



Victoria's Minerals, Petroleum  
and Extractive Industries

# 2003/04 Statistical Review

Minerals and Petroleum Division

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Department of Primary Industries  
GPO Box 4440 Melbourne Vic 3001

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## Introduction

The Statistical Review provides an overview of Victoria's petroleum, minerals and extractive industries. It includes data on production, exploration and expenditure, as well as licensing and safety performance. This report is the most comprehensive public database available for these sectors in Victoria and is relevant to anyone involved in the petroleum, mining or extractive industries.

Victoria's earth resource industry production includes:

- oil and gas – from onshore and offshore
- brown coal – used almost exclusively for power generation
- gold
- industrial minerals – including gypsum, silica, feldspar, rutile, zircon, ilmenite and kaolin
- rock, sand and clay – used mainly for building and road construction.



## Summary

### Petroleum

Natural gas production levels from the offshore Gippsland Basin increased again this year. While crude oil and condensate production is still declining (12% during 2003/04), as it has been since mid 1980s.

Gas and condensate production from the Otway Basin decreased this year.

Three seismic surveys were conducted in 2003/04, a decrease from 11 last year. All three surveys were collected in the offshore Otway Basin.

Half as many exploration wells were drilled in 2003/04 as in the previous year, while the number of development wells drilled remained at similar levels.

### Minerals

Mineral production continues to be dominated by brown coal and gold.

Brown coal production, predominantly from the Latrobe Valley for electricity generation, has been steady at about 66 million tonnes a year for the last three years.

Gold production, which increased markedly in the 1980s, has been in decline since 1999/2000 and this trend continued in 2003/04 with total production of 104,188 ounces.

Gypsum and kaolin are the other significant contributors to mineral production. Both show a high degree of variability in line with seasonal and market factors. In 2003/04 kaolin production remained in an upwards trend reaching 251,392 tonnes, the highest recorded figure since the 1980s. Feldspar production in Victoria was started in 1997/98 by Unimin Australia Ltd and has been steadily increasing since.

Mineral sands (ilmenite, rutile and zircon) production in Victoria commenced in 2000/01 by Murray Basin Titanium Pty Ltd and has grown each year since. However, production from its Wemen mine discontinued in January 2004.

### Extractive materials

Hard rock, clay, sand and gravel production was reported as 38.8 million tonnes this year, slightly higher than the previous year's production of 37.5 million tonnes. This is probably a reflection of improved reporting rather than an increased demand for the extractive materials.

### Governance

The Department of Primary Industries (DPI) collected a total of \$25.1 million in form of royalties, rentals and administration fees under *Mineral Resources Development Act 1990*, the *Extractive Industries Development Act 1995* and the *Petroleum Act 1998*.

Rehabilitation bonds held by DPI increased from \$95.6 million in 2002/03 to \$105.9 million in 2003/04 as a result of bond reviews and the issue of new licences.

In 2003/04, DPI issued 30 explosive use licences, four storage licences and eight Quarry Manager certificates meeting the demand of the industry. DPI also issued 581 Directions and Notices under various acts and regulation.

There has been a marked improvement in the Health and Safety performance of Victoria's mining and the extractive industries in 2003/04. The mining industry recorded 17 Lost Time Injuries and a corresponding Lost Time Injuries Frequency Rate of 4.9 in 2003/04, well below the previous two years' records of 27 and 8.0 respectively.

The extractive industry has also improved its Lost Time Injuries counts from 26 in 2002/03 to 22 in 2003/04. The corresponding Lost Time Injuries Frequency Rate fell from 8.5 to 7.7 in the same period.



# Petroleum

**Victoria's petroleum industry includes crude oil, liquefied petroleum gas/condensate, natural gas and commercial carbon dioxide.**

Production of crude oil and condensate from the offshore Gippsland Basin had an annualised average of 120,000 barrels per day in 2003/04 (declining 12%). Production rates peaked in 1985/86 (450,000 barrels per day). Production will continue to decline as the major fields discovered reach advanced stages of maturity and new oil discoveries are not anticipated to replace the drop in existing production levels. In Victoria, crude oil production is limited to the offshore Gippsland Basin.

Natural gas production levels, controlled by local market demand, increased again this year in response to access to new markets in South Australia via the Port Campbell – Adelaide SEAGas pipeline completed in December 2004. Five-year projections for demand are updated annually by the Victorian Energy Networks Corporation (VENCorp).

Gas from the Gippsland Basin currently accounts for over 95% of Victoria's production and is dominated by the Marlin and Snapper fields. Gas and condensate production from the Otway Basin decreased this year as all but one of the small onshore fields (Mylor) declined. A strong increase in gas production from the Otway Basin is projected in 2004/05 and beyond, as the first offshore fields are brought on stream (commencing with the Minerva Field, 12km south of Port Campbell, in 2005).

Development and production investment is not reported formally to DPI but is updated at least quarterly and posted on the DPI website at [www.dpi.vic.gov.au/minpet](http://www.dpi.vic.gov.au/minpet). Follow the links for Oil and Gas and then Industry Activity.

Exploration expenditure was \$39 million, significantly down from the previous three years. Three seismic surveys, all in offshore Otway Basin, were conducted this year, a decrease from eleven last year.

Six exploration wells were drilled in 2003/04, down from twelve in the previous year, while development wells drilled remained at similar levels.

Expenditure is projected to recover strongly in 2004/05 in both the Gippsland and Otway Basins, with early indicators suggesting the potential for the highest levels of activity in the last 20 years.



## Petroleum tenement activities

### Commonwealth acreage release

The Commonwealth of Australia and the State of Victoria jointly released six petroleum exploration areas in April 2003. These exploration areas were released based on the six-year work program bidding system.

### Commonwealth area awards

Offshore Gippsland Basin (phase - 1):

- V03-1: VIC/P-57 was awarded to 3D Oil Pty Ltd.

Offshore Gippsland Basin (phase - 2):

- V03-2: Vic/P-58 was awarded to Apache Energy Ltd.
- V03-3: Vic/P-59 was awarded to Sita Oil Exploration House Inc.
- V03-4: Vic/P-60 was awarded to Holloman Corporation, Australia-Canadian Oil Royalties, Robert Thorpe and Ely Sakhai.

### State waters areas (three-nautical miles zone)

Offshore Gippsland Basin:

- V03-1 (V): Vic/P-39 (V) was awarded to Nexus Energy (Aust) NL.
- V03-2 (V): Vic/P-40 (V) was awarded to Petrotech Pty Ltd.

### Retention leases

Offshore Otway Basin:

- BHP-Billiton Petroleum (Victoria) Pty Ltd and Santos (BOL) Pty Ltd made an application for renewal for retention lease Vic:RL-7 (La Bella Gas Field). The application was assessed and Vic:RL-7 lease area was renewed on 22 November 2003.

### Production licences

Vic:L-23 (Geographe Gas Field): Offshore Otway Basin

- A field development plan was approved and a production licence was granted to Woodside Energy Ltd on 24 June 2004.

### Definition of Petroleum under the *Petroleum Act 1998 (Act No. 96/1998)*

(1) Petroleum is –

- any naturally occurring hydrocarbon (whether in a gaseous, liquid or solid state); or
- any naturally occurring mixture of hydrocarbons (whether in a gaseous, liquid or solid state); or
- any naturally occurring mixture of one or more hydrocarbons (whether in a gaseous, liquid or solid state), and one or more of the following: hydrogen sulphide, nitrogen, helium or carbon dioxide.

(2) For the purposes of this Act –

- petroleum includes any petroleum as defined by sub-sections 1(a), (b) or (c), and any petroleum product specified by the regulations for the purposes of this section, that has been returned to a reservoir in Victoria; but
- petroleum does not include any naturally occurring hydrocarbon, or mixture of hydrocarbons, within a deposit of coal or oil shale.

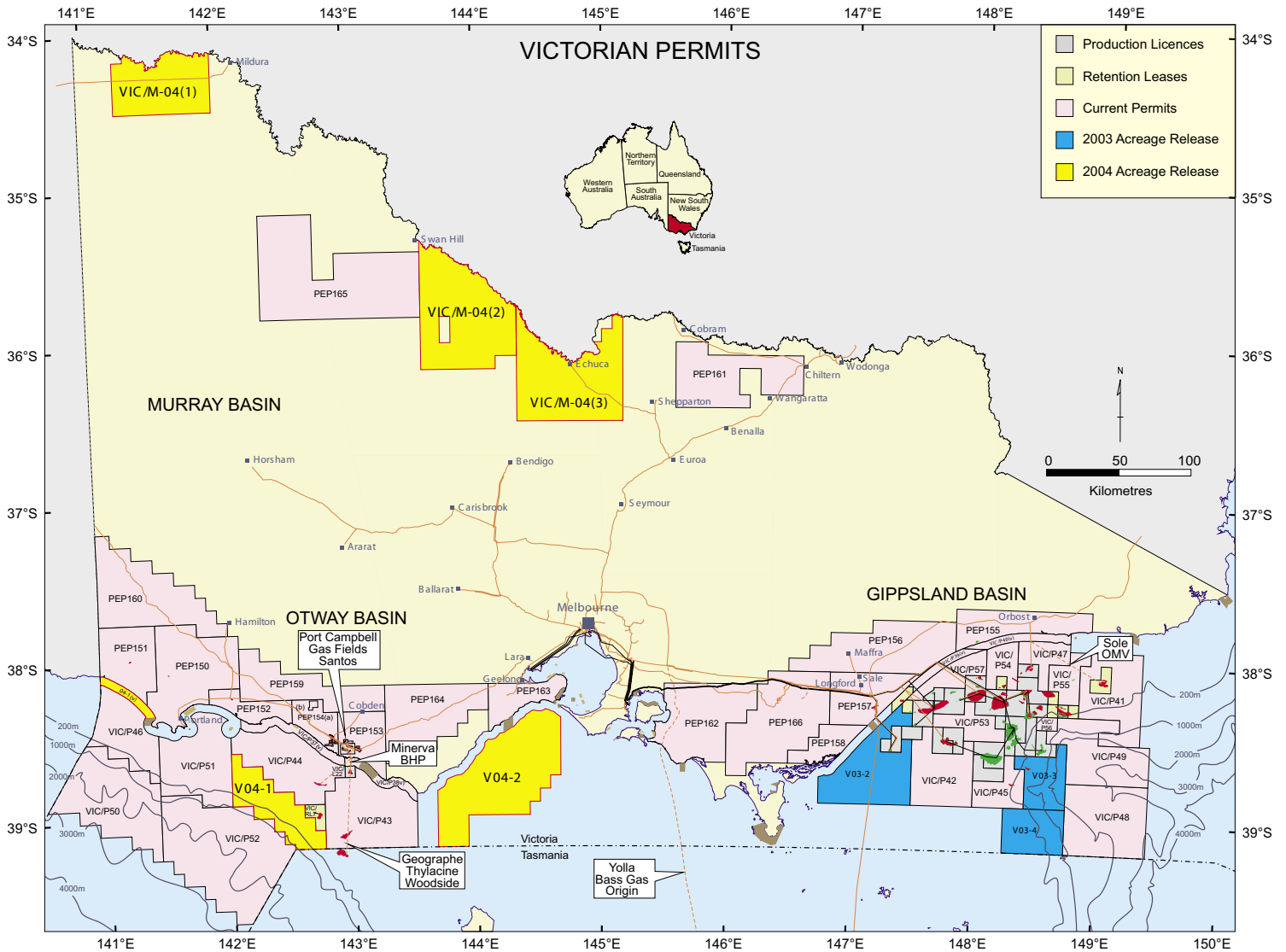
## Exploration and development

TABLE 3.1 Seismic Surveys: 2003/04

3D-Seismic							
Region	Basin	Survey Name	Permit	Operator	Start	Area (Sq km)	Expenditure (\$m)
Offshore	Otway	OWS03	VIC/P-37(V)	Woodside	15/10/2003	210	7.0
<b>TOTAL</b>						<b>210</b>	<b>7.0</b>
2D-Seismic							
Region	Basin	Survey Name	Permit	Operator	Start	Length (km)	Expenditure (\$m)
Offshore	Otway	OEP02A	VIC/P-44	Santos	12/11/2003	492	0.8
Offshore	Otway	OS02	VIC/P-51	Santos	17/11/2003	470	0.8
<b>TOTAL</b>						<b>962</b>	<b>1.6</b>

Source: DPI

MAP 3.1 Victorian Petroleum Permits: June 2004



Source: DPI

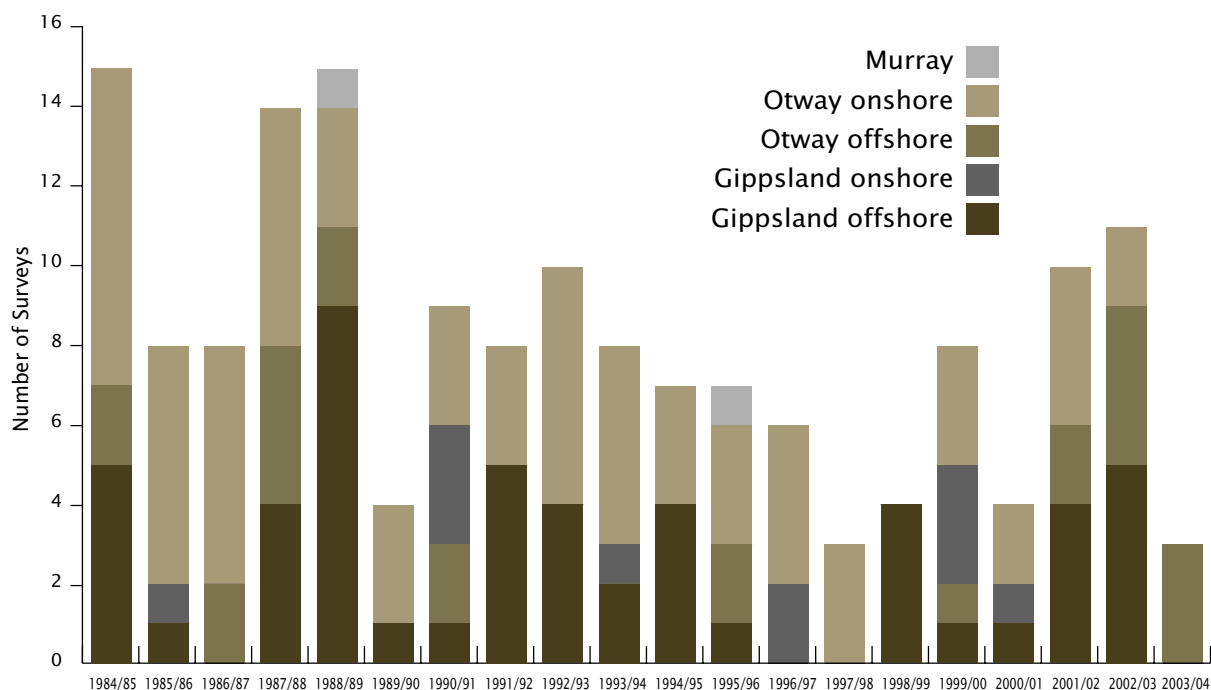
TABLE 3.2 Seismic Surveys: 1984/85 – 2003/04

Year	Offshore Basin		Onshore Basin			Total No. of Surveys	Seismic Surveys	
	Gippsland	Otway	Gippsland	Otway	Murray		2D (km)	3D (Sq km)
Pre 1984	54	23	33	60		170	*	*
1984/85	5	2	0	8		15	*	*
1985/86	1	0	1	6		8	*	*
1986/87	0	2	0	6		8	*	*
1987/88	4	4	0	6		14	*	*
1988/89	9	2	0	3	1	15	*	*
1989/90	1	0	0	3		4	*	*
1990/91	1	2	3	3		9	*	*
1991/92	5	0	0	3		8	*	*
1992/93	4	0	0	6		10	*	*
1993/94	2	0	1	5		8	*	*
1994/95	4	0	0	3		7	*	*
1995/96	1	2	0	3	1	7	*	*
1996/97	0	0	2	4		6	*	*
1997/98	0	0	0	3		3	*	*
1998/99	4	0	0	0		4	1129.0	542.0
1999/00	1	1	3	3		8	246.9	883.0
2000/01	1	0	1	2		4	580.4	188.0
2001/02	4	2	0	4		10	5272.0	3796.0
2002/03	5	4	0	2		11	2532.8	3295.5
2003/04	0	3	0	0		3	962.0	210.0
<b>Total</b>	<b>106</b>	<b>47</b>	<b>44</b>	<b>133</b>	<b>2</b>	<b>332</b>	<b>10723.1</b>	<b>8914.5</b>

Source: DPI

Notes: \*No data available.

GRAPH 3.1 Seismic Surveys: 1984/85 – 2003/04



Source: DPI

TABLE 3.3 Exploration/Appraisal Wells: 2003/04

Region	Basin	Well Name	Start Date	Operator	Tenement	Status	Total Depth (m)
Onshore	Otway	Killarney EPRL-1	09-Jun-04	Essential Oil	PEP-152	P+A	1640
Onshore	Otway	Findra-1	26-Jun-04	Essential Oil	PEP-159	P+A	889
Offshore	Otway	Hill-1	08-Dec-03	Santos	VIC/P-51	Suspended	2575
Onshore	Gippsland	Wombat-1	05-Dec-03	Lakes Oil	PEP-157	Non Econ. Gas discovery	1990
Offshore	Gippsland	Megamouth-1	17-Nov-03	BHP	VIC/P45	P+A	2688
Offshore	Gippsland	West Whiptail-1	10-May-04	ESSO/BHP	VIC/L1	Oil Discovery	1539

Source: DPI

TABLE 3.4 Historical Petroleum Exploration/Appraisal Wells: 1984/85 – 2003/04

Year	Offshore Basin		Onshore Basin			Total Wells	Total drilled (m)
	Gippsland	Otway	Gippsland	Otway	Murray		
Pre 1984						381	
1984/85	10	0	2	2	0	14	29,223
1985/86	9	1	3	5	0	18	36,925
1986/87	2	0	2	2	0	6	9,282
1987/88	1	0	2	7	0	10	13,839
1988/89	9	0	0	1	0	10	29,871
1989/90	17	0	0	2	0	19	51,941
1990/91	0	0	2	6	1	9	9,893
1991/92	5	0	0	2	0	7	14,953
1992/93	4	4	0	1	0	9	21,255
1993/94	2	1	0	3	0	6	12,682
1994/95	6	0	2	5	0	13	27,563
1995/96	2	2	0	3	0	7	16,281
1996/97	2	0	1	5	0	8	17,112
1997/98	2	0	0	1	0	3	6,518
1998/99	0	0	1	0	0	1	1,743
1999/00	3	0	3	2	0	8	10,745
2000/01	1	1	2	5	0	9	17,712
2001/02	4	2	4	7	1	18	28,208
2002/03	3	2	3	4	0	12	17,463
2003/04	2	1	1	2	0	6	11,321
<b>TOTAL</b>	<b>84</b>	<b>14</b>	<b>28</b>	<b>65</b>	<b>2</b>	<b>574</b>	<b>384,530</b>

Source: DPI

GRAPH 3.2 Exploration Wells: 1984/85 – 2003/04

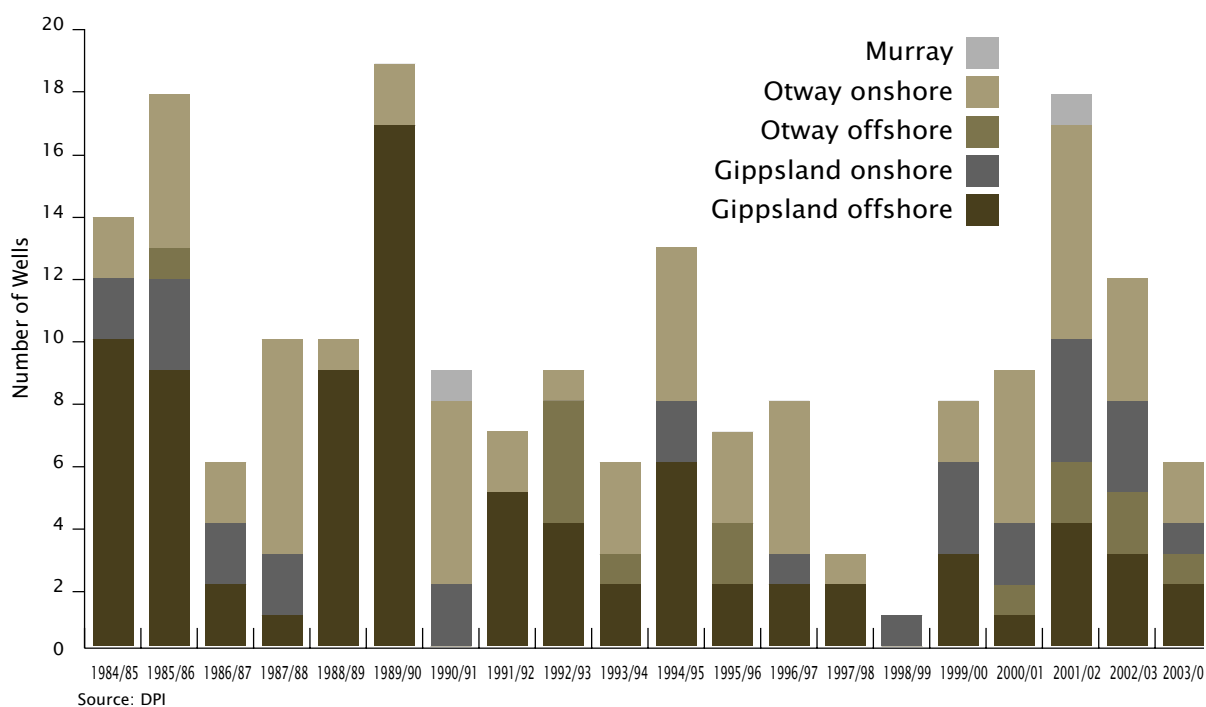


TABLE 3.5 Petroleum Exploration/Appraisal Expenditure: 1984/85 – 2003/04

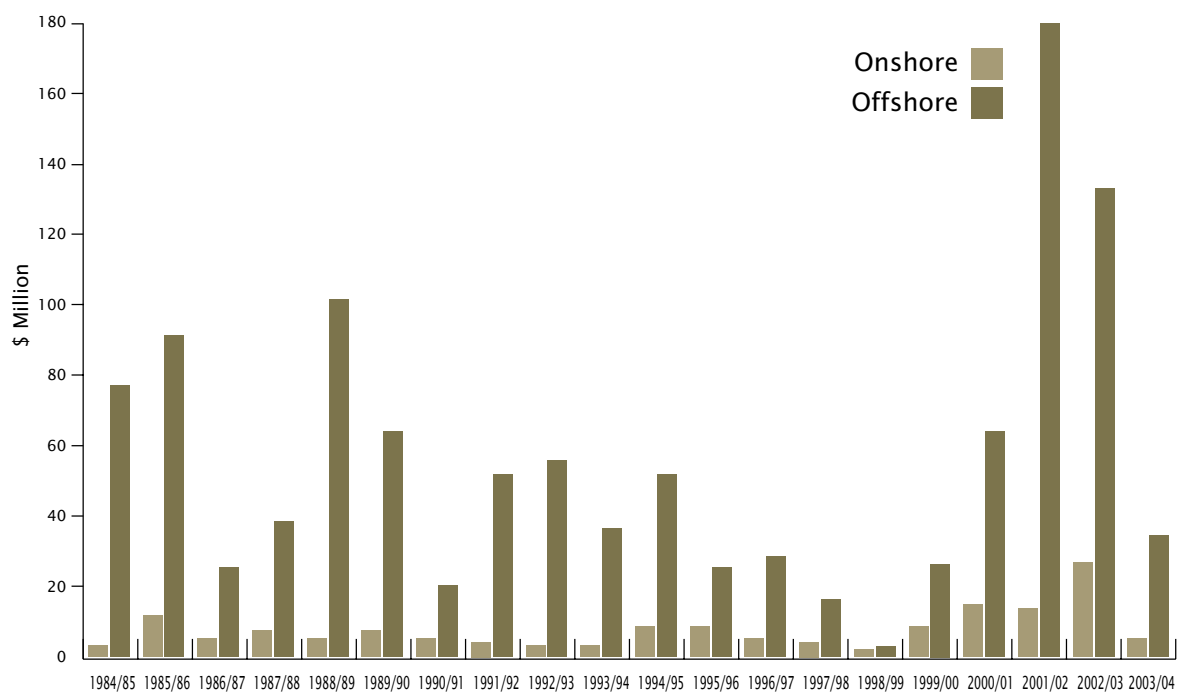
Year	Onshore	Offshore	Total (\$ million)
1984/85	3	76	79
1985/86	11	90	101
1986/87	5	25	30
1987/88	7	38	45
1988/89	5	100	105
1989/90	7	63	70
1990/91	5	20	25
1991/92	4	51	55
1992/93	3	55	58
1993/94	3	36	39
1994/95	8	51	59
1995/96	8	25	33
1996/97	5	28	33
1997/98	4	16	20
1998/99	2	3	5
1999/00	8	26	34
2000/01	14	63	77
2001/02	13	177	190
2002/03	25	131	156
2003/04	5	34	39

Source: DPI

Over the last decade, annual petroleum expenditure has fluctuated significantly, with peaks of over \$100 million a year in the 1980s. The average annual expenditure in the 1990s has been \$39 million.

Petroleum exploration (wells and seismic acquisition) and appraisal drilling expenditure in Victoria in 2003/04 was \$39 million. During the year six exploration wells have been drilled, two wells in onshore Otway Basin and one in onshore Gippsland Basin. In offshore regions, three wells were drilled, two in Gippsland and one in the Otway Basin. Data acquisition in the offshore Otway Basin (Port Campbell Region) comprises 962km<sup>2</sup> 2D and 210km<sup>2</sup> 3D.

GRAPH 3.3 Petroleum Exploration/Appraisal Expenditure: 1984/85 – 2003/04



Source: DPI

TABLE 3.6 Development Wells: July 2003 – June 2004

Region	Well	Field	Spud Date	Operator	Licence	Total Depth (m)
Offshore Gippsland	A-18a	FLOUNDER	7-Jun-03	ESSO	VIC/L-11	3,736
Offshore Gippsland	A-17	FLOUNDER	1-Aug-03	ESSO	VIC/L-11	3,660
Offshore Gippsland	A-2A	FLOUNDER	30-Aug-03	ESSO	VIC/L-11	2,803
Offshore Gippsland	HLA-A1	HALIBUT	19-Nov-03	ESSO	VIC/L-5	2,952
Offshore Gippsland	A-A6a	HALIBUT	15-Dec-03	ESSO	VIC/L-5	3,466
Offshore Gippsland	A-6a	MARLIN	19-Feb-04	ESSO	VIC/L-3	3,563
Offshore Gippsland	A-24a	MARLIN	9-Apr-04	ESSO	VIC/L-11	3,275
Offshore Gippsland	Turrum Location 5	TURRUM	26-May-04	ESSO	VIC/L-4	3,617
Offshore Otway	Casino-3	CASINO	14-Oct-03	Santos	VIC/P-44	2,135
Onshore Gippsland	Wombat-2	WOMBAT	30-Mar-04	Lakes Oil	PEP-157	1,550
Onshore Gippsland	Trifon-2	TRIFON	5-May-04	Lakes Oil	PEP-157	1,267
Onshore Otway	Iona-6	IONA	20-May-04	TXU	PPL-2	1,196

Source: DPI

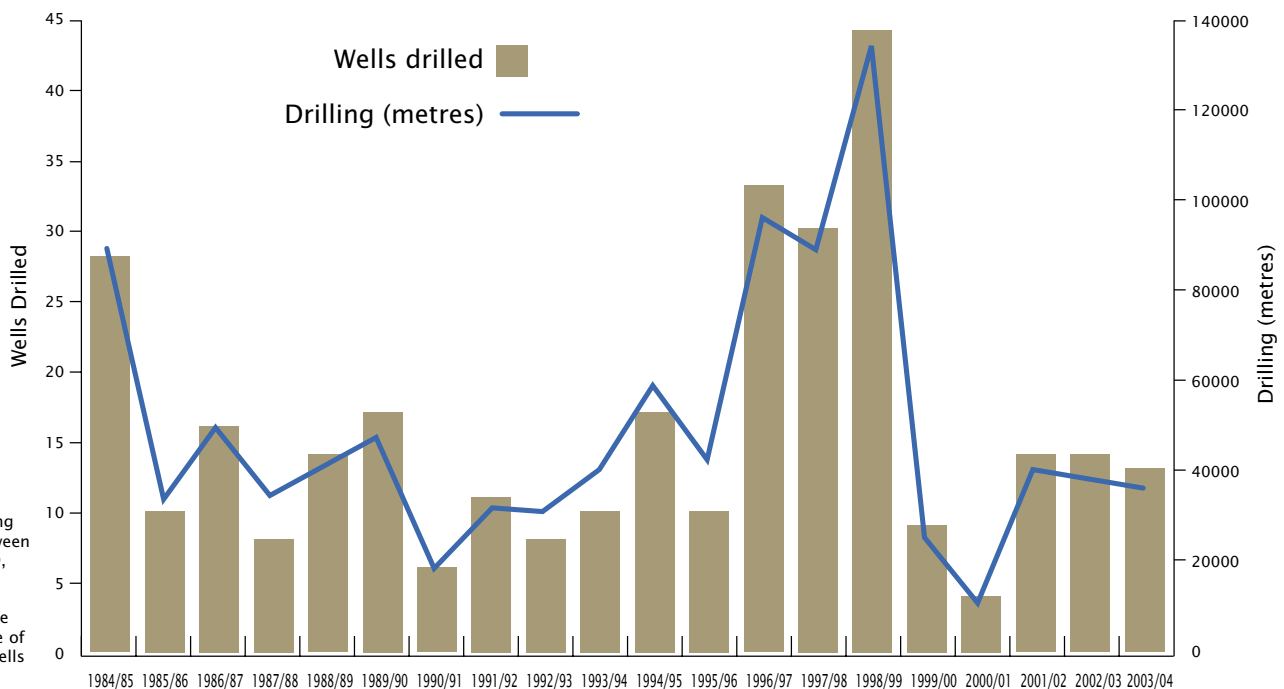
TABLE 3.7 Development Wells: 1984/85 – 2003/04

Year	Number of Wells Drilled	Annual Drilling (metres)
Pre 1984	499	N/A
1984/85	28	89,664
1985/86	10	34,320
1986/87	16	51,221
1987/88	8	29,613
1988/89	14	37,783
1989/90	17	46,369
1990/91	6	19,551
1991/92	11	30,664
1992/93	8	30,021
1993/94	10	39,810
1994/95	17	60,469
1995/96	10	42,519
1996/97	33	97,678
1997/98	30	84,823
1998/99	44	133,166
1999/00	9	25,915
2000/01	4	9,644
2001/02	14	36,429
2002/03	14	34,600
2003/04	13	33,220
<b>Total</b>	<b>815</b>	<b>967,479</b>



Source: DPI

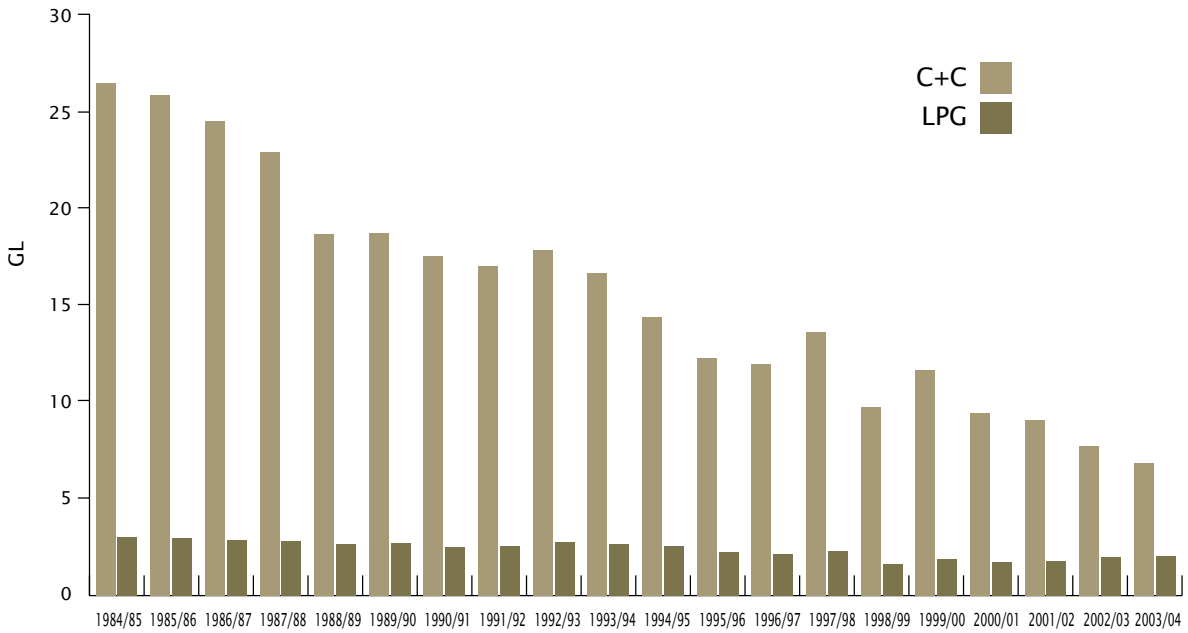
GRAPH 3.4 Development Wells: 1984/85 – 2003/04



Source: DPI  
 Note: Many fields were being developed between 1996 and 1999, and as a result of infill drilling operations there was an increase of development wells drilled.

## Production and revenue

GRAPH 3.5 Gippsland Basin Historical Petroleum Production (excluding gas): 1984/85 – 2003/04

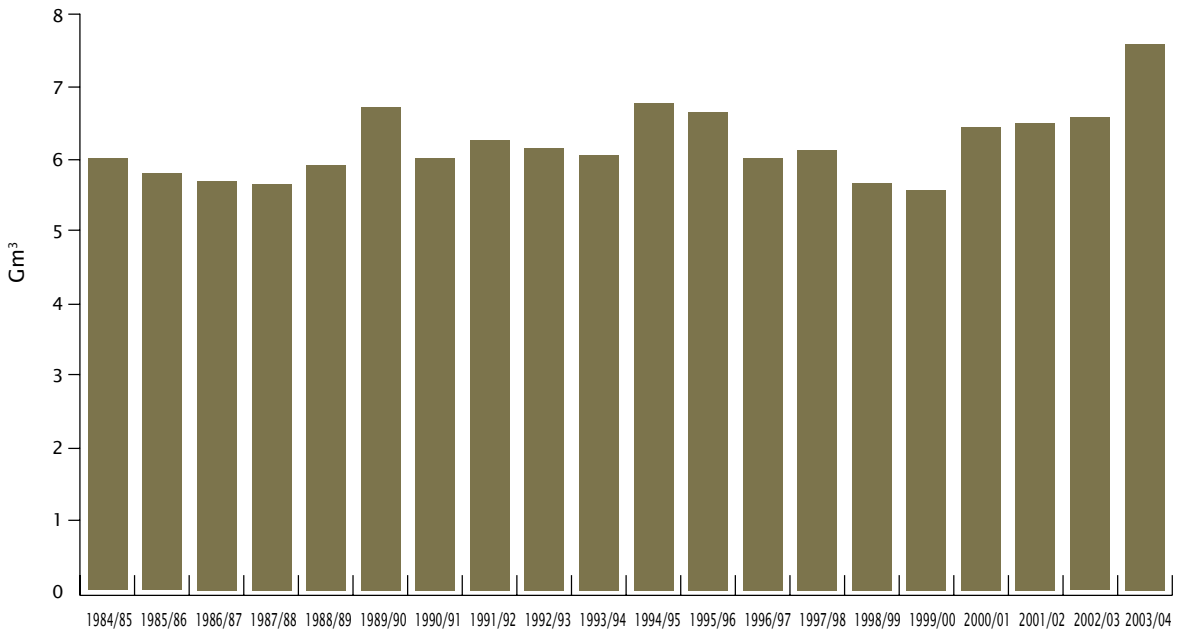


Source: DPI

Notes: 1998/99 Longford Gas plant incident.

Petroleum production has been declining for the last several years as the offshore Gippsland Fields are in the depletion stage.

GRAPH 3.6 Gippsland Basin Historical Gas Production: 1984/85 – 2003/04



Source: DPI

Notes: 1998/99 Longford Gas plant incident.

Gas production has been increasing for the last few years to meet demands.



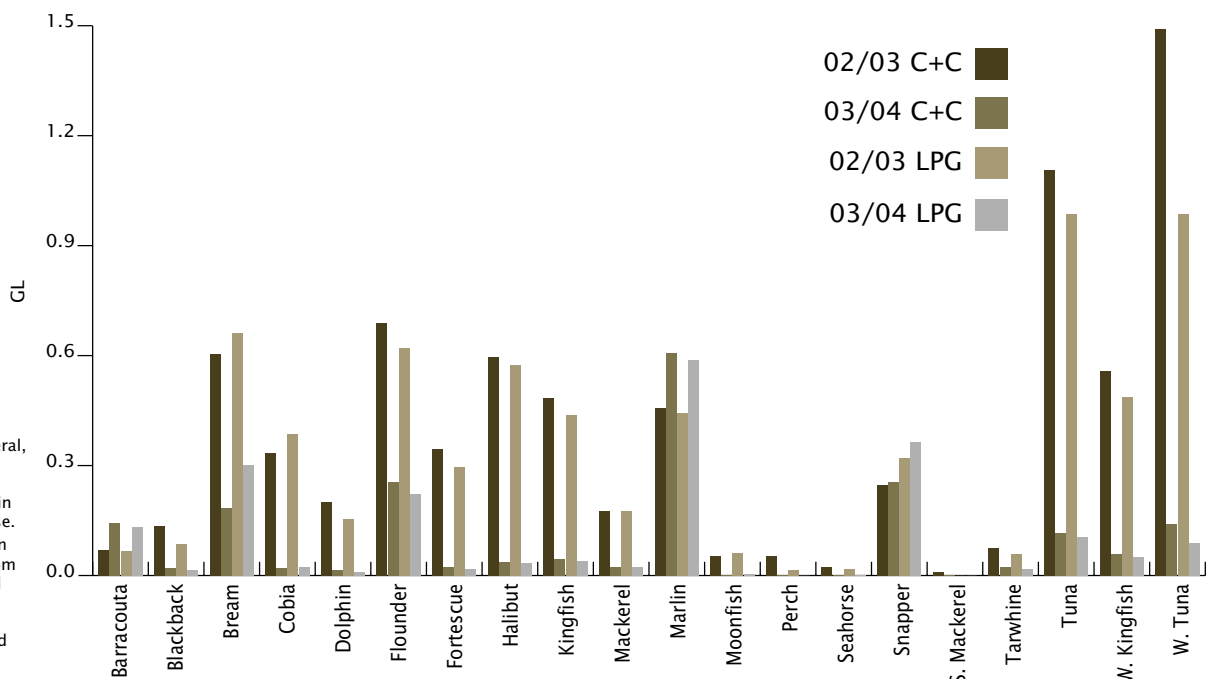
TABLE 3.8 Annual Gippsland Basin Petroleum Production: 1968 – 2003/04

Year	Gippsland Basin - Annual Petroleum Production		
	C+C (GL)	LPG (GL)	Gas (Gm <sup>3</sup> )
Pre 1984	290.20	34.30	51.20
1984/85	26.40	3.00	6.00
1985/86	25.78	2.97	5.79
1986/87	24.44	2.88	5.69
1987/88	22.87	2.83	5.65
1988/89	18.61	2.68	5.91
1989/90	18.68	2.69	6.71
1990/91	17.48	2.50	6.01
1991/92	16.97	2.57	6.26
1992/93	17.80	2.74	6.14
1993/94	16.60	2.66	6.05
1994/95	14.35	2.56	6.77
1995/96	12.26	2.25	6.65
1996/97	11.93	2.12	6.01
1997/98	13.56	2.29	6.12
1998/99	9.73	1.63	5.66
1999/00	11.60	1.89	5.56
2000/01	9.40	1.75	6.44
2001/02	9.06	1.80	6.49
2002/03	7.70	1.97	6.57
2003/04	6.83	2.04	7.59
<b>Total</b>	<b>602.26</b>	<b>82.12</b>	<b>175.69</b>

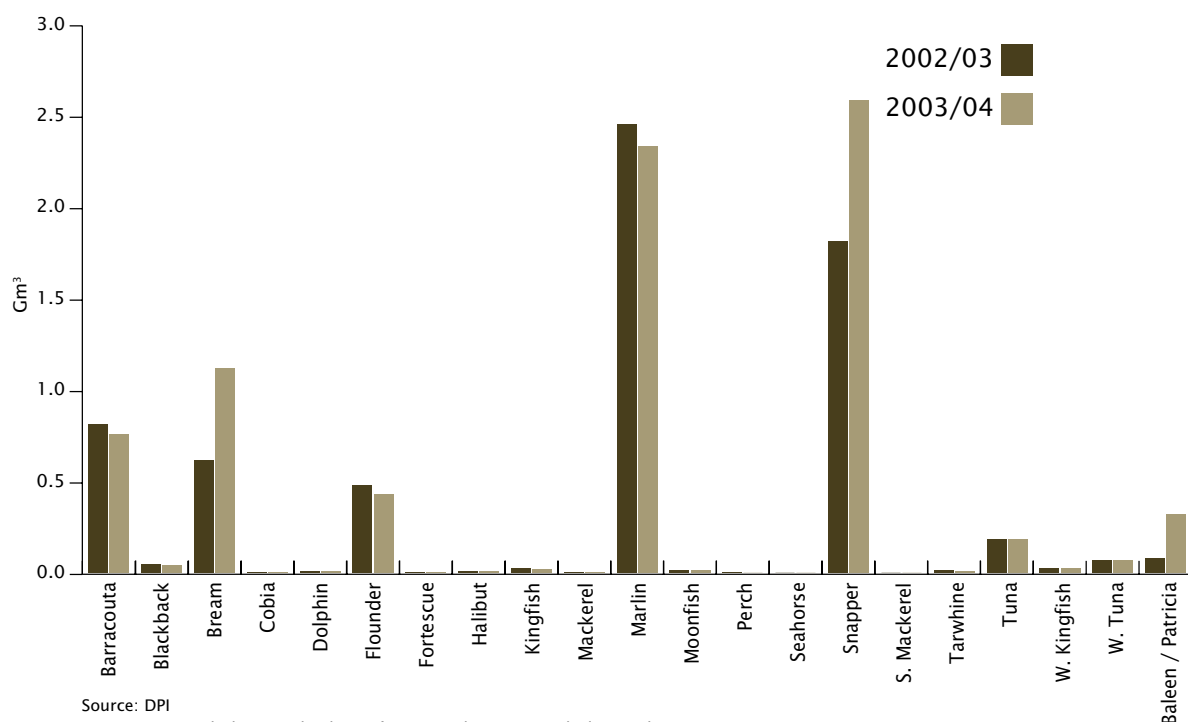
Source: Esso/BHP-Billiton, OMV Australia Pty Ltd



GRAPH 3.7 Gross Gippsland Petroleum Production (excluding natural gas): 2002/03 – 2003/04



GRAPH 3.8 Gross Gippsland Natural Gas Production: 2002/03 – 2003/04



Source: DPI

Notes: In general, the Gippsland Basin's gas production is in declining phase.

The increase in production from the Bream and Snapper fields is due to infill drilling (ie field development).

TABLE 3.9a Gross Gippsland Basin Petroleum Production: 2002/03 – 2003/04

Esso / BHP Billiton Fields	2002 / 2003			2003 / 2004		
	C+C (GL)	LPG (GL)	Gas (Gm³)	C+C (GL)	LPG (GL)	Gas (Gm³)
Barracouta	0.070	0.142	0.814	0.067	0.132	0.757
Blackback	0.135	0.020	0.049	0.086	0.014	0.040
Bream	0.604	0.185	0.615	0.662	0.302	1.119
Cobia	0.335	0.021	0.003	0.385	0.024	0.004
Dolphin	0.200	0.014	0.008	0.153	0.010	0.006
Flounder	0.688	0.254	0.479	0.621	0.221	0.429
Fortescue	0.346	0.023	0.004	0.295	0.019	0.003
Halibut	0.595	0.038	0.007	0.573	0.035	0.006
Kingfish	0.483	0.045	0.022	0.438	0.039	0.020
Mackerel	0.175	0.023	0.004	0.176	0.022	0.003
Marlin	0.456	0.607	2.450	0.443	0.587	2.331
Moonfish	0.053	0.002	0.012	0.061	0.003	0.013
Perch	0.052	0.001	0.001	0.015	0.000	0.000
Seahorse	0.023	0.001	0.000	0.018	0.001	0.000
Snapper	0.248	0.255	1.812	0.321	0.365	2.582
S. Mackerel	0.009	0.001	0.000	0.000	0.000	0.000
Tarwhine	0.074	0.023	0.011	0.060	0.019	0.009
Tuna	1.107	0.117	0.182	0.986	0.106	0.183
W. Kingfish	0.557	0.060	0.024	0.487	0.051	0.022
W. Tuna	1.492	0.140	0.071	0.987	0.090	0.066
<b>TOTAL</b>	<b>7.703</b>	<b>1.971</b>	<b>6.570</b>	<b>6.835</b>	<b>2.041</b>	<b>7.594</b>

Source: Esso/BHP-

Billiton

Notes: Bream and Flounder gas injection has been subtracted from the production volume.

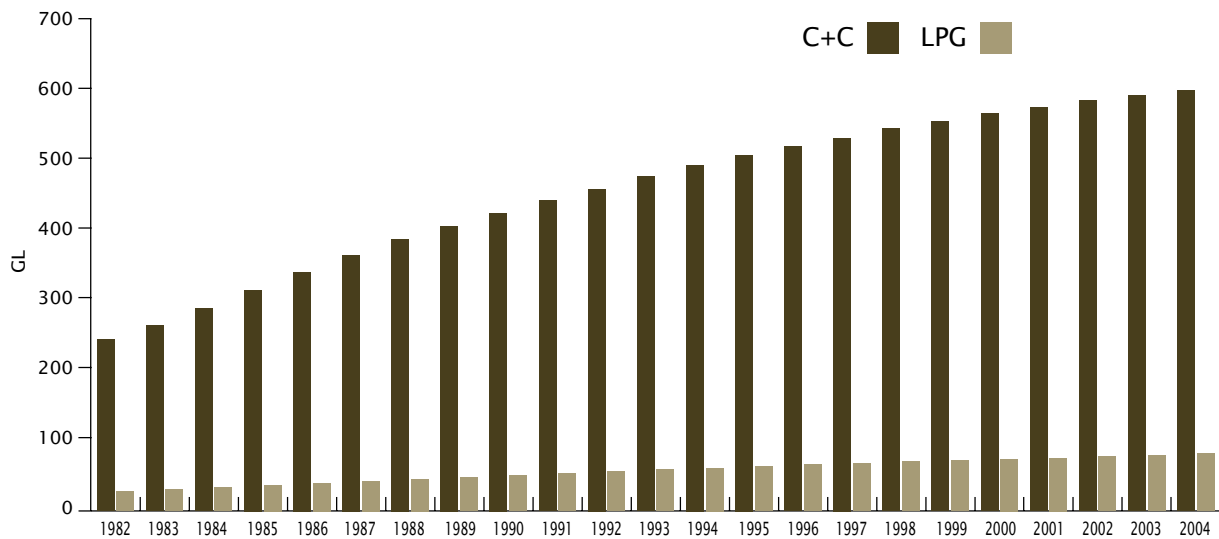
The major oil and condensate producers in 2003/04 were West Kingfish, Tarwhine, Blackback, Dolphin, Fortescue, Tuna, Mackerel, Halibut. These eight fields are now responsible for more than 77% of liquid production from the Gippsland Basin. Although production from the major fields is declining, infill drilling, development and work-over activities continued during 2003/04.

TABLE 3.9b Gross Gippsland Basin Petroleum Production: 2002/03 – 2003/04

OMV Australia Pty Ltd Field	2002 / 2003			2003 / 2004		
	C+C (GL)	LPG (GL)	Gas (Gm <sup>3</sup> )	C+C (GL)	LPG (GL)	Gas (Gm <sup>3</sup> )
Baleen/Patricia	-	-	0.080	-	-	0.331

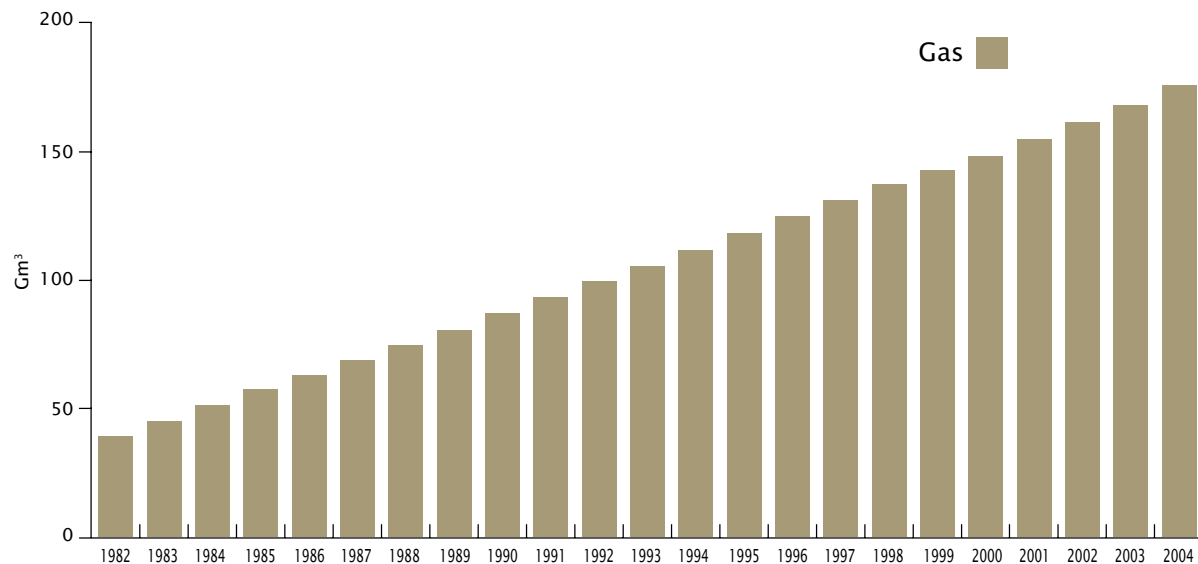
Source: OMV Australia Pty Ltd

GRAPH 3.9 Gippsland Basin – Cumulative Petroleum Production (excluding gas): 1982 – 2004



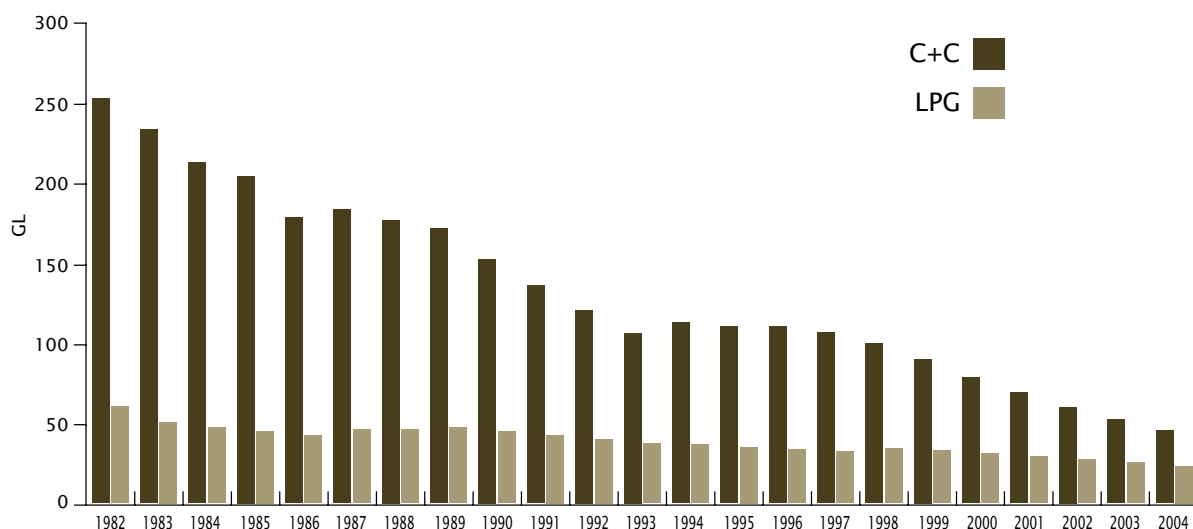
Source: DPI

GRAPH 3.10 Gippsland Basin – Cumulative Gas Production: 1982 – 2004



Source: DPI

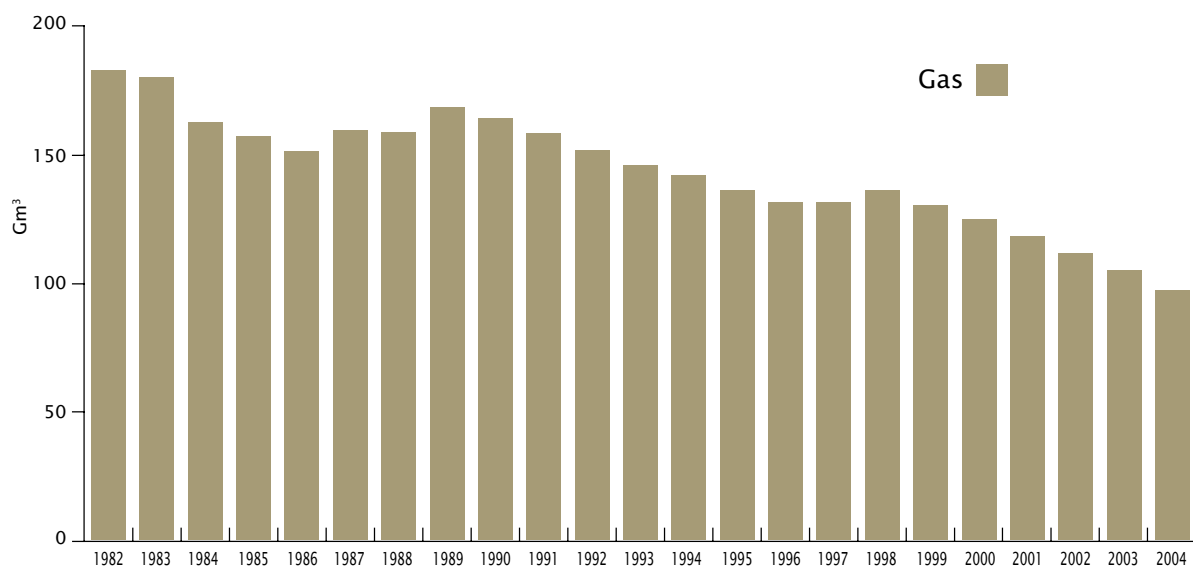
GRAPH 3.11 Gippsland Basin – Remaining Petroleum Reserves (excluding gas): 1982 – 2004



Source: DPI

Note: Petroleum reserves have been declining since 1996 as the Basin is in the depletion phase.

GRAPH 3.12 Gippsland Basin – Remaining Gas Reserves: 1982 – 2004



Source: DPI

Note: Gas reserves have been declining since 1998 as the Gippsland Basin fields currently in production are in the depletion phase.

TABLE 3.10 Onshore Otway Gas, Condensate and CO<sub>2</sub> Revenue: 2002 – 2004

Year	Gas Production (Mcf)	Condensate Production (bbl)	Sales Gas (Mcf)	Boggy Creek Field CO <sub>2</sub> Production (Mcf)	Revenue (Royalty) (A\$)
2002	10,767.45	73,218.64	9,690.71	625.07	2,359,763.90
2003	15,754.59	85,426.47	14,179.13	678.04	2,695,411.10
2004	13,386.74	40,924.68	12,048.07	700.47	1,579,184.51

Source: DPI

Production - TXU and Origin Energy Resources (Natural Gas), BOC (CO<sub>2</sub>)

Royalties - DPI

TABLE 3.11 Offshore Gippsland Oil and Gas Value: 1995 – 2004

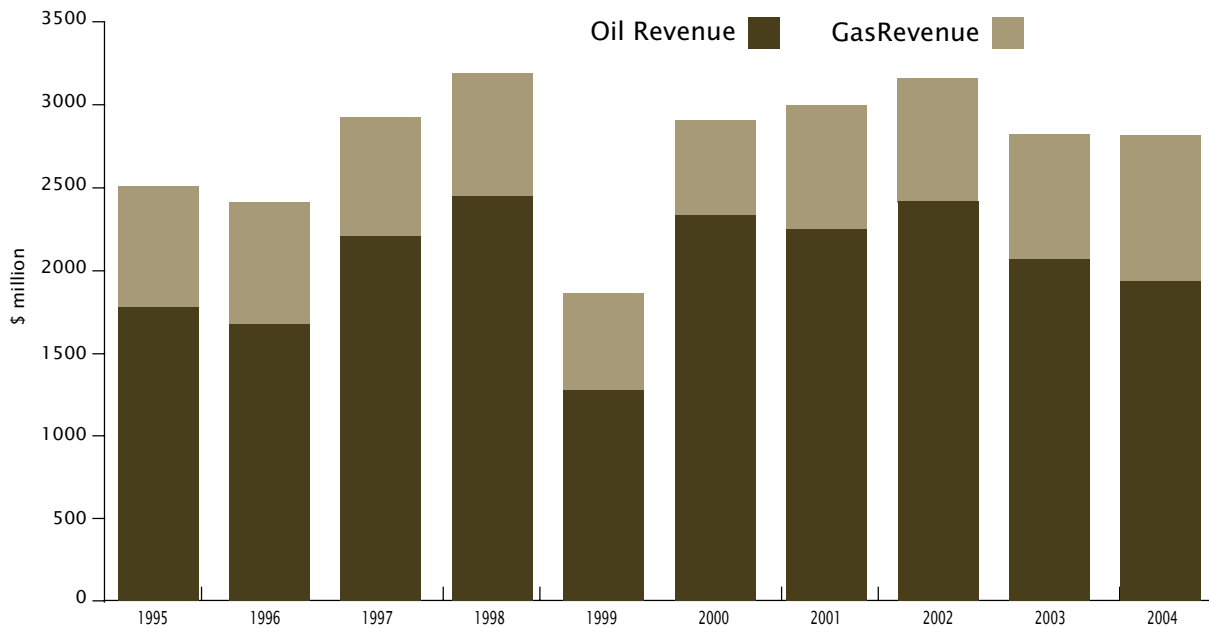
Year	Oil Production Rate (bbl/d)	Oil Yearly Production (MMbbl)	Oil Price (\$US/bbl)	Exchange Rates	Oil Price (\$A/bbl)	Oil Revenue (\$m)	Gas Production Rate (Mcf/d)	Gas Yearly Production (Bscf)	Gas Price (\$A/GJ)	Gas Revenue (\$m)	Oil and Gas Revenue (\$m)
1995	247,743.50	90.43	15.00	0.76	19.66	1,777.91	680.19	248.27	2.70	737.36	2,515.27
1996	210,908.47	76.98	17.00	0.78	21.78	1,676.42	683.31	249.41	2.70	740.74	2,417.17
1997	205,339.46	74.95	20.00	0.68	29.52	2,212.46	665.83	243.03	2.70	721.80	2,934.25
1998	233,480.71	85.22	18.00	0.62	28.81	2,455.56	687.70	251.01	2.70	745.50	3,201.06
1999	168,112.88	61.36	13.00	0.63	20.80	1,276.23	544.84	198.87	2.70	590.64	1,866.87
2000	200,053.58	73.02	17.00	0.53	31.98	2,335.27	538.78	196.66	2.70	584.07	2,919.34
2001	161,896.17	59.09	20.00	0.52	38.13	2,253.20	623.62	227.62	3.00	751.14	3,004.35
2002	156,174.75	57.00	25.00	0.59	42.46	2,420.58	628.27	229.32	3.00	756.75	3,177.33
2003	132,754.50	48.46	28.57	0.67	42.68	2,068.08	635.63	232.00	3.00	765.62	2,833.69
2004	117,785.50	42.99	32.00	0.71	45.07	1,937.65	734.73	268.18	3.00	884.99	2,822.64

Source: Oil Prices: 1995 to 2002 – BP Statistical Review ([www.bp.com/statisticalreview](http://www.bp.com/statisticalreview)); 2003 – Australia Bureau of Agricultural and Resources Economics, Australian Commodity Statistics; 2004 – Estimated from South East Asia: [www.aseanenergy.org](http://www.aseanenergy.org) (Australian 42).

Exchange Rates: [http://www.rba.gov.au/Statistics/Bulletin/index.html#table\\_f](http://www.rba.gov.au/Statistics/Bulletin/index.html#table_f)

Notes: The revenue figures are estimates based on the value of the petroleum using reference prices multiplied by production. They are not used for taxation purposes.

GRAPH 3.13 Offshore Gippsland Oil and Gas Value: 1995 – 2004



Source: DPI

TABLE 3.12 Onshore Otway Basin Annual Production: 1986/87 – 2003/04

Year	North Paaratte		Iona		Wallaby Creek		Skull Creek		Wild Dog Road		Mylor		Pennryn	
	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)
1986-87	6.4	108.9	-	-	-	-	-	-	-	-	-	-	-	-
1987-88	12.4	203.8	-	-	-	-	-	-	-	-	-	-	-	-
1988-89	16.5	274.3	-	-	-	-	-	-	-	-	-	-	-	-
1989-90	17.0	271.8	-	-	-	-	-	-	-	-	-	-	-	-
1990-91	19.0	300.3	-	-	-	-	-	-	-	-	-	-	-	-
1991-92	19.2	290.7	-	-	-	-	-	-	-	-	-	-	-	-
1992-93	14.6	220.7	10.7	244.9	-	-	-	-	-	-	-	-	-	-
1993-94	0.1	0.0	49.0	1088.7	-	-	-	-	-	-	-	-	-	-
1994-95	0.0	0.0	63.8	1568.1	-	-	-	-	-	-	-	-	-	-
1995-96	0.0	0.0	72.9	1771.6	-	-	-	-	-	-	-	-	-	-
1996-97	0.0	0.0	24.7	672.7	49.6	836.0	0.0	0.0	-	-	-	-	-	-
1997-98	19.9	328.3	16.3	335.6	30.7	466.7	19.1	0.0	-	-	-	-	-	-
1998-99	3.8	56.3	-	-	88.1	1881.2	-	-	-	-	-	-	-	-
1999-00	112.6	405.3	205.0	4248.1	90.1	1879.0	-	-	6.4	32.9	77.1	6146.8	-	-
2000-01	30.5	383.6	106.8	2634.0	36.5	719.5	-	-	13.6	57.3	108.0	7249.6	8.8	258.0
2001-02	5.1	55.3	77.3	335.6	6.0	99.7	-	-	-	-	27.8	1853.1	38.1	2254.1
2002-03	-	-	69.0	-	-	-	-	-	-	-	0.0	0.9	10.9	589.1
2003-04	-	-	174.9	-	-	-	-	-	-	-	15.91	933.6	4.8	281.3
<b>TOTAL</b>	<b>277</b>	<b>2899</b>	<b>870</b>	<b>12899</b>	<b>301</b>	<b>5882</b>	<b>19</b>	<b>0</b>	<b>20</b>	<b>90</b>	<b>229</b>	<b>16184</b>	<b>63</b>	<b>3383</b>

Source: DPI

Note: \*Boggy Creek is primarily a CO<sub>2</sub> producer.

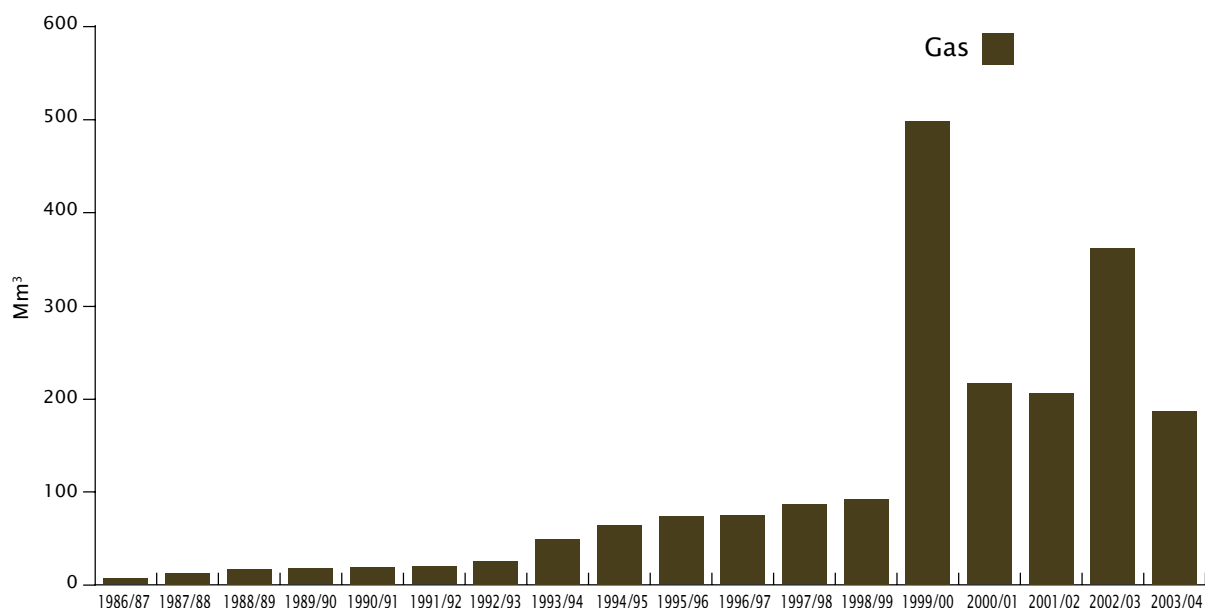
TABLE 3.12 Continued

Dunbar	Fenton Creek		Tregony		McIntee		Naylor		Croft		Seamer		Boggy Creek*	
	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)	Gas (Mm <sup>3</sup> )	cond (kL)
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3.9	121.0	34.5	1605.1	2.0	109.5	-	-	-	-	-	-	-	-	-
9.2	215.0	21.1	1046.7	70.2	4139.3	36.8	973.6	4.8	258.5	8.5	409.4	-	-	-
-	-	0.1	2.1	46.9	2263.6	130.8	2890.7	66.4	3227.1	104.8	4607.6	16.2	0.0	19.2
-	-	2.2	93.5	17.3	877.1	89.5	2085.2	40.6	2101.5	2.8	134.0	29.7	-	19.8
<b>13.0</b>	<b>336</b>	<b>84</b>	<b>4349</b>	<b>136</b>	<b>7390</b>	<b>257</b>	<b>5949</b>	<b>112</b>	<b>5587</b>	<b>116</b>	<b>5151</b>	<b>46</b>	<b>0</b>	<b>147</b>
														<b>71</b>

Source: DPI

Note: \*Boggy Creek is primarily a CO<sub>2</sub> producer.

GRAPH 3.14 Victorian Otway Basin Historical Gas Production: 1986/87 – 2003/04



Source: DPI

Notes: 1999/2000 production increased dramatically from previous years as Wild Dog Road, Mylor and Fenton Creek discoveries commenced production.

2002/03 production increased from previous years as McIntee, Naylor and Croft fields reached their highest production levels.

2003/04 low production was due mainly to the Croft field's low production.

TABLE 3.13 Gross Onshore Otway Basin Gas/Condensate Production: 2002/03 – 2003/04

Field	2002/03		2003/04	
	Gas (Mm <sup>3</sup> )	Condensate (kL)	Gas (Mm <sup>3</sup> )	Condensate (kL)
North Paaratte	0.0	0.0	0.0	0.0
Iona*	69.0	0.0	174.9	0.0
Wallaby Creek	0.0	0.0	0.0	0.0
Mylor	0.0	0.9	15.9	933.6
Penryn	11.9	589.1	6.1	281.3
Dunbar	0.0	0.0	0.0	0.0
Fenton Creek	0.1	2.1	2.2	93.5
Tregony	46.9	2263.6	17.3	877.1
McIntee	130.8	2890.7	89.5	2085.2
Naylor	66.4	3227.1	40.6	2101.5
Croft	104.8	4607.6	2.8	134.0
Seamer	16.2	0.0	29.7	0.0
<b>TOTAL</b>	<b>446.1</b>	<b>13581.1</b>	<b>379.1</b>	<b>6506.2</b>
Boggy Creek**	19.2	9.6	19.8	9.6

Source: DPI

Mylor, Fenton Creek and Penryn fields – Santos

Iona, North Paaratte and Wallaby Creek fields – Western Underground Gas Storage

Skull Creek, Wild Dog Road and Dunbar fields – Origin

Boggy Creek – British Oxygen Company (BOC)

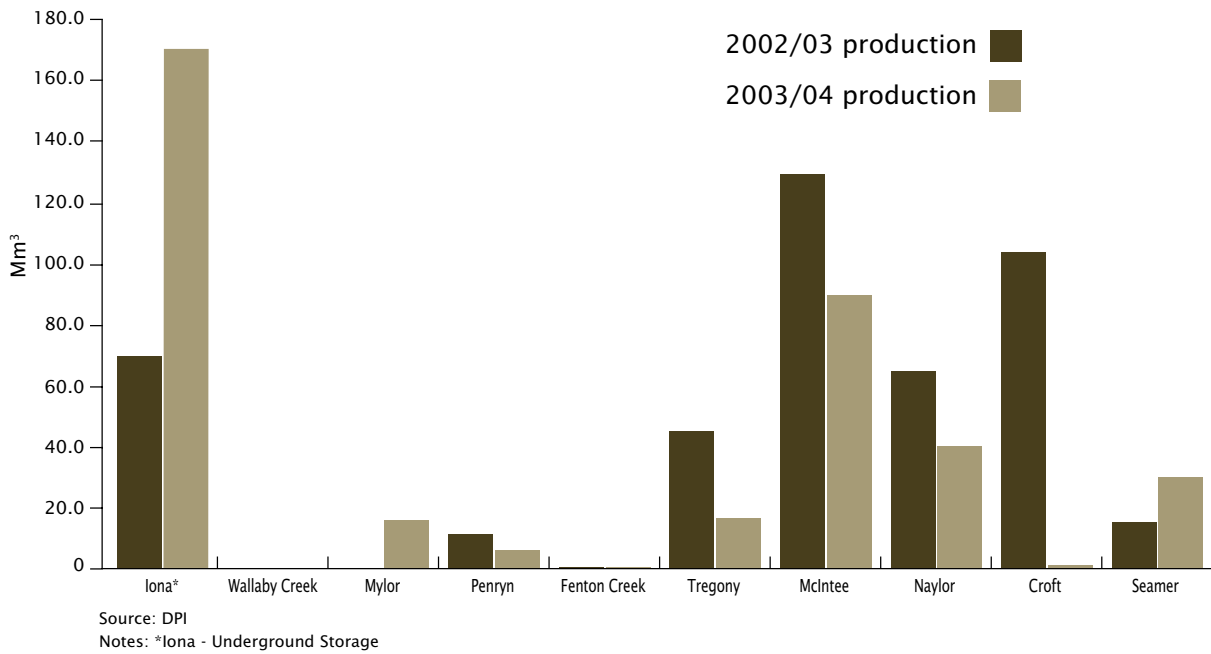
Notes: The Wallaby Creek field came on stream in September 1996. Mylor and Fenton Creek came on stream in August 1999, Wild Dog Road in January 2000 and Seamer in April 2003.

\*Iona – Underground Storage

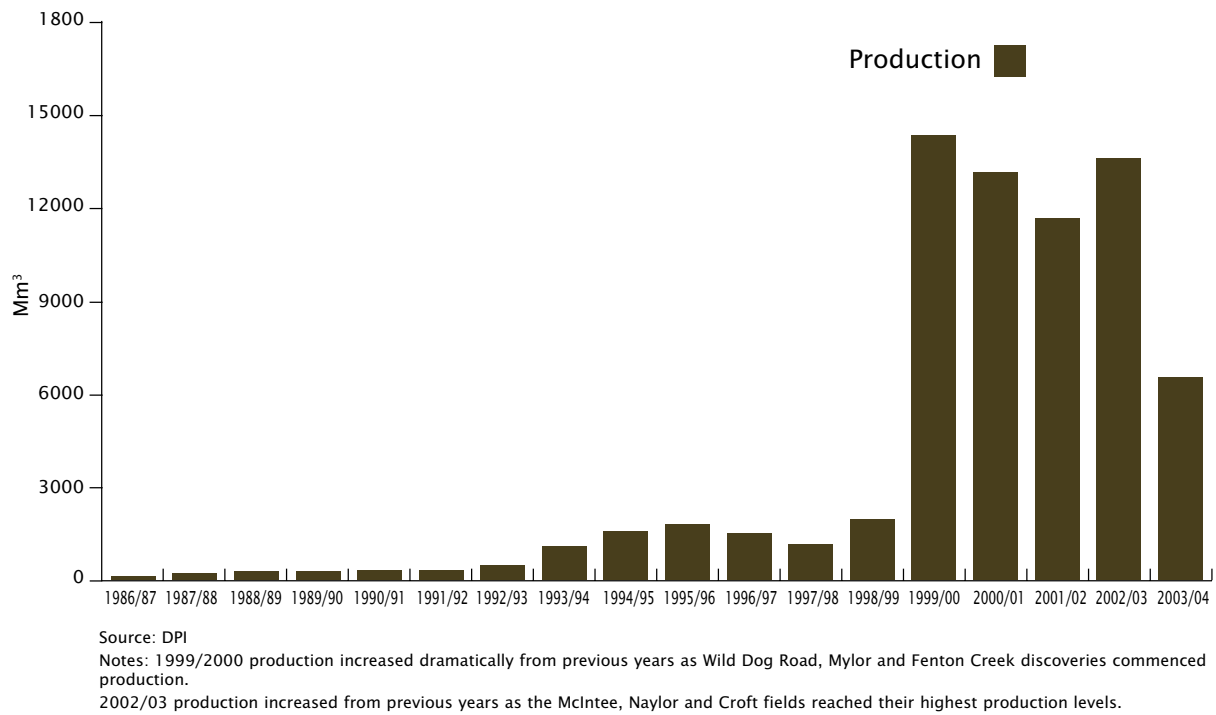
\*\* Boggy Creek is primarily a CO<sub>2</sub> producer.



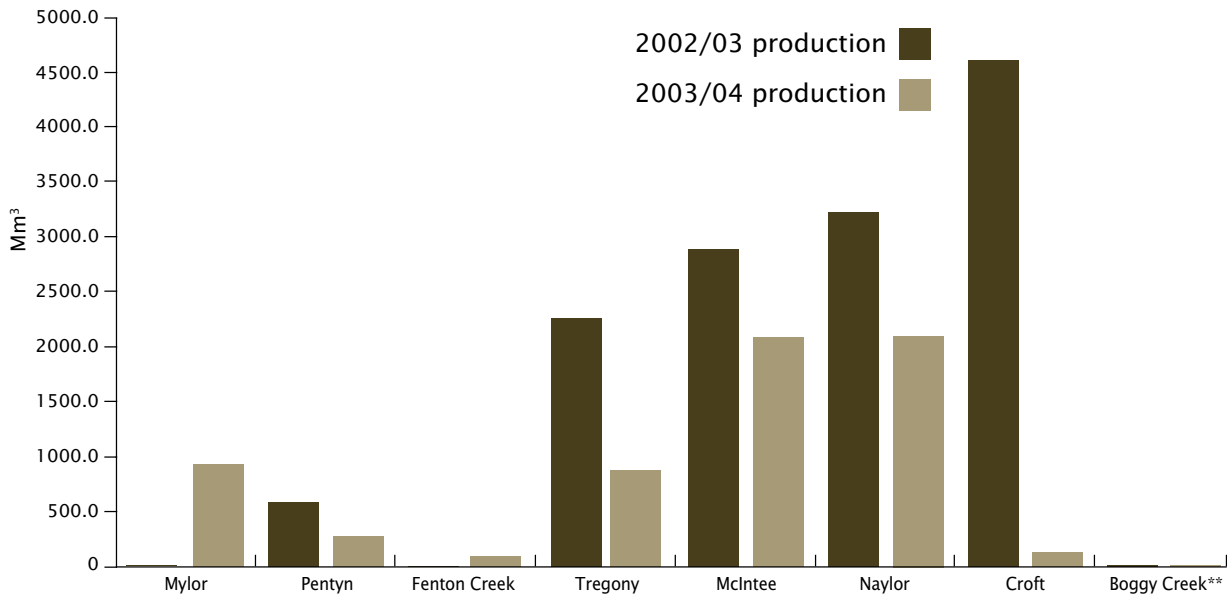
GRAPH 3.15 Victorian Otway Basin Gas Production: 2002/03 – 2003/04



GRAPH 3.16 Victorian Otway Basin Historical Condensate Production: 1986/87 – 2003/04



GRAPH 3.17 Victorian Otway Basin Condensate Production: 2002/03 – 2003/04



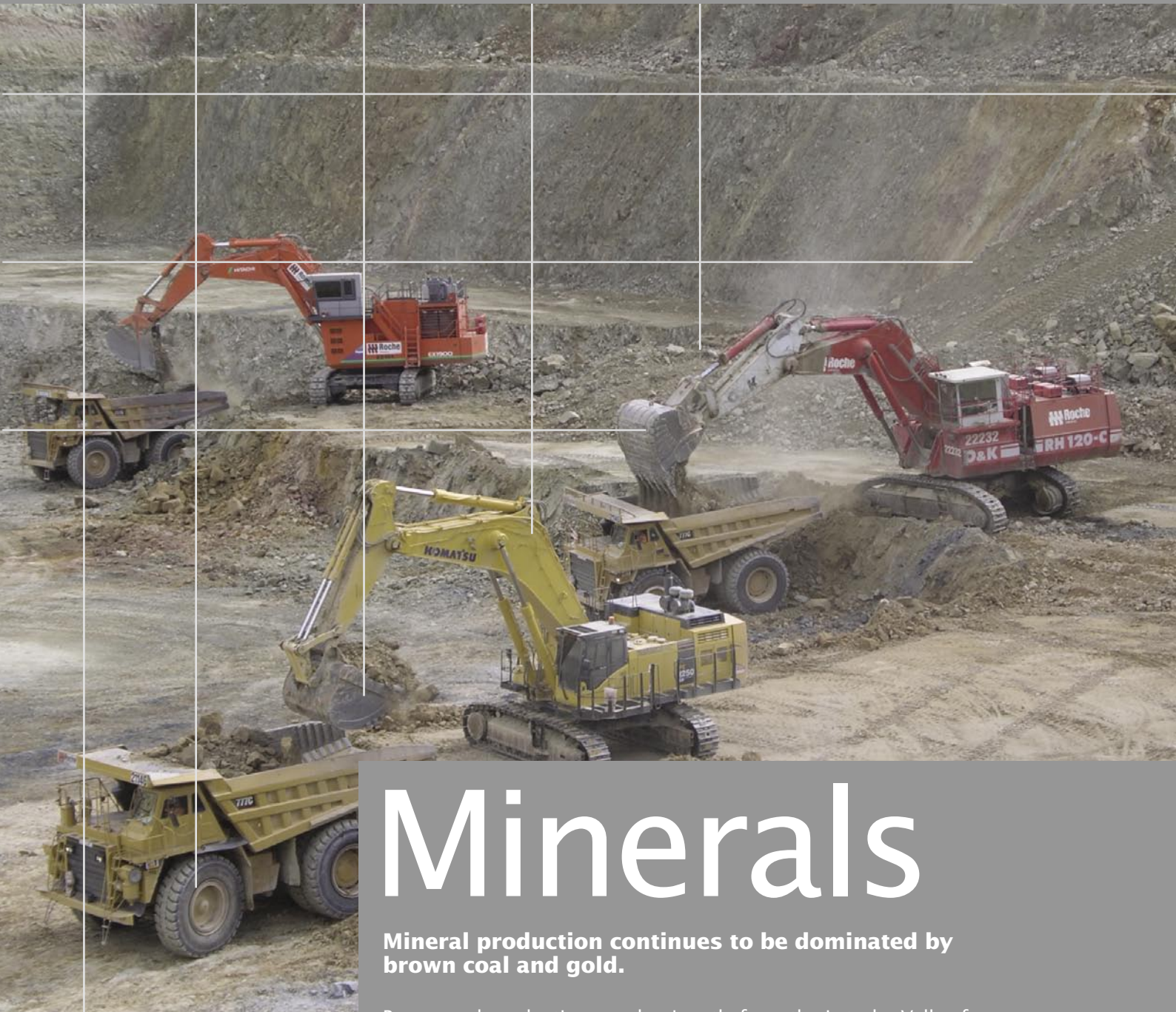
Source: DPI  
 Note: \*\* Boggy Creek is primarily a CO<sub>2</sub> producer.

TABLE 3.14 Onshore Otway Basin Sales Gas Reserves Status: June 2004

Licence Area	Initial Reserves (Mm <sup>3</sup> )	Cumulative Production (Mm <sup>3</sup> )	Remaining Reserves (Mm <sup>3</sup> )
H/C gas in Port Campbell area	2919.9	2546.2	373.7
Boggy Creek (CO <sub>2</sub> Producer)**	396.4	146.6	249.8

Source: DPI  
 Notes: Producing fields in the Port Campbell area consist of Boggy Creek, Fenton Creek, Tregoney, McIntee, Croft, Penryn, Seamer and Naylor. The newly discovered Lavers Field in the onshore Port Campbell region is not in production yet.  
 The total gas in-place for undeveloped offshore gas fields - excluding Tasmanian fields - (Minerva, La Bella, Casino-1 and Geograph) is estimated at about 1269 billion cubic feet (Bcf) or 35.94 billion cubic metres (Bm<sup>3</sup>), and including Tasmania fields (Thylacine and Yolla) 2369 Bcf or 67.1 Bm<sup>3</sup>.  
 \*\* Boggy Creek is primarily a CO<sub>2</sub> producer.





# Minerals

**Mineral production continues to be dominated by brown coal and gold.**

Brown coal production, predominantly from the Latrobe Valley for electricity generation, has been steady at about 66 million tonnes a year for the last three years.

Gold production, which increased markedly in the 1980s, has been in decline since 1999/2000 and this trend continued in 2003/04.

Gypsum and kaolin are the other significant contributors to mineral production. Both show a high degree of variability in line with seasonal and market factors. In 2003/04 kaolin production remained in an upwards trend reaching 251,392 tonnes, representing the highest recorded figure since the 1980s. Feldspar production in Victoria commenced in 1997/98 by Unimin Australia Ltd and has been steadily increasing since.

Mineral sands (ilmenite, rutile and zircon) production in Victoria commenced in 2000/01 by Murray Basin Titanium Pty Ltd and has grown each year since. However, production from its Wemen mine discontinued in January 2004.



## Exploration and mining tenements

In 2003/04, 197 new and renewal applications were received for mining and exploration licences, with about 66% of these being for exploration licences. One hundred and eighty-eight mining and exploration licences were granted or renewed, with about 70% of these being exploration licences.

TABLE 4.1 New and Renewal Applications for Mining and Exploration Licences: 2003/04

	Received	Granted	Withdrawn	Refused	Invalid
New Mining Licence Applications	23	17	7	2	0
Renewal Mining Licence Applications	43	39	0	3	0
<b>Total Mining Licence Applications</b>	<b>66</b>	<b>56</b>	<b>7</b>	<b>5</b>	<b>0</b>
New Exploration Licence Applications	85	83	6	3	0
Renewal Exploration Licence Applications	46	49	0	4	0
<b>Total Exploration Licence Applications</b>	<b>131</b>	<b>132</b>	<b>6</b>	<b>7</b>	<b>0</b>

Source: DPI

Note: 'Granted' includes applications that were on hand as at 1 July 2003.

TABLE 4.2 Mining and Exploration Licences - Granted and Renewed: 1997/98 - 2003/04

Licence Area	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04
Mining Licences Granted	22	19	17	12	24	13	17
Mining Licences Renewed	33	25	24	22	25	26	39
Total Mining Licences Granted & Renewed	55	44	41	34	49	39	56
Exploration Licences Granted	180	77	39	39	45	55	83
Exploration Licence Renewed	94	82	100	63	49	47	49
Total Exploration Licences Granted & Renewed	274	159	139	102	94	102	132

Source: DPI

Note: 'Granted' Includes applications that were on hand as at 1 July 2003.

### Definition of Minerals under the *Mineral Resources Development Act 1990*

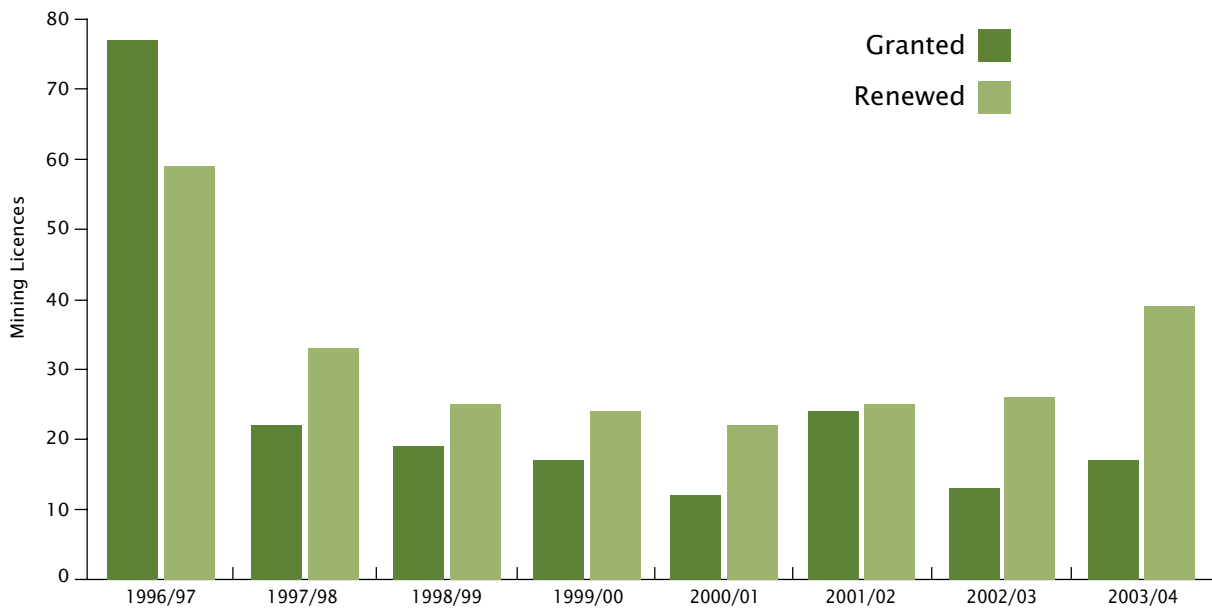
'Mineral' means any substance which occurs naturally as part of the earth's crust—

- (a) including — (i) oil shale and coal; and
- (ii) hydrocarbons and mineral oils contained in oil shale or coal or extracted from oil shale or coal by chemical or industrial processes; and
- (iii) Bentonite, fine clay, Kaolin, Lignite, minerals in alluvial form including those of titanium, zirconium, rare earth elements and platinoid group elements, Quartz crystals and Zeolite.
- (b) excluding water, stone, peat or petroleum.

The total number of exploration and mining licences granted is a broad indicator of exploration and mining activity.

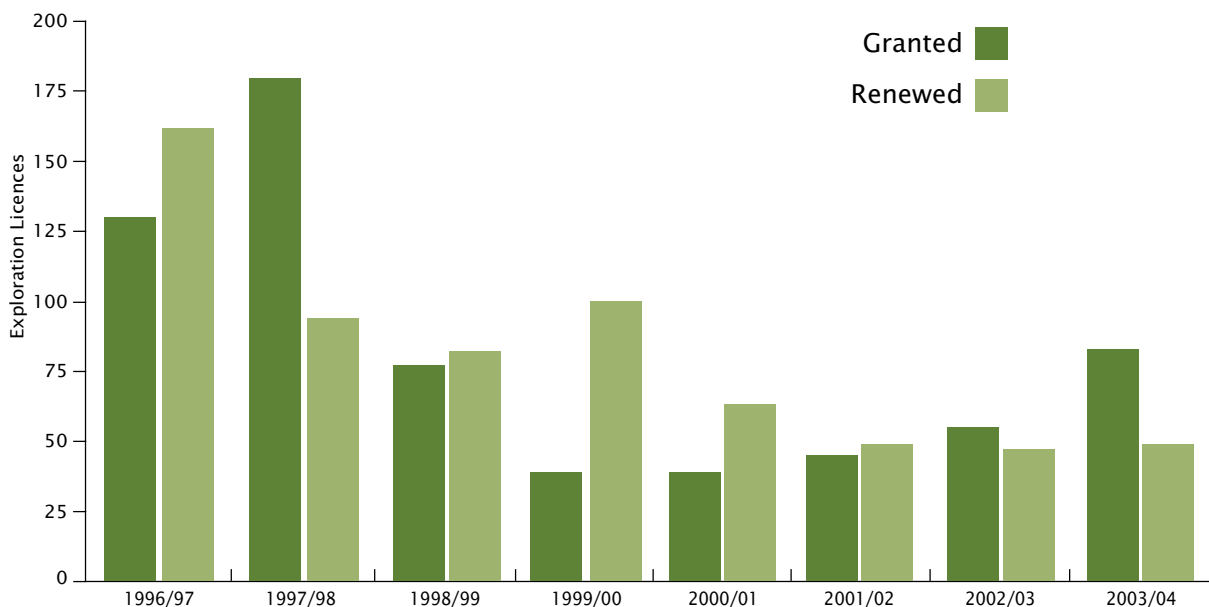
There was a general decline in the number of exploration licences granted and between 1997/98 and 2001/02. This trend has been reversed in 2002/03 and 2003/04. There was a large increase in number of exploration licence grants in 2003/04 of 83, up from 55 for the previous year. The total number of mining licence grants also increased in 2003/04, indicating resurging mining and exploration activities.

GRAPH 4.1 Mining Licence Grants: 1996/97 – 2003/04



Source: DPI

GRAPH 4.2 Exploration Licence Grants: 1996/97 – 2003/04



Source: DPI

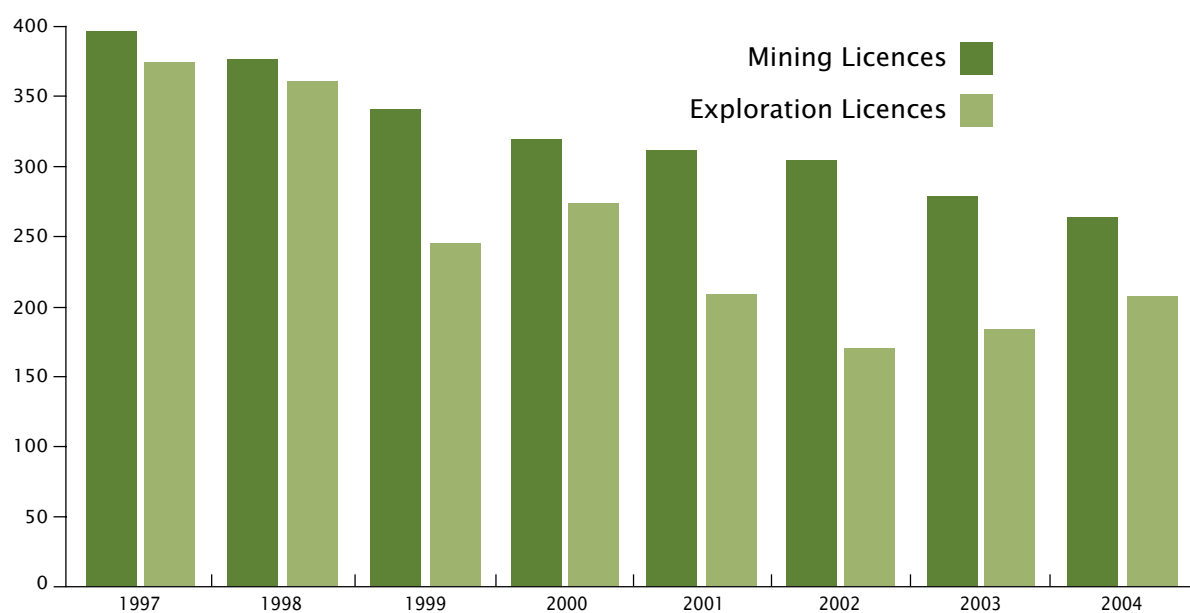
TABLE 4.3 Current Mining and Exploration Licences at 30 June each year: 1998 – 2004

Licence Area	1998	1999	2000	2001	2002	2003	2004
Mining Licences	377	341	320	312	305	279	264
Exploration Licence	361	245	274	209	170	184	207
<b>Totals</b>	<b>738</b>	<b>586</b>	<b>594</b>	<b>521</b>	<b>475</b>	<b>463</b>	<b>471</b>

Source: DPI

In 2003/04 the total areas covered by current mining and current exploration licences were 570 km<sup>2</sup> and 97,000 km<sup>2</sup> respectively. The number of current mining licences has steadily fallen over the last seven years. A significant number of amalgamations have contributed to the lower number of current mining licences. However, the number of current exploration licences has been on the rise since 2002/03 and this continued in 2003/04.

GRAPH 4.3 Current Mining and Exploration Licences as at 30 June each year: 1997 – 2004



Source: DPI



## Exploration

The Australian Bureau of Statistics (ABS) reports quarterly on private mineral exploration for all states. Victorian mineral exploration and mining expenditure is also reported by a requirement of the *Mineral Resources Development Act 1990* (MRDA). The ABS exploration expenditure statistics can vary significantly from expenditure reported under the MRDA. However, the ABS statistics are the only basis for comparison of Victorian expenditure with that of other States and are generally preferred as a guide to exploration trends.

TABLE 4.4 Expenditure on Mineral Exploration and Mining Development (\$ million): 1993/94 – 2003/04

	1993/ 1994	1994/ 1995	1995/ 1996	1996/ 1997	1997/ 1998	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004
Exploration (ABS)	20.7	31.2	42.6	52.3	43.1	37.0	33.8	32.7	33.9	46.2	53.5
Exploration (MRDA)	18.7	41.1	35.1	37.6	36.9	38.0	35.8	43.4	39.3	43.3*	36.4*
Mining (MRDA)	77.4	66.7	73.8	156.8	165.2	174.6	188.3	195.5	213.5	258.2	274.4

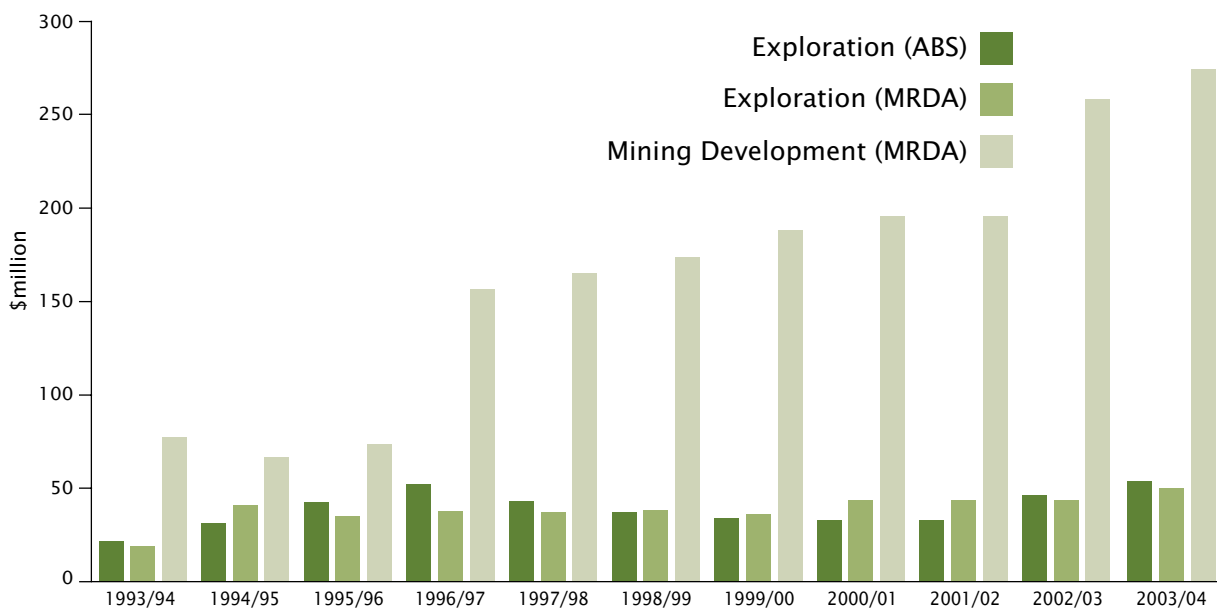
Source: Figures collated from six monthly reports forwarded to DPI required by the MRDA, and ABS: Actual and Expected Private Mineral Exploration (Catalogue No. 8412.0).

Notes: \* Incomplete data due to changes to mode of data collection under the new regulations introduced in 2002/03. The figure doesn't include annual exploration expenditure reported in the September 2004 quarter.

The MRDA mining expenditure figures represent total expenditure; ie capital and operating; by commercial entities engaged in exploration and mining activity during the relevant periods.

The MRDA exploration expenditure figures include exploration expenditure on mining and exploration licences.

GRAPH 4.4 Expenditure on Mineral Exploration and Mining Development (\$ million): 1993/94 – 2003/04



Source: DPI

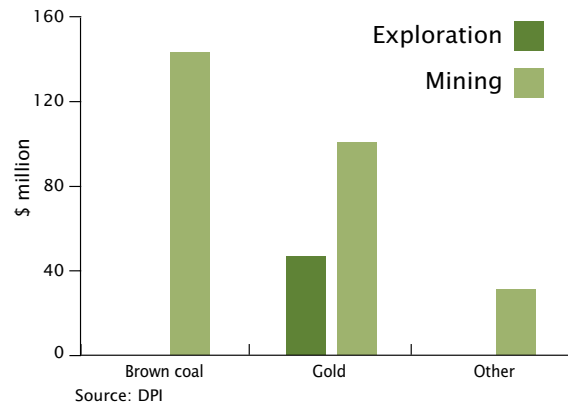
Mineral exploration expenditure is a lead indicator of mineral industry activity. ABS data indicates that 2003/04 exploration expenditure is on a strong growth trend. However, annual mineral exploration expenditure statistics are incomplete due to the changes to mode of collection under new regulations introduced in 2002/03.

Expenditure on mine development was boosted by the inclusion of expenditure reported by brown coal mines in the Latrobe Valley for the first time in 1996/97. The upward trend has continued in 2003/04.

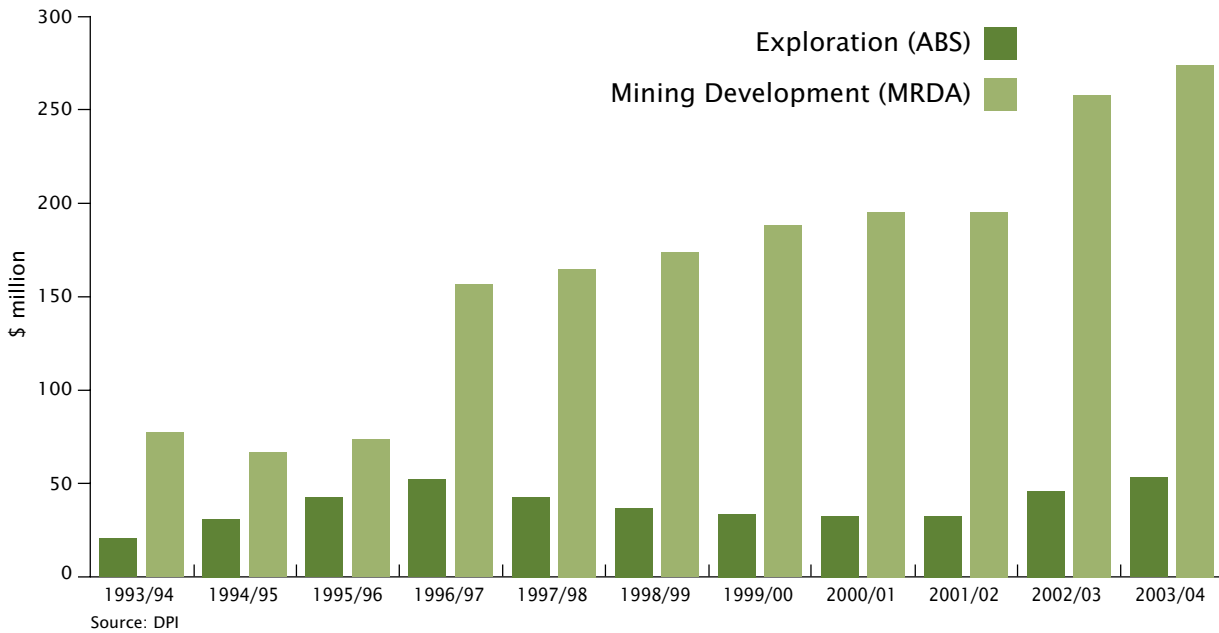
TABLE & GRAPH 4.5 Mineral Exploration and Mining Development Expenditure by Sector (\$ million): 2003/04

Sector	Exploration	Mining
Brown coal	1.2	145.9
Gold	34.0	99.6
Heavy mineral sands	0.9	18.6
Other	0.3	8.4
<b>Totals</b>	<b>36.4</b>	<b>274.4</b>

Source: DPI



GRAPH 4.6 Expenditure on Private Mineral Exploration and Mining Development: 1993/94 – 2003/04





## Production

TABLE 4.6 Mineral Production: 1983/84 - 2003/04

Year	Brown Coal (thousand tonnes)	Gold (tonne)	Gold (oz)	Copper Concentrate (tonne)	Zinc Concentrate (tonne)	Zircon (tonne)	Rutile (tonne)	Ilmenite (tonne)	Feldspar (tonne)	Gypsum (cubic metre)	Kaolin (tonne)
1983/84	33,198	0.150	4,823	-	-	-	-	-	-	207,400	83,700
1984/85	38,379	0.902	29,004	-	-	-	-	-	-	247,300	88,100
1985/86	36,069	1.272	40,901	-	-	-	-	-	-	138,800	35,900
1986/87	41,806	1.179	37,911	-	-	-	-	-	-	187,700	41,100
1987/88	44,288	1.719	55,274	-	-	-	-	-	-	203,100	100,800
1988/89	48,653	2.512	80,773	-	-	-	-	-	-	241,400	117,300
1989/90	45,960	3.515	113,025	-	-	-	-	-	-	301,500	168,900
1990/91	49,388	4.863	156,370	-	-	-	-	-	-	49,200	145,800
1991/92	50,717	3.346	107,591	-	-	-	-	-	-	53,100	87,800
1992/93	47,898	3.993	128,395	-	-	-	-	-	-	180,200	114,600
1993/94	49,683	3.917	125,960	16,287	1,012	-	-	-	-	176,800	105,400
1994/95	49,922	4.319	138,876	13,163	5,947	-	-	-	-	193,100	79,500
1995/96	54,281	4.838	155,550	1,338	6,384	-	-	-	-	198,667	55,065
1996/97	60,795	4.710	151,229	nil	nil	-	-	-	-	501,495	114,778
1997/98	65,274	4.979	160,122	nil	nil	-	-	-	25,703	479,820	166,100
1998/99	66,648	4.947	159,088	nil	nil	-	-	-	45,293	404,917	180,634
1999/00	67,363	4.790	154,043	nil	nil	-	-	-	46,162	462,806	201,436
2000/01	64,958	3.814	122,632	nil	nil	1,307	5,921	-	53,148	437,694	203,753
2001/02	66,661	3.492	112,283	nil	nil	4,043	21,328	30,627	56,757	600,931	202,370
2002/03	66,809	3.345	107,544	nil	nil	10,841	28,329	50,984	68,198	420,293	248,692
2003/04	66,343	3.240	104,188	nil	nil	4,645	11,239	19,978	69,552	439,906	251,392

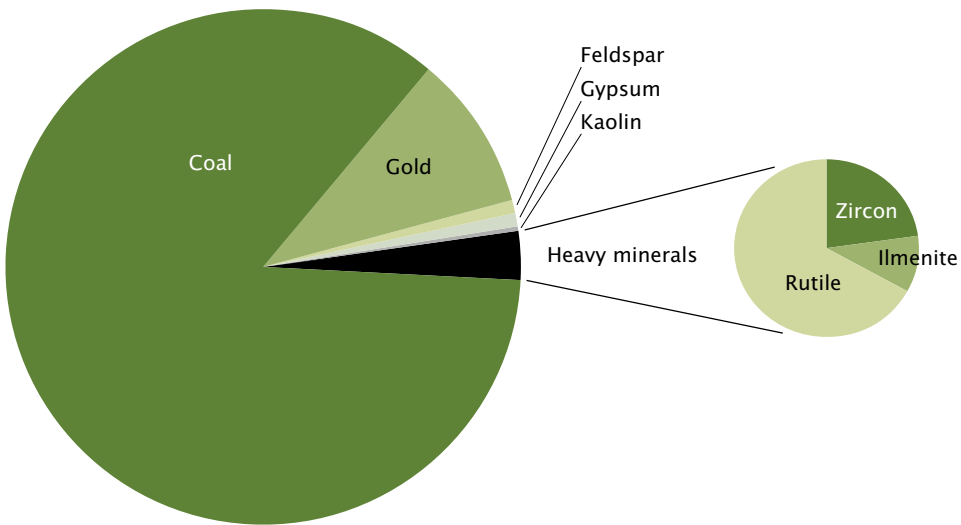
Source: DPI - statutory returns under the MRDA.

TABLE & GRAPH 4.7 Mineral Production Value: 2003/04

Mineral	Value (\$ million)
Coal	530.7
Gold	59.4
Feldspar	4.8
Gypsum	6.0
Kaolin	1.2
Ilmenite	1.9
Rutile	12.5
Zircon	4.2
<b>TOTAL</b>	<b>620.7</b>

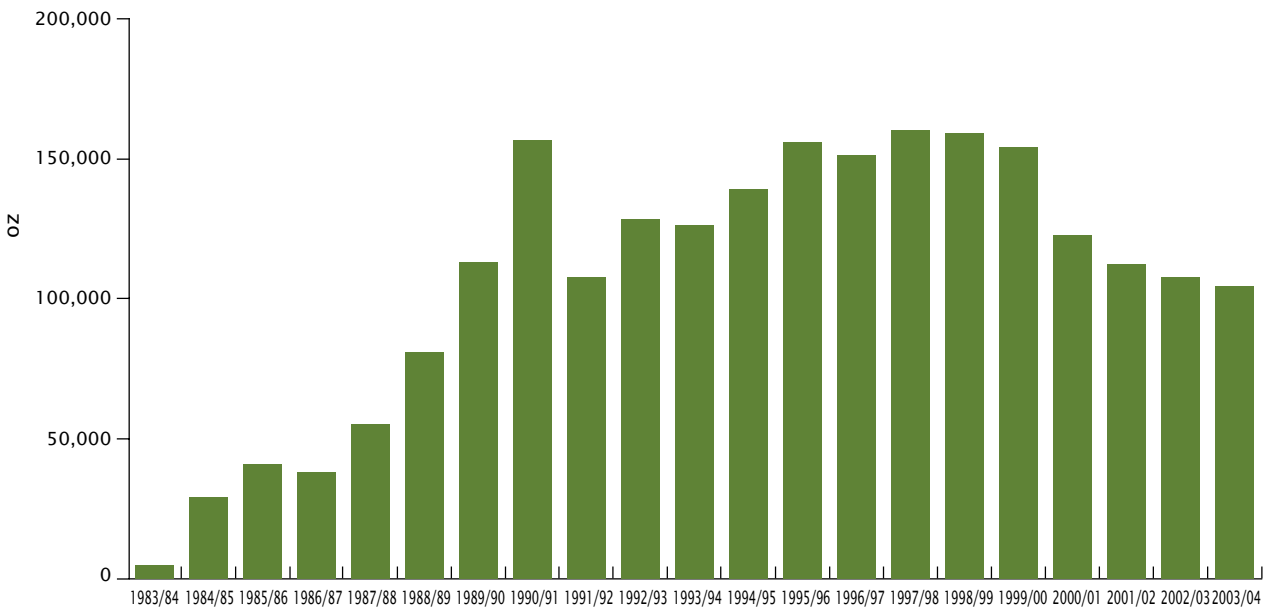


Source: DPI



Source: DPI

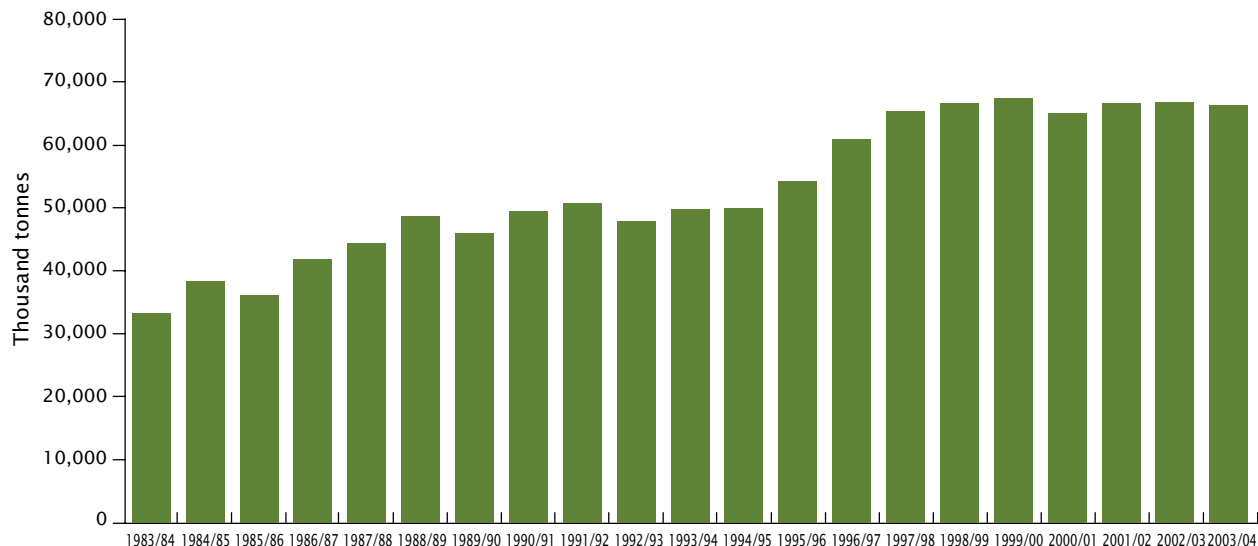
GRAPH 4.8 Gold Production: 1983/84 - 2003/04



Source: DPI

Since 1999/2000, gold production in Victoria has been in a declining trend, but is anticipated to increase with new production in 2004/05.

GRAPH 4.9 Brown Coal Production: 1983/84 – 2003/04



Source: DPI

TABLE 4.8 Gold Producers (Production more than 1kg): 2003/04

	Location	Licence	Production (kg)	Production (ozs)	Estimated Value
Stawell Gold Mines	Stawell	MIN 5260	2,993	96,232	\$54,852,240
Bendigo Mining Ltd	Bendigo	MIN 5344	183.6	5,905	\$3,365,850
Wanbana Pty Ltd	Dunolly	MIN 4803	36.2	1 164	\$663,480
Alliance Energy Limited	Maldon	MIN 5146	7.5	240	\$136,800
Boral Resources Vic Pty Ltd	Buninyong	MIN 4777	4.6	149	\$84,930
Perseverance Exploration Pty Ltd	Fosterville	MIN 5404	3.2	105	\$59,850
Rockcore Pty Ltd	Smiths Gully	MIN 4928 & MIN 4788	2.4	78	\$44,460
Lougoon DC	Eaglehawk	MIN 4618 & MIN 4693	2.4	76	\$43,320
Kinglake Resource Pty Ltd	Buninyong	MIN 4658	2.3	75	\$42,750
Hazav Pty Ltd	Harrierville	MIN 5379	1.8	59	\$33,630
<b>TOTAL</b>			<b>3,237</b>	<b>104,084</b>	<b>\$59,327,880</b>
<b>Other</b>					
		Licences >5 ha	0.6	20	\$11,400
		Licences <5 ha	2.6	84	\$47,880
<b>GRAND TOTAL</b>			<b>3,240</b>	<b>104,188</b>	<b>\$59,387,160</b>

Source: DPI – statutory returns under the MRDA.

Notes: Estimated value \$A570/oz

Gold production is dominated by one mine, with many smaller companies and individuals producing small amounts. The large part of Victoria's production is from Stawell Gold Mines Pty Ltd at Stawell. Other key producers in 2003/04 were Bendigo Gold Mining Ltd, Wanbana Pty Ltd and Alliance Energy Ltd.

TABLE 4.9 Brown Coal Production (thousand tonnes): 1982/83 – 2003/04

Year	Maddingley Brown Coal Co Bacchus Marsh	Alcoa Anglesea	SECV	Loy Yang	Yallourn	Hazelwood	Annual Total	Production Value* (000)
1982/83	83	1,210	33,415				34,708	-
1983/84	80	1,066	32,052				33,198	-
1984/85	89	1,205	37,085				38,379	-
1985/86	60	1,119	34,890				36,069	-
1986/87	43	1,272	40,491				41,806	-
1987/88	45	1,173	43,070				44,288	-
1988/89	47	1,253	47,353				48,653	-
1989/90	22	1,067	44,871				45,960	-
1990/91	40	1,179	48,169				49,388	-
1991/92	40	1,175	49,502				50,717	-
1992/93	36	1,084	46,778				47,898	-
1993/94	31	1,093	48,559				49,683	-
1994/95	43	1,162	48,717				49,922	-
1995/96	40	836	-	25,000	17,460	10,945	54,281	\$434,248
1996/97	39	1,005	-	27,808	17,083	14,860	60,795	\$486,360
1997/98	28	1,030	-	29,766	17,924	16,525	65,274	\$522,192
1998/99	22	1,091	-	30,510	17,350	17,675	66,648	\$533,184
1999/00	4	926	-	30,865	16,098	19,470	67,363	\$538,904
2000/01	11	963	-	28,686	16,234	19,063	64,958	\$519,664
2001/02	10	1,069	-	30,949	15,650	18,982	66,661	\$533,287
2002/03	15	1,051	-	29,017	17,515	19,210	66,809	\$534,472
2003/04	18	1,107	-	29,577	16,585	19,056	66,343	\$530,744

Source: DPI

Notes: \*estimated value (\$8/tonne)

Brown coal production is dominated by the electricity generation companies in the Latrobe Valley: Hazelwood Power Corporation, Loy Yang Power Ltd and Yallourn Energy Ltd. The largest producer is Loy Yang followed by Hazelwood and Yallourn.

The other major brown coal miner is Alcoa of Australia Ltd, which produces brown coal at Anglesea to generate electricity for its Point Henry aluminium smelter. The Maddingley Brown Coal company produces a very small amount of coal at Bacchus Marsh, mainly for fuel and soil conditioning.



# Extractive Industries

**Extractive industries provide the raw materials for building and construction, which vital to the State's development. The industry operates quarries that produce a range of hard rock, clay, sand and gravel.**

There are 848 operating quarries registered in Victoria. Five hundred and thirty six reported production in 2003/04 of 38.8 million tonnes. This is higher than the previous year's production of 37.5 million tonnes. This is possibly a reflection of improved reporting rather than an increased demand for the extractive materials.

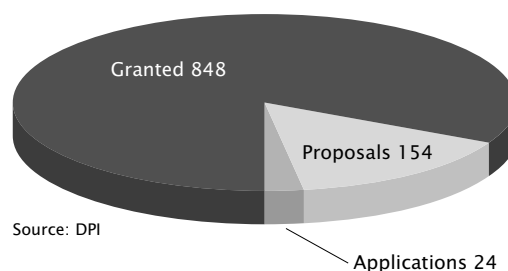
## Work authorities

TABLE & GRAPH 5.1 Status of Current Extractive Industry Work Authorities at 30 June 2004

	Proposal	Application	Granted
E I Search Permit	0	0	0
Work Authority	154	24	848
<b>TOTAL</b>	<b>154</b>	<b>24</b>	<b>848</b>

Source: DPI

Notes: A Search Permit and Work Authority are granted under the *Extractive Industries Development Act 1995*.



## Production

TABLE 5.2 Extractive Industries Production and Sales by Rock Type: 2003/04

Product Group	Product Type	Sales (tonnes)	Sales (\$A)
Hard Rock	Basalt	14,117,280	173,144,087
	Granite	2,895,292	40,246,322
	Dolerite	620,969	6,934,134
	Gneiss	13,456	157,942
	Hornfels	3,516,322	44,798,164
	Quartzite	62,279	550,768
	Rhyodacite	912,794	15,026,743
	Schist	199,294	2,523,134
	Sedimentary	1,403,580	9,790,613
	Slate	1,478	250,000
<b>Hard Rock total</b>		<b>23,742,744</b>	<b>293,421,907</b>
Soft Rock	Clay & Clay Shale	1,526,453	5,564,478
	Limestone	1,909,121	21,191,811
	Sand & Gravel	10,425,385	113,734,599
	Scoria	707,286	9,265,378
	Soil	71,914	713,212
	Tuff	448,046	2,390,989
<b>Soft Rock total</b>		<b>15,088,206</b>	<b>152,860,468</b>
<b>GRAND TOTAL</b>		<b>38,830,950</b>	<b>446,282,374</b>

Source: DPI - statutory returns under the *Extractive Industries Development Act 1995*.

Notes: \*An estimated value is used where no data is supplied by the operator.

### Definition of Extractive Industry under the *Extractive Industries Development Act 1995*

“Extractive industry” means the extraction or removal of stone from land if the primary purpose of the extraction or removal is the sale or commercial use of the stone or the use of the stone in construction, building, road or manufacturing works and includes:

- the treatment of stone or the manufacture of bricks, tiles, pottery or cement products on or adjacent to land from which the stone is extracted; and
- any place, operation or class of operation declared by the Minister, by notice published in the Government Gazette, to be an extractive industry for the purposes of this Act;

Only operations reported under the *Extractive Industries Development Act 1995* are included in these figures.

Stone production in 2003/04 showed a small increase to 38.8 million tonnes from 2002/03 production of 37.5 million tonnes. This is largely a reflection of reporting, rather than an increased demand for construction materials in 2003/04.

TABLE 5.3 Victorian Extractive Industries Production and Sales by Product: 2003/04

Product Group	Product Type	Sales (tonnes)	Sales (\$A)
Single size products	Aggregate	12,524,501	192,316,803
	Armour	178,432	1,986,903
<b>Single size products total</b>		<b>12,702,933</b>	<b>194,303,706</b>
Multi size products	Road base	5,794,114	69,674,592
	Road sub-base	6,551,944	46,478,173
	Fill	1,576,687	10,229,763
<b>Multi size products total</b>		<b>13,922,745</b>	<b>126,382,527</b>
Sand products	Concrete sand	4,328,200	55,418,500
	Foundry sand	40,863	384,379
	Fine sand	2,078,875	19,758,265
	Industrial	17,609	126,753
	Glass sand	418,094	4,180,940
<b>Sand products total</b>		<b>6,883,641</b>	<b>79,868,837</b>
Limestone products	Cement	673,763	4,716,341
	Agriculture	404,967	9,377,317
	Lime	121,815	2,084,670
<b>Limestone products total</b>		<b>1,200,545</b>	<b>16,178,328</b>
Clay products	Brick	1,309,882	4,980,907
	Firebricks	343	2,744
	Stoneware	3,680	55,200
	Tile/Pipe	34,432	151,592
<b>Clay products total</b>		<b>1,348,337</b>	<b>5,190,443</b>
Miscellaneous	Dimension stone	16,162	674,690
	Unspecified	2,756,586	23,683,843
<b>Miscellaneous total</b>		<b>2,772,748</b>	<b>24,358,533</b>
<b>GRAND TOTAL</b>		<b>38,830,950</b>	<b>446,282,374</b>

Source: DPI - Statutory returns under the *Extractive Industries Development Act 1995*.

Notes: Only operations reported under the *Extractive Industries Development Act 1995* are included in tables Table 5.1 and Table 5.2.

TABLE 5.4 Victorian Dimension Stone Production: 1994/95 – 2003/04

	1994/ 1995 (tonnes)	1995/ 1996 (tonnes)	1996/ 1997 (tonnes)	1997/ 1998 (tonnes)	1998/ 1999 (tonnes)	1999/ 2000 (tonnes)	2000/ 2001 (tonnes)	2001/ 2002 (tonnes)	2002/ 2003 (tonnes)	2003/ 2004 (tonnes)
Basalt	11,845	10,065	2,000	6,060	-	19,063	20,868	18,803	12,200	13,864
Granite	5,213	5,516	4,405	1,821	2,572	3,462	233	1,058	2,212	1,600
Sandstone	902	196	1,400	256	1,295	343	23	415	185	150
Slate	780	730	977	1,130	1,058	538	1,233	613	617	548
<b>TOTAL</b>	<b>18,740</b>	<b>16,507</b>	<b>8,782</b>	<b>9,267</b>	<b>4,925</b>	<b>23,406</b>	<b>22,357</b>	<b>20,889</b>	<b>15,214</b>	<b>16,162</b>

Source: Operators, DPI records and statutory returns under the Extractive Industries Development Act 1995.

Dimension stone production in 2003/04 showed a slight increase from the previous year. In view of the small size of the total dimension stone production in the State, this increase may be due to reporting.







# Governance

**DPI collected a total of \$25.1 million in royalties, rentals and administration fees in 2003/04 under the *Mineral Resources Development Act 1990*, the *Extractive Industries Development Act 1995* and the *Petroleum Act 1998*.**

Rehabilitation bonds held by DPI increased from \$95.6 million in 2002/03 to \$105.9 million in 2003/04, as a result of bond reviews and the issue of new licences.

Inspectors from DPI's Minerals and Petroleum Regulation Branch provide Statewide safety and health coverage of the mining, quarrying and upstream petroleum industries.

Minerals and Petroleum Regulation Branch Inspectors operate under the *following Acts*

- *Mineral Resources Development Act 1990*
- *Extractive Industries Development Act 1995*
- *Petroleum (Submerged Lands) Act 1967* (as Designated Authority under this Commonwealth Act)
- *Petroleum (Submerged Lands) Act 1982*
- *Petroleum Act 1998*
- *Pipelines Act 1967*
- *Occupational Health and Safety Act 1905* (for Offshore Petroleum sites)
- *Dangerous Goods Act 1985* (for offshore Petroleum sites and explosives on mining and extractive sites) and associated regulations.

The Inspectors, by agreement with the Victorian Workcover Authority, are also inspectors under the *Occupational Health and Safety Act 1985* for the Mining and Extractive Industries.

The Department issued 581 explosive use, four storage licences and eight Quarry Manager certificates in 2003/04. Five hundred and eighty one Directions and Notices were also issued.

There was a marked improvement in the health and safety performance of the Victorian mining and the extractive industries in 2003/04. The mining industry recorded 17 Lost Time Injuries and a Lost Time Injuries Frequency Rate of 4.9 in 2003/04, well below the previous two years' records of 27 and 8.0 respectively.

The extractive industry improved its Lost Time Injuries from 26 in 2002/03 to 22 in 2003/04. Corresponding Lost Time Injuries Frequency Rates fell from 8.5 to 7.7 in the same period.

## Regulation revenue and enforcement

TABLE & GRAPH 6.1 Minerals and Petroleum Regulation – Revenue: 2003/04

Type	Revenue (\$ million)
Administrations fees	0.46
Rentals	3.81
Royalty	20.88
<b>TOTAL</b>	<b>25.15</b>

Source: DPI

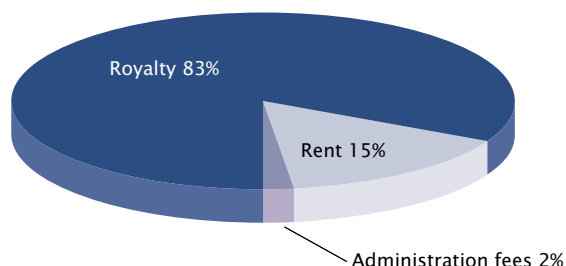


TABLE & GRAPH 6.2 Minerals and Petroleum Regulation – Royalty by Sector: 2003/04

Sector	Revenue (\$ million)
Mining	16.04
Extractive	3.26
Petroleum (Onshore)*	1.58
<b>TOTAL</b>	<b>20.88</b>

Source: DPI

Notes: Offshore petroleum in the Commonwealth production is subject to Resource Rent Tax, which was phased in from 1987-92.

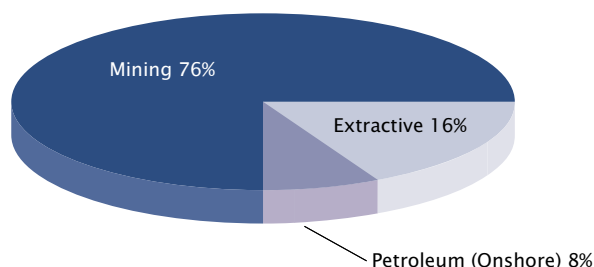


TABLE 6.3 Rehabilitation Bonds by Sector – Value (\$ million): June 1999 – June 2004

Date	Exploration	Mining	Extractive	<b>Total</b>
June 99	1.50	53.15	20.20	<b>74.86</b>
June 00	1.28	53.26	22.78	<b>77.32</b>
June 01	1.23	57.43	31.39	<b>90.06</b>
June 02	1.13	57.46	34.54	<b>93.13</b>
June 03	1.13	57.04	37.51	<b>95.69</b>
June 04	1.15	65.59	39.17	<b>105.91</b>

Source: DPI

TABLE 6.4 Rehabilitation Bond Reviews: 2003/04

Number of Bonds Reviewed	Result of Bond Review		
	Bond Increase	No Change	Bond Decrease
367	78	282	7

Source: DPI

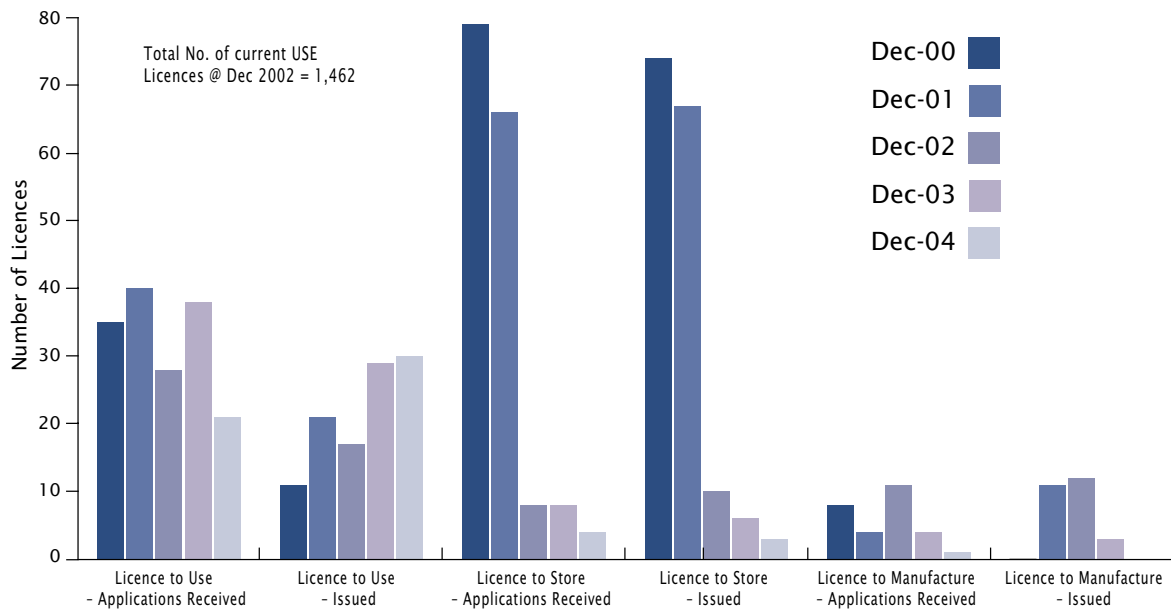
Notes: DPI has a program of regular bond review for active sites. Bonds are reviewed every one to six years depending on the risk associated with the operation.

TABLE 6.5 Mines and Quarries Explosive Licences Applications and Grants: 1999 – 2004

Licence Type	1999	2000	2001	2002	2003	2004
Licence to Use Application	12	35	40	28	38	21
Licence to Use Issued	25	11	21	17	29	30
Licence to Store Application	83	79	66	8	8	4
Licence to Store Issued	74	74	67	10	6	3
Licence to Manufacture Application	0	8	4	11	4	1
Licence to Manufacture Issued	0	0	11	12	3	0

Source: DPI

GRAPH 6.3 Explosives Licences Mines and Quarries: 2000 – 2004



Source: DPI

Notes: Figures indicate industry demands for various type of explosives licences.

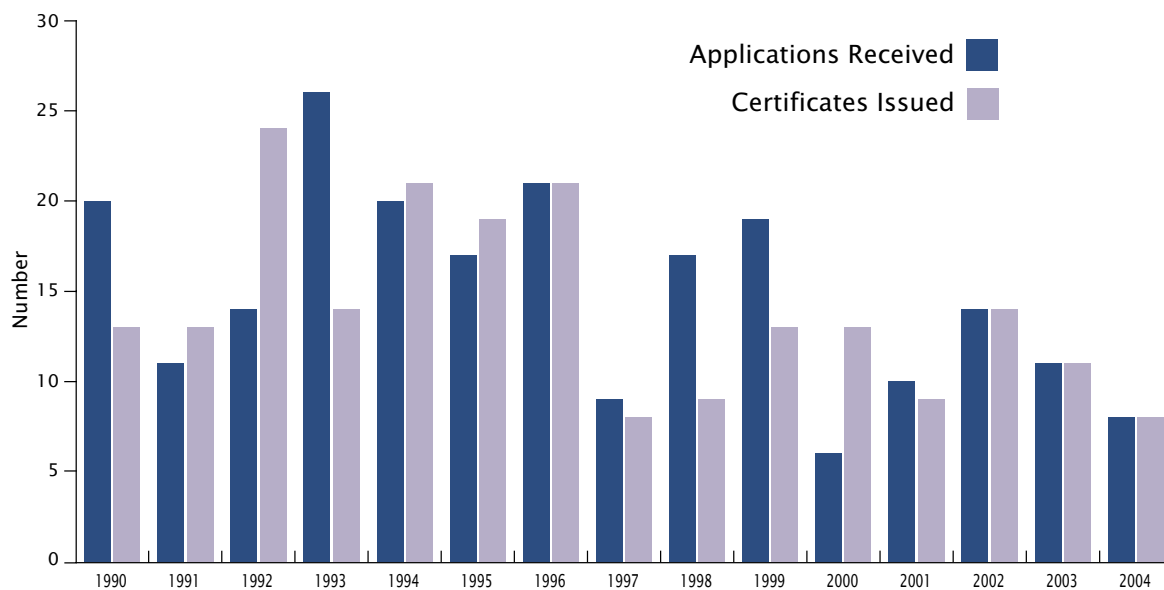
TABLE 6.6 Quarry Manager Certificates Applications and Grants: 1990 – 2004

Year Ending 31 December	Application	Issued
1990	20	13
1991	11	13
1992	14	24
1993	26	14
1994	20	21
1995	17	19
1996	21	21
1997	9	8
1998	17	9
1999	19	13
2000	6	13
2001	10	9
2002	14	14
2003	11	11
2004	8	8
<b>TOTAL</b>	<b>223</b>	<b>210</b>

Source: DPI



GRAPH 6.4 Quarry Managers Certificates issued under the *Extractive Industries Development Act 1995*



Source: DPI

TABLE 6.7 Enforcement 2004

Acts	Notices / Directions	Infringement Notices	Improvement Notices	Prohibition Notices
MRDA 1990	1	7	N/A	N/A
EIDA 1995	36	22	N/A	N/A
Petroleum Act 1998	-	N/A	2	N/A
PSLA 1967	-	N/A	N/A	N/A
PSLA 1982	-	N/A	N/A	N/A
OHS 1985	-	N/A	356	27
Dangerous Goods Act 1985	5	N/A	12	-
Pipelines Act 1967	-	N/A	N/A	N/A
<b>TOTAL</b>	<b>42</b>	<b>29</b>	<b>370</b>	<b>27</b>

Source: DPI

Notes: N/A: Not present in legislation.

Notices/Directions and Improvement Notices: Legal directions issued to an employer (operator) that require actions to be undertaken within a specified time.

Infringement Notices: Issued to persons that have committed an infringement against a relevant Act or Regulations. They include a financial penalty.

Prohibition Notices: Legal directions issued to an employer that prohibit an activity until that matters are remedied.

## Occupational Health and Safety

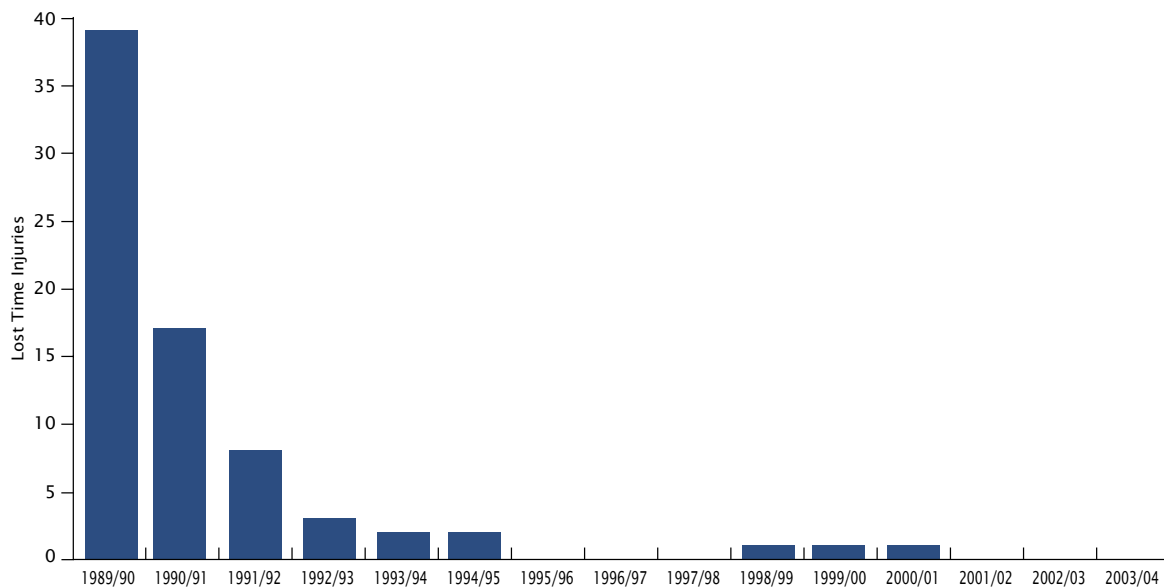
TABLE 6.8 Offshore Petroleum Safety Statistics: 1989/90 – 2003/04

Year	Lost Time Injuries
1989/90	39
1990/91	17
1991/92	8
1992/93	3
1993/94	2
1994/95	2
1995/96	0
1996/97	0
1997/98	0
1998/99	1
1999/00	1
2000/01	1
2001/02	0
2002/03	0
2003/04	0

Source: DPI



GRAPH 6.5 Offshore Petroleum Safety Statistics: 1989/90 – 2003/04



Source: DPI

TABLE 6.9 Mining Safety Statistics: 1993/94 – 2003/04

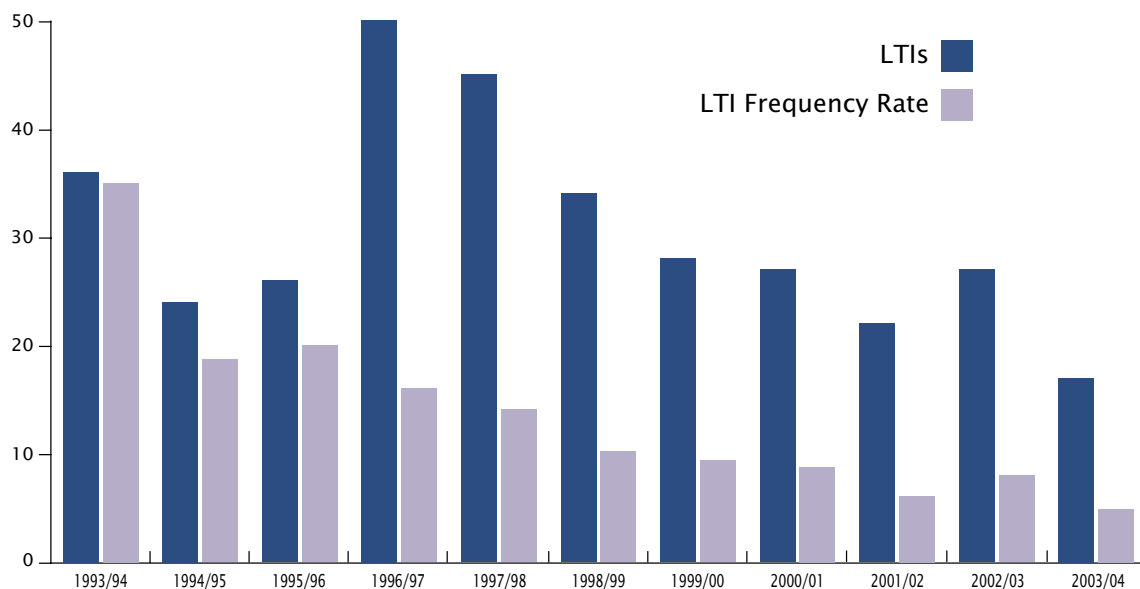
Operation	Lost Time Injuries (LTIs)	Employed*	Days Lost	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
1993/94	36	-	-	35.0	-	-	-	2
1994/95	24	-	-	18.7	-	-	-	0
1995/96	26	-	-	20.0	-	-	-	0
1996/97	50	-	-	16.0	-	-	-	0
1997/98	45	-	612	14.1	23.4	13.6	192.2	0
1998/99	34	1782	444	10.2	19.0	13.0	133.1	0
1999/00	28	1742	474	9.4	16.1	16.9	158.0	0
2000/01	27	2365	537	8.8	11.4	19.9	176.4	1
2001/02	22	2175	176	6.1	10.1	8.0	48.7	0
2002/03	27	1855	440	8.0	14.6	16.3	130.6	0
2003/04	17	2395	482	4.9	7.1	30.1	144.0	0

Source: DPI – returns made under the Mineral Resources Development Act 1990.

Notes: \* Annual average number of persons employed as reported.

The total number of Lost Time Injuries reported in the mining industry showed a significant decrease from 27 in 2002/03 to 17 in 2003/04. The Lost Time Injuries Frequency Rate has also decreased as a result. There were no fatalities in 2003/04.

GRAPH 6.6 Minerals Mining Safety Statistics: 1993/94 – 2003/04



Source: DPI

TABLE 6.10 Minerals Mining Safety Statistics by Sector: 2003/04

Sector**	Employed*	Hours Worked	Days Lost	LTI	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
Metalliferous open cut	158	158990	8	2	12.6	12.6	4	50.3	0
Metalliferous underground	511	746276	287	7	9.4	13.7	41	384.5	0
Non-Metalliferous***	228	246161	120	0	-	-	-	487.5	0
Coal	1257	2195436	67	7	3.2	5.6	9.6	30.6	0
Exploration	241	95084	1	1	10.5	4.1	1	10.5	0

Source: DPI - returns made under the MRDA.

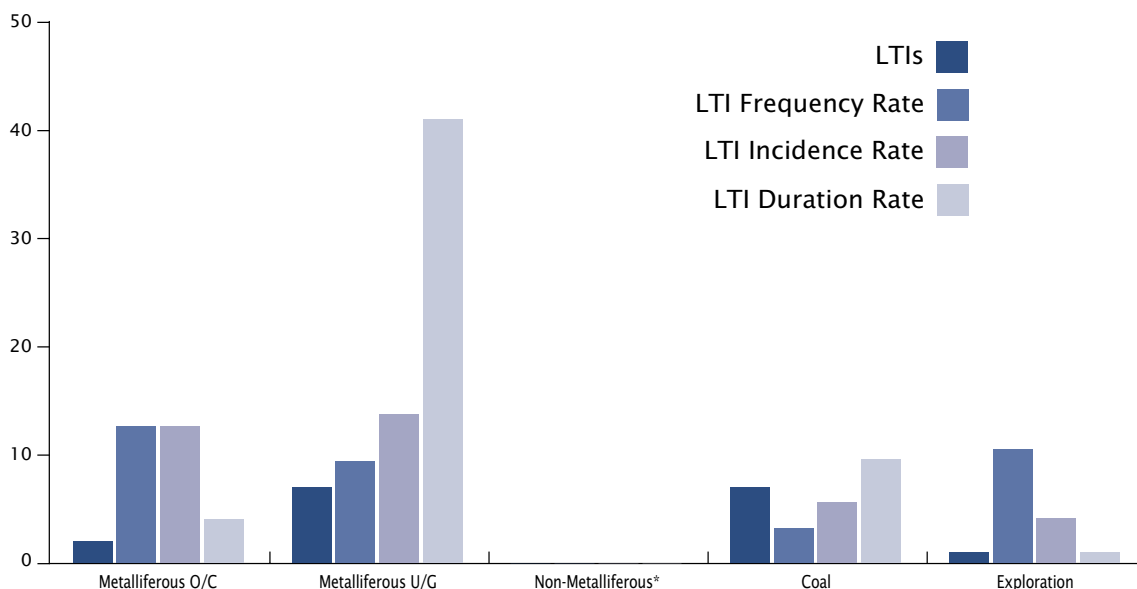
Notes: \* Annual average number of person employed as reported.

\*\* Based on returns for the six month period ending 30/6/04.

\*\*\* Includes mineral sands mines.

Metalliferous underground and coal mining were the main contributors to Lost Time Injury counts for the mining industry in 2003/04, followed by metalliferous opencut and non-metalliferous operations. The highest Lost Time Injury Frequency Rate for the year was recorded for metalliferous underground operations.

GRAPH 6.7 Minerals Mining Safety Statistics by Sector: 2003/04



Source: DPI - returns made under the MRDA.

Notes: \* Annual average number of person employed as reported.

Based on returns for the six month period ending 30/6/04.

\* Includes mineral sands mines.

TABLE 6.11 Extractive Industry Safety Statistics: 1993/94 – 2003/04

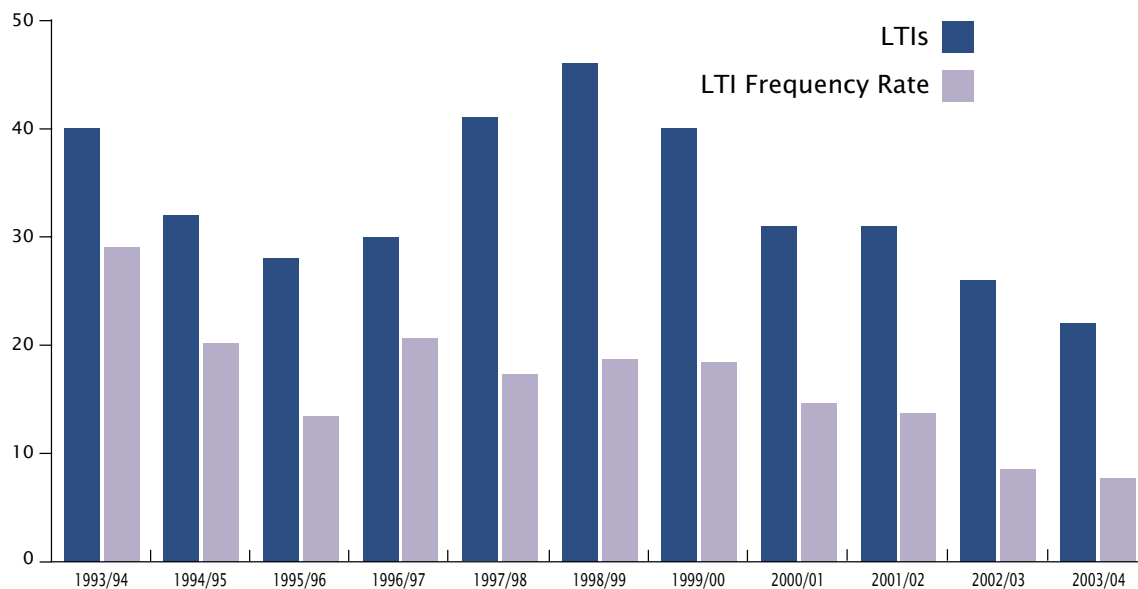
Operation	Lost Time Injuries (LTIs)	Employed*	Days Lost	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
1993/94	40	-	-	29.0	-	-	-	0
1994/95	32	-	-	20.2	-	-	-	0
1995/96	28	-	-	13.4	-	-	-	0
1996/97	30	-	-	20.6	-	-	-	0
1997/98	41	-	710	17.3	26.0	17.3	282.0	0
1998/99	46	1542	550	18.7	29.8	11.9	223.7	0
1999/00	40	1520	436	18.4	26.3	10.9	200.8	0
2000/01	31	1741	597	14.6	17.8	19.3	281.2	0
2001/02	31	1690	355	13.7	18.3	11.5	156.5	0
2002/03	26	2096	417	8.5	12.4	16.0	137.2	1
2003/04	22	2218	475	7.7	9.9	21.6	165.7	0

Source: DPI

\* Annual average number of person employed as reported.

The total number of Lost Time Injuries in the extractive industry fell to 22 in 2003/04 from previous year's figure of 26. The Lost Time Injury Frequency Rate has also decreased as a result. There were no fatalities in 2003/04.

GRAPH 6.8 Extractive Industry Safety Statistics: 1993/94 – 2003/04



Source: DPI



## Appendix A: Glossary

**ABS:** Australian Bureau of Statistics

**EIDA:** *Extractive Industries Development Act 1995*

**Employment:** Annual average of number of person employed as reported by title holders

**Lost Time Injuries (LTI):** Occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more

**Lost Time Injury Frequency Rate:** The number of occurrences of lost time injury for each one million hours worked

**Lost Time Injury Incidence Rate:** The number of lost time injuries per thousand employees

**Lost Time Injury Duration Rate:** The average days lost for every lost time injury

**MRDA:** *Mineral Resources Development Act 1990*

**OHS 1985:** *Occupational Health and Safety Act 1985*

**PSLA 1967:** *Petroleum (Submerged Lands) Act 1967 (Commonwealth)*

**PSLA 1982:** *Petroleum (Submerged Lands) Act 1982 (Victoria)*

**Severity Rate:** The number of days lost for each one million hours worked

**Work authority:** A title granted under the *Extractive Industries Development Act 1995*

## Appendix B: Abbreviations, symbols and conversions

**\$A/GJ** dollar (Australian) per gigajoule

**\$m** million dollars (Australian)

**\$US** dollar (United States)

**bbbl** barrel ( 42 US Gallons;158.987 L)

**bbbl/d** barrels per day

**Bm<sup>3</sup>** billion (10<sup>9</sup>) cubic metres

**Bscf** billion (10<sup>9</sup>) cubic feet (0.0283 Gm<sup>3</sup>)

**C+C** crude oil and condensate

**cond.** condensate

**GL** gigalitre (10<sup>9</sup> L)

**Gm<sup>3</sup>** billion (10<sup>9</sup>) cubic metres

**kL** kilolitre (10<sup>3</sup> L)

**L** litre

**LPG** Liquefied petroleum gas

**ML** megalitre (10<sup>6</sup> L)

**Mbbl** million barrel

**Mcf/d** Million cubic feet per day

**MIN** Mining licence granted under the *Mineral Resources Development Act 1990*

**Mm<sup>3</sup>** million cubic metres

**oz** Troy ounce (31.1 grams)

