MINERALS AND PETROLEUM VICTORIA

Statistical Review 2000-01

State Government Victoria

Department of Natural Resources and Environment

Introduction

THE STATISTICAL REVIEW PROVIDES AN OVERVIEW OF VICTORIA'S MINERALS, PETROLEUM AND EXTRACTIVE INDUSTRIES.

It includes data on production, exploration, expenditure, as well as licensing and safety performance. These data are highly relevant for anyone involved in the mining, extractive or petroleum industries and the report is the most comprehensive public database available for these sectors in Victoria.

Victoria's earth resource industry production includes:

- Brown coal used almost exclusively for power generation;
- Oil and gas from the offshore Gippsland and onshore fields north of Port Campbell in western Victoria
- Gold primarily from the Stawell and Fosterville mines.
- Industrial minerals including gypsum, silica, feldspar rutile, zircon and kaolin
- Rock, sand and clay, used mainly for building and road construction.

Victoria has the thickest and most extensive brown coal seams in the world and approximately 85% of the state's electricity is generated by coal-fired power plants in the LaTrobe Valley. Since the 1920s, brown coal has provided an inexpensive energy source to run the industrial and manufacturing sectors of the Victorian economy. Since 1969, gas production from Gippsland has supplied domestic and industrial customers largely for heating through a pipeline transmission system which now covers over 4100km. The offshore Gippsland petroleum province has provided more than two thirds of Australia's cumulative oil production to date and has led to the establishment of major petrochemical facilities in the Melbourne area with significant follow-on employment and supply benefits. Oil and gas remains the most valuable commodity produced in Victoria. Gold provided the foundation for Victoria's wealth last century and the gracious and substantial Victorian buildings seen in Melbourne, Ballarat and Bendigo are tangible evidence of the money generated by gold during the 50 years after the seminal discoveries at Warrandyte and Clunes in 1851. The potential for growth in mineral production is enormous, both from redevelopment of existing goldfields and new goldfields and for development of newly discovered mineral sands deposits in the Murray Basin region. The extractive industries are the foundation of Victoria's building and construction industries. Although not sharing the limelight of the other resource industries, they contribute the vital raw materials for a modern society. The extractive industries generate the greatest value, in direct royalties to the State, of any of the earth resource industries. The government will provide an additional $7.5 million over four years on promotion of exploration and improved regulation. That funding will enable the Department of Natural Resources and Environment, through its Energy and Minerals Division, to continue its program of regional geological data acquisition for the minerals and petroleum industries.

In addition, the Division is continuing its program of legislative reform which has yielded complete rewrites of the , Extractive Industries (1995) Act and the Petroleum(1998) Act over the past decade.

Minerals

MINERAL PRODUCTION CONTINUES TO BE DOMINATED BY BROWN COAL AND GOLD. Brown coal production, predominantly from the Latrobe Valley for electricity generation, has decreased marginally in 2000/01 compared with the previous three years of strong growth due to increased Victorian and interstate electricity sales. Gold production increased markedly in the last decade, but showed some decline in 1990/00 and this trend accelerated in 2000/01. Gypsum and kaolin are the other significant contributors to mineral production. Both show a high degree of variability, in line with seasonal and market factors. Production of kaolin continued its upward trend since 1996/97. Feldspar production in Victoria commenced in 1997/98 by ACI Industrial Minerals Division. No bauxite production is reported in 2000/01. Copper and zinc concentrate production from the Benambra ceased in 1995/96.Zircon, rutile and ilmenite production in Victoria commenced in 2000/01 due to Murray Basin Titanium Pty Ltd. It is expected that heavy mineral sands production from the Victorian Murray Basin deposits will accelerate in coming years.

TABLE 1.1 MINERAL PRODUCTION – VICTORIA 1982/1983 - 2000/2001

	Fuel Minerals	Metallic Minerals				Industrial Minerals					
Year	Brown Coal ('000 Tonne)	Gold (kg)	Gold (oz)	Copper Concentrate (tonne)	Zinc Concentrate (tonne)	Zircon (tonne)	Rutile (tonne)	Feldspar (tonne)	Bauxite (tonne)	Gypsum (cubic m)	Kaolin (tonne)
1982/83	34,708	115	3,698	-	-	-	-	-	8,585	88,000	47,000
1983/84	33,198	150	4,823	-	-	-	-	-	12,829	207,400	83,700
1984/85	38,379	902	29,004	-	-	-	-	-	4,409	247,300	88,100
1985/86	36,069	1,272	40,901	-	-	-	-	-	4,584	138,800	35,900
1986/87	41,806	1,179	37,911	-	-	-	-	-	7,882	187,700	41,100
1987/88	44,288	1,719	55,274	-	-	-	-	-	7,345	203,100	100,800
1988/89	48,653	2,512	80,773	-	-	-	-	-	6,211	241,400	117,300
1989/90	45,960	3,515	113,025	-	-	-	-	-	2,466	301,500	168,900
1990/91	49,388	4,863	156,370	-	-	-	-	-	7,925	49,200	145,800
1991/92	50,717	3,346	107,591	-	-	-	-	-	5,021	53,100	87,800
1992/93	47,898	3,993	128,395	-	-	-	-	-	nil	180,200	114,600
1993/94	49,683	3,917	125,960	16,287	1,012	-	-	-	1,500	176,800	105,400
1994/95	49,922	4,319	138,876	13,163	5,947	-	-	-	2,302	193,100	79,500
1995/96	54,281	4,838	155,550	1,338	6,384	-	-	-	1,090	198,667	55,065
1996/97	60,795	4,710	151,229	nil	nil	-	-	-	2,600	501,495	114,778
1997/98	65,274	4,979	160,122	nil	nil	-	-	25,703	nil	479,820	166,100
1998/99	66,648	4,947	159,088	nil	nil	-	-	45,293	nil	404,917	180,634
1999/00	67,363	4,790	154,043	nil	nil	-	-	46,162	nil	462,806	201,436
2000/01	64,958	3,814	122,632	nil	nil	1,307	5,921	53,148	nil	437,694	203,753

Source: Fuel Minerals: Department records, Statutory returns under the Mineral Resources Development Act 1990.
Metallic & Industrial Minerals: Statutory returns under the Mineral Resources Development Act 1990.

GRAPH 1 COAL & GOLD PRODUCTION 1982/83 - 2000/2001

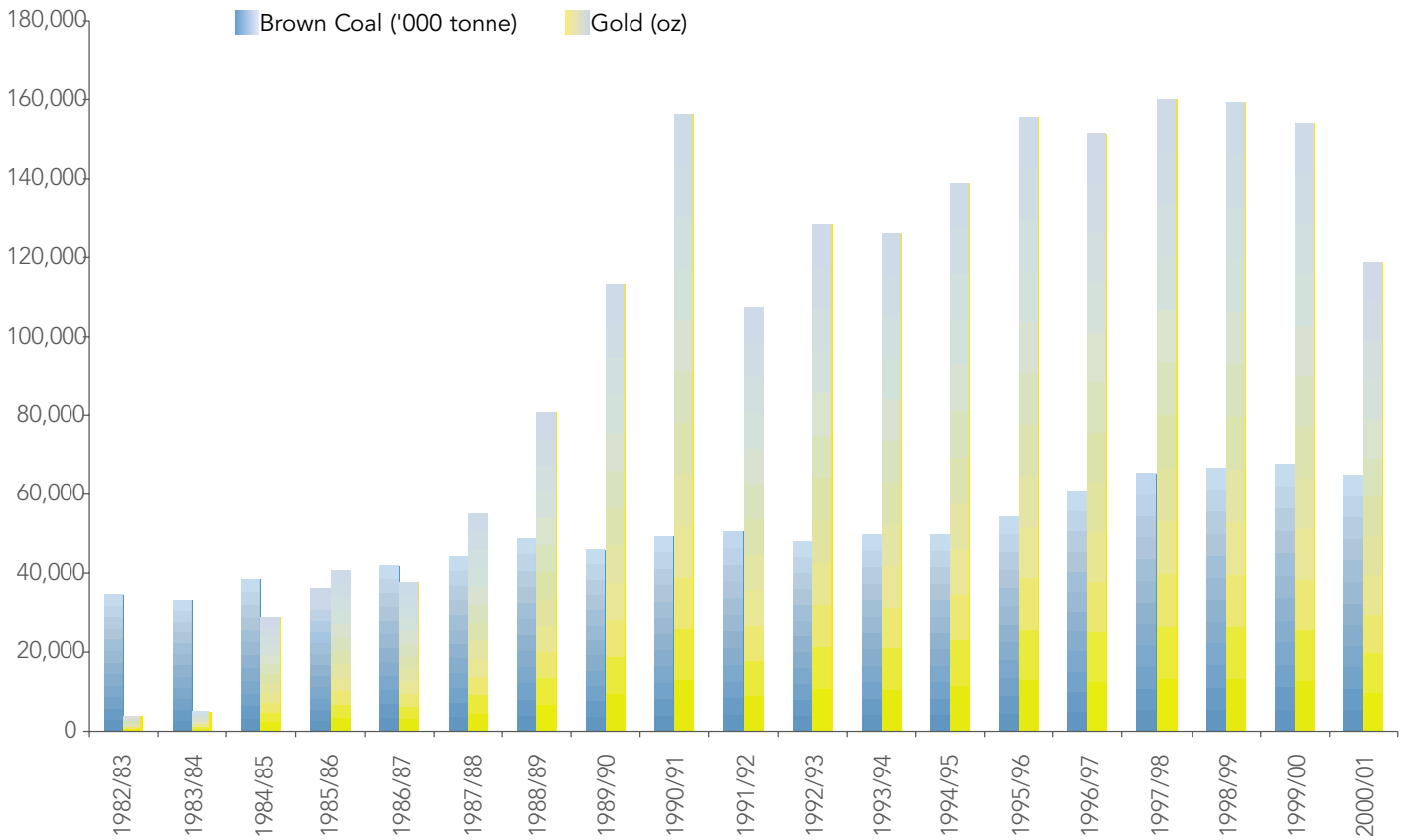

TABLE 1.2 MAJOR GOLD PRODUCERS - VICTORIA - 2000/01 (PRODUCERS MORE THAN 1,000 GRAMS)

Producer	Location	Licences	Production (grams)	Production (ozs)	Estimated Value
Duval Dene Pty Ltd	Omeo	MIN5335	1,539	49.5	$24,743
Ford, Garry A	Dunolly	MIN 5239	1,679	54.0	$26,994
Harris K	Mt Hotham	MIN 5262	2,933	94.3	$47,154
Kinglake Resource Pty Ltd	Buninyong	MIN 4658	9,299	299.0	$149,502
Lougoon, Desmond	Myers Flat	MIN 4618	1,941	62.4	$31,206
Perseverance Exploration Pty Ltd	Fosterville	ML 1868	310,254	9,976	$4,988,000
Smith C	Dunolly	MIN 5074	1,617	52.0	$25,997
Stawell Gold Mines	Stawell	MIN 5260	3,451,503	110,980.8	$55,490,402
Talager Pty Ltd	Bealiba	MIN 5230	6,902	221.9	$110,965
Tech-Sol Resources Pty Ltd	Mt Egerton	MIN4422	11,423	367.3	$183,650
Wanbana Pty Ltd	Burnt Creek	MIN 4803	7,388	237.6	$118,778
Williams Mines Pty Ltd	Wandiligong	MIN 4004	3,732	120.0	$60,000
Other		Licences<5 ha	3,555	114	$57,154
		Licences>5 ha	117	3.8	$1,881
TOTAL PRODUCTION			3,813,881	122,632.8	$61,316,424

Source: Statutory returns under the Mineral Resources Development Act 1990.
Note: Estimated value $A500/Oz.
MIN - Mining Licence
ML - Mining Lease
MAL -Mining Area Licence

Gold production is dominated by a few mines, with many smaller companies and individuals producing small amounts. The large part of Victoria's production is from Stawell Gold Mines Pty Ltd, at Stawell. In 2000/01 the other key producer was Perseverance Exploration Pty Ltd (Fosterville).

TABLE 1.3 BROWN COAL PRODUCTION - VICTORIA 1981/1982 - 2000/01 ('000 TONNES)

YEAR	Maddingley Brown Coal Co Bacchus Marsh	Alcoa Anglesea	SECV	Loy Yang	Yallourn	Hazelwood	Annual Total	Production Value*(000)
1981/82	99	1,210	36,256				37,565	-
1982/83	83	1,210	33,415				34,708	-
1983/84	80	1,066	32,052				33,198	-
1984/85	89	1,205	37,085				38,379	-
1985/86	60	1,119	34,890				36,069	-
1986/87	43	1,272	40,491				41,806	-
1987/88	45	1,173	43,070				44,288	-
1988/89	47	1,253	47,353				48,653	-
1989/90	22	1,067	44,871				45,960	-
1990/91	40	1,179	48,169				49,388	-
1991/92	40	1,175	49,502				50,717	-
1992/93	36	1,084	46,778				47,898	-
1993/94	31	1,093	48,559				49,683	-
1994/95	43	1,162	48,717				49,922	-
1995/96	40	836	-	25,000	17,460	10,945	54,281	$434,248
1996/97	39	1,005	-	27,808	17,083	14,860	60,795	$486,360
1997/98	28	1,030	-	29,766	17,924	16,525	65,274	$522,192
1998/99	22	1,091	-	30,510	17,350	17,675	66,648	$533,184
1999/00	4	926	-	30,865	16,098	19,470	67,363	$538,904

* estimated value ($8/tonne)

Brown coal production is dominated by the electricity generation companies in the Latrobe Valley - Hazelwood Power Corporation, Loy Yang Power Ltd and Yallourn Energy Ltd. The largest producer is Loy Yang followed by Hazelwood and Yallourn.
The other major brown coal miner is Alcoa of Australia Ltd, which produces brown coal at Anglesea to generate electricity for its Point Henry aluminium smelter.
Maddingley Brown Coal Company produces a very small amount of coal at Bacchus Marsh, mainly for fuel and soil conditioning.

TABLE 2.1 EXPENDITURE ON MINERAL EXPLORATION AND MINING DEVELOPMENT IN VICTORIA 1993/1994-1999/2000 ($MILLION)

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

	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Exploration (ABS)	20.7	31.2	42.6	52.3	43.1	37.0	33.8	32.7
Exploration (MRD Act)	18.7	41.1	35.1	37.6	36.9	38.0	35.8	43.4
Mining (MRD Act)	77.4	66.7	73.8	156.8	165.2	174.6	188.3	195.5

Source: The above figures are collated from Six Monthly reports forwarded to the Department of Natural Resources and Environment, as required by the Mineral Resource Development Act 1990, and ABS: Actual and Expected Private Mineral Exploration (Catalogue No. 8412.0).

Note: The MRD Act mining expenditure figures represent total expenditure; ie capital and operating; by commercial entities engaged in exploration and mining activity during the relevant periods.
The MRD Act exploration expenditure figures include exploration expenditure on mining and exploration licences.

Mineral exploration expenditure is a lead indicator of mineral industry activity. Victoria enjoyed strong growth in exploration in the period 1993/94-1996/97. The ABS statistics indicate that expenditure declined in the last four years from 1997/98 and flattened out in 2000/01 somewhat in line with the Australian trend. However, expenditure reported under the MRDA in 2000/01 is higher than that reported by ABS was due to the inclusion of exploration on mining licences in the exploration expenditure total.

Expenditure on mine development was boosted by the inclusion of expenditure reported by brown coal mines in the Latrobe Valley for the first time in 1996/97. The upward trend since then has continued in 2000/2001.

GRAPH 2 EXPENDITURE ON PRIVATE MINERAL EXPLORATION AND MINING DEVELOPMENT IN VICTORIA

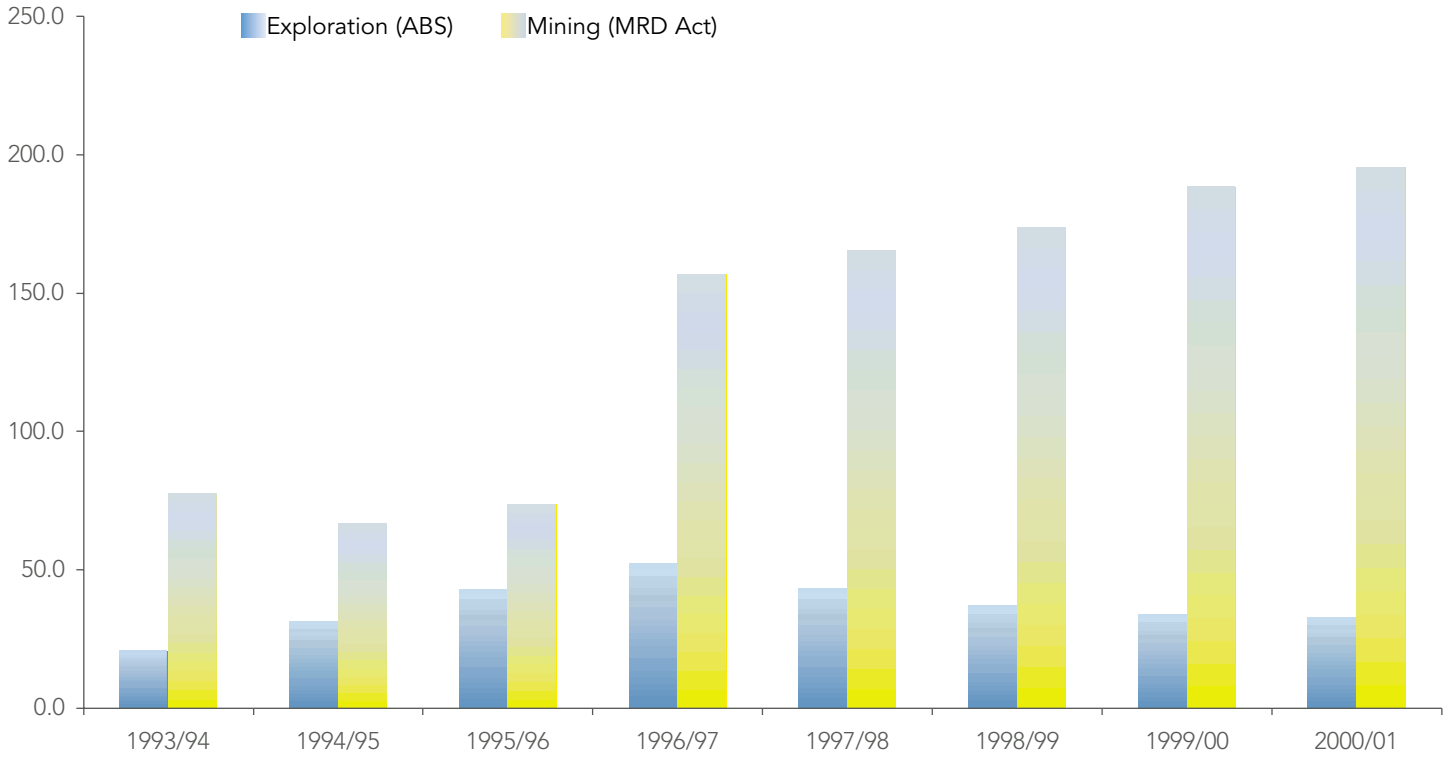

TABLE 3.1 NEW & RENEWAL APPLICATIONS FOR EXPLORATION AND MINING LICENCES - 2000/2001

	Received	Granted	W/drawn	Refused	Invalid
New Mining Licence Applications	32	12	9	1	0
Renewal Mining Licence Applications	32	22	1	0	0
Total Mining Licence Applications	64	34	10	1	0
New Exploration Licence Applications	83	39	20	1	0
Renewal Exploration Licence Applications	85	63	1	3	0
Total Exploration Licence Applications	168	102	21	4	0

Source: Department Records
Note: "Granted" Includes applications that were on hand as at 1 July 2000.

In 2000/01, 232 new and renewal applications were received for mining and exploration licences, with about 73 % of these being for exploration licences. 136 mining and exploration licences were granted or renewed, with about 75% of these being exploration licences.

TABLE 3.2 EXPLORATION AND MINING LICENCES GRANTED AND RENEWED 1994/1995 - 2000/01

	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Mining Licences Granted	46	65	77	22	19	17	12
Mining Licences Renewed	40	66	59	33	25	24	22
Total Mining Licences Granted & Renewed	86	131	136	55	44	41	34
Exploration Licences Granted	98	162	130	180	77	39	39
Exploration Licence Renewed	141	149	162	94	82	100	63

Source: Department Records
Note: "Granted" Includes applications that were on hand as at 1 July 2000

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

There has been a general decline in the number of exploration and mining licences granted and renewed since 1997/98.

GRAPH 4 EXPLORATION LICENCE GRANTS (1994/95 - 2000/01)

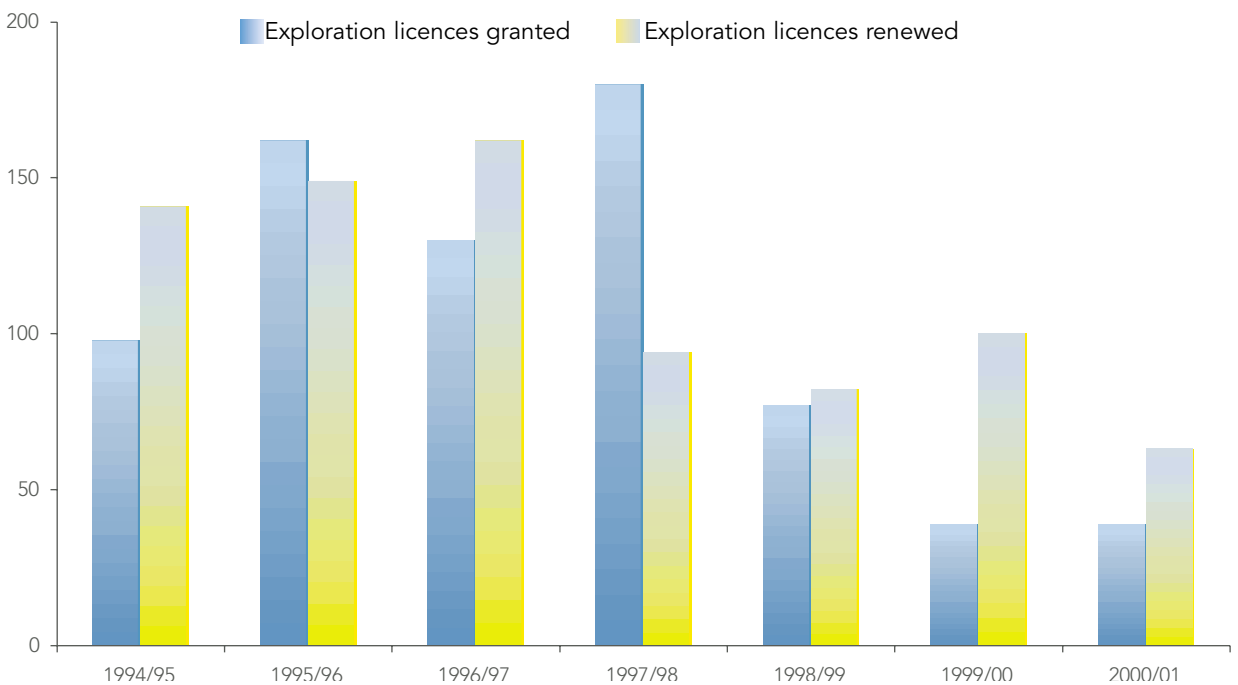

TABLE 3.3 CURRENT EXPLORATION AND MINING LICENCES AT 30 JUNE EACH YEAR 1996 - 2001

	1996	1997	1998	1999	2000	2001
Mining Licences	471	397	377	341	320	312
Exploration Licences	302	375	361	245	274	209
TOTALS	773	772	738	586	594	521

Source: Department records

The number of current mining and exploration licences has steadily fallen over the last five years. A significant number of amalgamations has contributed to the lower number of current mining and exploration licences.

GRAPH 5 CURRENT EXPLORATION AND MINING LICENCES AS AT 30 JUNE EACH YEAR (1996 - 2001)

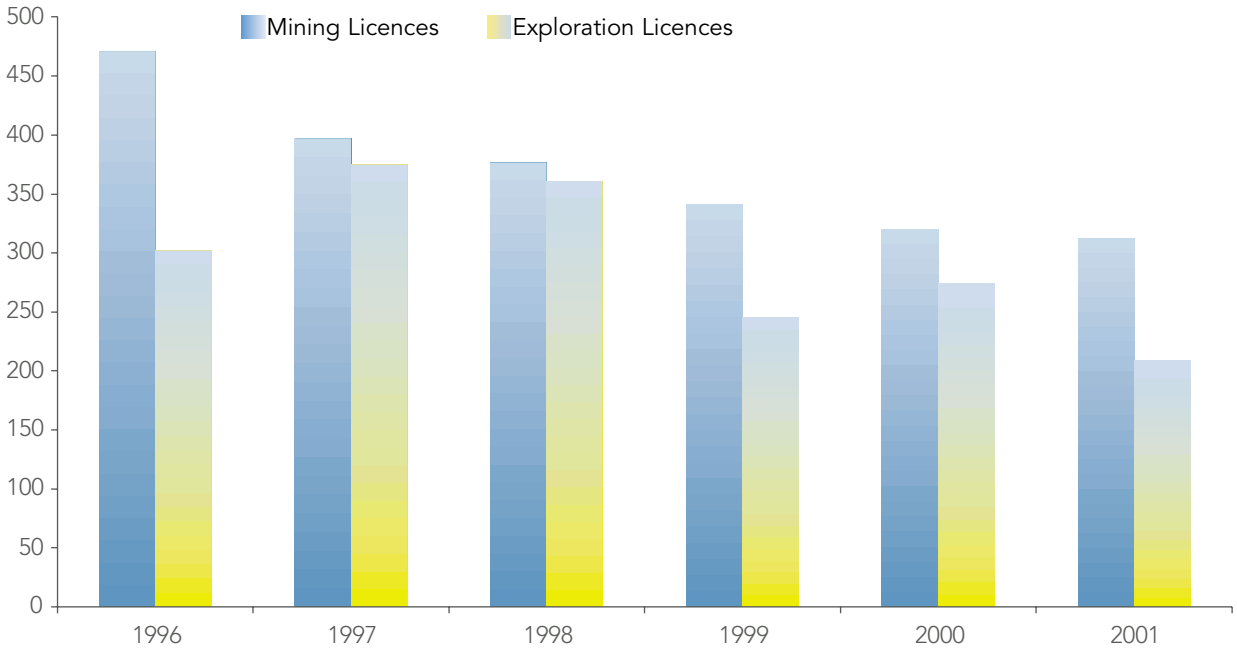

TABLE 4.1 MINING SAFETY STATISTICS 1993/1994 - 2000/2001

Operation	Lost Time Injuries (LTI's)	Employed*	Days Lost	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
1993/94	36		-	35.0	-	-	-	2
1994/95	24		-	18.7	-	-	-	0
1995/96	26		-	20.0	-	-	-	0
1996/97	50		-	16.0	-	-	-	0
1997/98	45		612	14.1	23.4	13.6	192.2	0
1998/99	34	1782	444	10.2	19.0	13.0	133.1	0
1999/00	28	1742	474	9.4	16.1	16.9	158.0	0
2000/01	27	2365	537	8.8	11.4	19.9	176.4	1

* Average number of person employed as reported.
Source: Returns made under the Mineral Resources Development Act 1990.

Note: Lost Time Injuries - are defined as those occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more.
Lost Time Injury Frequency Rate - is defined as the number of occurrences of lost time injury for each one million hours worked.
Lost Time Injury Incidence Rate -is defined as the number of lost time injuries per thousand employees.
Lost Time Injury Duration Rate - is defined as the average days lost for every lost time injury.
Severity Rate - is defined as the number of days lost for each one million hours worked.

The total number of Lost Time Injuries (LTI) in the mining industry showed a slight drop in 2000/01 from 1999/00. LTI Frequency Rate has also continued its general downward trend. There was one fatality in 2000/01.

GRAPH 6 MINING SAFETY STATISTICS (1993/94 - 2000/01)

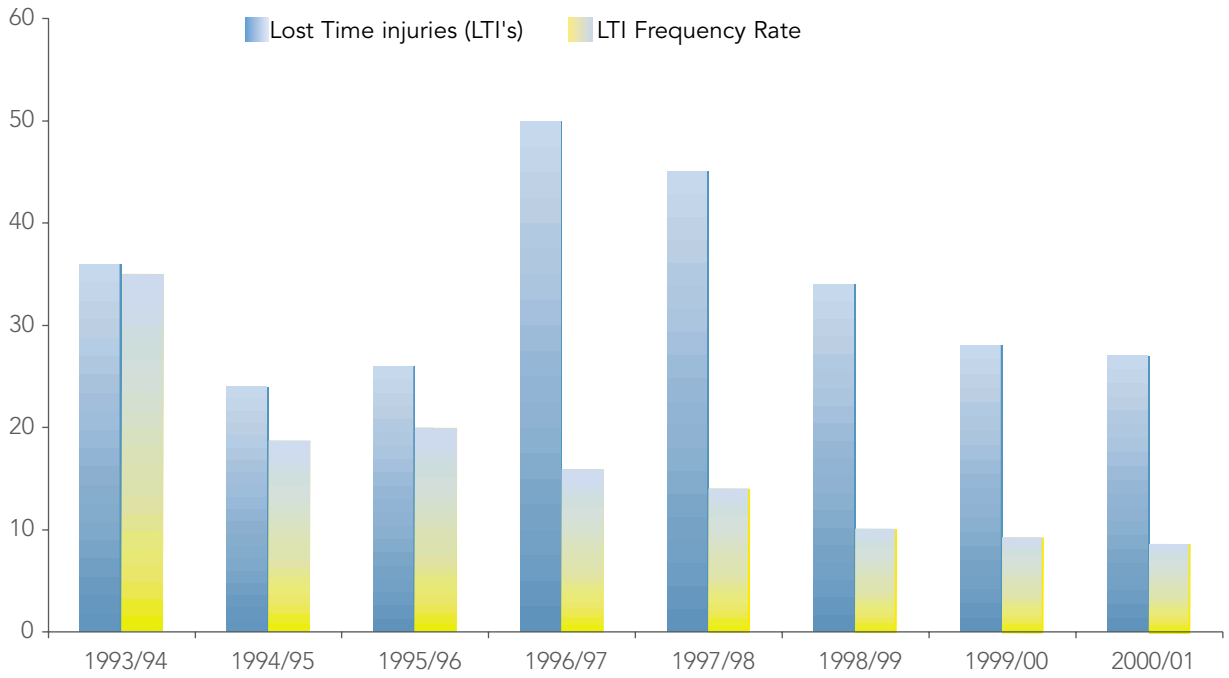

TABLE 4.2 MINING SAFETY STATISTICS BY SECTOR - 2000/01

Sector**	Employed*	Hours Worked	Days Lost	Lost-Time Injury (LTI)	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
Metalliferous O/C	301	87,334	-	-	-	-	-	-	0
Metalliferous U/G	850	705,397	278	6	8.51	7.0	46.3	394.1	1
Non-Metalliferous***	131	133,666	13	3	22.4	22.9	4.3	97.3	0
Coal	1019	2,078,822	246	18	8.7	17.7	14.0	118.0	0
Exploration	966	109,617	3	1	1.0	1.0	3	27.4	0

* Average number of person employed as reported.
** Based on returns for the six monthly period ending 30/6/01.
*** Includes heavy mineral sands mines
Source: Returns made under the Mineral Resources Development Act 1990.

Note: Lost Time Injuries - are defined as those occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more.
Lost Time Injury Frequency Rate - is defined as the number of occurrences of lost time injury for each one million hours worked.
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Severity Rate - is defined as the number of days lost for each one million hours worked.

Coal mining was the main contributor to high LTI counts for the mining industry in 2000/01, followed by metalliferous (U/G) and non-metalliferous operations. The highest lost-time-injury-frequency-rate (LTIFR) for the year was recorded for non-metalliferous operations, followed by coal and metalliferous U/G.

GRAPH 7 MINING SAFETY STATISTICS BY SECTORE. LTI, LTIIR, LTIFR AND LTIDR (2000/01)

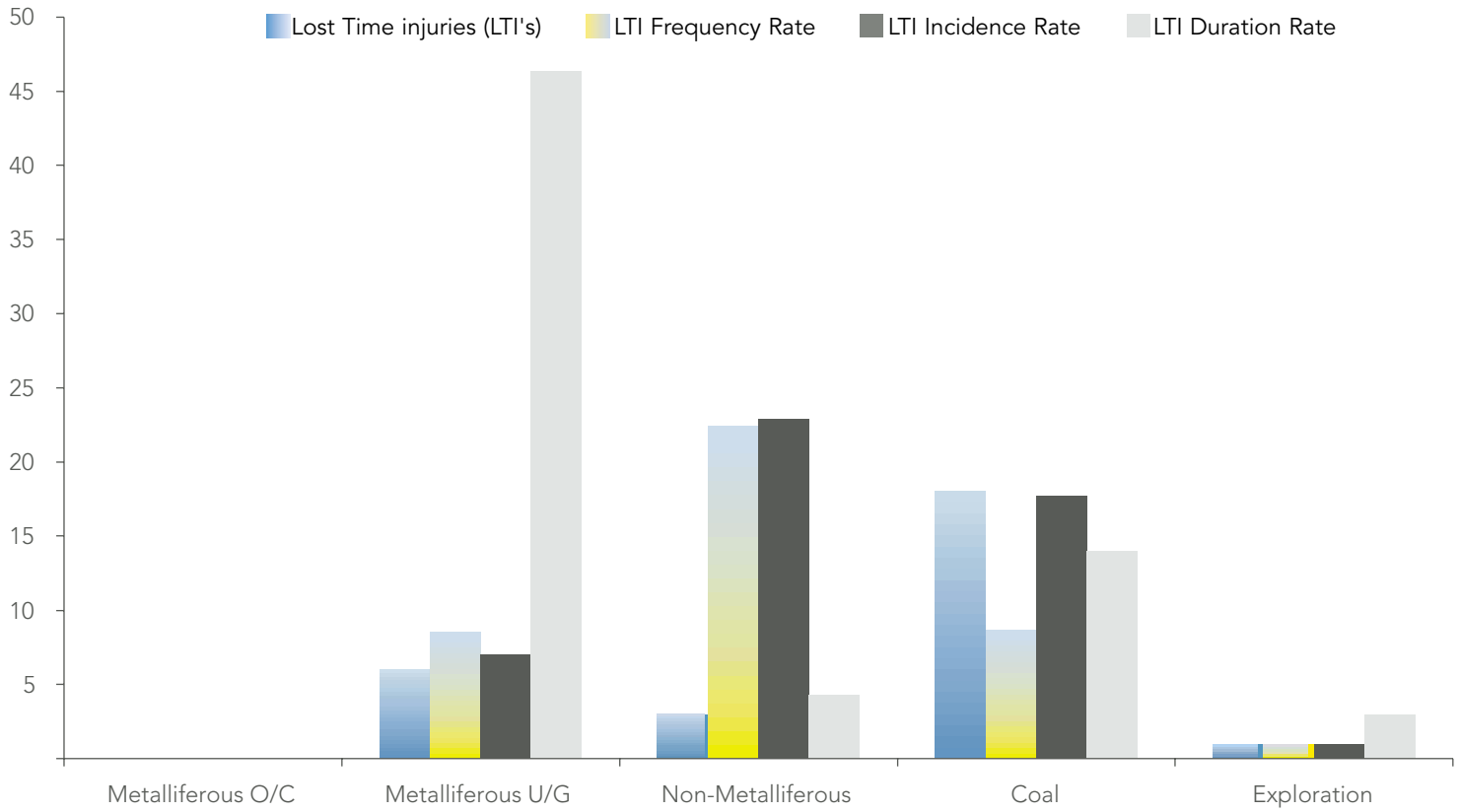


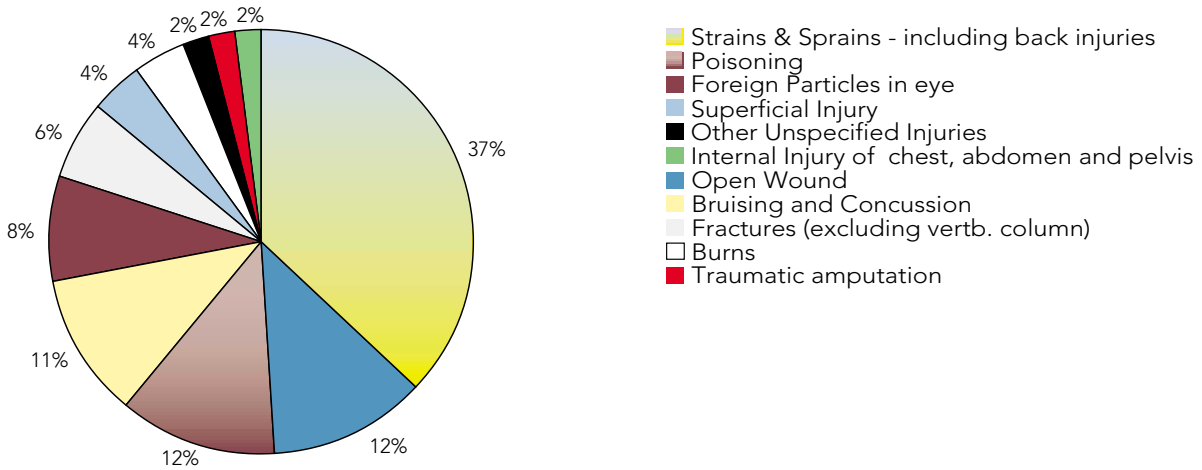
TABLE 4.3 MINING MOST FREQUENT INJURIES 2000/01

Injury	%
Strains & Sprains - including back injuries	37
Open Wound	12
Poisoning	12
Bruising and Concussion	11
Foreign Particles in eye	8
Fractures (excluding vertb. column)	6
Superficial Injury	4
Burns	4
Other Unspecified Injuries	2
Traumatic amputation	2
Internal Injury of chest, abdomen and pelvis	2
Total	100

* Based on returns as at 1 November 2001.
Source: Department's records.
Note: Based on reports submitted in AS1885.1 form.

Strains & Sprains, Open Wound, Poisoning and Bruising & Concussion are the dominant injury types reported for the mining industry in Victoria for the year ending 30 June 2001.

GRAPH 7 MINING MOST FREQUENT INJURIES 2000/01



Petroleum

BASS STRAIT CRUDE AND CONDENSATE PRODUCTION HAS DECLINED SINCE THE MID 1980'S. THIS OCCURRED AS RESERVES in the first generation major fields diminished and the rate of new discoveries could not compensate for the production decline in the major fields. Production levels increased during 97/98 compared to 96/97, due to the development of Bream B, Moonfish and West Tuna. The completion of phase -1 of the Blackback Field has maintained production levels in 98/99. The lower production levels in the year 98/99 are due to the two months hiatus after the Longford incident. Although production levels increased during 99/00 it is still 15% lower than the levels of 97/98. The declining rate in production continued at about 19% during 00/01

Gas production levels increased during 00/01 is linked to demand level, and will probably increase in time especially with the near future interstate gas sale.

TABLE 5.1 ANNUAL BASS STRAIT PETROLEUM PRODUCTION (SINCE 1968)

	Victoria Annual Petroleum Production		
Year	C+C, GL	LPG, GL	Gas, Gm3
Prior 1984	290.20	34.30	51.20
84-85	26.40	3.00	6.00
85-86	25.78	2.97	5.79
86-87	24.44	2.88	5.69
87-88	22.87	2.83	5.65
88-89	18.61	2.68	5.91
89-90	18.68	2.69	6.71
90-91	17.48	2.50	6.01
91-92	16.97	2.57	6.26
92-93	17.80	2.74	6.14
93-94	16.60	2.66	6.05
94-95	14.35	2.56	6.77
95-96	12.26	2.25	6.65
96-97	11.93	2.12	6.01
97-98	13.56	2.29	6.12
98-99	9.73	1.63	5.66
99-00	11.60	1.89	5.56
00-01	9.40	1.75	6.44

Source: Esso-BHPP.
Notes: C+C is Crude and Condensate.

GRAPH 8 PETROLEUM PRODUCTION BASS STRAIT (1984/85 - 2000/01)

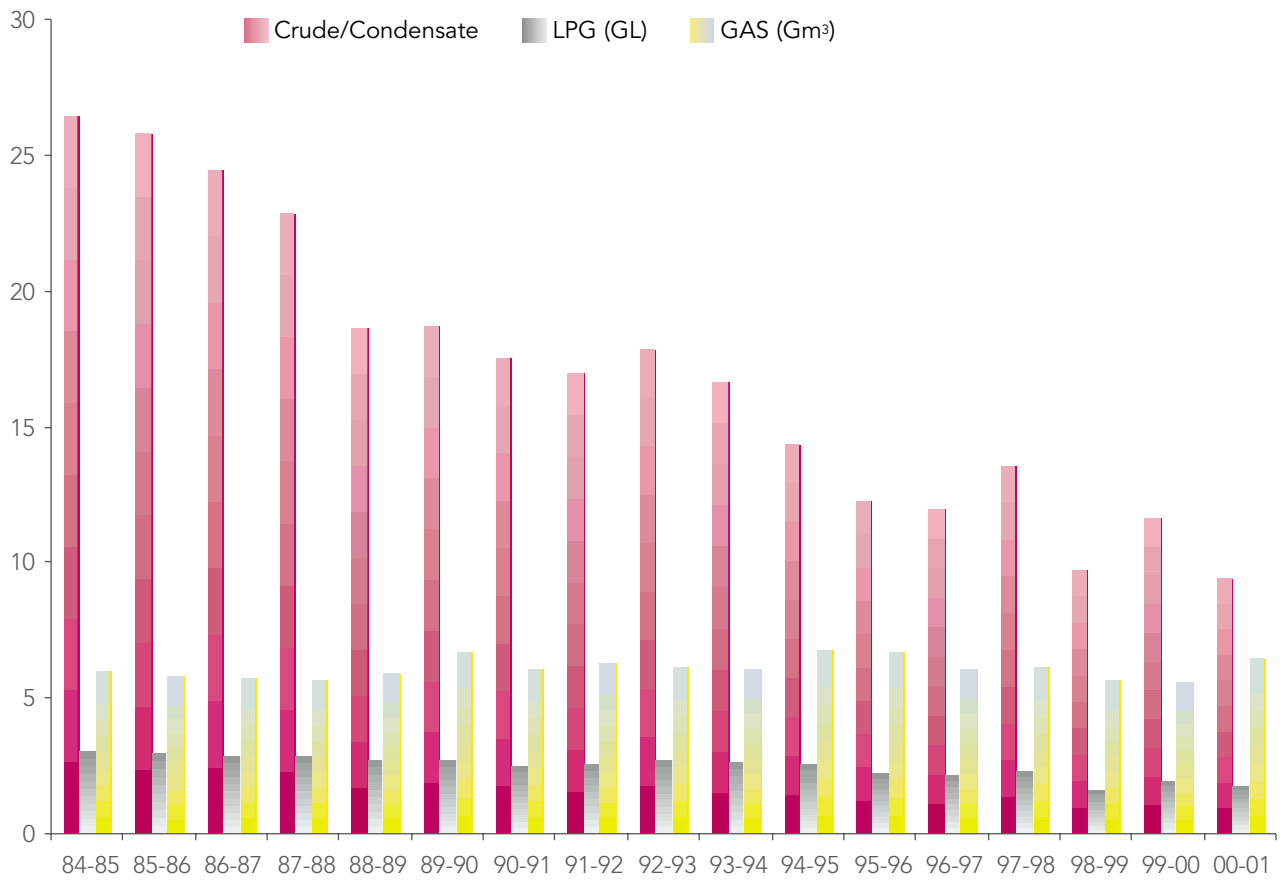


TABLE 5.2 ANNUAL BASS STRAIT PETROLEUM PRODUCTION (1999/2001)

	1999/2000			2000/2001		
Field	C+C, GL	LPG, GL	Gas, Gm3	C+C, GL	LPG, GL	Gas, Gm3
Barracouta	0.076	0.124	0.821	0.084	0.134	0.901
Blackback	0.417	0.090	0.162	0.216	0.043	0.082
Bream	0.820	0.087	0.070	0.766	0.078	0.068
Cobia	0.370	0.020	0.004	0.272	0.014	0.003
Dolphin	0.312	0.019	0.014	0.253	0.015	0.011
Flounder	1.270	0.278	0.506	0.977	0.232	0.493
Fortescue	0.617	0.037	0.007	0.570	0.032	0.007
Halibut	1.078	0.061	0.013	0.805	0.043	0.010
Kingfish	0.744	0.066	0.036	0.648	0.055	0.031
Mackerel	0.339	0.039	0.008	0.227	0.025	0.005
Marlin	0.359	0.396	1.839	0.425	0.452	2.160
Moonfish	0.139	0.006	0.024	0.112	0.005	0.018
Perch	0.000	0.000	0.000	0.006	0.000	0.000
Seahorse	0.015	0.001	0.000	0.033	0.002	0.000
Snapper	0.216	0.208	1.736	0.304	0.281	2.321
S. Mackerel	0.026	0.003	0.001	0.012	0.001	0.000
Tarwhine	0.130	0.037	0.021	0.148	0.040	0.022
Tuna	1.539	0.099	0.122	1.276	0.086	0.181
Turrum L	0.000	0.000	0.000	0.000	0.000	0.000
W. Kingfish	0.836	0.080	0.040	0.718	0.065	0.033
Whiting	0.000	0.000	0.000	0.000	0.000	0.000
W. Tuna	2.299	0.235	0.134	1.543	0.151	0.097

Source: Esso-BHPP.

Note: Bream and Flouner gas injection has been subtracted from the production volume.

The major oil and condensate producers in 2000/01 were Bream, Flounder, Fortescue, Halibut, Kingfish, Tuna, West Kingfish and Tuna. These eight fields are now responsible for more than 78% of liquid production from the Gippsland Basin. Although production from the major fields is declining, infill drilling, development and work-over activities continued during 00/01.

GRAPH 9 GROSS GIPPSLAND PRODUCTION (1999/00 - 00/01)

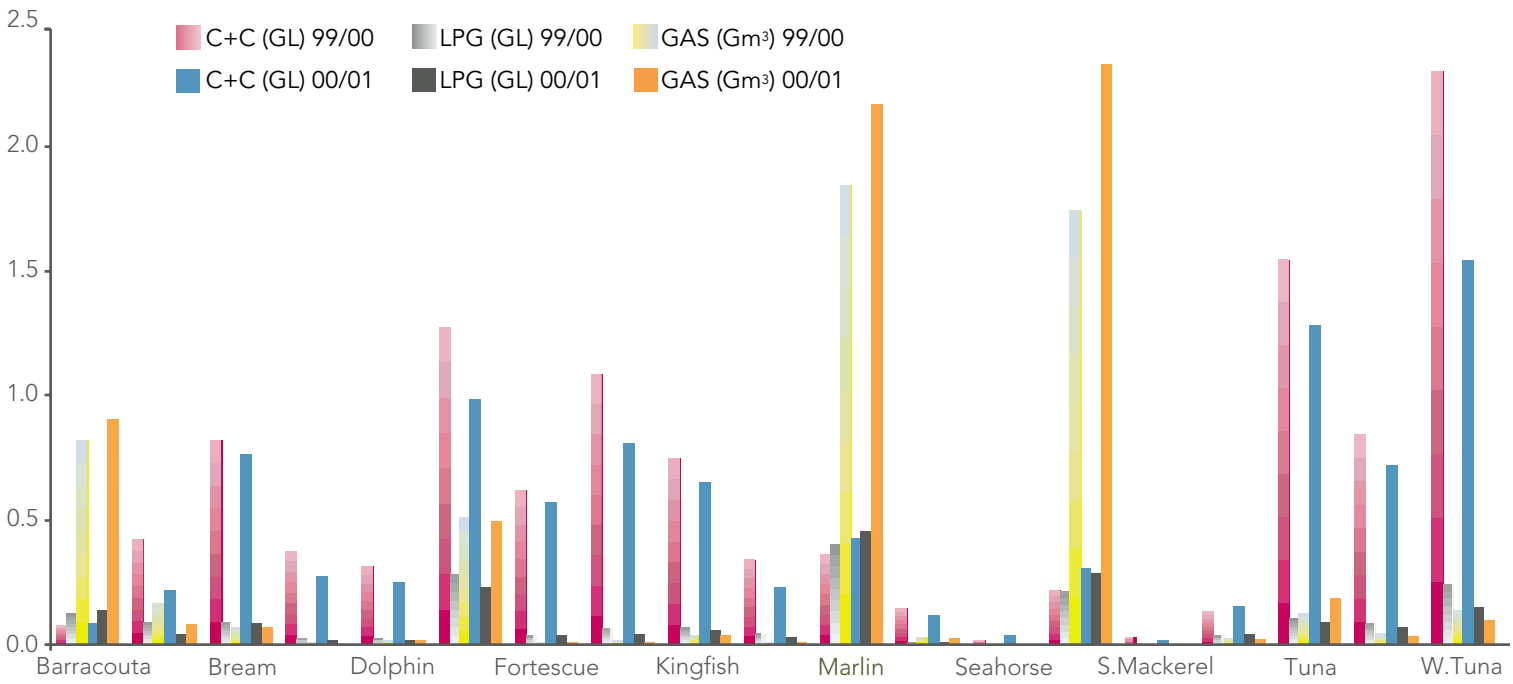


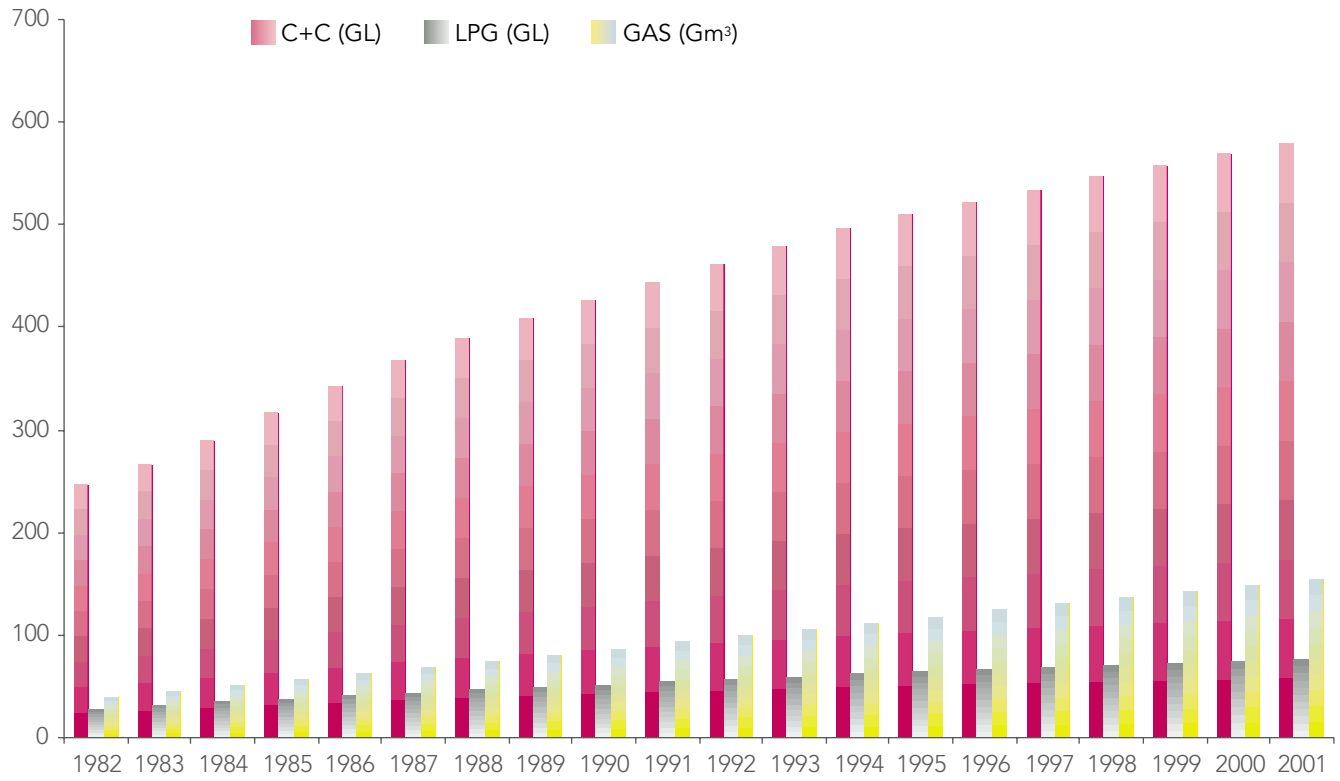
TABLE 5.3 ANNUAL BASS STRAIT PETROLEUM PRODUCTION (SINCE 1982)

	Cumulative Production			Remaining Reserves		
Year	C+C, GL	LPG, GL	Gas, Gm3	C+C, GL	LPG, GL	Gas, Gm3
1982	246.00	28.10	38.90	252.00	60.10	182.00
1983	266.30	31.10	44.90	232.80	50.60	179.30
1984	290.20	34.30	51.20	212.40	47.10	161.70
1985	316.60	37.30	57.20	203.80	45.00	156.40
1986	342.38	40.27	62.99	178.02	42.03	150.61
1987	366.82	43.15	68.68	182.88	45.95	158.82
1988	389.69	45.98	74.33	176.51	45.72	158.07
1989	408.30	48.66	80.24	171.20	47.24	167.46
1990	426.98	51.35	86.95	152.12	44.85	163.25
1991	444.46	53.85	92.96	135.54	42.55	157.54
1992	461.43	56.42	99.22	120.37	39.98	151.08
1993	479.23	59.16	105.36	105.97	37.04	145.14
1994	495.83	61.82	111.41	112.77	36.48	141.29
1995	510.18	64.38	118.18	110.02	34.92	135.32
1996	522.44	66.63	124.83	110.16	33.47	130.77
1997	534.37	68.75	130.84	106.23	32.35	130.66
1998	547.93	71.04	136.96	99.67	34.26	135.34
1999	557.69	72.67	142.60	89.91	32.63	129.70
2000	569.29	74.55	148.15	78.31	30.75	124.15
2001	578.66	76.31	154.62	68.94	28.99	117.68

Source: Esso - BHP

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 23% for crude oil and condensate, 16% for LPG and 21% for gas. As seen, when compared with the 1997 figures, the original oil reserves have decreased by about 0.32%, and the original gas reserves have increased by about 2.5%. The increase in the gas reserves was mainly due to a revision of the Marlin reserves.

GRAPH 10 GIPPSLAND BASIN - CUMULATIVE PRODUCTION (1982 - 2001)



GRAPH 11 GIPPSLAND BASIN - REMAINING PETROLEUM RESERVES (1982 - 2001)

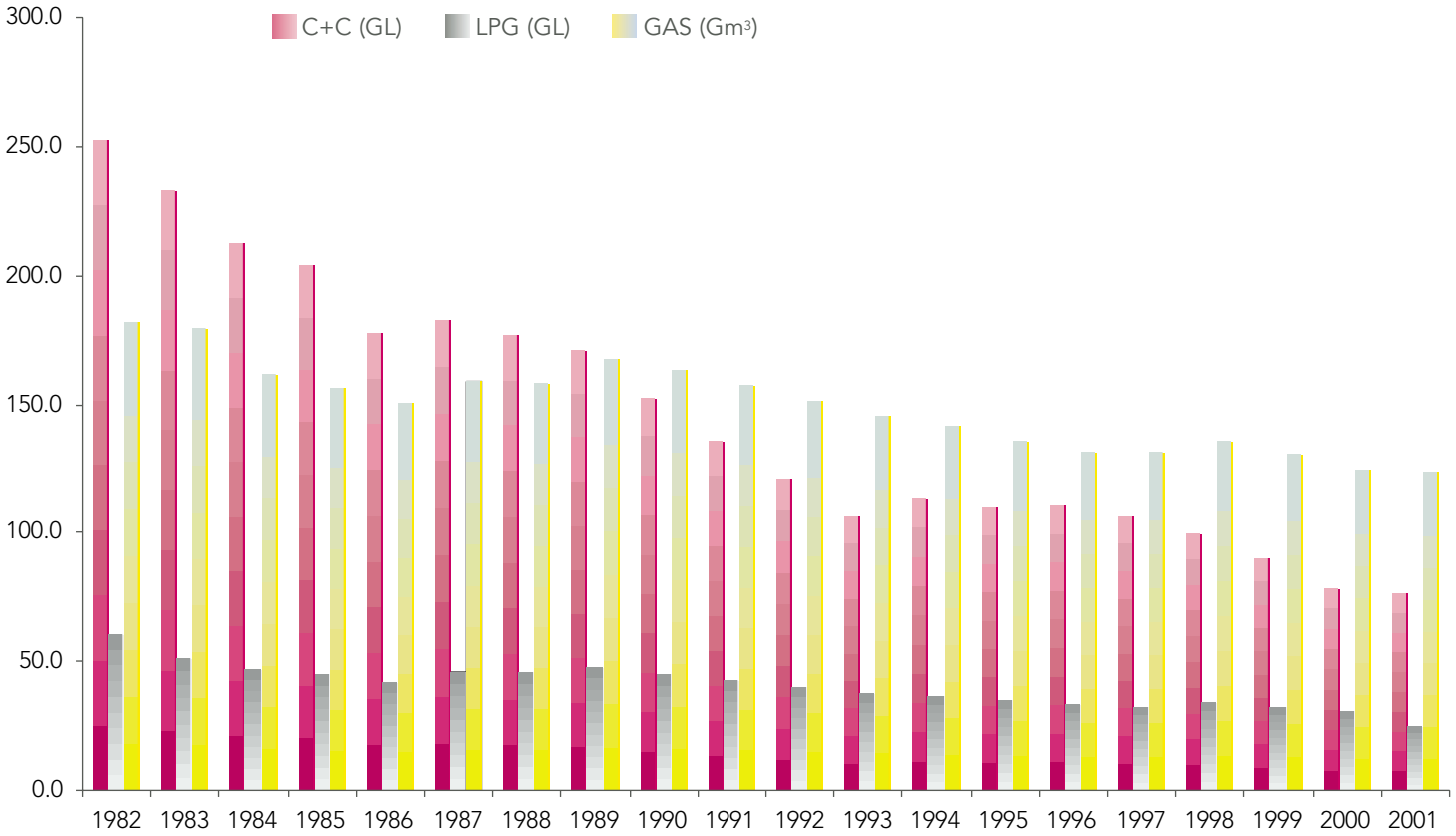


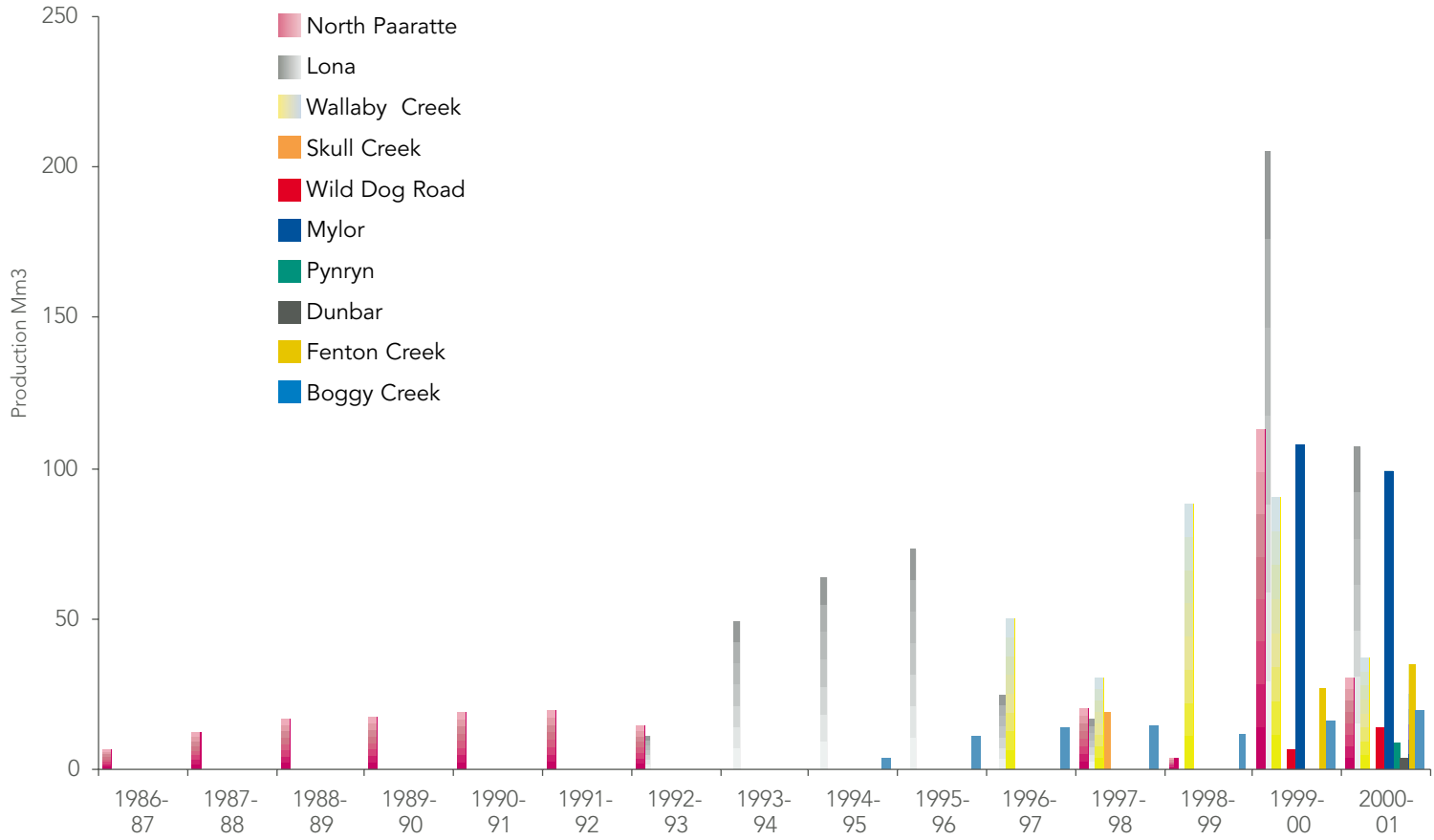
TABLE 6.1 OTWAY BASIN ANNUAL PRODUCTION

Year	North Paaratte		Iona		Wallaby Creek		Skull Creek		Wild Dog Road		Mylor		Penryn		Dunbar		Fenton Creek		Boggy Creek*	
	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl	Gas, Mm³	cond Kl
1986-87	6.4	108.9																		
1987-88	12.4	203.8																		
1988-89	16.5	274.3																		
1989-90	17.0	271.8																		
1990-91	19.0	300.3																		
1991-92	19.2	290.7																		
1992-93	14.6	220.7	10.7	244.9																
1993-94	0.1	0.0	49.0	1088.7																
1994-95	0.0	0.0	63.8	1568.1															3.4	0.1
1995-96	0.0	0.0	72.9	1771.6															10.7	4.1
1996-97	0.0	0.0	24.7	672.7	49.6	836.0	0.0	0.0											13.8	5.8
1997-98	19.9	328.3	16.3	335.6	30.7	466.7	19.1	0.0											14.5	7.5
1998-99	3.8	56.3			88.1	1881.2													11.8	7.1
1999-00	112.6	405.3	205.0	4248.1	90.1	1879.0			6.4	32.9	77.1	6146.8					26.6	1601.9	16.0	7.4
2000-01	30.5	383.6	106.8	2634.0	36.5	719.5			13.6	57.3	108.0	7235.7	8.8	257.3	3.5	175.1	34.5	1587.5	19.7	9.6

Source: Santos for : Mylor, Fanton 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 OxygenCompany (BOC) for: Boggy Creek

Wallaby Creek came on stream in September 1996. Maylor and Fenton Creek on August 1999, Wild Dog Road on January 2000
* Boggy Creek is primarily CO2 producer

GRAPH 12 VICTORIAN OTWAY BASIN GAS PRODUCTION (1986/87 - 2000/01)



GRAPH 13 VICTORIAN OTWAY BASIN CONDENSATE PRODUCTION (1986/87 - 2000/01)

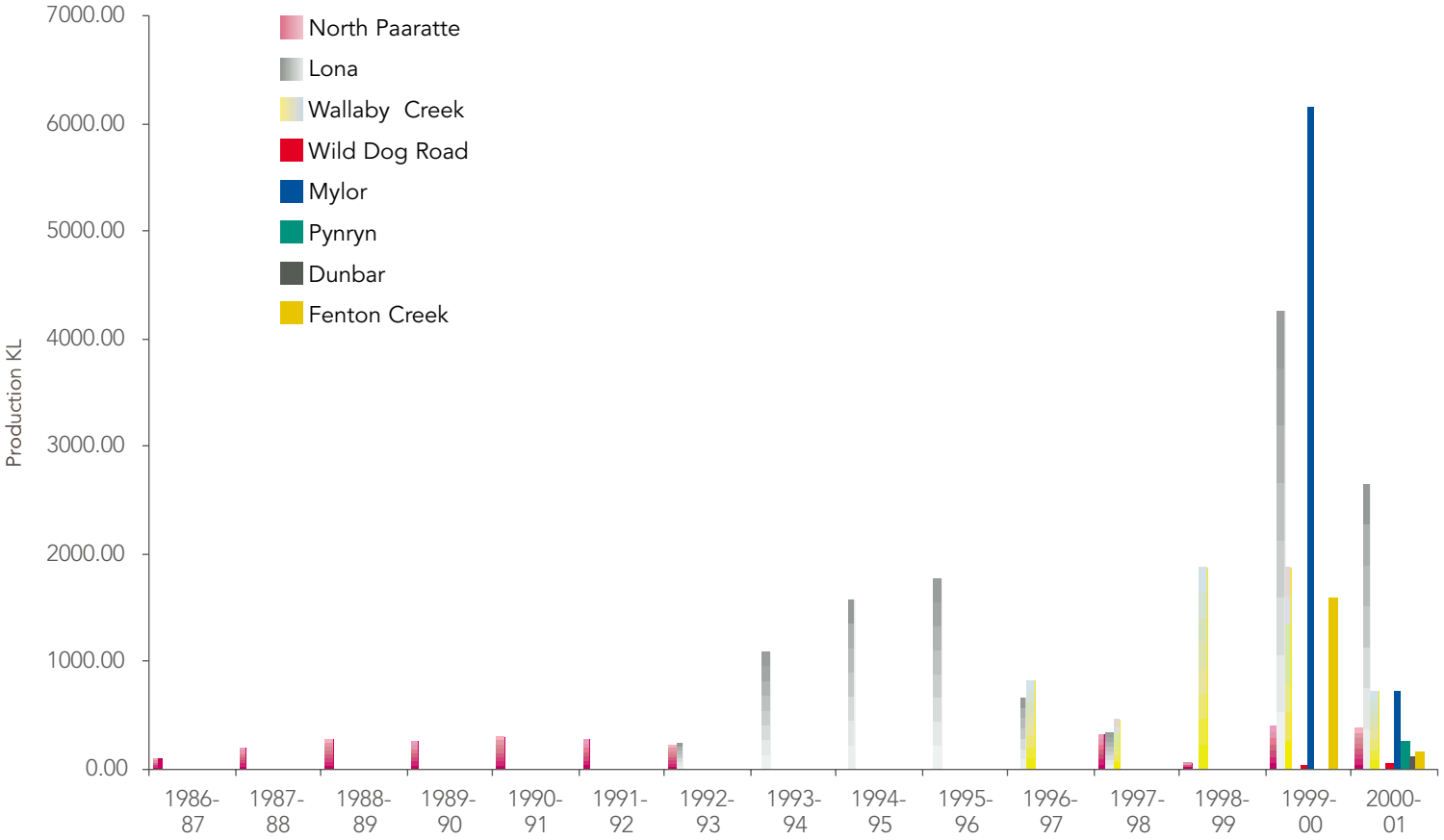


TABLE 6.2 OTWAY BASIN SALES GAS RESERVES STATUS (MM^3), JUNE 2001

Licence Area	Initial Reserves	Cumulative Production	Remaining Reserves
H/C gas in Port Campbell area, as listed bellow	2395.3	1370.4	1024.9
Boggy Creek (CO2 Producer)	396.4	63.6	332.8

Note: Producing fields in the Port Campbell area consist of Iona, North Paaratte, Wallaby Creek, Skull Creek, Boggy Creek, Fenton Creek, Mylor, Dunbar and Wild Dog Road.
The newly discovered fields in the onshore Port Campbell region are Tregoney, McIntee, Lavers, Croft and Naylor. These fields are not in production yet.
The total gas inplace for undeveloped offshore gas fields (Minerva, La Bella and Geograph) is estimated at about 1196.0 billion cubic feet (Bcf) or 33.1 billion cubic metres (Bm3).

TABLE 7.1 SEISMIC SURVEYS 2000/01

Region	Basin	Survey Name	Permit	Operator	Start	Kilometres
Onshore	Otway	Gipsys Creek	PEP 152 / 159	Origin	9-5-01	63.00 km
Onshore	Otway	Nirranda/Heytesbury	PEP 153 / 154	Santos	16-2-01	188.00 km2
Onshore	Gippsland	GBA01	PEP 131	Bass	27-2-01	67.74 km
Offshore	Gippsland	Scorpion	VIC/P41	Eagle Bay	20-6-01	449.72 km

Source : The above figures are collected from from reports forwarded to the Department of Natural Resources and Environment by permitholder under the provisions of the Petroleum Act 1985.

TABLE 7.2 SEISMIC SURVEYS 1984/85 - 2000/01

	Offshore Basin		Onshore Basin				
Year	Gippsland	Otway	Gippsland	Otway	Murray	No. of Surveys	Km Acquired
Pre 1984	54	23	33	60	0		
1984/85	5	2	0	8		15	10,130
1985/86	1	0	1	6		8	1,414
1986/87	0	2	0	6		8	477
1987/88	4	4	0	6		14	7,455
1988/89	9	2	0	3	1	15	7,838
1989/90	1	0	0	3		4	6,655
1990/91	1	2	3	3		9	11,384
1991/92	5	0	0	3		8	12,235
1992/93	4	0	0	6		10	50,946
1993/94	2	0	1	5		8	11,191
1994/95	4	0	0	3		7	20,073
1995/96	1	2	0	3	1	7	2,792
1996/97	0	0	2	4	0	6	301
1997/98	0	0	0	3	0	3	233
1998/99	4	0	0	0	0	4	1671
1999/00	1	1	3	3		8	1127
2000/01	1	0	1	2		4	768

Source : The above figures are collected from from reports forwarded to the Department of Natural Resources and Environment by operators under the provisions of the Petroleum (Submerged Lands) Acts 1967 (Commonwealth) & 1982 (State) and the Petroleum Act 1958.

GRAPH 14 SEISMIC SURVEYS - VICTORIA (1984/85 - 2000/01)

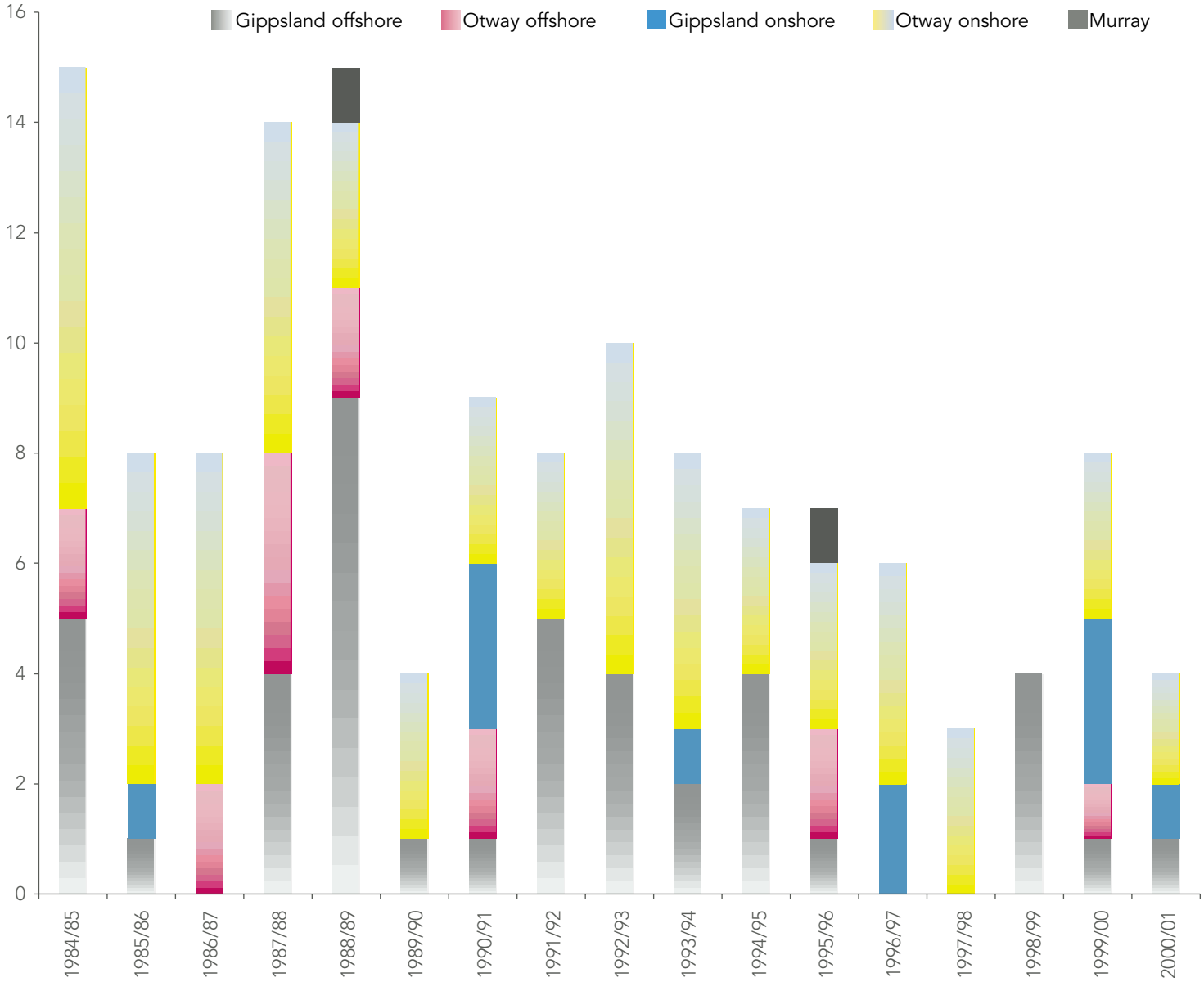


TABLE 8.1 EXPLORATION WELLS 2000 / 01

Region	Basin	Well Name	Spud Date	Operator	Tenement	Status	Total Depth (m)
Onshore	Otway	Tregony-1	27/2/01	Santos	PEP 153	Gas Discovery	1819
Onshore	Otway	Croft-1	30/03/01	Santos	PEP 154	Gas Discovery	2529
Onshore	Otway	Mclntee-1	10/2/01	Santos	PEP 154	Gas Discovery	1803
Onshore	Otway	Naylor-1	19/05/01	Santos	PEP 154	Gas Discovery	2157
Onshore	Otway	Lavers-1	26/04/01	Santos	PEP 154	Gas Discovery	1627
Offshore	Otway	S. Georgraphe-1	29/05/01	Origen / Woodside	VIC/P-43	Gas Discovery	2436
Onshore	Gippsland	Trifon-1	5/12/00	Lakes Oil	PEP 157	Gas Shows P+A	2600
Onshore	Gippsland	Gangell-1	26/01/01	Lakes Oil	PEP 157	Gas Shows P+A	2350
Offshore	Gippsland	Northright-1	25/04/01	Eagle Bay	VIC/P-41	P + A	391

Source : The above figures are collected from from reports forwarded to the Department of Natural Resources and Environment by operators under the provisions of the Petroleum (Submerged Lands) Acts 1967 (Commonwealth) & 1982 (State) and the Petroleum Act 1958.

TABLE 8.2 PETROLEUM EXPLORATIONS WELLS - VICTORIA 1984/85-2000/01

	offshore		onshore				
	Gippsland	Otway	Gippsland	Otway	Murray	wells	drilled (metres)
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

Source : The above figures are collected from from reports forwarded to the Department of Natural Resources and Environment by operators under the provisions of the Petroleum (Submerged Lands) Acts 1967 (Commonwealth) & 1982 (State) and the Petroleum Act 1958.

GRAPH 15 EXPLORATION WELLS - VICTORIA (1984/85 - 2000/01)

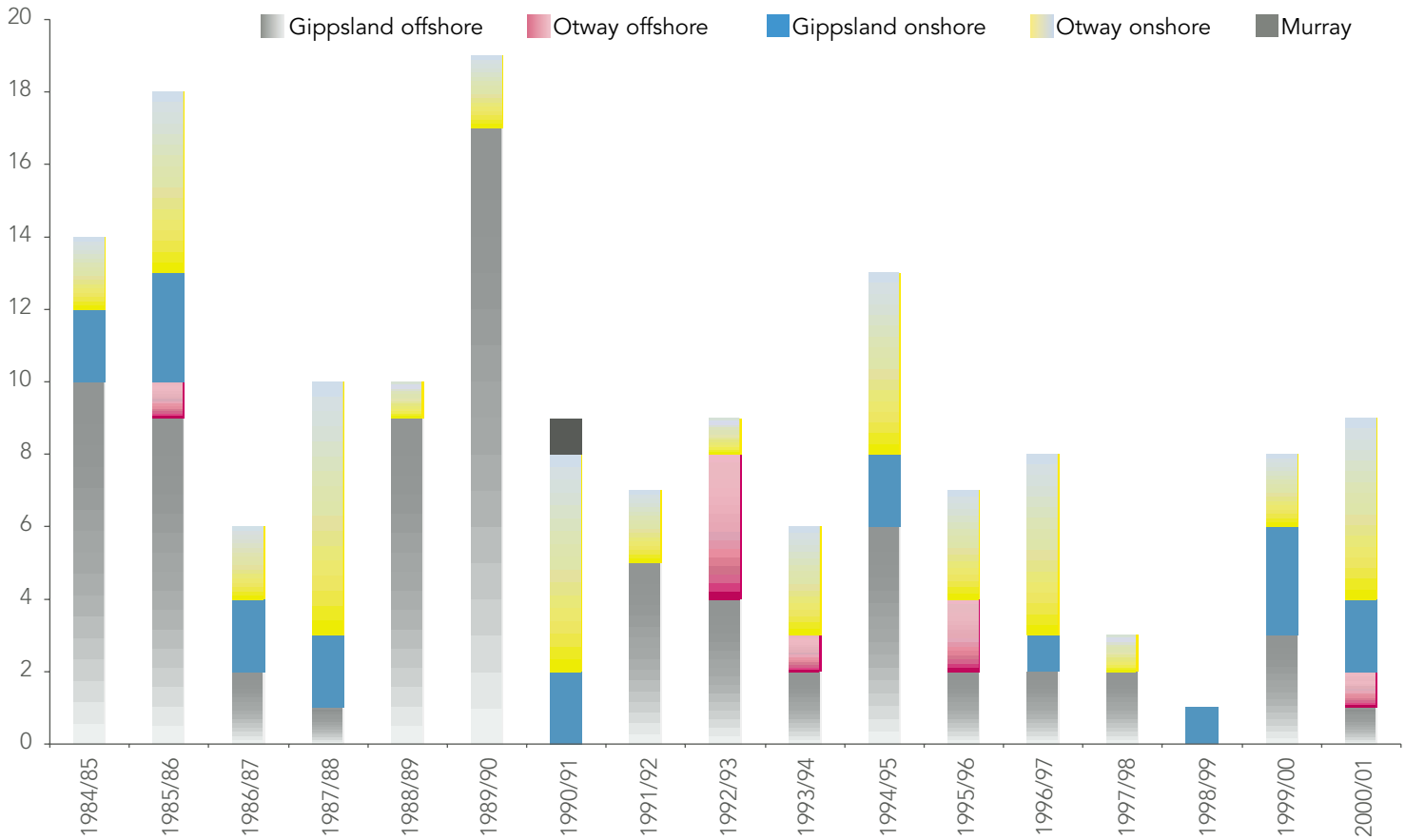


TABLE 9.1A DEVELOPMENT WELLS (OFFSHORE) - VICTORIA JULY 1999 - JUNE 2001

Region	Well	Spudd Date	Operator	Licence	Total Depth (m)
Offshore Gippsland	A-17A	27-Oct-00	Esso	VIC/L9	2880
Offshore Gippsland	A-20A	20-Dec-00	Esso	VIC/L9	2640
Offshore Gippsland	W-22	6-Jun-01	Esso	VIC/L4	2488
TOTAL METRES					8008

* A total of 8008 metres were drilled in Victoria by ESSO in offshore Gippsland Basin.

TABLE 9.1B DEVELOPMENT WELLS (ONSHORE) JULY 2000 - JUNE 2001

Region	Well	Spudd Date	Operator	Licence	Total Depth (m)
Onshore Otway	Dunbar DW1	19-Mar-01	Origin	VIC/PPL-1	1636
TOTAL METRES					1636

Source : The above figures are collected from from reports forwarded to the Department of Natural Resources and Environment by operators under the provisions of the Petroleum (Submerged Lands) Acts 1967 (Commonwealth) & 1982 (State) and the Petroleum Act 1958.

TABLE 9.2 DEVELOPMENT WELLS - VICTORIA 1984/85 - 1999/01

Year	Wells drilled	Annual Drilling (metres)
Pre 1984	499	N/A
1984/85	28	89664
1985/86	10	34320
1986/87	16	51221
1987/88	8	29613
1988/89	14	37783
1989/90	17	46369
1990/91	6	19551
1991/92	11	30664
1992/93	8	30021
1993/94	10	39810
1994/95	17	60469
1995/96	10	42519
1996/97	33	97678
1997/98	30	84823
1998/99	44	133166
1999/00	9	25915
2000/01	4	9644

Source : The above figures are collected from from reports forwarded to the Department of Natural Resources and Environment by operators under the provisions of the Petroleum (Submerged Lands) Acts 1967 (Commonwealth) & 1982 (State) and the Petroleum Act 1958.

TABLE 10 PETROLEUM EXPLORATION EXPENDITURE 1984/85-2000/01

	Onshore	Offshore	Total million A$
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

Source : The above figures are collected from from reports forwarded to the Department of Natural Resources and Environment by operators under the provisions of the Petroleum (Submerged Lands) Acts 1967 (Commonwealth) & 1982 (State) and the Petroleum Act 1958.

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

Petroleum exploration expenditure in Victoria in 2000/01 was A$ 77 million. During the year a total of nine exploration wells have been drilled, out of which five wells in onshore Otway Basin and two in onshore Gippsland Basin. In offshore region, two wells were drilled, one in Gippsland and one in Otway Basin. Data acquisition in onshore Otway Basin (Port Campbell region) comprises 188.0 km^2 3D + 63.0 km 2D and in Gippland Basin total of 517.43 Km 2D of which 449.73 Km 2D in offshore area and 67.7Km in onshore.

GRAPH 16 DEVELOPMENT WELLS - VICTORIA (1984/85 - 2000/01)

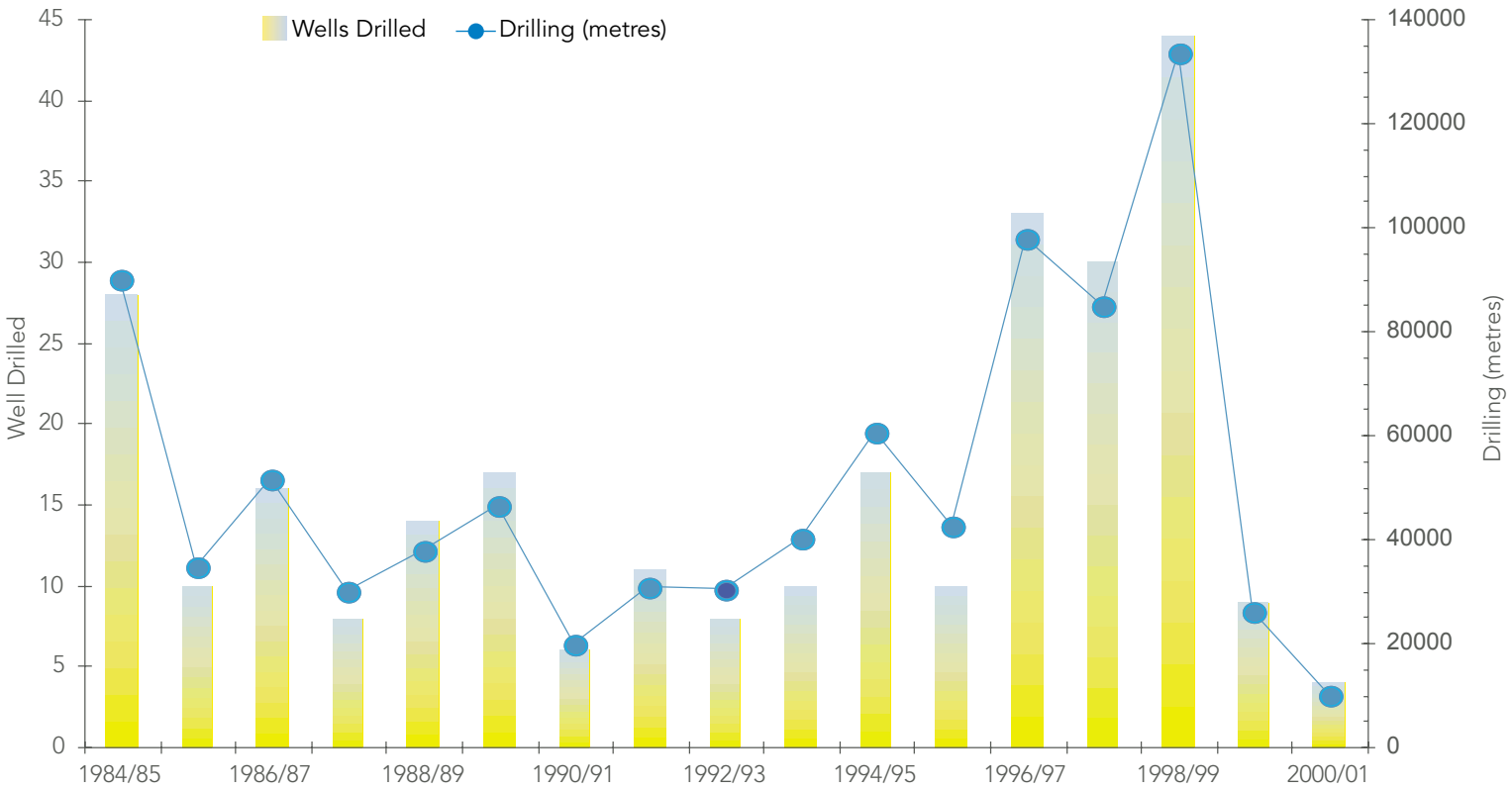


TABLE 11 OFFSHORE PETROLEUM SAFETY STATISTICS

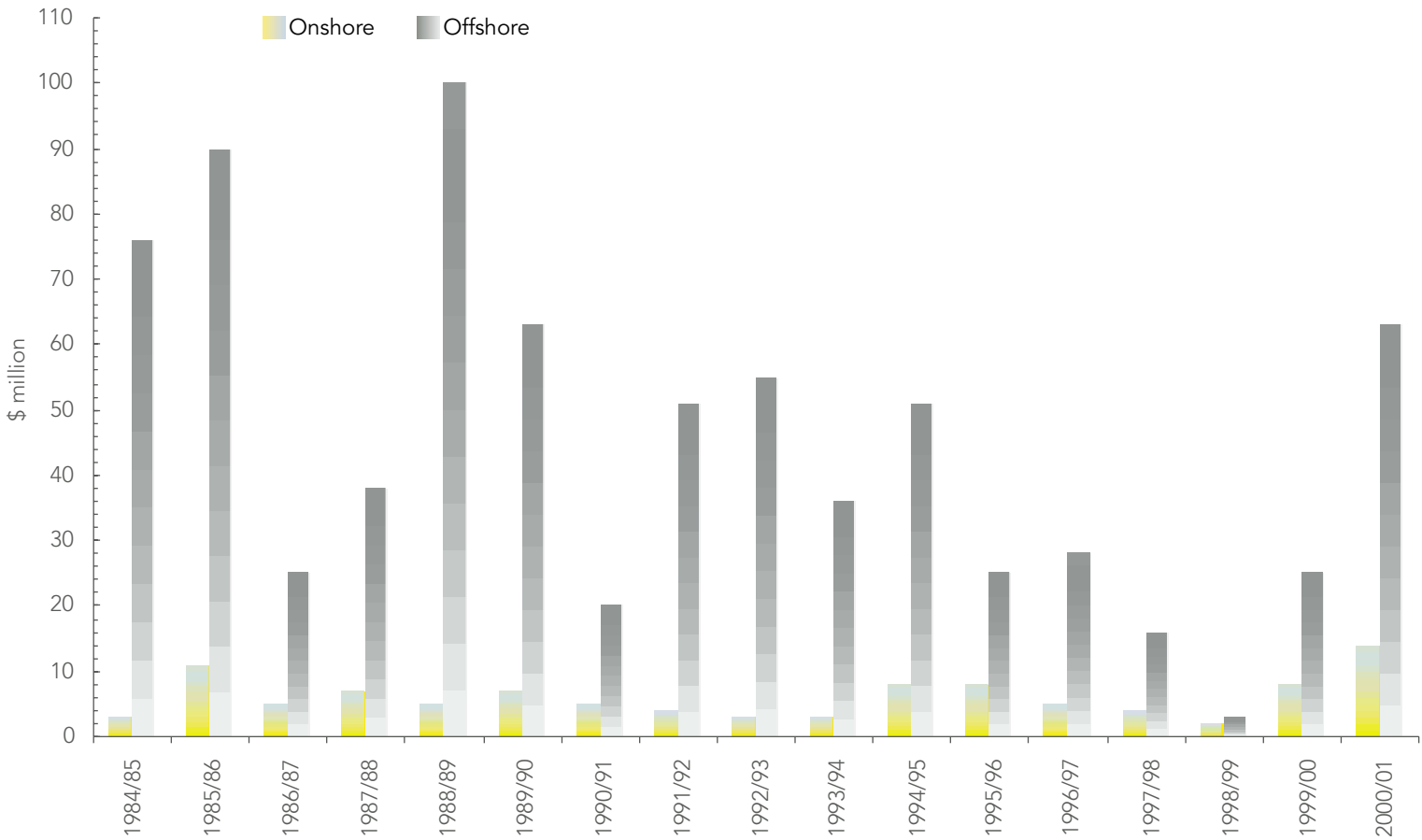
Year	Lost time Injuries
1989/90	39
1990/91	17
1991/92	8
1992/93	3
1993/94	2
1994/95	2
1995/96	0
1996/97	0
1997/98	0
1998/99	1
1999/00	1
2000/01	1

Source : Department records
Note: Based on monthly reports submitted by the petroleum industry

TABLE 12 BASS STRAIT OFFSHORE PETROLEUM SAFETY STATISTICS

	YEAR	EXPOSURE HRS CONTRACTORS	EXPOSURE HRS EMPLOYEES	TOTAL EXPOSURE HRS	INCIDENTS	LTI
TOTALS	1999/2000	1,652,796	332,066	1,984,862	10	1
TOTALS	2000/2001	1,786,488	374,696	2,161,184	5	1

GRAPH 17 PETROLEUM EXPLORATION EXPENDITURE - VICTORIA (1984/85 - 2000/01)



Extractive industries

TABLE 12.1A VICTORIAN EXTRACTIVE INDUSTRIES PRODUCTION AND SALES BY ROCK TYPE 2000/2001

Product Group	Product Type	Sales - Tonnes	Sales - $ value*
Hard Rock	Basalt new	9,760,571	$76,209,046
	Basalt old	4,001,480	$43,990,727
	Dolerite	101,326	$506,630
	Gneiss	28,454	$217,390
	Granite	3,026,099	$32,744,336
	Hornfels	3,402,548	$32,155,115
	Quartzite	52,883	$636,401
	Rhyodacite	1,051,756	$13,644,804
	Scoria	617,952	$6,360,107
	Sedimentary	1,462,700	$9,140,357
	Slate	1,233	$219,000
	Trachyte	22,934	$300.090
Hard Rock Total		23,529,936	$216,124,003
Soft Rock	Clay & clay shale	1,281,117	$3,214,987
	Limestone	2,551,741	$27,020,289
	Sand & gravel	9,537,010	$88,680,560
	Soil	133,697	$1,020,300
	Tuff	407,957	$1,747,932
Soft Rock Total		13,911,522	$121,684,067

* Where no data is supplied by the operator an estimated value is used.
Source: Statutory returns under the Extractive Industry Development Act 1995

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

TABLE 12.1B VICTORIAN EXTRACTIVE INDUSTRIES PRODUCTION AND SALES BY PRODUCT 2000/2001

Product Group	Product Type	Sales - Tonnes	Sales - $ value
Single size products	Aggregate	11,761,008	$117,177,442
	Armour	149,290	$1,583,248
Single size products Total		11,910,298	$118,760,690
Multi size products	Road_base	4,778,310	$44,520,792
	Road sub_base	7,058,531	$49,222,965
	Fill	1,258,193	$6,461,997
Multi size products Total		13,095,034	$100,205,754
Sand products	Concrete sand	4,274,730	$46,903,177
	Foundry sand	77,776	$661,314
	Fine sand	1,628,243	$13,093,911
Sand products Total		5,980,749	$60,658,403
Limestone Products	Cement	1,428,048	$7,849,244
	Agriculture	251,143	$4,192,606
	Lime	96,669	$862,189
Limestone Products Total		1,775,860	$12,904,039
Clay products	Brick	1,099,405	$2,798,578
	Firebricks	1,389	$26,896
	Tile/pipe	57,337	$180,559
	Stoneware	4,408	$66,120
Clay products Total		1,162,539	$3,072,153
Miscellaneous	Dimension stone	22,712	$756,649
	Product type not reported	3,494,266	$41,450,384
Miscellaneous Total		3,516,978	$42,207,033

Source: Statutory returns under the Extractive Industry Development Act 1995
Notes: Only operations reported under the Extractive Industries Development Act 1995 are included in the above Tables 12.1a and 12.1b.

TABLE 12.2 VICTORIAN DIMENSION STONE PRODUCTION 1991/1992 - 2000/01

	1991/92 Tonnes	1992/93 Tonnes	1993/94 Tonnes	1994/95 Tonnes	1995/96 Tonnes	1996/97 Tonnes	1997/98 Tonnes	1998/99 Tonnes	1999/00 Tonnes	2000/01 Tonnes
Basalt	7,292	4,497	5,607	11,845	10,065	2,000	6,060	-	19,063	20,868
Granite	8,061	7,474	5,235	5,213	5,516	4,405	1,821	2,572	3,462	588
Sandstone	-	1,535	857	902	196	1,400	256	1,295	343	23
Slate	-	-	625	780	730	977	1,130	1,058	538	1,233

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

Dimension stone production in 2000/01 was little different than the previous year reflecting steady market condition.

TABLE 13.1 STATUS OF CURRENT EXTRACTIVE INDUSTRY TITLES AT 30/6/2001

	At 30/6/2001		
	Proposal	Application	Granted
E I Search Permit	-	6	1
Work Authority	247	55	709
TOTAL	247	61	710

Sources: Department records.
Note: A Search Permit and Work Authority are granted under the Extractive Industries Development Act 1995 which commenced operation on 1 June 1996.

TABLE 14.1 EXTRACTIVE INDUSTRY SAFETY STATISTICS 1992/93 - 2000/01

Year	Lost Time Injuries (LTI's)	Employed*	Days Lost*	LTI Frequency Rate	LTI Incidence Rate	LTI Duration Rate	Severity Rate	Fatalities
1992/93	31	-	-	21.6	-	-	-	nil
1993/94	40	-	-	29.0	-	-	-	nil
1994/95	32	-	-	20.2	-	-	-	nil
1995/96	28	-	-	13.4-	-	-	nil	
1996/97	30	-	-	20.6	-	-	-	nil
1997/98	41	-	710	17.3	26.0	17.3	282.0	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

Sources: Departmental records
* Departmental records prior to 97/98 are incomplete
Note: Lost Time Injuries (LTI) - is defined as those occurrences that resulted in a fatality, permanent disability or time lost from work of one day/shift or more.
LTI Frequency Rate (Lost Time Injury Frequency Rate) - is defined as the number of occurrences of lost time injury for each one million hours worked.
Lost Time Injury Incidence Rate -is defined as the number of lost time injuries per thousand employees.
Lost Time Injury Duration Rate - is defined as the average days lost for every lost time injury.
Severity Rate - is defined as the number of days lost per one million hours worked.

GRAPH 17 EXTRACTIVE INDUSTRY SAFETY STATISTICS (1992/93 - 2000/01)

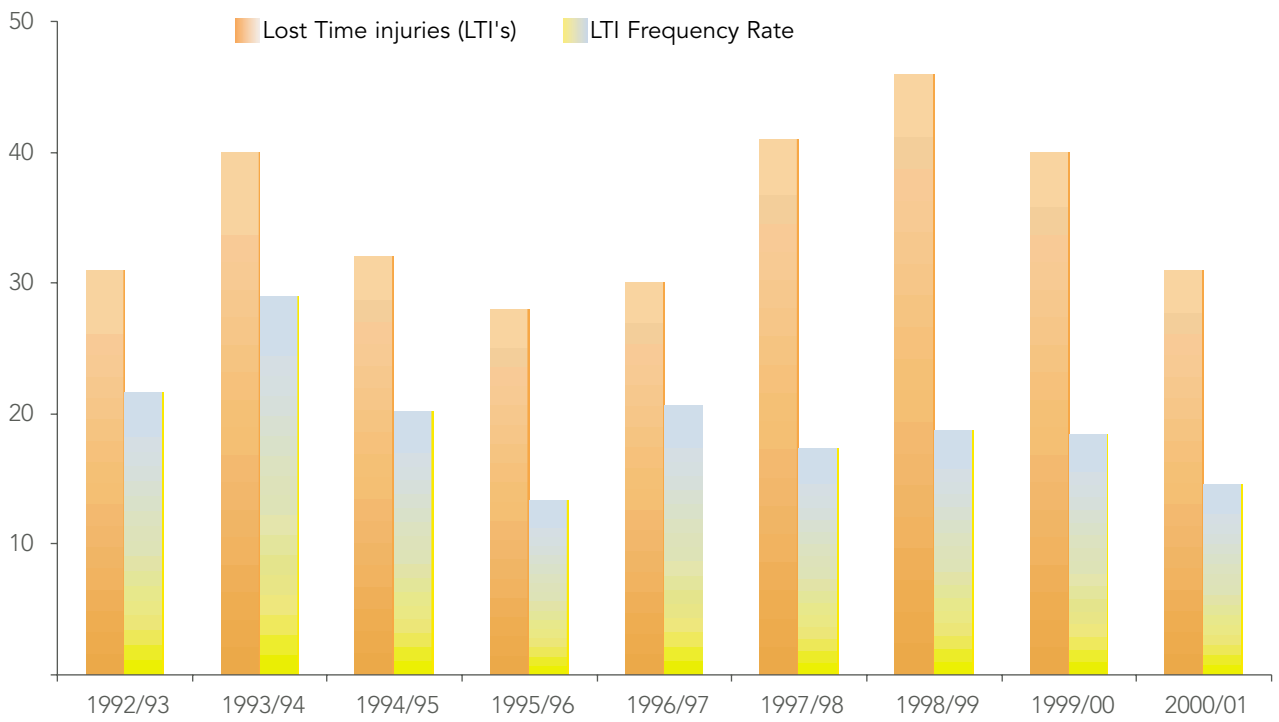


TABLE 14.2 EXTRACTIVE INDUSTRY MOST FREQUENT INJURIES (2000/01)

Injury	%
Open Wound	35
Fractures (excluding vertb. column)	29
Strains & Sprains	29
Foreign Particles in eye	7
Internal Injury of chest, abdomen and pelvis	2
Total	100

*Based on returns as at 1 December 2000.
Source: Department records.
Note: Based on reports submitted in AS1885.1 form.

Open wound, Fracture and Strains & Sprains are the dominant injury types reported for extractive industry in Victoria.

GRAPH 20 EXTRACTIVE INDUSTRY MOST FREQUENT INJURIES 2000/01

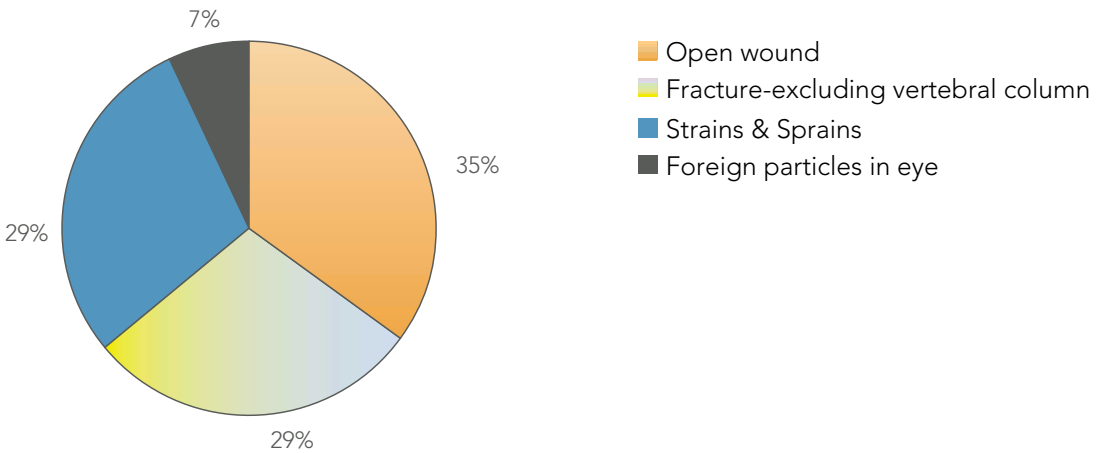


TABLE 15 MINERALS & PETROLEUM REGULATION - REVENUE 2000/01

Year	2000/01
Administration fees	$1,443,938
Rent (invoiced)	$3,201,303
Royalty	$4,960,764
Miscellaneous	$72,802
Total	$9,678,808

Source: DNRE Oracle financial system

GRAPH 21 MINERALS & PETROLEUM REGULATION REVENUE STREAM FOR 2000/2001

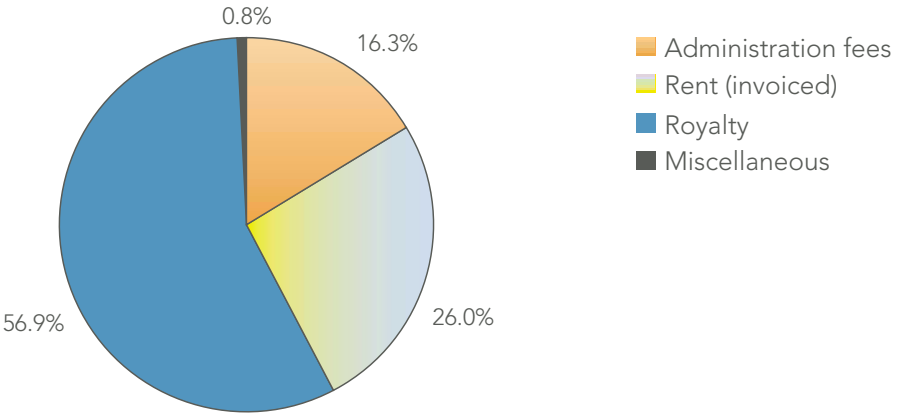


TABLE 16. REHABILITATION BONDS BY SECTOR - VALUE ($ MILLIONS) JUNE 99 - JUNE 01

				Total
June 99	1.504	53.154	20.203	74.861
June 00	1.279	53.262	22.782	77.323
June 01	1.234	57.434	31.392	90.060

TABLE 17 REHABILITATION BOND REVIEWS - 2000/01

		Result of Bond Review	
Number of Bonds Reviews			
370	94	270	6

Bond Reviews

The Department has a programme of regular bond review for active sites. Bonds are reviewed every 1 to 6 years depending on the risk associated with the operation.

Note: Bond Call-ins

The Department since 1995 has called-in 42 bonds. All of these operations except one have been mining licences. The bonds amounts have ranged from $800 to $135,000 and have been used to rehabilitate the land.