



The **thinking** behind  
our everyday essentials

Victoria's Minerals, Petroleum and Extractive Industries  
2005/06 Statistical Review

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# 1. 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

## 2. Summary

### Petroleum

Gas production from the offshore Gippsland Basin increased again this year, while crude oil and condensate production is declining (12% during 2005/06), from the peak levels of the mid 1980s.

Gas and condensate production from the offshore Otway Basin increased by approximately 9% during 2005/06.

Eight seismic surveys were conducted in 2005/06 compared with ten in the previous year. Three 3D-surveys were acquired in the offshore Gippsland Basin, three 2D-surveys in the offshore Otway Basin, one 2D-survey in the onshore Otway and one 2D-survey in the onshore Gippsland Basin.

Sixteen exploration and appraisal wells were drilled in 2005/06, one less than in the previous year. The number of development wells drilled increased from the previous year, with a total of 19 wells this year.

Exploration expenditures (wells, seismic data acquisition and appraisal drilling) reached \$A144.2 million in 2005/06, \$A119 million of which was spent on exploration wells and appraisal drilling. \$A25.2 million was spent in seismic data acquisition.

### Minerals

Victorian mineral production continues to be dominated by brown coal and gold.

Brown coal production, predominantly from the Latrobe Valley for electricity generation, continued on an increasing trend in 2005/06 to 67.7 million tonnes from the previous year's production of 67.1 million tonnes.

Gold production showed a substantial increase to 203,352 ounces in 2005/06, valued at \$A142 million, representing over a 60% increase from the previous year's production of 123,308 ounces. This increase is due to Perseverance Corporation's Fosterville operation starting production in May 2005.

Gypsum, kaolin and feldspar are the other significant contributors to mineral production. Gypsum and kaolin both show a high degree of variability reflecting seasonal and market factors. Gypsum production, primarily for agricultural uses, has increased in 2005/06 to 416,294 cubic metres, valued at \$A4.99 million, reversing the drop recorded in the previous year's production of 346,522 cubic metres. In 2005/06 kaolin production showed a significant drop to 149,218 tonnes, valued at \$A0.8 million, with a declining trend since 2004/05. Feldspar production in Victoria commenced in 1997/98 by Unimin Australia Ltd at Beechworth and has been steadily increased reaching 75,683 tonnes, valued at \$4.9 million in 2004/05, but in 2005/06 production fell to 69,876 tonnes valued at \$A4.8 million.

Mineral sands (ilmenite, rutile and zircon) production in Victoria commenced in 2000/01 by Murray Basin Titanium Pty Ltd from the Wemen mine in northwest Victoria, increasing each year to 2003/04. The Wemen mine stopped production in January 2004. Production is expected from the Iluka Resources Douglas mine in 2006/07.

### Extractive Industry

Hard rock, clay, sand and gravel production was reported as 46.2 million tonnes this year, significantly higher than the previous year's production of 41.7 million tonnes, and the highest recorded, since data collection commenced under the *Extractive Industries Development Act 1995*.



## Governance

The Department of Primary Industries (DPI) collected a total of \$A32.4 million in the form of royalties, rentals and administration fees under the *Mineral Resources (Sustainable Development) Act* 1990, the *Extractive Industries Development Act* 1995, the *Petroleum (Submerged Lands) Act* 1967, the *Petroleum (Submerged Lands) Act* 1982 and the *Petroleum Act* 1998.

Rehabilitation bonds held by DPI increased from \$A115.5 million in 2004/05 to \$A118.5 million in 2005/06 as a result of bond reviews and the issue of new licences.

In 2005/06, DPI issued 57 licences to use explosives and 23 storage licences.

The Lost Time Injury Frequency Rate (LTIFR) for the total minerals sector was 8.3 in 2005/06, which is an increase compared to LTIFR of 6.4 in 2004/05. The average time lost for each lost time injury (Duration Rate), in the minerals sector reduced to 9 in 2005/06 from the previous year's figure of 12.7. The Severity Rate is measured by the average number of days lost per one million hours worked. The figure of 75 days lost for 2005/06 is a slight improvement on the 83 days lost for 2004/05.

### 3. Petroleum

Production of crude oil and condensate from the offshore Gippsland Basin averaged about 83,000 barrels per day (declining 12% during 2005/06). Production rates peaked in 1985–86 (450,000 barrels). Oil production from major fields has reached advanced stages of maturity and new oil discoveries are not anticipated to fully replace the drop in existing production levels. Crude oil production in Victoria is limited to the offshore Gippsland Basin.

Natural gas production levels increased again this year in response to new market demand in South Australia met via the Port Campbell–Adelaide SEAGas pipeline (completed in December 2004).

Gas from the Gippsland Basin currently accounts for over 95% of Victorian production and is dominated by the Marlin, Barracouta and Snapper Fields. Gas and condensate production from the onshore Otway Basin decreased and gas production from most of the onshore fields ceased in 2005/06. Condensate production decreased from 10 800 barrels in 2004/05 to 8518 barrels in 2005/06. A strong increase in gas production from the offshore Otway Basin was projected in 2004/05 and beyond as the offshore fields (Minerva and Casino gas Fields) were brought on stream. The first developed offshore gas field in the Otway Basin (Minerva Field, 12 km south of Port Campbell) was brought on stream by BHP Billiton and tied in to the SEAGas pipeline on April 2005. The second developed offshore gas field (Casino gas Field, 45 km south of the Port Campbell) was brought on stream by Santos Ltd and tied into the True Energy (Under Ground Storage) Iona gas pipeline on January 2006.

Seismic expenditure in 2005/06 was \$A25.2 million, comprised of nine surveys including three 3D–seismic surveys in offshore Gippsland Basin, one 2D–seismic survey in offshore Otway Basin, three 2D–seismic surveys in onshore Otway Basin and one 2D–seismic survey in onshore Gippsland Basin.

A total of sixteen petroleum exploration/appraisal wells were drilled in Victoria during 2005/06 with total expenditure of \$A119 million (Tables 3.3 and 3.5). During this year, nineteen development wells were drilled compared to fifteen wells drilled in 2004/05 (Table 3.7).

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

(1) Petroleum is:

- (a) any naturally occurring hydrocarbon (whether in a gaseous, liquid or solid state); or
- (b) any naturally occurring mixture of hydrocarbons (whether in a gaseous, liquid or solid state); or
- (c) 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 purpose of this Act:

- (a) 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
- (b) petroleum does not include any naturally occurring hydrocarbon, or mixture of hydrocarbons, within a deposit of coal or oil shale.

## 3.1 Petroleum Tenement Activities

### Acreage Release

The Commonwealth of Australia and the State of Victoria jointly released four petroleum exploration areas, one in the offshore Otway and three in the offshore Gippsland Basins. Concurrent with this release, Victoria also released three areas in the onshore Otway Basin.

These areas were released for exploration activities covering a six-year work program for offshore areas, and a five-year work program for onshore areas.

The offshore area in the Otway Basin was designated V06-1 and the three Offshore areas in the Gippsland Basin were designated V06-2, V06-3 and V06-4 in Offshore Gippsland Basin (Map 3.1).

### Commonwealth Area Awards

#### Exploration Permits:

The offshore area released in the Otway Basin (formally designated as V04-1) was awarded to Exoil Ltd, Gascorp Australia Ltd, Otway Pty Ltd and Southern Energy Pty Ltd as Petroleum Exploration Permit VIC/P61 on 8 February 2005.

The offshore area also released in the Otway Basin (formerly designated as V04-2) was awarded to Trident Energy Ltd as Petroleum Exploration Permit VIC/P62 on 13 September 2005.

#### Retention Leases:

The Petroleum Retention Lease VIC/RL1 covering the Mulloway oil Field in the offshore Gippsland Basin was renewed for five years on 14 September 2005.

The petroleum Retention Lease VIC/RL4 covering the Sunfish oil and gas Field in the offshore Gippsland Basin was renewed for five years on 6 April 2006.

#### Production Licences:

The offshore area covered by Petroleum Retention Lease VIC/RL2 was awarded to Esso Australia Resources Pty Ltd, Santos Offshore Pty Ltd and BHP Billiton Petroleum (Victoria) Pty Ltd as Petroleum Production Licence Vic/L25 on 17 July 2006.

### State Waters Area Awards

#### Exploration Permit:

The offshore area released in the Otway Basin (formerly designated as V04-19V) was awarded to Origin Energy Resources Ltd as Petroleum Exploration Permit Vic/P41(V) on 8 February 2005.

#### Retention Lease:

An application for a 15 year retention lease over an area of Petroleum Exploration Permit PEP157 in the onshore Gippsland Basin was received from Petro Tech Pty Ltd on 24 April 2006.

#### Production Licences:

The Naylor Field covered by Petroleum Production Licence PPL10 was partially transferred to CO2CRC Pilot Project Ltd as a new production licence, PPL13, in onshore Otway Basin on 7 February 2006.

**Interest Changes:**

- **VIC/L23**

A 1% interest was transferred from CalEnergy Gas (Australia) LTD to Origin Energy Resources Ltd.

- **VIC/L43**

All Benaris International Pty Ltd 12.7% interest was transferred to Benaris Exploration (Otway) Pty Ltd.

- **VIC/PL34**

A 5% interest was transferred from CalEnergy Gas (Australia) Ltd to Origin Energy Resources Ltd.

- **VIC/P34(V)**

A 5% interest was transferred from ValEnergy Gas (Australia) Ltd to Origin Energy.

- **VIC/PL36**

A 1% interest was transferred from CalEnergy Gas (Australia) LTD to Origin Energy Resources Ltd.

- **VIC/PL36(V)**

A 1% interest was transferred from CalEnergy Gas (Australia) LTD to Origin Energy Resources Ltd.

- **VIC/RL1 (V)**

A 5% interest was transferred from CalEnergy Gas (Australia) Ltd to Origin Energy Resources Ltd.

- **VIC/P56**

All Nexus Energy Australia NL 50% interest was transferred to Korea National Oil Corporation (30%) and SCGAU Pty Ltd (20%).

- **VIC/P49**

All Nexus Energy Australia NL 50% interest was transferred to Korea National Oil Corporation (30%) and SCGAU Pty Ltd (20%).

- **VIC/RL10, VIC/RL9 and VIC/RL6**

A 12.5% interest was transferred from Anzon Australia Ltd to Beach Petroleum.

## 3.2 Exploration and Development

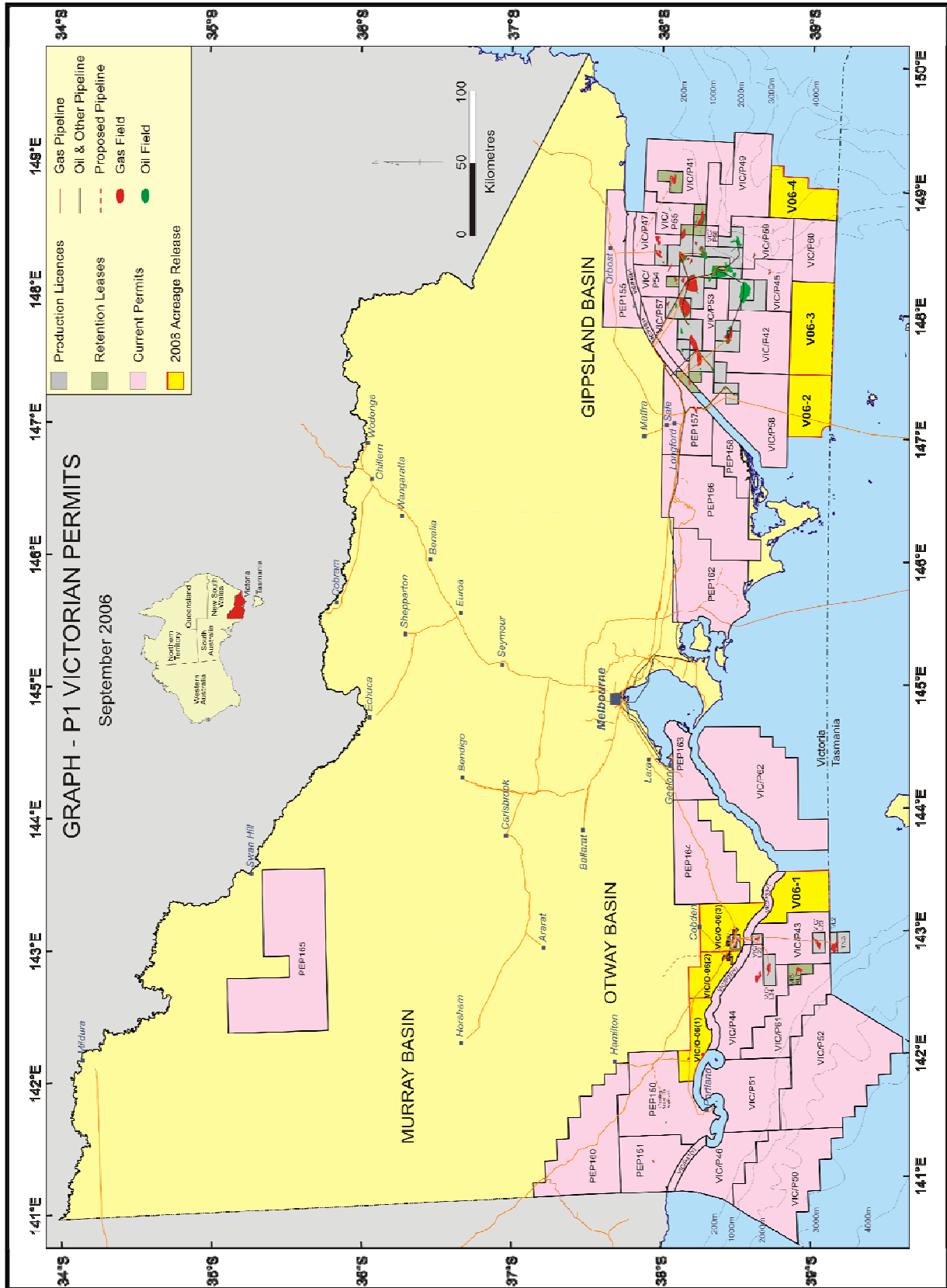
Table 3.1 Seismic Surveys: 2005/06

3D-Seismic							
Region	Basin	Survey Name	Permit	Operator	Start	Area (km)	Expenditure (\$m)
Offshore	Gippsland	G06A	VIC/L13,14	Esso	1/05/2006	376.6	17.3
Offshore	Gippsland	G06A	VIC/P-53	Esso	1/05/2006	87.7	4.1
Offshore	Gippsland	G06A	VIC/P-42	Esso /Apache	1/05/2006	55.0	2.5
<b>Total</b>						<b>519.3</b>	<b>23.9</b>
2D-Seismic							
Region	Basin	Survey Name	Permit	Operator	Start	Length (km)	Expenditure (\$m)
Offshore	Otway	OEP06A	VIC/P-50	Essential Pet.	23/06/2006	345.0	0.6
Onshore	Gippsland	GKG05	VIC/PEP-162	Karoo Gas	1/10/2005	255.5	0.1
Onshore	Otway	OCRC06	PPL11,12	CO2CRC	2/02/2006	2.0	0.03
Onshore	Otway	OLO06B	PEP-163	Lakes OIL	4/06/2006	25.0	0.3
Onshore	Otway	OLO06A	PEP-164	Lakes OIL	8/06/2006	25.0	0.3
<b>Total</b>						<b>652.5</b>	<b>1.3</b>

Source: DPI

The above figures are collated from reports forwarded to the Department of Primary Industries by the permit holder under the provisions of the *Petroleum Act* 1998.

Map 3.1 Victorian Petroleum Permits: September 2006



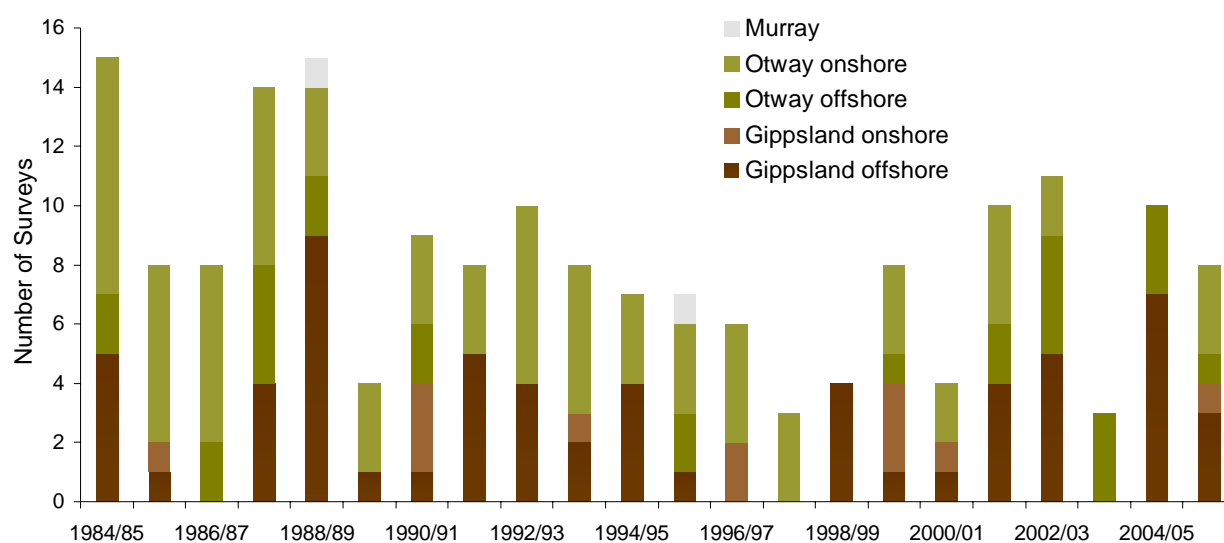
Source: DPI

Table 3.2 Seismic Surveys (by basin): 1984/85 – 2005/06

Year	Offshore Basin		Onshore Basin			Total Number of Surveys
	Gippsland	Otway	Gippsland	Otway	Murray	
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
1999/00	1	1	3	3		8
2000/01	1	0	1	2		4
2001/02	4	2	0	4		10
2002/03	5	4	0	2		11
2003/04	0	3	0	0		3
2004/05	7	3	0	0		10
2005/06	3	1	1	3		8
<b>Total</b>	<b>116</b>	<b>51</b>	<b>45</b>	<b>136</b>	<b>2</b>	<b>350</b>

Source: DPI

Graph 3.1 Seismic Surveys (by basin): 1984/85 – 2005/06



Source: DPI

**Table 3.3 Exploration / Appraisal Wells: 2005/06**

Region	Basin	Well Name	Start Date	Operator	Tenement	Status	Total Depth (m) MKB
Offshore	Otway	Henry-1	10-Jul-05	Santos	Vic/P 44	Gas Discovery	2032
Onshore	Otway	Bellarine-1	23-Jul-05	Lakes Oil	PEP-163	P + A	2139
Onshore	Otway	Peterborough-1	16-Aug-05	Origin Energy	PEP-154	P + A	2075
Onshore	Otway	Chilres Cove-1	19-Sep-05	Lakes Oil	PEP-155	P + A	309
Onshore	Otway	Pritchard-1	23-Mar-06	Essential Pet.	PEP-151	P + A	2543
Onshore	Gippsland	Banjo-1	06-Dec-05	Lakes Oil	PEP-155	P + A	282
Onshore	Gippsland	Patrobus-1	07-Dec-05	Lakes Oil	PEP-155	P + A	600
Onshore	Gippsland	Boundary Ck-2	10-Oct-05	Lakes Oil	PEP-157	P + A Gas Shows	2341
Onshore	Gippsland	Loy Yang-2	24-Feb-06	Lakes Oil	PEP-158	P + A Gas Shows	1443
Offshore	Gippsland	Basker-2	14-Aug-05	ANZON	Vic/RL-6	Gas/Oil Discovery	3414
Offshore	Gippsland	North Wirrah-1	04-Sep-05	Esso	Vic/L2	P + A	2800
Offshore	Gippsland	Gilbert-1	02-Oct-05	Bass Strait Oil	Vic/P-47	P + A	910
Offshore	Gippsland	Maclean-1	14-Oct-05	Bass Strait Oil	Vic/P-47	P + A	771
Offshore	Gippsland	Fur Seal-1	24-Oct-05	Apache	Vic/P-54	P + A	2636
Offshore	Gippsland	Culverin-1	15-Dec-05	Nexus	Vic/P-56	P + A Oil Show	3755
Offshore	Gippsland	Manta 2A	23-Jan-06	ANZON	Vic/RL6	Oil/Gas Discovery	3113

Source: DPI

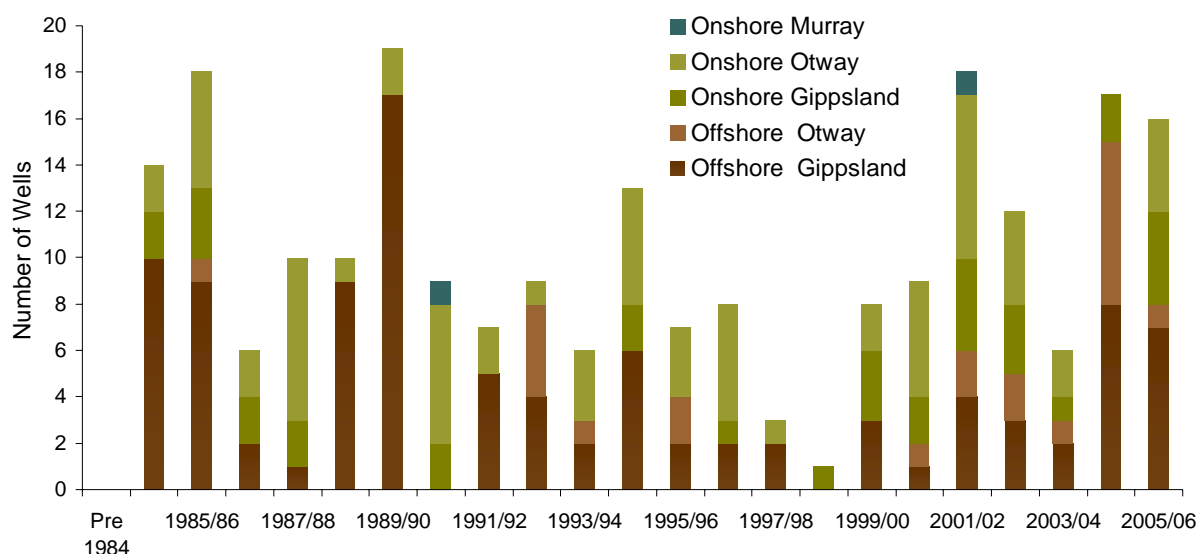


Table 3.4 Historical Petroleum Exploration/Appraisal Wells: 1984/85 – 2005/06

Year	Offshore		Onshore			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
2004/05	8	7	2	0	0	17	43,680
2005/06	7	1	4	4	0	16	31,163
<b>Total</b>	<b>99</b>	<b>22</b>	<b>34</b>	<b>69</b>	<b>2</b>	<b>607</b>	<b>459,373</b>

Source: DPI

Graph 3.2 Exploration Wells: 1984/85 – 2005/06



Source: DPI

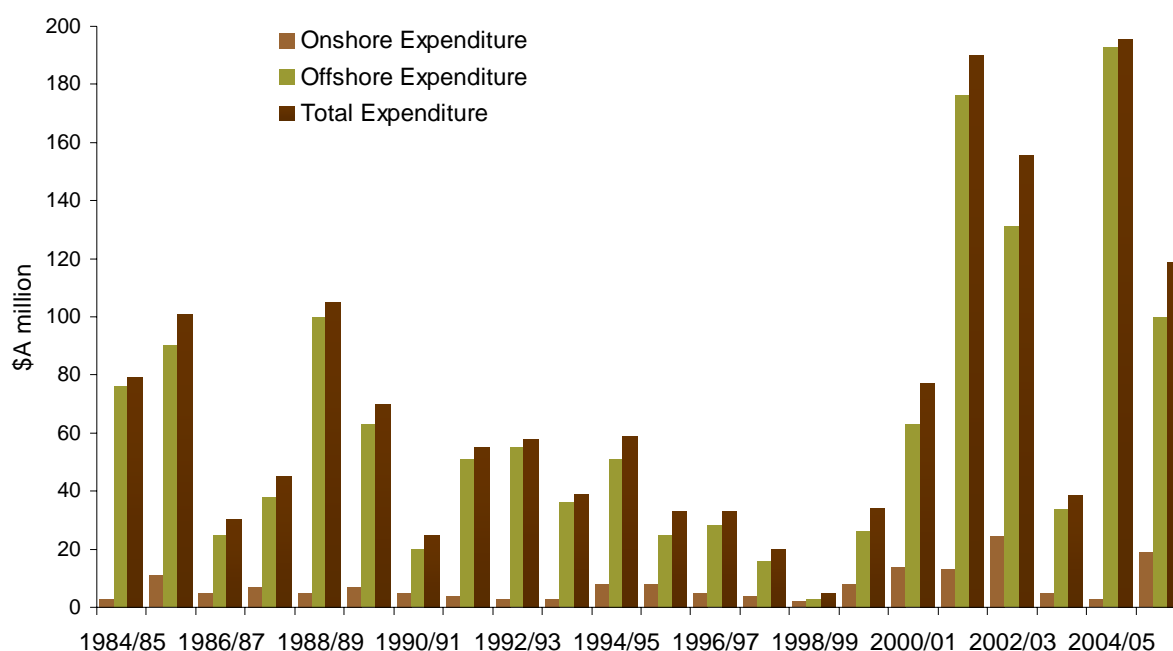
**Table 3.5 Petroleum Exploration/Appraisal Drilling Expenditure: 1984/85 – 2005/06**

Year	Onshore Expenditure (\$A million)	Offshore Expenditure (\$A million)	Total Expenditure (\$A 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
2004/05	3	193	195
2005/06	19	100	119

Source: DPI

Over the last two decades annual petroleum expenditure has fluctuated significantly, with peaks of over \$A100 million per annum in the 1980s. The average annual expenditure in the 1990s was \$A39 million. Since 2000/01 the average annual expenditure has increased to \$A129 million.

Petroleum exploration (wells and seismic acquisition) and appraisal drilling expenditure in Victoria in 2005/06 was A\$144.2 million (A\$119 million for drilling and A\$25.2 million in seismic data acquisition). During the year a total of 16 exploration wells have been drilled, of which 8 wells were in the onshore Otway and Gippsland Basins, 7 in the offshore Gippsland Basin and 1 in the offshore Otway Basin. Total seismic data acquisition comprised 1019 km<sup>2</sup> 3D-seismic in the offshore Gippsland Basin, 345 line km 2D-seismic in the offshore Otway Basin, 102 line km 2D-seismic in the onshore Otway Basin (Port Campbell region) and 255.5 line km 2D-seismic in the onshore Gippsland Basin.

**Graph 3.3 Petroleum Exploration/Appraisal Expenditure: 1984/85 – 2005/06**

Source: DPI

**Table 3.6 Development Wells (Offshore): July 2005 – June 2006**

Region	Well	Field	Spud Date	Operator	Licence	Total Depth (m)
Offshore Gippsland	Bream A10A (Loc A)	BREAM	1-May-05	ESSO	VIC/L13	2,718
Offshore Gippsland	Bream A5A (Loc B)	BREAM	10-May-05	ESSO	VIC/L13	2,810
Offshore Gippsland	Bream B17 (Loc X)	BREAM	7-Jul-05	ESSO	VIC/L14	2,847
Offshore Gippsland	Bream A23A (Loc C)	BREAM	4-Jul-05	ESSO	VIC/L13	3,302
Offshore Gippsland	Bream B16 (Loc Y)	BREAM	5-Jul-05	ESSO	VIC/L14	2,641
Offshore Gippsland	Bream A22A (Loc D)	BREAM	1-Aug-05	ESSO	VIC/L13	3,398
Offshore Gippsland	Bream A14A (Loc H)	BREAM	31-Aug-05	ESSO	VIC/L13	1,987
Offshore Gippsland	Bream A20A (Loc F)	BREAM	14-Oct-05	ESSO	VIC/L13	2,026
Offshore Gippsland	Bream A1A (Loc P)	BREAM	30-Oct-05	ESSO	VIC/L13	2,294
Offshore Gippsland	Bream A19A (Loc G)	BREAM	23-Nov-05	ESSO	VIC/L13	2,804
Offshore Gippsland	Bream A6A (Loc N)	BREAM	31-Jan-06	ESSO	VIC/L13	3,256
Offshore Gippsland	Bream A9A (Loc E)	BREAM	26-Feb-06	ESSO	VIC/L13	2,283
Offshore Gippsland	Baker 5	BASKER	26-Feb-06	ANZON	VIC/L26	2,283
Offshore Gippsland	Baker 3	BASKER	2-Apr-06	ANZON	VIC/L26	4,131
Offshore Gippsland	Baker 4	BASKER	2-May-06	ANZON	VIC/L26	3,366
Offshore Gippsland	WestKingfish 18A (Loc.A)	WEST-KINGFISH	24-Apr-06	ESSO	VIC/L7	2,709
Offshore Gippsland	WestKingfish 20A (Loc.D)	WEST-KINGFISH	20-Apr-05	ESSO	VIC/L7	2,710
Offshore Gippsland	WestKingfish 19A (Loc.E)	WEST-KINGFISH	1-Jun-06	ESSO	VIC/L7	2,682
Offshore Gippsland	WestKingfish 31A (Loc.G)	WEST-KINGFISH	20-Jun-06	ESSO	VIC/L8	2,363
<b>Total</b>						<b>52,610</b>

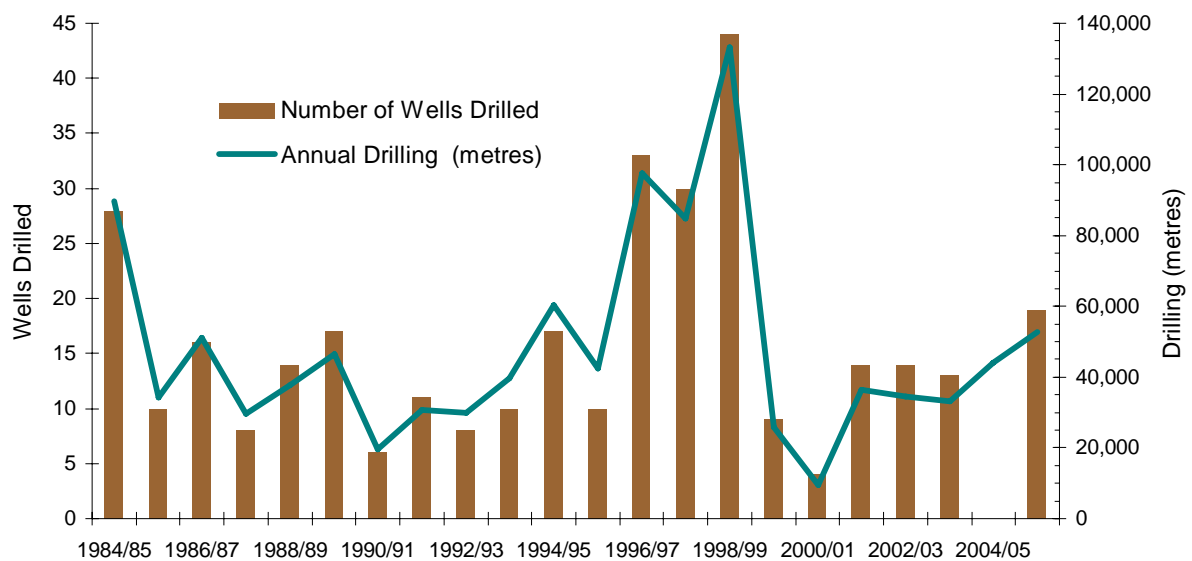
Source: DPI

**Table 3.7 Development Wells: 1984/85 – 2005/06**

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
2004/05	15*	43,966
2005/06	19	52,610
<b>Total</b>	<b>834</b>	<b>1,064,055</b>

Source: DPI

\* Including the Yolla-3 and Yolla-4 wells in Tasmanian waters.

**Graph 3.4 Development Wells: 1984/85 – 2005/06**

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.

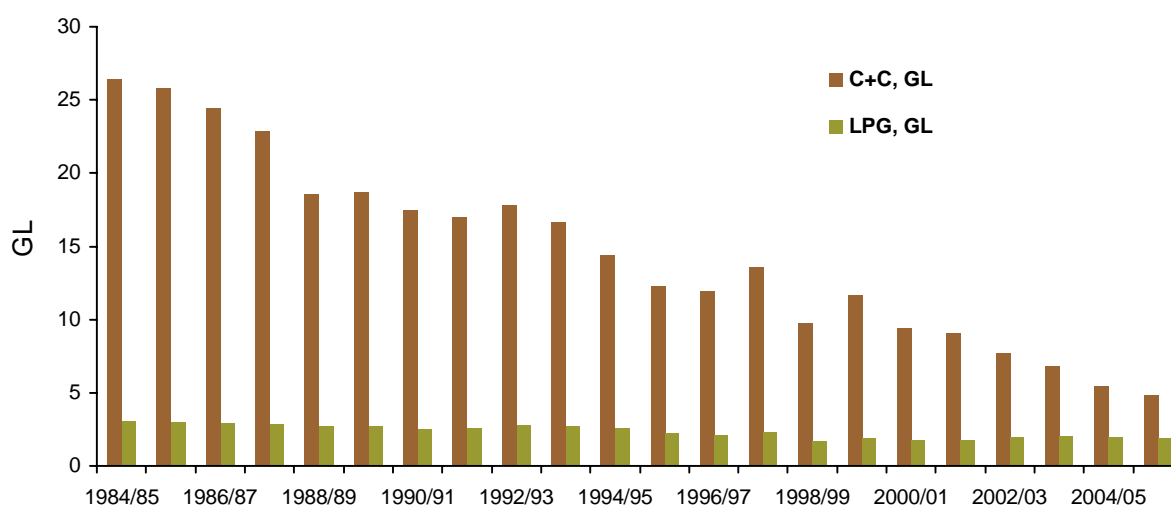
### 3.3 Production and Revenue

**Table 3.8 Annual Gippsland Basin Petroleum Production: 1968 – 2005/06**

Year	Bass Strait Annual Petroleum Production		
	C+C, GL	LPG, GL	Gas, Gm <sup>3</sup>
Prior 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	7.67
2004/05	5.46	1.98	7.93
2005/06	4.81	1.92	7.20
<b>Total</b>	<b>612.53</b>	<b>86.02</b>	<b>190.49</b>

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

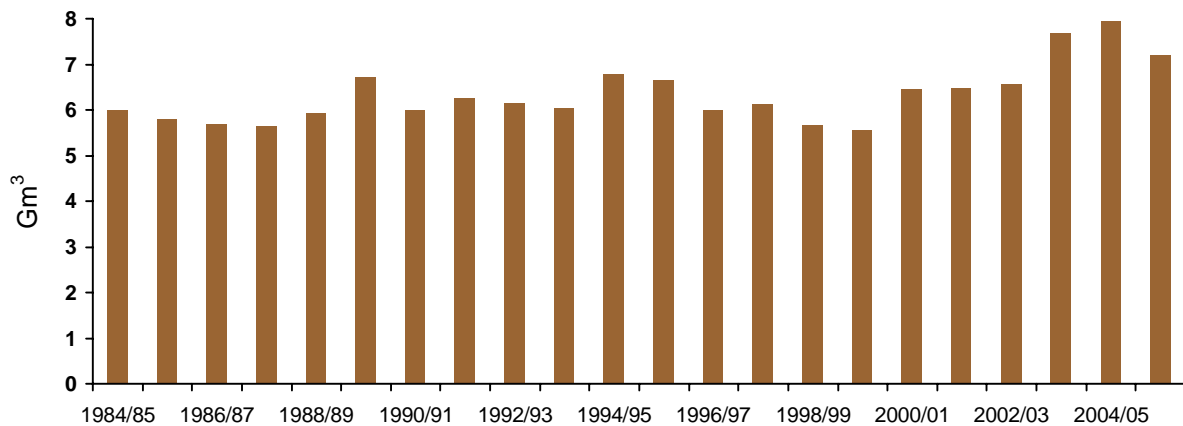
**Graph 3.5 Gippsland Basin Historical Petroleum Production (excl. gas): 1984/85 – 2005/06**



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

**Graph 3.6 Gippsland Basin Historical Gas Production: 1984/85 – 2005/06**

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

Notes: 1998/99 – Longford gas plant incident.

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

**Table 3.9 Gross Gippsland Basin Petroleum Production – Esso/BHP Billiton Fields: 2004/05 – 2005/06**

ESSO / BHP Billiton Fields	2004/2005			2005/2006		
	C+C, GL	LPG, GL	Gas, Gm <sup>3</sup>	C+C, GL	LPG, GL	Gas, Gm <sup>3</sup>
Barracouta	0.069	0.145	0.800	0.073	0.158	0.885
Blackback	0.042	0.007	0.020	0.032	0.006	0.614
Bream	0.698	0.314	1.056	0.680	0.304	0.919
Cobia	0.305	0.019	0.003	0.282	0.018	0.003
Dolphin	0.052	0.004	0.002	0.084	0.006	0.003
Flounder	0.478	0.219	0.506	0.405	0.241	0.488
Fortescue	0.212	0.014	0.002	0.179	0.011	0.002
Halibut	0.45	0.027	0.006	0.308	0.019	0.005
Kingfish	0.344	0.031	0.016	0.304	0.029	0.014
Mackerel	0.143	0.019	0.003	0.131	0.017	0.003
Marlin	0.424	0.588	2.284	0.458	0.651	2.359
Moonfish	0.053	0.002	0.011	0.042	0.002	0.009
Perch	0.027	0.000	0.001	0.015	0.000	0.000
Seahorse	0.018	0.001	0.000	0.128	0.022	0.015
Snapper	0.338	0.381	2.620	0.249	0.281	1.855
S. Mackerel	0	0.000	0.000	0.000	0.000	0.000
Tarwhine	0.054	0.017	0.008	0.040	0.014	0.006
Tuna	0.601	0.073	0.166	0.503	0.050	0.011
Turrum	0.001	0.000	0.000	0.041	0.004	0.012
W. Kingfish	0.411	0.045	0.019	0.286	0.028	0.012
W. Tuna	0.737	0.071	0.058	0.572	0.056	0.053
<b>TOTAL</b>	<b>5.457</b>	<b>1.977</b>	<b>7.581</b>	<b>4.812</b>	<b>1.917</b>	<b>7.268</b>

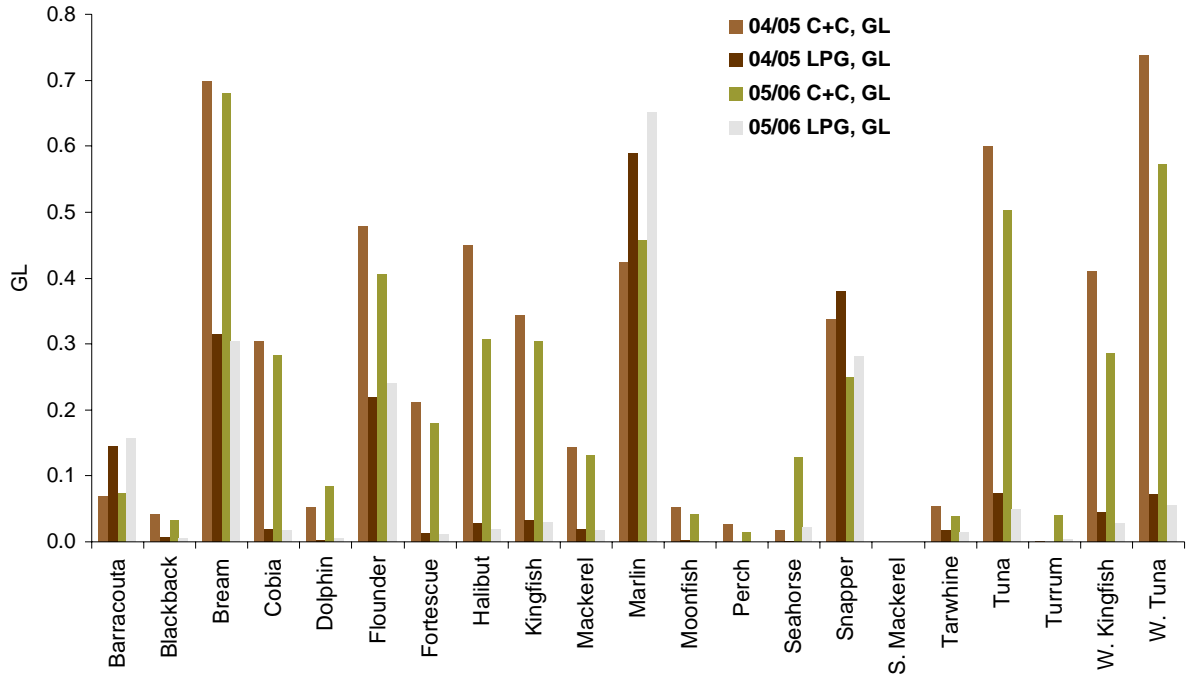
Source: Esso/BHP Billiton

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

The major oil and condensate producers in 2005/06 were W. Kingfish, Snapper, Kingfish, Marlin, Bream, West Tuna and Halibut.

These seven 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 2005/06.

**Graph 3.7 Gross Gippsland Petroleum Production (excluding gas) – Esso/BHP Billiton Fields: 2004/05 – 2005/06**

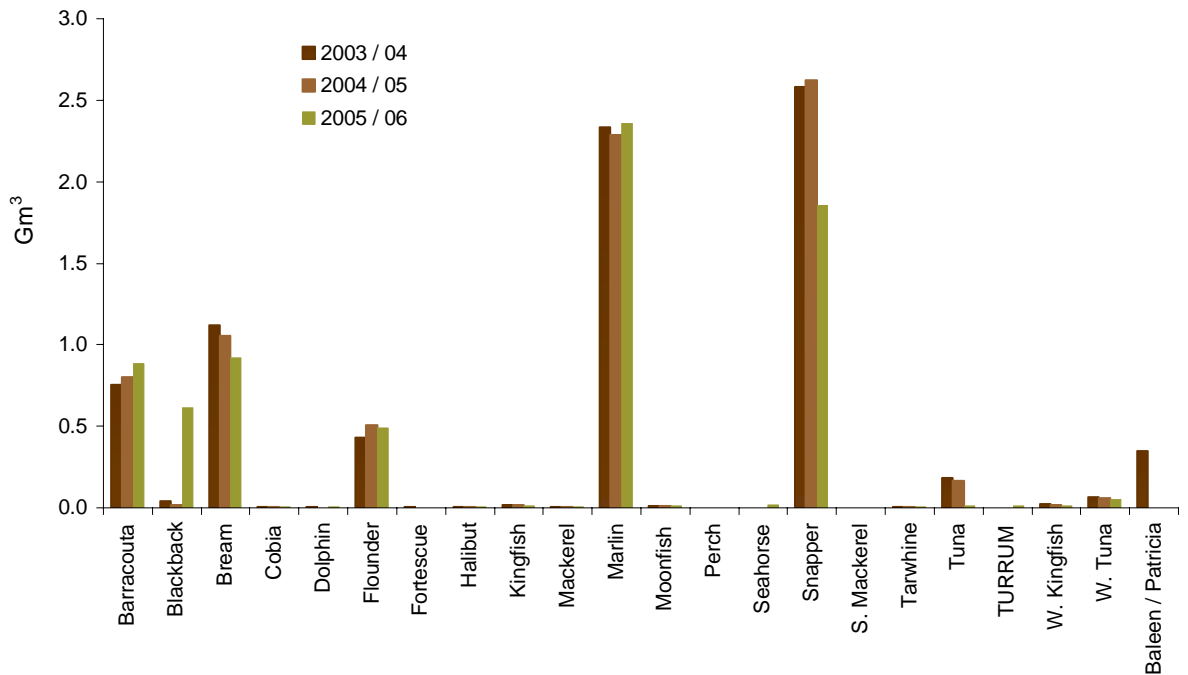


Source: Esso/BHP Billiton

Notes: In general, the Gippsland Basin's crude production is declining.

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

**Graph 3.8 Gross Gippsland Gas Production – Esso/BHP Billiton Fields: 2003/04 – 2005/06**



Source: Esso/BHP Billiton

Notes: The main gas producing fields in the Gippsland Basin having large gas-caps are Barracouta, Marlin, Snapper, Bream and Flounder. Gas production from the remaining fields in the basin is categorised as associated gas (solution gas).

**Table 3.10a Gippsland Basin Cumulative Production and Remaining Reserves - ESSO / BHP Billiton**

Year	Initial Recoverable Reserves			Cumulative Production			Remaining Reserves		
	C+C, GL	LPG, GL	Gas, Gm <sup>3</sup>	C+C, GL	LPG, GL	Gas, Gm <sup>3</sup>	C+C, GL	LPG, GL	Gas, Gm <sup>3</sup>
1982	498.00	88.20	220.90	246.00	28.10	38.90	252.00	60.10	182.00
1983	499.10	81.70	224.20	266.30	31.10	44.90	232.80	50.60	179.30
1984	502.60	81.40	212.90	290.20	34.30	51.20	212.40	47.10	161.70
1985	520.40	82.30	213.60	316.60	37.30	57.20	203.80	45.00	156.40
1986	520.40	82.30	213.60	342.38	40.27	62.99	178.02	42.03	150.61
1987	549.70	89.10	227.50	366.82	43.15	68.68	182.88	45.95	158.82
1988	566.20	91.70	232.40	389.69	45.98	74.33	176.51	45.72	158.07
1989	579.50	95.90	247.70	408.30	48.66	80.24	171.20	47.24	167.46
1990	579.10	96.20	250.20	426.98	51.35	86.95	152.12	44.85	163.25
1991	580.00	96.40	250.50	444.46	53.85	92.96	135.54	42.55	157.54
1992	581.80	96.40	250.30	461.43	56.42	99.22	120.37	39.98	151.08
1993	585.20	96.20	250.50	479.23	59.16	105.36	105.97	37.04	145.14
1994	608.60	98.30	252.70	495.83	61.82	111.41	112.77	36.48	141.29
1995	620.20	99.30	253.50	510.18	64.38	118.18	110.02	34.92	135.32
1996	632.60	100.10	255.60	522.44	66.63	124.83	110.16	33.47	130.77
1997	640.60	101.10	261.50	534.37	68.75	130.84	106.23	32.35	130.66
1998	647.60	105.30	272.30	547.93	71.04	136.96	99.67	34.26	135.34
1999	647.60	105.30	272.30	557.69	72.67	142.60	89.91	32.63	129.70
2000	647.60	105.30	272.30	569.29	74.55	148.15	78.31	30.75	124.15
2001	647.60	105.30	272.30	578.66	76.31	154.62	68.94	28.99	117.68
2002	647.60	105.30	272.30	587.72	78.11	161.11	59.88	27.19	111.19
2003	647.60	105.30	272.30	595.43	80.08	167.76	52.17	25.22	104.54
2004	647.60	105.30	272.30	602.26	82.12	175.69	45.34	23.18	96.61
2005	647.60	105.30	272.30	607.72	84.10	183.62	39.88	21.20	88.68
2006	656.40	113.60	306.70	610.60	86.00	186.60	45.80	27.60	117.80

Source: Esso - BHP

Note: The estimated Bass Strait oil, condensate, LPG and gas original reserves have all increased since 1982, with the discovery of some new reserves in existing and new fields. However, this increase in the original reserves has been modest, with an increase of 2.4% for crude oil and condensate, 11% for LPG and about 15% for gas (compared with the 1997 reserves figures).

**Table 3.10b Gippsland Basin Cumulative Production and Remaining Reserves - Santos Ltd**

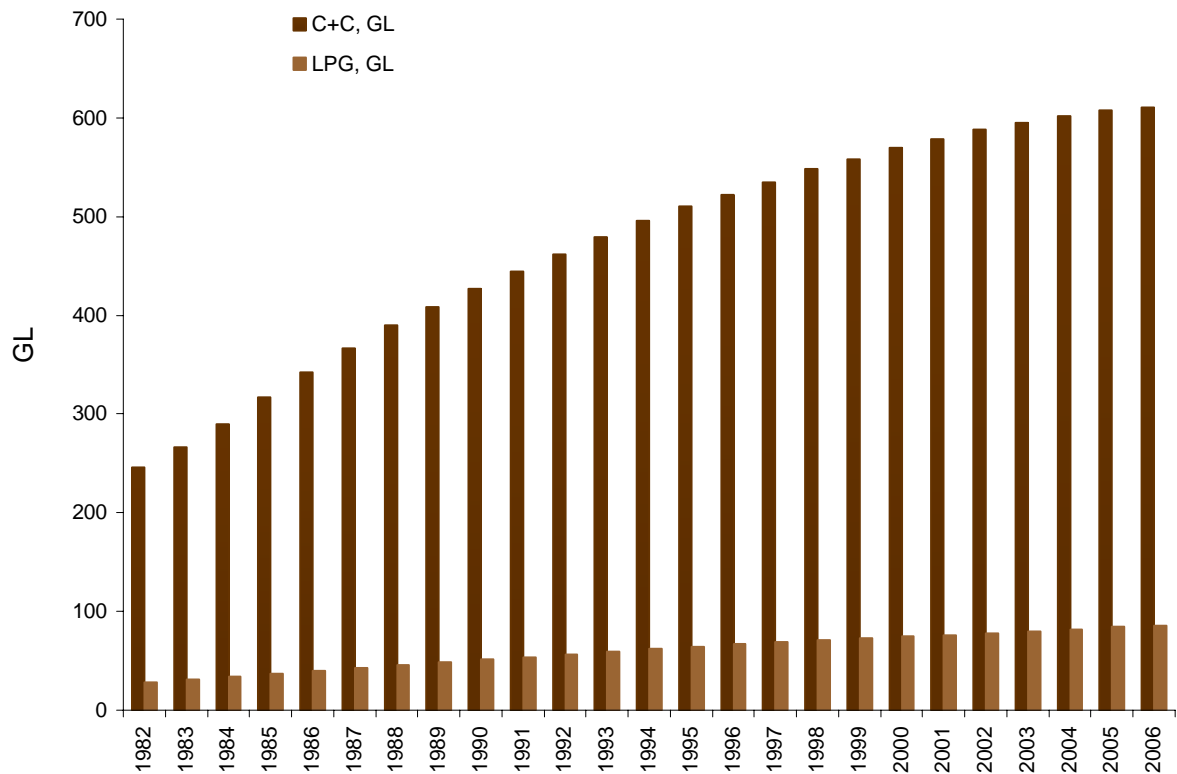
Santos Ltd*	Initial Recoverable Reserves			Cumulative Production			Remaining Reserves		
	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>
2004	0.00	0.00	2.75	0.00	0.00	0.43	0.00	0.00	2.32
2005	0.00	0.00	2.75	0.00	0.00	0.76	0.00	0.00	1.99
2006	0.00	0.00	2.75	0.00	0.00	0.93	0.00	0.00	1.82

Source: Santos Ltd

\* Baleen/Patricia

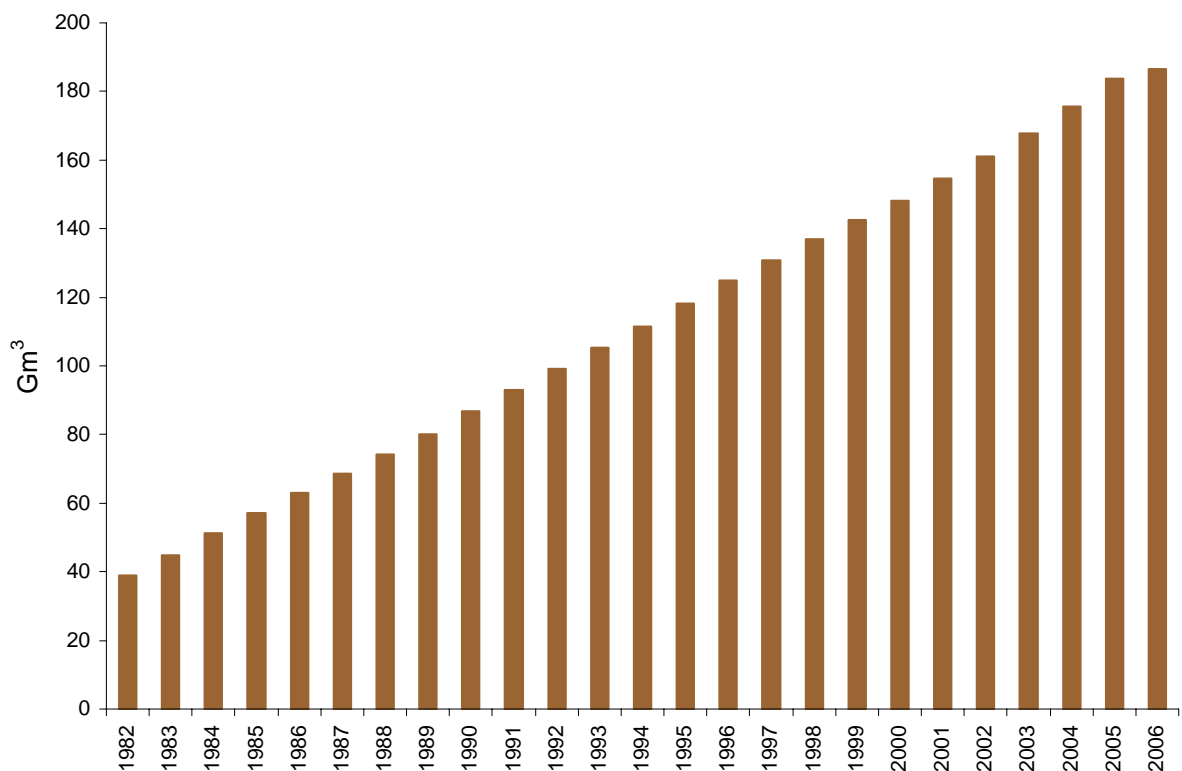


**Graph 3.9 Gippsland Basin Cumulative Petroleum Production (excluding gas): 1982 – 2006**



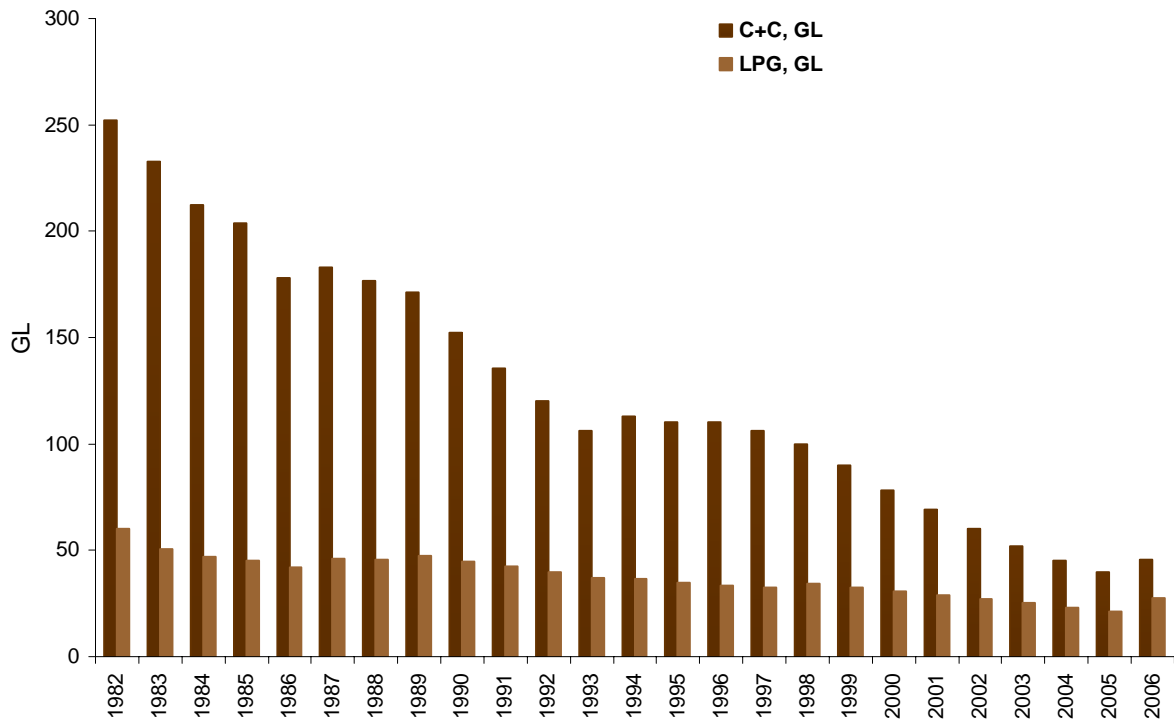
Source: DPI

**Graph 3.10 Gippsland Basin – Cumulative Gas Production: 1982 – 2006**



Source: DPI

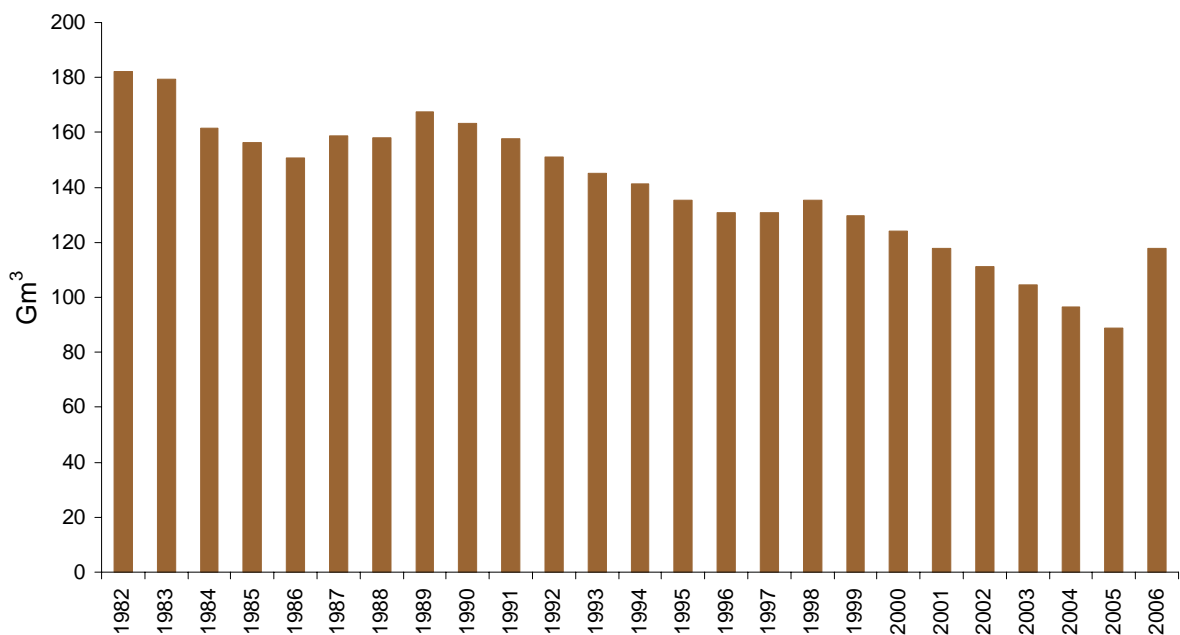
**Graph 3.11 Gippsland Basin – Remaining Petroleum Reserves (excluding gas): 1982 – 2006**



Source: DPI

Note: Petroleum reserves have been declining since 1996, hence the Gippsland Basin is in the depletion phase. The increase in remaining petroleum reserves in 2005/06 is based on the new field mapping of the producing fields and the use material balance analyses.

**Graph 3.12 Gippsland Basin – Remaining Gas Reserves: 1982 – 2006**



Source: DPI

Note: Gas reserves have been declining since 1998 as the Gippsland Basin fields currently in production are in the depletion phase. The increase in remaining gas reserves in 2005/06 is based on the new mapping 3D-seismic interpretation for volumetrics, detail geological modelling and material balance analyses.

**Table 3.11 Offshore Gippsland Oil and Gas Value: 1995 – 2006**

Year	Oil Production Rate (bbl/d)	Oil Yearly Production (Mbbl)	Oil Price \$US/bbl	Exchange Rates	Oil Price \$A/bbl	Oil Value (\$m)	Gas Production Rate (Mcf/d)	Gas Yearly Production (Bscf)	Gas Price \$A/GJ	Gas Value (\$m)	Oil and Gas Value (\$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
2005	94,052.50	34.33	50.00	0.75	66.67	2,288.61	733.49	267.72	3.00	883.49	3,172.10
2006	83,000.00	30.30	65.00	0.74	87.84	2,635.20	750.00	273.75	3.00	821.25	3,456.45

Source: DPI

Oil Price Source:

1995 to 2002 – BP Statistical Review ([www.bp.com/statistical review](http://www.bp.com/statistical-review))

2003 – Australia Bureau of Agricultural and Resources Economics, Australian Commodity Statistics

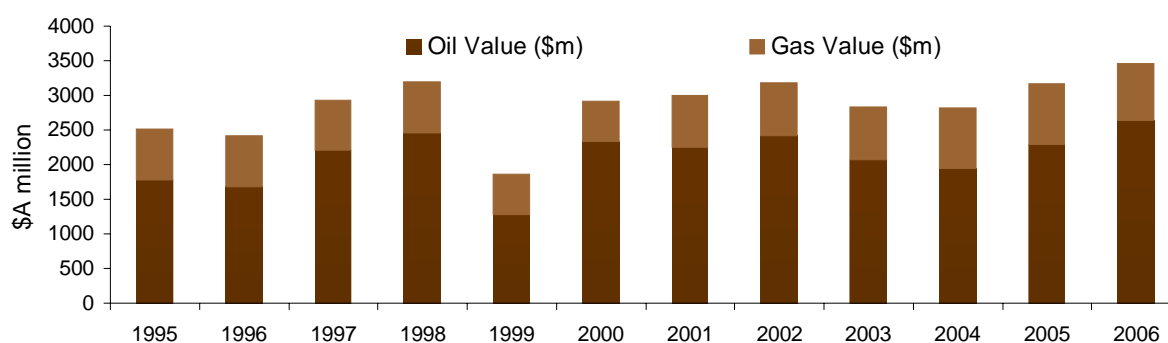
2004 – Estimated from South East Asia: [www.aseanenergy.org](http://www.aseanenergy.org) (Australian 42)

2005 – WTRG Economics

Exchange Rates Source:

[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 – 2006)**

Source: DPI

**Table 3.12 Onshore Otway Gas, Condensate and CO<sub>2</sub> Revenue: 2002 – 2006**

Year	Gas Production Mm <sup>3</sup>	Condensate Production kL	Sales Gas Mm <sup>3</sup>	CO <sub>2</sub> Production Mm <sup>3</sup>	Revenue (Royalty) (\$A)
2002	304.9	11650.7	274.4	17.7	2,359,763.90
2003	445.0	13590.8	400.5	19.2	2,695,411.10
2004	377.8	6515.8	340.0	19.8	1,579,184.51
2005	239.8	9600.0	215.8	19.2	809,338.00
2006	232.9	7100.0	209.6	19.5	105,718.01

Source: DPI

Production – TRU energy (TXU underground storage of gas), Origin Energy Resources (natural gas) and BOC (CO<sub>2</sub>).

**Table 3.13 Onshore Otway Basin Annual Production: 1986/87 - 2004/06**

Year	Dunbar		Penryn		Mylor		Wild Dog Road		Skull Creek		Wallaby Creek		Iona		North Paaratte	
	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	Gas, Mm <sup>3</sup>	cond, kL	Gas, Mm <sup>3</sup>
1986-87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	108.9	6.4
1987-88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	203.8	12.4
1988-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	274.3	16.5
1989-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	271.8	17.0
1990-91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300.3	19.0
1991-92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	290.7	19.2
1992-93	-	-	-	-	-	-	-	-	-	-	-	-	244.9	10.7	220.7	14.6
1993-94	-	-	-	-	-	-	-	-	-	-	-	-	1088.7	49.0	0.0	0.1
1994-95	-	-	-	-	-	-	-	-	-	-	-	-	1568.1	63.8	0.0	0.0
1995-96	-	-	-	-	-	-	-	-	-	-	-	-	1771.6	72.9	0.0	0.0
1996-97	-	-	-	-	-	-	-	-	0.0	0.0	836.0	49.6	672.7	24.7	0.0	0.0
1997-98	-	-	-	-	-	-	-	-	0.0	19.1	466.7	30.7	335.6	16.3	328.3	19.9
1998-99	-	-	-	-	-	-	-	-	-	-	1881.2	88.1	-	-	56.3	3.8
1999-00	-	-	-	-	6146.8	77.1	32.9	6.4	-	-	1879.0	90.1	4248.1	205.0	405.3	112.6
2000-01	121.0	3.9	258.0	8.8	7249.6	108.0	57.3	13.6	-	-	719.5	36.5	2634.0	106.8	383.6	30.5
2001-02	215.0	9.2	2254.1	38.1	1853.1	27.8	-	-	-	-	99.7	6.0	335.6	77.3	55.3	5.1
2002-03	-	-	589.1	11.8	0.9	0.0	-	-	-	-	-	-	-	69.0	-	-
2003-04	-	-	281.3	6.1	933.6	15.91	-	-	-	-	-	-	-	174.9	-	-
2004-05	-	-	0.0	0.0	909.7	14.71	-	-	-	-	-	-	-	189.0	-	-
2005-06	-	-	0.0	0.0	0.0	0.00	0.0	0.0	-	-	0.0	0.0	116.5	277.64*	0.0	0.0
<b>Total</b>	<b>336.0</b>	<b>13.0</b>	<b>3,382.5</b>	<b>64.8</b>	<b>17,093.6</b>	<b>243.4</b>	<b>90.2</b>	<b>20.0</b>	<b>0.0</b>	<b>19.1</b>	<b>5,882.1</b>	<b>301.0</b>	<b>13,065.8</b>	<b>1,337.0</b>	<b>2,790.3</b>	<b>270.7</b>

Source: DPI

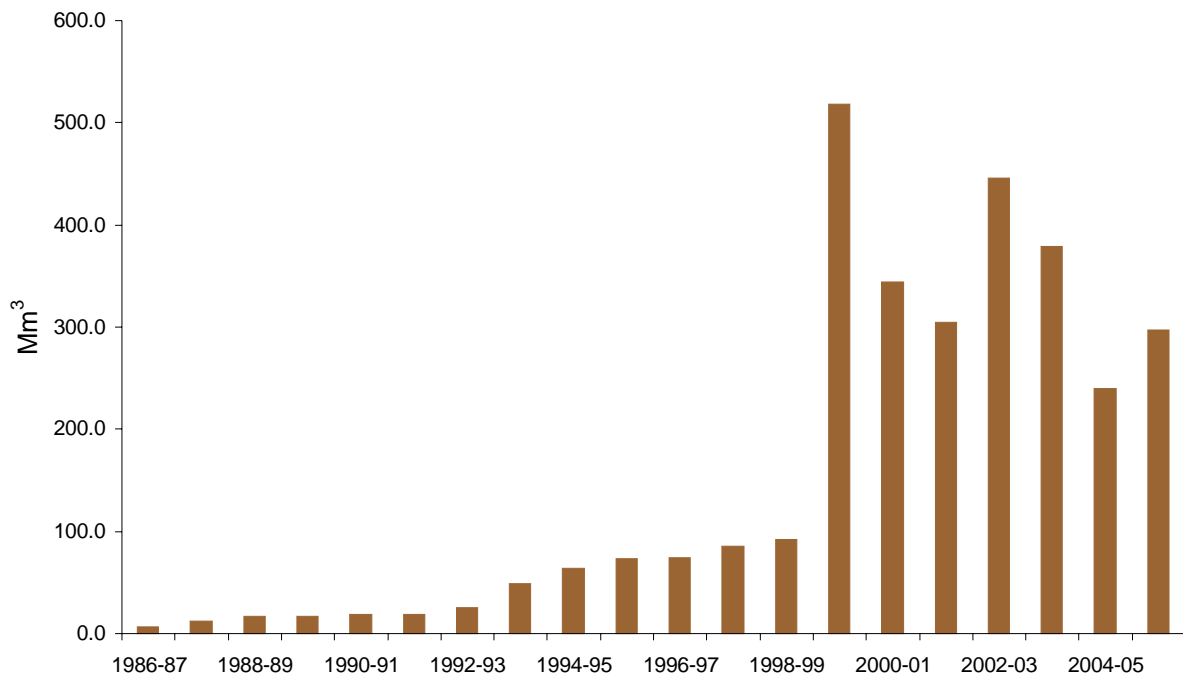
Note: \* Iona withdrawal is from underground storage.

Table 3.13 Continued

Year	Boggy Creek*		Seamer		Croft		Naylor		McIntee		Tregony		Fenton Creek		Total annual production	
	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	Gas, Mm <sup>3</sup>	cond, kL	Gas, Mm <sup>3</sup>
1986-87	-	-	-	-	-	-	-	-	-	-	-	-	-	-	108.9	6.4
1987-88	-	-	-	-	-	-	-	-	-	-	-	-	-	-	203.8	12.4
1988-89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	274.3	16.5
1989-90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	271.8	17.0
1990-91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300.3	19.0
1991-92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	290.7	19.2
1992-93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	465.7	25.3
1993-94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1088.7	49.0
1994-95	0.1	3.4	-	-	-	-	-	-	-	-	-	-	-	-	1568.2	63.8
1995-96	4.1	10.7	-	-	-	-	-	-	-	-	-	-	-	-	1775.7	72.9
1996-97	5.8	13.8	-	-	-	-	-	-	-	-	-	-	-	-	1514.5	74.3
1997-98	7.5	14.5	-	-	-	-	-	-	-	-	-	-	-	-	1138.1	86.0
1998-99	7.1	11.8	-	-	-	-	-	-	-	-	-	-	-	-	1944.6	91.9
1999-00	7.4	16.0	-	-	-	-	-	-	-	-	-	-	1601.9	26.6	14321.5	517.9
2000-01	9.6	19.7	-	-	-	-	-	0.0	-	-	109.5	2.0	1605.1	34.5	13147.2	344.4
2001-02	10.4	17.7	-	-	409.4	8.5	258.5	4.8	973.6	36.8	4139.3	70.2	1046.7	21.1	11650.7	304.9
2002-03	9.6	19.2	0.0	16.2	4607.6	104.8	3227.1	66.4	2890.7	130.8	2263.6	46.9	2.1	0.1	13590.8	445.9
2003-04	9.6	19.8	-	29.7	134.0	2.8	2101.5	40.6	2085.2	89.5	877.1	17.3	93.5	2.2	6515.8	379.1
2004-05	9.6	19.2	-	10.8	53.5	1.2	254.7	5.2	500.1	18.9	0.8	0.0	0.0	0.00	1728.4	239.8
2005-06	9.1	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	173.7	297.1
<b>Total</b>	<b>89.9</b>	<b>184.0</b>	<b>0.0</b>	<b>56.7</b>	<b>5,204.5</b>	<b>117.3</b>	<b>5,841.8</b>	<b>117.0</b>	<b>6,449.6</b>	<b>276.0</b>	<b>7,390.3</b>	<b>136.4</b>	<b>4,349.4</b>	<b>84.5</b>	<b>70,623.4</b>	<b>2,992.3</b>

Source: DPI

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

**Graph 3.14 Victorian Onshore Otway Basin Historical Gas Production: 1986/87 –2005/06**

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 3.14 Gross Onshore Otway Basin Gas/Condensate Production: 2004/05–2005/06**

Field	2004/2005		2005/2006	
	Gas, Mm <sup>3</sup>	Cond. KL	Gas, Mm <sup>3</sup>	Cond. KL
Iona*	189.0		277.6	116.5
Mylor	14.7	909.7	0.0	0.0
Penryn	0.0	0.0	0.0	0.0
Fenton Creek	0.0	0.0	0.0	0.0
Tregony	0.0	0.8	0.0	0.0
McIntee	18.9	500.1	0.0	0.0
Naylor	5.2	254.7	0.0	0.0
Croft	1.2	53.5	0.0	0.0
Seamer	10.8	0.0	0.0	0.0
<b>Total</b>	<b>239.8</b>	<b>1718.8</b>	<b>277.6</b>	<b>116.5</b>
Boggy Creek**	19.2	9.6	18.2	9.1

Sources:

Santos for: Mylor, Fenton Creek and Penryn fields

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

Origin for: Skull Creek, Wild Dog Road and Dunbar Fields

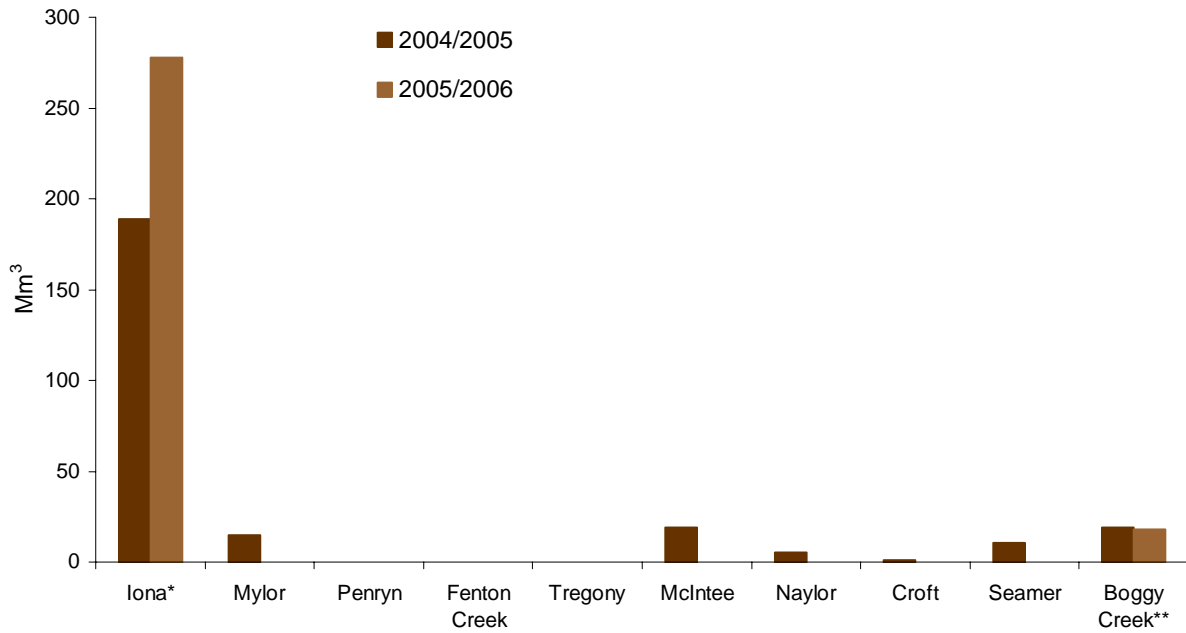
British Oxygen Company (BOC) for: Boggy Creek

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 Onshore Otway Basin Gas Production: 2004/05 – 2005/06**



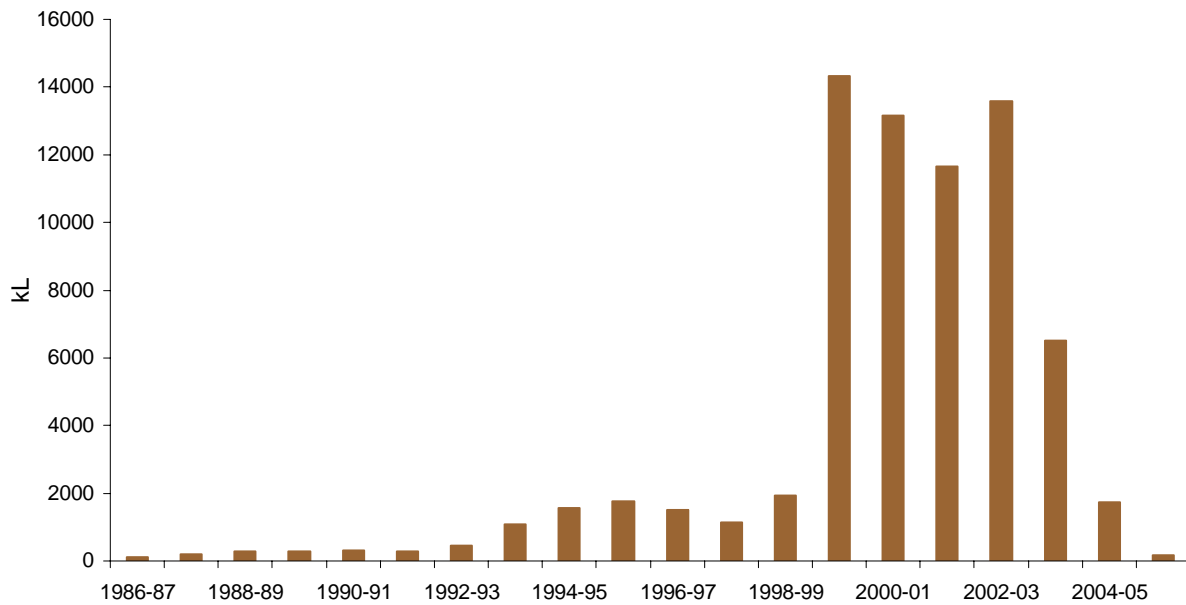
Source: DPI

Notes: Gas production ceased due to gas depletion from the onshore fields.

\*Iona – Underground Gas Storage – not primary production.

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

**Graph 3.16 Victorian Onshore Otway Basin Historical Condensate Production: 1986/87–2005/06**



Source: DPI

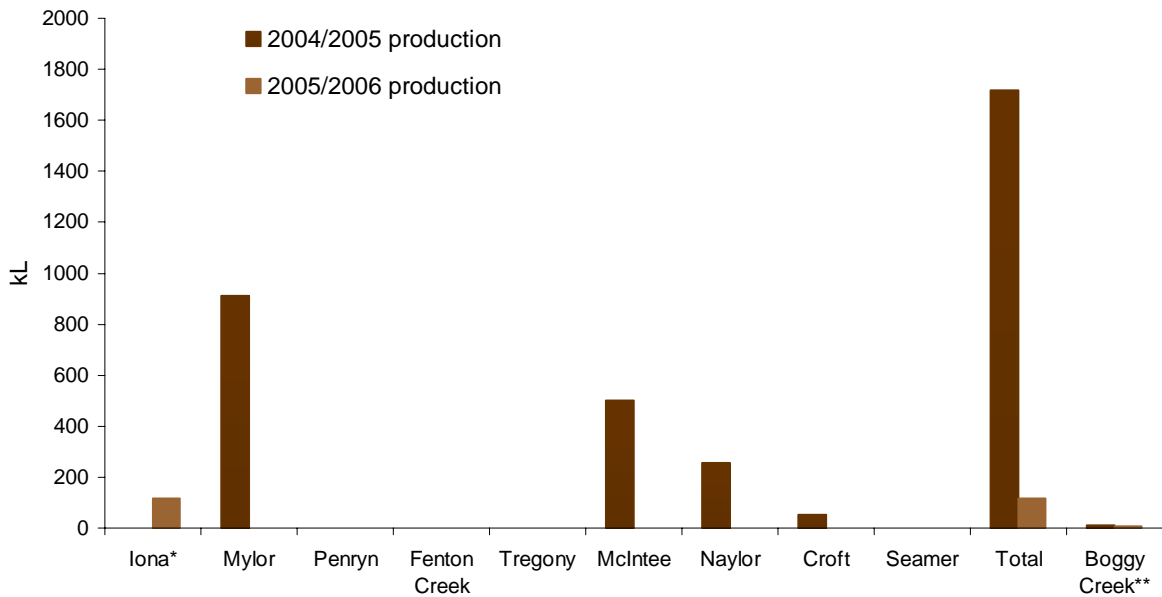
Notes: 1999/2000 – production increased dramatically from previous years as Wild Dog Road, Mylor and Fenton Creek discoveries commenced production.

2003/04 – rapid reduction in McIntee, Naylor and Seamer production levels.

2004/05 – rapid reduction in gas production from onshore fields – production ceased during 2005/06.

2005/06 – Boggy Creek Field is now the only onshore gas producer.

**Graph 3.17 Victorian Onshore Otway Basin Condensate Production: 2004/05 – 2005/06**



Source : DPI

Notes: \*Iona – Underground Gas Storage – not primary production.

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

**Table 3.15 Onshore Otway Basin Sales Gas Reserves Status: June 2006**

Licence Area	Initial Reserves (Mm <sup>3</sup> )	Cumulative Production (Mm <sup>3</sup> )	Remaining Reserves (Mm <sup>3</sup> )
Boggy Creek (CO <sub>2</sub> Producer)	396.4	184.0	212.4

Source: DPI

Note : The only current producing field in the onshore Port Campbell area is Boggy Creek ( Iona is used for gas storage and extraction). The total gas inplace for undeveloped offshore gas fields – excluding Tasmanian fields – (La Bella, Henry, Black Watch, Halladel, Martha and Geographe) is estimated at about 1090.9 billion cubic feet (Bcf) or 30.90 billion cubic metres (Bm<sup>3</sup>), and including Tasmania fields (Thylacine, Yolla and white Ibris) 2940.0 Bcf or 83.3 Bm<sup>3</sup>.

**Table 3.16a. Offshore Otway Basin Cumulative Production & Remaining Reserves–Santos Ltd**

Santos Ltd. Casino	Initial Recoverable Reserves			Cumulative Production			Remaining Reserves		
	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>
2006	0.00	0.00	3398.47	0.00	0.00	391.16	0.00	0.00	3007.31

Source: Santos Ltd

**Table 3.16b Offshore Otway Basin Cumulative Production & Remaining Reserves – BHP Billiton**

BHP Billiton Minerva	Initial Recoverable Reserves			Cumulative Production			Remaining Reserves		
	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>	C+C, ML	LPG, ML	Gas, Mm <sup>3</sup>
2006	0.00	0.20	8387.99	0.00	0.03	1462.50	0.00	0.17	6925.49

Source: BHP Billiton



## 4. Minerals

Victorian mineral production continues to be dominated by brown coal and gold.

Brown coal production, predominantly from the Latrobe Valley for electricity generation, continued on an increasing trend in 2005/06 to 67.7 million tonnes from the previous year's production of 67.1 million tonnes.

Gold production showed a substantial increase to 203,352 ounces in 2005/06, valued at \$A142 million, representing more than a 60% increase from the previous year's production of 123,308 ounces. This increase is due to Perseverance Corporation's Fosterville operation starting production in May 2005. Gypsum, kaolin and feldspar are the other significant contributors to mineral production. Gypsum and kaolin both show a high degree of variability reflecting seasonal and market factors. Gypsum production, primarily for agricultural uses, has increased in 2005/06 to 416,294 cubic metres, valued at \$A4.99 million, reversing the drop recorded in the previous year's production of 346,522 cubic metres. In 2005/06 kaolin production showed a significant drop to 149,218 tonnes, valued at \$A0.8 million, with a declining trend since 2004/05. Feldspar production in Victoria commenced in 1997/98 by Unimin Australia Ltd at Beechworth and has steadily increased reaching 75,683 tonnes, valued at \$A4.9 million in 2004/05, but in 2005/06 production fell to 69,876 tonnes valued at \$A4.8 million.

Mineral sands (ilmenite, rutile and zircon) production in Victoria commenced in 2000/01 by Murray Basin Titanium Pty Ltd from the Wemen mine in northwest Victoria, increasing each year to 2003/04. The Wemen mine stopped production in January 2004. Significant production is expected from the Iluka Douglas project (currently under construction) in 2006/07.

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

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

(1) including:

- oil shale and coal; and
- hydrocarbons and mineral oils contained in oil shale or coal or extracted from oil shale or coal by chemical or industrial processes; and
- 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.

(2) excluding water, stone, peat or petroleum.

## 4.1 Exploration and Mining Tenements

In 2005/06, 193 new and renewal applications were received for exploration and mining licences, with about 74% of these being for exploration licences. In the same period 142 exploration and mining licences were granted or renewed, with about 75% of these being exploration licences.

**Table 4.1 New and Renewal Applications for Exploration and Mining Licences: 2005/06**

	Received	Granted	Withdrawn	Refused
New Exploration Licence Applications	90	69	3	8
Renewal Exploration Licence Applications	53	38	0	3
<b>Total Exploration Licence Applications</b>	<b>143</b>	<b>107</b>	<b>3</b>	<b>11</b>
New Mining Licence Applications	14	13	1	2
Renewal Mining Licence Applications	36	22	0	1
<b>Total Mining Licence Applications</b>	<b>50</b>	<b>35</b>	<b>1</b>	<b>3</b>

Source: DPI

**Table 4.2 Exploration and Mining Licences – Granted and Renewed: 1999/00 – 2005/06**

	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06
Granted	39	39	45	55	83	38	69
Renewed	100	63	49	47	49	56	38
<b>Total Exploration Licences Granted and Renewed</b>	<b>139</b>	<b>102</b>	<b>94</b>	<b>102</b>	<b>132</b>	<b>94</b>	<b>107</b>
Granted	17	12	24	13	17	20	13
Renewed	24	22	25	26	39	29	22
<b>Total Mining Licences Granted and Renewed</b>	<b>41</b>	<b>34</b>	<b>49</b>	<b>39</b>	<b>56</b>	<b>49</b>	<b>35</b>

Source: DPI

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

The total number of exploration and mining licences granted since 1999 has been variable. In 2005/06 the number of exploration licences granted increased to 107 from the previous year's figure of 94. The total number of mining licences granted in 2005/06 declined to 35 due to a drop both in new and renewed licence numbers.

**Graph 4.1 Exploration Licence Grants: 1999/00 – 2005/06**

Source: DPI

**Graph 4.2 Mining Licence Grants: 1999/00 – 2005/06**

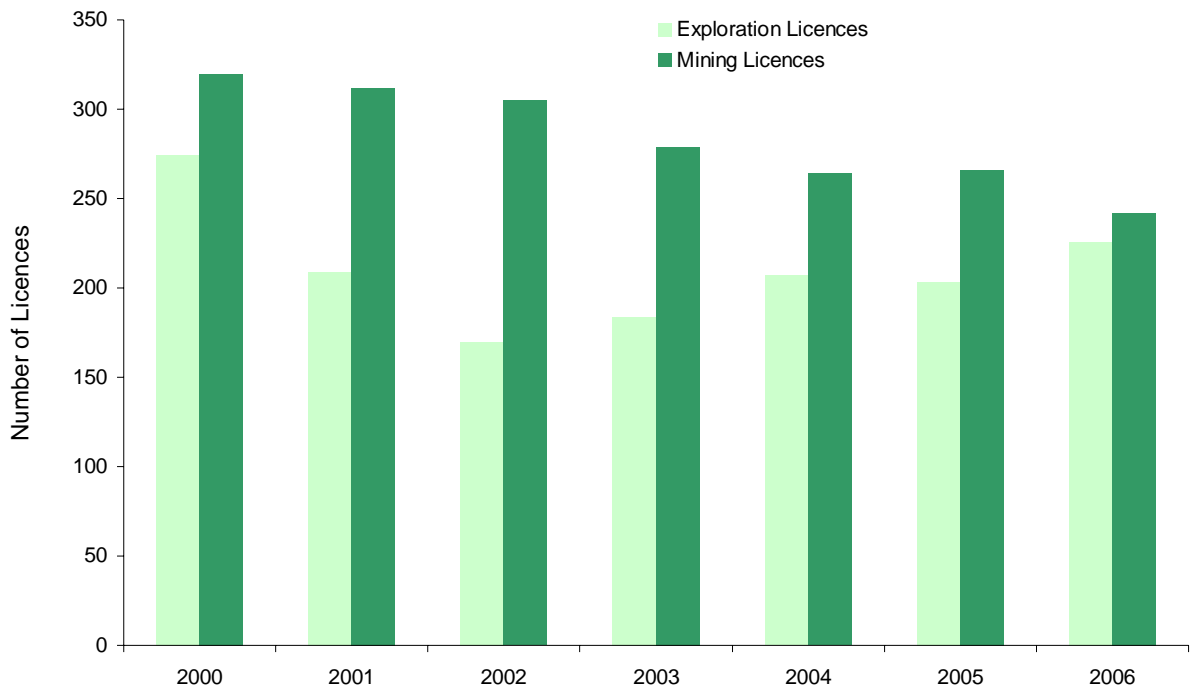
Source: DPI

**Table 4.3 Current Exploration and Mining Licences at 30 June each year: 2000 – 2006**

Tenement	2000	2001	2002	2003	2004	2005	2006
Exploration Licences	274	209	170	184	207	203	226
Mining Licences	320	312	305	279	264	266	242
<b>Totals</b>	<b>594</b>	<b>521</b>	<b>475</b>	<b>463</b>	<b>471</b>	<b>469</b>	<b>468</b>

Source: DPI

The total areas covered by mining and exploration licences in 2005/06 were 655 km<sup>2</sup> and 94,163km<sup>2</sup> respectively. The number of mining licences has steadily fallen over the last seven years. A significant number of amalgamations have contributed to the lower number of mining licences. The total number of current exploration and mining licences has remained fairly steady, averaging about 470 from 2002/03 to 2005/06.

**Graph 4.3 Current Exploration and Mining Licences as at 30 June each year: 2000 – 2006**

Source: DPI

## 4.2 Exploration

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

**Table 4.4 Expenditure on Mineral Exploration and Mining Development (\$A million): 1995/96 – 2005/06**

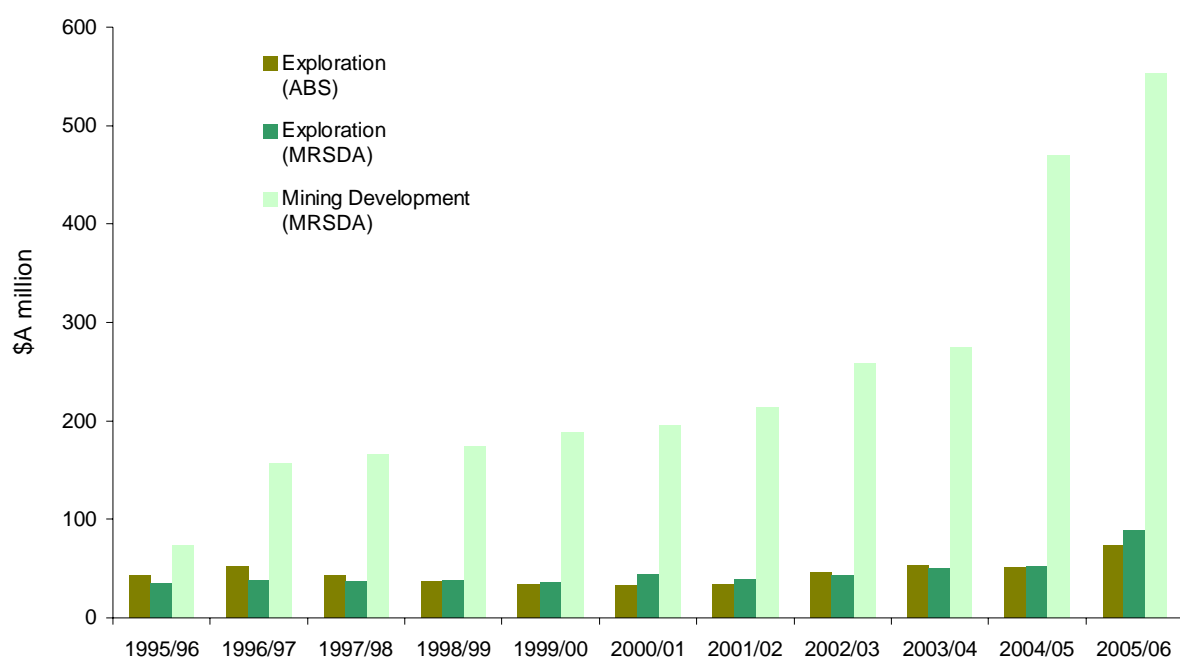
	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06
Exploration (ABS)	42.6	52.3	43.1	37.0	33.8	32.7	33.9	46.2	53.5	51.5	74.1
Exploration (MRSDA)	35.1	37.6	36.9	38.0	35.8	43.4	39.3	43.3	50.2	52.2	88.2
Mining Development (MRSDA)	73.8	156.8	165.2	174.0	188.3	195.5	213.5	258.2	274.4	469.9	553.0

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

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

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

**Graph 4.4 Expenditure on Mineral Exploration and Mining Development: 1995/96 – 2005/06**



Source: DPI

Mineral exploration expenditure is a lead indicator of mineral industry activity. ABS data shows a strong growth trend of exploration expenditure since 2001/02, with a slight decline in 2004/05 followed by strong growth in 2005/06 reaching \$A74.1million. This represents an increase of 45% from 2004 / 05.

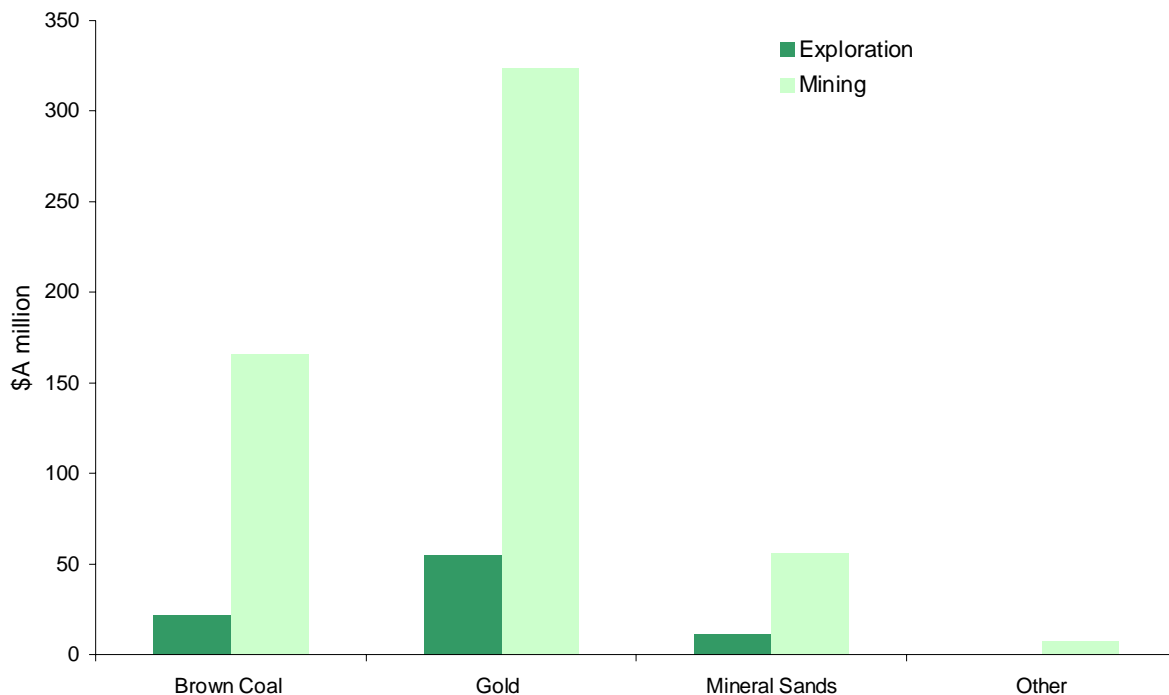
Since 1996/97, expenditure on mine development has included expenditure reported by brown coal mines in the Latrobe Valley. The upward trend has continued and showed further significant growth in 2005/06 largely due to the construction phase of gold mines including Perseverance Corporation's Fosterville mine, Bendigo Mining's New Bendigo project, Ballarat Goldfields' Ballarat East project, TRUenergy's East Field brown coal development and Iluka Resources' Douglas mineral sands project.

**Table 4.5 Mineral Exploration and Mining Development Expenditure by Sector (MRSDA): 2005/06**

Sector	Exploration (\$A million)	Mining (\$A million)
Brown Coal	21.8	165.9
Gold	55.3	323.4
Mineral Sands	11	56.2
Other	0.2	7.5
<b>Total</b>	<b>88.3</b>	<b>553</b>

Source: DPI

**Graph 4.5 Mineral Exploration and Mining Development Expenditure by Sector (MRSDA): 2005/06**



Source: DPI

### 4.3 Production

**Table 4.6 Mineral Production: 1984/85 – 2005/06**

Year	Fuel Minerals	Metallic Minerals				Industrial Minerals					
	Brown Coal ('000 tonnes)	Gold (kg)	Gold (oz)	Copper Concentrate (tonnes)	Zinc Concentrate (tonnes)	Zircon (tonnes)	Rutile (tonnes)	Ilmenite (tonnes)	Feldspar (tonnes)	Gypsum (cubic metres)	Kaolin (tonnes)
1984/85	38,379	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
2004/05	67,152	3,835	123,308	nil	nil	nil	nil	nil	75,683	346,522	189,237
2005/06	67,737	6,324	203,352	nil	nil	nil	nil	nil	69,876	416,294	149,218

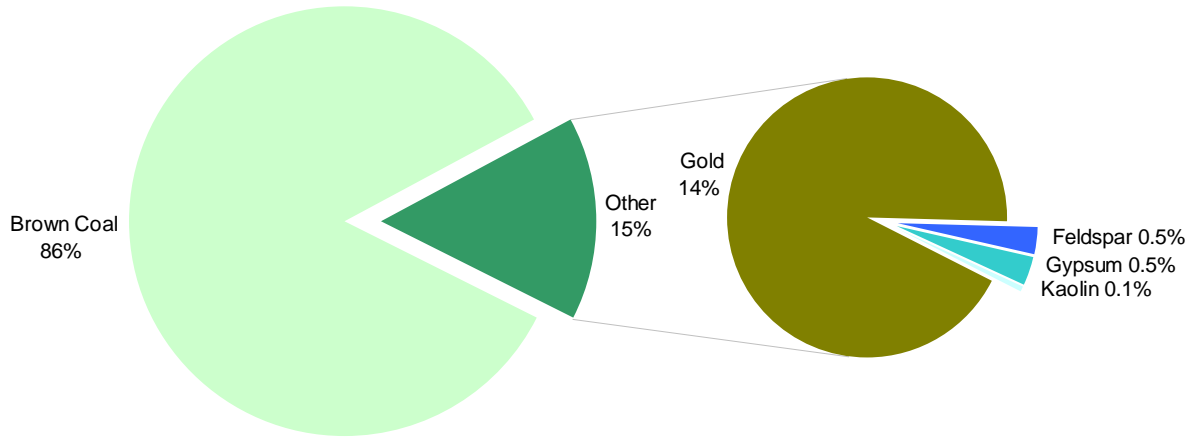
Source: DPI – statutory returns under the MRSDA.

**Table 4.7 Mineral Production Values: 2005/06**

Mineral	Value (\$A million)
Brown Coal	850.8
Gold	142.3
Feldspar	4.8
Gypsum	5
Kaolin	0.8
<b>Total</b>	<b>1003.7</b>

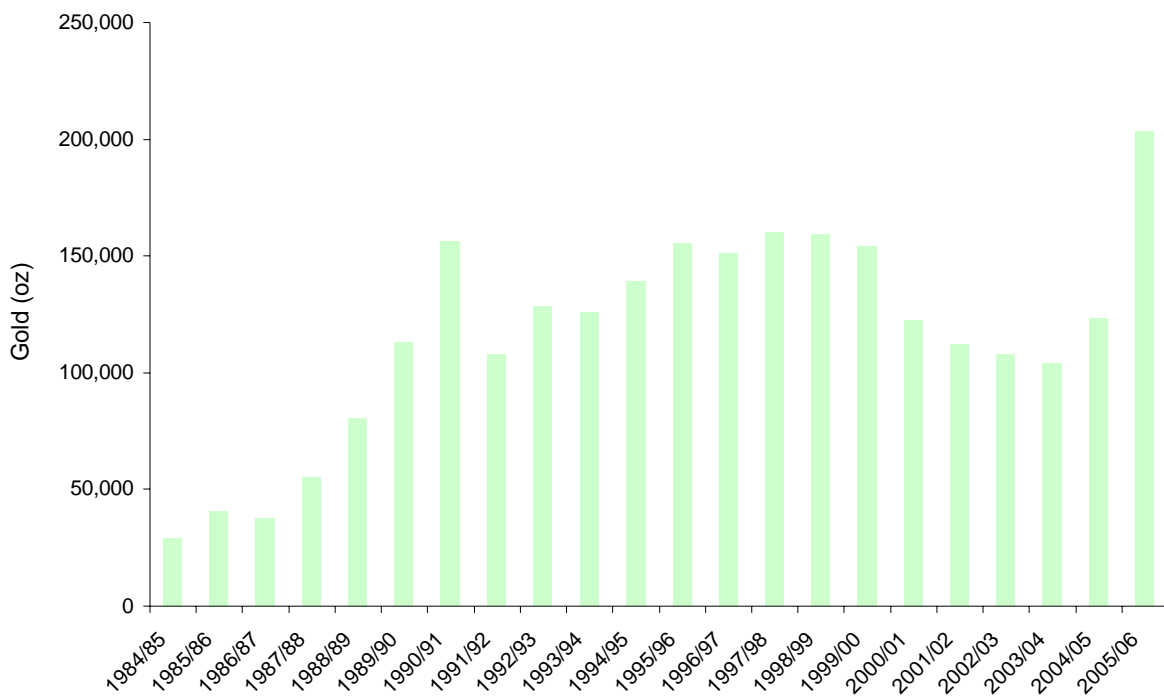
Source: DPI

**Graph 4.6 Mineral Production Values: 2005/06**



Source: DPI

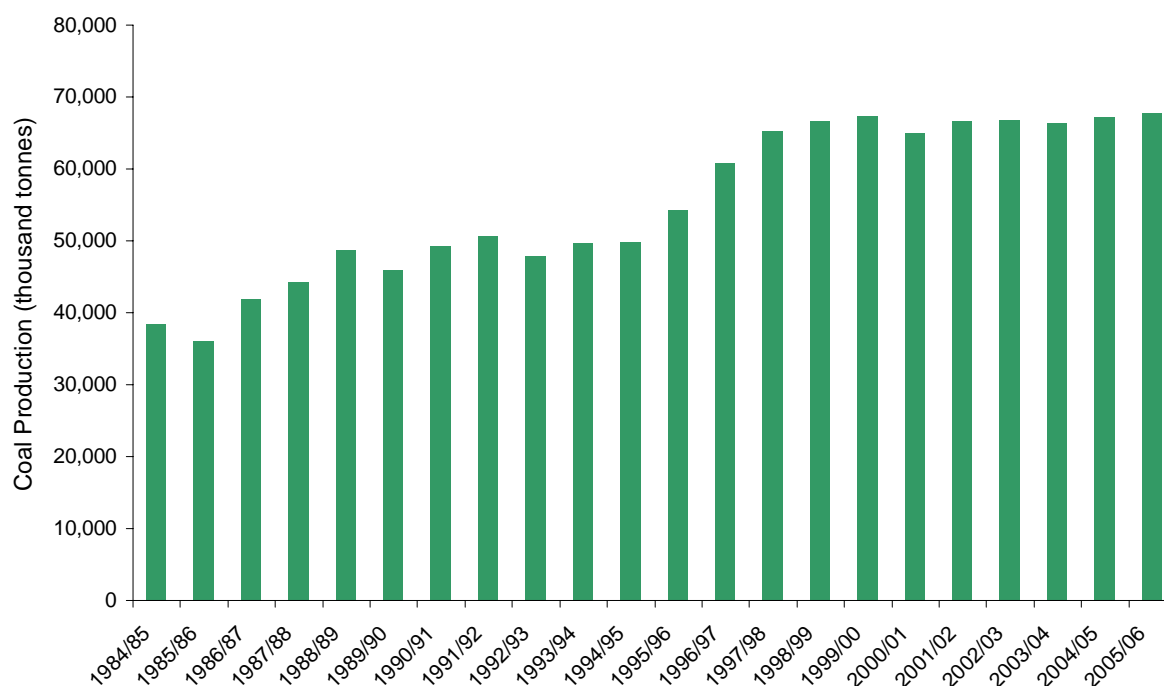
**Graph 4.7 Gold Production: 1984/85 – 2005/06**



Source: DPI

From 1998/1999, gold production in Victoria was in decline for several years. However, with increased production at Stawell and Fosterville, gold production in 2004/05 increased by 18% over 2003 / 04. In 2005/06, gold production increased by further 60 % over 2004 / 05 and reached 203,352 ounces.



**Graph 4.8 Brown Coal Production: 1984/85 – 2005/06**

Source: DPI

**Table 4.8 Gold Producers (Production more than 100 kg): 2005/06**

Producer	Location	Licence	Production (kg)	Production (oz)	Estimated Value (\$A)*
Leviathan Resources Ltd	Stawell	MIN 5260	3,448	110,856	77,599,200
Perseverance Exploration Pty Ltd	Fosterville	MIN 5404	2,824	90,790	63,553,000
<b>Total</b>			<b>6,271</b>	<b>201,646</b>	<b>141,152,200</b>
Other			53	1,706	1,194,200
<b>Total Production</b>			<b>6,324</b>	<b>203,352</b>	<b>142,346,400</b>

Source: DPI – statutory returns under the MRSDA.

Note: \*Based on the estimated gold price of \$A700/oz.

Most of Victoria's gold production in 2005 / 06 was from two mines owned by Leviathan Resources Ltd at Stawell and by Perseverance Exploration Pty Ltd at Fosterville. However, many smaller companies and individuals also produced small amounts of gold.

**Table 4.9 Brown Coal Production (thousand tonnes): 1983/84 – 2005/05**

Year	Maddingley Brown Coal Co. Bacchus Marsh	Alcoa Anglesea	SECV	Loy Yang	Yallourn	Hazelwood	Annual Total	Production Value* (\$A)
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	434,248,000
1996/97	39	1,005	-	27,808	17,083	14,860	60,795	486,360,000
1997/98	28	1,030	-	29,766	17,924	16,525	65,274	522,192,000
1998/99	22	1,091	-	30,510	17,350	17,675	66,648	533,184,000
1999/00	4	926	-	30,865	16,098	19,470	67,363	538,904,000
2000/01	11	963	-	28,686	16,234	19,063	64,958	519,664,000
2001/02	10	1,069	-	30,949	15,650	18,982	66,661	533,287,000
2002/03	15	1,051	-	29,017	17,515	19,210	66,809	534,472,000
2003/04	18	1,107	-	29,577	16,585	19,056	66,343	530,744,000
2004/05	19	943	-	29,826	17,663	18,701	67,152	843,429,000
2005/06	22	1,101	-	30,937	16,933	18,743	67,737	850,776,720

Source: DPI

Notes: \* Estimated value of \$A8/tonne has been used until 2003/04. In 2004/05 this value was re-assessed as \$A12.56/tonne.

Brown coal production is dominated by the electricity generation companies in the Latrobe Valley – International Power Hazelwood, Loy Yang Power Management Pty Ltd and TRUenergy Yallourn Pty Ltd. The largest producer is Loy Yang followed by Hazelwood and TRUenergy.

The other major brown coal miner is Alcoa 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 purposes.

## 5. Extractive Industry

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

There are 860 quarries operating under the *Extractive Industries Development Act 1995* (EIDA) in Victoria. A total of 545 of these reported a total production of 46.2 million tonnes in 2005/06. This is significantly higher than the previous year's production of 41.7 million tonnes and is the highest recorded production since data collection commenced under the EIDA. The reported higher production is a reflection of an increased demand for extractive materials and improvement in reporting.

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

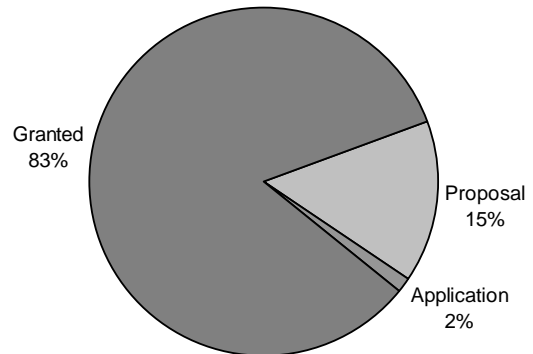
"Extractive industry" means the extraction or removal of stone from land if the primary purpose of the extraction or removal is the sale or commercial use of the stone or the use of the stone in construction, building, road or manufacturing works and includes:

- (a) 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
- (b) 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.

## 5.1 Work Authorities

Table and Graph 5.1 Status of Extractive Industry Work Authorities at 30 June 2006

Tenement	Proposal	Application	Granted
Work Authority	153	16	860



Source: DPI

Note: A Work Authority is granted under the *Extractive Industries Development Act 1995*.

## 5.2 Production

Table 5.2 Victorian Extractive Industries Production and Sales by Rock Type: 2005/06

Product Group	Product Type	Sales - volume (tonnes)	Sales - value (\$A)
Hard Rock	Basalt	15,866,024	211,924,181
	Dolerite	908,748	10,701,029
	Gneiss	3,296	3,914
	Granite	5,444,085	67,822,349
	Hornfels	2,984,230	38,482,052
	Quartzite	208,397	1,595,841
	Rhyodacite	1,150,392	18,789,064
	Schist	221,399	2,593,204
	Sedimentary	1,656,056	11,751,038
	Slate	369	134,750
<b>Hard Rock Total</b>		<b>28,442,996</b>	<b>363,797,421.6</b>
Soft Rock	Clay & clay shale	1,547,092	5,042,027
	Limestone	1,988,684	28,917,364
	Sand & gravel	12,910,149	124,263,375
	Scoria	477,721	6,221,084
	Soil	76,522	464,679
	Tuff	764,250	3,834,403
<b>Soft Rock Total</b>		<b>17,764,418</b>	<b>168,742,931.3</b>
<b>GRAND TOTAL</b>		<b>46,207,414</b>	<b>532,540,353</b>

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

Note: An estimated value is used where no data is supplied by the operator.

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

Table 5.3 Victorian Extractive Industries Production and Sales by Products: 2005/06

Product Group	Product Type	Sales - volume (tonnes)	Sales - value (\$A)
Single size products	Aggregate	13,717,346	220,186,594
	Armour	241,509	1,532,147
<b>Single size products total</b>		<b>13,958,856</b>	<b>221,718,741</b>
Multi size products	Road base	5,321,324	70,460,256
	Road sub-base	8,768,128	73,074,871
	Fill	5,653,456	19,122,678
<b>Multi size products total</b>		<b>19,742,907</b>	<b>162,657,805</b>
Sand products	Concrete sand	5,542,380	78,883,620
	Foundry sand	1,500	3,000
	Fine sand	2,002,352	17,294,556
	Industrial	54,872	421,669
	Glass sand	281,948	2,819,480
<b>Sand products total</b>		<b>7,883,052</b>	<b>99,422,325</b>
Limestone Products	Cement	620,242	5,631,797
	Agriculture	490,130	11,384,002
	Lime	205,561	5,707,912
<b>Limestone products total</b>		<b>1,315,933</b>	<b>22,723,711</b>
Clay products	Brick	1,031,842	4,400,968
	Firebricks	411	3,288
	Stoneware	2,836	45,376
	Tile/pipe	52,874	205,758
<b>Clay products total</b>		<b>1,087,963</b>	<b>4,655,390</b>
Miscellaneous	Dimension stone	27,581	707,195
	Unspecified	2,191,121	20,655,185
<b>Miscellaneous total</b>		<b>2,218,702</b>	<b>21,362,380</b>
<b>GRAND Total</b>		<b>46,207,414</b>	<b>532,540,352</b>

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

Note: Only operations reporting under the *Extractive Industries Development Act 1995* are included in tables 5.2 and 5.3.

Table 5.4 Victorian Dimension Stone Production: 1995/96 – 2005/06

	1995/96 (tonnes)	1996/97 (tonnes)	1997/98 (tonnes)	1998/99 (tonnes)	1999/00 (tonnes)	2000/01 (tonnes)	2001/02 (tonnes)	2002/03 (tonnes)	2003/04 (tonnes)	2004/05 (tonnes)	2005/06 (tonnes)
Basalt	10,065	2,000	6,060	0	19,063	20,868	18,803	12,419	13,864	13,875	21,552
Granite	5,516	4,405	1,821	2,572	3,462	943	1,058	1,993	1,600	879	636
Sandstone	196	1,400	256	1,295	343	103	492	185	258	1090	5,059
Slate	730	977	1,130	1,058	538	938	613	617	548	2,382	334
<b>TOTAL</b>	<b>16,507</b>	<b>8,782</b>	<b>9,267</b>	<b>4,925</b>	<b>23,406</b>	<b>22,852</b>	<b>20,966</b>	<b>15,214</b>	<b>16,270</b>	<b>18,226</b>	<b>27,581</b>

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

Note: In 2005/06 dimension stone production increased to 27,581 tonnes from the previous year's production of 18,226 tonnes. This is largely due to increases in basalt and sandstone production. The other dimension stone rock types production recorded a drop in the same period.

## 6. Governance

DPI collected a total of \$A32.4 million in royalties, rentals and administration fees in 2005/06 under the *Mineral Resources (Sustainable Development) Act 1990*, the *Extractive Industries Development Act 1995*, the *Petroleum (Submerged Lands) Act 1967*, the *Petroleum (Submerged Lands) Act 1982* and the *Petroleum Act 1998*.

Rehabilitation bonds held by DPI increased from \$A115.5 million in 2004/05 to \$A118.5 million in 2005/06, 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 (Sustainable 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 2004* (for mining and extractive sites)
- *Dangerous Goods Act 1985* (for mining and extractive sites) and the associated regulations.

The National Offshore Petroleum Safety Authority (NOPSA) is responsible for occupational health and safety for offshore petroleum sites.

The Inspectors, by agreement with the Victorian Workcover Authority, are also inspectors under the *Occupational Health and Safety Act 2004* for the Mining, Onshore Petroleum and Extractive Industries.

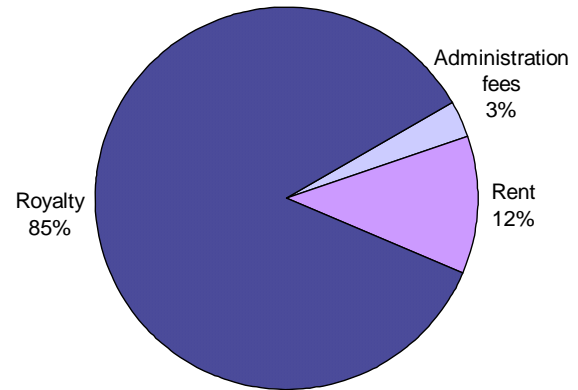
In 2005/06, DPI issued 57 licences to use explosives and 23 storage licences.

10 fatalities were recorded by the Australian minerals industry in 2004/05 and 11 in 2005/06. There was 1 fatality in Victoria for 2005/06.

## 6.1 Regulation, Revenue and Enforcement

**Table and Graph 6.1 Minerals, Extractive and Petroleum Revenue: 2005/06**

Revenue Stream	Revenue (\$A million)
Administration fees	1.0
Rent	3.8
Royalty	27.6
<b>Total</b>	<b>32.4</b>

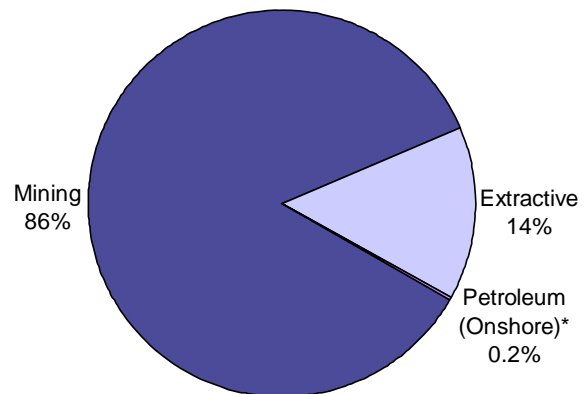


Source: DPI

Note: Royalty collected for the production/sales reported in the year ending 30/6/05.

**Table and Graph 6.2 Minerals, Extractive and Petroleum Royalty – by Sector: 2005/06**

Sector	Revenue (\$A million)
Mining	23.56
Extractive	3.99
Petroleum (Onshore)*	0.05
<b>Total</b>	<b>27.60</b>



Source: DPI

Note: Offshore petroleum production is subject to Resource Rent Tax which was phased in from 1987-92.

\*Includes some calendar year payments.

**Table 6.3 Rehabilitation Bonds by Sector – Value (\$A million): June 2000 – June 2006**

Date	Mineral Exploration	Mining	Extractive	<b>Total</b>
Jun-00	1.28	53.26	22.78	<b>77.32</b>
Jun-01	1.23	57.43	31.39	<b>90.06</b>
Jun-02	1.13	57.46	34.54	<b>93.13</b>
Jun-03	1.13	57.05	37.52	<b>95.69</b>
Jun-04	1.15	65.59	39.17	<b>105.91</b>
Jun-05	1.75	66.28	47.50	<b>115.53</b>
Jun-06	2.33	66.71	49.43	<b>118.47</b>

Source: DPI

**Table 6.4 Rehabilitation Bond Reviews: 2005/06**

Number of Bonds Reviewed	Result of Bond Review		
	Bond Increase	No Change	Bond Decrease
340	59	279	2

Source: DPI

Note: 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.

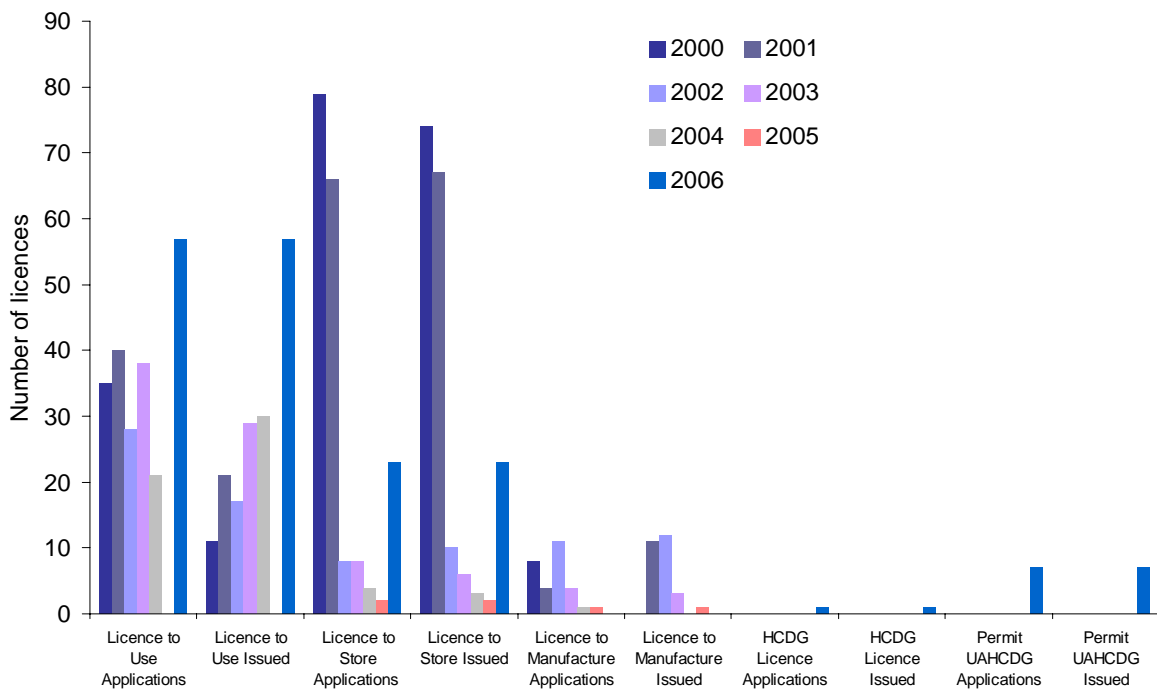
**Table 6.5 Mines and Quarries Explosives and HCDG Licence and Permit Applications and Grants: 2000 – 2006**

	2000	2001	2002	2003	2004	2005	2006
Licence to Use Applications	35	40	28	38	21	164*	57
Licence to Use Issued	11	21	17	29	30	119*	57
Licence to Store Applications	79	66	8	8	4	2	23
Licence to Store Issued	74	67	10	6	3	2	23
Licence to Manufacture Applications	8	4	11	4	1	1	0
Licence to Manufacture Issued	0	11	12	3	0	1	0
HCDG Licence Applications	N/a	N/a	N/a	N/a	N/a	N/a	1
HCDG Licence Issued	N/a	N/a	N/a	N/a	N/a	N/a	1
Permit UAHCDG Applications	N/a	N/a	N/a	N/a	N/a	N/a	7
Permit UAHCDG Issued	N/a	N/a	N/a	N/a	N/a	N/a	7

Source: DPI

\*Include a number of licences renewed under the new *Dangerous Goods (Explosives) Regulations 2000* (reg. 704).

**Graph 6.3 Explosives Licences and Permits, Mines and Quarries: 2000 – 2006**



Source: DPI

Note: Figures indicate industry demands for various types of explosives licences.



**Table 6.6 Enforcement and Compliance Activities 2005/06**

Site Visits	876
Inspections	246
Completed Compliance Audits	169
Complaints Received	105
Improvement Notices Issued	104
Explosives Licences Issued	88
EIDA Notices Issued	76
Investigations Initiated	26
Prohibition Notices Issued	19
MRDA Notices Issued	3
Dangerous Goods Directions Issued	2
Workplans & Variations Administration	535
Bond Assessments & Reviews	274
<b>Total of Regulatory Activities</b>	<b>2523</b>

Source: DPI

Notes:

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, prohibiting specified activity until issue is remedied.

## 6.2 Occupational Health and Safety

### Fatal Injuries

Ten fatalities were recorded by the Australian minerals industry in 2004/05 and 11 in 2005/06. There was 1 fatality in Victoria for 2005/06.

The risk of fatalities is measured by the Fatal Injury Frequency Rate (FIFR – the number of fatal Injuries per million hours worked). Victoria's FIFR of 0.04 is well below the 10 year national average of 0.08 (MCA, Health and Safety Performance Report 2003–2004).

### Lost Time Injuries

The Lost Time Injury Frequency Rate (LTIFR– number of lost time injuries per million hours worked) is a measure of the risk of lost time injuries. The LTIFR decreased in Victoria from 19.5 in 1994/95 to 8.3 in 2005/06.

Over the last decade the number of lost time injuries in the mining sector across Australia has decreased by 70% from 5,128 to 1520 (MCA, Health and Safety Performance Report 2003–2004). The Victorian minerals sector has achieved similar improvements in the reduction of lost time injuries.

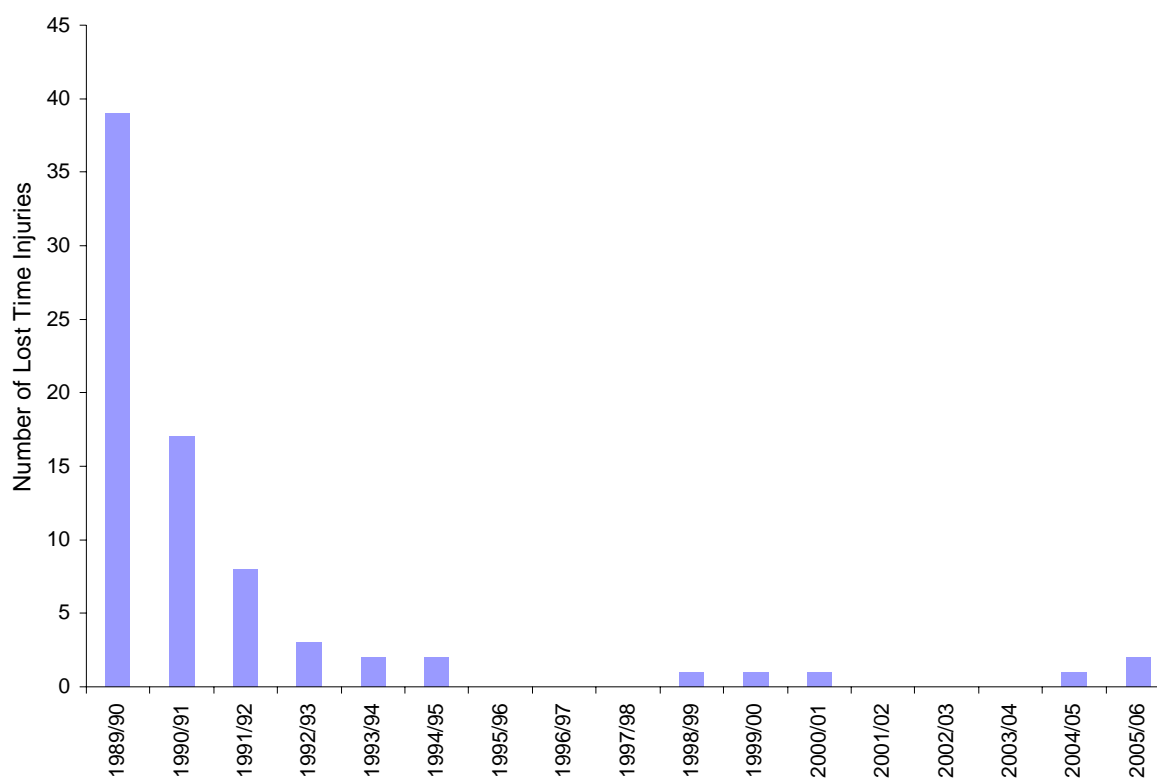
The LTIFR for the total minerals sector was 8.3 in 2005/06, which is a small increase compared to LTIFR of 6.4 in 2004/05. The average time lost for each lost time injury (Duration Rate), in the minerals sector reduced to 9 from last year's figure of 12.7. The Severity Rate is measured by the average number of days lost per one million hours worked. The figure of 75 days lost for 2005/06 is a slight improvement on the 83 days lost for 2004/05.

The mining industry recorded 26 Lost Time Injuries with a LTIFR of 6 in 2005/06, slightly up from the previous year's records of 20 and 5.0 respectively. The extractive industry recorded a small increase in Lost Time Injuries from 28 in 2004/05 to 33 in 2005/06. Corresponding Lost Time Injuries Frequency Rates increased from 8.3 to 12.2 in the same period.

**Table 6.7 Offshore Petroleum Safety Statistics: 1989/90 – 2005/06**

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
2004/05	1
2005/06	2

Source: DPI

**Graph 6.4 Offshore Petroleum Safety Statistics: 1989/90 – 2005/06**

Source: DPI

**Table 6.8 Minerals Safety Statistics by Sector: 2005/06**

Sector	Employed*	Hours Worked	Days Lost	Lost Time Injuries (LTIs)	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
Metalliferous O/C	527	759,191	43	9	11.9	17.1	4.8	56.6	0
Metalliferous U/G	952	1,281,323	59	13	10.1	13.7	4.5	46	0
Non Metalliferous	527	430,662	43	2	4.6	3.8	21.5	99.8	0
Coal	924	1,892,059	3	2	1.1	2.2	1.5	1.6	0
Exploration	396	282,153	5	2	7.1	5.1	2.5	17.7	0
Extractive	2,110	2,711,640	397	33	12.2	15.6	12	146.4	1
<b>Total Minerals Sector</b>	<b>5436</b>	<b>7537028</b>	<b>550</b>	<b>61</b>	<b>8.3</b>	<b>11.2</b>	<b>9</b>	<b>74.8</b>	<b>1</b>

Source: DPI – returns made under the MRSDA.

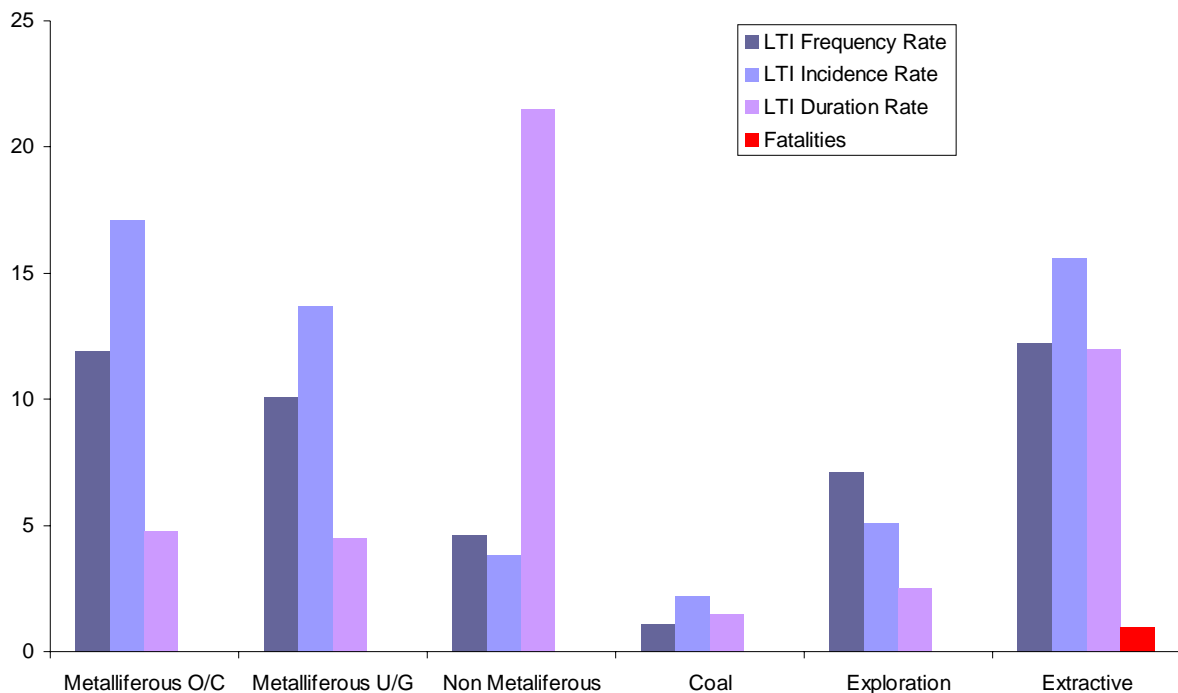
Notes:

O/C – Open Cut

U/G – Underground

\* Annual average number of person employed as reported.

The extractive and metalliferous underground operations were the main contributors to LTI counts for the mining industry in 2005/06, followed by metalliferous open-cut operations. The highest LTI Frequency Rate for the year was recorded for extractive operations.

**Graph 6.5 Minerals Safety Statistics by Sector: 2005/06**

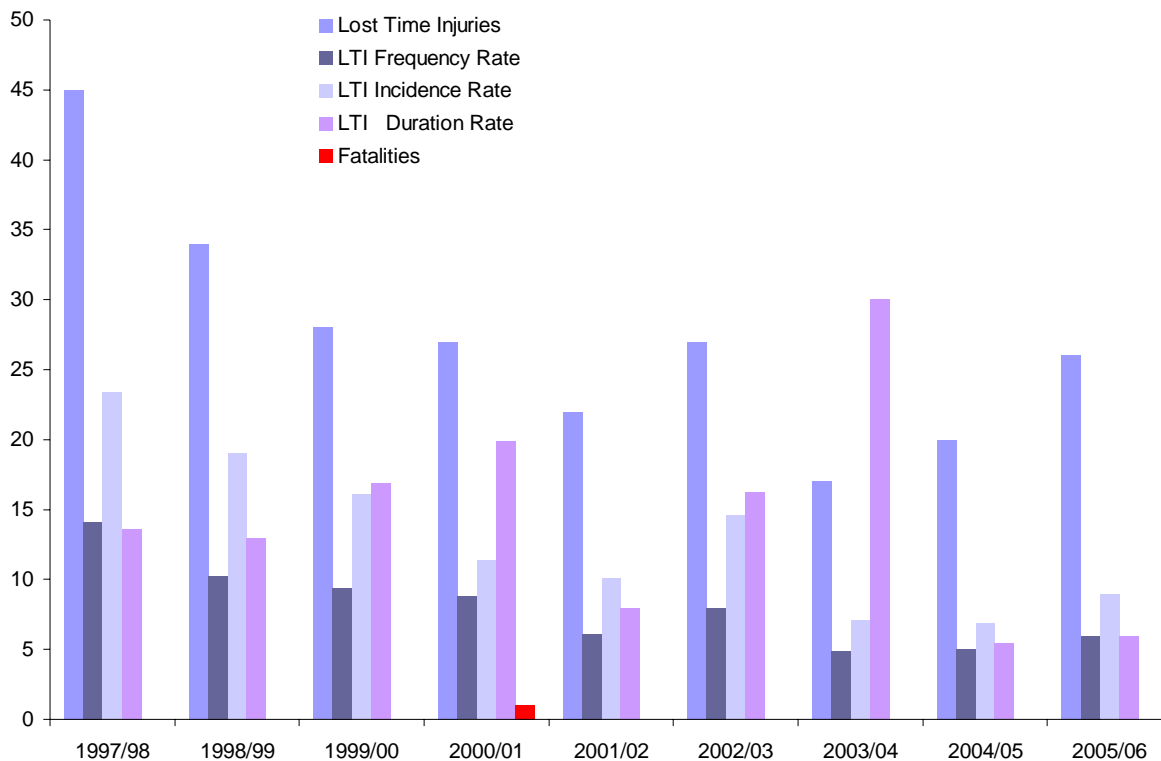
Source: DPI – returns made under the MRSDA.

**Table 6.9 Mining Safety Statistics: 1994/95 – 2005/06**

Operation	Lost Time injuries (LTI's)	Employed*	Days Lost	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
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
2004/05	20	2902	109	5.0	6.9	5.5	27.3	0
2005/06	26	2930	148	6.0	8.9	6.0	33.9	0

Source: DPI – returns made under the *Mineral Resources (Sustainable Development) Act 1990*.

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

**Graph 6.6 Mining Lost Time Injury and Fatality Statistics: 1997/98 – 2005/06**

The total number of Lost Time Injuries (LTI) reported in the mining industry increased, from 20 in 2004/05 to 26 in 2005/06. Due to increased employment, the LTI Frequency Rate has remained fairly steady: 5 in 2004/05 and 6 in 2005/06. There were no fatalities in 2005/06.

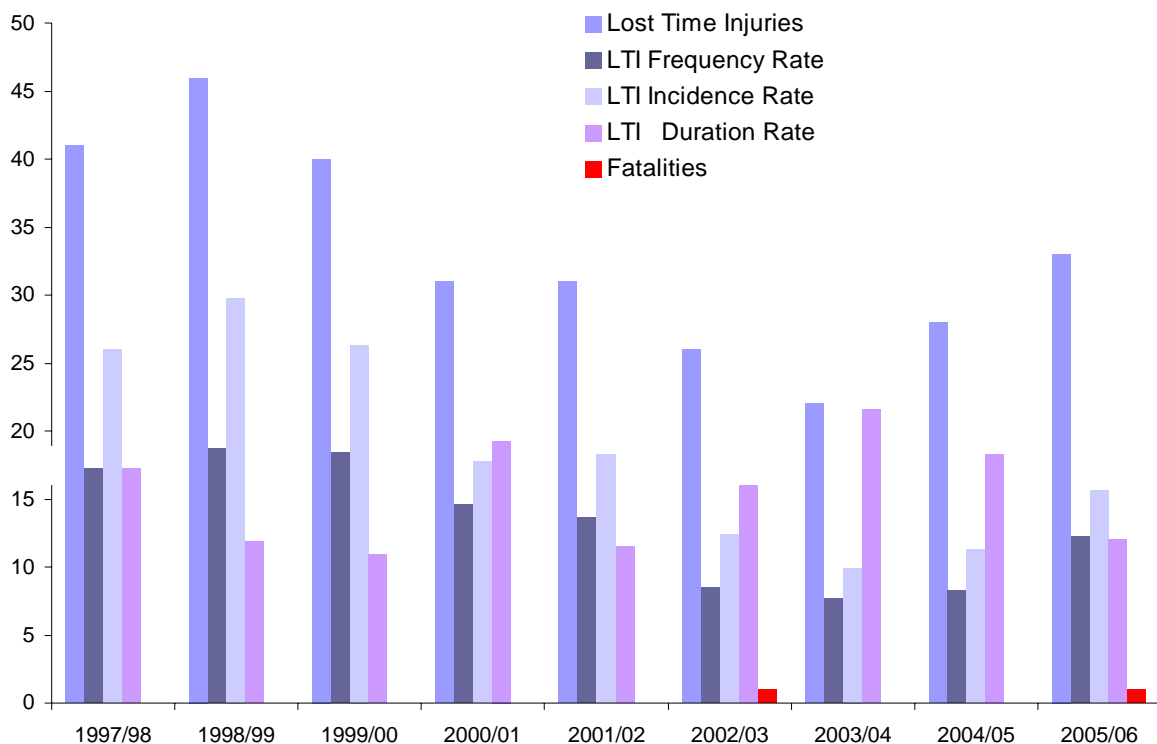
**Table 6.10 Extractive Industry Safety Statistics: 1994/95 – 2005/06**

Year	Lost Time injuries (LTI's)	Employed*	Days Lost	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
1994/95	32	-	-	20.2	-	-	-	nil
1995/96	28	-	-	13.4	-	-	-	nil
1996/97	30	-	-	20.6	-	-	-	nil
1997/98	41	-	710	17.3	26	17.3	282	nil
1998/99	46	1542	550	18.7	29.8	11.9	223.7	nil
1999/00	40	1520	436	18.4	26.3	10.9	200.8	nil
2000/01	31	1741	597	14.6	17.8	19.3	281.2	nil
2001/02	31	1690	355	13.7	18.3	11.5	156.5	nil
2002/03	26	2096	417	8.5	12.4	16	137.2	1
2003/04	22	2218	475	7.7	9.9	21.6	165.7	nil
2004/05	28	2472	512	8.3	11.3	18.3	151.4	nil
2005/06	33	2110	397	12.2	15.6	12	146.4	1

Source: DPI

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

The total number of Lost Time Injuries (LTI) in the extractive industry increased to 33 in 2005/06 from previous year's figure of 28. The LTI Frequency Rate has also increased from 8.3 to 12.2 in 2005/06. There was 1 fatality in 2005/06.

**Graph 6.8 Extractive Industry Safety Statistics: 1997/98– 2005/06**

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

**HCDG:** high consequence dangerous goods

**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 (LTIFR):** 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

**MRSDA:** *Mineral Resources (Sustainable Development) Act 1990*

**OHS Act 2004:** *Occupational Health and Safety Act 2004*

**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

<b>\$A</b>	dollar (Australian)
<b>\$A/GJ</b>	dollar (Australian) per gigajoule
<b>\$m</b>	million dollars (Australian)
<b>\$US</b>	dollar (United States)
<b>bbbl</b>	barrel ( 42 US Gallons; 158.987 L)
<b>bbbl/d</b>	barrels per day
<b>Bm<sup>3</sup></b>	billion (10 <sup>9</sup> ) cubic metres
<b>Bscf</b>	billion (10 <sup>9</sup> ) cubic feet (0.0283 Gm <sup>3</sup> )
<b>C+C</b>	crude oil and condensate
<b>cond.</b>	condensate
<b>GL</b>	gigalitre (10 <sup>9</sup> L; 6.29 Mbbbl)
<b>Gm<sup>3</sup></b>	billion (10 <sup>9</sup> ) cubic metres (35.336 Bscf)
<b>kL</b>	kilolitre (10 <sup>3</sup> L)
<b>L</b>	litre
<b>LPG</b>	Liquefied petroleum gas
<b>ML</b>	megalitre (10 <sup>6</sup> L)
<b>Mbbbl</b>	million barrels
<b>Mcf/d</b>	Million cubic feet per day
<b>MIN</b>	Mining licence granted under the <i>Mineral Resources (Sustainable Development) Act 1990</i>
<b>Mm<sup>3</sup></b>	million cubic metres
<b>oz</b>	Troy ounce (31.1 g)