Energy does not consider the use of recycled oil a viable option.[30]

Fourth, although the cement industry is a major consumer of used oil in Australia the use of recycled oil is not an option for Cockburn Cement.[31] While used oil is burned in other cement plant operations such as those in Queensland, the local community surrounding Cockburn

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23 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007.

24 Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007.

25 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007; Mr Fred Wren, Wren Oil, Letter to the Sustainability Policy Unit, Department of Premier and Cabinet, Perth, 27 November 2002.

26 Mr Fred Wren, Wren Oil, Letter to the Sustainability Policy Unit, Department of Premier and Cabinet, Perth, 27 November 2002.

27 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007; Mr Fred Wren, Wren Oil, Letter to the Sustainability Policy Unit, Department of Premier and Cabinet, Perth, 27 November 2002; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007.

28 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

29 Mr Luke Blackbourn, BP Refinery (Kwinana) Pty Ltd, Committee Briefing, 19 September 2007.

30 Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007.

31 Mr Barry Carbon, Chair, Waste Management Board, Western Australia, Committee Briefing, 3 September 2007.

Cement's plant does not support the burning of used oil. Instead, Cockburn Cement uses coal to supplement its main supply of fuel, namely gas.[32]

The lack of demand for used oil, together with the 'increase in supply of used oil from expanding mining operations tipped the balance of supply and demand rapidly in favour of supply, leading quickly to the current glut in stockpiled used oil'.[33]

This situation appears to be compounded by the:

- Lack of national standards for used oil products; and
- Lack of competition among key stakeholders in the used oil business.

The Committee notes, though, that the Australian Oil Recyclers Association has recently released an Issues Paper on Industry Standards for Burner Oils.[34] This paper acknowledges, first, the lack of standards for low- and high-grade industrial burner oils and, second, the 'need to ensure that potential customers are given accurate information about the products, including the standards that apply'.[35]

This market failure in Western Australia has led to a situation in which storage facilities, if not full, are certainly very close to capacity. Information provided suggests that between 16 and 20 million litres of used oil is in storage at large storage facilities in Kwinana and North Fremantle and that a further estimated 5 to 10 million litres are stockpiled on various business and industry sites across the state.[36]

1.5 Current Markets for Western Australian Used Oil

While the issue of establishing long-term and sustainable markets for used oil generated in Western Australia is discussed more fully in Chapter 5, it is appropriate at this point to outline the current market solution for this oil, which is to export it offshore.

Exporting used oil from Western Australia is considered to be an important element in the reduction of the used oil stockpile in the state. Some information provided to the Committee suggests that exporting used oil interstate is not an option as Australia's eastern states' markets do

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32 Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007; Mr Barry Carbon, Chair, Waste Management Board, Western Australia, Committee Briefing, 3 September 2007.

33 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007.

34 Australian Oil Recyclers Association Ltd, *Industry Standards for Burner Oils,* Issues Paper prepared by Professor Ian D Rae, School of Enterprise, The University of Melbourne, 21 August 2007.

35 ibid., p1.

36 Mr Fred Wren, Managing Director, Wren Oil, Electronic Mail, 20 August 2007; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007.

not have the capacity to absorb more oil from Western Australia.[37] However, others presented a more hopeful position in this regard and felt that markets could be developed interstate.[38] Exporting used oil offshore has proven to provide a valuable, if short-term, solution to the current glut.[39]

Used oil has been exported to the burner fuel markets in Singapore. One shipment has already occurred and, while there were some problems with this, a second contract has been negotiated for a 7.5 thousand tonne shipment of blended oil product to occur at the end of October 2007. The Singapore market is held to be very secure with the capacity to take between 20 and 30 thousand tonnes per annum.[40]

The second potential offshore market for burner fuel is Christmas Island for use in the island's phosphate mine with 16 thousand tonnes contracted for shipment later this year.[41] This represents the fourth shipment to Christmas Island.[42]

There are environmental factors to consider in relation to shipping oil to these markets as well as international convention requirements to be met, and these are discussed further in Chapter 5.

Western Australia is not alone in facing problems concerning the recovery, recycling and/or reuse of used oil. It is an issue of national and international significance. Used oil is a valuable commodity in terms of both its calorific and economic value. Furthermore, the improper use or disposal of used oil poses serious environmental risks such as the pollution of land like parks and reserves, and of waterways, sewer systems, underground reservoirs and the marine environment.[43] Because of, first, the additives incorporated into oil to allow it to meet its purposive specifications and, second, the contaminants that oil collects through its application processes, used oil is particularly hazardous. For example, when used in engines and transmissions, lubricating oil

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37 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

38 Department of Environment and Conservation, Western Australia, Committee Briefing, 29 August 2007.

39 Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007; Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007; Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007.

40 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007; Mr Peter Fitzpatrick, Chief Executive Officer, Motor Trade Association Western Australia, Committee Briefing, 29 August 2007.

41 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

42 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007.

43 Department of the Environment and Water Resources, 'Product Stewardship for Oil Program', nd. Available at: http://www.oilrecycling.gov.au/program.html. Accessed on 9 July 2007.

collects hazardous contaminants such as lead, dioxins, benzene and polycyclic aromatics.[44] If disposed of inappropriately, used oil is 'toxic, carcinogenic and harmful to the environment ... It is also poisonous if swallowed or inhaled and can present a fire hazard if not properly stored'.[45]

Numerous countries have implemented policies and programmes designed to alleviate the problems of used oil recovery, recycling and appropriate disposal. For example, the issue was discussed in the Hong Kong Legislative Council in April 2004 with regards to used oil from local fishing vessels and the illegal disposal of used oil generated from land based sources such as shipyards. The Hong Kong government heavily subsidises the treatment of used oil and the Legislative Council was asked to consider the need to increase treatment charges to safeguard against abuse (for example, by importing waste oil to treat), and to uphold the user-pays principle. As the monitoring of used oil disposal at shipyards in particular was deemed unsatisfactory and to have resulted in serious land contamination, a call was made for more proactive measures.[46]

Canada appears to be very pro-active with regards to used oil recycling. The National Used Oil Material Advisory Council (NUOMAC)[47] coordinates the Canada-wide used oil recycling effort and encourages national standards in their industry-led stewardship recycling program. According to the Chairman of NUOMAC, David Dingle, 'used oil is the largest single source of hazardous recyclable waste material in Canada'.[48]

The United Kingdom is also concerned about used oil and has various industry led and government initiatives designed to address the issue. Industry initiatives include:

- the National Oil Care Campaign launched in 1996 and which led to the development of a national oil recycling bank network and the establishment of the Oil Care Helpline; and
- Oil In Your Local Environment (OIYLE) which was launched by the Federation of Petroleum Suppliers in December 1999.[49]

United Kingdom Government initiatives include the:

- Waste Oils Directive which 'aims to avoid any damage to man or the environment' by:

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44 Department of the Environment and Water Resources, 'Recycling Used Oil - Why?', nd. Available at: http://www.oilrecycling.gov.au/factsheet-1.html. Accessed on 22 October 2007.

45 Department of Environment and Water Resources, 'Product Stewardship for Oil Program', nd. Available at: http://www.oilrecycling.gov.au/program.html. Accessed on 9 July 2007.

46 Hon. Choy So-yuk and Hon. Cyd Ho Sau-lan, Hong Kong, Legislative Council, Minutes of Panel on Environmental Affairs, 26 April 2004.

47 NUOMAC was formally approved on 28 Sept 2004 and united five provincial associations: Saskatchewan, Alberta, British Columbia, Manitoba and Quebec.

48 National Used Oil Material Advisory Council, 'Used Oil Recycling', 1 December 2004. Available at: http://www,usedoilrecycling.com/en/nuomac.aspx. Accessed on 12 July 2007.

49 Department of Trade and Industry, United Kingdom, *Waste Oil Recycling*, Department of Trade and Industry, UK, January 2001.

- prohibiting the discharge of waste oils to waters;
- requiring member states to introduce procedures for the management of waste oils;
- requiring priority to be given to the regeneration of oil where technical, economic and organisational constraints allow.

- Special Waste Regulations that 'dictate consignment handling procedures, fees, registration and other such aspects required to ensure the appropriate management of special wastes'.[50]
- Incineration Directive which is designed to 'significantly increase the stringency of emissions limits for incineration facilities, including those burning used oils'.[51]

The above examples are not intended to be comprehensive or definitive of the emphasis given to the problem of used oil throughout the world. Rather, they serve to demonstrate that the issue is not one that is unique to Australia.

1.6 Reliability of Data on Used Oil

There is a question mark against the reliability of statistical data on the amount of oil sold, used oil collected, and unaccounted for used oil in Australia. This has been noted by three major reports on used oil in Australia, namely the Meinhardt Report of January 2002, *Used Oil in Australia*, the Allen Consulting Group (ACG) 2004 report, *Independent Review of the Product Stewardship (Oil) Act 2000*, prepared for the Minister for the Environment and Heritage, and the Australian Academy of Technological Sciences and Engineering (AATSE) March 2004 report for the Minister for the Environment and Heritage, *Independent Review of the Transitional Assistance Element of the Product Stewardship for Oil (PSO) Program.*

The Meinhardt report notes that quantifying the volumes of oil sold, collected, used and unaccounted for 'was difficult due to a lack of or conflicting data presented by the varying sources'.[52] These sources include the Australian Bureau of Agricultural and Resource Economics (ABARE), the Australian Institute of Petroleum (AIP), the Australian Taxation Office (ATO) and the then Department of Industry, Science and Resources (DISR), now the Department of Industry, Tourism and Resources (DITR). The ACG suggests that 'variations between data provided by a range of information sources' is a 'key concern that has been raised in a number of previous

50 ibid.

51 ibid.

52 Environment Australia, *Used Oil in Australia*, report prepared by Meinhardt Infrastructure & Environment Group, January 2002, p8.1. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

studies'.[53] Similarly, the AATSE report describes obtaining accurate data as 'one of the major difficulties associated with carrying out this review'.[54] This difficulty relates to data for not only the amount of oil recovered, but also for the sales of virgin oil. Some of the problems associated with inaccurate data are discussed in Chapter 2 which deals with the PSO Program.

Without accurate and reliable data it is difficult to establish the nature and scope of the issues concerning used oil recovery and recycling in Australia, and to determine the best possible options available to resolve the problems. Not surprisingly, some of these reports also made recommendations concerning improving the accuracy and reliability of used oil data in Australia. The Meinhardt report contains a number of recommendations relating to data including:

> *1. Investigate greater coordination between the reporting organisatons (viz. ABARE, AIP, ATO and DISR) in order to more closely align reporting categories...*
>
> *3. Investigate the provision and coordination of data from all Australian States and Territories on the amount of used oil collected in ChemCollect, household hazardous waste collections and other State/Territory programs....*
>
> *5. Consider the feasibility of additional research, surveys and reporting requirements to determine the amount and sources of oil currently unaccounted for.*[55]

The ACG report's first recommendation is that:

> *Greater efforts by Commonwealth departments and agencies need to be made to ensure that statistics on the volumes of oil produced, imported and sold are consistent and are universally accepted as accurate.*[56]

1.7 The Current Situation in Western Australia

The Committee began its preliminary investigations by holding a number of briefings to gain a better understanding of the issues. It was also intended that the information gathered in this manner would allow appropriate terms of reference to be developed. These preliminary investigations revealed that a number of discussions are currently being held amongst key stakeholders in the issue with a view to solving the problems in Western Australia. The

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53 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p40. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

54 Department of the Environment and Heritage, *Independent Review of the Transitional Assistance Element of the Product Stewardship for Oil (PSO) Program*, report prepared by Australian Academy of Technological Sciences and Engineering, Australian Government, Canberra, 2004, piii.

55 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p3. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

56 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p56. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

Committee welcomes the interest shown by these parties and is pleased to see that discussions have the potential to lead to several initiates aimed to address the used oil problem, both in the short- and long-term.

Given that potential solutions are currently being discussed and planned, the Committee decided that a formal inquiry would not be beneficial at this stage. Nevertheless, the Committee also recognises that some challenges remain to the successful implementation of these plans. These challenges are discussed in more detail in the final chapter of this paper. Therefore, the Committee intends to maintain a watching brief on the issue of used oil recovery and recycling in the state.

CHAPTER 2 PRODUCT STEWARDSHIP FOR OIL SCHEME

2.1 The Product Stewardship for Oil Program

(a) Background

The Product Stewardship for Oil (PSO) Program is a national, federally administered scheme designed to 'encourage increased collection and recycling of used oil in Australia by providing oil recyclers with product stewardship benefits'.[57]

The PSO Program was implemented in January 2001 under the legislative auspices of the Commonwealth *Product Stewardship (Oil) Act 2000 (Cwlth) (PSO Act)*. The *PSO Act* sought to achieve three major objectives:

- develop a product stewardship arrangement for waste oils;
- ensure the environmentally sustainable management, re-refining and reuse of waste oil; and
- support economic recycling options for waste oil.[58]

To ensure an effective and efficient transition, the *PSO Act* is supported by a raft of legislation and associated regulations. These include the:

- *Product Stewardship (Oil) Regulations 2000*;
- *Excise Tariff Amendment (Product Stewardship for Waste Oil) Act 2000*;
- *Customs Tariff Amendment (Product Stewardship for Waste Oil) Act 2000*;
- *Product Stewardship (Oil) (Consequential Amendments) Act 2000*; and
- *Products Grants and Benefits Administration Act 2000.*[59]

At the core of the PSO Program are the benefit and levy rates introduced to promote product stewardship. These are:

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57 Department of Environment and Water Resources, 'Used Oil Recycling, Product Stewardship Benefits', 1 May 2007. Available at: http://www.oilrecycling.gov.au/benefits.html. Accessed on 10 October 2007.

58 Section 3 *Product Stewardship (Oil) Act 2000,* (Cwlth).

59 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p14. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

- the product stewardship levy on oils (currently fixed at 5.449 cents per litre) that is applied to domestic and imported oils and is paid by oil producers and importers; and

- the product stewardship benefits (funded by levy collections) that are paid to recyclers of used oil as volume-based incentives to encourage oil recycling.

A key feature of the PSO Program is that over the life of the Program the levy collections are intended to fully offset all expected costs.

The benefit rates contained within the *Product Stewardship (Oil) Regulations 2000* group used oil products into seven categories. These categories 'have been determined by identifying the level of incentive required for each form of recycling or increase in volume... other factors considered in determining the benefit rates include environmental and economic considerations and the likely available revenue'.[60] It is envisaged that the seven categories will cover all 'known current and likely future uses of used oil'.[61]

The seven categories for the PSO benefit rates are described in Table 2.1.

The PSO Program endeavours to alter consumer and business behaviour so that there is a reduced reliance on virgin oil and more used oil is recycled. To achieve this, the PSO Program provides a number of economic incentives to increase the uptake of used oils. These are:

- making it more financially attractive to firms to invest in recycling facilities and activities. This is done directly through the benefit payment and indirectly through the provision of transitional assistance funding for local used oil collection facilities so as to reduce collection costs;

- adjusting the relativities between virgin and recycled oil (i.e. reducing the demand for the former and increasing the use of the latter) through the provision of benefit support; and

- correcting information asymmetries through targeted information programs funded through the transitional assistance arrangements.[62]

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60 Department of Environment and Water Resources, 'Used Oil Recycling, Product Stewardship Benefits', 1 May 2007. Available at: http://www.oilrecycling.gov.au/benefits.html. Accessed on 10 October 2007.

61 ibid.

62 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p14. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

Table 2.1: PSO Benefit Rates[63]

Category	Description	Benefit (cents/litre)
1.	Re-refined base oil (for use as a lubricant or a hydraulic or transformer oil) that meets the specified criteria.[1]	50
2.	Other re-refined base oils (e.g. chain bar oil).	10
3.	Diesel fuels to which the *Excise Tariff Act 1921* applies.	7
4.	Diesel extenders (filtered, de-watered and de-mineralised).	5
5.	High grade industrial burning oils (filtered, de-watered and de-mineralised).	5
6.	Low grade industrial burning oils (filtered and de-watered).	3
7.	Industrial process oils and process lubricants, including hydraulic and transformer oils (re-processed or filtered, but not re-refined).	0
8.	Gazetted oil consumed in Australia for a gazetted use.[2]	5.449
9.	Recycled oil mentioned in item 5 or 6 that has been blended with a petroleum product that meets the criteria mentioned in schedule 2.[3]	9.557

1. The regulations specify a health, safety and environment standard for re-refined lubricants that is comparable with the current requirements for similar 'virgin' products. The purpose of this standard is to protect users of re-refined oil products from exposure to carcinogenic components and toxic heavy metals.
2. Multi-use oils such as printing inks, paint defoamers and agricultural sprays. These are not available as used oil to be recycled and do not present an environmental risk or hazard.
3. Category 9 ceased as of 30 June 2006.

A number of Commonwealth departments share the responsibility of administering the PSO Program. The collection of the levy occurs through the custom and excise system. The ATO and the Australian Customs Service (ACS) collect the levy on domestic and imported oil products through amendments to the customs and excise tariffs legislation.

The product stewardship levy rate is set by the Treasurer. The ATO pays the product stewardship benefits in accordance with the provisions of the *PSO Act* and the *Products Grants and Benefits Administration Act 2000*. Table 2.2 shows the product stewardship benefits paid by category for the year 2006/07. A table of Product Stewardship Benefit payments for years 2003/04 to 2005/06 can be found in Appendix Two.

63 Department of Environment and Water Resources, 'Used Oil Recycling, Product Stewardship Benefits', 1 May 2007. Available at: http://www.oilrecycling.gov.au/benefits.html. Accessed on 10 October 2007.

Table 2.2: Product stewardship benefit payments by category in 2006-07

Category	Benefit Payments	Litres
1. Re-refined base oil (for use as a lubricant or a hydraulic or transformer oil) that meets the specified criteria	$3,962,531	7,925,063
2. Other re-refined base oils (for example, chain bar oil)	0	0
3. Diesel fuels that comply with the Fuel Standard (Automotive Diesel) Determination 2001, as in force from time to time	$202,958	2,899,404
4. Diesel extenders: (a) that are filtered, de-watered and de-mineralised (b) that, if combined with diesel fuels, would produce a combined fuel that complies with the determination mentioned in item 3	0	0
5. High grade industrial burning oils (filtered, de-watered and de-mineralised)	$6,567,543	131,350,851
6. Low grade industrial burning oils (filtered and de-watered)	$2,319,727	77,324,219
7. Industrial process oils and lubricants, including hydraulic and transformer oils (re-processed or filtered, but not re-refined)`	0	0
8. Gazetted oil consumed in Australia for a gazetted use [1]	$1,174,949	21,562,663
9. Recycled oil mentioned in item 5 or 6 that has been blended with a petroleum product that meets the criteria mentioned in schedule 2 of the Regulation of the Act [1]	$4,593	48,060
Additional benefit 1 July 2006 to 30 June 2007 [2]	$17,695,514	175,952,212
Amount of used oil recycled (excludes categories 8 & 9 and the additional benefit)		219,499,537
Total	**$31,927,815**	**417,062,472**

1 Benefits paid under categories 8 and 9 including the additional benefit do not contribute to the overall volume of used oil recycled.

2 The additional benefit is separate from categories 1 to 9. All category 5 and 6 claimants will be eligible to claim the additional benefit. The additional benefit is the only benefit payment that may be claimed if another category of benefit payment (categories 5 or 6 only) has been claimed for the same recycled used oil.

As well has having responsibility for the ongoing monitoring and review of the product stewardship arrangements, the Department of Environment and Heritage is also responsible for the administration and management of the Transition Assistance Fund.

(b) The Transition Assistance Fund

The Transition Assistance Fund (TAF) was created to provide 'funding for strategic projects, which address more fundamental barriers to oil recycling, such as lack of adequate infrastructure or technology'.[64] Initially, $60 million was allocated for strategic initiatives over four years from July 2000. This has since been reduced to $34.5 million and the life of the program has been

64 Department of the Environment and Heritage, *Independent Review of the Transitional Assistance Element of the Product Stewardship for Oil (PSO) Program*, report prepared by Australian Academy of Technological Sciences and Engineering, Australian Government, Canberra, March 2004, p27. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

extended to June 2007. The TAF was always intended to be 'an interim mechanism to engender change that will underpin the long-term viability of the oil recycling industry'.[65]

The main objectives of the TAF are to:

- ensure a sustainable used oil recycling industry;
- accelerate the uptake of used oil from urban and rural Australia;
- facilitate the transition of the industry and the community into effective participants in the Product Stewardship Agreements (PSAs); and
- address special difficulties that remote Australia has in the recovery and management of used oil for appropriate recycling.

Under the TAF umbrella, money was used to establish the local government Used Oil Collection Infrastructure Small Grants Program whereby the grants were used to purchase and install used oil collection facilities.

The TAF has also been used for Expression of Interest Rounds. In line with the initial need to increase used oil facilities and infrastructure to support advances in used oil management, the majority of the projects given grants as a result of the Expression of Interest Rounds 'addressed the priority areas of environmentally responsible management of used oil and community and industry awareness'.[66]

As well as grants to local government areas to establish collection facilities, TAF grants to Western Australian applicants include:

> Western Australian Municipal Association: $6,645
> *Project:* Information dissemination through the Waste and Recycle 2001 Conference
> *Project Description:* Sponsor the Waste and Recycle 2001 Conference.
> *Project Status:* Complete. To complement sponsorship, the Department ran a booth and provided a speaker.

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65 Department of Environment and Water Resources, Commonwealth Government, 'Used Oil Recycling/ Transition Assistance', nd. Available at: http://www.oilrecycling.gov.au/assistance.html. Accessed on 27 September 2007.

66 Department of the Environment and Heritage, *Independent Review of the Transitional Assistance Element of the Product Stewardship for Oil (PSO) Program*, report prepared by Australian Academy of Technological Sciences and Engineering, Australian Government, Canberra, March 2004, p28. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

Bennett Brook Catchment Group: $9,075
Project: Malaga Industrial Area Survey
Project Description: The proponent will survey 110 small to medium size automotive enterprises in the Bennett Brook Catchment Area (North East Perth) to determine how difficult it is for such businesses to responsibly dispose of their used oil.
Project Status: Survey complete and interim report provided. Awaiting final report.[67]

Wren Oil/RNR: a multi-year grant of $400,000
Project: Used Oil Distillation Residue for Use in Road Bitumen
Project Description: To establish a processing plant to recycle distillation residue into a product suitable for use in road bitumen.[68]

2.2 The Effectiveness and Efficiency of the PSO Program

In May 2004, the ACG conducted an independent review of the *PSO Act* for the Minister for the Environment and Heritage. Overall, the ACG Review found that the PSO Program has had some success in encouraging more sustainable management, re-refining and reuse of used oil.

The growth of strong local government support for the development of centralised used oil collection facilities, the high number of recyclers involved in the program and the large financial investment that has been made in lube-to-lube recycling equipment were seen as examples of the PSO Program's success.[69] It is important to note that this is a national assessment of the PSO Program and may not accurately reflect the actual situation in each state, including Western Australia.

(a) Recycling Facilities

There has been considerable financial investment in lube-to-lube recycling in New South Wales but minimal investment in Western Australia. The re-refinery constructed in Wagga Wagga by Southern Oil Refineries currently produces 80,000 to 90,000 litres of re-refined oil per day with plans to increase output to 120,000 litres per day early in 2008. As a consequence, New South Wales and surrounding states now have a production facility with the potential to significantly reduce the amount of locally stockpiled used oil. States, like Western Australia, that are geographically isolated from major re-refineries will need to find alternative solutions to the used oil stockpile problem.

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67 ibid., pp83-84.

68 Department of the Environment and Water Resources, *PSO Transitional Assistance Grants Awarded in 2005-2006*, nd. Available at: http://www.oilrecycling.gov.au/ta-grants2005-06.html. Access on 9 October 2007.

69 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p70. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

The state to state variability in the potential to re-refine used oil under the PSO Program was recognised by the Motor Trade Association of Western Australia (Inc) (MTAWA) who suggests the PSO Program, though 'successful in significantly increasing oil collections around the nation,' has failed in the development of viable used oil markets in Western Australia'.[70] The MTAWA goes on to say that:

> *There is no 'lube to lube' facility to return waste oil back into lubricant, and no market for low or high grade burner oil.... So despite millions of dollars being collected under the Product Stewardship Scheme oil recyclers in Western Australia now need to look overseas for a market for their products.*[71]

The lack of a comparable lube-to-lube re-refinery in Western Australia has exacerbated the used oil storage problem and has led some to believe that locally 'there is no immediate or sustainable solution on the horizon'.[72]

(b) Variations in Data

The ACG Review Team also indicated that variations between data provided by a range of information sources such as the ABARE, the AIP, ATO and DITR was problematic.

This variation in data makes it difficult 'to definitely comment on changed outcomes in the production, importation and recycling levels attributable to the PSO Program'.[73]

There were instances where the ACG Review found that:

- the data provided to the collector appear to be incorrect;
- there have been differences in the interpretations of some of that data;
- there is a lack of available data in some important areas (various sources of unaccounted-for used oil);
- data problems have arisen because the data collector has relied upon the willingness of commercial organisations to provide it, and it may be subject to commercial confidentiality or may not be reflective of the status of the industry as a whole; and
- reported data did not reflect general industry perceptions as to what was happening in the marketplace.[74]

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70 Fitzpatrick, Peter, 'Waste Oil Collection a Shambles', *Motor Western Australia*, vol. 72, no. 3, May/June 2007, p3.

71 ibid.

72 ibid., p2.

73 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, pix. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

The ACG Review recommends that 'greater efforts by the Commonwealth departments and agencies need to be made to ensure that statistics on the volumes of oil produced, imported and sold are consistent and are universally accepted as accurate'.[75]

(c) Product Stewardship

The first objective of the *PSO Act* was the development of a product stewardship arrangement for waste oils. There is some conjecture as to whether a successful stewardship arrangement has been achieved.

The *PSO Act* infers that those organisations involved in the life cycle of the product need to share the responsibility of reducing the impact of the product on the environment. The ACG Review indicates that the oil producers 'have not become seriously engaged, suggesting that the current arrangements fall short of what could reasonably be called a complete product stewardship program'.[76] The ACG Review was quite adamant that 'if Australia was to have a real product stewardship in relation to used oil, the major oil companies have to become more engaged in the process'.[77]

The PSO Program has met with partial success in achieving the second objective of ensuring the environmentally sustainable management, re-refining and reuse of waste oil, particularly in the development and growth of used oil collection. There is concern, however, that the overall focus of the second objective is too narrow with too much 'emphasis on lube-to-lube recycling' at the expense of other comparable options.[78]

(d) Financial Viability of Recycling Options

The third and final objective, 'support for economic recycling options for waste oil' is financially skewed towards lube-to-lube recycling literally at the expense of other forms of recycling. The ACG Review found that the 'overwhelming emphasis on the support of lube-to-lube recycling is misplaced given the marginal financial viability of high grade burning oil recycling and its comparable environmental benefits'.[79]

The rate at which benefits are paid is seen as being problematic with some categories, particularly five and six, receiving an amount considered to be below the required amount needed to promote and sustain the production of higher grade recycled burner fuels. In their review of the PSO Program, the ACG indicate that the rate should be increased 'to somewhere in the vicinity of 14 to

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74 ibid., p40.

75 ibid., p56.

76 ibid., pxi.

77 ibid., pxi.

78 ibid., pxi.

79 ibid., pxi.

15 cents per litre'.[80] This figure was based on a financial model that incorporated data from a number of submissions to the ACG Review and based on the premise that 'given that there is indeed a higher level of infrastructure required to produce such [high grade burner] fuels there needs to be a higher reward for effort'.[81]

It is envisaged that an increase in subsidy for the higher grade burner fuel will allow consumers who traditionally burn low grade oil to change to the now comparably priced higher grade oil. This is an environmentally preferred option as 'higher grade burning oil is less polluting than low grade burning oil'.[82]

2.3 Reform Options for the PSO Program

It is apparent from the research that has been completed on the matter that the PSO Program requires some modification and/or reform. The Committee was informed that the PSO Program was cumbersome and that it failed to adequately remunerate individuals and organisations involved in used oil collection and recycling.[83]

The ACG Review indicated that a number of specific reform issues may need to be addressed to enhance the efficiency and effectiveness of the program, in particular, data reliability, the benefit categories and associated rate levels, the levy rates and sections of the *PSO Act* itself.

The matter of data reliability, as suggested in the previous Chapter, is problematic. The PSO Program has, as its premise, the sustainable management and re-refining of used oil and its re-use. The effective and efficient 'sustainable management' can become unattainable when there are 'continuing differences in oil-related data collected by Commonwealth agencies, particularly when compared to commonly understood industry experiences'.[84] Whilst compiling information for this report, the Committee found that the widespread discrepancy in data figures pertaining to used oil production and recycling made it extremely difficult to collate an accurate picture of how effective the PSO Program has been.

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80 ibid., p59.

81 Transpacific Industries Submission to: Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p59. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

82 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p59.

83 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Committee Briefing, 19 September 2007, Mr Gary Watson, General Manager - WA Developments, Nationwide Oil, Committee Briefing, 19 September 2007, Mr Peter Fitzpatrick, Executive Director, Motor Trade Association of Western Australia (Inc), Committee Briefing 29 August 2007.

84 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p56. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

The benefit levels that are provided within the PSO Program were 'only committed for the first year under the [PSO] *Act*'[85] and, therefore, subject to revision if required. The ACG report found that it would be advantageous that the benefit levels be modified to reflect:

- the cost of refining/recycling processes;
- the environmental impact of the reuse of oil;
- the lack of neutrality in the excise game;
- the cost of capital, where excise has to be paid and then claimed back;
- the need to encourage new uses of used oil; and
- the goal of equalising the levy funds collected and the benefit payments are broadly equal over the longer term.[86]

The current levy rate is set at 5.449 cents per litre. There is some speculation that this particular figure is generally not compatible with available accounting software. It was suggested that rounding the figure to 5.5 cents per litre would alleviate this issue without any demonstrable impact on the consumer.

As a consequence of the federal Fuel Excise Reform Program introduced on 1 July 2006 (concludes 1 July 2015) some additional funding has been made available to assist waste oil recyclers. The assistance, in the form of a $30.1 million dollar package and payable over three years, is a temporary support that 'will ensure that industry has sufficient time to adjust to the new excise arrangement'.[87] Eligible recyclers will receive 7.557 cents per litre from 1 July 2006 to 30 June 2007; 5 cents per litre from 1 July 2007 to 30 June 2008; and 2.5 cents per litre from 1 July 2008 to 30 June 2009.[88]

2.4 Review of the *Product Stewardship (Oil) Act 2000*

According to s 36 of the *PSO Act*:

> *1) The Minister must cause an independent review of:*

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85 Department of the Environment and Heritage, *Independent Review of the* Product Stewardship (Oil) Act 2000, report prepared by The Allen Consulting Group, Australian Government, Canberra, May 2004, p56. Available at: http://www.oilrecycling.gov.au/psoexecutive.html. Accessed on 9 October 2007.

86 ibid.

87 Senator The Hon. Ian Campbell, 'Media Release: $30.1 million to promote oil recycling', 9 May 2006. Available at: http://www.environment.gov.au/minister/env/2006/mr09may706.html. Accessed on 4 September 2007.

88 ibid.

(a) the operation of this Act; and

(b) relevant provisions of customs and excise legislation; and

(c) the extent to which the objects set out in section 3 have been achieved;

to be undertaken within 4 years after the commencement of this Act and thereafter at intervals of not longer than 4 years.[89]

With regards to the two independent reviews of the PSO Program, the then Department of the Environment and Heritage *2005-06 Legislation Annual Report* notes that the government response to the reviews' recommendations 'is ongoing. The government has responded to some of the recommendations and expects to address others during the coming year. The next review will be conducted in 2008'.[90]

Nevertheless, the Department of the Environment and Water Resources' *2006-07 Annual Report* notes that a programme review was commissioned in February 2007 to assess the programme's effectiveness following changes to the excise arrangements for recycled oil. The report states that 'the review is expected to be completed early in 2007–08'.[91]

The Committee believes this review is important as it will have implications for the capacity of the PSO Program to achieve its objectives including improving the viability of the used oil recycling industry.

89 *Product Stewardship (Oil) Act 2000* (Cwlth).

90 Parliament of Australia, *Bills Digest*, Parl. Paper 187, 2006-07, Canberra, 20 June 2007, p6.

91 Department of the Environment and Water Resources, *2006-07 Annual Report*, Government of Australia, Canberra, 2007, p121.

CHAPTER 3 FROM WASTE OIL TO USED OIL

3.1 Generation of Used Oil in Western Australia

As previously stated, the volume of used oil generated is calculated by deducting the volume of oil consumed during use, both directly and indirectly, from the volume of oil sold. The consumption of oil during use occurs through what is called 'generation factors'.[92] There have been a number of sets of generation factors developed including those of the United States Environmental Protection Agency (USEPA), CONCAWE (European Oil Company Organisation for Environment, Health and Safety - Belgium), the Australia and New Zealand Environment Council (ANZEC) and the AIP. There is considerable variation between these sets of generation factor calculations. For example, ANZEC and USEPA calculate a generation factor of 47% for aviation oils, while AIP and CONCAWE calculate 90%; industrial hydraulic oil generation factors range from 50% (AIP) through to 76% (USEPA and ANZEC); and engine oils range from 60% (AIP) to 59-67% (USEPA).[93]

Once generation factors have been determined it is possible to apply them to the appropriate categories of oil to calculate the amount of used oil generated. The following Tables 3.1 and 3.2 apply AIP generation factors to DITR data for oil sales in Australia. The AIP factors were chosen for this report as these were the factors the Meinhardt report deemed 'most often [been] accepted when considered in conjunction with stakeholders' advice and other information sources relating to lubricant consumption rates'.[94]

The Meinhardt report clearly states that the generation factors applied were developed from Australia-wide statistical data, such as average age of motor vehicle, driving conditions, machinery maintenance levels, machinery location and size of vehicle, and that there would be regional variations in such data. For example, the average age of motor vehicles in Western Australia may vary from the national average. These variations would, in turn, affect the generation factor for each state and territory. Therefore, the Meinhardt report cautions against the application of these factors to individual regions, stating that 'it is likely that application of the above factors to individual States and Territories will overlook regional variations'.[95] While mindful of the call for prudence in the use of these factors, the calculations in Tables 3.1 and 3.2 have been made for Western Australia using the AIP generation factors. In the absence of any Western Australia-specific generation factors these represent the best estimates possible and are

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92 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p4.1. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

93 ibid., p4.2.

94 ibid., p4.9. The authors of this report had some reservations about applying the AIP generation factors but felt it was better to accept one source of information than to apply different factors from different sources to different products. For a discussion of the reasons behind this decision, refer to Chapter 4 of *Used Oil in Australia*.

95 ibid., p4.11.

intended merely to provide an indication of possible used oil generation that might support anecdotal evidence provided to the Committee. The accuracy of this data is also affected by the overall reliability of data concerning used oil, as previously discussed.

Table 3.1: Volume of Used Oil Available for Recovery in Australia (2000)

	Australia			**Western Australia**[96]	
Product	**Oil Sales (ML)**	**Generation Factor**	**Used Oil Available for Recovery (ML)**	**Oil Sales WA (ML)**	**Used Oil WA (ML)**
Automotive Petrol Engine Oils	94.1	60	56.5	9.3	5.6
Automotive Diesel Engine Oils	107.3	60	64.4	18.9	11.3
Transmission Fuels	23.8	80	19.0	3.9	3.1
Gear Oils	21.2	80	17.0	4.4	3.5
Specialty Oils	12.0	0	-	1.4	-
Hydraulic Brake Fluid	2.1	0	-	0.4	-
Aviation	2.9	90	2.6	0.1	0.1
Marine	19.4	0	-	3.9	-
Railroad	5.5	40	2.2	1.6	0.6
Industrial Gear Oils	16.1	75	12.1	3.7	2.8
Industrial Hydraulic Oils	43.2	50	21.6	6.0	3.0
Industrial Metalworking Oils	9.2	20	1.8	1.8	0.4
Industrial Other	43.6	61	26.6	5.4	3.3
Greases	15.9	0	-	2.7	-
Process Oils	32.7	0	-	0.2	-
Base Stocks	105.8	60	63.5	14.5	8.7
Total	**554.8**		**287.3**	**78.2**	**42.4**

Based on DISR data 2000 and the application of AIP generation factors.[97]

[96] These calculations are based on the application of Australia-wide AIP generation factors to oil sales in Western Australia and are, therefore, indicative only. They should be used with caution.

[97] DISR data has been extracted from: Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, Appendix B, p9. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

Table 3.2: Volume of Used Oil Available for Recovery in Australia (2007)

	Australia			Western Australia	
Product	**Oil Sales (ML)**	**Generation Factor**	**Used Oil Available for Recovery (ML)**	**Oil Sales WA (ML)**	**Used Oil WA (ML**
Automotive Petrol Engine Oils	81.5	60	48.9	6.8	4.0
Automotive Diesel Engine Oils	99.2	60	59.5	18.7	11.2
Transmission Fuels	29.9	80	23.9	7.2	5.8
Gear Oils	20.4	80	16.3	2.7	2.2
Specialty Oils	6.7	0	-	0.6	-
Hydraulic Brake Fluid	1.5	0	-	0.2	-
Aviation	1.1	90	1.0	0.2	0.2
Marine	17.0	0	-	3.7	-
Railroad	3.4	40	1.4	0.6	0.2
Industrial Gear Oils	11.5	75	8.6	1.8	1.4
Industrial Hydraulic Oils	37.1	50	18.6	4.6	2.3
Industrial Metalworking Oils	3.5	20	0.7	.01	0
Industrial Other	37.8	61	23.0	6.6	4.0
Greases	13.3	0	-	2.9	-
Process Oils	10.0	0	-	0.4	-
Base Stocks	46.5	60	28.0	1.6	1.0
Total	**420.6**		**229.9**	**58.9**	**32.3**

DITR 2007 data and the application of AIP generation factors.[98]

The quantity of used oil in Western Australia suggested in the above tables appears to be consistent with the proposition put forward by Mr Ewen Macpherson of AIP that 'it is estimated that just under half the original volume [of lubricants sold] resurfaces as used oil'.[99] However, it seems that the precise volume of used oil generated in the state is unknown. Mr Gary Watson, Nationwide Oil, suggests that 45ML of used oil is generated in Western Australia per annum.[100] The DEC estimate the volume of used oil generated to be 35 to 40ML.[101] The MTAWA report that

98 Department of Industry, Tourism and Resources, *Australian Petroleum Statistics*, vol. 131, June 2007, Table 3C and 3CC.

99 Australian Institute of Petroleum, 'Increased Competition and Environmental Concerns Prompt Oil Recyclers to Widen Collection Nets and Product Ranges', nd, p6. Available at: http://www.aip.com.au/health/used_oil_more.htm. Accessed on 31 August 2007.

100 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

101 Department of Environment and Conservation, Western Australia, Committee Briefing, 29 August 2007.

of the approximately 50ML of lubricating oil sold each year in the state only 36 to 40ML is collected by oil recycling companies, leaving approximately 10ML unaccounted for or missing.[102]

According to the Australian Department of Environment and Heritage, of the 500ML of lubricating oil sold in Australia, more than 250ML of used oil is generated and of this used oil between 60 to 100 ML is not recycled. This is a significant quantity of missing oil and anecdotal evidence suggests that this oil could be:

- *sitting in temporary stockpiles (eg in the garage or shed)*
- *retained in waste or scrap equipment (such as vehicles)*
- *lost to the environment at collection points (eg leaking, spills etc)*
- *put out for household rubbish collection or*
- *illegally dumped (in parks and reserves or in waterways, sewer systems and storm water drains).*[103]

At present there is no accurate information available on where this missing oil might be in the state or what condition it is, that is, what particular contaminants it might contain. However, it is not unreasonable to suggest that Western Australia's missing oil would also be found in similar locations to that mentioned in the Meinhardt report. With regards to known quantities of used oil generated, Peter Fitzpatrick of MTAWA agrees that 'it is difficult to arrive at an exact figure for the amount of waste oil individual companies are holding. It could be anywhere between 5 and 10 megalitres'.[104] One truck repairer advised the MTA that he had a total of 25 kilolitres (KL) of waste oil, 10KL stored in 250 litre drums and 15KL in a bunded tank.[105]

3.2 Collection of Used Oil in Western Australia

(a) Oil Collection

The first step in the conversion of so-called waste oil into used oil is to collect the oil from the various sites at which it is held. As noted in Chapter 1, used oil is generated in a wide variety of locations such as heavy and light industry located in metropolitan, rural and regional areas, on farms, at mine sites in rural and regional areas, in marine environments, in businesses such as motor vehicle servicing and auto parts recycling, and in individual households. The issue is how to

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102 Fitzpatrick, Peter, 'Waste Oil Collection a Shambles', Executive Comment, *Motor Western Australia*, vol. 72, no. 3, May/June 2007, p2.

103 Hon. John Hill, (South Australian Minister for Environment and Conservation) and Senator the Hon Ian Campbell (Australian Minister for the Environment and Heritage, *More Oil Recycling Centres for South Australia*, Joint Media Statement, 3 February 2006.

104 Fitzpatrick, Peter, 'Waste Oil Collection a Shambles', Executive Comment, *Motor Western Australia*, vol. 72, no. 3, May/June 2007, p2.

105 ibid., p2.

get it from these particular sites to a recycling facility. There appears to be two main avenues of collection. The first is for the oil user to take the used oil to a collection facility; the second is for it to be collected by commercial, private collectors and/or recyclers directly from the point of use, for example, from motor vehicle repair shops.

In 2002, the Meinhardt report stated that throughout Australia there were a number of local and state government collection programmes and systems in place, most notably a system of drop-off facilities or collection points at waste disposal sites. Oil deposited here is generally collected by private commercial collectors under contract to local councils or landfill operators.[106] However, the 2004 review of the transitional assistance element of the PSO drew attention to the 'lack of adequate used oil collection facilities, particularly in rural Australia' and recognised that this lack 'was a major barrier to the collection and recycling of greater amounts of used oil'.[107]

It is recognised that the collection infrastructure available and the way in which facilities are managed impact upon the quantity of used oil collected and that the standard of infrastructure 'varies significantly from place to place, particularly between metropolitan, rural and remote areas'.[108] To assist the development of appropriate collection facilities the local government Used Oil Collection Infrastructure Small Grants Program was established in 2001 to assist local government organisations to purchase and install environmentally sound oil collection facilities. Table 3.3 below shows the amount of funding provided for collection infrastructure grants and the number of collection facilities this funding developed.

In addition to these grants, the following funding was made available in 2002-03 to facilitate a coordinated approach to oil collection in the states:

- EcoRecycle Victoria: $550,000
- Queensland EPA: $1,489,400
- WA Local Government Association: $1,633,547[109]

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106 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p5.1. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

107 Department of the Environment and Heritage, *Independent Review of the Transitional Assistance Element of the Product Stewardship for Oil (PSO) Program*, report prepared by Australian Academy of Technological Sciences and Engineering, Australian Government, Canberra, 2004, p27.

108 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p7.1. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

109 While the Review does not mention it specifically, it is likely that these grants are part of the State Partnership Programme element of the TA fund.

Table 3.3: Collection Infrastructure Grants

Year	Small Grants Programme* Cumulative Funding $ (million)	Number of Facilities	Number of Local Government Organisations	Facilities funded via State Partnership programme	Total Number of Collection Facilities
to date 2003-2004	6.6	501**	309	-	501
2004-2005	7.6	519	324	309	828
2005-2006	7.9	528	324	325	853

Extracted from Department of Environment and Heritage Annual Reports.
* Local Government Waste Oil Collection Infrastructure Small Grants Programme.
** No figure was provided for 2003-04. The number here is based on a 2004-05 statement that 18 new facilities were funded that year.

In Western Australia as at June 2006 a total of 71 local government used oil collection facilities existed throughout the state (See Appendix Three). While the Committee was not able to inspect these sites, given that many of them are relatively new, it is reasonable to assume that they are of an appropriate standard. Nevertheless, the Committee cannot guarantee that all facilities in the state consist of a 'roofed, sealed and bunded area surrounding dedicated oil tanks'.[110] Furthermore, as the Meinhardt report notes, 'the collection of used oil at drop-off facilities also does not necessarily lead to its re-use';[111] the used oil must be collected from these facilities. In some areas of Australia commercial collectors no longer collect from local government facilities due to poor management and its associated lack of quality control.[112]

The commercial collection and reprocessing industry consists of collectors who collect oil from users or collection points and transport this oil to reprocessors, recyclers and re-refiners who convert the waste product into usable commodities. In Western Australia there are two main used oil collectors, namely Wren Oil and Nationwide Oil. These companies are also involved in used oil recycling and this will be discussed later in this report. As recyclers of used oil these companies would also draw from the PSO benefit fund.[113] Having the two main used oil collectors based in the south of a state in which there is significant mining and construction projects in the north, and farming activity to the north and east, presents particular issues for used oil collection.

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110 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p5.1. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

111 ibid., p5.1.

112 ibid., p5.1.

113 Mr Peter Fitzpatrick, Chief Executive Officer, Motor Trade Association Western Australia, Committee Briefing, 29 August 2007; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007; Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

For example, Wren Oil, based in Picton (85km south of Perth) sends trucks to Port Hedland, which is 2,000km to the north, and to Esperance, which is 600km south east. Wren Oil advised delegates at the 1997 Used Oil Management Conference in Brisbane that in order to cover this extensive oil collection catchment area they use 'double road trains for the long haul mine pick-ups and smaller single-tank vehicles for metropolitan Perth and local runs'.[114]

Until recently the two main used oil collection companies in Western Australia provided their collection services free of charge. However, at present neither company offers free collection of used oil. Anecdotal evidence suggests that a charge of 15 cents per litre, with a minimum of $75, now applies.[115] While for businesses such as motor vehicle servicing the cost of removal of used oil may not be difficult to absorb, particularly as motorists generally pay a waste management fee on their accounts, there is a risk that the imposition of a collection charge will lead to illegal dumping practices and, hence, environmental damage.

(b) Oil Storage

Step two in the conversion of waste oil to used oil is storage of the collected oil. While it would seem that any major issues concerning the collection of used oil in Western Australia have been resolved, particularly through the development of collection facilities throughout the state, the collapse of the burner fuel market for used oil has meant that available storage facilities at the Verve Energy Kwinana site (13ML) and at Shell North Fremantle (7ML) are at capacity.[116] This situation is compounded by the fact that Nationwide Oil are losing access to the Kwinana storage tanks.[117] Western Australia has a critical lack of storage space available for used oil and no new storage tanks have been built in Perth for more than 30 years.[118] As a direct result of this, and with no alternative storage site available, both Wren Oil and Nationwide Oil stopped their collection services and, at the time this investigation began, no used oil collections had occurred for six months.[119] This, in turn, led to used oil accumulating at either the individual points of use such as small businesses and garages or at local government collection facilities, which has resulted in the current glut of used oil.[120]

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114 Australian Institute of Petroleum, 'Increased Competition and Environmental Concerns Prompt Oil Recyclers to Widen Collection Nets and Product Ranges', nd, p3. Available at: http://www.aip.com.au/health/used_oil_more.htm. Accessed on 31 August 2007.

115 Department of Environment and Conservation, Western Australia, Committee Briefing, 29 August 2007; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007.

116 Department of Environment and Conservation, Western Australia, Committee Briefing, 29 August 2007; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007.

117 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

118 ibid.

119 Mr Barry Carbon, Chair, Waste Management Board, Western Australia, Committee Briefing, 3 September 2007.

120 Mr Peter Fitzpatrick, Chief Executive Officer, Motor Trade Association Western Australia, Committee Briefing, 29 August 2007; Mr Barry Carbon, Chair, Waste Management Board, Western Australia, Committee Briefing, 3 September 2007.

Nationwide Oil advised that the 'present glut first began to impact on used oil collection services in March this year'.[121] The Committee has concerns about the impact of the inability of storage facilities to accept more used oil, particularly with relation to the attendant risk of illegal dumping of used oil in bushland, drains and waterways, in metropolitan rural and regional areas. The Waste Management Board suggests that people are now starting to dispose of oil by placing it in their council provided bins or dumping it in the bush.[122] In their study, the Meinhardt group was advised that:

> *Earthmoving contractors, particularly in remote areas, may bury used oil - one stakeholder reported that used oil collections from two major contractors in his region amounted to only 5% of sales of new oil to those companies.*[123]

While the Committee's preliminary investigations have not included a survey of the state to determine issues concerning storage in non-metropolitan areas, clearly, practices such as these, were they to occur in Western Australia, would be of major concern.

3.3 Viability of Used Oil Collection

With the failure of the used oil market in Western Australia, as noted above, the collection and recycling of used oil, particularly as a free collection service, is no longer a viable proposition. One initiative taken by the used oil collectors in the state has been to establish an overseas market, that is, to engage in 'blend and send' activities as mentioned in Chapter 1. Another more long-term option exercised by the collectors is to become involved in the recycling aspects of used oil. For example, Wren Oil and Nationwide Oil have signed a Memorandum of Understanding to 'investigate the formation of a Joint Venture project to build a 50ML refinery including hydrotreatment for Western Australia's first lube to lube plant'.[124] As discussed in Chapter 2, under the PSO Program benefits are paid to recyclers of used oil to encourage an increase in used

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121 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007.

122 Mr Barry Carbon, Chair, Waste Management Board, Western Australia, Committee Briefing, 3 September 2007.

123 Environment Australia, *Used Oil in Australia*, report prepared by, Meinhardt Infrastructure & Environment Group, January 2002, p5.6. Available at: http://www.oilrecycling.gov.au/used-oil/chapter2.html. Accessed on 6 September 2007.

124 Mr Fred Wren, Wren Oil, Electronic Mail, 30 August 2007.

oil recycling. While Nationwide Oil advised that PSO benefits generally provide only approximately 50% of funds required to recycle oil,[125] the Committee understands that the viability of plants of the proposed Wren/Nationwide plant size would be largely dependent on the PSO benefit they might receive. These issues are discussed further in the final chapter of this report dealing with the current situation in Western Australia.

125 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

CHAPTER 4 RECYCLING USED OIL INTO NEW PRODUCTS

4.1 Recycling Used Oil

The chemical characteristics of base oil are very stable in that it does not 'lose its molecular structure or lubricating properties after prolonged use',[126] that is, lubricating oil does not wear out during its application process. However, it does become contaminated throughout its use, which reduces the efficiency of the lubricating oil. Furthermore, the additives that are blended to virgin base oil stock to produce high grade lubricants degrade over time and this degradation further reduces the effectiveness of the oil product. When the degradation of the additives and the contamination reaches a particular level, the oil is deemed to have reached its endlife and replaced. New lubricating oil is put into service and the discarded oil becomes potential used oil.

From the time that oil began to be used, and particularly since the advent of the motor vehicle, the potential to recycle used oil has been recognised.[127] For example, many methods were developed in the United States of America to filter, clean and distil used oil, and these were generally small scale, requiring minimal capital investment. By the late 1950s over 150 reprocessing plants operated in the United States.[128] Most of the methods implemented failed, a situation that was exacerbated by the major oil companies' 1960s initiative of using 'additive packages to make improved oils over the formerly straight weight single grade motor oils'.[129] This meant that the existing reprocessing technologies could not remove the contaminants, a major factor that led to the cessation of the majority of attempts to clean, reuse and recycle used oil.[130] Following this period, used oil was utilised in road dust oiling, burned in asphalt paving plants, or burned by farmers and small business owners for their own heating purposes.[131] Other factors that compounded the problem in the United States included the revocation of tax incentives for re-refining, the mid-1970s crash of the crude oil market and the establishment of strict environmental protection regulations. Thus, by 1989 the number of re-refining plants in the United States was less than ten.[132]

In the latter part of the twentieth century major oil companies became interested in recycling and re-refining used oil and a number of new technologies were developed. Not all of these have been successful and each type of re-refining system comes with its own set of economic and

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126 Southern Oil Refineries, 'Re-refining Process', nd. Available at: http://www.sor.com.au/products/re-refining/index.htm. Accessed on 18 October 2007.

127 Briggs, Bill, 'What is Happening to Used Oil Recycling in North America', *Liquid Recycling*, July 2007, p12.

128 Bryant, Christopher, 'Slick New Oil Re-refining Process', *Resource Recycling*, November 1989, p36.

129 Briggs, Bill, 'What is Happening to Used Oil Recycling in North America', *Liquid Recycling*, July 2007, p12.

130 ibid.

131 ibid.

132 Bryant, Christopher, 'Slick New Oil Re-refining Process', *Resource Recycling*, November 1989, p36.

environmental advantages and disadvantages.[133] Nevertheless, each process that converts used oil into a new marketable product is designed around the fact that due to its chemical stability the base oil retains its lubricating properties, and thus its economic and calorific value.

There seems little doubt that used oil can be recycled or re-refined. However, as previously noted in this paper, re-refining used oil is subject to a number of economic barriers. These include collection costs, the cost of re-refining oil in comparison to the selling price of the new commodities, capital expenditure and the costs associated with hazardous by-product generation.[134] One of the key issues, though, seems to be developing the most desirable and effective combination of technology, type of used product to be re-refined, the quantity of used oil available, plant location, environmental safety and economic viability. This particular matching issue as it relates to Western Australia is addressed in Chapter 5.

4.2 Recycling and Re-refining Technologies

There are a number of technological barriers to the recycling and/or re-refining process, and disagreements occur over which process is the best. Before providing a brief overview of the processes involved it is important to note that whichever is implemented it will encounter difficulties that arise because of the chemical properties of the oil itself. The contaminants generally found in lubricating oil, including 'dirt, grease, leaded gasoline, lead, zinc, diesel fuel and chlorinated solvents', necessitate that re-refiners use a 'complex set of operations (often referred to as pre-treatment steps) such as filtration, heating and settling, vacuum stripping and vacuum distillation to move contaminants'.[135] Sarah Carney, a used oil specialist with the USEPA, notes the following as additional difficulties faced by re-refiners:

- oil is high-temperature sensitive and, in combination with the contaminants it contains, 'fouls the heat exchange equipment and vacuums used at most re-refining plants';
- 'most re-refining operations use large volumes of intermediate storage'; and
- up to 50 per cent of used oil feedstock can be lost during pre-treatment.[136]

(a) Stages in Used Oil Re-Refining: From Recycling to Re-refining

The separation of used lubricating oil from the contaminants it has accumulated throughout its use can involve four stages depending upon the intended use of the recycled oil, that is, upon whether, for example, it is intended to be sold as low grade burner fuel or re-refined into top quality

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133 Briggs, Bill, 'What is Happening to Used Oil Recycling in North America', *Liquid Recycling*, July 2007, p12.

134 Bryant, Christopher, 'Slick New Oil Re-refining Process', *Resource Recycling*, November 1989, p37.

135 ibid., p36.

136 Carney, Sarah, Environmental Protection Authority, United States, cited in Bryant, Christopher, 'Slick New Oil Re-refining Process', *Resource Recycling*, November 1989, p36.

lubricating oil. The four distinct stages, from relatively simple recycling to complex re-refining, are:

- pre-treatment
- filtering and demineralisation
- propane de-asphalting;
- and distillation.[137]

It is important to note that all recycling and re-refining processes produce waste or residues. Issues concerning the nature of this waste and its treatment are discussed further in Chapter 5.

(i) Pre-treatment

Once used oil has been collected it undergoes a pre-treatment stage, commonly referred to as dewatering. Dewatering is a 'simple process relying on the separation of aqueous and oil phases over time under the influences of gravity'.[138] This is achieved by placing used oil into large settling tanks and allowing it to stand. Over a period of time free water sinks to the bottom where it is drained off. Water that has been emulsified within used oil will require the addition of a demulsifier to separate it prior to dewatering.

The de-watering process can sometimes be enhanced by heating the settling tanks. The addition of heat to the used oil speeds up the dewatering process and allows the evaporation of the water. The resultant de-watered or dehydrated oil can be sold at this stage as low grade burner oil. Alternatively, it can be on-sold to other re-refineries for further processing.

(ii) Filtering and Demineralisation

Used oil that has been dewatered still contains inorganic materials and other contaminants and the filtering and demineralisation stage removes these by adding sulphuric acid to the used oil and then heating it. At this stage, to reduce surface tension a surfactant (a chemical surface-active reagent) is added and the mixture is stirred and allowed to stand.[139] The sulphuric acid and the surfactant react with additives and other substances in the used oil and sink to the bottom of the settling tank. This is subsequently drained off and dried before being disposed of.

Once the contaminants have been removed, the used oil is filtered to remove any fine particles of matter that remain suspended in the oil. Following this filtering, the used oil can be blended or cut with 'a lighter petroleum product (called cutter stock) to produce a range of intermediate to light

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137 Department of the Environment and Water Resources, 'What Happens to Your Recycled Used Oil', 2 July 2004. Available at: http://www.oilrecycling.gov.au/what-happens.html. Accessed on 17 October 2007.

138 ibid.

139 ibid.

fuels'[140] that are suitable for use as burner fuel. Alternatively, the filtered and demineralised oil can proceed to the next stage, propane de-ashpalting, which is itself a pre-treatment for the re-refining stage.

(iii) Propane De-asphalting

Propane de-asphalting involves pumping the filtered and demineralised used oil into the top of an extraction tank (an extraction column) whilst pumping propane into the bottom. Used oil is much heavier than propane. Therefore, the oil gradually drains towards the bottom of the tank while the propane percolates towards the top. The used oil and propane mix during this process. The rising propane dissolves 'the more soluble lube oil components'[141] on its way to the top of the extraction tank. Once the propane and the other dissolved matter reach the top of the tank it is removed, vaporised and condensed. This allows the propane to be re-used. Once the oil has been de-asphalted it becomes feedstock for re-refineries where it is further distilled.

(iv) Distillation

As the name suggests, this process involves distilling the used oil by boiling it. Different compounds have different boiling points, and various gases and gasolines are produced at the lower end of the boiling spectrum whilst heavier lubricating oils are 'distilled at higher boiling points'.[142] There are two forms of distillation technology currently in use. These are atmospheric distillation and vacuum distillation.

Atmospheric distillation is undertaken at normal atmospheric pressure and involves using temperatures up to 300 degrees Celsius. As atmospheric distillation can often be a pre-treatment for vacuum distillation it does not require the used oil to be dewatered or de-asphalted before distilling.[143]

Vacuum distillation normally involves taking the end product of atmospheric distillation and separating this into 'products of similar boiling range to better control the physical properties of the lube base stock "distillate cuts" that will be produced from the vacuum tower products'.[144] Vacuum distillation is used to produce light, medium and heavy oil.

Distillation technology allows a used oil recycling plant to produce a re-refined base oil that is of comparable quality to virgin base oil. The used oil recycling plants that use this technology are often referred to as re-refineries.

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140 ibid.

141 ibid.

142 ibid.

143 ibid.

144 ibid.

4.3 Used Oil Recycling and Re-Refining in Australia

There are many sites in Australia at which basic recycling, in the form of filtering, of used oil occurs. Rather than detail all of these, the Committee focussed its attention on re-refining of lubrication oil. There are currently two large re-refining plants in Australia, the Southern Oil Refinery located at Wagga Wagga, New South Wales and the Transpacific Industries Group Inc. (Transpacific) plant located at Rutherford, New South Wales.

(a) Existing Recycling/Re-refining Facilities

(i) Southern Oil Refinery, Wagga Wagga

The Southern Oil Refinery (SOR), located at Wagga Wagga is classified as a lube-to-lube re-refinery that produces a re-refined base oil that is 'at least as good as and in some specific ways better than base oils made from crude oil'.[145] While the present capacity of the SOR is approximately 80,000 to 90,000 litres per day, expectations are that upgrades to the facility currently in progress will increase this to 120,000 litres per day early in 2008.

The re-refining technology used in the SOR is a multi-step process incorporating a number of new and old concepts. The used oil is collected from a number of sites including 'workshops, industrial sites and collection stations'[146] by contractors and tested to make sure it is suitable for re-refining. It is then transported to the re-refinery by road tanker. Used oil coming on-site is pre-tested for 'flash and chlorine to ensure that there is not a high content of flammable fuel or solvents'.[147] The used oil is then placed in guard tanks where it is again tested. Only used oil that meets the SOR supply specifications is accepted; any load of used oil failing to meet the requirements is rejected and sent back to the supplier for disposal. The Committee was advised that SOR have rarely rejected a load of used oil. On those occasions when it has occurred, the rejected load is tested again to determine its burning suitability and disposed of as low grade, unfiltered burner fuel.[148] Accepted loads of used oil are pumped into the feeder tanks for pre-treatment with caustic to reduce fouling later in the re-refining process.

The used oil is heated as part of the dewatering process. Water and light fuel oil are distilled, condensed and then separated.[149] The water is primarily incinerated (vaporised) and the light oil residue is sold off as burner fuel. The remainder of the used oil is then sent to a 'pre-flash evaporator where it is heated under vacuum'.[150] Distillate cuts at this stage produce higher grade burner oils. The used oil then goes through a wiped film evaporator (where the oil runs down a

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145 Southern Oil Refineries, 'Home page'. Available at: http://www.sor.com.au. Accessed on 18 October 2007.

146 ibid.

147 ibid.

148 Tim Rose, General Manager, Southern Oil Refineries, Telephone Conversation, 29 October 2007.

149 Southern Oil Refineries, 'Home page'. Available at: http://www.sor.com.au. Accessed on 18 October 2007.

150 ibid.

heated cylindrical surface[151]) and is sent for further vacuum distillation. Any residue from this stage is sent off site as low grade kiln burner fuel.

At the second stage vacuum distillation, the distillates produced from the used oil are separated into four distinct components. These are gas oil, light lube distillate, heavy lube distillate and heavy fuel oil. The 'gas oil and heavy lube distillates are pumped to storage and sold as furnace fuels.... the light and heavy lube distillates are pumped to intermediate storage as feed supply for solvent extraction treatment.'[152]

The remaining light and heavy distillates undergo a solvent treatment that extracts that last of the contaminants, particularly coloured, odorous and polar components.[153] The resultant product now meets PSO regulations which 'require the re-refined lube base oil specifications to be equivalent to virgin lube base oils'.[154]

At the completion of the re-refining process the resultant products are stored in dedicated tanks awaiting load out. Each tank is sampled to ensure the product meets the required specifications. The light base oil and the heavy base oil require a Certificate of Analysis from the on-site laboratory to verify that the end product meets the required specifications of the buyer. Another sample is taken once the distillate product has been loaded for transport and given to the buyer along with the Certificate of Analysis.

(ii) Transpacific Industries Group Inc., Rutherford

Transpacific Industries Group Inc (Transpacific) is another company that is currently involved in developing recycling plants for used oil. In September 2007 Transpacific opened a used oil recycling facility in Rutherford, New South Wales, capable of processing 40 million litres of used oil per annum.[155]

The Transpacific plant at Rutherford uses hydrogenation to produce a reusable base oil end product. Hydrogenation is a 'hydrocarbon processing operation where pre-treated used lubrication oil is chemically reacted with hydrogen at elevated temperature and pressure to remove oxygen, nitrogen, sulphur and metal compounds, to saturate olefins and to correct the colour'.[156] Hydrogenation incorporates different technology to the SOR re-refinery in Wagga Wagga. The

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151 Americas VTA, 'Basics of Vacuum Distillation'. Available at: http://www.avta-us.com/basics.html. Accessed on 22 October 2007.

152 Southern Oil Refineries, 'Home page'. Available at: http://www.sor.com.au. Accessed on 18 October 2007.

153 ibid.

154 ibid.

155 Transpacific Industries Group Ltd, 'Official Opening of Hydrogenation Facility', 27 September 2007. Available at: http://www.transpacific.com.au/tpi/news_detail.php?newsID=150. Accessed on 25 October 2007.

156 Rutherford Hydrogenation Plant, Standard Operating Procedures - General Description, Transpacific Refiners Pty Ltd, Doc. No. SOP-HGP-01.doc, 9 March 2007, p2.

hydrogenation technology is designed around a 'catalyst filled, fixed bed reactor'[157] and only incorporates certain aspects of the four stages of re-refining mentioned earlier, mainly pre-treatment and modified vacuum distillation.

The hydrogenation process removes 'metal contaminants as well as converting oxides, nitrides and sulphur to stable compounds'.[158] The unwanted compounds are extracted either as solids or gas and disposed of. Most of the gas is recycled and burnt as a fuel source for the plant. According to Transpacific, the final product is a 're-refined base oil that can be reintroduced into the lubricant market to be used again and again'.[159]

(b) Proposed Used Oil Recycling/Re-refining Facilities

Anecdotal evidence suggests that presently, within Australia, there are plans to establish new re-refineries and used oil recycling plants. It is proposed that these will be located in several states, including Western Australia. However, as the following demonstrates, there is considerable difference in the rate at which the proposed re-refineries and recycling plants are being progressed with some at an advanced planning level and others still at the discussion stage.

(i) Lube Oil Re-refining and Exchange Pty Ltd (LOREX)

Lube Oil Re-refining and Exchange Pty Ltd (LOREX) has announced that the company is in the process of planning a 100 million litre capacity used oil re-refinery in the Hunter Valley, New South Wales.[160] The new re-refinery will incorporate technology that is comparable to the plant operated by SOR in Wagga Wagga, as this technology was deemed robust and reliable.[161] Mr Mark Glover, Director of LOREX Investments Pty Ltd, advised that rather than use new technology, the Hunter Valley plant will use proven technologies that are used world-wide, for example, by Evergreen (California), Safety Kleen, (Chicago) and Mohawk (Vancouver). This technology does not involve hydrotreatment, which is expensive, and will produce high quality material that the customer wants, using simple, robust processes.[162]

LOREX has chosen the 100 million litre capacity benchmark for the new re-refinery based on a detailed analysis the company conducted that demonstrated the importance of:

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157 ibid.

158 ibid.

159 Transpacific Industries Group Ltd, 'Official Opening of Hydrogenation Facility', 27 September 2007. Available at: http://www.transpacific.com.au/tpi/news_detail.php?newsID=150. Accessed on 25 October 2007.

160 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Electronic Mail, 19 October 2007, p2; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007. LOREX is also planning to construct a similar re-refinery in the United Kingdom.

161 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Electronic Mail, 19 October 2007, p2.

162 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Committee Briefing, 17 October 2007.

(a) the operational, commercial and thermal efficiency of the complex re-refining plant;

(b) the ability to create an efficient national collection and used oil aggregation network to supply such a project;

(c) the importance of building a plant that has low costs of production whilst being big enough to afford the very best equipment and environmental safeguards; and

(d) being entirely viable with or without the used oil product stewardship scheme in the medium to long term.[163]

LOREX also advised that they had considered and rejected an 'alternative strategy to build small (20-30ML/Yr) plants in each capital city'[164] because, in their opinion, these plants do not satisfy their four aforementioned requirements.

LOREX suggested that the re-refinery will require approximately 20 million litres of Western Australian used oil per annum as part of its national quota. The used oil will be collected and stored in dedicated tanks before it is transported to New South Wales by ship. The amount of used oil required by LOREX equates to approximately 50% of Western Australia's current stockpile of used oil. The formal approval process is about to start and LOREX expects the Hunter Valley facility to be operational in two years.[165]

(ii) Transpacific Industries Group Inc. - Hydrogenation Plants

On 27 September 2007 Transpacific Executive Chairman, Terry Peabody, announced that the hydrogenation project at Rutherford was only the first of a number of hydrogenation plants that Transpacific are to construct. The Rutherford plant is to be the 'first of four such facilities planned for Australia with other facilities to be strategically located in Victoria, Western Australia and Queensland'.[166] However, the Committee's investigations indicate that Transpacific are primarily focussing on establishing the hydrogenation plants in Victoria and Queensland.[167] At the time of collating this information, the Committee was unaware of the status of the hydrogenation plant proposed for Western Australia.

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163 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Electronic Mail, 19 October 2007, p2.

164 ibid.

165 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Committee Briefing, 17 October 2007.

166 Transpacific Industries Group Ltd, 'Official Opening of Hydrogenation Facility', 27 September 2007. Available at: http://www.transpacific.com.au/tpi/news_detail.php?newsID=150. Accessed on 25 October 2007.

167 Mr Stewart Douglas, Project Manager, Transpacific Industries Group Ltd, Telephone Conversation, 25 October 2007.

4.4 Used Oil Recycling and Re-Refining in Western Australia

(a) Existing Recycling/Re-Refining Facilities

At present in Western Australia, Wren Oil utilises a thin film evaporator to recycle used oil from the domestic market. Thin film evaporators use a process that involves the application of heat to boil the used oil. The difference between thin film evaporation and other distillation processes is the operating pressure used in the thermal separation. By reducing the operating pressure, 'a substantial decrease of boiling temperature is obtained.... this allows separation of products that would be destroyed by conventional vacuum distillation'.[168] The end products of thin film evaporation are predominantly light to medium burner fuels. Thus, the Wren Oil plant produces a number of recycled used oil products with the majority of these categorised as industrial burner oils.[169] The Wren Oil facility currently recycles over 12 million litres of used oil per annum.[170]

(i) Wren Oil Bitumen Plant

In 2006, Wren Oil received a multi-year grant of $400,000 from the Transitional Assistance Grants Programme to establish a bitumen processing plant capable of using the residue left over from recycling used oil.[171] Initially this plant was to be constructed in Picton, however, it is now envisaged that it will be located in North Fremantle. Wren Oil is currently in the process of obtaining the necessary environmental approvals prior to the commencement of construction. It is anticipated that the project will commence in mid 2008.[172] This is discussed further in Chapter 5.

(b) Proposed Recycling/Re-Refining Facilities

There was consensus amongst the various interested parties with whom the Committee had discussions that a lube-to-lube facility would be the best type of re-refining facility for Western Australia. Those who determined that a lube-to-lube facility would produce the best solution include BP Refinery (Kwinana) Pty Ltd (BP), DEC, Nationwide Oil and the MTAWA. If a lube-to-lube facility is not possible, the best second option was held to be a thermal cracking facility.[173]

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168 Americas VTA, 'Basics of Vacuum Distillation'. Available at: http://www.avta-us.com/basics.html. Accessed on 22 October 2007.

169 Wren Oil, 'Recycled Products', nd. Available at: http://www.wrenoil.com.au/products.html. Accessed on 18 October 2007.

170 ibid.

171 Department of Environment and Heritage, *Annual Report 2005-06*. Available at: http://www.environment.gov.au/about/publications/annual-report/05. Accessed on 18 October 2007.

172 Mr Fred Wren, Owner Wren Oil, Telephone Conversation, 29 October 2007.

173 Mr Peter Fitzpatrick, Chief Executive Officer, Motor Trade Association Western Australia, Committee Briefing, 29 August 2007; Department of Environment and Conservation, Committee Briefing, 29 August 2007.

(i) Wren Oil and Nationwide Oil Pty Ltd Joint Venture

The Committee was advised that Wren Oil and Nationwide Oil have signed a Memorandum of Understanding and formulated a commercial agreement to construct Western Australia's first lube-to-lube facility. The plant is planned for construction at Picton, near Bunbury in the state's South West.[174] The investment in this new facility is estimated to be between $15-20 million and is intended to provide a '"cradle-to-grave" solution' to Western Australia's used oil problems.[175] The partners estimate that this lube-to-lube facility could be completed within two to three years from commencement and be operational 'within 12 months of obtaining approvals'.[176] This re-refining plant will also take advantage of the PSO benefits.[177]

(ii) Thin Film Evaporator for Feedstock for LOREX's Hunter Valley Plant

As noted above, to meet feedstock requirements for its Hunter Valley re-refining plant, LOREX intends to enter the market for Western Australia's used oil. The Committee understands that LOREX would prefer better quality, filtered, feedstock. At this stage, to obtain this feedstock LOREX is considering either entering into a joint venture with an existing used oil recycler or developing its own thin film evaporator facility in Western Australia. The Committee understands that a number of discussions have been held between the interested parties to progress this.[178]

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174 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007; Mr Fred Wren, Wren Oil, Electronic Mail, 30 August 2007.

175 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007; Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

176 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007; Hon. David Templeman, Minister for the Environment, Letter, 20 September 2007; Mr Fred Wren, Wren Oil, Electronic Mail, 30 August 2007.

177 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Letter, 20 September 2007.

178 Mark Glover, Director, LOREX Investments Pty Ltd, Committee Briefing, 17 October 2007.

CHAPTER 5 CHALLENGES TO DEVELOPING USED OIL MARKETS FOR WESTERN AUSTRALIAN USED OIL

5.1 Introduction

It is clear from the information gathered to date that the problems associated with used oil recovery and recycling in Western Australia have been significant. It is also clear that both the public and private sectors have been engaged in developing viable solutions to these problems, and this effort needs to be recognised and congratulated. Nevertheless, the Committee recognises that there are still some major challenges to be faced in ensuring that the best possible outcomes for used oil collection and recycling are achieved.

While it seems that the crisis that has existed this year from the collapse of the burner fuel market has been alleviated, largely due to shipments offshore, there is a need to develop long-term markets for Western Australia's used oil that are sustainable in both economic and environmental terms.

5.2 Data for Western Australia

In Chapter 1 the issue of the availability and reliability of data regarding used oil was raised as a matter of concern to the independent reviewers of the federal PSO and TAF programmes. This data is generated by ABARE, AIP, ATO and DITR and relates to all Australian states and the Northern Territory. The Committee is concerned about this lack of reliable data, particularly in relation to Western Australia. It is generally understood in government and industry that there is a used oil problem in the state and that current storage facilities have reached capacity. However, it seems that data on the precise volume of used oil is not available. The location of used oil in the state has not been mapped. Nor is it possible to determine the condition of the used oil, what level of contamination it might contain, the nature of storage facilities, particularly in the more remote parts of the state, and the quantity and sites of missing used oil.

The Committee has heard varying estimates for the amount of used oil available in the state. However, without more accurate information on the volumes of oil sold, collected, used and unaccounted for in Western Australia it is difficult to ascertain the potential effectiveness and sustainability of proposed solutions to the present situation.

5.3 Environmental Challenges

The current situation regarding collection, storage and recycling or re-refining of used oil in Western Australia presents a number of environmental challenges to ensure that the state's environment is protected. The capacity for a small amount of oil to pollute a large amount of ground or water is regularly cited as a warning about the potential for oil, used or otherwise, to damage the environment.

A single drop of used motor oil can contaminate a million drops of water. ... a single litre of used oil can contaminate a million litres of ground water.[179]

One litre of used motor vehicle oil, poured onto the ground, can contaminate up to one million litres of groundwater.[180]

The term 'a little goes a long way' is very true for oil. Even a little oil can cause severe damage to the environment and threaten human health: just one litre of used oil can pollute up to a million litres of water, one engine change or five litres of oil is enough to cover a small lake.[181]

One litre of oil can contaminate up to one million litres of water, and the heavy metal in used oil can bio-accumulate in plants and wildlife, poisoning the food chain and posing a risk to human health.[182]

Disposing of oil the wrong way can pollute our land, our water and our environment. Oil poured onto soil can seep through the ground and into the local water table. Just one litre of oil can contaminate one million litres of water.[183]

Oil is also a pollutant: it takes only one litre of oil to contaminate one million litres of water (which is about half the size of an Olympic swimming pool), and a single automotive oil change produces four to five litres of used oil.[184]

As little as one litre of oil can contaminate one million litres of water. Burning waste oil can also produce carcinogens. The incorrect disposal of waste oil is a serious environmental problem.[185]

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179 British Columbia Used Oil Management Association, nd. Available at: http://www.rcbc.bc.ca/documents/resources/ps_bcuomabrochure.pdf. Accessed on 29 October 2007.

180 Raven Recycling Society, 'Federal Recycling Responsibility', nd. Available at: http://www.ravenrecycling.org/resources/wasteNotnew_files/wastenotpdfs/jan1306.doc. Accessed on 29 October 2007.

181 Surrey County Council, 'Household Waste Guide - The Garage', nd, Available at: http://www.surreycc.gov.uk/sccwebsite/sccwspages.nsf/LookupWebPagesByTITLE_RTF/Household+waste+guide+-+the+garage?opendocument. Accessed on 29 October 2007.

182 Hon Dr David Kemp, (Minister for the Environment and Heritage), *Do the Right Thing: Responsibly Dispose of Used Motor Oil*, Media Statement, 17 May 2004. Available at: http://www.environment.gov.au/minister/env/2004/mr17may404.html. Accessed on 29 October 2007.

183 Department of the Environment and Heritage, 'I'm an Environmental Activist. Because I Recycle My Used Engine Oil', May 2005. Available at: http://www.oilrecycling.gov.au/brochure/index.html. Accessed on 29 October 2007.

184 Department of the Environment and Water Resources, 'Used oil - health and environmental impacts', nd. Available at: http://www.oilrecycling.gov.au/factsheet-3.html. Accessed on 29 October 2007.

185 Zero Waste WA, 'Recycle It!', nd. Available at: http://www.wastewise.wa.gov.au/pages/hazardous2.asp?ID=22. Accessed on 29 October 2007.

All oil, used or otherwise, that is not recycled or disposed of in an appropriate manner presents problems to both the environment and human health. The ACG review of the PSO recognised this potential harm to:

- *the environment generally — the improper use of used oil can pollute land, waterways, underground reservoirs and the marine environment, and in so doing, harm biodiversity. The potential pollution can be disproportionate to the volume of used oil ...; and*

- *human health — it is also poisonous if swallowed or inhaled and can present a fire hazard if not properly stored.*[186]

(a) Used Oil as Hazardous Waste and a Dangerous Good

It is important to note, though, that used oil is particularly hazardous in large part because of the methods by which it is generated and the contaminants that it contains, whether they be additives to help it achieve its dedicated purpose or metal and/or other matter accumulated through its application process. Such contamination of used oil means it poses a much higher risk than does virgin oil. This point was reiterated by the Hon. John Hill, South Australian Minister for Environment and Conservation and Senator the Hon. Ian Campbell, Australian Minister for the Environment and Heritage, in their joint media statement of 3 February 2006.[187] The serious potential for used oil to pollute the environment is also acknowledged by the Western Australian Waste Management Board and DEC.[188]

(i) Used Oil as Hazardous Waste

As discussed in Chapter 3, a combination of increased consumption of oil and a lack of storage capacity in Western Australia led to an enormous stockpile of used oil in the state. This, in turn, created a situation where no collections took place for a considerable period of time. The obvious risk that arises here is that of inappropriate storage and disposal of used oil or illegal dumping. Natalie Sharp of MTAWA states that:

> *there are very real environmental and occupational safety issues associated with the problems in the lack of collection of waste oil. The environmental issue is an obvious one - waste oil will end up in the environment, including wetlands, groundwater and other sensitive areas, if it is not collected by oil recyclers or taken back by oil companies. It*

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186 Department of the Environment and Heritage, *Independent Review of the Transitional Assistance Element of the Product Stewardship for Oil (PSO) Program*, report prepared by Australian Academy of Technological Sciences and Engineering, Australian Government, Canberra, 2004, p7.

187 Hon. John Hill, South Australian Minister for Environment and Conservation and Senator the Hon. Ian Campbell, Australian Minister for the Environment and Heritage, 'More Oil Recycling Centres for South Australia', Joint Media Statement, 3 February 2006. Available at: http://www.zerowaste.sa.gov.au/pdf/media_releases/oil_recycling_centres.pdf. Accessed on 7 September 2007.

188 Mr Barry Carbon, Chair, Waste Management Board, Western Australia, Committee Briefing, 3 September 2007; Department of Environment and Conservation, Committee Briefing, 29 August 2007.

> *takes only a little stretch of the imagination to see what some unconsciounable operators will do with waste oil when they can store no more at their premises.*[189]

When businesses are compelled to store used oil in drums it can also create safety issues such as an increased risk of spillages and fire hazards, particularly when not stored in 'bunded or purpose built areas'.[190] The risk of environmental damage does not come only from business and industry. As noted previously, there is evidence to suggest that used oil is being placed in council provided general rubbish collection bins or simply dumped in bushland. The challenges presented by this situation include ensuring adequate protection measures are in place in Western Australia and continuing to educate both the business/industry community and the general public about the dangers of inappropriate disposal and on how to responsibly dispose of used oil.

In Western Australia the DEC is charged with 'protecting and conserving the State's environment'.[191] DEC's main responsibilities include:

> *broad roles in conserving biodiversity, and protecting, managing, regulating and assessing many aspects of the use of the State's natural resources. The department contributes to the development of environmental protection policies, managing the environmental impact assessment process and carrying out regulatory functions to achieve improved environmental outcomes. It is also responsible for management of contaminated sites and coordination of pollution incident responses.*[192]

One of the DEC's eight key objectives is:

> *Preventing pollution and remediating contamination – Protect the environment, and people's health and amenity, by ensuring discharges meet approved criteria and contaminated sites are appropriately remediated.*[193]

In order to meet these responsibilities the department has recourse to a raft of legislation, regulations and policies, most notably in this context the *Environmental Protection Act 1986* and the *Contaminated Sites Act 2003*, and associated regulations such as the Enforcement and Prosecution Policy (November 2004). From the following set of definitions, used oil can be classified as a hazardous substance and, thus, its disposal is subject to regulation.

As defined in Part 1 of the *Environmental Protection Act 1986* waste includes matter 'whether liquid, solid, gaseous or radioactive and whether useful or useless, which is discharged into the

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189 Sharp, Natalie, 'The Used Oil Crisis', *Motor Western Australia*, vol. 72, no. 3, May/June 2007, p4.

190 ibid.

191 Department of Environment and Conservation, 'About Us', nd. Available at: http://portal.environment.wa.gov.au/portal/page?_pageid=119,5928024&_dad=portal&_schema=PORTAL. Accessed on 30 October 2007.

192 ibid.

193 ibid.

environment'.[194] The DEC website glossary also provides the following definitions relating to the concept of hazard.

Hazard:

> *the intrinsic property of a dangerous substance or physical situation at an establishment, with a potential for creating damage to man and the environment.*[195]

Hazardous Pollutants:

> *These are present at low concentration with characteristics such as toxicity or persistence so as to be hazardous to humans, plant or animal life. These hazardous pollutants have been identified and known or suspected to be carcinogenic, mutagenic, teratogenic, highly toxic or highly persistent substances and consequently require special attention.*[196]

Hazardous Waste:

> *Component of the waste stream which by its characteristics poses a threat or risk to public health, safety or the environment (includes substances which are toxic, infectious, mutagenic, carcinogenic, teratogenic, explosive, flammable, corrosive, oxidising and radioactive).*[197]

By definition, used oil that is not disposed of appropriately or recycled or re-refined has significant potential to become a hazardous waste and pollutant.

Part of the problem of inappropriate disposal of used oil can be addressed via education programmes. The Committee is aware of the role of ZeroWaste WA in producing educational materials such as the environmental educator fact sheet 'Dispose of Unwanted Household Hazardous Waste Safely!' which states that 'household hazardous waste includes a broad range of products that are flammable, toxic, explosive or corrosive'.[198] The fact sheet includes motor oil, brake fluid, fuels and transmission fluid in the list of household hazardous wastes.

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194 *Environmental Protection Act 1986 (WA).*

195 Department of Environment and Conservation, 'Glossary - Hazard' citing *EPA (2000) Guidance for Risk Assessment and Management Offsite Individual Risk from Hazardous Industrial Plant, no. 2*, 2000. Available at: http://portal.environment.wa.gov.au/portal/page?_pageid=233,5913380&_dad=portal&_schema=PORTAL. Accessed on 30 October 2007.

196 Department of Environment and Conservation, 'Glossary - Hazardous Pollutant' citing *EPA (2003). Guidance statement for Implementing Best Practice in proposals submitted to the Environmental Impact Assessment process, no. 55*, 2003. Available at: http://portal.environment.wa.gov.au/portal/page?_pageid=233,5913380&_dad=portal&_schema=PORTAL. Accessed on 30 October 2007.

197 Department of Environment and Conservation, 'Glossary - Hazardous Waste' citing Landfill Waste Classification and Waste Definitions 1996 (as amended). Available at: http://portal.environment.wa.gov.au/portal/page?_pageid=233,5913380&_dad=portal&_schema=PORTAL. Accessed on 30 October 2007.

198 ZeroWaste WA, 'Dispost of Hazardous Household Waste Safely!', nd. Available at: http://www.zerowastewa.com.au/documents/kits/hhw_fs.pdf. Accessed on 30 October 2007.

(ii) Used Oil as a Dangerous Good

Goods classified as dangerous are subject to regulation through the Department of Consumer and Employment Protection (DOCEP). DOCEP's safety division 'is responsible for safety and health regulation of dangerous goods, mining, and major hazard facilities'.[199] The function of Resources Safety includes setting 'safety and health standards and policies for the mineral and dangerous goods industries' and administering 'Dangerous Goods Safety and other relevant legislation'.[200]

As a dangerous good used oil, its handling, storage and transport, is subject to a raft of dangerous goods legislation and regulations:

- *Explosives and Dangerous Goods Act 1961 (WA)*
- *Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations 1992 (WA)*
- *Explosives and Dangerous Goods (Search Warrant) Regulations 1979 (WA)*
- *Dangerous Goods (Transport) Act 1998 (WA)*
- *Dangerous Goods (Transport) (Road and Rail) Regulations 1999 (WA)*
- *Dangerous Goods (Transport) (General) Regulations 1999 (WA)*
- *Dangerous Goods (Transport) (Dangerous Goods in Ports) Regulations 2001 (WA)*
- *Dangerous Goods Safety Act 2004 (WA)*

Used oil is a combustible liquid, which under the Australian Standard AS1940 *Class 3 Flammable and Combustible Liquids*,[201] is 'any liquid, other than a flammable liquid, that has a flash point, and has a fire point that is less than its boiling point'.[202] If the used oil has a flash point of 150°C or less it is a Class C1 combustible liquid. If the flash point of the used oil is more than 150°C it is a Class C2 combustible liquid.[203]

Under the current Western Australian regulations regarding dangerous goods handling and storage used oil is classified as a dangerous good. However, these 1992 regulations concerning handling and storage of dangerous goods are currently being reviewed and new regulations, namely *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations* 2007, have been released for public information, but not yet proclaimed. Under the new regulations used oil will no longer be classified as a dangerous good unless it has additives that give it a flash point of less

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199 Resources Safety, Department of Consumer and Employment Protection 'About Us', September 2007. Available at: http://www.docep.wa.gov.au/resourcessafety/Sections/About_Us/overview.html. Accessed on 30 October 2007.

200 ibid.

201 Department of Consumer and Employment Protection, 'Dangerous Goods Storage', 2006. Available at: http://www.docep.wa.gov.au/ResourcesSafety/Sections/Dangerous_Goods/Frequently_Asked_Questions/Dangerous_Goods_Stor.html#Def. Accessed on 29 October 2007.

202 Standards Australia, *AS1940-2004 The Storage and Handling of Flammable and Combustible Liquids*, Standards Australia, Sydney, 2004, p10.

203 ibid.

than 150°C, that is, used oil as a C2 combustible liquid. C1 combustible liquids and Class 3 flammable liquids remain as dangerous goods.[204]

(b) Residue from the Recycling and Re-Refining Process

As the primary purpose of the re-refining/recycling process is to extract contaminants and other foreign matter from the used oil, during such procedures a certain amount of residue is necessarily produced as a direct by-product of the process. Furthermore, the nature or make-up of the by-product will depend upon the particular stage of the re-refining or recycling process at which it is extracted. For example, dewatering, which is a primary treatment, removes excess water from the used oil. Once removed, the excess water is 'treated (waste water treatment) and discharged appropriately to sewer or stormwater depending on quality and local regulations'.[205] The residue produced via the distillation process, which is an advanced stage of processing, has a high calorific value which can be utilised as a low grade burner fuel.

Recyclers and re-refiners of used oil generally can not be aware of the particular contaminants in each shipment of used oil as it is received at the plant. Pre-testing of used oil prior to re-refining or recycling allows for early detection of possible dangerous contaminants, particularly chlorine and diesel.[206] The ability to detect and then prevent contaminated used oil from entering the re-refining/recycling process enables the technology that is in place to produce an uncontaminated product and, more importantly, an uncontaminated by-product.

For example, SOR advises that its plant applies complex technology to ensure that the re-refined base oil and any waste can be effectively utilised. Waste residue produced from SOR is generally used in cement kilns as a burner fuel. SOR argues that the high calorific value and low ash content of the residue produced in their plant makes it more effective to burn than coal.[207]

This suggests that the higher the quality of the waste by-product the more marketable that by-product becomes and/or the easier it is to find a safe and acceptable method of disposal. The quality of the waste material is determined by the technology utilised by the re-refining and recycling plants. The more efficient the process for removing contaminants and unwanted materials from the used oil, the lower the likelihood that the by-product or waste material will be contaminated.

However, not all waste material is converted to a marketable by-product such as burner fuel. During some pre-treatment processes used oil undergoes a de-asphalting stage and the resultant residue is mixed with other heavy waste (sometimes referred to as heavy bottoms) to form an

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204 Department of Consumer and Employment Protection, *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*, s8.

205 Department of Environment and Water Resources, 'What Happens to Your Recycled Used Oil', 2 July 2004. Available at: http://www.oilrecycling.gov.au/what-happens.html. Accessed on 17 October 2007.

206 Tim Rose, General Manager, Southern Oil Refinery, Telephone Conversation, 30 October 2007.

207 ibid.

'asphaltic material'.[208] Anecdotal evidence suggests that potential uses for this product are still in the developmental stage and more research is required to ascertain how this asphaltic material can be effectively utilised. This is discussed further in the section on Bitumen which follows.

In Western Australia, Wren Oil recycles over 12 million litres of used oil per year.[209] The majority of the recycled oil is categorised as 'Industrial Burner Oil'.[210] Waste residue produced from the Wren Oil plant is blended with other lighter oil to form a low grade burner fuel. It is this burner fuel that is currently being shipped to Christmas Island for use in the local phosphate industry and to Singapore for inclusion in the Asian burner fuel market.[211]

The general conclusion that might be drawn from this brief investigation is that there is a increased awareness and understanding of the need to ensure that any by-product or residue produced in the recycling and re-refining processes is as clean as possible. This allows for the residue to be more readily marketed or appropriately disposed of as a dangerous good or hazardous material, as discussed above.

5.4 Shipment of Used Oil

The Committee is aware that one of the solutions to reduce the increasing stockpile of used oil in Western Australia is to ship it offshore. The Committee is also aware of proposals to send shipments of oil from Western Australia to re-refineries in the eastern states. The shipment of hazardous goods from one country to another is controlled under the 'Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal'[212] (Basel Convention) which operates under the umbrella of the United Nations Environment Programme and came into operation in 1992. As a signatory to the Convention, Australia was required to 'introduce appropriate national or domestic legislation to prevent and punish illegal traffic in hazardous and other wastes'.[213] The Convention also stipulates that 'parties are expected to minimize the quantities that are moved across borders, to treat and dispose of wastes as close as possible to their place of generation and to prevent or minimize the generation of wastes at source'.[214]

In Australia, the Basel Convention directives are administered by the federal Department of the Environment and Water Resources' Hazardous Waste Section and are covered under the

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208 Department of Environment and Water Resources, 'What Happens to Your Recycled Used Oil', 2 July 2004. Available at: http://www.oilrecycling.gov.au/what-happens.html. Accessed on 17 October 2007.

209 Wren Oil, 'Recycled Products', nd. Available at: http://www.wrenoil.com.au/products.html. Accessed on 18 October 2007.

210 ibid.

211 Mr Fred Wren, Managing Director, Wren Oil, Electronic Mail, 31 October 2007.

212 Basel Convention, 'Basel Convention at a Glance'. Available at: http://www.basel.int/convention/bc_glance.pdf. Accessed on 30 October 2007.

213 ibid.

214 ibid.

Hazardous Waste (Regulation of Exports and Imports) Act 1989.[215] Under the *Act* and in accordance with the requirements of the Basel Convention, any person or organisation intending to either import or export from Australia a cargo that contains hazardous material requires a Basel permit before shipment can be undertaken.

From a Western Australian perspective, there have been a number of shipments of blended used oil sent to overseas market, particularly from British Petroleum's (BP) Kwinana refinery. The blended oil comprised a mixture of decanted oil from the Kwinana refinery and some surplus used lube oil.[216] Loads of between 40 to 50 million litres of the blended oil would be shipped to Singapore either monthly or quarterly as fuel oil.[217]

The Committee was advised that prior to shipping these blends to Singapore, clarification was sought from the federal Department of the Environment and Water Resources on whether the loads required a permit that would exempt the shipment from the provisions of the Basel Convention. BP was advised by the federal government that the Basel Convention did not apply to their 'blend and send' shipments.[218] This assessment was based on the following three characteristics of the used oil involved: first, the used oil had been subjected to further processing (dewatering); second, it had been blended with other oil so that it was not neat used oil; and third, it was blended to meet a particular specification of furnace oil. As a result of these three characteristics, rather than being viewed as hazardous waste, the resultant mixture could be classified as a new product.[219]

By 2004, however, demands for these blended fuel oils had reduced markedly due mainly to the gasification of the market and to changes in specification requirements. BP was also unable to access the PSO benefits. As a consequence of this reduced demand and dropping profitability BP ceased its shipments to Singapore.[220]

The current used oil glut in Western Australia has meant that the shipping of blended fuels has recommenced. Under a 'blend and send' agreement, exporters have sent, and are about to send, burner fuel, a mixture of used oil and heavy fuel, to Singapore and Christmas Island. The Committee understands that one shipment of blended burner fuel has already gone to the Vitol Asia Fuel Company in Singapore and a second shipment of 7,500 tonnes of blended oil product is

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215 Dr Barry Reville, Assistant Secretary, Environmental Protection Branch to Fred Wren, Managing Director, Wren Oil, in Mr Fred Wren, Managing Director, Wren Oil, Electronic Mail, 30 August 2007.

216 Mr Fred Wren, Managing Director, Wren Oil, Electronic Mail, 30 August 2007.

217 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Committee Briefing, 19 September 2007.

218 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Telephone Conversation, 30 October 2007.

219 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Committee Briefing, 19 September 2007.

220 ibid.

due to leave for Vitol in late October 2007.[221] A load of 16,000 tonnes of blended burner fuel is scheduled to go to Christmas Island late in 2007.[222]

Advice was sought by Wren Oil from the federal Department of the Environment and Water Resources' (DEWR) Hazardous Waste Section on whether a Basel Convention export permit was required to send the 7,500 tonne load of blended oil to Singapore. The response states that as the blended product 'will be destined for direct use as fuel oil use without undergoing further processing'[223] it did not require an export permit 'for this proposed export'.[224] This suggests that DEWR has not granted a general exemption to Wren Oil for all shipments of burner fuel oil and the company would need to seek a permit or similar exemption for future shipments.

To clear the current stockpile of used oil in Western Australia by shipping it either overseas or to the eastern states would take a ship capable of transporting 6 million litres per load approximately eight return trips.[225] There is, however, inherent risk associated with shipping large amounts of used oil to overseas or eastern states markets, particularly at an environmental level. Any mishap or accident during the loading and unloading process or whilst the used oil is being transported has the potential to create a number of major environmental problems.

The Committee was advised by the MTAWA that shipping used oil offshore had a high associated risk of the used oil either leaking or spilling into the marine environment.[226] The DEC has a similar view and informed the Committee that they were concerned about the environmental risks associated with transporting used oil by ship.[227]

(a) Extended Producer Responsibility

As well as challenges to the business and industry communities, and to members of the public, the issue of producer responsibility needs to be addressed. Companies have long been encouraged to take increased responsibility for the social and environmental impacts of their products, a notion that coalesced around the concept of triple bottom line accounting. While a contested notion, the concept of corporate social responsibility can be accepted as generally meaning 'a company's duty to operate by means that avoid harm to stakeholders and the environment and, further, to consider

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221 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007.

222 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing, 19 September 2007; Mr Fred Wren, Managing Director, Wren Oil, Electronic Mail, 30 August 2007.

223 Dr Barry Reville, Assistant Secretary, Environmental Protection Branch to Mr Fred Wren, Managing Director, Wren Oil, in Mr Fred Wren, Managing Director, Wren Oil, Electronic Mail, 30 August 2007.

224 Mr Fred Wren, Managing Director, Wren Oil, Electronic Mail, 30 August 2007.

225 Peter Fitzpatrick, Executive Director, 'Waste Oil Collection a Shambles', *Motor Western Australia*, vol. 72, no. 3, May/June 2007, p2.

226 Mr Peter Fitzpatrick, Executive Director, Motor Trade Association Western Australia, Committee Briefing, 29 August 2007.

227 Department of Environment and Conservation, Committee Briefing, 29 August 2007.

the overall betterment of society in its decisions and actions'.[228] This responsibility equates with a company's commitment to operate 'in a way that takes account of not only the financial implications of business decisions, but also the social and environmental impacts it has on the community'.[229]

In Western Australia the *Waste Avoidance and Resource Recovery Bill 2006* (WARR) is currently before the Parliament of Western Australia. One of the main aims of WARR is the:

> *creation of the head powers for establishing extended producer responsibility (EPR) schemes and product stewardship schemes, and implementation of the associated instruments for significantly reducing 'priority wastes'. The aim here is to get producers and consumers of products that generate problematic waste to share the responsibility of reducing and dealing with waste.*[230]

EPR is considered part of product stewardship and there is currently a draft National Environment Protection Measure (NEPM) for 'co-regulatory product stewardship schemes'.[231] WARR provisions 'are intended to be consistent with and complementary to NEPM work being done at the national level.[232]

With regards to defining 'priority wastes', the Explanatory Notes to the WARR Bill state that:

> *Generally, the priority wastes covered by schemes or policy instruments implemented under the WARR Act would be products of particular significance and concern to Western Australia, which were not being addressed at the national level.*[233]

Producers of priority wastes are encouraged to develop and implement voluntary PSAs. The Explanatory Notes to WARR state that:

> *the guiding principle for the application of EPR in Western Australia is that the Government would not intervene where industries are effectively reducing priority wastes according to specified published criteria, but would act decisively where they are not.*[234]

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228 Thompson, Arthur A., A.J. Strickland III, and John E. Gamble, *Crafting and Executing Strategy: The Quest for Competitive Advantage Concepts and Cases*, 14th edn, McGraw-Hill Irwin, Boston, 2005, p301.

229 Mission Australia. 'Business and Community Partnerships: Corporate Social Responsibility', nd. Available at: http://www.missionaustralia.com.au. Accessed 8th September, 2007; Palacios, Juan José, 'Corporate citizenship and social responsibility in a globalized world', *Citizenship Studies*, vol. 8, no.4, December 2004, pp383-402.

230 *Explanatory Notes for the Waste Avoidance and Resource Recovery Bill 2006 Executive Summary,* p1.

231 ibid.

232 ibid., p10.

233 ibid., p10.

234 ibid., p5. See also: Government of WA, Extended Producer Responsibility, Policy Statement, 29 June 2005, p12. Available at: http://portal.environment.wa.gov.au/pls/portal/docs/PAGE/DOE_ADMIN/OTHER_REPOSITORY/TAB1185076/050628_EPR_POLICY.PDF. Accessed on 11 September 2007.

The Committee acknowledges that inclusion of the power to establish EPR and product stewardship schemes is an important step in getting producers and consumers to share the responsibility of dealing with waste. However, the definition of 'priority waste' as those of particular significance to Western Australia which are not being addressed at a national level is problematic. Under this definition, it could be argued that used oil is not a priority waste, whereas information provided to the Committee suggests that it should be awarded priority status. Perhaps this depends on the interpretation of 'not being addressed at a national level', but the existence of the PSO Program suggests that it is being addressed (effectively or otherwise) at a national level. One conclusion to be drawn from this is that issues concerning interpretation of legislation will only be clarified if and when they are contested at law.

In a briefing to the Committee BP advised that there was a role for the major oil companies in helping to solve the problems relating to used oil. BP indicated that the company's role in the shipment of oil to Singapore to help ease the stockpile crisis was evidence of this, particularly as it had cost them in the vicinity of $200,000 to ship. As the company has a role in the transport fuel industry, BP has also had discussions with Mr Barry Carbon of the Waste Management Authority to discuss BP's broad role in addressing the problem of used oil. At the time of the Committee briefing BP was yet to look at the WARR Bill to determine its EPR responsibilities.[235]

(b) Used Oil Residue (Bottoms)

As discussed earlier in this Chapter, the primary purpose of the re-refining/recycling process is to remove contaminants and foreign matter from used oil. The unwanted waste material is often left at the floor or bottom of the re-refining/recycling tanks at the completion of the re-refining/recycling process. Thus the term 'bottoms' is often used to describe this residue at the bottom of the tank.

The make-up or consistency of the bottoms is directly dependent upon the process used to extract the unwanted materials from the used oil. For example, some bottoms are referred to as heavy, a consequence of the heavy foreign materials that are extracted from used oil. Other bottoms may have a more fluid nature, a result of the contaminants in the residue being slightly lighter than the material in heavy bottoms. These are referred to as sloppy bottoms. Residue that has been created as part of another re-refining process is quite dry and powdery in appearance. This is called a dry bottom.

The Committee is, however, aware that irrespective of the consistency of the bottoms the material that is contained within it is a concentrated conglomeration of contaminants and foreign matter that, at present, cannot be further refined. The bottoms are the most noxious of the end products created by the re-refining/recycling process and as a result are the hardest to dispose of in a safe and effective manner.[236]

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235 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Committee Briefing, 19 September 2007.

236 Mr Peter Fitzpatrick, Executive Director, Motor Trade Association Western Australia, Committee Briefing, 29 August 2007.

The problem of refinery residues was recognised by the Department of Environment and Heritage in its call for 'expressions of interest for a long-term and comprehensive solution to deal with oil bottoms in an environmentally sustainable manner'.[237] This call for expressions of interest led to projects such as that undertaken by the Environmental Biotechnology Cooperative Research Centre and involving the biological treatment of tank bottoms.[238] This project successfully demonstrated a 'proof of concept through laboratory scale studies at the microbiological and analytical chemistry level'.[239] In November 2005, the assets of this project were purchased by Comet Resources Limited as part of its Environmental Oil Solutions Project being undertaken in conjunction with Flinders and Murdoch universities. Comet Resources Limited was assisted by an investment of over $1 million by the South Australian Government's Science Technology and Innovation Directorate of the Department of Further Education, Employment, Science and Technology.[240]

The bottoms are a concentrated mixture of material that is heavier than oil and is asphaltic in texture and appearance. Because bottoms are a by-product of a re-refining process they possess similar physical characteristics to the residue that is left from refining virgin crude oil. The residue that is created from virgin oil refining is used to make bitumen.[241] This comparability has led companies such as LOREX, Wren Oil and Nationwide Oil to suggest that opportunities exist to utilise the bottoms as a possible bitumen supplement.[242] The MTAWA concur with this possibility and suggest that the best use for bottoms is in the local bitumen market.[243]

Bitumen is used primarily as a road surface sealant. There are three main grades of bitumen: Class 170, Class 320 and Class 600, each characterised by a different viscosity at 60°C and, thus,

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237 Department of Environment and Heritage, 'Treatment of Refinery Residue. Expressions of Interest', 22 November 2003. Available at: http://www.basis.act.gov.au. Accessed on 5 September 2007.

238 Environmental Biotechnology Cooperative Research Centre, *Annual Report 2004-2005*, CRC Australia, Canberra, 2005, p28. See also the Centre's *Annual Report 2005-2006*.

239 Environmental Biotechnology Cooperative Research Centre, *Annual Report 2005-2006*, CRC Australia, Canberra, 2005, p38.

240 Comet Resources Ltd, *December Quarter Activities Report*, Comet Resources Ltd, Perth, 31 January 2006, p1.

241 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Electronic Mail, 17 October 2007, p2.

242 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Committee Briefing, 17 October 2007; Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing 19 September 2007; Mr Fred Wren, Managing Director, Wren Oil, Telephone Conversation, 29 October 2007.

243 Mr Peter Fitzpatrick, Executive Director, Motor Trade Association Western Australia, Committee Briefing, 29 August 2007.

different levels of hardness, flexibility and durability.[244] The national market for bitumen is in the vicinity of 750,000 tonnes per annum.[245]

The Australian Standard specifications for residual bitumen 'were developed based on the properties of bitumen refined from crude oil imported from the Middle East and on the field performance of those bitumens'.[246] Crude oil from other locations such as Australia or Indonesia is not suitable for bitumen production. Oil from other sources has not yet been tested, though it is understood that New Zealand is now importing bitumen produced from Venezuelan oil. Western Australia does import some bitumen from Singapore, and while the quantity to date has been relatively small, this is now increasing.[247]

In Western Australia, Main Roads Western Australia (MRWA) is Western Australia's State road authority and is charged with 'managing a network of 17,800 kilometres of National Highways and State Roads'.[248] MRWA work in 'conjunction with Local Government and its local road network'[249] to ensure that all road construction and and/or surfacing treatments that are undertaken in this state meet the required minimum standard.

MRWA advised the Committee that the provision of quality roads was their main priority.[250] MRWA specifications for surfacing bitumen come under the 'Materials for Bituminous Surfacing Treatments Standard'.[251] This Standard 'specifies the requirements used in spray seal and asphalt surfacings applied to the Main Roads network'.[252] The standard specifically states that:

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244 Australian Pavement Asphalt Association, 'A Guide to the Selection of Binder for Asphalt Pavements', *Advisory Note 4*, Australian Pavement Asphalt Association, Kew, Victoria, August 2003, p1. See also: Ecopave Australia, *Synthetic Bitumen*, November 2002, p1. Available at: http://www.ecopave.com.au. Acessed on 8 November 2007.

245 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Committee Briefing, 19 October 2007.

246 Main Roads Western Australia, Briefing Note to the Minister for Planning and Infrastructure, *Potential Use of Recycled Waste Oil in the Production of Residual Bitumen*, September 2007.

247 Mr Steve Halligan, Project Manager, Materials Engineering - Surfacings Main Roads Western Australia, Committee Briefing, 9 November 2007.

248 Main Roads Western Australia, 'Our Purpose'. Available at: http://www2.mainroads.wa.gov.au/Internet/Default.asp. Accessed on 2 November 2007.

249 ibid.

250 Mr Steve Halligan, Project Manager, Materials Engineering - Surfacings Main Roads Western Australia, Committee Briefing, 9 November 2007.

251 Main Roads Western Australia, *Materials Engineering Branch, Materials for Bituminous Surfacing Treatments*, Document No. 71/06/135, Government of Western Australia, 12 July 2007.

252 ibid., p5.

> *All bitumen used, whether as residual bitumen, or for manufacturing cutback bitumen, polymer modified bitumen, multigrade bitumen or bitumen emulsion shall be a straight run, slightly blown or blended product prepared by distillation from crude bituminous base oils.*[253]

According to MRWA,'if bitumen were to be produced from alternate crude material, e.g. shale coal or molasses, the properties and performance of that bitumen may not reflect those traditional bitumens produced from crude oil'.[254]

MRWA also advised that their experience has revealed some problems with the local product and, while the Australian standard is applied in Western Australia, MRWA has recently re-introduced some characteristics that were deleted from the national standard. For example, bitumen for use on Western Australian roads must comply with specifications additional to the national standard relating to excessive wax, something that causes instability in the product.[255]

Class 320, 'the most versatile and commonly used binder for hot mix asphalt in a wide range of applications',[256] is the standard for asphalt in Western Australian road construction. Class 170, the softest and most flexible grade, is used for some asphalt in the state's roads, but is primarily used for rural roads where it is applied via a spraying process.[257]

Clearly, the MRWA requirement that bitumen be distilled from crude (virgin) base oil renders problematic the use of used oil bottoms in bitumen production. Nevertheless, the prospect of using bottoms as a bitumen supplement was raised by Nationwide Oil and LOREX. Nationwide Oil indicated to the Committee that residue produced at their recycling plant could be used in bitumen.[258] LOREX informed the Committee that combining the bottoms residue with bitumen at a ratio of 1 part in 10 can 'produce a much higher grade, "Multigrade" bitumen product'[259] that can extend 'road pavement life by >50% (or 10-20 years)'.[260] LOREX did, however, clarify this statement by suggesting that the 'full economic benefit of such an approach should be

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253 ibid., p6.

254 Main Roads Western Australia, Briefing Note to the Minister of Planning and Infrastructure, *Potential Use of Recycled Waste Oil in the Production of Residual Bitumen*, September 2007.

255 Mr Steve Halligan, Project Manager, Materials Engineering - Surfacings Main Roads Western Australia, Committee Briefing, 9 November 2007.

256 Australian Pavement Asphalt Association, 'A Guide to the Selection of Binder for Asphalt Pavements', *Advisory Note 4*, Australian Pavement Asphalt Association, Kew, Victoria, August 2003, p1.

257 Mr Steve Halligan, Project Manager, Materials Engineering - Surfacings Main Roads Western Australia, Committee Briefing, 9 November 2007. Note: there is a Class 600 bitumen, which is the hardest of the three grades and generally used for heavy-duty asphalt base layers. See: Australian Pavement Asphalt Association, 'A Guide to the Selection of Binder for Asphalt Pavements', *Advisory Note 4*, Australian Pavement Asphalt Association, Kew, Victoria, August 2003, p1.

258 Mr Gary Watson, General Manager - WA Developments, Nationwide Oil Pty Ltd, Committee Briefing 19 September 2007.

259 Mr Mark Glover, Director, LOREX Investments Pty Ltd, Electronic Mail, 19 October 2007, p2.

260 ibid.

scientifically and objectively confirmed and the options, barriers and net benefits clearly and transparently presented'[261] before it could be used.

BP has advised that they are prepared to look at the prospect of using the bottoms residue in their existing bitumen production facility in Kwinana, but only after MRWA confirm that the bottoms/bitumen mixture is of an acceptable standard.[262] BP, though prepared to look at using bottom residue as a bitumen supplement, indicated that the company is concerned about other possible side effects this utilisation may have. BP informed the Committee that it has some trepidation about using bottom residue in bitumen because:

- waste oils are classified as 'hazardous material' in many countries - including Australia;
- data available show that waste oils are potential skin carcinogens and are dangerous for the environment;
- waste oil streams are also sometimes contaminated with waste solvents and other flammable hydrocarbons;
- adding waste oil to bitumen would render the bitumen a hazardous substance and negate all the work done by industry over the years to show that bitumen does not present a hazard/risk to the health of workers;
- waste oils are of lower boiling point and hence higher volatility than bitumen so this would increase the amount of fume/vapour/mist emissions from bitumen handled at normal application temperatures (in the range 160-200C);
- residues/sludges from re-refining would not be acceptable since they are enriched in polycyclic aromatic hydrocarbons (PAHs - potential carcinogens) and metals. They are also often acidic in nature, a property which has resulted in the distant past in acid-leechate on road surfaces; and
- addition of hazardous waste to bitumen is likely to adversely affect the potential of recycling of asphalt.[263]

These concerns reflect the underlying problem associated with the disposal of bottom residue. As stated earlier, bottoms contain various amounts of unwanted material produced during the re-refining/recycling process. The challenge to industry and government is to work towards achieving an acceptable quality standard for all bottom residue produced to allow it to be disposed of in an acceptable and, where possible, reusable way.

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261 ibid.

262 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Committee Briefing, 19 September 2007.

263 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Electronic Mail, 18 October 2007.

MRWA advised that as an organisation they have had 'no direct experience in the use of this product [bitumen made using used oil bottoms] or the performance of roads incorporating waste oil'.[264] Of concern to MRWA is that bottom residue is not suitable 'as a residual bitumen in its own right and it will need to be blended with residual bitumen [produced from virgin oil stocks] in small proportions to produce a conforming product'.[265] This recognition of the possibility of utilising bottom residue in bitumen adds credence to LOREX's claim of using a 1:10 blend of bottoms residue to residual bitumen. MRWA's lack of experience makes it difficult for the agency to assess the viability of such bitumen. Nevertheless, the agency is open to the possibility of using alternative bitumens on Western Australian roads provided that they meet requirements. This is evidenced by some of the projects in which MRWA is involved. For example, the agency has been contacted to participate in a trial involving a synthetic asphalt bitumen manufactured from non-petroleum based raw materials.[266] This project is managed by the City of Wanneroo on behalf of a Local Government Area and uses synthetic bitumen developed by Ecopave Australia.[267] According to Ecopave Australia, their alternative bitumen, GEO320 MRH, can also be made from used oil bottoms.[268]

MRWA's lack of experience in working with residue/residual bitumen mixture may be overcome to some extent as a result of their recent appointment to the Steering Group created to oversee the expenditure of the $400,000 grant which, as noted in Chapters 2 and 4, was awarded to Wren Oil by the federal Department of Environment and Water Resources (DEWR) to 'produce a bituminous product from waste oil'.[269] MRWA advised that Wren Oil have completed their bench top study and are now in the design and build phase, with commissioning expected in 2008. At the time MRWA briefed the Committee they had had no involvement with the Steering Group,[270] but expect to provide technical input into the project in the form of the technical evaluation of the product 'to evaluate the chemical properties of the bitumen and identify any limitations or benefits of the product'.[271] This will allow MRWA to determine the potential level of interest for the bitumen from Wren Oil's plant for use in road construction in Western Australia.[272]

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264 Main Roads Western Australia, Briefing Note to the Minister of Planning and Infrastructure, *Potential Use of Recycled Waste Oil in the Production of Residual Bitumen*, September 2007.

265 ibid.

266 Mr Steve Halligan, Project Manager, Materials Engineering - Surfacings Main Roads Western Australia, Committee Briefing, 9 November 2007.

267 ibid.

268 Ecopave Australia, *GEO320 MRH Research and Development*, 2004-2006, p1. Available at: http://www.ecopave.com.au. Acessed on 8 November 2007.

269 Main Roads Western Australia, Briefing Note to the Minister of Planning and Infrastructure, *Potential Use of Recycled Waste Oil in the Production of Residual Bitumen*, September 2007.

270 Mr Steve Halligan, Project Manager, Materials Engineering - Surfacings Main Roads Western Australia, Committee Briefing, 9 November 2007.

271 Main Roads Western Australia, Briefing Note to the Minister of Planning and Infrastructure, *Potential Use of Recycled Waste Oil in the Production of Residual Bitumen*, September 2007.

272 Mr Steve Halligan, Project Manager, Materials Engineering - Surfacings Main Roads Western Australia, Committee Briefing, 9 November 2007.

In briefing the Committee, MRWA expressed concern that the agency had not been considered to be, or approached, by other parties as a stakeholder in the used oil problem in the state. MRWA has held discussions with the Western Australian Local Government Association with regards to using recycled materials, and is hopeful that used oil bottoms can be added to the materials to be considered.[273] MRWA expressed concerned about the long-term viability of bitumen in Australia, particularly in view of the rationalisation of refineries in the country and an increasing dependence on imported bitumen.[274] This concern centres on factors such as the availability of a reliable product, the guarantee of bitumen supplies from Asia, and market prices. MRWA has encouraged Austroads to investigate alternatives and has signalled a need for Australia to invest in knowledge in the area.[275]

Evidence would suggest that extensive testing is required by both MRWA and industry to establish whether bottom residue can be successfully utilised as a supplement in bitumen production. Industry, in cooperation with government authorities, needs to work towards achieving a suitable outcome that would allow used oil residue to be used in bitumen production without compromising the exacting standards required for Australian road surfaces. Working toward creating a bitumen market based on the need to dispose of used oil residue, as opposed to following a set of standards that were developed on the basis of importing virgin crude oil, would be a significant step in alleviating the problem of used oil residue.

(c) Achieving a Balanced Long-Term Solution

This paper has highlighted the current situation regarding used oil in Western Australia and the combination of factors that contributed to the failure of the used oil market and the subsequent used oil stockpile in the state. It now seems that the shipment of used oil to Singapore and Christmas Island has provided an immediate solution to the problem, albeit one with attendant risks. Furthermore, a number of proposals have been developed in an effort to provide long-term economically viable and environmentally sustainable markets for Western Australia's used oil and used oil residue (bottoms). However, as noted above, the state still faces a number of significant challenges in this regard and these need to be addressed in order to reduce the risk of further market failure.

The Committee has also recognised the efforts of various parties that have been engaged in working toward providing solutions to the used oil problems in the state. One significant challenge not yet mentioned is that of continuing the level of engagement and cooperation between these stakeholders. The achievement of a long-term solution to the recycling of the state's used oil is dependent upon the combined efforts of the three major groups involved, namely the federal government, the state government and the used oil industry members. The used oil problem

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273 ibid.

274 ibid.

275 ibid. Austroads is the association of Australian and New Zealand road transport and traffic authorities. Austroads members are the six Australian state and two territory road transport and traffic authorities, the Australian Department of Transport and Regional Services (DOTARS), the Australian Local Government Association (ALGA), and Transit New Zealand.

developed out of a set of complex circumstances and it is not surprising that the proposed solutions to the problem are also complex and based upon certain co-dependencies. For example, for smaller re-refineries to be successful they need the continuation of the PSO benefit, appropriate collection facilities, storage and services, and sufficient quantities of used oil to process. In situations of such dependency the withdrawal or collapse of one element necessarily creates a 'domino effect', impacting on other elements involved. Therefore, it is incumbent on each of these parties, the federal government, the state government and the used oil industry members, to ensure that they continue their individual and combined efforts to ensure that the state's used oil is appropriately and effectively managed to alleviate the risk of market failure and thus prevent the development of a further used oil crisis in Western Australia.

(i) Encouraging Product Stewardship

Product stewardship in the oil industry is vital, not only for environmental reasons. There are also sound economic reasons for engaging more actively in product stewardship. There has been increasing attention focused on the issue of 'peak oil' and concern has been expressed about Australia's ability to obtain sufficient oil to meet its demand. For example, the February 2007 Australian Senate report, *Australia's Future Oil Supply and Alternative Transport Fuels*, states that Australia's demand for petroleum is projected to increase from the current 750,000 barrels a day to 1,200,000 barrels per day by 2029-2030.[276] Furthermore, the report argues that:

> *Australia's net self-sufficiency in oil is expected to decline significantly as future discoveries are not expected to make up for the growth in demand and the decline in reserves as oil is produced.*[277]

It is projections such as these that provide a strong argument for the need to increase Australia's used oil recycling efforts. Converting used oil into usable oil products will help alleviate the pressure on virgin oil stocks. This, though, can only be achieved with effective product stewardship.

The independent reviews of the PSO Program, as discussed in Chapter 2, together with information gathered throughout the Committee's investigation, suggests that true or effective product stewardship for oil has not yet been achieved in Australia or Western Australia. Stewardship involves taking responsibility for a product throughout its lifecycle so as to reduce its impact on the environment. While the PSO Program's aims of increasing collection and recycling of used oil by making investment in recycling facilities more attractive are admirable, the issues raised in this paper show there are several factors that reduce the effectiveness of product stewardship efforts in Australia, generally, and in Western Australia, in particular.

Evidence suggests that the benefit rates offered to companies to recycle and/re-refine used oil do not provide a sufficient incentive for them to invest in technology and plant. This is evidenced by the recent imposition of collection fees by collection companies. While the aim of the Program to

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276 The Senate, Standing Committee on Rural and Regional Affairs and Transport, *Australia's Future Oil Supply and Alternative Transport Fuels*, The Senate, Canberra, February 2007, p2.43.

277 ibid., p2.48.

be fully self funded via its benefits and levy components is acknowledged, it is also important to consider the rate of benefit payments in light of the overall aims and objectives of the Program. To meet the criteria of PSO Program being self-funded, the federal government may need to consider adjusting the rate of levy. While this clearly would be an impost on industry it is one that the market seems able to bear particularly given that many motor vehicle services, for example, are charging waste collections fees as part of their regular service charges. It is important that the Western Australian Government raises this issue with the federal government as a matter of priority.

The PSO benefit rates are also not sufficient for major oil companies such as BP to become involved in recycling the oil they produce and import. BP advised the Committee that PSO Program funds were not available to them for their blended oil.[278] Given this, the PSO Program could be better linked to the producers and/or suppliers of oil to encourage them to become more involved in providing solutions to the problems of used oil. Minimal involvement of the major oil companies appears to be a key failure of the PSO Program and the federal government would be well advised to consider initiatives to increase the majors' participation in used oil recovery and recycling.

Given the strength of the resources sector in Western Australia, a significant proportion of the used oil is generated by these industries. It would be possible to develop innovative initiatives to encourage re-refiners to develop links with mining companies, for example, to collect the large quantities of used oil from their sites, re-refine the oil and deliver it back to the mining company.

(ii) Potential for Development of the Product Stewardship for Oil Program

The Committee recognises that the PSO Program was implemented to encourage product stewardship and, as such, is an excellent concept. The Committee also notes that the TAF component of the Program has been very successful in establishing collection facilities throughout the country. However, it seems that there are areas in which the PSO Program and TAF have met with less success. For example, there has been less emphasis on creating research into used oil recycling generally, including determining and locating lost oil, and/or solutions to the problems concerning residue disposal, storage and/or recycling. Also, while there has been some investment in lube-to-lube infrastructure via the TAF, there has been insufficient emphasis placed on developing practical solutions to the problem of used oil that go beyond the establishment of collection facilities. There also seems to be little emphasis placed on research into and the development of markets for used oil and used oil products. These are areas in which the PSO Program might be developed to help address some of the challenges still faced by the federal, state and territory governments in solving the problems concerning the collection, storage and recycling of used oil as a valuable commodity.

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278 Mr Luke Blackbourn, Communications and External Affairs Officer, BP Refinery (Kwinana) Pty Ltd, Committee Briefing, 19 September 2007.

APPENDIX ONE

BRIEFINGS

Date	Name	Position	Organisation
29 August 2007	Mr Kim Taylor	Acting Deputy Director General (Environment)	Department of Environment and Conservation
	Mr Steven Beilby	Business Coordinator	Department of Environment and Conservation
	Mr Piers Verstegen	Senior Policy Officer for Climate Change	Minister for the Environment
29 August 2007	Mr Peter Fitzpatrick	Chief Executive Officer	Motor Trades Association of Western Australia (Inc)
3 September 2007	Mr Barry Carbon	Chair	Waste Management Board of WA
19 September 2007	Mr Luke Blackbourn	Communications and External Affairs Officer	BP Refinery (Kwinana) Pty Ltd
19 September 2007	Mr Gary Watson	General Manager - WA Developments	Nationwide Oil Pty Ltd
17 October 2007	Mr Mark Glover	Director	LOREX Investments Pty Ltd
9 November 2007	Mr Steve Halligan	Project Manager, Materials Engineering - Surfacings	Main Roads Western Australia

APPENDIX TWO

PRODUCT STEWARDSHIP BENEFIT PAYMENTS BY CATEGORY OF OIL PRODUCT

		2003-04		2004-05		2005-06		
		Benefit Payments $	**Litres**	**Benefit Payments $**	**Litres**	**Benefit Payments $**	**Litres**	**% ***
1	Re-refined base oil (for use as a lubricant or a hydraulic or transformer oil) which meets the specified criteria	2 769 345	5 538 690	4 614 480	9 228 960	5 053 730	10 107 460	82.5
2	Other re-refined base oils	0	0	53 461	534 610	0	0	
3	Diesel fuels to which the *Excise Tariff Act 1921* applies	1 617 365	23 105 219	1 204 763	17 210 898	1 416 697	19 898 322	(13.9)
4	Diesel extenders (filtered, de-watered and de-mineralised)	0	0	0	0	0	0	
5	High grade industrial burning oils (filtered, de-watered and de-mineralised)	4 911 600	98 232 004	5 009 867	100 197 331	5 362 978	107 169 566	9.1
6	Low grade industrial burning oils (filtered and de-watered)	3 192 708	106 423 626	2 796 156	93 205 197	2 204 318	73 401 270	(31)
7	Industrial process oils and lubricants, including hydraulic and transformer oils (re-processed or filtered, but not re-refined)	0	no data available	0	no data available	0	0	
8	Gazetted oil consumed in Australia for a gazetted use	515 550	9 461 369	1 349 175	24 760 048	2 563 284	47 041 373	39.7
9	Recycled oil mentioned in item 5 or 6 that has been blended with a petroleum product that meets the criteria mentioned in schedule 2	213 900	3 925 491	667 065	6 979 858	569 668	5 960 736	51.8
	Used oil recycled (excludes categories 8 & 9)	12 491 019	233 299 539	13 678 727	220 376 996	14 037 723	210 576 618	(9.7)
	Total	**13 220 469**	**246 686 399**	**15 694 967**	**252 116 902**	**17 170 675**	**263 578 727**	**6.8**

Compiled from Department of Environment and Heritage Annual Reports.

* Percentage variation based on 2003-04 figures. Figures in parentheses represent a negative movement.

APPENDIX THREE

COLLECTION FACILITIES IN WESTERN AUSTRALIA[279]

City of Albany
Shire of Beverley
Shire of Brookton
Shire of Carnamah
Shire of Chapman Valley
Shire of Coolgardie
Shire of Corrigin
Shire of Cuballing
Shire of Cunderdin
Shire of Dandaragan
Shire of Dowerin
Shire of Dundas
Shire of Gnowangerup
Shire of Irwin
Shire of Katanning
Shire of Kondinin
Shire of Kulin
Shire of Manjimup
Shire of Merredin
Shire of Moora
Shire of Mt. Magnet
Shire of Mullewa
Shire of Nannup
Shire of Ngaanyatjarraku
Shire of Nungarin
Shire of Quairading
Shire of Shark Bay
Shire of Tammin
Shire of Upper Gascoyne
Shire of Wagin
Shire of Wanneroo
Shire of West Arthur
Shire of Wickepin
Shire of Woodanilling
Shire of Wyndham East Kimberley
Three Springs Shire Council
City of Mandurah
Shire of Bridgetown-Greenbushes
Shire of Bruce Rock
Shire of Carnarvon
Shire of Chittering
Shire of Coorow
Shire of Cranbrook
Shire of Cue
Shire of Dalwallinu
Shire of Denmark
Shire of Dumbleyung
Shire of Esperance
Shire of Goomalling
Shire of Jerramungup
Shire of Kellerberrin
Shire of Koorda
Shire of Lake Grace
Shire of Meekatharra
Shire of Mingenew
Shire of Mount Marshall
Shire of Mukinbudin
Shire of Murray
Shire of Narembeen
Shire of Northam
Shire of Pingelly
Shire of Roebourne
Shire of Tambellup
Shire of Trayning
Shire of Victoria Plains
Shire of Wandering
Shire of Waroona
Shire of Westonia
Shire of Wongan-Ballidu
Shire of Wyalkatchem
Shire of Yilgarn

279 Department of Environment and Heritage, Commonwealth Government, 'Approved Council Grants', nd. Available at: http://www.oilrecycling.gov.au/local-governments.html. Accessed on 27 September 2007.

APPENDIX FOUR

LEGISLATION

List of Legislation (or other relevant information) used in the inquiry.

Legislation	**State (or Country)**
Product Stewardship (Oil) Act 2000	Commonwealth of Australia
Excise Tariff Amendment (Product Stewardship for Waste Oil) Act 2000	Commonwealth of Australia
Customs Tariff Amendment (Product Stewardship for Waste Oil) Act 2000	Commonwealth of Australia
Product Stewardship (Oil) (Consequential Amendments) Act 2000	Commonwealth of Australia
Products Grants and Benefits Administration Act 2000	Commonwealth of Australia
Product Stewardship (Oil) Regulations 2000	Commonwealth of Australia
Environmental Protection Act 1986	Western Australia
Contaminated Sites Act 2003	Western Australia
Explosives and Dangerous Goods Act 1961	Western Australia
Explosives and Dangerous Goods (Dangerous Goods Handling and Storage) Regulations 1992	Western Australia
Explosives and Dangerous Goods (Search Warrant) Regulations 1979	Western Australia
Dangerous Goods (Transport) Act 1998 (WA)	Western Australia
Dangerous Goods (Transport) (Road and Rail) Regulations 1999	Western Australia
Dangerous Goods (Transport) (General) Regulations 1999	Western Australia
Dangerous Goods (Transport) (Dangerous Goods in Ports) Regulations 2001	Western Australia
Dangerous Goods Safety Act 2004	Western Australia