

2009/2010 Statistical Review

Victoria's Minerals, Petroleum and Extractive Industries

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1. Introduction

The Statistical Report provides an overview of Victoria's earth resources industry – namely the petroleum, geothermal, minerals and extractive industries – and includes data on production, exploration, expenditure and licensing. This report is the most comprehensive public report available for these sectors in Victoria and is relevant to anyone involved in these 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

Earth Resources Regulation Branch in the Department of Primary Industries is responsible for the regulation of the minerals, extractive, petroleum, pipelines, geothermal and carbon storage industries in Victoria and off-shore waters. The Branch provides a consistent and transparent tenement management regime, together with monitoring and enforcement that ensure these industries comply with their obligations and meet community expectations.

Earth Resources Regulation Branch administers the following Acts:

- Mineral Resources (Sustainable Development) Act 1990
- Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Designated Authority under this Commonwealth Act)
- Petroleum (Submerged Lands) Act 1982 (Vic)
- Petroleum Act 1998
- Pipelines Act 1967
- Geothermal Energy Resources Act 2005
- Greenhouse Gas Geological Sequestration Act 2008.

NOTE: It should be noted that the provisions of the *Extractive Industries Development Act 1995* were consolidated into the *Mineral Resources (Sustainable Development) Act 1990* on 1 January 2010. For the purposes of this report, information relating to extractive industries straddles both the *Extractive Industries Development Act 1995* and the 1990.

2. Petroleum and Geothermal

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.

2.1 Petroleum and Geothermal Tenements

Petroleum

Victoria's petroleum exploration and production is concentrated in the Otway and Gippsland Basins. The Gippsland Basin has produced approximately two thirds of Australia's cumulative oil production and one third of its gas production to date.

Work started in 2009-10 on the Exxon/Mobil/BHP Billiton Kipper and Turrum fields in the Gippsland Basin. Nearly \$3 billion is committed to the development of these fields. Together they will develop around 1.6 trillion cubic feet of gas and 140 million barrels of liquids.

In 2010, Victoria returned strongly to the petroleum acreage release stage. The Minister offered five areas onshore in the Gippsland basin, two areas onshore in the Otway basin and one area in Otway State waters. Bids closed for one of the onshore Gippsland basin areas on 15 July 2010 and the bids for the other areas closed on 18 November 2010.

Victoria's gas is to be increasingly used for power generation. The Origin Energy Ltd's Mortlake gas-fired power station is expected to be complete in 2011. Three other gas-fired power stations (ie AGL Tarrone, Santos Shaw River and TRUenergy power stations) are at various stages of approval.

Geothermal

The latest report on Victoria's geothermal energy resources shows significant potential, with some local hot spots present. In spite of this, Victoria's geothermal energy resources have scarcely been tapped. There is however growing awareness of their potential value. With further exploration and improved technology, a better picture of Victoria's geothermal resource potential will emerge.

The Victorian Renewable Energy Target scheme aims to increase the amount of energy generated from renewable sources to 10 per cent by 2016. This is supported by the Federal Government target of 20 per cent by 2020. Geothermal energy has the potential to contribute to these targets.

Geothermal Exploration Permits (GEP) Application Received and Granted

2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
GEP Application Received	12	Nil	11	Nil	Nil
GEP Granted	12	Nil	11	Nil	Nil

Onshore Petroleum Exploration Permits (PEP) Application Received and Granted

2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
PEP Application Received	Nil	3	Nil	Nil	Nil
PEP Granted	Nil	2	1	Nil	Nil

Offshore Commonwealth Petroleum Exploration Permits (VIC/P) Application Received and Granted

2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
VIC/P Application Received	Nil	3	1	Nil	Nil
VIC/P Granted	Nil	3	Nil	1	Nil

Onshore Pipeline Licences (PL) Applications Received and Granted

2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
PL Application Received	7	9	Nil	Nil	Nil
PL Granted	9	7	2	1	Nil

Offshore Commonwealth Production Licences (VIC/L) Applications Received and Granted

2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
VIC/L Application Received	2	1	1	Nil	Nil
VIC/L Granted	Nil	1	3	1	Nil

Offshore Commonwealth Pipeline Licences (VIC/PL) Applications Received and Granted
2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
(VIC/PL) Application Received	Nil	1	1	3	Nil
(VIC/PL) Granted	Nil	Nil	2	Nil	3

Onshore Petroleum Retention Lease (PRL) Applications Received and Granted
2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
PRL Application Received	1	1	Nil	Nil	Nil
PRL Granted	Nil	2	1	Nil	Nil

Offshore Petroleum Retention Lease VIC/RL(V) Applications Received and Granted
2005/2006 - 2009/2010

	2005/06	2006/07	2007/08	2008/09	2009/10
VIC/RL(V) Application Received	Nil	Nil	1	Nil	Nil
VIC/RL(V) Granted	Nil	Nil	1	Nil	Nil

Current Petroleum and Geothermal Tenements as at 30 June 2010

Geothermal Exploration Permits (GEP)

Tenement	Number of GEP
GEP	23

Petroleum Tenements

Exploration Permits (PEP)

Tenement	Number of PEP
On shore	8
Off Shore (Vic)	Nil
Off Shore Joint authority	13

Pipeline Licences (PL)

Tenement	Number of PL
On shore	226
Off Shore (Vic)	13
Off Shore Joint authority	40

Production Licences (PPL)

Tenement	Number of PPL
On shore	14
Off Shore (Vic)	nil
Off Shore Joint authority	30

Retention Leases (PRL)

Tenement	Number of PRL
On shore	3
Off Shore (Vic)	2
Off Shore Joint authority	3

2.2 Exploration and Development

Petroleum activities through the financial year 2009/2010 are summarised below:

2.2.1 Drilling

One exploration well was drilled through the year 2009/2010 in the areas administered by the Victorian Department of Primary industries compared to 7 wells drilled during the same period last year.

Seventeen development wells were drilled in 2009/2010 compared to 9 wells drilled during the same period last year.

One exploration well was drilled in Gippsland offshore areas and it intersected significant oil and gas columns. The discovery is considered to be a commercial discovery.

One appraisal well was drilled in Gippsland onshore areas (it is counted with exploration wells for simplicity)

Table 2.1.1: Summary of Wells Drilled for the Year 2009/10

Activity	Exploration wells	Development wells	Total	Comments
Drilling	2	17	19	Onshore and offshore wells are combined

Table 2.1.2: History of the Number of Exploration Wells Drilled from 1984

Year	Offshore		Onshore			Total wells
	Gippsland	Otway	Gippsland	Otway	Murray	
Pre 1984	-	-	-	-	-	381
1984/85	10	0	2	2	0	14
1985/86	9	1	3	5	0	18
1986/87	2	0	2	2	0	6
1987/88	1	0	2	7	0	10
1988/89	9	0	0	1	0	10
1989/90	17	0	0	2	0	19
1990/91	0	0	2	6	1	9
1991/92	5	0	0	2	0	7
1992/93	4	4	0	1	0	9
1993/94	2	1	0	3	0	6
1994/95	6	0	2	5	0	13
1995/96	2	2	0	3	0	7
1996/97	2	0	1	5	0	8
1997/98	2	0	0	1	0	3
1998/99	0	0	1	0	0	1
1999/00	3	0	3	2	0	8
2000/01	1	1	2	5	0	9
2001/02	4	2	4	7	1	18
2002/03	3	2	3	4	0	12
2003/04	2	1	1	2	0	6
2004/05	8	7	2	0	0	17
2005/06	7	1	4	4	0	16
2006/07	2	0	4	2	0	8
2007/08	6	2	0	2	0	10
2008/09	5	1	0	1	0	7
2009/10	1	0	1	0	0	2
Total 1984-2010	113	25	39	74	2	253
Grand Total						634

Table 2.1.3: History of the Number of Development Wells Drilled

Year	No. of Wells Drilled
Pre 1984	499
1984/85	28
1985/86	10
1986/87	16
1987/88	8
1988/89	14
1989/90	17
1990/91	6
1991/92	11
1992/93	8
1993/94	10
1994/95	17
1995/96	10
1996/97	33
1997/98	30
1998/99	44
1999/00	9
2000/01	4
2001/02	14
2002/03	14
2003/04	13
2004/05	15
2005/06	19
2006/07	14
2007/08	14
2008/09	9
2009/2010	17
Total	903

There were twelve major work-over activities and about 104 wire-line interventions were undertaken in offshore Gippsland.

2.2.2 Geophysical Surveys

Three seismic surveys were undertaken in the areas administered by the Victorian Department of Primary Industries during the financial year 2009 / 2010 compared to no seismic during the same period last year.

Onshore

The Windermere 3D seismic survey of 41.63 sq kms was acquired in the onshore Otway Basin, permit PEP167. The survey was conducted during the period 12 February to 31 March 2010. PEP167 is jointly held by Bass Strait Oil Company Ltd (50% and operator) and Interra Resources (Australia) Pty Ltd (50%). The survey objectives were to better define the nature and extent of the Windermere oil accumulation. Mapping has been a key uncertainty due to poor quality of the existing 1980's 2D seismic survey. The title holders wish to facilitate detailed well planning in anticipation of follow up drilling and to further assess surrounding leads. The seismic data has been processed by Velseis in Brisbane with a final data cube made available mid-August. Data quality assessment and interpretation are ongoing.

Offshore

Drillsearch reprocessed and performed an interpretation of more than 4,000km of 2D seismic data. This was completed during the June quarter 2009. A number of structural and stratigraphic prospects have been identified on the southern margin of the Gippsland Basin. The company believes this is a focus for hydrocarbons migrating out of the main source area immediately to the north.

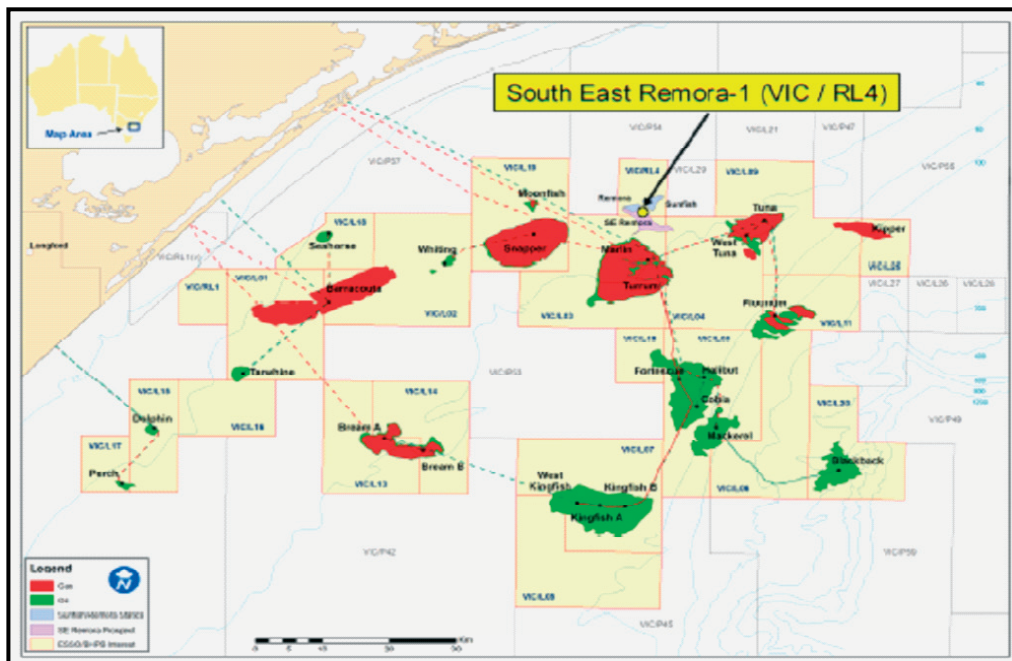
Additionally Drillsearch conducted the Furneaux 2D seismic survey that commenced on 26 January 2010 and finished on 21 February 2010. The seismic contractor was SeaBird Exploration, using the vessel The M/V Aquila Explorer (Figure 1) . Total km's collected in Victorian waters totalling 1116.7 km located on two survey blocks, VIC/P63 (525.7km within the permit) and VIC/P64 (591 km within the permit).

2.2.3 Hydrocarbon Discovery

The Wildcat well South East Remora-1, spudded on 20 December 2009 by Esso Australia Pty Ltd, in VIC/RL4 intersected significant oil and gas columns. Located 35 kilometres off the Victorian coast in Bass Strait, the well was drilled in 57 metres of water to a total depth of 3,602 metres below sea level. This found oil and gas in the Latrobe and Golden Beach groups in the Gippsland Basin.

Data analysis and additional studies are being conducted to evaluate the discovery to establish an efficient appraisal program as a precursor to possible development in the near future.

After four decades of gas and oil production from Bass Strait, there are significant oil and gas resources still to be produced in the Gippsland Basin, and decades of remaining oil and gas production.



2.3 Production

2.3.1 Hydrocarbon Production

The production of crude oil and condensate from Gippsland has been declining for almost three decades, this is associated with a gradual increase in the water cut. This is an expected profile because of the extensive production and natural depletion of the reservoirs.

Hydrocarbon production from the Gippsland Basin remained strong although there was a decrease compared to the previous year as follows:

- Crude oil and condensate production was 4.00 GL compared to 4.35 GL during the previous year.
- LPG produced was 1.62 GL compared to 1.63 GL during the previous year.
- Gas produced was 5.50 GL compared to 7.23 GL during the previous year.

Hydrocarbon production remains strong in Gippsland due to infill drilling in the developed fields and work-overs undertaken to renew the down hole equipment and to open new zones.

Major gas fields continue to produce after four decades. There is also significant potential for the discovery of new hydrocarbon resources or the development of known reservoirs.

Bass Strait production is included with that for the Gippsland Basin, while Otway Basin figures are significantly less and were therefore not discussed.

Table 2.2.1: Summary of Gippsland Offshore Production figures for the Year 2009/10

Operators	Oil + Condensate (bbl)	Gas (MMscf)	LPG (bbl)	Comments
Roc Oil	927,449	3744	-	Basker, Manta and Gummy
Nexus	78,666	5,717	-	
Esso *	25,002,371	193,937	10,176,924	* see below
Basin Total	26,008,486	203,398	10,176,924	-

*Barracouta, Blackback, Bream, Bream, Cobia, Dolphin, Flounder, Fortescue, Halibut, Mackerel, Kingfish, Marlin, Moonfish, Perch, Seahorse, Snapper, S. Mackerel, Tarwhine, Tuna, Turrum, W. Kingfish, W. Tuna

Table 2.2.2: Summary of Otway Offshore Production figures for the Year 2009/10

Field	Condensate (bbl)	Gas (MMscf)
Casino	14,193	19,032
Henry	3,459	2,787
Netherby	9,477	8,385
Minerva	65,306	24,846
Basin Total	92,435	55,050

Table 2.2.3: Summary of Otway Onshore Production and Injection figures for the Year 2009/10

Field	Condensate (bbl)	CO2 (MMscf)	Gas Prod. (MMscf)	Gas Inj. (MMscf)	Comments
Iona	1066		9,592	6719	Gas storage
Boggy Creek	Negligible	691			CO ₂

Table 2.2.4: Gippsland Production and Injection Figures for the Financial Year 2009/10 – Esso

PLATFORM	Oil & Cond	GAS	LPG	WATER
	bbl	KSCF	bbl	bbl
BLACKBACK	230,067.17	555,611.59	50,796.78	1,272,343.45
BREAM A	1,522,477.31	22,536,185.65	970,159.89	2,993,249.81
BREAM B	980,966.65	9,237,733.95	432,217.95	1,456,025.14
BARRACOUTA	565,019.96	37,976,627.39	1,228,561.99	988.38
COBIA	4,470,671.47	234,162.09	279,172.41	22,711,110.08
DOLPHIN	278,509.78	62,251.46	19,044.10	2,936,078.28
FLOUNDER	1,765,138.65	11,689,950.08	899,428.50	13,785,976.38
FORTESCUE	1,121,857.12	69,465.03	64,942.63	20,665,401.13
HALIBUT	1,120,441.83	61,874.17	68,928.38	14,376,806.44
KINGFISH A	904,621.05	114,300.86	94,205.76	20,853,809.56
KINGFISH B	738,469.03	218,651.49	68,975.01	20,377,101.09
MOONFISH	711,928.14	1,686,493.38	49,175.76	2,342,986.77
MACKERAL	752,950.31	91,520.47	89,544.86	24,801,527.71
MACKERAL - INJ	0.00	0.00	0.00	-725,185.07
MARLIN	2,543,197.23	80,589,341.87	3,609,216.54	0.00
PERCH	139,336.12	19,793.87	2,083.42	1,733,216.16
SEAHORSE	188,748.54	8,125.06	7,476.04	1,096,759.48
SOUTH MACKERAL	32,368.95	3,860.21	3,806.07	1,148,327.15
SNAPPER	1,979,575.77	69,585,863.06	1,807,815.34	1,766,454.79
TUNA	1,823,158.70	2,499,109.83	164,650.37	7,923,166.75
TUNA - INJ	0.00	-2,805,400.46	0.00	0.00
TURRUM	101,332.58	12,134.84	3,269.24	10,551.74
TURRUM - INJ	0.00	-5,240,992.71	0.00	0.00
WEST KINGFISH	1,050,652.91	156,959.39	114,242.11	11,736,919.30
WHITING	0.00	0.00	0.00	0.00
WEST TUNA	1,980,881.57	1,001,865.09	149,211.17	6,222,877.24
WEST TUNA - INJ	0.00	-36,428,930.54	0.00	0.00
Field Total	25,002,370.85	193,936,557.14	10,176,924.32	179,486,491.76

NOTE: Highlighted cells are the totals injected and are to be subtracted from the Platform to give the actual production volume for the platform.

Table 2.2.5: History of Bass Strait Annual Petroleum Production Figures – Esso

Year	O+C, GL	LPG, GL	Gas, Gm³
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
2006 - 07	4.61	1.89	7.33
2007 - 08	4.50	1.88	7.29
2008 - 09	4.35	1.63	7.23
2009 - 10	4.00	1.62	5.50

Figure 2.2.1: History of the Total Annual Production for Bass Strait of Crude & Condensate, Liquid Petroleum Gas and Gas

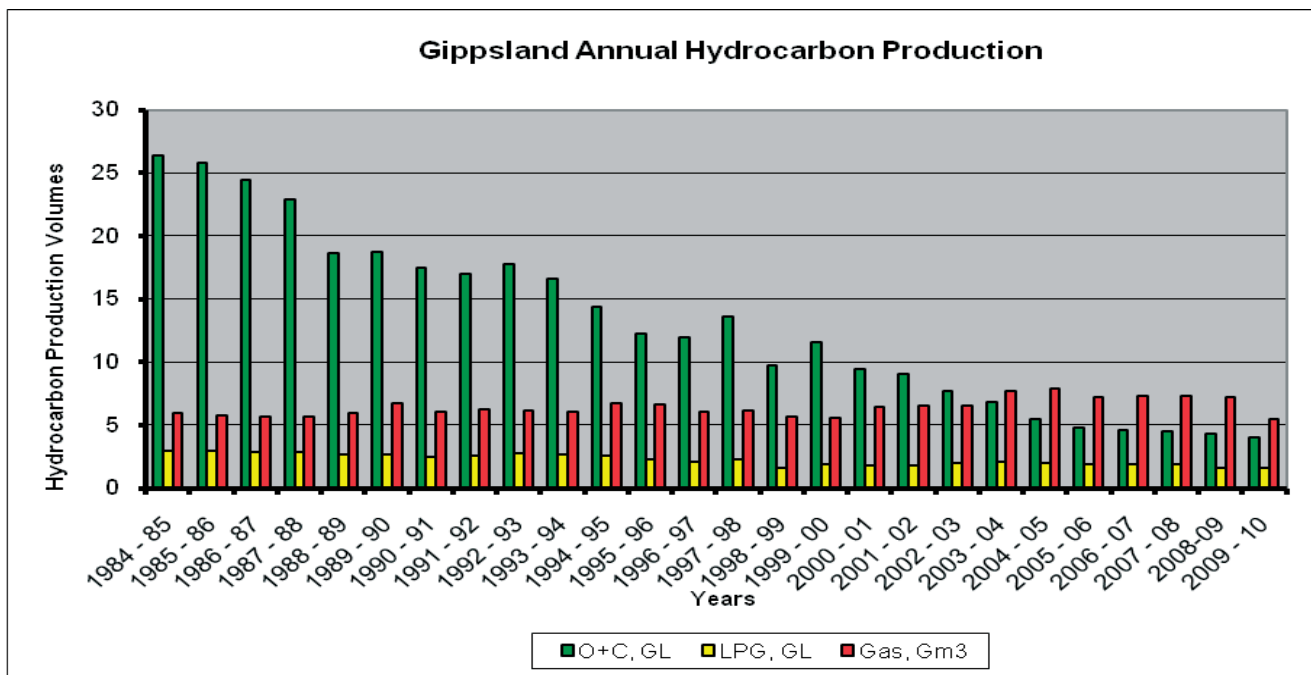
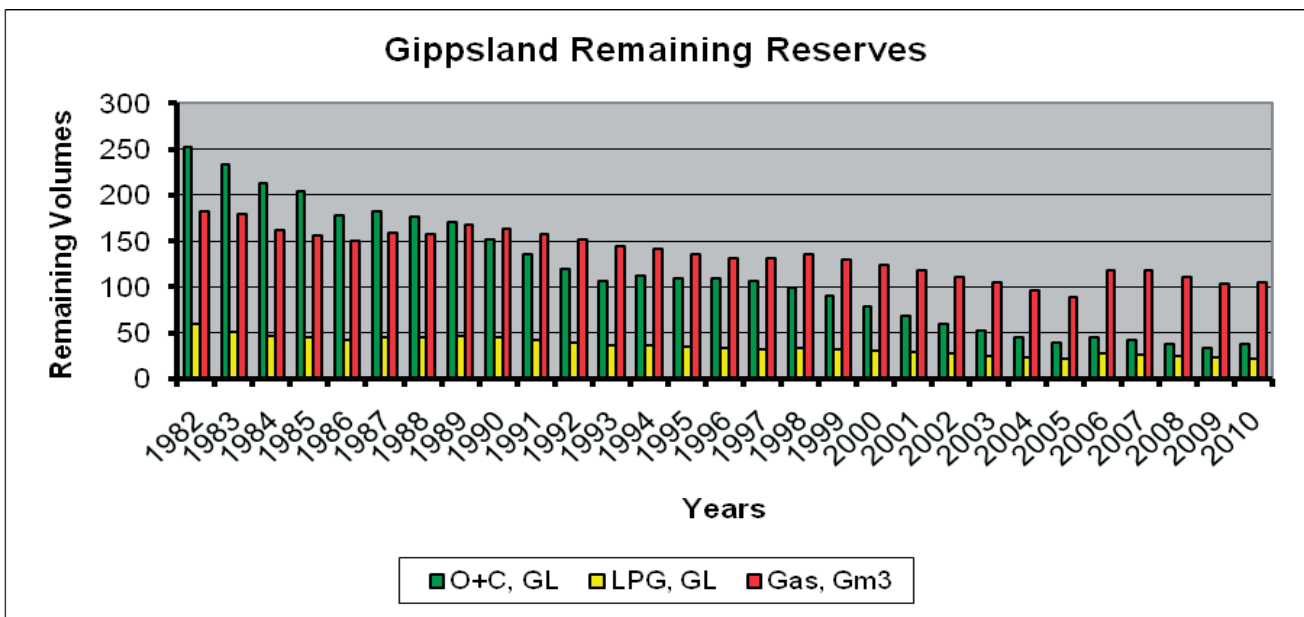


Table 2.2.6: Gippsland Basin Cumulative Production And Remaining Reserves – Esso

Year	Initial Recoverable Reserves			Cumulative Production			Remaining Reserves		
	O+C, GL	LPG, GL	Gas, Gm3	O+C, GL	LPG, GL	Gas, Gm3	O+C, GL	LPG, GL	Gas, Gm3
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
2007	657.70	114.10	311.90	615.10	87.90	193.50	42.60	26.20	118.40
2008	657.70	114.10	311.90	619.60	89.78	200.79	38.10	24.32	111.11
2009	657.70	114.10	311.90	623.95	91.41	208.02	33.81	22.69	103.89
2010	665.40	115.60	318.00	627.95	93.03	213.52	37.45	22.57	104.48

Figure 2.2.2: History of the Total Crude & Condensate, Liquid Petroleum Gas and Gas Reserves Remaining for Gippsland



Note: The value Of Victorian petroleum production was intentionally not included as the oil price fluctuates over time.

Additional information:

One barrel = 0.158987 cubic metres

One cubic meter = 35.31466 cubic feet

One cubic meter = 1000 Litres

GL = Giga litres = 1,000,000,000 Litres = 109 litres

Gm3= Giga cubic metres =1,000,000,000 meters = 109 metres

Kscf = Kilo standard cubic feet

MMscf = million standard cubic feet

MMscm = million standard cubic metres

bbl = barrels

O+C = Oil plus Condensate

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3. Minerals

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

In 2009/10, brown coal production, predominantly from the Latrobe Valley for electricity generation, reported at 68.7 million tonnes, represented a slight increase from the previous year's production of 68.2 million tonnes in 2008/09.

Gold production in the year has been 241,965 ounces, a little drop from the previous year's production of 248,918 ounces in 2008/09. In 2006/07 AGD Operations Pty Ltd commenced producing antimony concentrates from the company's Costerfield mine. The production of antimony in the last 4 years has been 1110 tonnes per annum.

Gypsum, kaolin, mineral sands 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, increased in 2009/10 to 315,507 cubic metres, from the previous year's production of 131,145 cubic metres. In 2009/10 kaolin production showed a slight increase to 92,865 tonnes from 90,553 tonnes in 2008/09. Feldspar production in Victoria commenced in 1997/98 by Unimin Australia Ltd at Beechworth. In 2009/10 feldspar production was 66,507 tonnes lower than previous year production of 73,893 tonnes in 2008/09.

Mineral sands (zircon, rutile and ilmenite) 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. In 2009/10 all mineral sands production (recovery) of 235,889 tonnes came from the Iluka owned Basin Minerals Holdings Douglas, Kulwin and Eco mines.

Definition of Minerals under Section 4 of 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.

3.1 Minerals Tenements

In 2009/10, 160 applications were received for grant or renewal of minerals related licences under the MRSDA. Approximately 72 % of these were for exploration licences. In the same period 161 exploration and mining licences were granted or renewed, with about 72 % of these being exploration licences. It should be noted that while an application may be received in one financial year, it may not be determined within that financial year.

Table 3.1.1 New and Renewal Applications for Exploration and Mining Licences: 2009/10

	Received	Granted or Renewed	Withdrawn	Refused
New Exploration Licence Applications	61	61	16	1
Renewal Exploration Licence Applications	55	55	1	0
Sub Total Exploration Licence Applications	116	116	17	1
New Mining Licence Applications	13	15	3	0
Renewal Mining Licence Applications	31	30	0	0
Sub Total Mining Licence Applications	44	45	3	0
Total Licences	160	161	20	1

Source: DPI

Table 3.1.2 Exploration and Mining Licences - Granted and Renewed over time: 2003/04 - 2009/10

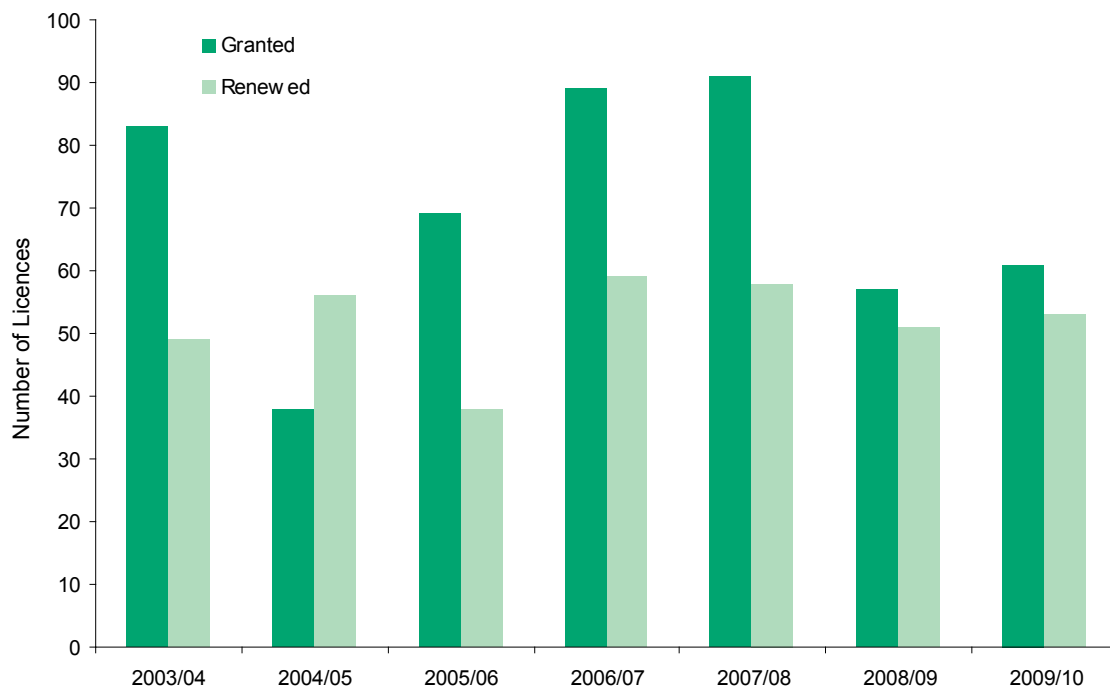
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Exploration Licence Granted	83	38	69	89	91	57	61
Exploration Licence Renewed	49	56	38	59	58	51	55
Subtotal Exploration Licences Granted and Renewed	132	94	107	148	149	108	116
Mining Licence Granted	17	20	13	19	11	14	15
Mining Licence Renewed	39	29	22	56	21	41	30
Sub Total Mining Licences Granted and Renewed	56	49	35	75	32	55	45
Total Licences	188	143	142	223	181	163	161

Source: DPI

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

In 2009/10 the number of exploration licences granted/renewed was 116, compared to the previous year figure of 108. The total number of mining licences granted/renewed in 2009/10 decreased to 45 from the previous year of 55 in 2008/09 primarily due to a drop of number of renewals in that year.

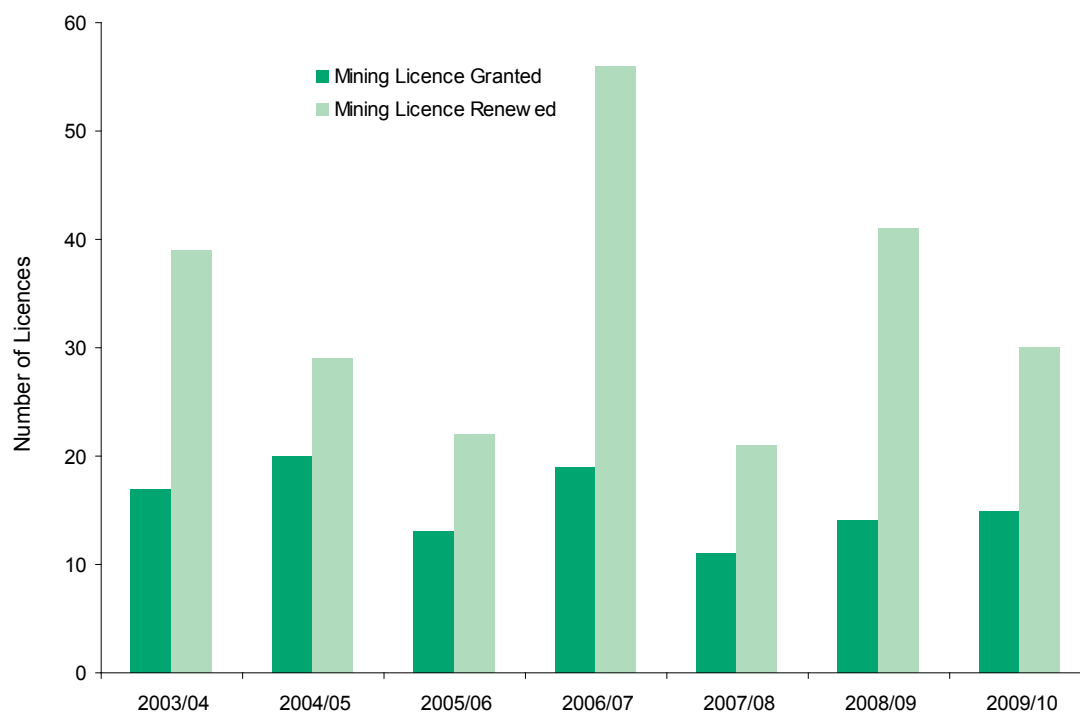
Figure 3.1.1 Exploration Licence Grants and Renewals: 2003/04 – 2009/10



Source: DPI

There is a cyclical trend in the level of activity associated with exploration licences (grants and renewals). The Global Financial Crisis which began in October 2008 curtailed the preceding upward trend.

Figure 3.1.2 Mining Licence Grants and Renewals: 2003/04 – 2009/10



Source: DPI

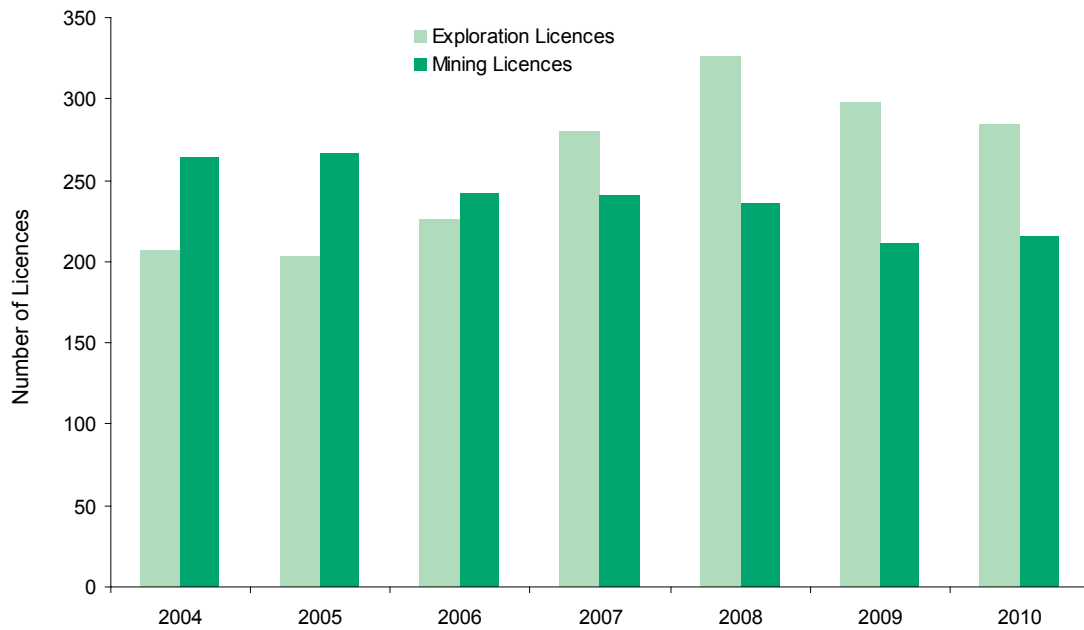
Table 3.1.3 Current Exploration and Mining Licences at 30 June each year: 2004 – 2010

Tenement	2004	2005	2006	2007	2008	2009	2010
Exploration Licences	207	203	226	280	326	298	285
Mining Licences	264	266	242	240	236	211	216
Totals	471	469	468	520	562	509	501

Source: DPI

The total areas covered by mining and exploration licences in 2009/10 were 736 km² and 86,365km² respectively. The number of mining licences has steadily fallen over the last seven years but this trend changed in 2009/10 with a slight increase to 216 from previous year of 211. A significant number of amalgamations contributed to the annual reduction in the number of mining licences. The total number of current exploration licences in 2009/10 decreased to 285 in continuation of the peak since 2006.

Figure 3.1.3 Current Exploration and Mining Licences as at 30 June each year: 2004 – 2010



Source: DPI

3.2 Mineral Exploration and Mining Expenditure

The Australian Bureau of Statistics (ABS) reports quarterly on private mineral exploration expenditure for all Australian 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 3.2.1 Expenditure on Mineral Exploration and Mining Development (\$A million): 2000/01 – 2009/10

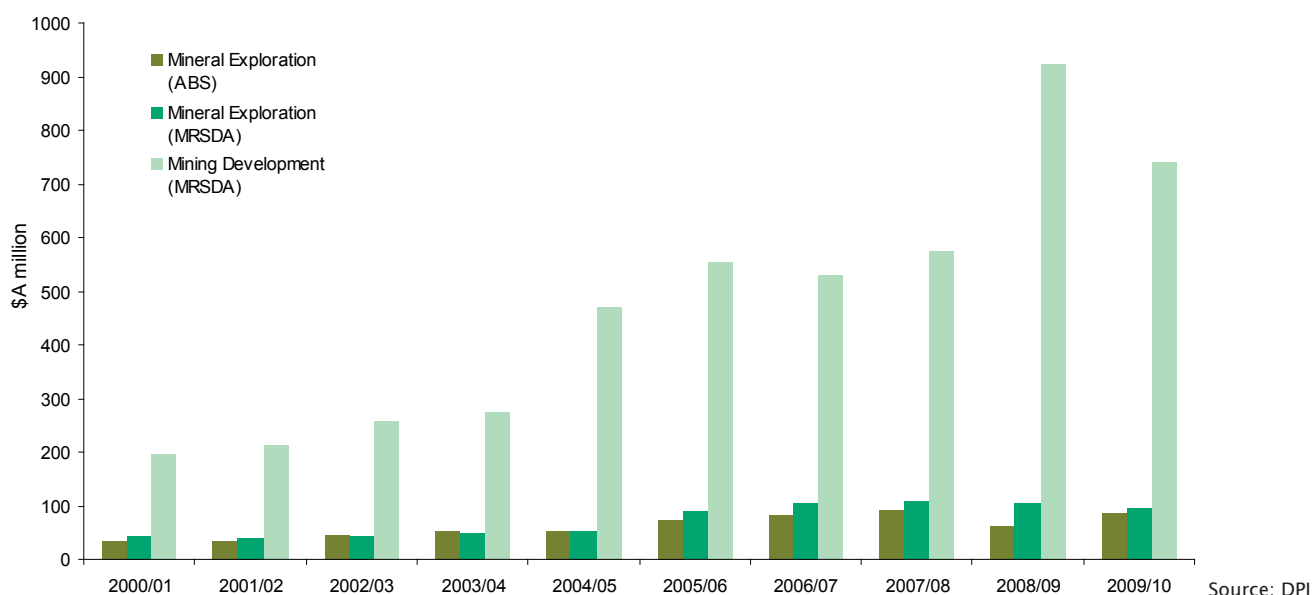
	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10
Mineral Exploration (ABS)	32.7	33.9	46.2	53.5	51.5	74.1	82.5	93.7	62.2	84.8
MRSDA Exploration	43.4	39.3	43.3	50.2	52.2	88.2	105.4	107.8	103.3	94.3
MRSDA Mining	195.5	213.5	258.2	274.4	469.9	553.0	527.8	576.6	923.3	742.0

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

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

Figure 3.2.1 Expenditure on Mineral Exploration and Mining Development: 2000/01 – 2009/10



Mineral exploration expenditure is a lead indicator of mineral industry activity. ABS data shows a growth trend of exploration expenditure from 2001/02 to 2007/08, with a slight decline in 2004/05. According to ABS data this trend has sharply reversed in 2008/09 but increased in 2009/10. This change was not observed as strongly in the MRSDA data. The difference in these two exploration expenditure data sets is considered to be mainly due to the difference in methodologies for data collection, and the inclusion of the exploration expenditure on mining licences in the MRSDA figure.

Expenditure on mining was on an upward trend from 2000/01 to 2008/09 but this has been reversed in 2009/10.

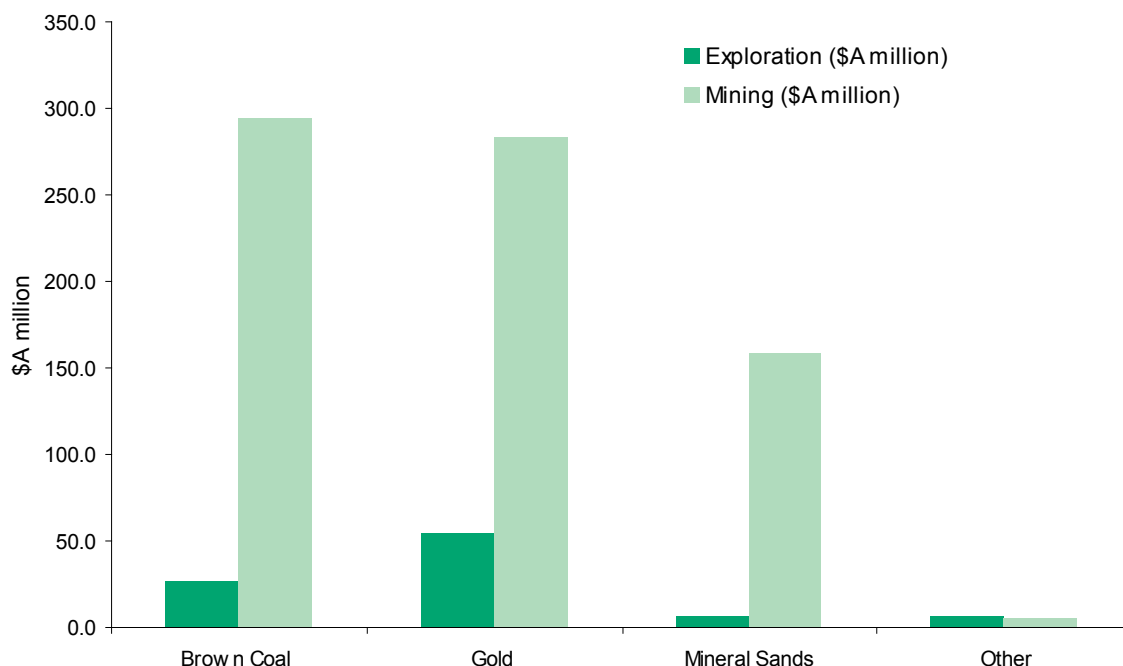
There had been a gradual, and significant increase in mining development expenditure since 00/01 (almost by a factor of 5 or 500%).

The dip in 2009/10 was as the result of a significant decrease in expenditure by one company which had been expending large amounts on plant and equipment in previous years.

Table 3.2.2 Mineral Exploration and Mining Development Expenditure by Sector (MRSDA): 2009/10

Sector	Exploration (\$A million)	Mining (\$A million)
Brown Coal	26.6	294.6
Gold	54.2	282.9
Mineral Sands	6.5	158.7
Other	7.0	5.8
Total	94.3	742.0

Figure 3.2.2 Mineral Exploration and Mining Development Expenditure by Sector (MRSDA): 2009/10



Source: DPI

3.3 Production

Table 3.3.1 Mineral Production: 1986/87 – 2009/10

Year	Fuel Minerals	Metallic Minerals					Heavy Mineral Sands				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)	
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	3,702	16,805	28,123	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	
2006/07	65,613	6,995	224,927	nil	nil	48,636	22,263	nil	76,187	235,266	170,727	
2007/08	66,033	5,632	181,100	nil	nil	140,853	72,166	13,503	75,384	395,717	151,669	
2008/09	68,252	7,741	248,918	nil	nil	102,123	80,317	nil	73,893	313,145	90,553	
2009/10	68,751	7,526	241,965	nil	nil	90,671	117,314	27,904	66,507	315,509	92,862	

Source: DPI – statutory returns under the MRSDA.

Table 3.3.2 Mineral Production Values: 2009/10

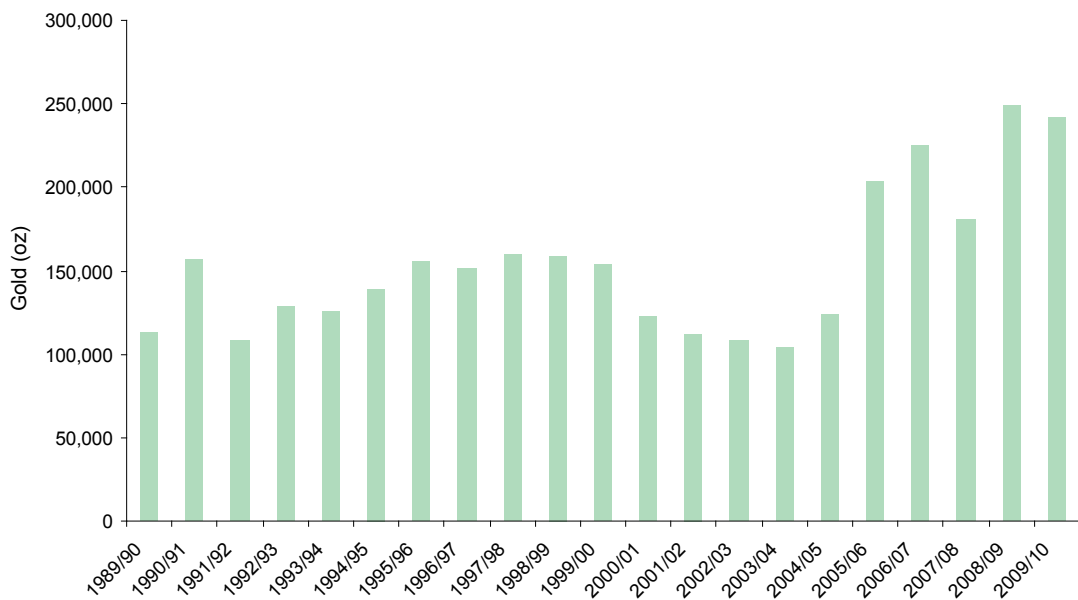
Mineral	Value (\$A million)
Brown Coal	Not available
Gold	300.1
Heavy Mineral Sands	190.9*
Feldspar	4.8
Gypsum	4.3
Kaolin	2.4
Total	502.5

Source: DPI

*Sold

Note: Unit value for Brown Coal is not available and the values of other minerals are as reported by tenement holders.

Figure 3.3.1 Gold Production (ounces) : 1989/90 – 2009/10



Source: DPI

Table 3.3.3 Gold Producers (Production more than 100 kg): 2009/10

Producer	Location	Licence	Production (kg)	Production (oz)	Estimated Value (\$A)*
Perseverance Exploration Pty Ltd	Fosterville	MIN 5404	3,330	107,062	132,756,880
Leviathan Resources Ltd	Stawell	MIN 5260	2,505	80,538	99,867,120
Bendigo Mining Limited	Kangaroo Flat	MIN 5344	1,248	40,140	49,773,600
Ballarat Goldfields NL	Ballarat East	MIN 5396	217	7,003	8,683,720
AGD Operations Pty Ltd	Costerfield	MIN 4644	201	6,448	7,995,520
Total			7,501	241,191	299,076,840
Other			24	778	964,768
Total Production			7,525	241,969	300,041,608

Source: DPI – statutory returns under the MRSDA.

Note: *based on the reported average gold price of \$1 240/oz.

Most of Victoria's gold production in 2009/10 was from mines owned by Leviathan Resources Ltd at Stawell, Perseverance Exploration Pty Ltd at Fosterville, Bendigo Mining Limited at Kangaroo Flat, Ballarat Goldfields NL operation at Ballarat East and AGD Operations Pty Ltd at Costerfield. However, many smaller companies and individuals (19 in total) also produced small amounts of gold.

Table 3.3.4 Brown Coal Production (thousand tonnes): 1983/84 – 2009/10

YEAR	Maddingley Brown Coal Co. Bacchus Marsh	Alcoa Anglesea	SECV	Loy Yang	Yallourn	Hazelwood	Annual Total
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
1996/97	39	1,005	-	27,808	17,083	14,860	60,795
1997/98	28	1,030	-	29,766	17,924	16,525	65,274
1998/99	22	1,091	-	30,510	17,350	17,675	66,648
1999/00	4	926	-	30,865	16,098	19,470	67,363
2000/01	11	963	-	28,686	16,234	19,063	64,958
2001/02	10	1,069	-	30,949	15,650	18,982	66,661
2002/03	15	1,051	-	29,017	17,515	19,210	66,809
2003/04	18	1,107	-	29,577	16,585	19,056	66,343
2004/05	19	943	-	29,826	17,663	18,701	67,152
2005/06	22	1,101	-	30,937	16,933	18,743	67,737
2006/07	15	1,049	-	29,146	16,090	19,313	65,613
2007/08	16	1,066	-	30,745	15,467	18,739	66,033
2008/09	14	966	-	29,007	18,229	20,036	68,252
2009/10	11	1,077	-	30,446	17,685	19,531	68,750

Source: DPI



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.

The significant increase in Minerals Mine Development Expenditure from 00/01 to 09/10 (500%) is reflected in significant increases in Gold and Mineral Sands production.

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4. 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.

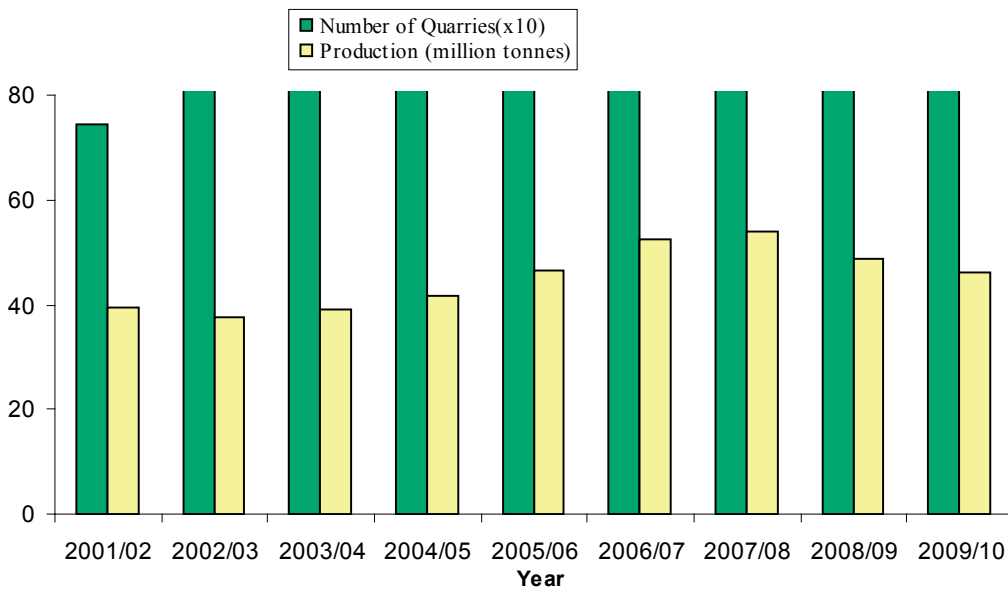
There are 869 quarries operating under the Mineral Resources (Sustainable Development) Act 1990 (MRSDA) in Victoria. This number has remained relatively stable since 2001/2002. A total of 605 of these reported a total production of 46.1 million tonnes in 2009/10. This is lower than the previous production of 48.7 million tonnes in 2008/09. The reported decreased production is a reflection of a lower demand for extractive materials in the year.

Definition of the Extractive Industry under Section 4 of the Mineral Resources (Sustainable Development) Act 1995

"Extractive industry" means the extraction or removal of stone from land if a 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 involving the extraction or removal of stone from land, declared by the Minister, by notice published in the Government Gazette, to be an extractive industry for the purposes of this Act.

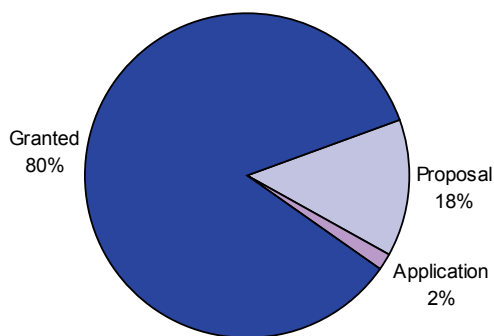
Figure 4.1 Extractive Industry Quarries and Production: 2001/02 – 2009/10



While the number of quarries operating in Victoria has remained stable since 2001/02, there has been a slight fluctuation in production output reflecting demand drivers for stone resources.

4.1 Work Authorities

Table and Figure 4.1.1 Status of Extractive Industry Work Authorities at 30 June 2010



Tenement	Proposal ¹	Application ²	Current
Work Authority	144	15	869

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

1. Work Authority is in proposal stage when an initial site meeting takes place attended by the Inspector and other relevant parties.
2. Application stage is when a Work Authority application is lodged with all requirements to obtain an approved Work Plan.

The number of Work Authorities in Victoria is a proponent driven rather than DPI activity, and in the last 5 years the average is 865.

4.2 Production

Table 4.2.1 Victorian Extractive Industries Production and Sales by Rock Type: 2009/10

Product Group	Product Type	Sales - volume (tonnes)	Sales - value (\$A)
Hard Rock	BASALT	16,651,904	246,658,873
	DOLERITE	311,350	4,952,272
	GNEISS	4,128	58,500
	GRANITE	4,213,610	74,082,244
	HORNFELS	3,877,901	53,055,335
	MARBLE	2,501	31,260
	QUARTZITE	75,980	502,329
	RHYODACITE	1,548,865	27,399,085
	SCHIST	190,490	2,879,337
	SEDIMENTARY	2,272,437	23,074,766
	SLATE	35,049	1,074,940
	TRACHYTE	18,310	366,200
Hard Rock Total		29,202,525	434,135,141
Soft Rock	CLAY & CLAY SHALE	1,505,412	4,638,846
	LIMESTONE	2,409,495	43,230,042
	SAND & GRAVEL	11,902,572	158,551,631
	SCORIA	636,493	9,119,702
	SOIL	52,122	300,795
	TUFF	433,702	2,759,991
Soft Rock Total		16,939,796	218,601,007
GRAND TOTAL		46,142,321	652,736,148

Source: DPI – statutory returns under the Extractive Industries Development Act 1995 and the Mineral Resources (Sustainable Development) Act 1990.

Table 4.2.2 Victorian Extractive Industries Production and Sales by Products: 2009/10

Product Group	Product Type	Sales - volume (tonnes)	Sales - value (\$A)
Single size products	Aggregate	13,006,475	234,964,720
	Armour	126,225	1,663,374
Single size products total		13,132,700	236,628,094
Multi size products	Road base	7,170,391	103,708,669
	Road sub-base	9,774,218	106,045,598
	Fill	2,511,873	23,530,913
Multi size products total		19,456,482	233,285,180
Sand products	Concrete sand	6,776,170	95,935,056
	Fine sand	1,741,862	15,296,817
	Industrial	35,988	1,600,327
	Foundary	172,766	4,700,000
	Glass sand	166,011	4,500,000
Sand products total		8,892,797	122,032,199
Limestone Products	Cement	797,712	9,541,235
	Agriculture	608,971	14,106,304
	Lime	65,231	7,759,630
Limestone products total		1,471,914	31,407,170
Clay products	Brick	1,447,395	4,084,393
	Stoneware	1,732	311,176
	Tile/pipe	35,035	199,235
Clay products total		1,484,162	4,594,804
Miscellaneous	Dimension stone	6,070	734,270
	Unspecified	1,698,195	24,054,432
Miscellaneous total		1,704,266	24,788,702
GRAND Total		46,142,321	652,736,149

Source: DPI – Statutory returns under the Extractive Industries Development Act 1995 and the Mineral Resources (Sustainable Development) Act 1990.

Note: Only operations reporting under the Extractive Industries Development Act 1995 and the Mineral Resources (Sustainable Development Act) 1990 are included in tables 4.2.1 and 4.2.2

Table 4.2.3 Victorian Dimension Stone Production: 2000/01 – 2009/10

	2001/02 (tonnes)	2002/03 (tonnes)	2003/04 (tonnes)	2004/05 (tonnes)	2005/06 (tonnes)	2006/07 (tonnes)	2007/08 (tonnes)	2008/09 (tonnes)	2009/10 (tonnes)
Basalt	18,803	12,419	13,864	13,875	21,552	27,280	27,559	3,735	3,733
Granite	1,058	1,993	1,600	879	636	797	448	867	680
Sandstone*	492	185	258	1090	5,059	4,214	3,437	2,873	1,402
Slate	613	617	548	2,382	334	879	1,710	1,000	255
TOTAL	20,966	15,214	16,270	18,226	27,581	33,170	33,154	8,475	6,070

Sources: Operators, DPI records and statutory returns under the Extractive Industries Development Act 1995 and the Mineral Resources (Sustainable Development) Act 1990.

*Include some sedimentary and limestone production.

Dimension stone production showed a significant decrease in 2008/09 to 8,475 tonnes from 33,154 tonnes in 2007/08 and the decrease in production continued in 2009/10. This may be seen an indication of a slowdown of the construction industry in the State resulting in a decreased demand for such product.

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5. Regulations

DPI collected a total of \$49.7 million in royalties, rentals and administration fees in 2009/10 under the Mineral Resources (Sustainable Development) Act 1990 (MRSDA), the Extractive Industries Development Act 1995 (EIDA), the Petroleum (Submerged Lands) Act 1967, the Petroleum (Submerged Lands) Act 1982 and the Petroleum Act 1998.

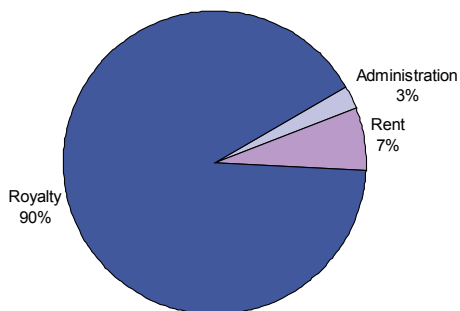
It should be noted that the provisions within the EIDA were consolidated into the MRSDA on 1 January 2010. Following this the EIDA was repealed and extractive industries were regulated under the MRSDA. Accordingly extractive industry statistics straddle 6 months under the EIDA and six months under the MRSDA from the 2009/10 year.

Rehabilitation bonds held by DPI for minerals and extractive increased from \$162.4 million in 2008/09 to \$178.3 million in 2009/10, as a result of bond reviews and the issue of new licences (see Table 5.1.3 and Figure 5.1.3).

5.1 Regulation, Revenue and Enforcement

Table and Figure 5.1.1 Minerals, Extractive and Petroleum Revenue: 2009/10

Revenue Stream	Revenue (\$A million)
Administration	1.2
Rent	3.3
Royalty	45.1
Total	49.7

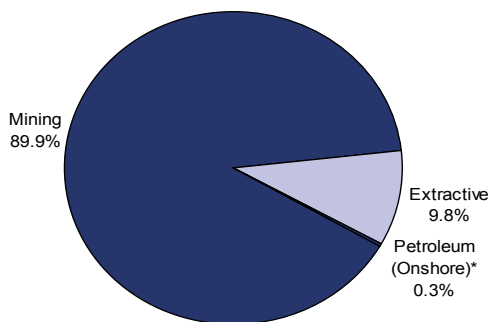


Source: DPI

Note: Royalty collected for the production/sales reported in the year ending 30/6/08.

Table and Figure 5.1.2 Minerals, Extractive and Petroleum Royalty – by Sector: 2009/10

Sector	Revenue (\$A million)
Mining	40.6
Extractive	4.4
Petroleum (Onshore)*	0.1
Total	45.1



Source: DPI

*Includes some calendar year payments.

Table 5.1.3 Rehabilitation Bonds by Sector – Value (\$A million): June 2000 – June 2010

Date	Mineral Exploration	Mining	Extractive	Total
Jun-00	1.3	53.3	22.8	77.3
Jun-01	1.2	57.4	31.4	90.1
Jun-02	1.1	57.5	34.5	93.1
Jun-03	1.1	57.0	37.5	95.7
Jun-04	1.2	65.6	39.2	105.9
Jun-05	1.8	66.3	47.5	115.5
Jun-06	2.3	66.7	49.4	118.5
Jun-07	2.8	73.7	57.5	134.0
Jun-08	3.1	75.6	58.8	137.5
Jun-09	2.0	97.1	64.9	164.0
Jun-10	2.3	103.7	72.3	178.3

Figure 5.1.3 Rehabilitation Bond by Sector: June 2000 – June 2010

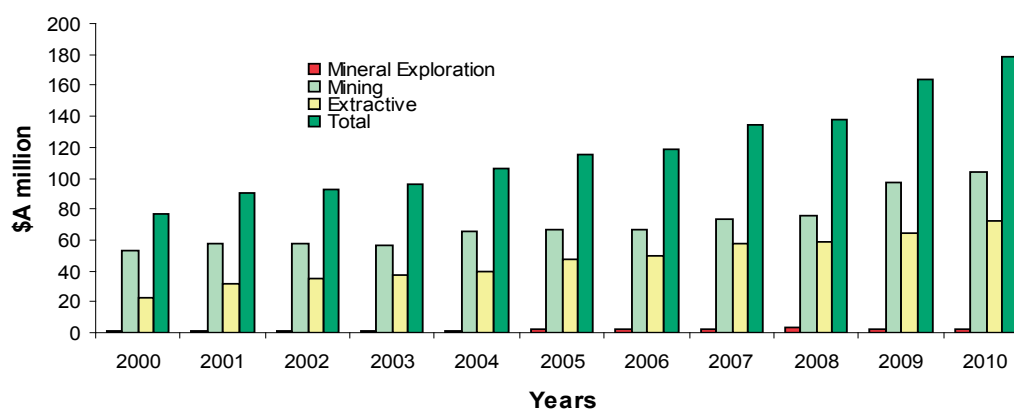


Table 5.1.4 Rehabilitation Bond Reviews: 2000/01 – 2009/10

Year	Number of Bonds Reviewed	Result of Bond Review		
		Bond Increase	No Change	Bond Decrease
2000/01	370	94	270	6
2001/02	389	49	332	8
2002/03	332	85	237	10
2003/04	367	78	282	7
2004/05	344	99	238	7
2005/06	340	59	279	2
2006/07	258	65	190	3
2007/08	402	58	335	9
2008/09	382	49	323	10
2009/10	413	55	344	14

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 5.1.5 Enforcement and Compliance Activities 2009/10

Site Visits	792
Inspections	604
Completed Compliance Audits	87
High Risk Issues Audit	101
Complaints Received	40
Improvement Notices Issued	0
EIDA Notices Issued	3
Investigations Initiated	40
MRSDA Notices Issued	3
Work plans & Variations Administration	507
Management of Rehabilitation Liabilities	413

Source: DPI

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Appendix A: Glossary

ABS: Australian Bureau of Statistics

EIDA: Extractive Industries Development Act 1995

MRSDA: Mineral Resources (Sustainable Development) Act 1990

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

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

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

Appendix B: Abbreviations, Symbols and Conversions

\$A	dollar (Australian)
\$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 ³	billion (10 ⁹) cubic metres
Bscf	billion (10 ⁹) cubic feet (0.0283 Gm ³)
C+C	crude oil and condensate
cond.	condensate
GL	gigalitre (10 ⁹ L; 6.29 Mbbbl)
Gm ³	billion (10 ⁹) cubic metres (35.336 Bscf)
kL	kilolitre (10 ³ L)
L	litre
LPG	Liquefied petroleum gas
ML	megalitre (10 ⁶ L)
Mbbbl	million barrels
Mcf/d	Million cubic feet per day
MIN 1990	Mining licence granted under the Mineral Resources (Sustainable Development) Act 1990
Mm ³	million cubic metres
oz	Troy ounce (31.1 g)

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